

Chesapeake
BAY CROSSING STUDY
TIER 2 NEPA

AGENCY CORRESPONDENCE

FINAL ENVIRONMENTAL IMPACT STATEMENT

APPENDIX C

OCTOBER 2026

MDTA
Maryland
Transportation
Authority

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Appendix C – Agency Correspondence

Agency	Page No.	Date	Subject
Advisory Council on Historic Preservation (ACHP)	1	6/1/2023	Invitation to Participate with Attachment
	5	8/6/2026	Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act Transmittal Letter
Anne Arundel County	6	5/11/2023	Anne Arundel County Agreement on Study Schedule
	7	6/2/2023	Invitation to Participate with Attachment
	11	6/23/2023	Anne Arundel County Response to Invitation to Participate
	12	2/19/2026	Anne Arundel County Comment Letter on the Draft EIS
	13	3/10/2026	Anne Arundel County Email Confirmation Letter Participating Agency Comments on the Draft EIS
	15	9/11/2026	Anne Arundel County Concurrence on the Preferred Alternative & Conceptual Mitigation (PACM)
Baltimore Metropolitan Council (BMC)	16	4/27/2023	BMC Agreement on Study Schedule
	17	6/2/2023	Invitation to Participate with Attachment
	21	6/5/2023	BMC Response to Invitation to Participate
	22	11/14/2023	BMC No Comments on Additional Foreseeable Effects (AFE, formerly Indirect and Cumulative Effects (ICE)) Methodology
	23	11/14/2023	BMC Comments on Air Quality Methodology
	24	2/29/2024	BMC Concurrence on Socioeconomics & Land Use (SELU) Methodology
	25	7/11/2024	BMC No Comments on Purpose & Need (P&N) Summary
	26	3/27/2025	BMC No Comments on Alternatives Retained for Detailed Study (ARDS)
	27	7/28/2026	Bay Bridge Amendment Approval
Critical Area Commission (CAC)	41	3/9/2026	CAC No Comments on the Draft EIS
	42	5/13/2026	CAC Concurrence on the PACM
Delaware Department of Transportation (DelDOT)	43	5/17/2023	DelDOT Agreement on Study Schedule
	44	6/2/2023	Invitation to Participate with Attachment
	48	6/20/2023	DelDOT Response to Invitation to Participate
	49	8/5/2024	DelDOT No Comments on Preliminary P&N
	50	3/5/2025	DelDOT No Comments on ARDS
Federal Aviation Administration (FAA)	51	5/17/2023	FAA Agreement on Study Schedule
	52	6/1/2023	Invitation to Participate with Attachment
	56	8/3/2023	FAA Response to Invitation to Participate
	57	7/10/2024	FAA No Comments on P&N Summary
	58	4/11/2025	FAA No Comments on ARDS
Federal Emergency Management Administration (FEMA)	63	5/24/2023	FEMA Agreement to Study Schedule
	64	6/1/2023	Invitation to Participate with Attachment
	68	7/18/2023	FEMA Response to Invitation to Participate
Federal Highway Administration (FHWA)	69	11/17/2023	FHWA Concurrence on Cultural Resources Methodology
	70	11/17/2023	FHWA Concurrence on AFE (formerly ICE) Methodology
FHWA	71	12/12/2023	FHWA Concurrence on Air Quality Methodology

Agency	Page No.	Date	Subject
	72	1/25/2024	FHWA Concurrence on Noise Methodology
	73	2/5/2024	FHWA Concurrence on Natural Environmental Technical Report (NETR) Methodology
	74	2/20/2024	FHWA Concurrence on SELU Methodology
	75	4/23/2025	FHWA Concurrence on ARDS
Federal Transit Administration (FTA)	76	6/1/2023	Invitation to Participate with Attachment
	80	6/23/2023	FTA Response to Invitation to Participate
Maryland Aviation Administration (MAA)	83	4/25/2023	MAA Agreement to Study Schedule
	84	6/2/2023	Invitation to Participate with Attachment
	88	6/5/2023	MAA Response to Invitation to Participate
	89	7/1/2024	MAA Concurrence on P&N Summary
	90	3/5/2025	MAA Concurrence on ARDS
Maryland Board of Public Works (MBPW)	91	5/25/2023	MBPW Agreement to Study Schedule
	93	6/2/2023	Invitation to Participate with Attachment
	97	7/17/2023	MBPW Response to Invitation to Participate
	98	8/13/2024	MBPW Comments on P&N Summary
	104	9/6/2024	MBPW Additional Comments on P&N Summary
Maryland Department of Emergency Management (MDEM)	110	6/2/2023	Invitation to Participate with Attachment
	114	6/7/2023	MDEM Response to Invitation to Participate
	115	6/22/2023	MDEM Agreement to Study Schedule
	116	6/28/2024	MDEM Concurrence on P&N Summary
Maryland Department of the Environment (MDE)	117	5/11/2023	MDE Agreement to Study Schedule
	118	6/2/2023	Invitation to be a Cooperating Agency with Attachment
	123	6/28/2023	MDE Response to Invitation to be a Cooperating Agency
	124	11/15/2023	MDE Concurrence on AFE (formerly ICE) Methodology
	125	12/20/2023	MDE Concurrence on Air Quality Methodology
	126	2/5/2024	MDE Concurrence on NETR Methodology
	127	2/29/2024	MDE Concurrence on SELU Methodology
	128	7/26/2024	MDE Concurrence on P&N Summary
	129	1/13/2025	MDE Notice of Intent (NOI) Scoping Comments
	131	3/31/2025	MDE Concurrence on ARDS
	132	3/9/2026	MDE Comments on the Draft EIS
	133	5/13/2026	MDE Concurrence with Comments on the PACM
Maryland Historical Trust (MHT)	135	4/26/2023	MHT Agreement to Study Schedule
	136	6/2/2023	Invitation to Participate with Attachment
	140	6/13/2023	MHT Response to Invitation to Participate
	141	8/9/2023	Notification of Continued Section 106 Consultation Activities
	146	8/22/2023	MHT Response to Continuation of Section 106 Consultation Activities
	147	11/13/2023	MHT No Comments on Cultural Resources Methodology
	148	7/12/2024	MHT No Comments on P&N Summary
	149	1/23/2026	MDTA Section 106 Effects Letter
	154	2/26/2026	MHT Concurrence on Section 106 Effects Assessment and Comments on Draft EIS
MHT	156	5/11/2026	MHT No Comments on the PACM
	157	5/9/2023	MDNR Agreement to Study Schedule

Agency	Page No.	Date	Subject
Maryland Department of Natural Resources (MDNR)	158	6/2/2023	Invitation to be a Cooperating Agency with Attachment
	163	6/14/2023	MDNR Response to Invitation to be a Cooperating Agency
MDNR	164	11/20/2023	MDNR Concurrence on AFE (formerly ICE) Methodology
	165	2/5/2024	MDNR Concurrence on NETR Methodology
	167	2/8/2024	MDNR Concurrence on SELU Methodology
	168	7/23/2024	MDNR Concurrence on P&N Summary
	169	1/13/2025	MDNR NOI Scoping Comments
	170	3/31/2025	MDNR Concurrence on ARDS
	172	8/6/2025	MDNR Comments on Potential Impacts to Sandy Point State Park
	174	10/8/2025	Comments on Preliminary Public Notice D05PPN-08-2025
	175	3/9/2026	MDNR Comments on the Draft EIS
	182	5/11/2026	MDNR Concurrence on the PACM
Maryland Department of Planning (MDP)	183	4/27/2023	MDP Agreement to Study Schedule
	184	6/2/2023	Invitation to Participate with Attachment
	188	6/5/2023	MDP Response to Invitation to Participate
	189	11/13/2023	MDP No Comments on AFE (formerly ICE) Methodology
	190	7/12/2024	MDP No Comments on P&N Summary
	193	1/13/2025	MDP NOI No Scoping Comments
	194	4/1/2025	MDP Comments on ARDS
	197	1/26/2026	MD State Clearinghouse Acceptance Letter for Intergovernmental Review of the Draft EIS
	200	3/9/2026	MDP Comments on the Draft EIS
	203	3/9/2026	MD State Clearinghouse Email Transmittal of Review and Recommendation Letter for the Draft EIS
	204	3/9/2026	MD State Clearinghouse Review and Recommendation Letter with Attachments for the Draft EIS
	212	5/11/2026	MDP No Comments on the PACM
Maryland Port Authority (MPA)	213	5/11/2023	MPA Agreement to Study Schedule
	214	6/2/2023	Invitation to Participate with Attachment
	218	6/26/2023	MPA Response to Invitation to Participate
	219	3/19/2024	Notification of NIR submittal to U.S. Coast Guard
	221	7/11/2024	MPA Comments on P&N Summary
	222	3/27/2025	MPA Comments on ARDS
Maryland State Highway Administration (MDSHA)	223	5/11/2023	MDSHA Agreement to Study Schedule
	224	6/2/2023	Invitation to be a Cooperating Agency with Attachment
	229	6/6/2023	MDSHA Response to Invitation to be a Cooperating Agency
	230	11/17/2023	MDSHA Concurrence on Cultural Resources Methodology
	231	11/17/2023	MDSHA Concurrence on AFE (formerly ICE) Methodology
	232	12/12/2023	MDSHA Concurrence on Air Quality Methodology
MDSHA	233	2/13/2024	MDSHA Concurrence on NETR Methodology
	234	2/26/2024	MDSHA Concurrence on SELU Methodology

Agency	Page No.	Date	Subject
	235	7/29/2024	MDSHA Concurrence on P&N Summary
	236	9/17/2024	MDSHA Concurrence on Noise Methodology
	237	1/13/2025	MDSHA NOI No Scoping Comments
	238	3/31/2025	MDSHA Concurrence on ARDS
	239	5/13/2026	MDSHA Concurrence on the PACM
Maryland Transit Administration (MTA)	240	5/25/2023	MTA Agreement on Study Schedule
	241	6/2/2023	Invitation to Participate with Attachment
	245	7/17/2023	MTA Response to Invitation to Participate
	246	7/12/2024	MTA No Comments on P&N Summary
	247	3/14/2025	MTA Comments on ARDS
National Oceanic and Atmospheric Administration (NOAA) Fisheries	248	5/12/2023	NOAA Fisheries Agreement to Study Schedule
	249	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	254	6/30/2023	NOAA Fisheries Response to Invitation to be a Cooperating Agency
	257	11/16/2023	NOAA Fisheries Concurrence on AFE (formerly ICE) Methodology
	258	2/5/2024	NOAA Fisheries Concurrence on NETR Methodology
	259	7/16/2024	NOAA Fisheries Concurrence on P&N Summary
	260	1/13/2025	NOAA Fisheries NOI Scoping Comments
	267	3/31/2025	NOAA Fisheries Concurrence on ARDS
	268	7/8/2025	NOAA Fisheries MMPA Coordination
	271	11/28/2025	FHWA Letter to Initiate Formal Section 7 Consultation and Essential Fish Habitat (EFH) Consultation
	274	3/6/2026	FHWA Official Request for EFH Consultation
	275	3/9/2026	NOAA Fisheries Comments on the Draft EIS
	279	3/18/2026	FHWA Official Request for Section 7 Consultation
	280	3/26/2026	NOAA Fisheries Sufficient Information for EFH Consultation
	281	5/6/2026	MDTA Essential Fish Habitat Assessment (Final Submittal)
	372	5/13/2026	NOAA Fisheries Concurrence on the PACM
	373	5/28/2026	MDTA Biological Assessment Atlantic Sturgeon, Shortnose Sturgeon, and Sea Turtles (Final Submittal)
	499	6/1/2026	NOAA Fisheries EFH Conservation Recommendations
	511	6/30/2026	FHWA Response to EFH Conservation Recommendations
	524	7/28/2026	FHWA Revised Response to EFH Conservation Recommendations
	534	7/30/2026	Confirmation of FHWA EFH Revised Response to EFH Conservation Recommendations
	538	8/10/2026	NOAA Fisheries Section 7 Biological Opinion
National Park Service (NPS)	756	5/9/2023	NPS Agreement to Study Schedule
	757	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	762	6/22/2023	NPS Response to Invitation to be a Cooperating Agency
	763	8/31/2023	NPS Response to Continuation of Section 106 Consultation Activities
NPS	764	11/20/2023	NPS Concurrence on Cultural Resources Methodology
	765	2/2/2024	NPS Concurrence on NETR Methodology

Agency	Page No.	Date	Subject
	766	2/28/2024	NPS Concurrence on SELU Methodology
	767	8/6/2024	NPS Concurrence on P&N Summary
	768	9/17/2024	NPS Concurrence on Noise Methodology
	770	1/13/2025	NPS NOI Scoping Comments
	773	3/11/2025	NPS Concurrence on ARDS
	774	5/4/2026	NPS Concurrence on the PACM
Natural Resources Conservation Service (NRCS)	775	5/16/2023	NRCS Agreement to Study Schedule
	776	6/1/2023	Invitation to Participate with Attachment
	780	9/11/2023	NRCS Response to Invitation to Participate
	781	5/26/2026	Farmland Protection Policy Act (FPPA) Farmland Impact Determination Request
	782	6/8/2026	NRCS FPPA Farmland Impact Determination
Queen Anne's County	789	5/31/2023	Queen Anne's County Agreement to Study Schedule
	790	6/2/2023	Invitation to Participate with Attachment
Queen Anne's County	794	6/5/2023	Queen Anne's County Response to Invitation to Participate
	797	1/25/2024	Queen Anne's County Comments on Noise Methodology
	798	3/9/2026	Queen Anne's County Comments on the Draft EIS
United States Army Corps of Engineers (USACE)	807	5/11/2023	USACE Agreement to Study Schedule
	808	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	813	6/16/2023	USACE Response to Invitation to be a Cooperating Agency
	814	11/22/2023	USACE Concurrence on AFE (formerly ICE) Methodology
	815	2/16/2024	USACE Concurrence on NETR Methodology
	816	7/26/2024	USACE Concurrence on P&N Summary
	817	1/13/2025	USACE NOI Scoping Comments
	835	4/7/2025	USACE Concurrence on ARDS
	836	3/9/2026	USACE Comments on the Draft EIS
	852	5/13/2026	USACE Concurrence with Comments on the PACM
U.S. Coast Guard (USCG)	855	5/16/2023	USCG Agreement to Study Schedule
	856	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	861	11/8/2023	USCG Response to Invitation to be a Cooperating Agency
	863	8/1/2024	USCG Concurrence on P&N Summary
	864	12/16/2024	Project Initiation Request (PIR) with Attachments
	875	4/2/2025	USCG Response to PIR
	877	4/3/2025	USCG Concurrence on ARDS
	879	4/9/2025	Navigational Impact Report (NIR) Transmittal Letter
	882	4/16/2025	USCG Receipt of NIR
	884	5/20/2025	USCG Acceptance of NIR
	887	9/29/2025	Preliminary Public Notice Certification Letter
	889	11/28/2025	Preliminary Navigation Clearance Determination Letter (PNCD)
	891	5/15/2026	USCG Concurrence on the PACM
United States Department of the Interior (USDOI)	892	3/9/2026	USDOI Comments on the Draft EIS
	898	5/11/2023	USEPA Agreement to Study Schedule

Agency	Page No.	Date	Subject
U.S. Environmental Protection Agency (USEPA) USEPA	899	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	904	6/29/2023	USEPA Response to Invitation to be a Cooperating Agency
	907	11/16/2023	USEPA Concurrence on Cultural Resources Methodology
	908	11/16/2023	USEPA Concurrence on AFE (formerly ICE) Methodology
	909	12/12/2023	USEPA Concurrence on Air Quality Methodology
	910	1/24/2024	USEPA Concurrence on Noise Methodology
	911	2/2/2024	USEPA Concurrence on NETR Methodology
	913	2/12/2024	USEPA Concurrence on SELU Methodology
	914	7/29/2024	USEPA Concurrence on P&N Summary
	915	1/13/2025	USEPA NOI Scoping Comments
	921	3/26/2025	USEPA Concurrence on ARDS
	922	3/9/2026	USEPA Comments on the Draft EIS
	924	5/7/2026	USEPA Concurrence on the PACM
United States Fish and Wildlife Service (USFWS)	925	5/11/2023	USFWS Agreement on Study Schedule
	926	6/1/2023	Invitation to be a Cooperating Agency with Attachment
	931	7/11/2023	USFWS Response to Invitation to be a Cooperating Agency
	932	11/15/2023	USFWS Concurrence on AFE (formerly ICE) Methodology
	933	2/5/2024	USFWS Concurrence on NETR Methodology
	934	7/29/2024	USFWS Concurrence on P&N Summary
	935	1/13/2025	USFWS NOI Scoping Comments
	936	3/31/2025	USFWS Concurrence on ARDS
	937	11/26/2025	FHWA Letter to Initiate Formal Section 7 Endangered Species Act Consultation
	939	3/4/2026	USFWS Concurrence on Biological Assessment Determination of Not Likely to Adversely Affect Northern Long-Eared Bat and Tricolored Bat
	942	5/13/2026	USFWS Concurrence on the PACM
	943	5/19/2026	MDTA Biological Assessment Northern Long-eared and Tricolored Bat (Final Submittal)
	1103	6/2/2026	USFWS Section 7 Consultation Reinitiation Not Required
	1104	9/17/2026	USFWS Endangered Species Act Section 7 Official Species List
U.S. Navy	1115	6/1/2023	Invitation to Participate with Attachment

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. Mandy Ranslow
FHWA Liasion
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington DC 20001-2637

Dear Ms. Ranslow:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's

response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

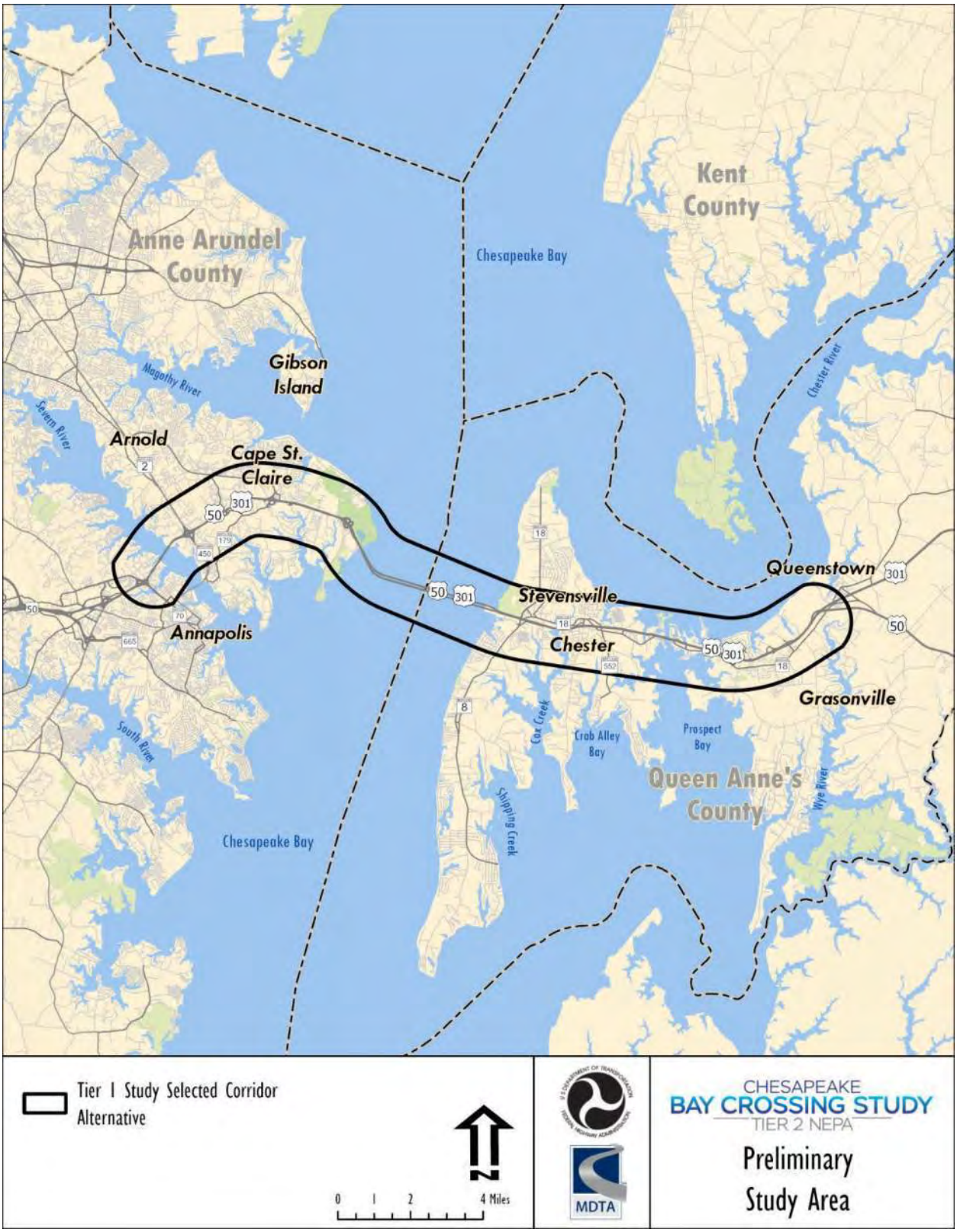
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 16:34:20 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

August 6, 2026

Valeriya Remezova
Division Administrator
Federal Highway Administration
Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201

Ref: *Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act for the Chesapeake Bay Crossing Study*
Anne Arundel and Queen Anne's Counties, Maryland
ACHP Case Number: 012490

Dear Ms. Remezova:

Enclosed is your copy of the fully executed Section 106 programmatic agreement (Agreement) for the referenced program of undertakings. By carrying out the terms of the Agreement, the Federal Highway Administration will fulfill its responsibilities under Section 106 of the National Historic Preservation Act and its implementing regulations, "Protection of Historic Properties" (36 CFR Part 800), for this program. Please ensure all consulting parties are provided a copy of the executed Agreement in accordance with 36 CFR § 800.14(b)(2)(iv).

If we can be of further assistance as the agreement is implemented, please contact Kasey Miller at kmiller@achp.gov or (202) 517-6389 and reference ACHP Case Number: 012490.

Sincerely,

Jaime Loichinger
Director
Office of Federal Agency Programs

Enclosure

DocuSign Envelope ID: 1948C2B1-6F45-4DB4-99A4-65E53D0510D3

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: Anne Arundel County, Maryland

_X_ **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: DocuSigned by: F18F9A5AA60D47F... Date: 5/11/2023 | 11:43 EDT

APPROVED FOR FORM & LEGAL SUFFICIENCY
GREGORY J. SWAIN, COUNTY ATTORNEY

DocuSigned by: 2CEB5C8084454A3... 5/11/2023 | 08:38 PDT

Senior Assistant County Attorney

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Sam Snead
Director of Transportation
Anne Arundel County
Heritage Office Complex
2664 Riva Road,
Annapolis, MD 21401

Dear Sam Snead:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.

3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

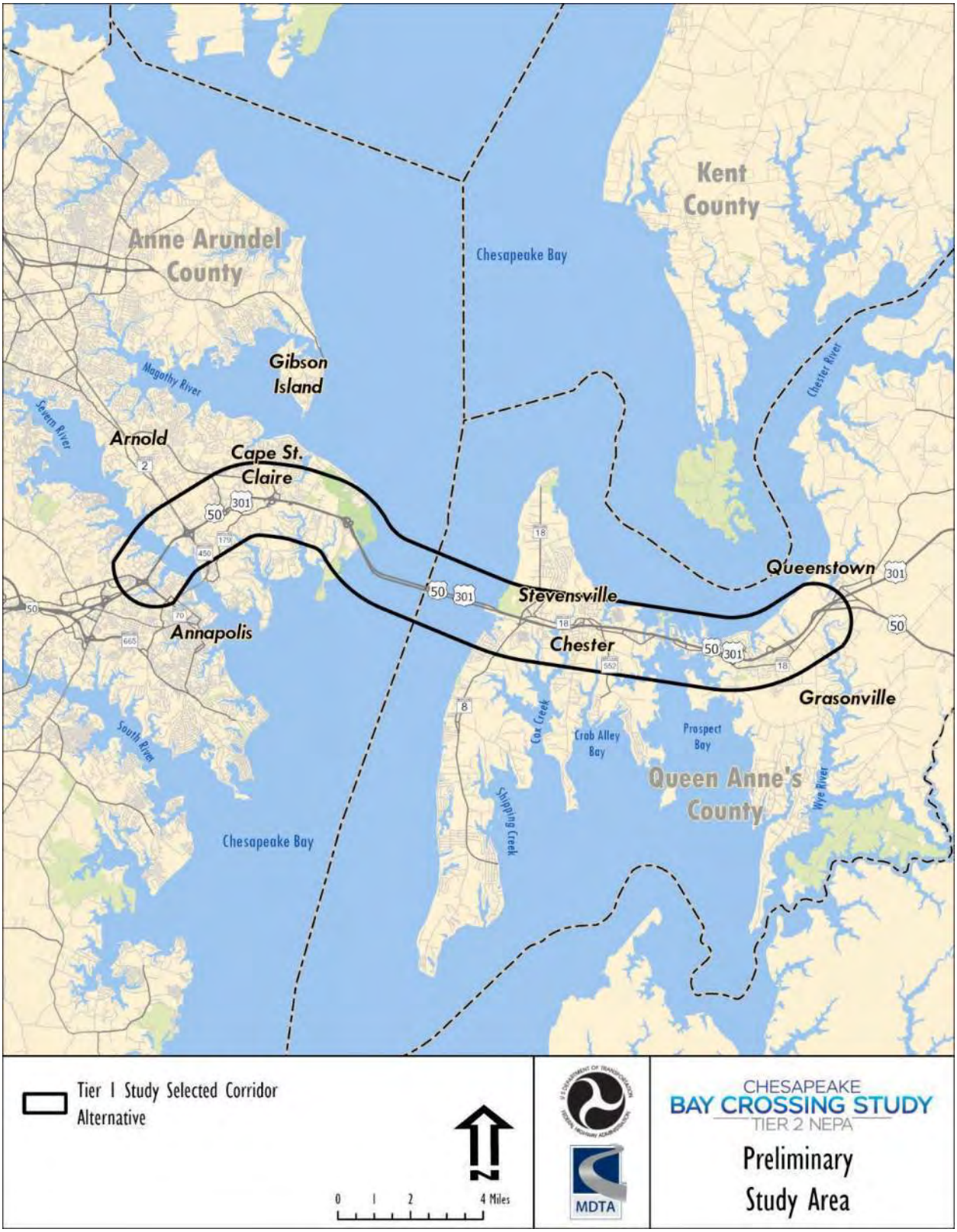


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Kelly Krinetz, Anne Arundel County, Planning Administrator (Critical Area)
Brian Ulrich, Anne Arundel County, Transportation Planning Administrator
Sarah Fowler, Anne Arundel County, Planning Administrator
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

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Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

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☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: ANNE ARUNDEL COUNTY, MARYLAND

Signature: DocuSigned by: F18F9A5AA80D47F... Date: 6/23/2023 | 15:23 EDT

Print Name: Christine Anderson

Title: Chief Administrative Officer

APPROVED FOR FORM AND LEGAL SUFFICIENCY
GREGORY J. SWAIN , COUNTY ATTORNEY

DocuSigned by: 2CEB5C8084454A3...
Jason E. Fettermann
Senior Assistant County Attorney

APPROVED FOR PROGRAM SUFFICIENCY

DocuSigned by: Samuel Snead F44E96A3181240E...
Samuel Snead
Director, Office of Transportation

ANNE ARUNDEL COUNTY
MARYLAND

Office of the County Executive
STEUART PITTMAN

February 19, 2026

The Honorable Katie Thomson
Acting Secretary of the Maryland Department of Transportation
7201 Corporate Center Drive
Hanover, MD 21076 - 0548

Dear Secretary Thomson:

As you and the other Board members of the Maryland Transportation Authority (MDTA) prepare to approve funding for the construction of the Chesapeake Bay Bridge, I wish to express our sincere support for protected shared use bike/pedestrian path and multimodal transit funding. I realize the monumental challenge of funding such an integral component but also want to emphasize the generational impact of the project. With supportive infrastructure for multimodal transportation on both the Western and Eastern Shore of the bridge there would be ample connectivity for non-motorists to commute as well as for recreational use. This linkage as well as an investment in bus transit infrastructure would also alleviate barriers which presently result in inequitable access for those who presently do not own a vehicle as there is limited transit available.

The Chesapeake Bay Bridge is vital to the economy of the State of Maryland, and having protected bike/pedestrian access is a goal of members of the Anne Arundel County Bicycle/Pedestrian Advisory Commission. By including a protected bike/pedestrian path into the design of the bridge, the MDTA would be supporting the removal of barriers for alternative modes of transportation as well as additional recreational tourism in the Central Maryland region for generations.

I encourage you and the MDTA Board to include a protected bicycle and pedestrian lane in the design of the future Chesapeake Bay Bridge facility.

Sincerely,

Steuart Pittman
County Executive

From:	Emma Beck
To:	Emma Beck
Subject:	RE: Anne Arundel County Comments on Bay Crossing Study Draft EIS and Preferred Alternative
Date:	Tuesday, March 10, 2026 1:14:10 PM
Attachments:	image001.png

From: Samuel Snead <trsnea19@aacounty.org>
Sent: Tuesday, March 10, 2026 11:35 AM
To: Sarah Williamson <sarahw@cri.biz>
Cc: Brian Ulrich <trulri44@aacounty.org>; info@baycrossingstudy.com; Karen Henry <pwhenr00@aacounty.org>; Heather Lowe <hlowe@mdta.state.md.us>
Subject: Re: Anne Arundel County Comments on Bay Crossing Study Draft EIS and Preferred Alternative

Yes, that is our intent.

On Tue, Mar 10, 2026 at 11:33 AM Sarah Williamson <sarahw@cri.biz> wrote:

> Hi Brian,
> The BCST2 did not receive any other participating agency comments from AA County during the DEIS comment period that we are aware of beyond this letter you sent last month. We are planning on considering this letter as AA County's comments on the DEIS. Based on the subject of your email, I am thinking this was indeed your intent. Please confirm you are OK with that approach.
> Thank you,
>
> **Sarah Williamson** | *Bay Crossing Study Team*
> Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
> 25 Old Solomons Island Road, Annapolis, MD 21401
> Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131
>
> 
>
>
> *WE'RE HIRING! – CLICK HERE*
>
> ---
>
> **From:** Brian Ulrich <trulri44@aacounty.org>
> **Sent:** Thursday, February 19, 2026 10:05 AM
> **To:** info@baycrossingstudy.com
> **Cc:** Samuel Snead <trsnea19@aacounty.org>; Karen Henry <pwhenr00@aacounty.org>; Sarah Williamson <sarahw@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>
> **Subject:** Anne Arundel County Comments on Bay Crossing Study Draft EIS and Preferred Alternative

Please see the attached formal comment letter from Anne Arundel County on the Bay Crossing Study Draft EIS and Preferred Alternative.

--

Brian Ulrich
Office of Transportation
Planning Administrator
2664 Riva Road
Annapolis, MD 21140

Office number: (410) 222-7711
www.aacounty.org

Docusign Envelope ID: 1BEEC43E-E171-8018-800B-7FCB524F4329

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: Anne Arundel County

X **Provides Comments (below or attached)**

____ Has No Comments

Comments:

Anne Arundel County reiterates its support for the Preferred Alternative and Conceptual Mitigation Package of the Chesapeake Bay Crossing Study. To ensure the project meets the safety and accessibility needs of the region, the County specifically requests the inclusion of the proposed bicycle and pedestrian path and local transit investments as part of the design and construction for the new span. This request is consistent with the formal position of the County Executive as s tated in the letter from February 2026.

Signature: DocuSigned by: F18F9A5AA60D47F... Date: 9/11/2026 | 11:28 EDT

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:** BALTIMORE METROPOLITAN COUNCIL
X **Agrees** with the **Study Schedule (without comments)** ____ **Agrees** with the **Study Schedule (with minor comments)*** ____ **Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: [signature] Date: April 27, 2023

Maryland Transportation Authority

Wes Moore, Governor
Aruna Miller, Lt. Governor
Paul J. Wiedefeld, Chairman

Board Members:
Dontae Carroll
William H. Cox, Jr.
William C. Ensor, III
W. Lee Gaines, Jr.
Mario J. Gangemi, P.E.
Cynthia D. Penny-Ardinger
Jeffrey S. Rosen
John F. von Paris

William Pines, P.E., Executive Director

In Reply Refer To:
Chesapeake Bay Crossing Study: Tier 2 NEPA; Invitation to Serve as a Participating Agency

June 2, 2023

Michael B. Kelly
Executive Director
Baltimore Metropolitan Council
1500 Whetstone Way
Suite 300
Balitmore, MD 21230-4767

Dear Michael B. Kelly:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.

3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

Sincerely,

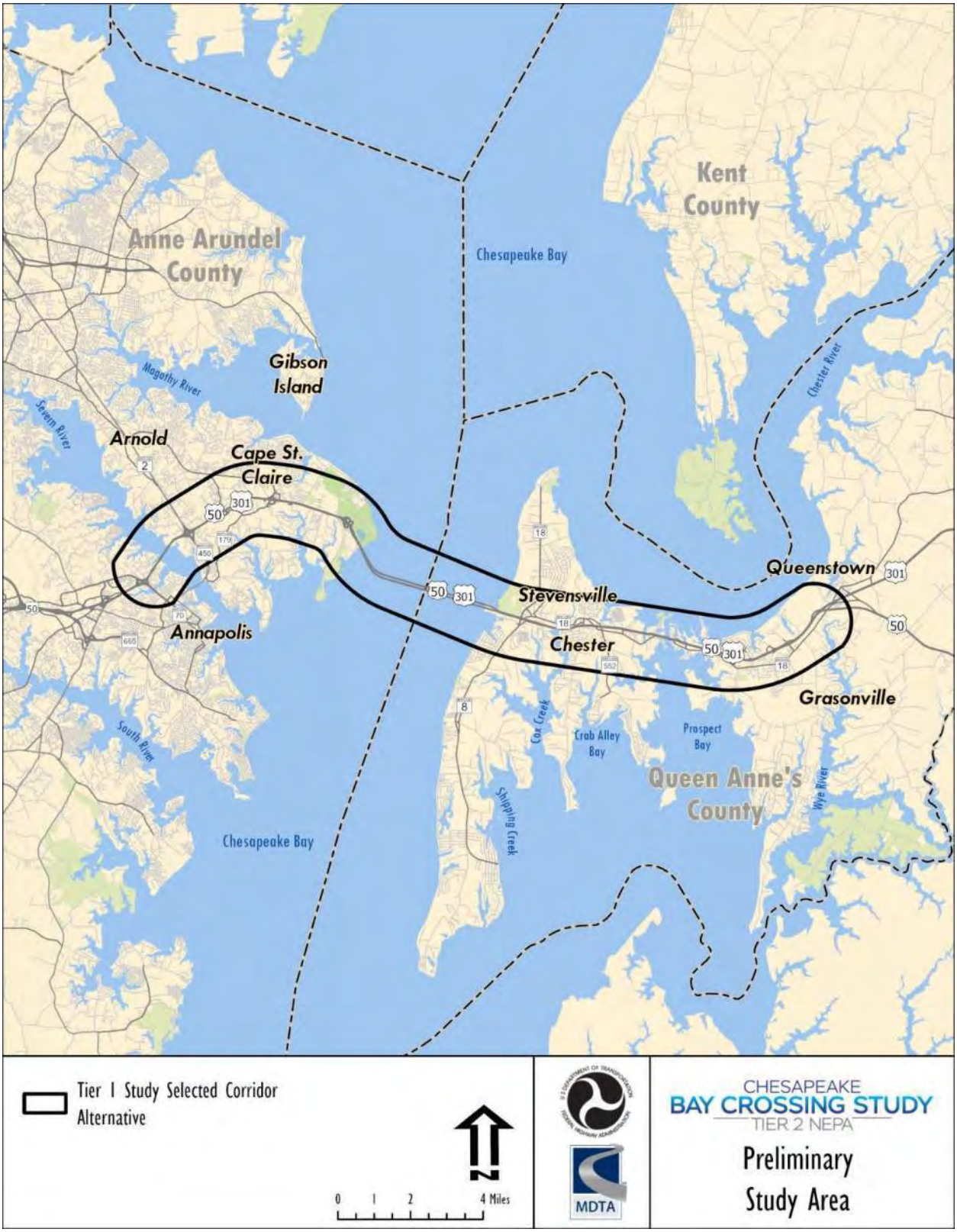


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Todd Lang, BMC, Director of Transportation Planning, Transportation Division
Regina Aris, BMC, Assistant Director, Transportation Planning Division
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Baltimore Metropolitan Council

Signature: [signature] Date: 6/5/23

Print Name: Michael B Kelly

Title: Executive Director

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

INDIRECT & CUMMULATIVE EFFECTS METHODOLOGY

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **INDIRECT & CUMMULATIVE EFFECTS METHODOLOGY** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the INDIRECT & CUMMULATIVE EFFECTS METHODOLOGY, the following agency (by signing this form):

Agency: Baltimore Metropolitan Council

___ **Provides Comments (below or attached)**

_✓_ **Has No Comments**

Comments:

Signature: Todd Lang Date: 11.14.23

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

AIR QUALITY METHODOLOGY

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **AIR QUALITY METHODOLOGY** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the AIR QUALITY METHODOLOGY, the following agency (by signing this form):

Agency: Baltimore Metropolitan Council

✓ **Provides Comments (below or attached)**

___ **Has No Comments**

Comments:

As noted in an earlier email, see page 3 and update the reference to the 2024-2027 TIP and to Resilience 2050.

The BRTB approved in July and FHWA & FTA concurred on 10/27/2023.

Signature: Todd Lang Date: 11.14.23

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:_ Baltimore Metropolitan Council _____**
_ ✓ _ **Concures** with the **Socioeconomics & Land Use Methodology (without comments)** **____ Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** **____ Does not agree** with the **Socioeconomics & Land Use Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _  __Todd Lang_____ Date: _February 29, 2024_____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests final review and any comments on the **Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose & Need Summary, the following agency (by signing this form):

Agency: Baltimore Metropolitan Council

____ **Provides Comments (below or attached)**

_✓_ **Has No Comments**

Comments:

Prior comments have been reflected in the Draft Purpose and Need Summary.

Signature: _____ Date: 7.11.24

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form):

Agency:____Baltimore Metropolitan Council_____

____ Provides Comments (below or attached)

_✓_ Has No Comments

Comments:

Signature: Todd Lang Date: 3/27/2025

July 28, 2026

Mr. Geoff Anderson, Chief
Office of Planning, Programming, and Delivery
Attn: Mr. Dan Janousek
Maryland Department of Transportation
7201 Corporate Center Drive
Hanover, MD 21076-1415

Dear Mr. Anderson:

Enclosed is an amendment to the 2023 Baltimore Region Transportation Plan, *Resilience 2050*, as approved by the Baltimore Regional Transportation Board (BRTB) on July 28, 2026. The documentation enclosed supports adding the U.S. 50/301 Bay Bridge Replacement Project to *Resilience 2050* concurrent with its inclusion in the *2027-2030 TIP*.

The amendment underwent a publicized 30-day public review from May 14, 2026 to June 15, 2026 with two public meetings and several presentations to BRTB subcommittees. Several comments were received on the amendment and the BRTB reviewed and responded to all comments. The Interagency Consultation Group has determined that the project is not exempt from the requirement to determine conformity according to the Conformity Rule. The project was included in the regional emissions analysis of the conforming *Resilience 2050* and *2027-2030 TIP* with the assumption of a year of operation of 2045. The Interagency Consultation Group has determined that implementation of the project will not worsen the region's air quality or delay the timely attainment of national air quality standards or interfere with implementation of any transportation control measures.

The Maryland Transportation Authority has affirmed that fiscal constraint for their program of projects remains intact.

Pursuant to the prescribed amendment process, the BRTB approved Resolution #27-2 to support this change to *Resilience 2050*.

If you have any questions, please feel free to call me.

Sincerely,



Todd R. Lang, Director
Transportation Planning

Enclosures

cc: Mr. Carl Chamberlin, MDTA
Ms. Heather Lowe, MDTA
Ms. Melissa Williams, MDTA
Mr. Shawn Burnett, Wilson T. Ballard
Ms. Michelle Martin, MDOT
Ms. Kari Snyder, MDOT
Mr. Zach Kaufman, BMC

BALTIMORE METROPOLITAN PLANNING ORGANIZATION

BALTIMORE REGIONAL TRANSPORTATION BOARD RESOLUTION #27-2

APPROVAL OF THE PREFERRED ALTERNATIVE FOR THE U.S. 50/301 BAY BRIDGE REPLACEMENT PROJECT AND AN AMENDMENT ADDING THE PROJECT TO THE 2023 BALTIMORE REGIONAL TRANSPORTATION PLAN (*RESILIENCE 2050*)

WHEREAS, the Baltimore Regional Transportation Board is the designated Metropolitan Planning Organization for the Baltimore region, encompassing the Baltimore Urban Area, and includes official representatives of the cities of Annapolis and Baltimore, the counties of Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's as well as representatives of the Maryland Department of Transportation, the Maryland Department of the Environment, the Maryland Department of Planning, the Maryland Transit Administration, and the RTA of Central Maryland; and

WHEREAS, the Baltimore Regional Transportation Board, as the Metropolitan Planning Organization for the Baltimore region, is required under the Infrastructure Investment and Jobs Act (IIJA) to complete a long-range transportation plan every four years for the Baltimore region; and

WHEREAS, the 2023 Baltimore Region Transportation Plan (*Resilience 2050*) was prepared to ensure its compliance with IIJA requirements and documented in the Metropolitan Transportation Planning regulations (May 27, 2016 *Federal Register*); and

WHEREAS, the Baltimore Regional Transportation Board, as the Metropolitan Planning Organization for the Baltimore region, approved *Resilience 2050* at its July 25, 2023 meeting, with federal approval on October 25, 2023; and

WHEREAS, Section 450.322 of the Final Metropolitan Transportation Planning Rules issued by the Federal Highway Administration and Federal Transit Administration on May 27, 2016 identifies the requirements of a congestion management process in transportation management areas. In TMAs designated as nonattainment for ozone or carbon monoxide, the congestion management process shall provide an appropriate analysis of reasonable (including multimodal) travel demand reduction and operational management strategies for the corridor in which a project that will result in a significant increase in capacity for SOVs is proposed to be advanced with Federal funds; and

WHEREAS, in October 1997, the Baltimore Regional Transportation Board approved Resolution #98-7, adopting a work program for the Congestion Management System (CMS) corridor implementation, now called the Congestion Management Process (CMP); and

WHEREAS, on February 27, 2024, the BRTB approved Resolution #24-14 endorsing the Bay Crossing Study Purpose and Need Statement which advanced consideration of alternatives to provide congestion relief and improve travel reliability, mobility and safety

across the Chesapeake Bay. Alternatives included a No Build Alternative and a range of build alternatives involving various alignments, crossing types and modal and operational alternatives; and

WHEREAS, on March 25, 2025 the BRTB then approved Resolution #25-22 endorsing the Alternatives Retained for Detailed Study (ARDS) which are the NEPA range of reasonable alternatives for evaluation in the Tier 2 Study EIS. The ARDS include the No-Build Alternative and six build alternatives. Each build alternative includes removing the existing eastbound and westbound bridge structures and replacing them with two new bridge structures constructed near the location of the existing bridges. The ARDS are differentiated by the number of lanes provided across the new bridge and on the approaches as well as the bridge location; and

WHEREAS, the Maryland Transportation Authority (MDTA) made a formal presentation at the State's Joint Evaluation Interagency Coordination Meeting on March 25, 2026 of their preferred alternative which consists of replacing the existing Bay Bridge spans with two new bridge spans over the Chesapeake Bay; both existing Bay Bridge spans would be removed (see description in Attachment); and

WHEREAS, the Maryland Department of Transportation (MDOT) on behalf of the MDTA has also requested approval of an amendment adding the U.S. 50/301 Bay Bridge Replacement project to *Resilience 2050* concurrent with the inclusion of engineering and right-of-way funds in the draft *RegionNow 2027* through the approved long-range plan amendment process; and

WHEREAS, the Baltimore Regional Transportation Board, as the Metropolitan Planning Organization for the Baltimore region, is considering approval of the 2027-2030 TIP, known as *RegionNow 2027*, for the Baltimore region concurrent with consideration of this amendment to *Resilience 2050*; and

WHEREAS, MDTA proposes to add the U.S. 50/301 Bay Bridge Replacement project to *Resilience 2050* with the following elements included in their recommended preferred alternative: A) Two new bridge spans with a total of eight travel lanes and full shoulders across the Chesapeake Bay, B) Widening U.S. 50/301 to eight lanes from west of Oceanic Drive to east of Cox Creek, C) Maintaining the existing roadway alignment and number of lanes on U.S. 50/301 beyond the lane transitions, D) Increasing vertical navigational clearance to 230 feet to meet U.S. Coast Guard requirements, E) An optional Shared-Use Path that would provide connectivity for bicyclists and pedestrians across the Bay Bridge, and F) Financial commitments for transit-related improvements; and

WHEREAS, 1) the estimated total cost of the U.S. 50/301 Bay Bridge Replacement project is $14.8 - $17.6 billion 2) the MDTA has identified the sources of reasonably anticipated funds for this project from expected toll revenues, and 3) MDOT, MDTA, and the BRTB have determined that sufficient funds are available to cover the estimated programmed cost of the project. Within this context, the Baltimore Regional Transportation Board has found that the proposed amendment complies with the fiscal constraint requirements for *Resilience 2050* and *RegionNow 2027*; and

WHEREAS, the U.S. 50/301 Bay Bridge Replacement project will add capacity to the transportation network and thus was included in the regional emissions analysis of the conforming *Resilience 2050* and *RegionNow 2027* (with the assumption of a year of operation of 2045); and

WHEREAS, The Interagency Consultation Group (ICG) has determined that implementation of the project will not worsen the region's air quality or delay the timely attainment of air quality standards or interfere with implementation of any transportation control measures (TCMs), consistent with the Conformity Rule (40 CFR Parts 51 and 93); and

WHEREAS, the proposed amendment to *Resilience 2050* was available online for a 30-day public comment period from May 14 – June 15, 2026 concurrent with the public comment period for *RegionNow 2027* with presentations made to BRTB subcommittees and a public meeting on May 28, 2026. Public comments were submitted and considered by the BRTB; and

NOW, THEREFORE, BE IT RESOLVED that the Baltimore Regional Transportation Board, as the Metropolitan Planning Organization for the Baltimore region, approves the preferred alternative and attached amendment to *Resilience 2050* for the U.S. 50/301 Bay Bridge Replacement project and finds it to conform to the applicable Maryland State Implementation Plan and requirements of the 1990 Clean Air Act Amendments.

I HEREBY CERTIFY that the Baltimore Regional Transportation Board, as the Metropolitan Planning Organization for the Baltimore region, approved the aforementioned resolution at its July 28, 2026 meeting.



7/28/2026
Date

Trey Dickerson, Chair
Baltimore Regional Transportation Board

Amendment to *Resilience 2050: Adapting to the Challenges of Tomorrow* and update to the FY 2027-2030 Transportation Improvement Program (TIP) with an Air Quality Conformity Determination

U.S. 50/301 Bay Bridge Replacement Project

Open for Public Comment: May 14 to June 15, 2026

This document describes a proposed amendment to *Resilience 2050: Adapting to the Challenges of Tomorrow*, approved July 25, 2023, and an update to the *2027-2030 Transportation Improvement Program* (TIP), called *RegionNow 2027*.

AMENDING *RESILIENCE 2050 TO ADD THE U.S. 50/301 Bay Bridge Replacement Project*

The Maryland Transportation Authority (MDTA) proposes to add a project to the long-range transportation plan (known as *Resilience 2050*) and to include the project in *RegionNow 2027*.

The table below shows details about this project.

Project	**U.S. 50/301 Bay Bridge Replacement**
Project Sponsor	Maryland Transportation Authority
Jurisdiction	Anne Arundel and Queen Anne's Counties
Project Limits	West of Oceanic Drive to east of Cox Creek
Description	Replace the existing Bay Bridge spans with two new bridge spans over the Chesapeake Bay; both existing Bay Bridge spans would be removed. The improvements would consist of: • Two new bridge spans with a total of eight travel lanes (four in each direction) and full shoulders across the Chesapeake Bay. • Widening U.S. 50/301 to eight lanes from west of Oceanic Drive to east of Cox Creek to allow sufficient room to transition from six lanes to eight lanes on the new bridge crossing. • Maintaining the existing roadway alignment and the number of lanes on U.S. 50/301 beyond the lane transitions west of Oceanic Drive and east of Cox Creek. • Increasing vertical navigational clearance to 230 feet to meet U.S. Coast Guard requirements. • An optional SUP that would provide connectivity for bicyclists and pedestrians across the Bay Bridge. • Financial commitments for transit-related improvements.
Expected Year of Operation	2038, first span; 2045 second span

Projected Cost	$14.8 - $17.6 billion – funded with MDTA funds
Justification	The purpose of the project is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor. The project will address multiple transportation issues: • The Bay Bridge has inadequate capacity for current and projected traffic volumes, particularly during summer weekends. • Congestion on the Bay Bridge reduces regional mobility and reliability, which is needed for accessing employment and recreation areas, moving commerce, and providing capacity for emergencies or evacuation events. • The bridge does not meet current standards for design or traffic operations. Maintenance activities and incident management often result in closed lanes, creating substantial congestion. • The existing Bay Bridge is a key constraint for the height of ships that can travel the Chesapeake Bay, including to the Port of Baltimore.

PROCESS REQUIRED FOR AMENDING *RESILIENCE 2050* AND *REGIONNOW 2027*

In response to federal law and regulations, the Baltimore Metropolitan Planning Organization (MPO), known as the Baltimore Regional Transportation Board (BRTB), has developed a dynamic process for amending *Resilience 2050* (the Regional Transportation Plan) and updating *RegionNow 2027* that meets federal requirements and involves participation from BRTB members and from the public at large. The process also requires that nonexempt (and regionally significant for air quality purposes) proposed project(s) undergo a formal air quality conformity analysis to ensure the plan retains its conformity status under the Clean Air Act Amendments of 1990 (CAAA). In addition, the BRTB must demonstrate that the plan is fiscally constrained. This means that the plan must identify specific committed or reasonably anticipated sources of funding for all programs and projects in the document.

Federal regulations require that the BRTB consider this amendment because **the project sponsor proposes a major new capacity-adding project** that was not included in the *Resilience 2050* document the BRTB adopted on July 25, 2023.

ASSESSMENT OF FISCAL CONSTRAINT

Federal law requires that the BRTB analyze projects proposed for inclusion in plans and programs to ensure that the fiscal resources required to construct them are reasonably expected to be available within the specified time frame. MDTA expects to use funding entirely from toll revenues. Based on the ability to proceed with the project without the need for federal funds or state funds, MDTA and the BRTB have determined that sufficient funds are available to cover the estimated programmed costs of this project that will apply beyond the time frame of *RegionNow 2027*. Within this context, the BRTB has found **the proposed amendment complies with the fiscal constraint requirements for both *Resilience 2050* and *RegionNow 2027***.

ANALYSIS OF AIR QUALITY CONFORMITY

Under the Clean Air Act Amendments, areas designated as being in nonattainment or maintenance of air quality standards are required to review their current transportation plans and programs to ensure they are in conformity with the applicable State Air Quality Implementation Plan (SIP). The Baltimore region is currently federally designated as a “serious” nonattainment area for ground-level ozone.

Federal law requires the MPO to analyze projects proposed for amendment to ensure they do not jeopardize the conformity of the plan under federal rules and guidelines. A technical process estimates the mobile source emissions associated with projected travel demand

considering the latest planning assumptions and the transportation network supply. The estimated mobile emissions are compared to the mobile vehicle emission budgets (MVEBs) contained in the State Implementation Plan (SIP) for the Baltimore region. The MVEBs contained in the SIP document, prepared by the Maryland Department of the Environment (MDE), are established through technical analysis with the goal of attaining and maintaining federal air quality standards.

The Interagency Consultation Group (ICG) has determined that the *U.S. 50/301 Bay Bridge Replacement Project* is nonexempt from the requirement to determine conformity, through review of the Transportation Conformity Rule (§93.126 and §93.127). This project will provide additional capacity to the transportation network. The ICG, consisting of representation from the MPO and the Maryland Departments of Transportation and the Environment, provided direction for how to move forward with the conformity determination. A conformity determination ensures that the implementation of the project in the *amended Resilience 2050* and *RegionNow 2027* does not worsen the region's air quality or delay the timely attainment of national ambient air quality standards. ***The conformity determination considers this amendment in addition to RegionNow 2027 (BRTB Resolution #27-3).***

To determine conformity to air quality improvement objectives delineated in the SIP, a regional emissions analysis was performed using EPA's MOVES 5 model. The projected emissions from the regional transportation network, considering the combined effect of the U.S. 50/301 Bay Bridge Replacement Project together with the conforming long range transportation plan (*Resilience 2050*) and *RegionNow 2027*, do not cause the Plan or TIP to exceed the SIP mobile source emission budgets. The results indicate that mobile source emissions associated with the implementation of projects contained in the amended *Resilience 2050* and *RegionNow 2027* are below established mobile source budgets for all affected horizon years.

Table 1 provides region-wide on-road emission estimates for four horizon years: 2026, 2035, 2045, and 2050. All years were tested since the U.S. 50/301 Bay Bridge Replacement Project is being amended into *Resilience 2050* concurrent with the project's inclusion in *RegionNow 2027*. Emissions resulting from the 2026, 2035, 2045, and 2050 networks are below SIP budgets for each pollutant.

Conformity Results: Implementation of these projects will not worsen the region's air quality or delay the timely attainment of national air quality standards or interfere with implementation of any transportation control measures (TCMs).

Table 1
Regional Emissions Analysis Results for ***Resilience 2050 and RegionNow 2027 with* U.S. 50/301 Bay Bridge Replacement Project *in 2045***
Network-Based Analysis Ozone Precursor Mobile Source Emissions
(average summer weekday, tons/day)

	Implementation		**Motor Vehicle Emissions Budgets**[1]	
	VOC	**NO_x**	**VOC**	**NO_x**
2026	13.794	17.056	17.47	35.26
2035	9.442	7.358	17.47	35.26
2045	5.949	3.950	17.47	35.26
2050	5.258	3.579	17.47	35.26

1 2023, 8-hour ozone MVEB for the Baltimore region (motor vehicle emission budgets determined adequate by EPA on August 18, 2023)

PUBLIC COMMENT OPPORTUNITIES

As mandated by federal law, the BRTB conducted a 30-day review from May 14 to June 15, 2026 on the proposed *Resilience 2050* amendment, *RegionNow 2027*, and the related Conformity Determination. Information was placed on the Baltimore Metropolitan Council website, provided to local planning agencies, and distributed to local media and interested parties.

PUBLIC REVIEW / COMMENT PERIOD

The BRTB conducted a 30-day review and comment period for the enclosed plan amendment, *RegionNow 2027*, and Conformity Determination (see information about open house public meeting below). See Appendix G of *RegionNow 2027* for a summary of public comments and BRTB responses (when available).

The BRTB will meet on Tuesday, July 28 at 9 A.M. at the Baltimore Metropolitan Council (1500 Whetstone Way, Suite 300, Baltimore, MD 21230) to consider approval of the associated amendment to *Resilience 2050* and *RegionNow 2027*, with an air quality Conformity Determination. A virtual option will also be available via zoom.

OPEN HOUSE PUBLIC MEETING

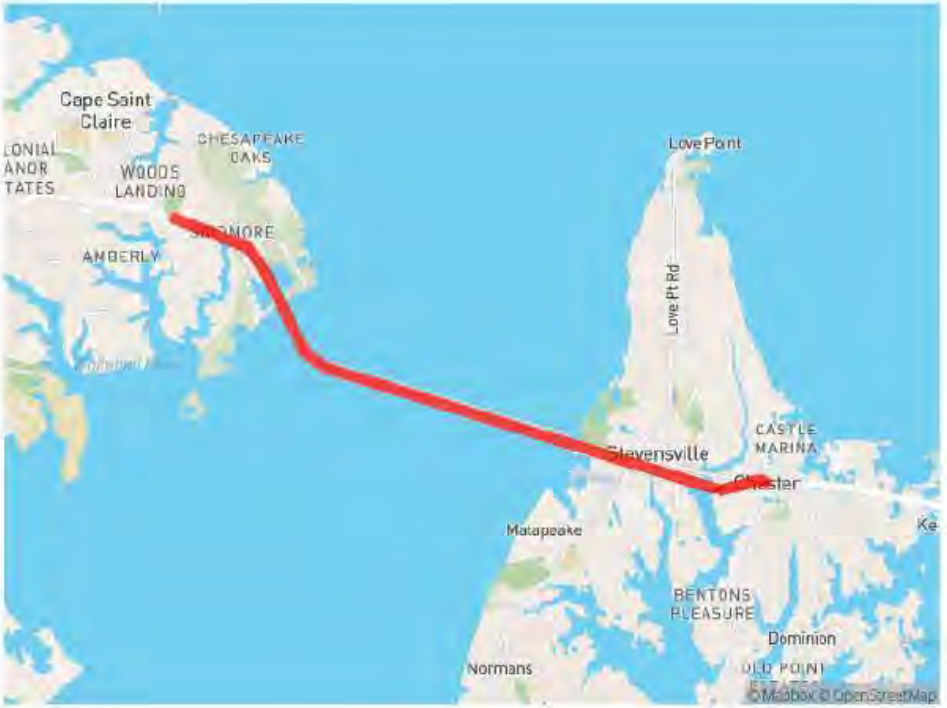
The BRTB invited the public to attend the following public meeting relative to *RegionNow 2027* and the amendment to *Resilience 2050*. The meeting location was ADA-accessible for people with disabilities.

Date and Time	***Location***
Thursday, May 28, 2026 from 5:30 – 7:30 pm	Queen Anne's County Library Kent Island Branch 200 Library Circle Stevensville, MD 21666

20-2601-44 - U.S. 50/301 Bay Bridge - Replacement

This project is for the remainder of the Chesapeake Bay Crossing Study and the future bridge replacement. The Chesapeake Bay Crossing Study: Tier 2 NEPA is the second stage of the two-tiered federally required National Environmental Policy Act (NEPA) process. The future project will include replacement of the existing Chesapeake Bay Bridge with two new four lane bridge spans; increasing the Chesapeake Bay Bridge capacity from five lanes to eight lanes; expanding U.S. 50/301 at the tie-ins to the Chesapeake Bay Bridge from six lanes to eight lanes; and removing the existing Chesapeake Bay Bridge. Funding for this project will come from 100% Toll Revenues during the plan years.

Project Benefits:	This project addresses existing and future transportation capacity needs and access across the Chesapeake Bay at the Chesapeake Bay Bridge approaches along U.S. 50/301. The project addresses multiple issues: •The Bay Bridge has inadequate capacity for current and projected traffic volumes. •Increases in congestion reduce regional mobility and reliability. •The bridge does not meet current standards for design or traffic operations. Maintenance activities and incident management often result in closed lanes, creating substantial congestion. •The existing Bay Bridge is a key constraint for the height of ships that can travel the Chesapeake Bay, including to the Port of Baltimore.
Project Changes:	-
Agency:	Maryland Transportation Authority
Year of Operation:	2045
Project Category:	Highway Capacity
Project Type:	New bridge/elimination of at-grade crossing (HC)
Conformity:	Not Exempt
Functional Classification:	Other Principal Arterial
CIP ID:	-
CTP ID:	MDTA-31
Route/Road Name:	US 50/301
Length:	6.0 mi
Existing Lanes:	5
Proposed Lanes:	8
Estimated Total Cost:	$17,600,000,000
Connection to Long-Range Transportation Planning Goals:	2.A Improve and Maintain the Existing Infrastructure – Preserve and maintain the condition of roadway and transit systems through performance based planning and programming, 3.F Improve Accessibility – Improve system connectivity and continuity among all modes and across geographic boundaries, 7.C Promote Prosperity and Economic Opportunity – Concentrate transportation investments in state and local designated growth areas



Phase	Fund Source	FY2027	FY2028	FY2029	FY2030	Total
ENG	Toll Revenue	$2,000,000	$6,000,000	$6,000,000	$0	$14,000,000
Total ENG		$2,000,000	$6,000,000	$6,000,000	$0	$14,000,000
ROW	Toll Revenue	$0	$2,000,000	$2,000,000	$0	$4,000,000
Total ROW		$0	$2,000,000	$2,000,000	$0	$4,000,000

Phase	Fund Source	FY2027	FY2028	FY2029	FY2030	Total
Active TIP Years		$2,000,000	$8,000,000	$8,000,000	$0	$18,000,000
Total Prior Costs		$0	$0	$0	$0	$7,000,000
Total Programmed		$2,000,000	$8,000,000	$8,000,000	$0	$25,000,000

From:	Sarah Williamson
To:	Emma Beck
Subject:	FW: BCST 2 - DEIS Comments
Date:	Monday, March 9, 2026 5:42:46 PM

From: Kathryn Durant <kathryn.durant@maryland.gov>
Sent: Monday, March 9, 2026 4:29 PM
To: hlowe@mdta.state.md.us
Cc: Sarah Williamson <sarahw@cri.biz>; Jennifer M Esposito -DNR- <jennifer.esposito@maryland.gov>
Subject: BCST 2 - DEIS Comments

Hi Heather and Sarah,

Our office has reviewed the BCST DEIS and does not have any comments at this time. We understand that there will be impacts to the Critical Area that will need to be mitigated, and we will comment on the specific impacts and mitigation plans after they are finalized and submitted to our office for review.

Thank you for your time.
Best,
Kate

Critical Area Commission

Chesapeake & Atlantic Coastal Bays

dnr.maryland.gov/criticalarea

Kate Durant

Critical Area Commission for the Chesapeake & Atlantic Coastal Bays

1804 West Street, Suite 100

Annapolis, MD 21401

410.260.3477 (office)

443.454.8064 (cell)

kathryn.durant@maryland.gov

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form): **Agency:___Critical Area Commission**
__X__ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)** **____ Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)*** **____ Does not agree** with the **Preferred Alternative & Conceptual Mitigation*** ***If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Kathryn Durant Date: 5/13/26

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: Delaware Department of Transportation

X **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: _____ Date: 5/17/23

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Pamela Steinebach
Director of Planning
Delaware Department of Transportation

Dear Pamela Steinebach:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.

5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

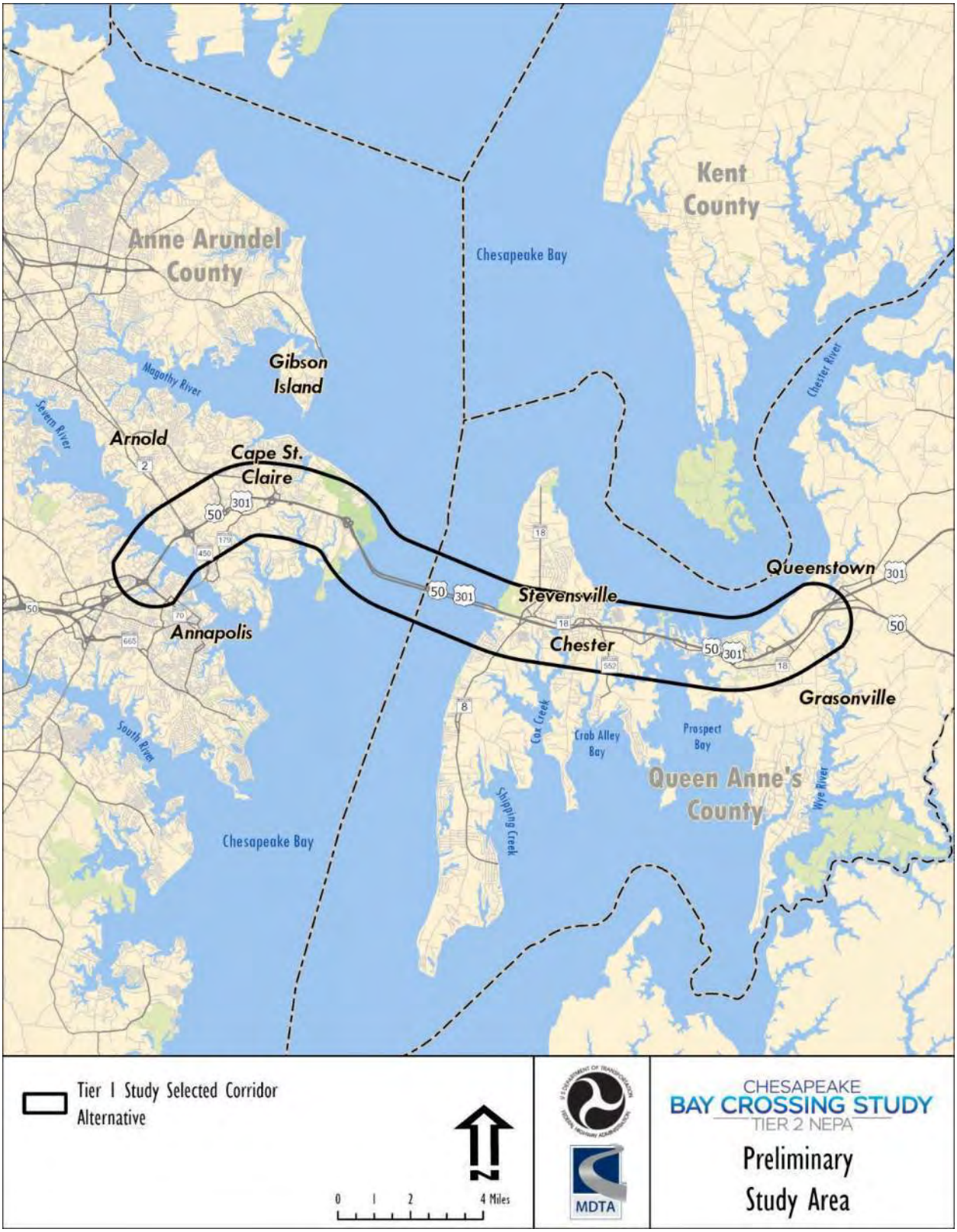


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

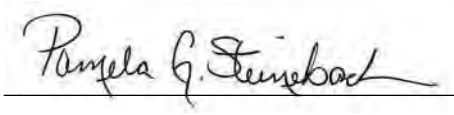
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Delaware Department of Transportation

Signature:  Date: 6/20/23

Print Name: Pamela Steinebach

Title: Director of Planning

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

PRELIMINARY PURPOSE & NEED

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests final review and any final comments on the **Preliminary Purpose & Need** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Preliminary Purpose & Need, the following agency (by signing this form):

Agency:_____Delaware Department of Transportation

_____

____ Provides Comments (below or attached)

__X__ Has No Comments

Comments:

Signature: Pamela Shaw Date: 8/5/24

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form):

Agency: Delaware Department of Transportation

___ **Provides Comments (below or attached)**

X **Has No Comments**

Comments:

Signature: Pam Ross Date: 3/5/25

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:** Federal Aviation Administration
__x__ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with <u>minor</u> comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 5-17-23

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. David Fish
Director - Eastern Region
Federal Aviation Administration
1 Aviation Plaza
Jamaica, NY 11434

Dear Mr. Fish:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's

response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

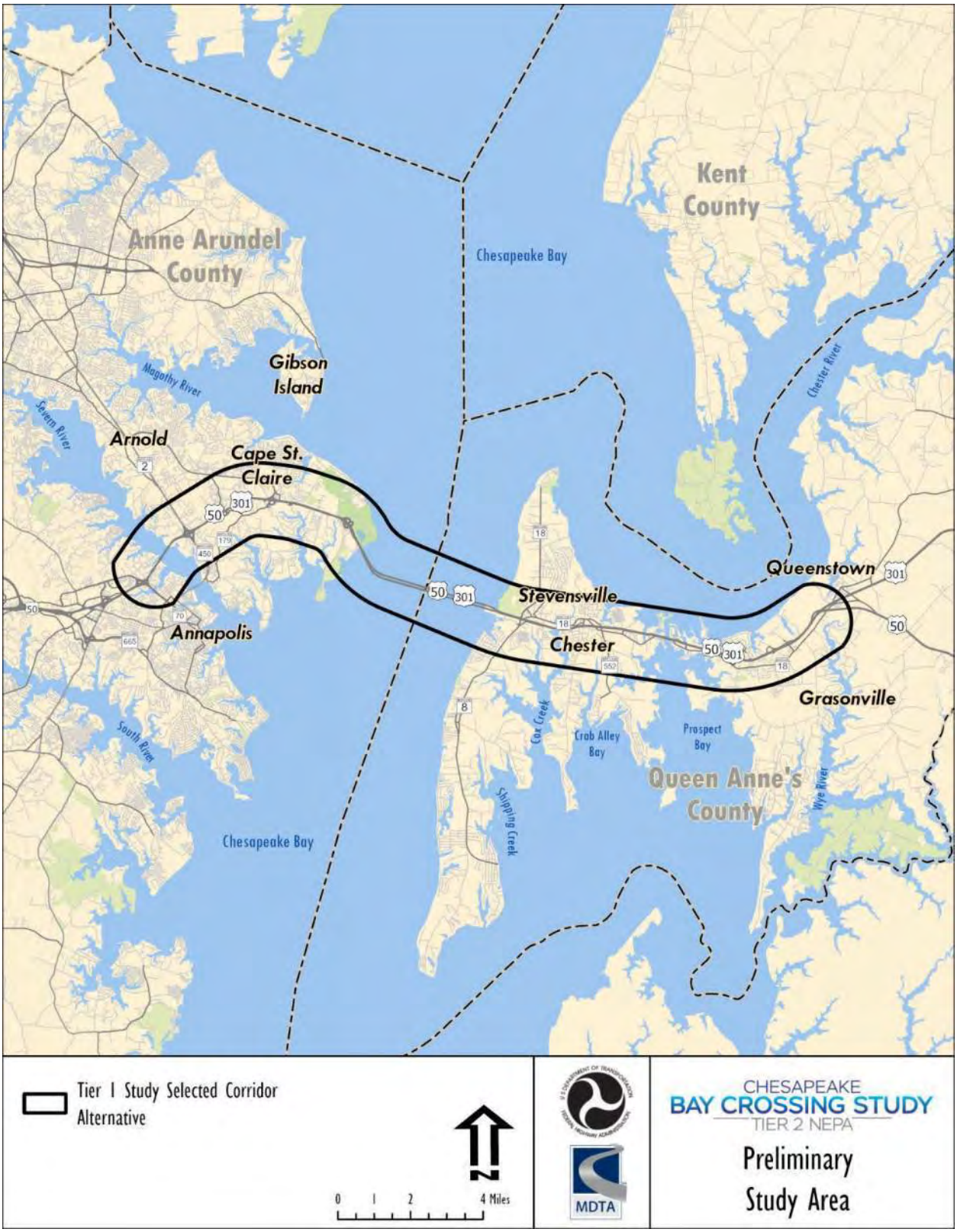
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:16:41 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Ms. Marie Kennington-Gardiner, FAA, Eastern Regional Administrator
Ms. Genevieve Walker, FAA, Environmental Protection Specialist
Mr. Aaron Braswell, FAA, Environmental Protection Specialist
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Federal Aviation Administration

Signature: DAVID A FISH Digitally signed by DAVID A FISH Date: 2023.08.03 05:41:02 -04'00' Date: _____

Print Name: David Fish

Title: Director, Eastern Region Airports Division

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests final review and any comments on the **Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose & Need Summary, the following agency (by signing this form): **Agency: Federal Aviation Administration/ Washington Airports District Office**
____ Provides Comments (below or attached) **__X__ Has No Comments**
Comments:
Signature: Genevieve Walker Date:July 10, 2024 Environmental Protection Specialist Washington Airports District Office

From: "Walker, Genevieve J (FAA)" <Genevieve.J.Walker@faa.gov>
Date: April 11, 2025 at 6:30:55 AM EDT
To: Sarah Williamson <sarahw@cri.biz>, "Jenet, Marie (FAA)" <Marie.Jenet@faa.gov>
Subject: RE: BCST2 - ARDS Concurrence Response due Today, 3/31/25

Good Morning Sarah,
I apologize for the late response, but please note that the FAA has "no Comment" on the ARDS Concurrence.
Thank you for your patience.

Genevieve

Genevieve Walker
Environmental Protection Specialist
Washington ADO
13783 Park Center Road, Suite 490S
Herndon, VA 20171
(703) 487-3979
__!__
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From: Sarah Williamson <sarahw@cri.biz>
Sent: Monday, March 31, 2025 12:09 PM
To: Walker, Genevieve J (FAA) <Genevieve.J.Walker@faa.gov>
Subject: RE: BCST2 - ARDS Concurrence Response due Today, 3/31/25

CAUTION: This email originated from outside of the Federal Aviation Administration (FAA). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

I understand and I appreciate you trying to get it to us. I know there has been a lot going on at the federal level. Even if after that date, its helpful to have it for our records. We plan on having a revised version that considers any agency comments back to the agencies at the end of April early May. So, if it comes much later than the 12th, we may not be able to address comments. But we still have time before the DEIS I the fall.

From: Walker, Genevieve J (FAA) <Genevieve.J.Walker@faa.gov>
Sent: Monday, March 31, 2025 11:32 AM
To: Sarah Williamson <sarahw@cri.biz>
Subject: RE: BCST2 - ARDS Concurrence Response due Today, 3/31/25

We can try, but honestly things are taking a lot longer than anticipated as our attorneys have to review everything before it goes out. Sigh… yes- I will download everything and TRY to get concurrence. Everything is very challenging today…

Genevieve Walker
Environmental Protection Specialist
Washington ADO
13783 Park Center Road, Suite 490S
Herndon, VA 20171
(703) 487-3979
__!__
---o--(_)--o---

From: Sarah Williamson <sarahw@cri.biz>
Sent: Monday, March 31, 2025 10:51 AM
To: Walker, Genevieve J (FAA) <Genevieve.J.Walker@faa.gov>
Cc: Jenet, Marie (FAA) <Marie.Jenet@faa.gov>; Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>
Subject: RE: BCST2 - ARDS Concurrence Response due Today, 3/31/25

CAUTION: This email originated from outside of the Federal Aviation Administration (FAA). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Hi Genevieve,
Would you be able to review and provide response in two weeks, Monday April 12th?

The link in my email this morning (in the chain below) will be live until April 7th, so you will want to download the materials now if you haven't done so already.

Let me know if the extra time will allow you to provide a response.
Sincerely,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From: Walker, Genevieve J (FAA) <Genevieve.J.Walker@faa.gov>
Sent: Monday, March 31, 2025 9:45 AM
To: Sarah Williamson <sarahw@cri.biz>
Cc: Jenet, Marie (FAA) <Marie.Jenet@faa.gov>
Subject: RE: BCST2 - ARDS Concurrence Response due Today, 3/31/25

Hi Sarah- I apologize for not reaching out sooner- the FAA Environmental Protection Specialists were, until recently, not permitted to contact individuals or organizations outside of the FAA. Unfortunately, our current review schedule does not allow for a timely review of this document. Anything requiring our signature requires a review at a higher level within the organization. I apologize if this negatively impacts your schedule.

Genevieve

Genevieve Walker
Environmental Protection Specialist
Washington ADO
13783 Park Center Road, Suite 490S
Herndon, VA 20171
(703) 487-3979
__!__
---o--(_)--o---

From: Sarah Williamson <sarahw@cri.biz>
Sent: Monday, March 31, 2025 8:21 AM

<alexander.bienko@dot.gov>; Parikh, Jitesh (FHWA) <Jitesh.Parikh@dot.gov>; Millington, Chris (FHWA) <Chris.Millington@dot.gov>; joseph.davia@usace.army.mil; april.e.sparkman@usace.army.mil; hal.r.pitts@uscg.mil; Charles.d.bullock@uscg.mil; witman.timothy@epa.gov; glyn.rebecca@epa.gov; fitzgerald.megan@epa.gov; boos.patrick@epa.gov; french.emily@epa.gov; mazzarella.christine@epa.gov; mark_eberle@nps.gov; Wendy_O'Sullivan@nps.gov; Christine_Yott@nps.gov; Jacob_Ross@nps.gov; cindy_chance@nps.gov; abbi_huntzinger@nps.gov; Ray_li@fws.gov; trevor_clark@fws.gov; karen.greene@noaa.gov; brian.d.hopper@noaa.gov; Jonathan.Watson@noaa.gov; tammy.roberson@maryland.gov; Amanda.sigillito@maryland.gov; Danielle.spendiff1@maryland.gov; jon.stewart@maryland.gov; William.seiger@maryland.gov; dbuscemi@mdot.state.md.us; TPenders@mdot.maryland.gov; DAtkins@sha.state.md.us; rmoravec@mdot.maryland.gov; harriet.levine@jacobs.com; sburnett@wtbco.com; tredman@dnr.state.md.us; Gwendolyn.gibson@maryland.gov; roland.limpert@maryland.gov; lindsey.sestak@maryland.gov; Rachel.temby@maryland.gov; melissac.day1@maryland.gov; rmangum@achp.gov; kmiller@achp.gov; e106@achp.gov; Kennington-Gardiner, Marie (FAA) <Marie.Kennington-Gardiner@faa.gov>; april.cummings@fema.dhs.gov; tessa.nolan@fema.dhs.gov; michael.hufnagel@fema.dhs.gov; Jamie.carpenter@fema.dhs.gov; Joshua.lippert@fema.dhs.gov; Katherine.charbonneau@maryland.gov; nick.kelly@maryland.gov; charlotte.shearin@maryland.gov; Kathryn.durant@maryland.gov; lmolesworth@mta.maryland.gov; lbarcena@mdot.maryland.gov; bihui.xu@maryland.gov; Russell.strickland@maryland.gov; marcia.deppen@maryland.gov; chas.eby@maryland.gov; dscurti@marylandports.com; apenafiel@marylandports.com; Koenig, Daniel (FTA) <daniel.koenig@dot.gov>; tim.tamburrino@maryland.gov; dixie.henry@maryland.gov; bill.morgante@maryland.gov; gail.kenson@navy.mil; pamela.steinebach@delaware.gov; asolanki@bwiairport.com; aaron.braswell@faa.gov; Walker, Genevieve J (FAA) <Genevieve.J.Walker@faa.gov>; tlang@baltometro.org; raris@baltometro.org; amarshall@baltometro.org; scohoon@qac.org; amoredock@qac.org; rgunter@qac.org; pzkrin00@aacounty.org; trulri44@aacounty.org; pzfowl22@aacounty.org
Cc: Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>; ealmquist@rkk.com; Emma Beck <emmab@cri.biz>
Subject: BCST2 - ARDS Concurrence Response due Today, 3/31/25

CAUTION: This email originated from outside of the Federal Aviation Administration (FAA). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Dear BCST2 Interagency Team,

The Maryland Transportation Authority (MDTA) requests concurrence from Cooperating Agencies on the Chesapeake Bay Crossing Study Tier 2 NEPA, Draft **Alternatives Retained for Detailed Study (ARDS)** by COB today, **March 31, 2025**.

It looks like the link expired yesterday, so for those who need to download the Cooperating Concurrence and Participating Comment forms to provide a response, a fresh link is provided below:

ARDS Concurrence Package_20250228

Please provide concurrence via the form in the link and respond electronically **by COB today** to Heather Lowe at hlowe@mdta.state.md.us and cc me at sarahw@cri.biz.
Thank you to those who have sent in concurrence already.
Best,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131
<image001.png>

WE'RE HIRING! – CLICK HERE

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:** Federal Emergency Management Agency
__X__ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: TESSA W NOLAN Digitally signed by TESSA W NOLAN Date: 2023.05.24 11:59:37 -04'00' Date: 05/24/2023

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. April Cummings
Director, Mitigation Division
Federal Emergency Management Agency
615 Chestnut Street
One Independence Mall, Sixth Floor
Philadelphia, PA 19106-4404

Dear Ms. Cummings:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project

announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

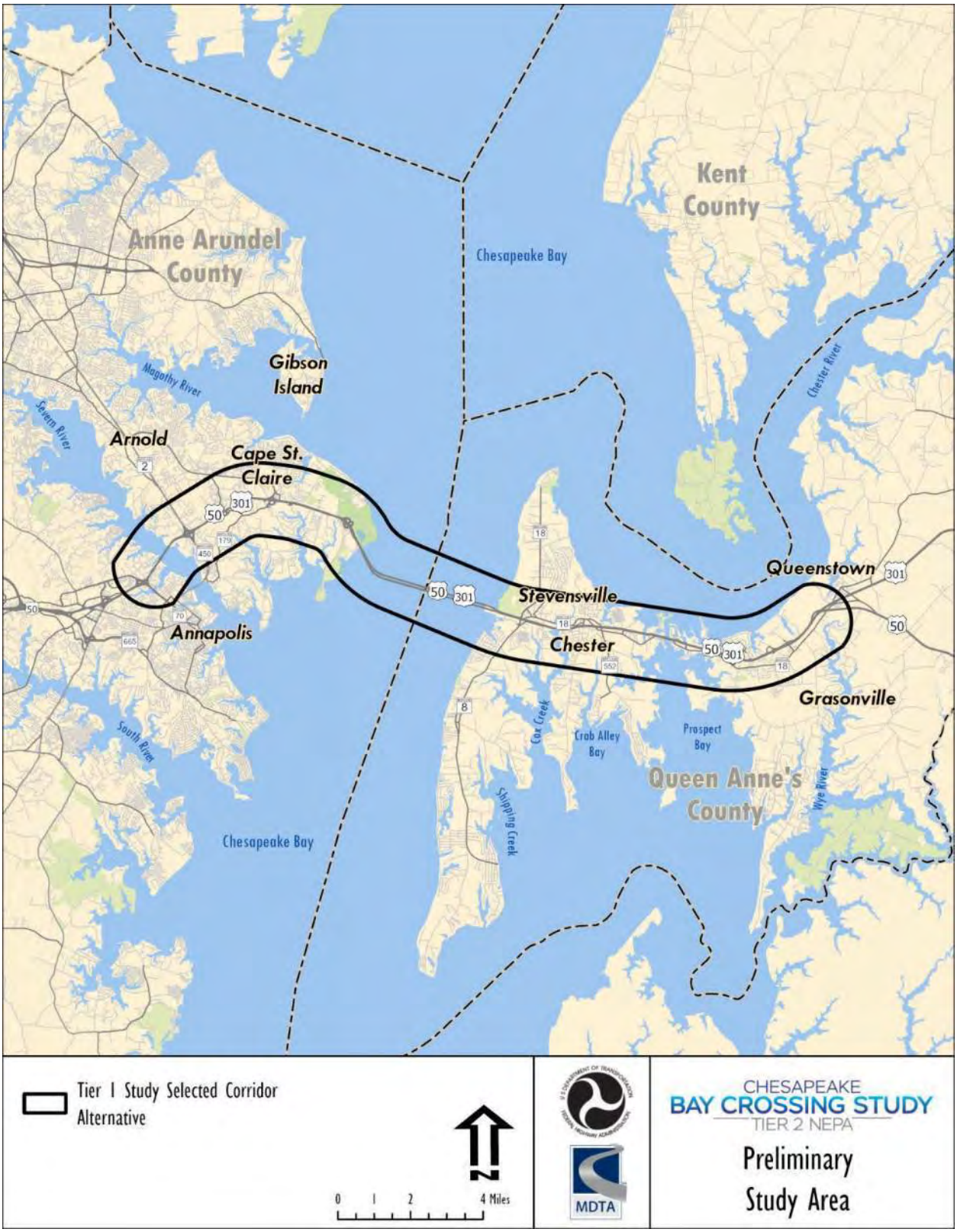
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:23:04 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Ms. Tessa Nolan, FEMA, Regional Environmental Officer Mitigation - Region 3
Mr. Michael Hufnagel, FEMA
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: FEMA

Signature: Jamie Carpenter Date: 07/18/2023

Print Name: Jamie Carpenter

Title: Floodplain Management and Insurance Specialist

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Cultural Resources Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Cultural Resources Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Cultural Resources, the following agency (by signing this form): **Agency:** Federal Highway Administration
_X_ **Concures** with the **Cultural Resources Methodology (without comments)** ____ **Agrees** with the **Cultural Resources Methodology (with <u>minor</u> comments)*** ____ **Does not agree** with the **Cultural Resources Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2023.11.17 10:54:33 -05'00' Date: 17 NOV 2023

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:** Federal Highway Administration
_X_ **Concurs** with the **Indirect & Cumulative Effects Methodology (without comments)** ____ **Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)*** ____ **Does not agree** with the **Indirect & Cumulative Effects Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2023.11.17 10:56:04 -05'00' Date: 17 NOV 2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Air Quality Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Air Quality Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Air Quality, the following agency (by signing this form): **Agency:** Federal Highway Administration
X **Concures** with the **Air Quality Methodology (without comments)** ____ **Agrees** with the **Air Quality Methodology (with minor comments)*** ____ **Does not agree** with the **Air Quality Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2023.12.12 10:18:20 -05'00' Date: 12 DEC 2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Noise Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Noise Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Noise Methodology, the following agency (by signing this form): **Agency:** Federal Highway Administration
X **Concurs** with the **Noise Methodology (without comments)** ____ **Agrees** with the **Noise Methodology (with <u>minor</u> comments)*** ____ **Does not agree** with the **Noise Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2024.01.25 08:06:06 -05'00' Date: 25 JAN 2024

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:** Federal Highway Administration
X **Concurs** with the **Natural Environmental Methodology (without comments)** ____ **Agrees** with the **Natural Environmental Methodology (with minor comments)*** ____ **Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2024.02.05 07:19:54 -05'00' Date: 05 FEB 2024

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:** Federal Highway Administration
_X_ **Concurs** with the **Socioeconomics & Land Use Methodology (without comments)** ____ **Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** ____ **Does not agree** with the **Socioeconomics & Land Use Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ALEXANDER CHRISTOPHER BIENKO Digitally signed by ALEXANDER CHRISTOPHER BIENKO Date: 2024.02.20 08:32:47 -05'00' Date: 20 FEB 2024

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** Federal Highway Administration
_X_ **Concurs** with the **Draft ARDS (without comments)** ____ **Agrees** with the **Draft ARDS (with <u>minor</u> comments)*** ____ **Does not agree** with the **Draft ARDS*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: JAMIE LEE PAVONA Digitally signed by JAMIE LEE PAVONA Date: 2025.04.23 15:30:44 -04'00' Date: April 23, 2025

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. Daniel Koenig
Environmental Protection Specialist
U. S. Department of Transportation
Federal Transit Administration
1200 New Jersey Ave, SE
Washington, DC 20590-0001

Dear Mr. Koenig:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project

announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

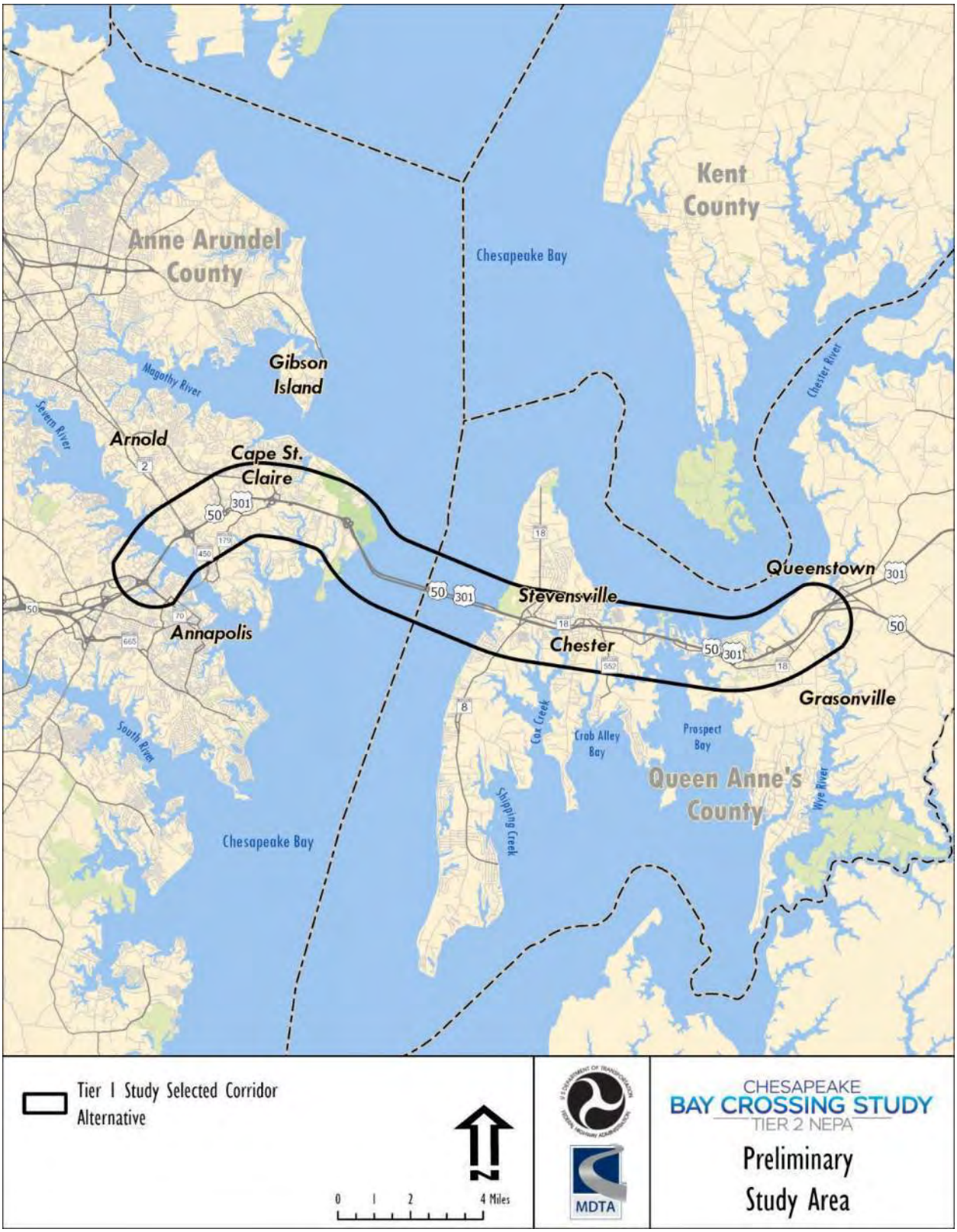
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:25:56 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

From:	Krofft, Heidi (FTA)
To:	Mar, Jeanette (FHWA)
Cc:	Hearon, Rachel (FTA); Heather Lowe; Koenig, Daniel (FTA); Keeley, Laura (FTA)
Subject:	RE: BCST2 Participating Agency letter
Date:	Friday, June 23, 2023 1:26:06 PM
Attachments:	CBST2 participating form 2023_FTA signed.pdf

Hi Jeanette,

FTA is accepting your invitation to be a participating agency for the Chesapeake Bay Crossing Tier 2 Study. Attached is our signed acceptance form. We look forward to coordinating with you on this project.

Thanks,
Heidi

Heidi E. Krofft, RPA
Environmental Protection Specialist
U.S. Department of Transportation
Federal Transit Administration, Region III
1835 Market Street, Suite 1910
Philadelphia, PA 19103-4124
215-656-7053

From: Koenig, Daniel (FTA) <daniel.koenig@dot.gov>
Sent: Thursday, June 1, 2023 7:28 PM
To: Mar, Jeanette (FHWA) <Jeanette.Mar@dot.gov>
Cc: Hearon, Rachel (FTA) <rachel.hearon@dot.gov>; Krofft, Heidi (FTA) <heidi.krofft@dot.gov>; hlowe@mdta.state.md.us
Subject: FW: BCST2 Participating Agency letter

Hi Jeanette – I'm no longer our EPS, but I've cc'd our two EPSs that can address the letter. Thanks.

From: Mar, Jeanette (FHWA) <Jeanette.Mar@dot.gov>
Sent: Thursday, June 1, 2023 6:42 PM
To: Koenig, Daniel (FTA) <daniel.koenig@dot.gov>
Cc: Heather Lowe <hlowe@mdta.state.md.us>
Subject: BCST2 Participating Agency letter

Dan:

Please see the attached Participating Agency invitation for the Chesapeake Bay Crossing Study Tier 2 NEPA. Please return **Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Agency Response Form** to me via email and copy Heather Lowe (hlowe@mdta.state.md.us) by June 30, 2023. Please contact me if you have any questions. We look forward to working with you on this Tier 2 Study.

Sincerely,
Jeanette

Jeanette Mar
Environmental Program Manager
FHWA - Maryland Division
George H. Fallon Federal Building
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201
phone (410) 779-7152
fax (410) 962-4054

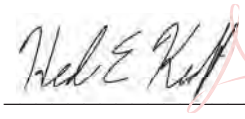
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: __Federal Transit Administration, Region 3_____

Signature:  Digitally signed by HEIDI ELIZABETH NASCA Date: 2023.06.23 13:20:03 -04'00' Date: _____

Print Name: __Heidi E. Krofft_____

Title: __Environmental Protection Specialist_____

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: Maryland Aviation Administration

✓ **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: _____ Date: April 25, 2023

Ashish J. Solanki, A.A.E.
Director, Office of Regional Aviation Assistance
Maryland Aviation Administration
410.859.7064/asolanki@bwiairport.com

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Ashish Solanki
Director, Office of Regional Aviation Assistance
Maryland Department of Transportation
Maryland Aviation Administration
P.O. Box 8766
BWI Airport, MD 21240-0766

Dear Ashish Solanki:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.

3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

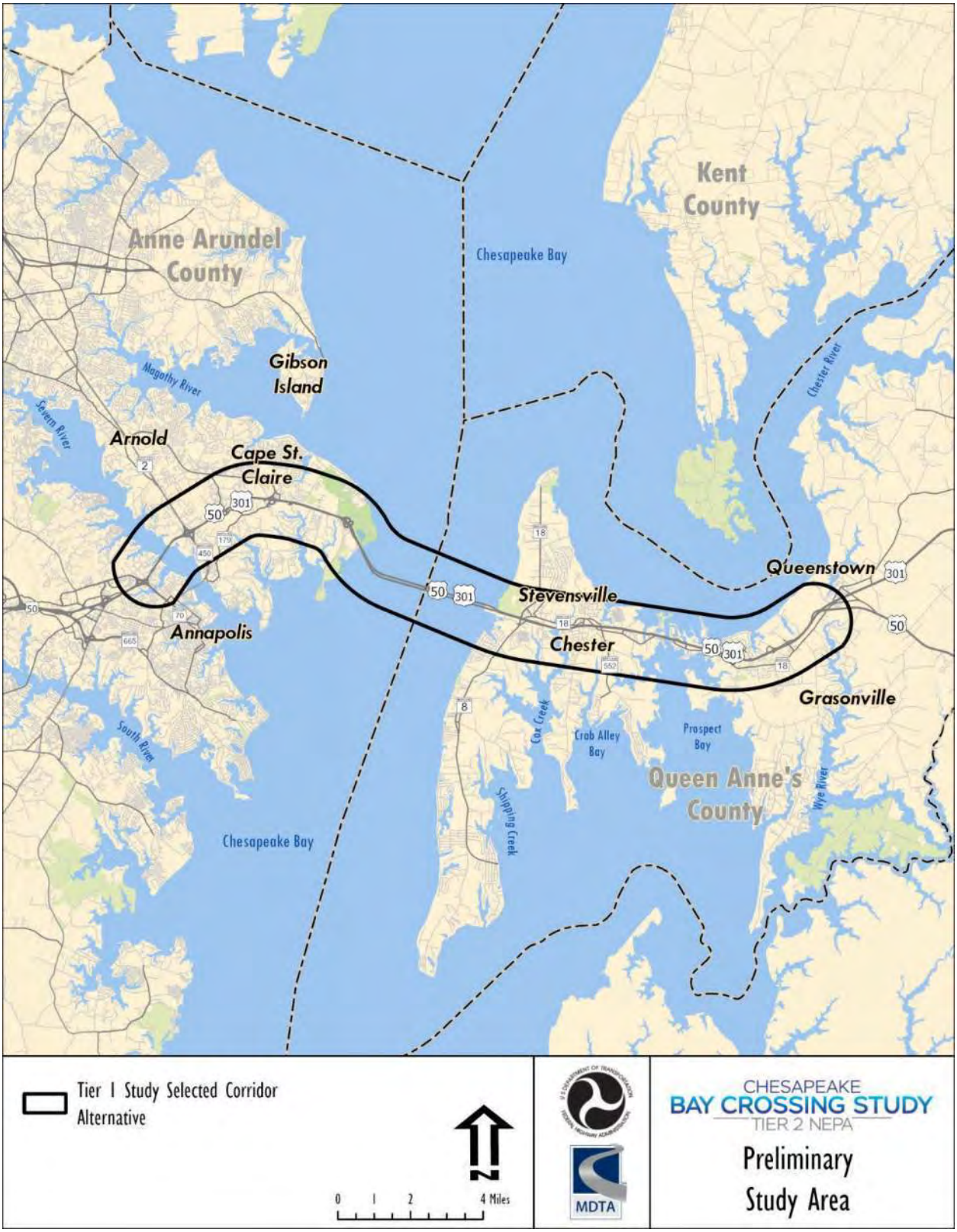


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

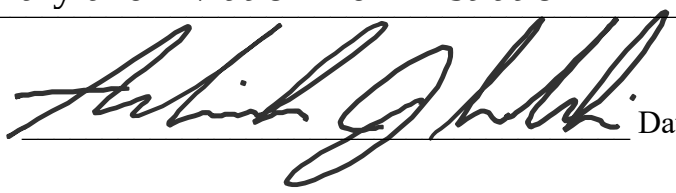
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- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Maryland Aviation Administration

Signature:  Date: 06-05-23

Print Name: Ashish J. Solanki

Title: Director, Office of Regional Aviation Assistance

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:____MARYLAND AVIATION ADMINISTRATION _____**
__X__ Concurs with the **Draft Purpose and Need Summary (without comments)** **____ Agrees** with the **Draft Purpose and Need Summary (with <u>minor</u> comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _____ Date:__2024-07-01_____

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** Maryland Aviation Administration
__X__ **Concurs** with the **Draft ARDS (without comments)** ____ **Agrees** with the **Draft ARDS (with <u>minor</u> comments)*** ____ **Does not agree** with the **Draft ARDS*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _____ Date: 2025-03-05

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): Maryland Board of Public Works **Agency:**_____
__X__ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:

Signature: William Morgante Date: May 25, 2023

Maryland Transportation Authority
MDTA

Wes Moore, Governor
Aruna Miller, Lt. Governor
Paul J. Wiedefeld, Chairman

Board Members:
Dontae Carroll
William H. Cox, Jr.
William C. Ensor, III
W. Lee Gaines, Jr.
Mario J. Gangemi, P.E.
Cynthia D. Penny-Ardinger
Jeffrey S. Rosen
John F. von Paris

William Pines, P.E., Executive Director

In Reply Refer To:
Chesapeake Bay Crossing Study: Tier 2 NEPA; Invitation to Serve as a Participating Agency

June 2, 2023

Bill Morgante, PWS
Wetlands Administrator
Maryland Board of Public Works
80 Calvert Street, Room 117
Annapolis, MD 21401

Dear Bill Morgante:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.

4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

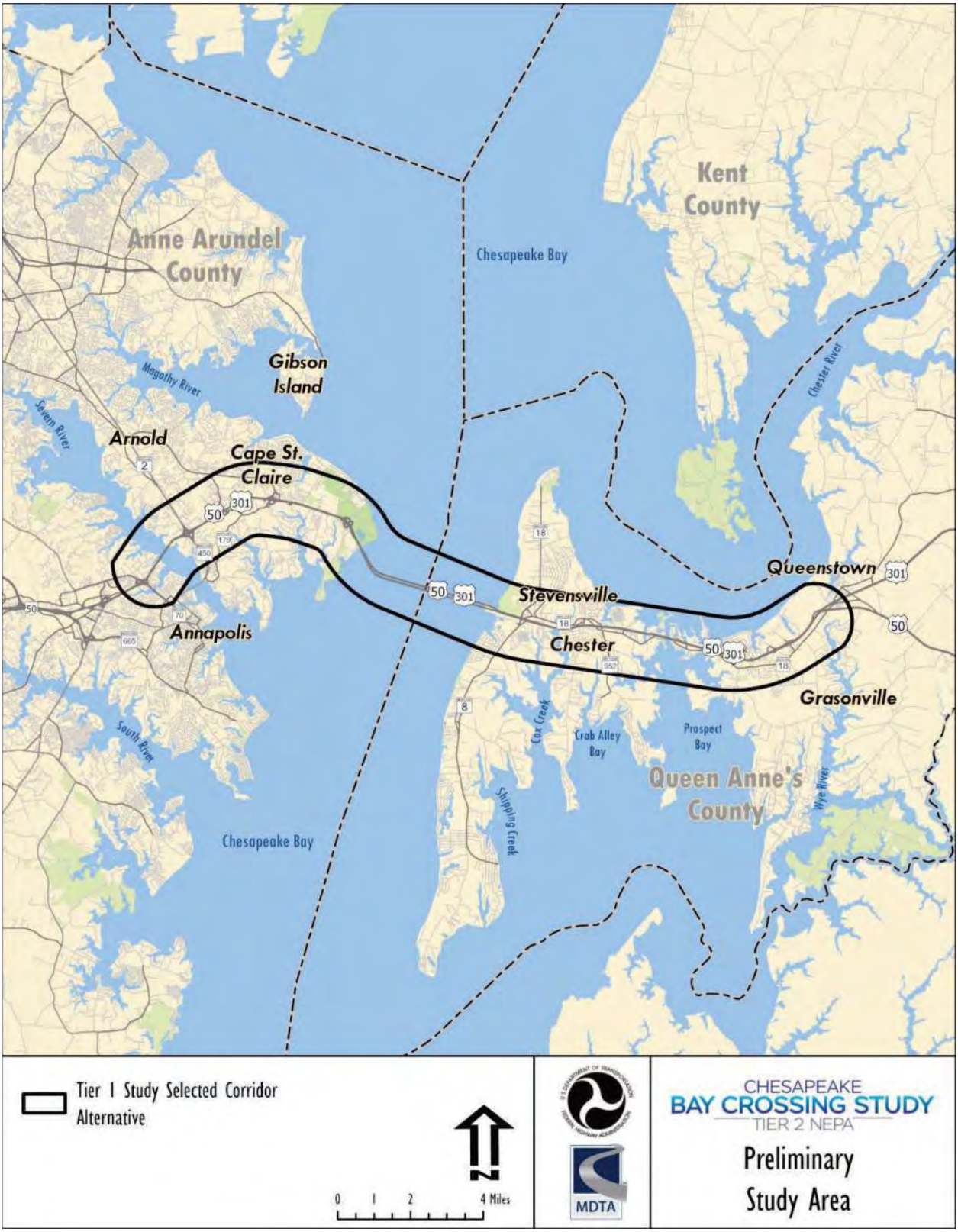


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Audrey Smylie, MBPW
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

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Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

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☐ Elect to decline the invitation to be a Participating Agency because:

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- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

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- ☒ Other (please provide):

I am unable to participate in order to maintain objectivity for the time when this project comes before the Board for the approval of a tidal wetlands license. It would also be difficult for me to represent the three distinct Board member as various decision are made during the project's planning and design phases. I'm glad to provide input to matters that pertain specifically to tidal wetlands.

Agency: Maryland Board of Public Works

Signature: William Morgante Date: July 17, 2023

Print Name: William Morgante

Title: Wetlands Administrator for the Board of Public Works

From:	Bill Morgante -BPW-
To:	Sarah Williamson
Cc:	Emma Beck; Clemons, Jasmine; Alex Butler; Pezza, Kim
Subject:	Re: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER
Date:	Tuesday, August 13, 2024 11:50:59 AM
Attachments:	image001.png

Hi Sarah,

Thank you again for allowing BPW comments until August 13. Kim Pezza, the Comptroller's Office Climate Resilience Director, has recommended the following additions to the purpose and need document. Thank you.

Bill

- The Project should be built with considerations of sea level rise, storm surge, flood levels and average local air temperatures modeled for 2050-2100.

- The project should include Electric vehicle charging infrastructure at both ends.

On Tue, Aug 6, 2024 at 3:20 PM Sarah Williamson <sarahw@cri.biz> wrote:

> Hi Bill,
>
> The P&N summary is only a few pages. But if you need that long, we will still accept your response by the 13th.
>
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>
> **From:** Bill Morgante -BPW- <bill.morgante@maryland.gov>
> **Sent:** Tuesday, August 6, 2024 3:14 PM
> **To:** Sarah Williamson <sarahw@cri.biz>
> **Cc:** Emma Beck <emmab@cri.biz>
> **Subject:** Re: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER
>
> Hi Sarah,
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> Can you please give me until August 13th?
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> Bill
>
> On Tue, Aug 6, 2024 at 11:22 AM Sarah Williamson <sarahw@cri.biz> wrote:

Hi Bill,

Here is an updated link for the P&N package. P&N- Concurrence Package_20240627

I also attached the Form you need to fill out.

The request is for final review of the P&N summary only, but the full P&N and errata of agency comments and responses are at the link too if you want to get into the details behind the summary.

From: Bill Morgante -BPW- <bill.morgante@maryland.gov>
Sent: Monday, August 5, 2024 4:29 PM
To: Sarah Williamson <sarahw@cri.biz>
Subject: Re: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER

Sarah,

I thought I had done this form for BPW. The link you provided is no longer working.

Bill

On Mon, Aug 5, 2024 at 12:27 PM Sarah Williamson <sarahw@cri.biz> wrote:

> Good Afternoon,
>
> The MDTA requested concurrence from Cooperating agencies and final review/comments from Participating agencies on the **BCST2 Draft Purpose and Need Summary** by last Monday, July 29th. To date, we have not received a response from your agency.
>
> I have attached the Participating Agency final review/comment form for your convenience. The draft P&N Summary and entire P&N Concurrence package can be downloaded here: P&N- Concurrence Package_20240627

We appreciate you providing your response as soon as possible.

Thank you,

Sarah Williamson | *Bay Crossing Study Team*

Coastal Resources, Inc. | Facebook | LinkedIn | Instagram

25 Old Solomons Island Road, Annapolis, MD 21401

Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From: Sarah Williamson
Sent: Thursday, July 11, 2024 10:37 AM
Subject: RE: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER

Good Morning BCST2 Interagency Team,

I hope everyone is having a great summer!

This is a reminder that MDTA has requested your concurrence (Cooperating Agencies) or final review (Participating Agencies) on the Chesapeake Bay Crossing Study Tier 2 NEPA, **Draft Purpose and Need Summary.** Concurrence is requested by **COB Monday, July 29th, 2024.**

Cooperating Agencies: Please note, **the deadline for making MDTA aware of any issues that would stand in the way of your agency's concurrence on the Draft P&N Summary is tomorrow, July 12th, 2024.** This is requested in accordance with the BCST2 Guiding Principles to allow for time to work on resolving those issues before the

concurrence deadline.

Thank you,

Sarah Williamson | *Bay Crossing Study Team*

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WE'RE HIRING! – CLICK HERE

Subject: BCST2 - Purpose and Need Summary Concurrence Request

Good Afternoon,

The Maryland Transportation Authority (MDTA) requests concurrence from reviewing Cooperating Agencies on the Chesapeake Bay Crossing Study Tier 2 NEPA, **Draft Purpose and Need Summary**. Please provide concurrence via the concurrence form linked below and respond electronically **by COB Monday, July 29th, 2024** to Heather Lowe at hlowe@mdta.state.md.us and cc me at sarahw@cri.biz.

In accordance with the BCST2 Guiding Principles, MDTA requests that within 10 business days of this email (July 12th), you make MDTA and me aware of any issues that would stand in the way of your agency's concurrence on the Draft P&N Summary. This will allow for time to work on resolving those issues before the concurrence deadline.

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- revised Draft P&N Summary for concurrence,
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Please note, concurrence or final review/comment is requested on the Draft Purpose & Need Summary only. However, the full Draft Preliminary P&N Report has been provided for additional background and to support the summary information if you wish to see more detail.

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Sarah Williamson | *Bay Crossing Study Team*

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--

William Morgante, M.Sc., Professional Wetland Scientist

Wetlands Administrator

Maryland Board of Public Works

80 Calvert Street, Room 117

Annapolis, Maryland 21401

office 410.260.7791

direct 410.260.7764

bill.morgante@maryland.gov

--

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Wetlands Administrator
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80 Calvert Street, Room 117
Annapolis, Maryland 21401

office 410.260.7791
direct 410.260.7764
bill.morgante@maryland.gov

From: Pezza, Kim <KPezza@marylandtaxes.gov>
Sent: Friday, September 6, 2024 10:31 AM
To: Bill Morgante -BPW- <bill.morgante@maryland.gov>; Sarah Williamson <sarahw@cri.biz>
Cc: Emma Beck <emmab@cri.biz>; Clemons, Jasmine <JClemons@marylandtaxes.gov>; Butler, Alex <AButler@marylandtaxes.gov>
Subject: RE: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER

Hi all,

My comment below about future local air temperatures were alluding to the points made in this article. I hope the engineers are taking this into consideration.

Climate Change Can Cause Bridges to 'Fall Apart Like Tinkertoys,' Experts Say
Extreme heat and flooding are accelerating the deterioration of bridges, engineers say, posing a quiet but growing threat.
https://www.nytimes.com/2024/09/02/climate/climate-change-bridges.html

Thanks,
Kim

Kim Pezza
Climate Resilience Director
Policy, Public Works & Investment
Comptroller of Maryland
C: (667) 408-0543
O: (410) 260-7595
www.MarylandTaxes.gov


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Sent: Tuesday, August 13, 2024 11:50 AM
To: Sarah Williamson <sarahw@cri.biz>
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> Ecological Consultants
>
> *WE'RE HIRING! – CLICK HERE*
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WE'RE HIRING! – CLICK HERE

Subject: BCST2 - Purpose and Need Summary Concurrence Request

Good Afternoon,

The Maryland Transportation Authority (MDTA) requests concurrence from reviewing Cooperating Agencies on the Chesapeake Bay Crossing Study Tier 2 NEPA, **Draft Purpose and Need Summary**. Please provide concurrence via the concurrence form linked below and respond electronically **by COB Monday, July 29th, 2024** to Heather Lowe at hlowe@mdta.state.md.us and cc me at sarahw@cri.biz.

In accordance with the BCST2 Guiding Principles, MDTA requests that within 10 business days of this email (July 12th), you make MDTA and me aware of any issues that would stand in the way of your agency's concurrence on the Draft P&N Summary. This will allow for time to work on resolving those issues before the concurrence deadline.

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********** Confidentiality Notice ********** This email and any file transmitted with it may be confidential and are intended solely for the use of the individual or entity to whom they are addressed. If you received this email in error, please notify the Comptroller's System Manager by forwarding this message to postmaster@marylandtaxes.gov
****

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Russ Strickland
Executive Director
Maryland Emergency Management Agency
William Donald Schaefer Tower
6 St. Paul Street
Baltimore, MD 21201-1614

Dear Russ Strickland:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

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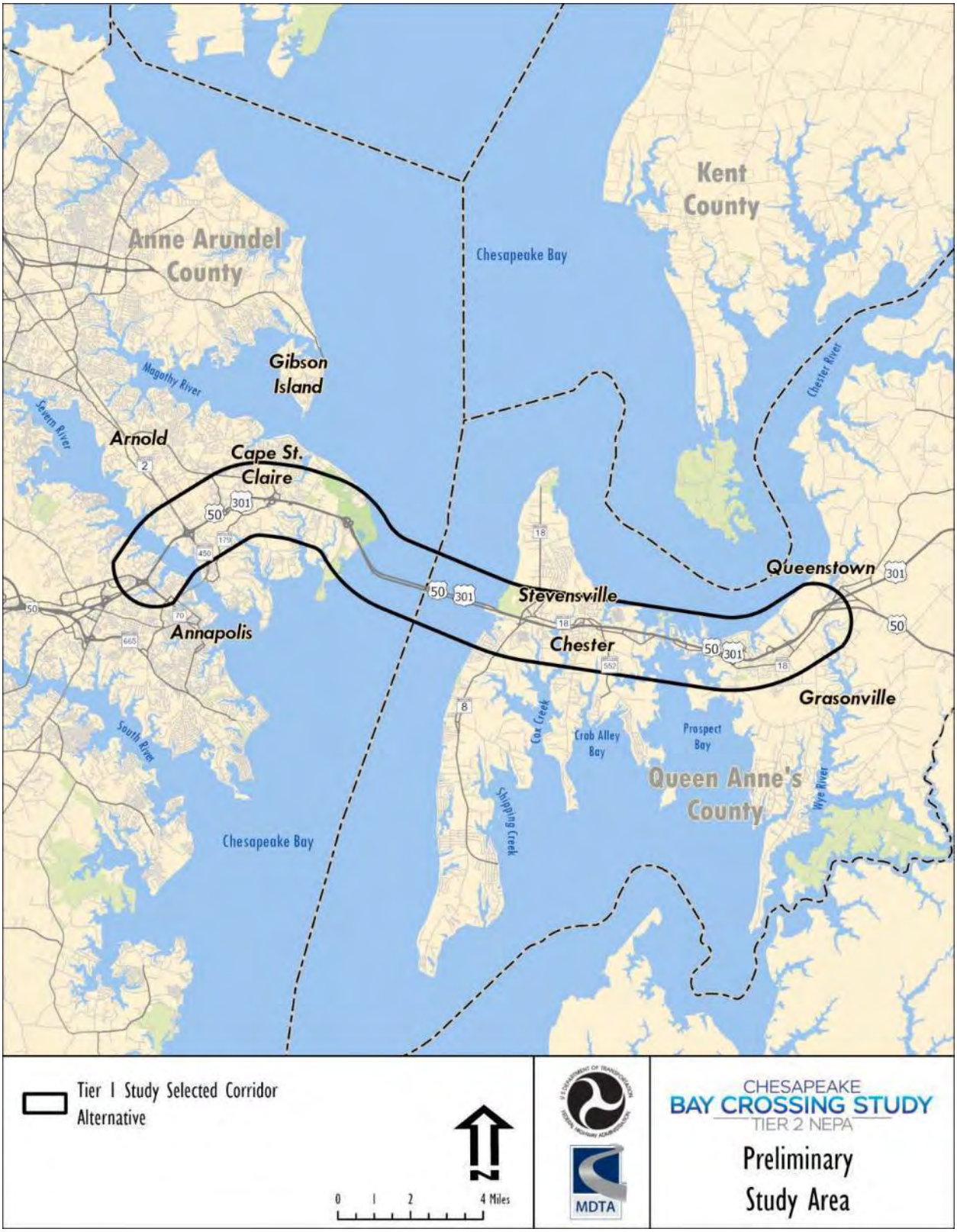


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Chas Eby, MEMA, Deputy Executive Director
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

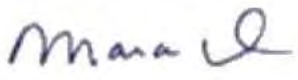
Agency: Maryland Department of Emergency Management

Signature: Marcia Deppen Date: 06/07/2023

Print Name: Marcia Deppen

Title: Director of Consequence Management

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:Maryland Department of Emergency Management**
__X__ **Agrees** with the **Study Schedule (without comments)** **_____ Agrees** with the **Study Schedule (with minor comments)*** **_____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: ___  _____ Date: June 22, 2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form):

Agency: MD Department of Emergency Management

✓ **Concurs** with the **Draft Purpose and Need Summary (without comments)**

___ **Agrees** with the **Draft Purpose and Need Summary (with minor comments)***

___ **Does not agree** with the **Draft Purpose and Need Summary ***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

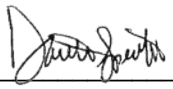
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

No comments

Signature: Mara Q Date: 10/28/2024

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:** Maryland Department of the Environment
_X_ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with <u>minor</u> comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 05/11/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Cooperating and Participating
Agency

June 2 2023

Heather Nelson
Program Manager, Wetlands and Waterways Protection
Maryland Department of the Environment
1800 Washington Avenue
Baltimore, MD 21230

Dear Heather Nelson:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Clean Water Act, Maryland Nontidal Wetlands Protection Act, Maryland Tidal Wetlands Act, and other laws and regulations. As Lead Agencies, MDTA and FHWA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).

3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.
6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

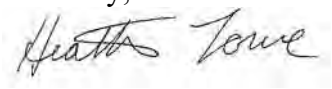
Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

Sincerely,

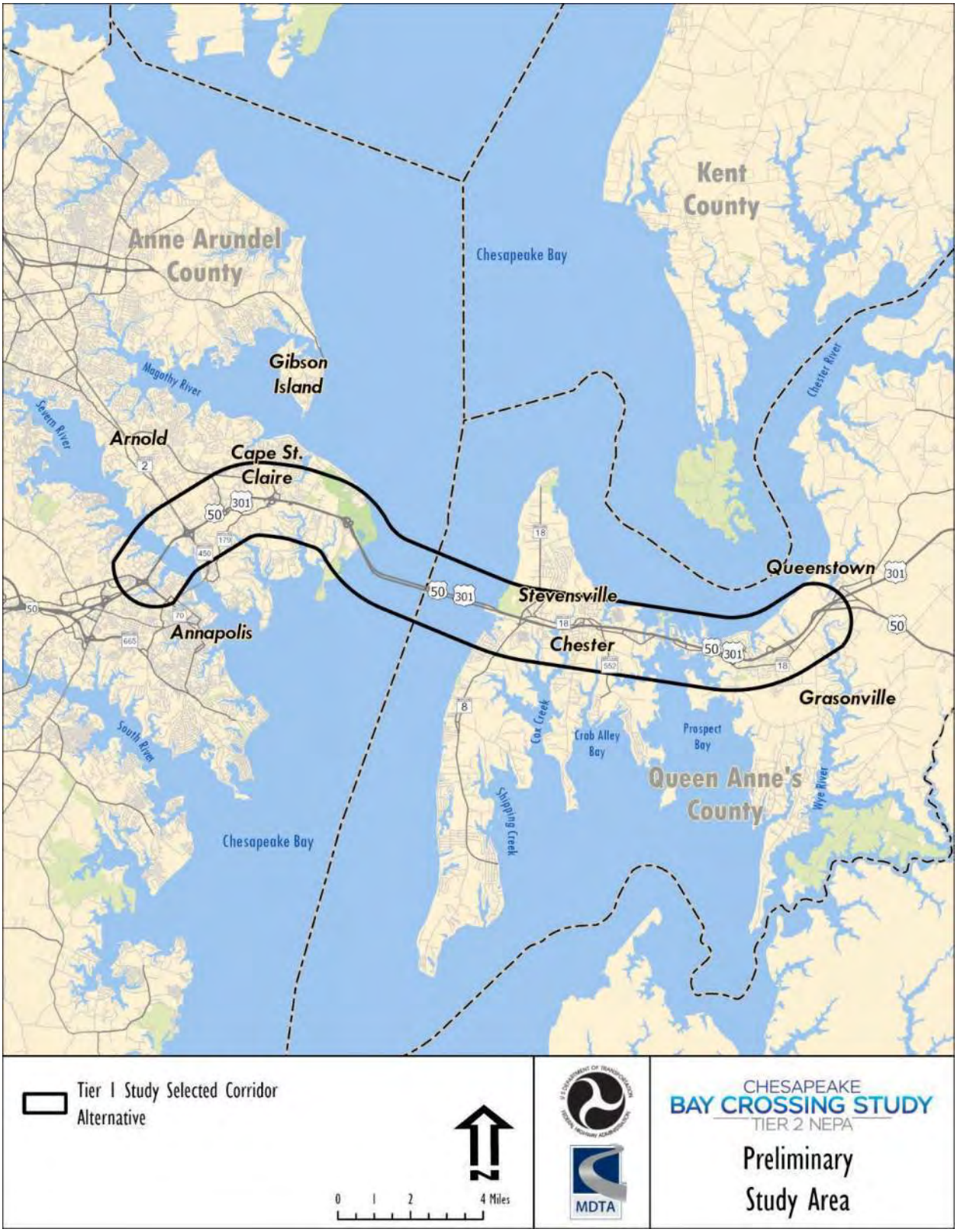


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Danielle Spendiff, MDE, Division Chief - Regulatory and Customer Service Division
Tammy Roberson, MDE, Tidal Wetlands Division Chief
Amanda Sigillito, MDE, Non-Tidal Wetlands Division Chief
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

June 28, 2023

Maryland Transportation Authority
Division of Planning and Program Development
Attention: Heather Lowe
2310 Broening Highway
Baltimore, MD 21224
Via email: hlowe@mdta.state.md.us

Re: Bay Crossing Study Tier 2 NEPA, Cooperating Agency Invitation

Dear Ms. Lowe,

The Maryland Department of the Environment (MDE) received your invitation dated June 2, 2023 to be a Cooperating Agency in the preparation of the Tier 2 Environmental Impact Statement (EIS) for the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). MDE participated in the Tier 1 Study as a Cooperating Agency, and hereby accepts the invitation to continue in this role for the purposes of developing the EIS for the Tier 2 Study. MDE understands that, at this time, the Maryland Transportation Authority (MDTA) intends to request any permits necessary for a proposed build alternative after the conclusion of (and not concurrent with) the NEPA process. Please note that while MDE will make every effort to ensure that NEPA documentation meets permitting requirements and is sufficient to form the basis of MDE's future permitting decisions, additional documentation will be requested if significant time should elapse or if new information becomes available between completion of the Tier 2 Study and permit application submission.

MDE looks forward to continued coordination with MDTA to review this important project, and appreciates the opportunity to continue serving as a Cooperating Agency during the Tier 2 Study. Please do not hesitate to contact me at (410) 537-3528 or hnelson@maryland.gov with any questions or concerns regarding this letter.

Sincerely,

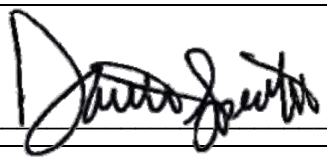
Heather L. Nelson

Heather Nelson (Jun 28, 2023 12:20 EDT)

Heather L. Nelson, Manager
Wetlands and Waterways Protection Program

Cc: Joseph DaVia, USACE
Danielle Spendiff, MDE
Tammy Roberson, MDE
Amanda Sigillito, MDE

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:** Maryland Department of the Environment
_X_ **Concures** with the **Indirect & Cumulative Effects Methodology (without comments)** **____ Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)*** **____ Does not agree** with the **Indirect & Cumulative Effects Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 11/15/2023

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Air Quality Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the Air Quality Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Air Quality, the following agency (by signing this form).

Agency: Maryland Department of the Environment

____ **Concurs** with the **Air Quality Methodology (without comments)**

__X__ **Agrees** with the **Air Quality Methodology (with minor comments)***

____ **Does not agree** with the **Air Quality Methodology***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

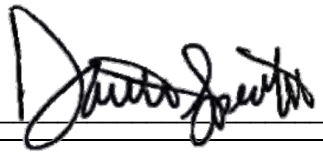
Comments: MDE recommends the addition of "National Environmental Policy Act Implementing Regulations Revisions Phase 2, 88 Fed. Reg. 49924" to the bulleted list under "Regulatory Context & Background"

Justification: The Council on Environmental Quality (CEQ) is signaling that it will codify climate change and EJ language into NEPA regs. This language was only in guidance documents and executive orders previously. The proposed regulation would incorporate climate change and EJ into the definition of "effects" to include "climate change-related effects, including the contribution of a proposed action and its alternatives to climate change, and the reasonably foreseeable effects of climate change on the proposed action and its alternatives," and "disproportionate and adverse effects on communities with environmental justice concerns, whether direct, indirect, or cumulative."

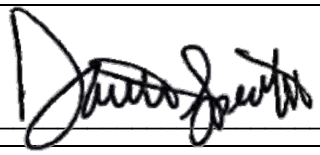
Including this in the list of Regulatory Context & Background would formalize any requirements that our Federal Partners have been discussing with stakeholders and ensure consideration in the next Phase of the NEPA review for this project should the proposed rule go into effect.

Signature: _____ Date: 12/20/23

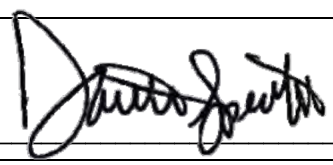
Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:** Maryland Department of the Environment
_X_ **Concurs** with the **Natural Environmental Methodology (without comments)** **____ Agrees** with the **Natural Environmental Methodology (with minor comments)*** **____ Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 02/05/2024

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:** Maryland Department of the Environment
_X_ **Concurs** with the **Socioeconomics & Land Use Methodology (without comments)** **____ Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** **____ Does not agree** with the **Socioeconomics & Land Use Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 2/29/2024

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:** Maryland Department of the Environment
X **Concurs** with the **Draft Purpose and Need Summary (without comments)** ____ **Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** ____ **Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: July 26, 2024

From:	Danielle Spendiff -MDE-
To:	Heather Lowe (hlowe@mdta.state.md.us)
Cc:	tammy.roberson@maryland.gov; Amanda.sigillito@maryland.gov; jon.stewart@maryland.gov; William.seiger@maryland.gov; Sarah Williamson
Subject:	Re: BCST2 - Reminder of Scoping Comment Deadline - 1/13/25
Date:	Monday, January 13, 2025 4:37:09 PM
Attachments:	image001.png

Hi Heather,

MDE Wetlands and Waterways Protection Program has reviewed the NOI and APID, and does not have any comments at this time.

As MDE noted during the 5/22/2024 Alternatives Workshop, the decision to limit the Tier 2 Study Area to the MD 2/MD 450 interchange on the Western Shore may result in public comments on the project termini as the Study moves forward. Please ensure that MDTA closely reviews any public or other agency comments received on the NOI/APID related to the underlying traffic analysis and presents these at an upcoming Interagency Coordination Meeting. MDE kindly requests that any comments related to the elimination of a tunnel option from the Alternatives Retained for Detailed Study are also provided to agencies and presented at an Interagency Coordination Meeting. We appreciate your consideration of these requests.

If you have any questions, please do not hesitate to contact me.

Thank you,

--

Danielle A. Spendiff
Chief, Regulatory & Customer Service Division
Federal Consistency Coordinator
Water & Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
danielle.spendiff1@maryland.gov
410-537-4023 (O)
410-913-8524 (M)
Website | Facebook | Twitter

Click here to complete a three question customer experience survey.

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** Maryland Department of the Environment
_X_ **Concurs** with the **Draft ARDS (without comments)** ____ **Agrees** with the **Draft ARDS (with minor comments)*** ____ **Does not agree** with the **Draft ARDS*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _____ Date: March 31, 2025

March 9, 2026

Maryland Transportation Authority
Division of Planning and Program Development
Attention: Heather Lowe
2310 Broening Highway
Baltimore, MD 21224
Via email: hlowe@mdta.state.md.us

Re: Comments on Draft Environmental Impact Statement for Chesapeake Bay Crossing Tier 2 NEPA Study

Dear Heather Lowe,

The Maryland Department of the Environment (MDE) has reviewed the *Draft Environmental Impact Statement* (DEIS) published by the Maryland Transportation Authority (MDTA) on January 23, 2026. MDE previously reviewed and provided comments on the Administrative Draft of the DEIS on September 8, 2025, and appreciates that most of these comments were incorporated into the published DEIS.

A comprehensive impact avoidance and minimization analysis will be required for the preferred alignment at the time of permit application submission. In the DEIS, MDTA identified Alternative C as the Recommended Preferred Alternative. This alternative would replace the existing bridge spans with two new spans within the existing corridor, south of the existing bridge. The DEIS indicates that Alternative C would result in fewer impacts to natural resources, community resources, and historic resources as compared to all other build alternatives evaluated. MDE supports the recommendation of Alternative C as the selection which would result in the lowest overall impacts to wetlands and other regulated resources based on the study information to date. This commitment to avoidance and minimization should continue throughout the remainder of project planning as well as project design and construction, with the incorporation of appropriate design modifications, construction methods, and best management practices intended to further reduce all regulated impacts where possible.

Compensatory mitigation will be required for all permanent impacts to nontidal and tidal wetlands. The applicant will be required to develop and submit a mitigation plan that adequately compensates

for permanent wetland losses in accordance with applicable regulatory requirements and established mitigation standards; MDE notes that a Preferred Alternative Compensatory Mitigation submission is forthcoming and will provide detailed mitigation comments after review.

Thank you for the opportunity to review and comment on the Chesapeake Bay Crossing Study DEIS. If you have any questions or if we can assist you in any way, please do not hesitate to contact me by telephone at 410-537-4023 or by email at danielle.spendiff1@maryland.gov.

Sincerely,



Danielle Spendiff, Chief
Regulatory and Customer Service Division
Wetlands and Waterways Protection Program

Cc: Sarah Williamson, Bay Crossing Team

From:	Danielle Spendiff
To:	Emma Beck; Sarah Williamson; Heather Lowe
Cc:	Jon Stewart -MDE-; Kelly Neff -MDE-
Subject:	Re: BCST2 - Preferred Alternative and Conceptual Mitigation Concurrence Package
Date:	Wednesday, May 13, 2026 4:16:01 PM
Attachments:	image001.png image002.png PACM_ConcurrenceForm_MDE_05132026.pdf

Good afternoon- attached is MDE's concurrence form. Please note that final mitigation decisions (including detailed site searches during final design) will be made during MDE's review of the Joint Permit Application for this project; mitigation options identified as least preferable may be determined to not provide adequate compensatory mitigation during the permitting phase.

Thank you for the opportunity to review and comment.

Danielle Spendiff
Regulatory & Customer Service Division Chief
Federal Consistency Coordinator
Water & Science Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

danielle.spendiff1@maryland.gov

410-537-4023 (O)

410-913-8524 (M)
Website | Facebook | X | Instagram | YouTube | LinkedIn

A revised application fee schedule for the Wetlands & Waterways Protection Program will take effect for all project applications received on or after July 17, 2026. To view the public notice and the updated fee schedule click HERE.

Submit your application, pay fees, and track progress online through the Environmental Service Center.

On Wed, May 13, 2026 at 7:55 AM Emma Beck <emmab@cri.biz> wrote:

> Good morning,
>
> This is a reminder that the MDTA has requested Cooperating Agency concurrence on the **BCST2 PACM** by **COB Today**, **May 13, 2026**. Please provide concurrence via the form linked in the email below and respond electronically **by COB today** to Heather Lowe at hlowe@mdta.state.md.us, and copy Sarah Williamson at sarahw@cri.biz.

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: Maryland Department of the Environment

_X_ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)**

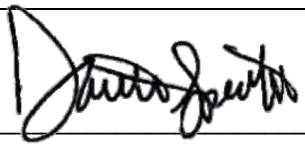
____ **Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree** with the **Preferred Alternative & Conceptual Mitigation***

****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature:  Date: May 13, 2026

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: MARYLAND HISTORICAL TRUST (MD SHPO)

_X_ **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: Tim LaBumme Date: 4/26/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Beth Cole
Administrator, Review and Compliance
Maryland Historical Trust
100 Community Place
Crownsville, MD 21032-2023

Dear Beth Cole:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.

4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

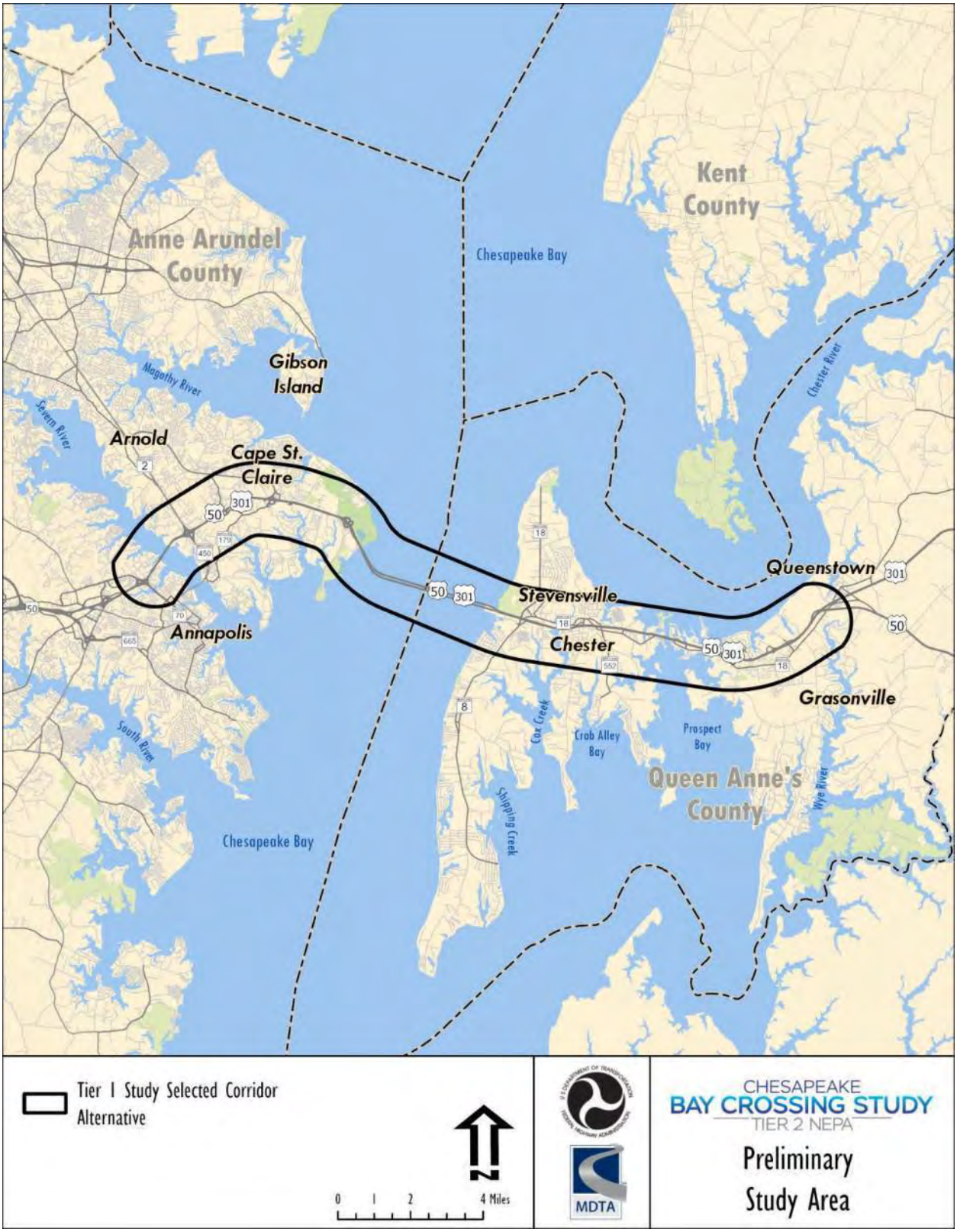


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Tim Tamburrino, MHT, Preservation Officer
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: MARYLAND HISTORICAL TRUST

Signature: Tim Tamburrino Date: 6/13/2023

Print Name: TIM TAMBURRINO

Title: PRESERVATION OFFICER

August 9, 2023

Ms. Elizabeth Hughes
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville MD 21032-2023

Dear Ms. Hughes:

On behalf of the Federal Highway Administration (FHWA) and in accordance with the *Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act for FHWA Undertakings in Maryland* (Section 106 PA), this letter serves to inform the Maryland Historical Trust (MHT) of continued consultation activities for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study). The Maryland Transportation Authority (MDTA) and the FHWA concluded the Tier 1 Study with a Record of Decision (ROD) identifying Corridor 7 as the Selected Corridor Alternative. Corridor 7 has been carried forward for further evaluation in the Tier 2 Study. The Tier 2 Study will include preparation of a Tier 2 Environmental Impact Statement (EIS) to satisfy requirements of the National Environmental Policy Act (NEPA). The EIS will evaluate transportation alternatives including the No-Build Alternative and potential Build Alternatives within Corridor 7.

Consultation Background

The Section 106 process generally consists of four parts: initiation of the review process, identification of historic properties within an Area of Potential Effects (APE), assessment of adverse effects, and resolution of adverse effects. The FHWA and the MDTA initiated the Section 106 consultation process during the Tier 1 Study, on May 10, 2018. The APE for the Tier 1 Study was defined as the three Corridor Alternatives Retained for Analysis (Corridors 6, 7, and 8).

Tier 1 activities included the phased identification of historic properties within the APE. Section 106 regulations at 36 CFR §800.4(b)(2) allow agencies to complete phased identification of historic properties for tiered environmental reviews, in which large corridors or land areas are being considered as alternatives. As part of the Tier 1 Study Section 106 consultation process, historic properties identification focused on establishing the likely presence of historic properties within an agreed upon APE. The Tier 1 Cultural Resources Technical Report compared the three Corridor Alternatives Retained for Analysis and identified significant resources that merited avoidance.

In accordance with 36 CFR §800.8, the MDTA recorded Section 106 decisions made during the Tier 1 Study in the Tier 1 Final Environmental Impact Statement (FEIS)/ROD. Recorded commitments included the deferral of historic properties identification and the continuation of the Section 106 process during the Tier 2 Study. The FEIS/ROD also documented Section 106 activities completed in the Tier 1 Study and specified that Section 106 historic properties identification will continue only within the Tier 1 Study Selected Corridor Alternative (Corridor 7).

Tier 2 Section 106

The Section 106 process is resuming in the Tier 2 Study with the continued identification of historic properties within the Tier 1 Selected Corridor Alternative (Corridor 7). The MDTA will complete a Gap Analysis of archaeological and architectural resources within this area, providing specific recommendations for additional investigations required to identify historic properties in this area, in accordance with 36 CFR 800.4(a). The Gap Analysis will also include recommendations for archaeological and architectural surveys.

The MDTA historic properties identification will also include completion of an architectural historic context focusing on suburbanization and seasonal resources in Anne Arundel and Queen Anne's counties. The historic context will provide specific National Register of Historic Places (NRHP) eligibility requirements and considerations for property types commonly found in the area. This document will be used to complete NRHP evaluations of architectural resources.

Once the Tier 2 Study alternatives are identified, the MDTA will refine the APE established during the Tier 1 Study. If the Tier 2 Study APE is expanded to include areas outside of the Tier 1 Study Area, the MDTA will complete any additional analysis needed to identify historic properties within these areas. The MDTA will provide consulting parties the opportunity to review and provide comments on the Gap Analysis, historic context, archaeological reports, and Determinations of Eligibility.

The MDTA will identify the potential effects to historic properties from each retained alternative and consider these potential effects in the identification of a preferred alternative. The MDTA will minimize or avoid adverse effects to historic properties to the extent possible and seek consulting parties' input on assessments of effects. The MDTA anticipates that a Programmatic Agreement will be executed at the conclusion of Section 106 consultation, because of the project's complexity and the likelihood that effects on historic properties will not be fully determined prior to approval of the undertaking (36 CFR 800.14(b)(ii)). This decision will be made in consultation with relevant parties as the Section 106 consultation progresses.

Next Steps and Consulting Party Invitation

On September 7, 12, and 14, 2023, the MDTA will host three Open House events to learn about the proposed Purpose and Need and alternatives development process and recommendations, to discuss the study with the agency's team, and to provide comments. More details are available at

www.baycrossingstudy.com. The MDTA is currently in the process of completing the Cultural Resources Gap Analysis and historic context. This information will be shared with the MHT and consulting parties for review and comment.

We invite, by copy of this letter, the organizations listed in Attachment 1 to provide comments and participate in the Section 106 process. Pursuant to the requirements of the implementing regulations found at 36 CFR Part 800, the MDTA seeks their assistance in identifying historic preservation issues as they relate to this specific project (see 36 CFR §800.2(c)(3) and (5), and §800.3(f) for information regarding the identification and participation of consulting parties, and §800.4, and §800.5 regarding the identification of historic properties and assessment of effects). For additional information regarding the Section 106 regulations, see the Advisory Council on Historic Preservation's website, www.achp.gov, or contact the MDTA or the MHT.

Please call Sarah Groesbeck, MDTA Cultural Resources Lead, at 410-545-0038 or email sgroesbeck@mdot.maryland.gov with questions regarding this project.

Sincerely,



Melissa Williams
Director of Planning & Program Development

Attachment

cc: Ms. Carol Benson, Chesapeake Crossroads Heritage Area
Ms. Darian Beverungen, Anne Arundel County Office of Environmental and Cultural Resources
Mr. Alexander Bienko, Federal Highway Administration, Maryland Division
Mr. John E. Broderick, Kent Island Heritage Society
Mr. Steve Chandlee, Queen Anne's County Parks and Recreation
Mr. Robert Clark, Historic Annapolis Foundation
Mr. Steve Cohoon, Queen Anne's County Department of Public Works
Ms. Allison Colden, Chesapeake Bay Foundation
Ms. Nancy Cook, Friends of Historic Christ Church
Mr. Joseph DeVia, United States Army Corps of Engineers
Mr. Mark Eberle, National Park Service, Northeast Region
Mr. Jay Falstead, Queen Anne's Conservation Association
Mr. Steve Hammond, Anne Arundel County Historical Society
Mr. Alton Hardee, Jr. Town of Queenstown Planning Commission
Rev. Sterling T. Harris, M. DIV, New United Methodist Church
Mr. Chad Helfenbein, Stevensville Cemetery, Inc.

Historic Stevensville Arts & Entertainment District
Mr. Brian Hopper, NOAA Fisheries, Greater Atlantic Regional Fisheries Office
Rev. Jacquela Horsey, Bryan's United Methodist Church
Kennard African American Cultural Heritage Center
Mr. Steven K. Kline, Eastern Shore Land Conservancy
Ms. Vince Leggett, Blacks of the Chesapeake Foundation
Ms. Jeanette Mar, Federal Highway Administration, Maryland Division
Ms. Erica Matthews, Anne Arundel County Department of Recreation and Parks
Mr. R. Shane Moore, Queen Anne's County Roads Division
Ms. Amy Moredock, Queen Anne's County Planning & Zoning
Ms. Wendy O'Sullivan, National Parks Service, Chesapeake Bay
Ms. Gail Owings, Stories of the Chesapeake Heritage Area
Mr. Chris Pupke, Queen Anne's County Historical Society
Ms. Mandy Ranslow, Advisory Council for Historic Preservation
Mr. Nicholas Redding, Preservation Maryland
Ms. Elizabeth Rosborg, Arnold Preservation Council
Mr. Mickey Sanders, United States Coast Guard
Mr. Samuel Snead, Anne Arundel County Office of Transportation
Ms. Linda Steiner, Bay Bridge Airport
Mr. Steve Archer, State Highway Administration
Mr. Kristofer Beadenkopf, Maryland Transportation Authority
Ms. Beth Cole, Maryland Historical Trust
Mr. Keith Colston, Maryland Commission on Indian Affairs
Ms. Chanel Compton, Maryland Commission on African American History and Culture
Ms. Angela Crenshaw, Maryland Park Service
Mr. Curtis Dale, Sandy Point State Park
Ms. Gwen Gibson, Department of Natural Resources
Ms. Sarah Groesbeck, Maryland Transportation Authority
Ms. Heather Lowe, Maryland Transportation Authority
Mr. Tim Tamburrino, Maryland Historical Trust

Chesapeake Bay Crossing Study Tier 2

Section 106 Consulting Parties Invitation List

Organization	Contact
Advisory Council on Historic Preservation	Ms. Mandy Ranslow
Anne Arundel County Department of Recreation and Parks	Ms. Erica Matthews
Anne Arundel County Historical Society	Mr. Steve Hammond
Anne Arundel County Office of Environmental and Cultural Resources	Ms. Darian Beverungen
Anne Arundel County Office of Transportation	Mr. Samuel Snead
Arnold Preservation Council	Ms. Elizabeth Rosborg
Asbury-Broadneck United Methodist Church	Rev. Stephen Tillett
Bay Bridge Airport	Ms. Linda Steiner
Blacks of the Chesapeake Foundation	Mr. Vince Leggett
Bryan's United Methodist Church	Rev. Jacquela Horsey
Chesapeake Bay Foundation	Ms. Allison Colden
Chesapeake Crossroads Heritage Area	Ms. Carol Benson
Department of Natural Resources	Ms. Gwen Gibson
Eastern Shore Land Conservancy	Mr. Steven K. Kline
Federal Highway Administration, Maryland Division	Mr. Alexander Bienko
Friends of Historic Christ Church	Ms. Nancy Cook
Historic Annapolis Foundation	Mr. Robert Clark
Historic Stevensville Arts & Entertainment District	
Kennard African American Cultural Heritage Center	
Kent Island Heritage Society	Mr. John E. Broderick
Maryland Commission on African American History and Culture	Ms. Chanel Compton
Maryland Commission on Indian Affairs	Mr. Keith Colston
Maryland Historical Trust	Ms. Elizabeth Hughes
Maryland Park Service	Ms. Angela Crenshaw
National Park Service, Chesapeake Bay	Ms. Wendy O'Sullivan
National Park Service, Northeast Region	Mr. Mark Eberle
New United Methodist Church	Rev. Sterling T. Harris, M. DIV
NOAA Fisheries, Greater Atlantic Regional Fisheries Office	Mr. Brian D. Hopper
Preservation Maryland	Mr. Nicolas A. Redding
Queen Anne's Conservation Association	Mr. Jay Falstead
Queen Anne's County Department of Public Works	Mr. Steve Cohoon
Queen Anne's County Historical Society	Mr. Chris Pupke
Queen Anne's County Parks and Recreation	Mr. Steve Chandlee
Queen Anne's County Planning & Zoning	Ms. Amy Moredock
Queen Anne's County Roads Division	Mr. R. Shane Moore
Sandy Point State Park	Mr. Curtis Dale
Stevensville Cemetery Inc	Mr. Chad Helfenbein
Stories of the Chesapeake Heritage Area	Ms. Gail Owings
Town of Queenstown Planning Commission	Mr. Alton Hardee, Jr.
United States Coast Guard	Mr. Mickey Sanders
US Army Corps of Engineers	Mr. Joseph DeVia

August 22, 2023

Melissa Williams
Maryland Transportation Authority
2310 Broening Highway
Baltimore, MD 21224

Re: Chesapeake Bay Crossing Study: Tier 2 NEPA
Continuation of Section 106 Consultation

Dear Ms. Williams,

The Maryland Historical Trust (Trust), a division of the Maryland Department of Planning, received the Maryland Transportation Authority's (MDTA) recent letter informing our office of ongoing consultation activities for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2). As you note, the Section 106 consultation process was initiated in May 2018 during Tier 1 of the study. This phase of the undertaking concluded with a Record of Decision identifying Corridor 7 for further evaluation. The Trust looks forward to working with your agency and other involved parties to successfully complete the Section 106 requirements for Tier 2 of the proposed undertaking.

According to your letter, MDTA will refine the Area of Potential Effects, complete a Gap Analysis, develop a historic context report, and conduct cultural resources investigations that will result in the preparation of archaeology report(s) and the National Register evaluation of architectural resources. Finally, MDTA, on behalf of the Federal Highway Administration, will assess the effects of the proposed alternatives on historic properties. Section 106 Consulting Parties will have an opportunity to review and comment on these studies and key decision-making milestones. We agree with the list of potential consulting parties for this undertaking as presented in Attachment 1 of your letter. As the Section 106 coordination and public outreach efforts progress, additional relevant parties may be identified and invited to participate in the consultation.

We look forward to working with MDTA and the other Section 106 consulting parties throughout the project planning process to identify project alternatives with Corridor 7 that achieve the goal of providing an improved Chesapeake Bay crossing while respecting the state's significant cultural resources. If you have questions or require any assistance, please contact Beth Cole (for archeology) at beth.cole@maryland.gov or me (for the historic built environment) at tim.tamburrino@maryland.gov.

Sincerely,

Tim Tamburrino
Preservation Officer

TJT 202303340

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

CULTURAL RESOURCES METHODOLOGY

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **CULTURAL RESOURCES METHODOLOGY** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the CULTURAL RESOURCES METHODOLOGY, the following agency (by signing this form):

Agency: MARYLAND HISTORICAL TRUST

___ **Provides Comments (below or attached)**

X **Has No Comments**

Comments:

Signature: Tim Tamburrino TIM TAMBURRINO Date: 11/13/2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests final review and any comments on the **Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose & Need Summary, the following agency (by signing this form): **Agency:** **Maryland Historical Trust / MD SHPO**
____ **Provides Comments (below or attached)** **_X__ Has No Comments**
Comments:
Signature:  Date: 7/12/2024

January 23, 2026

Ms. Elizabeth Hughes
State Historic Preservation Officer
Maryland Historical Trust
100 Community Place
Crownsville MD 21032-2023

Dear Ms. Hughes:

On behalf of the Federal Highway Administration (FHWA) and in accordance with the *Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act for FHWA Undertakings in Maryland* (Section 106 PA), this letter continues consultation with the Maryland Historical Trust (MHT) for the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The MDTA has determined that all Build Alternatives would have an adverse effect on historic properties. The attached *Section 106 Effects Assessment Report* (Effects Report) (Attachment 1) includes information about Section 106 consultation to date, and assessment of effects on historic properties within the Area of Potential Effects (APE), and project effects determinations by alternative. This letter summarizes these findings.

Alternative C is the MDTA's Recommended Preferred Alternative (MDTA-RPA). Additional information about Alternative C's advantages over other Build Alternatives as the MDTA-RPA is described in Chapter 8 of the Draft Environmental Impact Statement (DEIS). At this time, Alternative C is the MDTA's recommended preference only, and an alternative has not been selected to advance to design or construction. The FHWA will identify the selected alternative after comments on the DEIS and input from the public and agencies have been considered.

Area of Potential Effects and Archaeology Survey Area

The Area of Potential Effects (APE) is unchanged from when it was refined in April 2025. It is based on a preliminary engineering limits of disturbance along the U.S. 50/301 corridor with buffer to account for potential audible/visual effects to adjacent parcels that would not be physically affected by the Tier 2 Study build alternatives. Along the Chesapeake Bay, the APE includes parcels adjacent to the Chesapeake Bay, as well as the Sandy Point Shoal Lighthouse, to account for potential visual effects from new bridge structures. Field visits were completed on the Eastern Shore to determine areas in which the existing bridge and future improvements would be visually prominent.

The MDTA Archaeology Survey Area for the project is defined as the limits of disturbance for the MDTA-RPA, Alternative C, as shown in Appendix A of the Effects Report.

Archaeological Historic Properties Identification

Following the methodology set forth in the *Chesapeake Bay Crossing Study, Tier 2 NEPA: Cultural Resources Gap Analysis Technical Report* (Gap Analysis), MDTA has conducted terrestrial archaeological surveys in a phased approach. The MDTA completed the Phase I survey along the U.S. 50/301 corridor within SHA and MDTA right-of-way in the Archaeological Study Area for the build alternatives. Following the identification of the alternatives retained for detailed study (ARDS), MDTA conducted archaeological surveys within areas common to all alternatives not previously surveyed and determined that no further archaeological investigations were warranted in letters dated August 6, 2024 and December 16, 2025. MHT concurred with these findings on September 4, 2024 and January 15, 2026.

The MDTA's phased approach called for additional archaeological survey to be conducted within those areas of the MDTA-RPA not surveyed previously. All areas of high or moderate archaeological potential within the MDTA-RPA, as identified in the Gap Analysis, have now been surveyed. If a different Build Alternative is selected than Alternative C, MDTA will determine if additional investigations are required.

Effect Determination

The seven Alternatives Retained for Detailed Study (ARDS) include the No-Build Alternative (Alternative A) and six Build Alternatives (Alternatives B-G). Each build alternative includes removing the existing eastbound and westbound Bay Bridge spans and replacing them with two new bridge spans constructed near the location of the existing Bay Bridge. The ARDS are differentiated by the number of lanes provided across the new bridge and on the approaches as well as the bridge location. They consist of:

- **Alternative A - No-Build:** retains the existing Bay Bridge, the U.S. 50/301 alignment, and the existing number of lanes: 6 lanes along U.S. 50/301 on the Western Shore, 5 lanes across the Chesapeake Bay on the existing Bay Bridge, and 6 lanes along U.S. 50/301 on the Eastern Shore;
- **Alternative B - 6-8-6 North:** 6 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, and 6 lanes along U.S. 50/301 on the Eastern Shore;
- **Alternative C (MDTA-RPA) - 6-8-6 South:** 6 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, and 6 lanes along U.S. 50/301 on the Eastern Shore;

- **Alternative D - 8-8-8 North:** 8 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, 8 lanes along U.S. 50/301 on the Eastern Shore;
- **Alternative E - 8-8-8 South:** 8 lanes along U.S. 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, 8 lanes along U.S. 50/301 on the Eastern Shore;
- **Alternative F - 8-10-8 North:** 8 lanes along U.S. 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, 8 lanes along U.S. 50/301 on the Eastern Shore; and
- **Alternative G - 8-10-8 South:** 8 lanes along U.S. 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, 8 lanes along U.S. 50/301 on the Eastern Shore.

Each of the Build Alternatives also include stormwater management, utility relocations, and improvements associated with each build alternative. These elements informed the development of the limits of disturbance (LOD) for each build alternative. Additionally, an optional pedestrian and bicycle shared-use path (SUP) is being considered and would provide connectivity for pedestrians and bicyclists between the Eastern and Western Shores.

There are 18 historic properties within the project APE. The following table lists these historic properties and summarizes effects by Build Alternative:

MIHP or Site No.	Name	Build Alternatives Effects					
		B	C (MDTA-RPA)	D	E	F	G
AA-47-48	Chesapeake Bay Bridge	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**
AA-74	Holly Beach Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-166	Sandy Point Shoal Light Station	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-322	Weedon Farmhouse	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected
AA-330	Sandy Point Farmhouse	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-2305	Sandy Point State Park	**Adversely Affected**	No Diminishment	**Adversely Affected**	No Diminishment	**Adversely Affected**	No Diminishment
AA-2511	Asbury Broadneck Methodist Church and Cemetery	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment

MIHP or Site No.	Name	Build Alternatives Effects					
		B	C (MDTA-RPA)	D	E	F	G
AA-2592	Westinghouse Ocean Research and Engineering Center	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
AA-2594	Skidmore	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**
AA-2603	Dutch Mill Farm Restaurant	Not Affected	Not Affected	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**
QA-125	Eareckson House	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected	Not Affected
QA-221	Clayland Price Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-270	Belle Vue	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-542	SHA Bridge No. 1700600	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-545-547	Matapeake Ferry Terminal, Club House, Shop	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-633	William E. Denny Farm	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment	No Diminishment
QA-723	Piney Narrows Yacht Haven	Not Affected	Not Affected	No Diminishment	No Diminishment	No Diminishment	No Diminishment
18AN652	Sharpe-Ridout-Boone Mill	Not Affected	Not Affected	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**	**Adversely Affected**
Overall Project Effect		**Adverse Effect**	**Adverse Effect**	**Adverse Effect**	**Adverse Effect**	**Adverse Effect**	**Adverse Effect**

There would be no historic properties affected by Alternative A, the No-Build Alternative. All Build Alternatives would result in an adverse effect on historic properties. The MDTA-RPA, Alternative C, would adversely affect the Chesapeake Bay Bridge and Skidmore. Of the Build Alternatives, the MDTA-RPA adversely affects the fewest historic properties.

MDTA continues to consult with MHT and consulting parties on development of the study's Programmatic Agreement (PA) as discussed in the October 30th Consulting Parties Meeting. MDTA and FHWA will proceed with PA consultation and development of mitigation for historic properties adversely affected by the MDTA-RPA.

With FHWA, the MDTA will conduct consultation to identify mitigation to include in the PA for historic properties that will be adversely affected, first focusing on the properties adversely affected by the MDTA-RPA. These properties are also affected by all Build Alternatives. Should another alternative be the Selected Alternative, further consultation will be necessary to identify mitigation, minimization, or avoidance commitments for the additional properties

impacted by the other build alternatives. MDTA will continue to evaluate design adjustments to avoid adverse effects.

Review Request

Please review the attached Effects Report. We request your concurrence by February 23, 2026 that all Build Alternatives (B-G) would have an adverse effect on historic properties, and any comments you may have on the attached report. We also request any comments on the definition of the Archaeology Survey Area.

We invite, by providing a copy of this letter, the organizations listed in Attachment 2 to provide comments and participate in the Section 106 process. Pursuant to the requirements of the implementing regulations found at 36 CFR Part 800, the MDTA seeks their assistance in identifying historic preservation issues as they relate to this specific project (see 36 CFR §800.2[c][3] and [5], and §800.3[f] for information regarding the identification and participation of consulting parties, and §800.4, and §800.5 regarding the identification of historic properties and assessment of effects). If no response is received by February 23, 2026, we will assume that these offices decline to participate. MDTA will also assume concurrence by MHT with the finding of Adverse Effect if no response is received within 30 days following receipt of this letter by MHT. For additional information regarding the Section 106 regulations, see the Advisory Council on Historic Preservation's website, www.achp.gov, or contact the MDTA or the MHT.

Please call Sarah Groesbeck, MDTA Cultural Resources Lead, at 410-545-0038 or email sgroesbeck@mdot.maryland.gov with questions regarding this project.

Sincerely,



Heather Lowe
Planning & Community Relations Manager

Attachments

cc:

Mr. Alexander Bienko, Federal Highway Administration, Maryland Division
Mr. Steve Archer, State Highway Administration
Ms. Sarah Groesbeck, Maryland Transportation Authority
Ms. Heather Lowe, Maryland Transportation Authority

February 26, 2026

Ms. Heather Lowe
Planning and Community Relations Manager
Maryland Transportation Authority
2310 Broening Highway
Baltimore, Maryland 21224

Re: Chesapeake Bay Crossing Study – Tier 2 NEPA
Section 106 Effects Assessment Report and Draft Environmental Impact Statement
Anne Arundel and Queen Anne's Counties, Maryland
MHT Log Numbers 202600297 and 202600313

Dear Ms. Lowe:

Thank you for providing the Maryland Historical Trust (MHT), the Maryland State Historic Preservation Office, with the Section 106 Effects Assessment Report and the Draft Environmental Impact Statement (DEIS) for the above-referenced undertaking. The Maryland Transportation Authority's (MDTA) submittal, which identifies Alternative C (6-8-6 South) as MDTA's Recommended Preferred Alternative (RPA), represents ongoing consultation pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended. MHT staff have completed our review and offer the following comments.

Identification of Historic Properties: As documented in the Effects Assessment Report, MDTA conducted phased architectural and archaeological investigations within the refined Area of Potential Effects (APE) during Tier 2 review. A total of seventeen (17) architectural historic properties and one (1) archaeological site were identified within the APE, including one National Register–listed property and multiple National Register–eligible resources. The report summarizes the evaluation results and reflects the historic properties present within the APE.

MHT has reviewed MDTA's phased archaeological investigations and the definition of the Archaeology Survey Area associated with the RPA. We concur that all areas of high and moderate archaeological potential within the RPA have been surveyed and that no additional terrestrial archaeological investigations are warranted at this time. Should a different build alternative be advanced, any additional survey needs should be evaluated in consultation with MHT.

Assessment of Effects: The Effects Assessment Report concludes that all build alternatives would result in adverse effects to historic properties. Under the RPA, two new bridge spans would be constructed south of the existing alignment and the existing spans would be removed. Based on the documentation provided, MHT concurs that the RPA would result in adverse effects to the following historic properties:

- MIHP Nos. AA-47/AA-48: Chesapeake Bay Bridge (William Preston Lane Jr. Memorial Bridge)
- MIHP No. AA-2594: Skidmore

The adverse effect to the Chesapeake Bay Bridge results from removal of the existing historic bridge spans. The adverse effect to Skidmore results from project-related alterations within its historic setting.

Draft Environmental Impact Statement (DEIS): MHT has reviewed the Tier 2 Draft Environmental Impact Statement. The DEIS summarizes the identification efforts and effects findings documented in the Section 106 Effects Assessment Report and acknowledges that adverse effects to historic properties would occur under the build alternatives. It identifies the RPA and notes its comparatively reduced impacts to historic properties relative to the other build options.

While the DEIS reflects the results of the Section 106 review, resolution of adverse effects will occur through a separate agreement document developed through the Section 106 consultation process prior to issuance of the combined Final EIS/Record of Decision.

Resolution of Adverse Effects: Given the scope, complexity, and phased design development of the undertaking, MHT agrees that execution of a Programmatic Agreement is appropriate to resolve adverse effects and guide continued consultation as design advances. We look forward to working with FHWA, MDTA, and consulting parties to develop an agreement that clearly defines mitigation commitments, establishes procedures for ongoing coordination, and includes provisions addressing unanticipated discoveries and project modifications during final design and construction.

Thank you for the opportunity to comment. If you have questions or require further assistance, please contact Tim Tamburrino (for architectural historic properties) or Dixie Henry (for archaeology) at your convenience.

Sincerely,

Anne Raines
Deputy Director/Deputy State Historic Preservation Officer

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests any final comments on the **draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form): **Agency: Maryland Historical Trust (MHT) / Maryland State Historic Preservation Office**
____ **Provides Comments (below or attached)** _X_ **Has No Comments**
Comments:
Signature:  Date: 5/11/2026

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:_____Department of Natural Resources_____**
____ **Agrees** with the **Study Schedule (without comments)** **__X__ Agrees** with the **Study Schedule (with <u>minor</u> comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: **Please note that if access to DNR lands is required, DNR's Internal Review process will have to be considered as part of the project schedule.**
Signature: Gwen Gibson Date: 5/9/23

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Cooperating and Participating
Agency

June 2, 2023

Tony Redman
Director
Project Review Unit
Maryland Department of Natural Resources
581 Taylor Avenue
Tawes State Office Building
Annapolis, MD 21401

Dear Tony Redman:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Nongame and Endangered Species Conservation Act, Natural Resources Article 8-18 Critical Area Law, and other laws and regulations. As Lead Agencies, MDTA and FHWA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.
6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

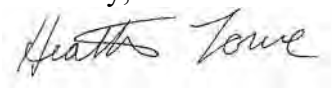
Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

Sincerely,

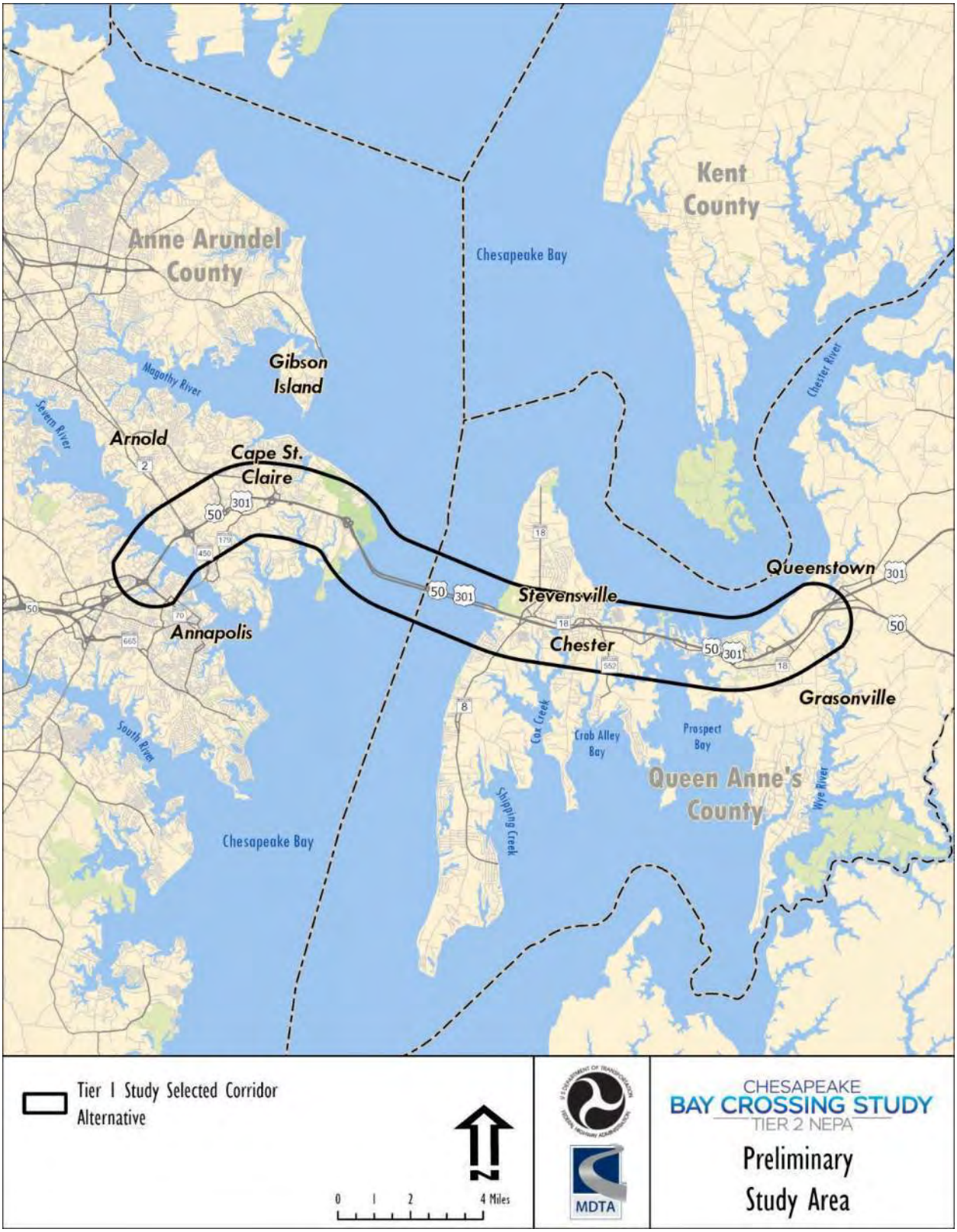


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Gwen Gibson, MDNR, MES-MDOT SHA Liasion
Roland Limpert, MDNR
Chris Aadland, MDNR
Katherine Charbonneau, MDNR-CAC, Executive Director
Nick Kelly, MDNR-CAC, Regional Program Chief
Kathryn Durant, MDNR-CAC
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Department of Natural Resources

Signature: Gwen Gibson Date: 6/14/23

Print Name: Gwen Gibson for Tony Redman (Director, Environmental Review Program)

Title: DNR Environmental Review Program

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:_____Department of Natural Resources_____**
____ **Concures** with the **Indirect & Cumulative Effects Methodology (without comments)** **_X___ Agrees** with the **Indirect & Cumulative Effects Methodology (with <u>minor</u> comments)*** **____ Does not agree** with the **Indirect & Cumulative Effects Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: **There's a typographical error in the errata sheet comment #20 provided by DNR. The comment should read:** **Page 5 says "Bay Bridge to open up new land within typical commute distance (0 to 60 minutes of travel time) of major employment areas. This information will also be overlaid with data from MDP identifying rural and natural areas vulnerable to residential development to identify potential induced growth areas." Critical Areas, DNR WHS, and other natural resource agencies should also be consulted on identifying natural areas. Additionally, DNR WHS is in the process of identifying areas on DNR-managed lands that would be designated as Irreplaceable Natural Areas in accordance with Maryland HB784. Candidate areas are still being identified and it is not known at this time whether any would fall within the Study Area; however, Irreplaceable Natural Area designations will be made during the time period of the study.** **Additionally, the Irreplaceable Natural Areas designations were finalized in September 2023. There does not appear to be any currently listed Irreplaceable Natural Areas within the Study Corridor.** **Please continue coordinating with DNR regarding natural resources and Maryland State Parks resources in the ICE area as studies progress.**
Signature: __Gwen Gibson_____Date: ____11/20/23_____

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:**___Maryland Department of Natural Resources_____
____ **Concures** with the **Natural Environmental Methodology (without comments)** __X_ **Agrees** with the **Natural Environmental Methodology (with minor comments)*** ____ **Does not agree** with the **Natural Environmental Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **Fishing & Boating Service comments (2):** The dates listed as our common TOYRs for anadromous species, March 1st through June 15th, may be extended in this mid-Bay area. Multiple species such as striped bass, Atlantic sturgeon, American shad, hickory shad, alewife herring, and blueback herring will be traveling through this area to the largest spawning grounds on the east coast. The migrations through the area will likely be occurring in February as well, so DNR may recommend February 1st through June 30. pg 15 L(2)(d)(iii) "Anadromous Fish" This section should probably include an evaluation of striped bass. Striped bass pass through the area on their migration to upper Bay spawning areas and the area around the Bay Bridge is an important striped bass fishing location. The current overfished status and poor spawning of the Atlantic striped bass stocks intensifies the importance of these critical resources. Observing the tagging telemetry data will be a useful source of information to see what species are within the bridge area. **Environmental Review comments (1):** 1. pg 11 H(4) "Dredging and Disposal of Dredged Material" (a)(iv): "Material requirements will be obtained from various disposal/beneficial use area managers..." and then a list of disposal sites. The listed disposal sites can only accept material that was identified in their planning and licensing process. Poplar Island and Mid-Bay Islands can only accept material from the sources identified in the respective EIS's (federal navigation channels) and dredged material from a new Bay crossing is not

among the acceptable sources identified in the respective EIS's. Masonville and Cox Creek are for Baltimore Harbor dredge material which is legally defined as contaminated. It is unlikely that Bay crossing material could be placed at those two sites since the capacity to dispose of Harbor dredge material is limited. Disposal of dredged material for the Bay Crossing may entail establishing a new disposal area.

2. Section G.5.b.ii. Scenic Rivers review staff and coordination are being updated at DNR at this time. Further comments may be forthcoming in the next stages.

3. Section K.2.b.iv. DNR refers to the FIDS layer on MERLIN as the boundary for FIDS. The description provided in this section makes it seem like the FIDS acreage within the study area could decrease due to the methods used for this study, which would underestimate overall impacts. Please add the actual MERLIN FIDS acreage for comparison in any results presented. As stated, smaller forest stands (less than 10 acres of interior) could act as FIDS habitat or flyover refugia when recently impacted by development.

Signature: Martha Stauss Date: 2/5/2024

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:** Maryland Department of Natural Resources
____ **Concures** with the **Socioeconomics & Land Use Methodology (without comments)** __X_ **Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** ____ **Does not agree** with the **Socioeconomics & Land Use Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: Corridor 7 would benefit from vertical land-use analyses in their methodologies, not just horizontal land-use, in order to conserve grown-out horizontal land-use. For example, a double-decker suspension bridge(s) installed as the area experiences population growth to minimize the take of land and natural resources that affect Sandy Point State Park, Holly Beach Farm, and etc. A double-deck bridge(s) may be an option that would maximize land use efficiency and minimize environmental, economic, EJ impacts while also offering multimodal options. DNR recommends methodologies be robust enough to encompass vertical building strategies and identify height or airspace restrictions, or minimum height (i.e. shipping clearance), or minimum depth (i.e. shipping clearance) requirements.
Signature: Martha Stauss Date: 2/8/2024

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:** Department of Natural Resources
_X___ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **____ Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Melissa C. Day Date: July 23, 2024

From:	Gwendolyn Gibson -DNR-
To:	Heather Lowe (hlowe@mdta.state.md.us)
Cc:	Sarah Williamson
Subject:	Fwd: BCST2 - Reminder of Scoping Comment Deadline - 1/13/25
Date:	Monday, January 13, 2025 6:10:14 PM
Attachments:	image001.png

Hello,

DNR has reviewed the Chesapeake Bay Crossing Tier 2 NEPA Notice of Intent document, dated November 2024, and is providing the following scoping comments for this project as it moves forward:

- Please coordinate with DNR as the study progresses. DNR will help provide information on fisheries, SAV, shellfish, rare/ threatened/ endangered species, and other aquatic, non-tidal, and terrestrial natural resources. Impacts to DNR land (i.e. Sandy Point) and Critical Areas are also of concern to DNR.
- The Study area includes the 786-acre Sandy Point State Park on the north side of US50 and the newly acquired Holly Beach Farm to the south. DNR supports alternatives that minimize impacts to these properties and appreciates the ongoing coordination from the study team related to these resources. Avoidance and minimization efforts should continue as the study moves forward, and DNR can help provide relevant information regarding these properties.
- The project should minimize adverse impacts to shipping, commercial, and recreational boating to the extent practical. Notices to Mariners, regulations, and aids to navigation should be utilized appropriately to protect both workers and vessel operators.

Thank you for the opportunity to review and comment. We look forward to continuing coordination with the study team as this process moves forward. Please let me know if there are any questions.

Thank you,

Gwen Gibson

MD Logo.png

dnr.maryland.gov

Gwen Gibson
Maryland Environmental Service/ MDOT
Liaison
Environmental Review Program
Department of Natural Resources
580 Taylor Avenue, B-3
Annapolis, Maryland 21401
410-260-8405 (office)
240-278-6429 (cell)
gwendolyn.gibson@maryland.gov

Click here to complete a three question customer experience survey.

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** ___Maryland Department of Natural Resources_____
____ Concurs with the **Draft ARDS (without comments)** **__X__ Agrees** with the **Draft ARDS (with <u>minor</u> comments)*** **____ Does not agree** with the **Draft ARDS*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: Please see the attached comment on page 2 from our colleagues at DNR-Maryland Park Service.
Signature: ____ Melissa C. Day _____ Date: _____3/31/2025_____

Comments: Sandy Point State Park management has reviewed the Draft Alternatives Retained for Detailed Study (ARDS) and concur with its findings. However, we express strong opposition to any alignments featuring additional spans or tunnels implemented north of the existing bridge structures.

Implementing a northern alignment crossing in this corridor would necessitate the acquisition of significant acreage of Sandy Point State Park, particularly affecting the marina and Mezick Pond—areas that are among the most frequented and cherished by our visitors. Such a significant reduction in park property would diminish recreational opportunities and severely impact access to these amenities. Moreover, the Sandy Point State Park Marina stands as one of the largest public marinas in the region, playing a pivotal role in providing public water access and supporting local tourism and recreation.

Beyond the immediate recreational and operational impacts, the park and its associated properties hold substantial historical and cultural significance to the State of Maryland. The proposed Northern alignment threatens to disrupt these valued resources, undermining the park's integrity and its contribution to our state's heritage.

In conclusion, while we support efforts to address transportation needs across the Chesapeake Bay, we urge the consideration of alternatives that do not compromise the invaluable resources and public amenities that Sandy Point State Park offers.

Signature: _____ Date: 3/28/25

August 6, 2025

Heather Lowe, Planning & Community Relations Manager
Maryland Transportation Authority
Division of Planning and Program Development
2310 Broening Highway
Baltimore MD 21224

RE: Maryland DNR Feedback on the Chesapeake Bay Crossing Study - Potential Impacts to Sandy Point State Park

Dear Ms. Lowe:

The Maryland Department of Natural Resources (DNR) has participated in meetings and ongoing reviews of the alternatives for new Chesapeake Bay Bridge crossings. DNR appreciates the effort and opportunities to discuss the design alternatives and proposed shared-use path concepts as part of the Chesapeake Bay Crossing Tier 2 Study. DNR supports the concept of new bridge crossings and the efforts to minimize potential impacts to the environment from the replacement of the existing bridges.

DNR has concerns regarding the Northern alignment design, potential vertical clearances over the Mezick pond, and shared-use path configuration that would have potential operational and resource impacts to Sandy Point State Park. Sandy Point is one of the State's most popular parks, receiving over one million visitors each year. DNR has made significant financial investments in Sandy Point over the last 10 years, totaling $14.5 million. The public routinely enjoys the Park's beaches, trails, marina and other water recreation offerings. The Mezick Pond channel connects the Park's marina and boat launch to the Chesapeake Bay, playing a pivotal role in providing public water access, supporting local tourism and recreation, and providing Bay access for police and emergency management services. The Park also hosts many popular annual events.

Initial concepts of the proposed Northern alignment for the bridge, and shared-used path, cross the Mezick Pond entrance channel and appear to impact Park property. DNR has stated in previous comment letters and meetings the preference for the Southern alignment alternatives rather than Northern alignment to minimize impacts to Sandy Point State Park. Additionally, the preferred alternative should avoid vertical, or other access restrictions, to the entrance channel to Mezick Pond as well as any utilization of Park property for the construction or operation of the shared use path.

In closing, we appreciate the continued coordination with DNR and the Maryland Park Service. We look forward to working with the project team on this important effort.

Sincerely,



Josh Kurtz
Secretary

CC:
Paul Peditto,
Katherine Charbonneau,
Angela Crenshaw,
Richard Ortt,
Rachael Temby,
Jonas Williams,
Mary Ironside,
Curtis Dale,
Shane Johnston,
Tony Redman, Director, Environmental Review Program
Gwen Gibson, Transportation Liaison, Environmental Review Program
Melissa Day, Transportation Liaison, Environmental Review Program
Sarah Williamson, CRI

October 8, 2025

Subject: Maryland DNR comments on PRELIMINARY PUBLIC NOTICE D05PPN-08-2025

To Office of Commander;

The Maryland Department of Natural Resources (DNR) has previously communicated to the MDTA Bay Crossing Study team that any proposed vertical clearance restriction at the entrance to Mezick Pond is not acceptable. A 31.5 foot clearance would significantly impede emergency response capabilities and restrict public access to one of the most popular recreational and boating areas within Sandy Point State Park.

DNR's position remains that impacts to park operations and visitor access should be minimized, and maintaining unrestricted access to Mezick Pond is essential to that objective. As stated in DNR's official correspondence to the Bay Crossing Study team submitted in August 2025, DNR expects that any vertical clearance restriction at Mezick Pond be removed from further consideration.

We appreciate your attention to this matter and request confirmation that the proposed restriction has been withdrawn from the current plan.

Sincerely,



Tony Redman, Director
DNR Environmental Review Program

Attachment: DNR Official Response Letter dated August 6, 2025

CC: Rich Ortt, Bob Sadzinski, Jonas Williams, Curtis Dale, Gwen Gibson, Melissa Day

March 09, 2026

Heather Lowe
Planning & Community Relations Manager
Maryland Transportation Authority
Division of Planning and Program Development
2310 Broening Highway
Baltimore, MD 21224

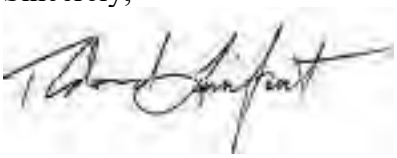
RE: Maryland Department of Natural Resources Comments to the Chesapeake Bay Crossing Study, Tier 2 NEPA, Draft Environmental Impact Statement Comments

Dear Ms. Lowe:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Chesapeake Bay Crossing Study Tier 2 NEPA. Please find Maryland Department of Natural Resources comments to the DEIS and supporting technical reports attached.

Please contact me if you have questions or comments related to this review at MelissaC.Day1@maryland.gov**.**

Sincerely,



Roland Limpert
Acting Director,
Environmental Review Program
Maryland Department of Natural Resources
580 Taylor Avenue, B-3
Annapolis, MD 21401

Cc: Richard Ortt, Director, Resource Assessment Service
Bob Sadzinski, Director, Power Plant Research Program

Attachments

Attachment 1: Maryland Department of Natural Resources comments to Chesapeake Bay Crossing Study Tier 2 NEPA Draft Environmental Impact Statement, January 2026

Page	Page # in .pdf	Section	Section Header	Comment
0	0		General comment	General comment for the whole DEIS: This document should reference the associated documents more and add more summaries in DEIS for the referenced sections. This would help incorporate more information to items that are priorities for DNR- such as blue crabs and non-federal fish species.
0	0		General	The Wildlife and Heritage Service Natural Heritage Program has reviewed the DEIS for the Bay Crossing Study and it appears that our previous comments have been incorporated. These included concerns for a great blue heron colony near Sandy Point, a habitat protection area at Sandy Point for breeding marsh birds including the Black Rail, mixed heron colonies on the man made islands under the bridge towers, peregrine falcon nest sites under the catwalk of the bridge, waterfowl concentration and staging areas along shorelines to the east and west of the bridge, and Delmarva fox squirrel and potential FIDS habitat in the forested areas of the study area. For further technical assistance regarding all avian concerns except waterfowl, Dave Brinker of our staff would be the contact at dave.brinker@maryland.gov. For waterfowl concerns, Kayla Harvey would be our contact at Kaylam.harvey@maryland.gov.
0	0		General comment	DNR MPS requests a communications plan during construction regarding how operations may affect Sandy Point State Park and its users. A primary concern is how a fifteen year construction window will affect day to day management of the Sandy Point State Park and Mezick Pond. With construction anticipated to begin around 2032 and major components such as dredging to nine feet and possible pier blasting, DNR needs to better understand how access will be maintained. During peak season the Park is moving a very high volume of boaters and beach goers, and DNR cannot have extended periods where access is effectively cut off. Construction staging appears to be primarily off site, but that remains a concern given Park visitation levels and the potential for conflicts.
0	0		General comment	DNR appreciates that the preferred western shore connection has shifted to Oceanic Drive. Our earlier concern was that terminating the path inside the park would create parking pressure and congestion from users who are not utilizing the beach or marina. Keeping that connection parallel to the westbound lanes is a much more workable approach for us and positions park use as an option rather than a requirement for those using the path.
0	0		General comment	Please make it clear that the recommended southern alignment avoids new permanent structures or height limitations over Mezick Pond and its inlet, which would create significant operational issues for one of the busiest marinas in the region. Earlier drafts showed limits of disturbance at the pond entrance, so please confirm any construction at Mezick Pond and its inlet are only temporary measures such as sediment control rather than a change in bridge footprint.
0	0		General Comment	Forest Mitigation that adds trees to gaps identified in the Habitat Connectivity Network is preferred.
2-9	9	2.2.5.3	Future Shipping Traffic	It would be helpful to understand the approximate depth required by the Panamax III Max vessels to understand how it relates to the navigation channel depth and how it may influence future federal dredging needs.
2-9	9	2.2.5.3	Future Shipping Traffic	The final paragraph on page 2-9 discusses the pier protection project. However, a little more discussion of the project would be applicable here. Could pier placement impact the Shipping Operations discussion in Section 2.2.5.1 because the placement of the pier protection structures are along the sides of the channel?
3-11, 3-22	50/61	3.2.1/3.3.1.2	Design Considerations	The entry into Mezick Pond was not addressed in the main study document. The Natural Environment Technical Report does a better job looking at potential impacts (especially natural), it is still believed that any preferred path may have direct impacts on larger sailboats' ability to utilize this boat launch. As one of the most popular launches in this region, the Maryland Park Service would like to minimize impacts, or preferably, have no impact or changes to the sizes/heights of boats utilizing this boat ramp. DNR would like the text to clarify that there will be no height restrictions to Mezick Pond with the new bridge design. Please state this in the text.
3-24/ 4-62/ 4-92	63/165 / 195	3.3.5.1, 4.5.4.2/ 4.5.7.1	Methodology and Assumptions/ Water Quality/ Environmental Consequences	Would there be any potential for stormwater discharge treatment off the new bridge before it goes into the Bay?
3-25	64	3.3.5.1	Methodology and Assumptions	The text at the top of the page references the 2000 Maryland Stormwater Design Manual, but the 2009 version is referenced on pdf page 165 (page 4-62) in section 4.5.4.2 under heading Minimization and Mitigation update. Update first stormwater manual reference to be consistent instead of sometimes referring to out-of-date manual.
4-18	121	4.2.1.5	Environmental Consequences	It was reported in a recent meeting that there would be no DNR land impacted by Alternative C. Will the discussion in this section and the impact numbers in Table 4-10 be updated for Alt C and the other alternatives?
4-68	171	4.5.5.1	Regulated Wetlands and Waterways	The project should be designed to maintain or enhance fish passage through the project area, particularly during low flow periods.
4-69	172	4.5.5.2	Chesapeake Bay	The bottom paragraph on page 4-69 and text on 4-73 discusses hydrodynamics modelling.
4-73	176	4.5.5.2	Chesapeake Bay	The last paragraph on page 4-73 lists some temporary impacts that will be of longer duration. Will demolition activities potentially have a long enough duration to be part of this list?
4-74 to 4-75	177	4.5.5.2	Chesapeake Bay	The statement that the final design will have similar flow characteristics to the existing structures based on the hydrodynamic modeling is not supported by the Hydrodynamic Modeling Report (Appendix F) which estimates an increase in tidal velocities in the area of the shipping channel for the final design. The Hydrodynamic Model also did not model the to-be-built bridge protection measures which, if they remain in place, would be expected to further constrict tidal flow increasing tidal velocities. Will modelling be performed with consideration to the pier protection structures that will be installed? Additional information on how these structures will influence post-construction conditions seems to be needed.

4-75	178	4.5.5.2	Chesapeake Bay	Please note that there are resources available to locate beneficial use opportunities for dredged material in local restoration projects. Please reference Beneficial Use of Dredged Material resources BUILD tool at: https://dnr.maryland.gov/ccs/Pages/beneficial-use.aspx or contact Maggie Cavey at maggie.cavey1@maryland.gov
4-76	179	4.5.5.3	Maintained Navigational Channels and Civil Works Projects, Affected Environment	There are also channels that are not Federally maintained, and serve local communities, marinas, parks, and provide water access for small recreation and commercial vessels, including channels on Mill Creek, Whitehall Creek, Hackson Creek, at the Chesapeake Bay Bridge Marina, Mezick Pond access channel, and the Sandy Point Channel.
4-78	181	4.5.5.3	Table 4-40	This table shows that Alternative C will cross the Mezick Pond waterway. Is this a temporary impact for construction or permanent? If so, please indicate the difference in the table. This is related to the previous Mezick pond comment.
4-92	195	4.5.7.1	Table 4-44	The conversion of shallow water habitat to deep water habitat should be included in this table. It may lead to a change in species composition in those areas as noted in bulleted list on page 4-96, and the concept of converting the shallow to deep habitat should be addressed in the other parts of the section where appropriate.
4-92/4-107	196/210	4.5.7.1/4.5.7.2	Environmental Consequences/ Blue Crabs and Horseshoe Crabs	Retention of as many sand beaches at the bases of the bridges as is practical would be beneficial to the Horseshoe crabs for spawning purposes.
4-96	199	4.5.7.1	Aquatic Habitat	The top paragraph on this page notes that the dredged areas will be restored to their benthic contours. Will similar substrate be used for the restoration?
4-96	199	4.5.7.1	Aquatic Habitat	DNR feels the report does not adequately describe impacts to commercial and recreational fishing and loss of income as it does for land-based businesses. We can expect significant impacts to both as the area of behavior disturbance associated with the construction encompasses a significant portion of the middle bay. Commercial impacts include blue crab pot fishery, commercial hook and line fishery for striped bass, oysters, winter drift net gill fishery (striped bass), charter fishing for striped bass. There may be others. We can use much more information on the blue crab fishery in Section 4- pages 4-97 through 4-99. The NETR Section 13.7 does a better job of describing this, and this text needs to be referenced.
4-99 to 4-107	208-210	4.5.7.2	Aquatic Biota, Blue Crab sections	Similar to the comment above, the blue crab and associated fishery is not emphasized enough in this section. The NETR provides applicable information in Section 13.7 that should be summarized and referenced. Additionally the text on pages 4-99 and 4-107 that describe the blue crab habitat does not clearly state that they can be found in most shallow waters during the warm months. The wording used makes it seem like they would mostly be found in SAV areas, but they are common on shallow edges that don't have SAV as well. This section should also include overwintering habitat for crabs. The area around the bridge is important for commercial crabbing and this area will be impacted by dredging (page 4-74) and bridge construction.
4-103 to 4-105	207-208	4.5.7.2	Aquatic Biota, Fish	Although the text on the bottom of page 4-103 does mention that noise impacts would affect all fish and not just Federally managed species, this section should be written in a manner that correlates noise effects to all the fish species in the area, not just EFH. The EFH designation doesn't cover other important species that heavily utilize the area, such as striped bass. It would also help if the figure noted what size piles each isopleth was designated for.
4-113	216	4.5.7.3	Minimization and Mitigation	The second paragraph on the page states "The MDTA will determine in coordination with NOAA Fisheries whether is practicable to implement of ZSFP within the Chesapeake Bay during construction..." Please note that MDNR expects to be involved in this coordination.
4-113-4-114	216-217	4.5.7.3	Minimization and Mitigation	Reword the sentence beginning with "The MDTA will commit..." on page 4-113 and the text on the bottom of page 4-114 to include a reference to all aquatic species so that its understood that the avoidance and minimization measures on these pages apply more broadly. The "Reduced water Quality" list should include managing temperatures and velocity of intake/ and discharge waters to maintain ambient water temperature and not to entrain fish.
3-22	61	3.3.1.2	Adjacent to a Northern/Westbound Span	Western Shore, Connection #1 (not preferred) describes a short bridge over to the inlet to Mezick Pond prior to the switchback and Path users using Sandy Point SP to access the trail connections. It would be nice if a draft schematic of the permanent LOD were referenced to visualize the resources impacted. DNR is focusing here on Sandy Point SP and Mezick Pond impacts, and as previously stated DNR is strongly opposed to an SUP design that would impact SPSP or Mezick Pond in any way.
3-22	61	3.3.1.3	Preferred SUP Location	In the final paragraph, the sentence "The connection into Sandy Point State Park was not preferred because it would bring all path users through the heart of the park and near the beach." Consider rephrasing this to include more facts, the suggest language would be something like, "The possible connection into Sandy Point State Park was not preferred because it would bring all path users through the heart of the park which requires the state park staff to manage those extra visitors outside of park hours, and it would impact the very popular beach and picnic areas, as well as restrict use of Mezick Pond including emergency boats and ice breaker boats if the new SUP not preferred design is built". Also, Sandy Point periodically reaches capacity and has periods of closure to new guests during peak summer weekends. Therefore using the Park to access a SUP would likely not be the best solution.
4-38	141	4.5.1.1/ 4.5.7.2/ 4.5.7.3	Affected Environment	Injury and mortality associated with pile driving activities is the most concerning environmental impact to fisheries. The document states that intermittent pile driving is expected to occur for a total of 9 years with a 3 year gap between the east and westbound bridges. As with the most recent MDTA proposal to install Pier Protections around the current Bay Bridge span, DNR Fisheries will likely want a TOY restriction to allow migratory fish to pass by the Bay Bridge to reach spawning areas in the Upper Bay since anticipated behavioral impacts reach beyond the entire width of the bay at this location. Zone(s) of safe passage may also be warranted during non-migratory times of year. Further coordination regarding the appropriate time of year restriction for this work would be ongoing as the project design progresses.
4-66	169	4.5.5.1	Environmental Consequences	Text states "For a more in-depth discussion of impacts to waterways, including impacts to culverted waterways and waterway crossings, see the Natural Environment Technical Report." Please provide a citation of the location in the in-depth discussion in the NETR.

4-89	192	4.5.7.2	Aquatic Biota	The report specifically identifies a number of different fish species, including alewife and blueback herring - but fails to list hickory shad or American shad. These should be added, as both species follow similar migratory patterns as herring as they migrate past the bay bridge to reach upstream spawning areas.
4-101	204		Figure 4-27	DNR's Horseshoe crab habitat data (referenced in multiple locations) is incomplete and is being revised. Observations of horseshoe crab spawning are available on the Horseshoe Crab Sightings web map which can be found on the DNR Fishing and Boating Services Volunteer Angler Survey page, https://maryland.maps.arcgis.com/apps/webappviewer/index.html?id=391606d4a962405db2429779ff47e5d8 (index main page: https://dnr.maryland.gov/fisheries/Pages/survey/index.aspx)
4-112	215	4.5.7.3	Minimization and Mitigation	Fish most likely to need a TOY restriction include American shad, hickory shad, alewife herring, blueback herring, striped bass, white perch, yellow perch, Atlantic sturgeon and shortnosed sturgeon. Further coordination regarding the appropriate time of year restriction for this work would be ongoing as the project design progresses.
4-112	215	4.5.7.3	Minimization and Mitigation	Telemetry tagging of affected fish prior to construction could help bolster the population of detectable fish. Acoustic receivers could then be used to understand when these fish are in the construction area and determine when these populations are most vulnerable. Collecting this data could help guide time of year restrictions assigned to this long-term project.
4-112		4.5.7.3	Minimization and Mitigation	Page 4-112 incorrectly lists the TOY restriction for anadromous fish. It's listed as February 15 through July 15, it should read June 15. However, data collected for the current Bay Bridge Pier Protection application shows high numbers of spawning aged striped bass in the vicinity of the Bay Bridge as early in the migration period as December. This is collaborated by the commercial winter gill-net fisher which spans December through February and accounts for roughly half of the commercial striped bass harvest by weight. The deep channel habitats south of the Bay Bridge are popular for this fishery. As a result, it may be necessary to modify the TOY restriction from January to May. The "standard" TOY restriction is better suited to protect fish while spawning in tidal rivers, but these fish often stage in deep water habitats in the bay much earlier. Further coordination regarding the appropriate time of year restriction for this work would be ongoing as the project design progresses.
4-112	215	4.5.7.3	Minimization and Mitigation	There is also a concern for young of year fish staging and migrating out of the bay from summer through fall. These juvenile fish may be more susceptible to noise impacts, injury, and mortality than adult fish. Please contact DNR to obtain this data.
4-112	215	4.5.7.3	Minimization and Mitigation	Shallow water dredging should not be performed during the period from 15 April through 15 October to minimize impacts to submerged aquatic vegetation, horseshoe crabs and oysters.
4-119	222	4.5.8.1	Environmental Consequences	"Review of imagery reveals that much of this area would not meet the regulatory definition of forest; however, it would still function as terrestrial habitat". Please Provide the definition of forest being used.
4-12	115	4.2.1.3	Protected Lands	The proposal mentions impacts to current Forest Conservation Act easements. The final alignment for the new bridge should provide a map for these areas. The proposal indicated that all alternatives will impact 0.1 acres of conserved easements. These easements can be moved, but need approval from the Maryland BPW. Alternative FCA easements should be identified and redesignated as needed. DNR must have a copy of the final FCA easement location. The project must verify the plan to move easements with the DNR Forestry's Urban and Community Forestry Section.
4-129	232	4.5.9.1	Federally Listed Species	Northern Long-eared Bat (NLEB) refers to *Myotis septentrionalis*, state and federally listed as Endangered; Indiana Bat (IBAT) is *Myotis sodalis*, state and federally listed as Endangered; Tricolored Bat (TCB) is *Perimyotis subflavus*, federal proposed as Endangered, Maryland status S1 critically imperiled; Eastern Small-footed Bat (ESFB) is *Myotis leibii*, state listed as Endangered; and Little Brown Bat (LBB) is *Myotis lucifugu*s, Maryland status S1 critically imperiled. These species have all been documented within their ranges to use bridges, culverts, trees, or buildings as roosts.
4-129	232	4.5.9.1	Federally Listed Species	DNR WHS supports the survey work for bats that has been done so far, although the timing of the surveys was not the best for assessing presence. As stated in the DEIS, these surveys have a two-year shelf life, so this still allows for a second round of surveys to be completed before the project begins during more suitable time periods (see further information below under Natural Heritage Program recommendations). Note that page 4-129 of the DEIS states, "Due to a lack of evidence of bat roosting in both the Bay Bridge and Cox Creek bridge, it is probable that bats are not actively roosting in these bridges." Given the time of year that bat surveys were conducted, it is premature to draw this conclusion.
4-129	232	4.5.9.1	Federally Listed Species	Please reference and see attached the Acceptable Management Practices for Bat Species Inhabiting Transportation Infrastructure (Attachment 3). For further questions regarding bat concerns, please contact Dana Limpert of our program at danal.limpert@maryland.gov.
4-136	239	4.5.10	Unique and Sensitive Areas	The section 4.5.10 Unique and Sensitive Areas It isn't clear if the design proposals have considered the updated 2024 Habitat Connectivity Network (HCN) update. The HCN replaced the Green Infrastructure Assessment. The 2024 update leverages the Chesapeake Bay Program's cutting-edge, high-resolution 2017/2018 land use/land cover mapping and provides several additional enhancements, including differentiation of hub and corridor types (forest, wetland, or aquatic), a breakdown of land cover types within corridors, and identification of potentially restorable gaps within corridors. The updated Habitat Connectivity Network map layer can be viewed on the Maryland Green Print web map (https://mdgeodata.md.gov/greenprint/). The data layer can be downloaded from the Maryland iMap Data Catalog.

4-136	239	4.5.9.2	Minimization and Mitigation	Recent Information to Guide Future Survey Work for Bats • States in the Eastern US have found populations of NLEB (federally and state listed as Endangered) to be active year-round in the Coastal Plain bordering the Gulf of Mexico and along the Atlantic seaboard, including NC, VA, and NJ. • NLEB in these areas do not exhibit hibernation but torpor during the winter and will awaken to feed on insects and drink water when temperature and weather conditions are conducive for insect activity. • Coastal populations of NLEB select non-traditional roosts that include bridges, culverts, buildings, and trees. NLEBs and IBATs have been found using bridges and/or culverts throughout their ranges, as well as other species of conservation concern, such as TCB, LBB, and ESFB. • DNR WHS and Blackwater NWR staff are currently monitoring NLEB recorded on the Blackwater Wildlife Refuge year-round to document activity. The Coastal Plain of Maryland has not been well-surveyed for bats, and there is currently no data on active coastal populations outside of Blackwater. Future surveys for the Bay Crossing project should take this new information under consideration since this project occurs in the Coastal Plain and to avoid misconceptions of where bats could be during vulnerable periods.
4-136	239	4.5.9.2	Minimization and Mitigation	Survey Site Selection Guidance A very useful document written by the White-nose Syndrome Conservation and Recovery Working Group is entitled Acceptable Management Practices for Bat Species Inhabiting Transportation Infrastructure. The document is a product of the White-nose Syndrome National Plan (www.whitenose.org). Section 2 of the document addresses misconceptions about bat use of transportation structures. • Misconception 1 | Bats require at least 3 m of vertical measurement to take flight. Therefore, the structure must be equal to or exceed 3 m to be suitable for bats. • Misconception 2 | Culverts are unsuitable due to the absence of crevices or perching substrate. • Misconception 3 | Culverts must be between 1.5 and 3 meters in height and ≥ 100 m in length. • Misconception 4 | Bats exhibit obvious signs of occupancy (e.g., bat vocalizations, guano and/or urine stains). • Misconception 5 | Bats require vertical crevices 12.7 to 31.75 mm wide and ≥ 304.8 mm in depth. • Misconception 6 | Bats only roost within bridges over water. • Misconception 7 | DOTs can safely conduct operations after October 1, when bats are absent. This interval coincides with autumnal migration and movements to local hibernacula. • Misconception 8 | Roosts must receive full sun exposure. • Misconception 9 | Bats will not roost over busy roadways (Erickson et al. 2002) • Misconception 10 | Bats do not occupy transportation structures within northern states because “few are warm enough to meet bat needs”. Please contact DNR for this document and full citations.
4-136	239	4.5.9.2	Minimization and Mitigation	The DNR WHS recommends the following: • Please consult USFWS and WHS in preparing survey plans and submit survey plans to both agencies in advance of survey work. • Please submit the results of all surveys, including surveys with negative results, to DNR WHS as well as USFWS. • WHS recommends that the next round of surveys be conducted when bats are the most vulnerable as presence would indicate the appropriate TOY to avoid take. The periods when bats are most vulnerable to disturbance that could result in take include during winter torpor, December 15-February 15, when winter mean temperatures fall below 40 degrees F, and during the maternity pup season, May 15 to July 31, when flightless young would be present. Surveys should include all structures with potential bat roosts. The Draft Biological Assessment (Appendix Q page 7-1) states that tree clearing will not occur during the active period, April 1 – September 30; therefore, acoustic surveys of forest habitat will not be necessary. • If signs of roosting bats are found, then a time of year restriction (TOY) would be applied to these vulnerable time periods. Excluding bats from using the structure while work is conducted in a particular section may be necessary under certain circumstances outside of the sensitive TOY periods. Further coordination regarding the appropriate time of year restriction for this work would be ongoing as the project design progresses.
4-136	239	4.5.9.2	Minimization and Mitigation	After project completion, placing bat roosting structures under the bridge is optional as bats roosting in bridges and culverts indicate the lack of natural roosts. Endangered gray bats returned after bridge construction conducted outside of maternity pup season to roost under the bridge https://www.fws.gov/story/2022-06/roosting-structures-endangered-bats-installed-french-broad-river-bridges . Bridges can also be designed to create roosting crevices; that has been done in several states.
8-1	282	8.1	Alternative C: Recommended Preferred Alternative	East College Parkway backs up during the summer months, although recent procedural adjustments by SHA and MDOT have helped keep drivers on Route 50. DNR MPS wants to be sure that the transition to eight lanes near Oceanic Drive actually improves that condition and does not shift additional congestion toward the entrance of Sandy Point State Park.
8-5	286	8.1.2	Environmental Impacts	Based on updates about the project impacts presented in recent meetings and even more up to date design communicated by email, does the *de minimus* impact discussion in the second paragraph on this page need to be updated?
9-36, 9-37/ 4-77	130, 131/ 181	9.3.3.2/4.5.5.3	Table 9-19/ Table 4-40	Same comment for NETR/DEIS: An X is marked denoting the waterway will be crossed for Mezick Pond Channel. DNR has communicated that no limits to Mezick Pond will be accepted. In the text below the table, the Local Channels subheading states the entrance of Mezick Pond would be directly impacted by the northern alignment build alternatives but there is an X in the table denoting all build alternatives would affect the navigation channels.

Attachment 2: Maryland DNR comments to Technical Reports, as attached to Chesapeake Bay Crossing Study Tier 2 NEPA Draft Environmental Impact Statement, January 2026

Technical report	Page #	Page # in .pdf	Section	Section Header	Comment
ARDS Concurrence Package	4-1	8, 9	4.1	Structure Location	DNR has concerns that the new Bay Bridge pier protection design won't be coordinated with the new bridge design. Please make sure the 2 project teams work together.
Hydrodynamic Report (Appendix F)					The response regarding the Hydrodynamic Report (Appendix F) was " The hydrodynamics report models the alternatives relative to the existing conditions. The hydrodynamics modeling focuses on long-term effects of the alternatives." Since the existing conditions will now include some form of Pier Protection measures at the current bridges, the effect of the protection structures to be built must be modeled because there will be a change to the "existing conditions" and conditions during construction. The hydrodynamic modeling showed a approximate doubling of tidal velocities from current conditions. It could be assumed that during construction of the new eastbound bridge the new bridge piers, the existing bridge piers and the bridge protection measures to be constructed will all combine to further restrict water movement through the bridge area which is also the narrowest part of the Bay. The presence of all these structures, at least until unneeded structures and old bridge piers are demolished, would be expected to increase tidal velocities above the values presented in the hydrodynamic modeling report. The final EIS should address the Pier Protection measures that will be constructed and their potential fate when the replacement bridges are constructed.
Navigation Impact Report	2& 24	9& 30		2. & Conclusion	As per other comment for NETR/DEIS: An X is marked denoting the waterway will be crossed for Mezick Pond Channel. DNR has communicated that no limits to Mezick Pond will be accepted. Please revise if this impact was revised.
NETR	8-4	72	8.1.2	Table 8-1	Many of the impervious surface estimates provided in Table 8-1 on page 8-4 of the Natural Environment Technical Report are low based on the calculation methodology used by the Fishing and Boating Service's Fisheries Ecosystem Assessment Division. Our estimates for the year 2024 in order of Table 8-1 are 30%, 31%, -, -, -, 13%,11%, 7%, 5%, 8%. Impervious surface estimates are available on the interactive Nontidal Anadromous Fish Spawning Sitemap: https://experience.arcgis.com/template/8b13df5918be4e288fb3439a2afc3153/ [Methodology is available in Uphoff, J. H., Jr., A. Park, C. Hoover, T. Fowler, S. Moorhead, M. Ponte, J.Horne, and M. Topolski. 2024. Marine and estuarine finfish ecological and habitat investigations. Performance Report for Federal Aid Grant F-63-R, Segment 14, 2023 Activities. Maryland Department of Natural Resources, Fishing and Boating Services, Annapolis, Maryland.]
NETR	8-8	76			Page 8-8 paragraph one of the Natural Environment Technical Report states that MDTA will "ensure that all SWM and ESC requirements are met or exceeded to limit the potential for additional contaminants to be introduced to waterways." Requirements under COMAR 26.17.02 should be scrutinized to identify and incorporate the most effective techniques and scenarios where they should be exceeded.
NETR	8-23	91	8.2.3.2	Environmental Consequences, Build Alternatives	Paragraph starting with "Winter maintenance materials..." and ending with "Because of inherently higher salinity, conductivity, and chloride levels of the tidal waterways in the resource review area, additional impacts from de-icing chemicals would be less severe." Suggest finishing that final sentence with, "than if building in a freshwater zone." BUT this area is of low salinity and there are biota adapted to lower salinity and life cycles in lower salinity that would die in higher salinity. Salinity regimes can literally determine which species are present. SAV species and oyster spat come to mind, and mentioned in NETR page 13-33 is male blue crabs prefer fresher waters and female crabs prefer saltier waters. Higher salinity can also change the chances of viruses that kill off oysters. Adding salt, a conservative element, will cause it to stay in the system unless physically removed.
NETR	8-23	91	8.2.3.3	Environmental Consequences, Build Alternatives	Higher salinity and higher temperature waters caused by expanding roadway lowers the ability of oxygen to dissolve in water, even when excepting eutrophication, this can cause larger volume of dead zone and less habitable ecosystems.
NETR	8-25	93	8.3.3.2	Wild and Scenic Rivers, Environmental Consequences, Build Alternatives	Mention the term "viewshed" in the introduction section 8.3.1.

NETR	9-16	110	9.1.3.2	Build Alternatives	Alternatives B and C seem to only impact three main waterways, Meredith Creek, Thompson Creek, and Cox Creek, and the Mezick Pond connection to the Chesapeake Bay. This seems like 4 waterways, because of the Mezick Pond's connection to the Chesapeake Bay. DNR has previously communicated that the Mezick Pond and inlet to the C. Bay cannot be impacted by the bridges or SUP.
NETR	9-16	110	9.1.3.2	Build Alternatives	The text states that "The addition of a SUP option with any of the build alternatives would result in less than 0.1 acres of nontidal and tidal waterway impacts across all build alternatives". This is confusing to say <0.1 acres of impact when the report seems to state as different impact in other places.
NETR	9-17	111		Table 9-13	The table shows that Alt C crosses or overlaps Mezick Pond 1 time. DNR has previously communicated that the Mezick Pond and inlet to the C. Bay cannot be impacted by the bridges or SUP.
NETR	9-36	130	9.2.1	Local Channels	To state that Mezick Pond "currently provides local boating and access for recreation," seems like an understatement. The importance of this channel to public boating access should be stated.
NETR	13-7	158		Figure 13-7	The preferred Alternative C reduces the land impacts within the watersheds and would likely have limited impact on areas of anadromous spawning due to road expansion. Among the greatest impacts overall will be subsurface noise during the installation of pilings, piers, supports, etc. on anadromous fish during their migratory run which passes through the project site and disturbance envelopes (Figure 13-7 in Natural Environment Technical Report).
NETR	13-32	183			The impact of impervious surface on tidal and nontidal fishes, page 13-32 second paragraph of Natural Environment Technical Report, requires further analysis. Impervious surface, which encompasses many types of impact, is negatively related to successful reproduction of anadromous fishes and reduced species diversity. For example, increased road surfaces result in additional cold weather salt application and elevated conductivity in fresh water streams as well as an increase in automobile derived contaminants such as tire crumb and associated 6PPD-quinone; while this contaminant has not been studied in anadromous species that spawn in Chesapeake Bay, it does cause acute toxicity and mortality in some salmonid species. Spawning distribution of anadromous fishes can be viewed on the interactive Nontidal Anadromous Fish Spawning Site Map: https://experience.arcgis.com/template/8b13df5918be4e288fb3439a2afc3153/
NETR & DEIS	9-36, 9-37/ 4-77	130-131/181	9.3.3.2/4.5.5.3	Table 9-19/ Table 4-40	Same comment for NETR/DEIS: An X is marked denoting the waterway will be crossed for Mezick Pond Channel. DNR has communicated that no restrictions or encroachment to Mezick Pond will be accepted. In the text below the table, the Local Channels subheading states the entrance of Mezick Pond would be directly impacted by the northern alignment build alternatives but there is an X in the table denoting all build alternatives would affect the navigation channels.
NETR	9-37, 9-38	131, 132	9.3.3.2	Local Channels	Where is the Sandy Point Channel compared to the Mezick Pond Channel? I see Table 9-18 has a latitude & longitude mentioned for Sandy Point Channel, but please reference that in this text at a minimum because even we thought they were the same thing. The entrance of Mezick Pond is discussed as being temporarily impacted during construction and directly impacted by northern alignment build alternatives, which is confusing because Table 9-19 marks that each Build Alternative will be crossing Mezick Pond. Please clarify these 2 points and be consistent with wording. When someone cross-references with the Navigation Impact Report it also mentions Northern alignment Build Alternatives may impact vessel access (but not mentioning Southern alignment Build Alternatives). The Navigation Impact Report does not mention Sandy Point Channel.
Socioeconomic and Land Use Technical Report & Cultural Resources Technical Report					Impact of bridge replacement on the commercial and recreational fishing sectors is not addressed in the Socioeconomic and Land Use Technical Report and should be emphasized in the NETR. These resources are a primary concern for DNR as it relates to the proposed project.

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: Maryland Department of Natural Resources

__X__ **Concurs with the Preferred Alternative & Conceptual Mitigation (without comments)**

____ **Agrees with the Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree with the Preferred Alternative & Conceptual Mitigation***

**If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.*

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: _____ Date: 05/11/2026

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: Maryland Department of Planning

___X_ **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Bihui Xu, Lead Transportation planner, MDP

Signature: _____ Date: 04/27/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Chuck Boyd
Director, Planning Coordination
Maryland Department of Planning
301 West Preston Street, Suite 1101
Baltimore, MD 21201-2392

Dear Chuck Boyd:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.

4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

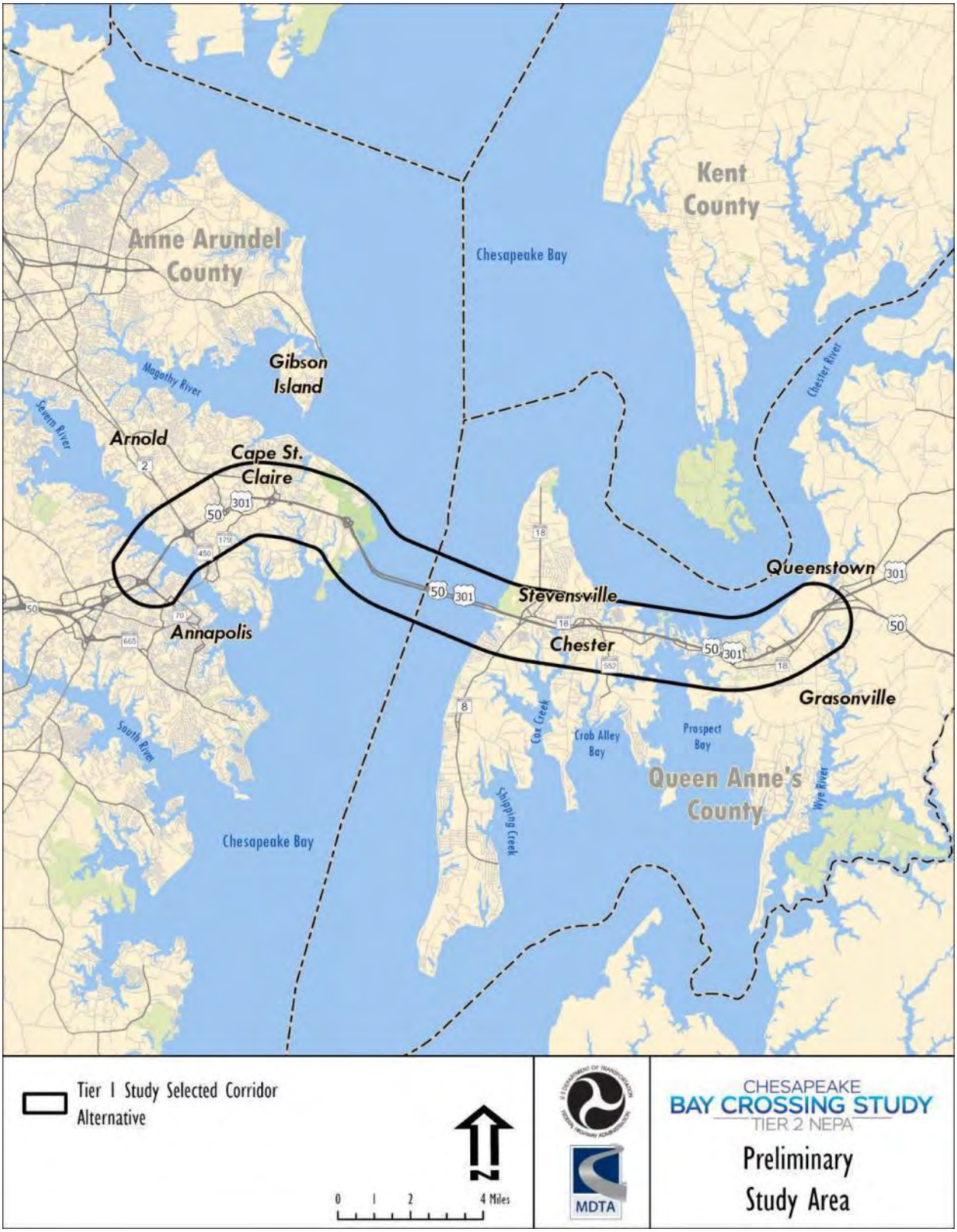


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Bihui Xu, MDP, Principal Planner
Ken Choi, MDP, Manager, Geospatial & Data Analysis
Scott Hansen, MDP, Transportation Planner
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Maryland Department of Planning

Signature:  Date: June 5, 2023

Print Name: Charles W Boyd

Title: Director of Planning Coordination

Emma Beck

From: Sarah Williamson
Sent: Monday, November 13, 2023 2:24 PM
To: Emma Beck
Subject: FW: BCST2 - Concurrence Request: ICE Methodology

From: Bihui Xu -MDP- <bihui.xu@maryland.gov>
Sent: Monday, November 13, 2023 2:22 PM
To: Sarah Williamson <sarahw@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>
Cc: Scott Hansen -MDP- <scott.hansen@maryland.gov>; Jill Lemke -MDP- <jill.lemke1@maryland.gov>
Subject: Re: BCST2 - Concurrence Request: ICE Methodology

Hi, Sarah and Heather,
Thank you for addressing our comments on the draft ICE methodology in the Errata Sheet. And MDP doesn't have additional comments.

From:	Sarah Williamson
To:	Emma Beck
Subject:	FW: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER
Date:	Friday, July 12, 2024 11:35:24 AM
Attachments:	image001.png

From: Bihui Xu -MDP- <bihui.xu@maryland.gov>
Sent: Friday, July 12, 2024 11:03 AM
To: Sarah Williamson <sarahw@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>
Cc: Jason Dubow -MDP- <jason.dubow@maryland.gov>; Scott Hansen -MDP- <scott.hansen@maryland.gov>
Subject: Re: BCST2 - Purpose and Need Summary Concurrence Request -REMINDER

Sarah and Heather,
The Maryland Department of Planning does not have additional comments on the Draft Purpose and Need Summary (06-26-24) for the BCST2. We noted that MDTA/the Project Team addressed our comments on the draft Purpose and Need Summary (05-24-23) and the draft Purpose and Need Statement (December 2023). Please let us know if you have any questions.

Thank you,

Bihui Xu, AICP
Principal Transportation Planner
Maryland Department of Planning
301 West Preston Street, RM 1101
Baltimore, MD 21201
(443)-854-6488 (Mobile)
(410) 767-
4567 (Office)

bihui.xu@maryland.gov
Please take our customer service survey.
Planning.Maryland.gov

On Thu, Jul 11, 2024 at 10:37 AM Sarah Williamson <sarahw@cri.biz> wrote:

> Good Morning BCST2 Interagency Team,
> I hope everyone is having a great summer!
> This is a reminder that MDTA has requested your concurrence (Cooperating Agencies) or final review (Participating Agencies) on the Chesapeake Bay Crossing Study Tier 2 NEPA, **Draft Purpose and Need Summary.** Concurrence is requested by **COB Monday, July**

29th, 2024.

Cooperating Agencies: Please note, **the deadline for making MDTA aware of any issues that would stand in the way of your agency's concurrence on the Draft P&N Summary is tomorrow, July 12th, 2024.** This is requested in accordance with the BCST2 Guiding Principles to allow for time to work on resolving those issues before the concurrence deadline.

Thank you,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

Subject: BCST2 - Purpose and Need Summary Concurrence Request

Good Afternoon,

The Maryland Transportation Authority (MDTA) requests concurrence from reviewing Cooperating Agencies on the Chesapeake Bay Crossing Study Tier 2 NEPA, **Draft Purpose and Need Summary**. Please provide concurrence via the concurrence form linked below and respond electronically **by COB Monday, July 29th, 2024** to Heather Lowe at hlowe@mdta.state.md.us and cc me at sarahw@cri.biz.

In accordance with the BCST2 Guiding Principles, MDTA requests that within 10 business days of this email (July 12th), you make MDTA and me aware of any issues that would stand in the way of your agency's concurrence on the Draft P&N Summary. This will allow for time to work on resolving those issues before the concurrence deadline.

You can download the following documents here: P&N- Concurrence Package_20240627

- revised Draft P&N Summary for concurrence,
- revised full Draft Preliminary Purpose & Need Report for reference,
- errata showing how agency comments were addressed by MDTA on both documents, and
- the Cooperating Agency Concurrence Forms and Participating Agency final review/comment forms.

Please note, concurrence or final review/comment is requested on the Draft Purpose & Need Summary only. However, the full Draft Preliminary P&N Report has been provided for additional background and to support the summary information if you

wish to see more detail.

Thank you,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From: Bihui Xu -MDP-
To: Heather Lowe
Cc: Sarah Williamson; Jason Dubow -MDP-
Subject: Re: BCST2 - Reminder of Scoping Comment Deadline - 1/13/25
Date: Monday, January 13, 2025 2:44:20 PM
Attachments: image001.png

Heather,
MDP reviewed the NEPA scoping documents for the BCST2 Project and has no comments. We look forward to reviewing information on land use/growth impact analyses and providing technical support in that regard if there is a need. We would also work with MDTA and MDOT to address the PFA law compliance matter if MDTA, MDOT, and MDP determine the Priority Funding Areas Law applies to the project.
Thank you.

Best regards,

Bihui

Bihui Xu, AICP
Principal Transportation Planner
Maryland Department of Planning
120 E. Baltimore Street, Suite 2000
Baltimore, MD 21202
(443)-854-6488 (Mobile)
(410) 767- 4567 (Office)
bihui.xu@maryland.gov
Planning.Maryland.gov
MD TWO FIFTY: Maryland's Story is America's Story

On Mon, Jan 6, 2025 at 9:36 AM Sarah Williamson <sarahw@cri.biz> wrote:

> Dear BCST2 Interagency Team,
>
> Happy New Year, and happy snow day! This is a final reminder that if you would like to submit NEPA scoping comments in response to the EIS Notice of Intent (NOI), please send those to Heather Lowe at hlowe@mdta.state.md.us with a cc to me at sarahw@cri.biz by **January 13th, 2025**.
>
> You can find the NOI and NOI Additional Project Information Document (APID) here: https://baycrossingstudy.com/study-process/tier-2-study/scoping-noi
>
> Best,
>
> **Sarah Williamson** | *Bay Crossing Study Team*
>
> Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
>
> 25 Old Solomons Island Road, Annapolis, MD 21401

Maryland
DEPARTMENT OF PLANNING

Memo

To: Heather Lowe, Planning/Community Relations Manager, MDTA

From: Bihui Xu, Principal Planner, MDP Bihui Xu

CC: Sarah Williamson, Bay Crossing Study Team, MDTA

David Dahlstrom, Regional Planner, MDP

Jason Dubow, Director, Research/Review/Policy Division, MDP

Date: April 1, 2025

Re: The Draft Alternatives Retained for Detailed Study (ARDS) Concurrence Package, February 2025.

Maryland Department of Planning (MDP) has reviewed the Draft Alternatives Retained for Detailed Study (ARDS) Concurrence Package, and we offer the following comments.

Overall, MDP recognizes the rationale for recommending the ARDS for detailed evaluation in the Draft Environmental Impact Statement (DEIS) development stage. MDP supports the inclusion of Transit, Transportation System Management (TSM)/Transportation Demand Management (TDM), and Pedestrian and Bicycle Shared Use Path as the integral elements of the build alternatives, which will provide a multimodal approach to address the purpose and need of the Bay Crossing Study-Tier 2.

Transit Element

MDP supports carrying forward the Enhanced Bus Service option described in 3.7.1.3 Enhanced Bus Service on pages 3-34 – 3-35 of Appendix A (Screening Summary Document) as part of the ARDS. To clarify the scope of the bus improvements, Section 3.7.1.3 of Appendix A should be referenced in the Bus Improvements paragraph on page 5-1 of the ARDS Package.

In addition to the enhanced bus service evaluation, MDP suggests as part of the ARDS, these options be evaluated: (1) providing toll-free or reduced tolls for buses and car-/vanpooling (

high-occupancy vehicle travel) or (2) allowing car-/vanpooling to use dedicated transit lanes/shoulders, especially during weekday peak hours.

Supporting car-/vanpooling should be part of the park-and-ride lot improvement consideration.

TSM/TDM Element

As part of the "Congestion Pricing" and "part-time shoulder use" evaluation, incentivizing transit and car/van-pooling should be considered to achieve transportation goals including vehicle miles traveled (VMT) reduction goals (page 5, 2050 Maryland Transportation Plan).

MDP supports the inclusion of a pedestrian/bicycle shared use path as part of a build ARDS for not only a transportation connection but also a significant asset for tourism and recreational use.

Build ARDS

The ARDS package should discuss if and how the ARDS would address transportation safety and connectivity including safe pedestrian and bicycle connections in interchange areas where traffic to/from the mainline may affect the safety of connecting roadways. We understand that the DEIS will address how the build ARDS, especially the alternatives with approach roadway widening, affect the communities along the approaching U.S. 50/301 on both shores; nevertheless, the ARDS package should clarify if/how the ARDS will improve access (including pedestrian/bicycle access) in interchange areas.

Appendix A

On page 3-18: The document references "the town of Grasonville." Please note that Grasonville is not an incorporated town. There was a separate Community Plan for Grasonville and for unincorporated Stevensville, but these community plans have been absorbed into the 2022 Queen Anne's County Comprehensive Plan. Kent Narrows continues to keep its Community Plan status, but it is also unincorporated.

On page 3-21: Table 3-5 should include the current bridge traffic queuing condition data and reference "2045" in columns' subtitles for clarification. Has the project team analyzed the traffic safety and connectivity conditions for interchanges under the current, no-build, and build alternative conditions? It will be helpful to include the traffic safety and connectivity information for interchanges under the current, no-build, and build alternative conditions in Appendix A.

From Section 3.5.2 to 3.5.4 (pages 3-22): The document should include the queueing information for each of the build options. For instance, Table 3-5 indicates that the queues would be reduced to 0 miles or 0 hours under the option 8-10-8.

On page 3-37: The document references "Section 3.7.3," but the section doesn't exist.

Refer to Figures 4.3 and 4.4. Alternatives: What are the structures that appear on the right side of the graphics? They do not appear in Figure 4.2. The depicted structure does not appear to reflect the community context, the local communities and land uses adjacent to the corridor.

Table 5-1 (page 5-2): In the next study phase, the project team should discuss how the ARDS will address incident response/management to reduce their impact on communities. Specific community facilities (e.g. schools, fire stations, and park & ride lots) affected by the project should also be discussed, which would help estimate the total cost of the project. The preliminary cost estimates provided in Table 4-3, only appear to include the bridge structural, transit enhancements, and TSM/TDM improvements (page 4-15). It is unclear how the cost associated with the resource impacts included in Table 5-1 has been evaluated. (By the way, Does the estimated cost (page 4-15, Table 4-3) include the shared use path?)

Additionally, there should be a strategy to identify limited additional improvements or public/private investments in areas needed for the bridge structure or additional lanes. Any public expenditures between now and 2045 may have a short lifespan and should be avoided, provided it is not investments to maintain public safety.

Table 5-1 (page 5-2): For Critical Area, impacts should be assessed for IDA, LDA and RCA. Reductions in IDA will likely have additional economic development impacts to the counties. Once IDA is removed, it cannot be replaced unless an allocation is granted. Allocation is limited by COMAR.

Although noise is listed as a potential impact in the last bullet on page 84, noise is not included in Table 5-1.

January 26, 2026

Ms. Sarah Williamson
Bay Crossing Study Team,
Coastal Resources Inc.
25 Old Solomons Island Road
Annapolis, MD 21401

STATE CLEARINGHOUSE REVIEW PROCESS

State Application Identifier: **MD20260126-0019**
Reply Due Date: 03/02/2026
Project Description: Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor
Project Location: Anne Arundel and Queen Anne's Counties
Clearinghouse Contact: Rita Pritchett

Dear Ms. Williamson:

Thank you for submitting your project for intergovernmental review. Your participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps to ensure that your project will be consistent with the plans, programs, and objectives of State agencies and local governments.

We have forwarded your project to the following agencies and/or jurisdictions for their review and comments: the Maryland Departments of Transportation, Natural Resources, and the Environment; Anne Arundel and Queen Anne's Counties; and the Maryland Department of Planning including the Maryland Historical Trust. A composite review and recommendation letter will be sent to you by the reply due date. Your project has been assigned a unique State Application Identifier that you should use on all documents and correspondence.

Please be assured that we will expeditiously process your project. The issues resolved through the MIRC process enhance the opportunities for project funding and minimize delays during project implementation.

If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at rita.pritchett@maryland.gov. Thank you for your cooperation with the MIRC process.

Sincerely,

Jason Dubow, Director
Research, Review and Policy Division

JD:RP
cc: Bihui Xu - MDP
26-0019_NRR.NEW.docx

MD20260126-0019 FINANCIAL ASSISTANCE

Coastal Resources Inc.

Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor

Bihui Xu - MDP

Ms. Sarah Williamson
Bay Crossing Study Team,
Coastal Resources Inc.
25 Old Solomons Island Road
Annapolis, MD 21401

March 9, 2026

Heather Lowe, Manager, Planning & Community Relations
Division of Planning and Program Development
Maryland Transportation Authority
Point Breeze
2310 Broening Highway
Baltimore, MD 21224

Re: Bay Crossing Study Tier 2 – DEIS Review- January 2026

Dear Ms. Lowe:

Maryland Department of Planning (MDP) has reviewed the Draft Environmental Impact Statement (DEIS) for the Bay Crossing Study (BCS)-Tier 2 NEPA, released in January 2026. We appreciate that this version of the DEIS incorporated most of our comments from earlier September 2025 version. The following comments focus on the Maryland Transportation Authority (MDTA) Recommended Preferred Alternative (RPA) - Alternative C.

PFA Law

In January 2026, in coordination with the Maryland State Highway Administration (SHA), MDP noted that since MDTA recommended Alternative C (6-8-6 South) as the Preferred Alternative for the BCS-Tier 2 Project, MDTA intends to use MDTA funding for the entire future project construction and no other state funding, e.g., funding from the SHA, will be used on the project. Since the RPA – Alternative C (6-8-6 South) would be within the MDTA's right-of-way and only use MDTA funding for future construction and maintenance, the RPA would be exempted from the Priority Funding Area (PFA) law as defined in §5–7B–01. (c.) (1) (i) of the State Finance and Procurement Article. MDP suggests that MDTA prepare a summary document on how the project complies with the PFA law and include that information in the Final Environmental Impact Statement (FEIS).

The MDTA Recommended Preferred Alternative (RPA)

MDP noted that the MDTA recommended Alternative C (6-8-6 South) as the Preferred Alternative, which would replace the two existing Bay Bridge spans with two new spans, totaling eight travel lanes with four lanes on each span. And the two new bridge spans would extend along U.S. 50/301 from west of Oceanic Drive in Anne Arundel County to east of Cox Creek in Queen Anne's County, providing sufficient room to transition into the existing U.S. 50/301, which would not be changed. MDP recognizes that, overall, Alternative C (6-8-6 South) would have fewer environmental impacts, including a lower likelihood of induced adverse growth within the project's influence area, as compared to other built alternatives that would entail more highway expansion.

Heather Lowe, MDTA
Re: BCST2-DEIS – January 2026

MDP also recognizes that the RPA – Alternative C would not resolve traffic queuing and travel time delays in the project corridor and beyond, especially during summer weekends. Since increasing the bridge capacity would not resolve future traffic challenges resulting from vehicle travel demands, MDP encourages the MDTA to continue working with the Maryland Department of Transportation (MDOT), local agencies, and Metropolitan Planning Organizations (MPOs) to consider robust and innovative Transportation Demand Management (TDM)/Transportation System Management (TSM) and transit measures to manage and reduce single-occupancy vehicle (SOV) travel demand, and maximize the efficiency of available bridge and highway capacity.

The RPA-Alternative C would include a transit investment commitment from the MDTA to support future transit improvements (page 8-2). Through the transit investment, it is expected that the MDTA would work with MDOT and local jurisdictions to help develop and implement transit strategies that would help address Bay crossing transportation needs. Chapter 8 (MDTA Recommended Preferred Alternative) should indicate that, in addition to making the financial commitment, the MDTA would work with appropriate state and local partners to help develop and implement appropriate transit improvements as part of the PRA.

Regarding TDM and TSM, Chapter 8 should clarify which TDM/TSM measures the RPA-Alternative C would include (page 8-2). Please clarify whether the RPA-Alternative C continues to include Congestion Pricing, Park-and-Ride, and Part-Time Shoulder Use (PTSU) as recommended during the Alternative Retained for Detailed Study stage (pages 3-10). In addition to addressing these TDM/TSM measures, MDP suggests that Chapter 8 indicate that the MDTA will continue coordinating with the MDOT/SHA on MDOT/SHA's studies and improvements along U.S. 50/301 that would affect travel conditions on the Bay Bridge, because improvements on U.S. 50/301 affect the TDM/TSM component of the RPA-Alternative C.

It appears that the SHA is studying and implementing the "Rural Opportunities to Use Traffic Technology Enhancements (ROUTE)" project (a TSM project) on the U.S. 50 corridor on Maryland's Eastern Shore. Are there any proposed TSM improvements from the "ROUTE" project in the BCS-Tier 2 project area? If so, the information can be included in the No-Build Alternative.
MDP noted the RPA-Alternative C would include an optional pedestrian and bicycle shared-use path (SUP), and the MDTA would further coordinate with other state, local, and federal agencies to determine whether an SUP would be implemented (page 8-2). MDP suggests that on page 8-2, the paragraph discussing the SUP include the information that the MDTA would continue coordinating with local, state, and regional planning agencies in considering the consistency of the SUP with local pedestrian and bicycle plans, the proposed regional bike network in the Baltimore region, the 2025 Maryland State Transportation Trails Strategic Plan, and the Maryland's Complete Streets Policy.

Other Comments
TSM measures, e.g., robust and comprehensive traffic incident management, installing speed cameras to deter vehicle speeding and weaving in and out of lanes, encouraging local roadway improvements for local traffic, and other strategies, should be evaluated for current and future traffic congestion mitigation and safety improvement. MDP staff are aware that, likely due to limited incident management resources, it sometimes takes a long time to clear a traffic accident in the project corridor. Speeding/aggressive driving are also problems in the project corridor. Proactive traffic management to deter aggressive driving could improve overall travel efficiency and safety. It is unclear whether the MDTA has considered and addressed these TSM measures. If so, the information can be included in the

Heather Lowe, MDTA
Re: BCST2-DEIS – January 2026

No-Build Alternative for clarification.

On page 4-12, in the 4.2.1.4 paragraph, please change "……State-certified Priority Funding Areas (PFAs)……" to "……State-**concurred** Priority Funding Areas (PFAs)……" because local jurisdictions certify their designated PFAs, and MDP only reviews against the defined PFA criteria and makes a determination of whether to concur or not with the locally designated PFA. If a locally designated PFA doesn't meet the PFA criteria, MDP will indicate the area as a PFA Comment Area.

Refer to Table 4-9 (page 4-17): Please make a footnote for "Other Land" to explain the other land as: The remaining land not covered under another category. Examples include but are not limited to rural or agricultural lands, single-family residential parcels greater than or equal to 20 acres in size, and undeveloped portions of large parcels containing urban uses (See MDP's Statewide Classification Definitions. Visit the Statewide Land Use ArcGIS Story Map).

If you have any questions or wish to discuss the above comments further, please contact me at jason.dubow@maryland.gov and Bihui Xu at bihui.xu@maryland.gov.

Sincerely,



Jason Dubow, CC-P
Director, Research, Review, and Policy Division (RRP)

Maryland Department of Planning
(410) 767-3370; Jason.dubow@maryland.gov

CC: Sarah Williamson, Sr. Environmental Scientist & Owner, Coastal Resources, Inc.
Bihui Xu, Principal Transportation Planner, RRP, MDP
Chuck Boyd, Assistant Secretary of Planning Services, MDP

From: rita.pritchett@maryland.gov <rita.pritchett@maryland.gov>
Sent: Wednesday, March 11, 2026 8:26 AM
To: Sarah Williamson <sarahw@cri.biz>
Cc: rita.pritchett@maryland.gov
Subject: Review and Recommendation of Clearinghouse Project: MD20260126-0019

Hello Ms. Sarah Williamson,

The following link below includes the State Clearinghouse Review and Recommendation letter for your project, Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor.

Click this link to view the letter,
https://apps.planning.maryland.gov/EMIRC_Files/MD20260126-0019.zip . This is a file.

Thank you.

Rita Pritchett,
rita.pritchett@maryland.gov

Jason Dubow, Unit Manager
jason.dubow@maryland.gov
410-767-3370
Please take our customer service survey.

March 9, 2026

Ms. Sarah Williamson
Bay Crossing Study Team,
Coastal Resources Inc.
25 Old Solomons Island Road
Annapolis, MD 21401

STATE CLEARINGHOUSE RECOMMENDATION

State Application Identifier: MD20260126-0019
Applicant: Coastal Resources Inc.
Project Description: Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor
Project Location: Anne Arundel and Queen Anne's Counties
Approving Authority: U.S. Department of Transportation DOT/FHWA
Recommendation: **Consistent with Qualifying Comments**

Dear Ms. Williamson:

In accordance with Presidential Executive Order 12372 and Code of Maryland Regulation 34.02.01.04-.06, the State Clearinghouse has coordinated the intergovernmental review of the referenced project. This letter constitutes the State process review and recommendation. This recommendation is valid for a period of three years from the date of this letter.

Review comments were requested from the Maryland Departments of Natural Resources, Transportation, and the Environment; Anne Arundel and Queen Anne's Counties; and the Maryland Department of Planning including the Maryland Historical Trust. **The Maryland Department of Transportation had a statement.**

MDOT/ The Secretary's Office (TSO) stated that it will share comments with Maryland Transportation Authority (MDTA) directly. Please see MDOT's comments enclosed in the zipped file.

Queen Anne's County (QAC) found this project to be consistent with its plans, programs, and objectives.

QAC comments are summarized and included in the zipped file.

MDP found this project to be generally consistent with its plans, programs, and objectives. MDP commented that the project is generally consistent with the Sustainable Growth Policy and Planning Principle for Transportation to prioritize transportation networks that create reliable access to jobs, housing, and services.

Maryland Department of Planning • 120 E. Baltimore St., 20th Floor • Baltimore • Maryland • 21202
Tel: 410.767.4500 • Toll Free: 1.877.767.6272 • TTY users: Maryland Relay • Planning.Maryland.gov

The Maryland Departments of Environment (MDE), and Natural Resources (DNR); Anne Arundel County and the Maryland Historical Trust (MHT) found this project to be generally consistent with their plans, programs, and objectives, but included certain qualifying comments summarized below.

MDE comments are summarized in the zipped file. **Please be advised that MDE has identified Tier II anti-degradation waterbodies and/or flood zones in the project area and additional caution and/or requirements apply.**

DNR commented that it is reviewing the Tier 2 Chesapeake Bay Crossing Study and providing comments directly to the Maryland Transporation Authority (MDTA) Study Team and will provide copies of the comments if requested.

The Anne Arundel County Department of Recreation and Parks (DRP) commented that the State has now elected to proceed with Alternative C (a 6-8-6 plan which shifts access to the south side of US50/301 and the existing bridge approaches). That said, this alternative will essentially reconstruct everything from the Bridge west to nearly the Bay Head Park spur of the Broadneck Peninsula Trail (BPT). The northern alternatives considered had even greater (farther west) impact to the Trail. Note the specific reference to DRP's Trail in the Impact to Community Facilities attachment, which calls for "partial acquisition" of the BPT. The County would end up with revised/reconstructed portions of East College Parkway and Broadneck Trail Phases 1B and 5. The State previously indicated that it would be responsible for any involved portions of the Trail as part of the bridge project. **The County's "feedback" to this Clearinghouse request should affirm the State's commitment to full restoration of DRP's new trail.**

MHT had determined that the proposed undertaking will result in adverse effects to historic properties under Section 106 of the National Historic Preservation Act. Accordingly, MHT is consulting with the Federal Highway Administration (FHWA), Maryland Transporation Authority (MDTA), and other consulting parties to develop and execute a Programmatic Agreement to resolve the undertaking’s adverse effects prior to issuance of the combined Final EIS/Record of Decision.

Any statement of consideration given to the comments should be submitted to the approving authority, with a copy to the State Clearinghouse.

The State Application Identifier Number must be placed on any correspondence pertaining to this project. The State Clearinghouse must be kept informed if the approving authority cannot accommodate the recommendation.

Please remember, you must comply with all applicable state and local laws and regulations. If you need assistance or have questions, contact the State Clearinghouse staff person noted above at 410-767-4490 or through e-mail at rita.pritchett@maryland.gov.

Also please complete the attached form and return it to the State Clearinghouse as soon as the status of the project is known. ***Any substitutions of this form must include the State Application Identifier Number.*** **This will ensure that our files are complete.**

Thank you for your cooperation with the MIRC process.

Sincerely,

Jason Dubow, Director
Research, Review and Policy Division

JD:RP
Enclosure(s)
cc: Bihui Xu - MDP
Brittany Brothers - MDOT
Patrick Felch - DNR
Nicole Eisenstein - MDE
Stephen Walker - ANAR
Amy Moredock - QANN
David Dahlstrom - MDPLU
Carter Reitman - MDPLS
Dixie Henry - MHT

26-0019_CRR.CLS.docx

PROJECT STATUS FORM

Please complete this form and return it to the State Clearinghouse at mdp.clearinghouse@maryland.gov upon receipt of notification that the project has been approved or not approved by the approving authority.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning

DATE: _____
(Please fill in the date form completed)

FROM: _____
(Name of person completing this form.)

PHONE: _____-____-_____
(Area Code & Phone number)

RE: **State Application Identifier:** **MD20260126-0019**
Project Description: Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor

PROJECT APPROVAL			
This project/plan was:	☐ **Approved**	☐ **Approved with Modification**	☐ **Disapproved**
Name of Approving Authority: _____		**Date Approved:** _____	

FUNDING APPROVAL			
The funding (if applicable) has been approved for the period of: _____, 202____ **to** _____, 202____ **as follows:**			
Federal $: _____	**Local $:** _____	**State $:** _____	**Other $:** _____

OTHER
☐ *Further comment or explanation is attached*

Ms. Sarah Williamson
Bay Crossing Study Team,
Coastal Resources Inc.
25 Old Solomons Island Road Annapolis, MD 21401

Bihui Xu - MDP

Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), Draft Environmental Impact Statement (DEIS): Addressing Existing and Future Transportation Capacity Needs and Access Along the U.S. 50/301 Corridor

Maryland Department of the Environment – WSA/WPRPP

REVIEW FINDING: **R1 Consistent with Qualifying Comments (MD20260126-0019)**

Please be advised, the property or properties in MD20260126-0019 is/are in close proximity to Flood Zone AE (100-year Floodplain) and X (500-year Floodplain). The project coordinator(s) should follow local floodplain ordinances and Federal Emergency Management Agency's guidelines and standards.

It is advised that the coordinator(s) consider climate resiliency, which could include but not limited to the following steps (https://toolkit.climate.gov/):

- Explore Hazards: Identify climate and non-climate stressors, threats, and hazards and how they could affect assets (people and infrastructure).
- Assess vulnerability and risks: Evaluate assets vulnerability and estimate the risk to each asset.
- Investigate options: Consider possible solutions for your highest risks, check how others have responded to similar issues, and reduce your list to feasible actions.
- Prioritize and plan: Evaluate costs, benefits, and capacity to accomplish each action integrating the highest value actions into a stepwise plan.
- Take action: Move forward with your plan and check to see if your actions are increasing your resilience with monitoring.

The coordinator(s) is advised to State National Flood Insurance Program Coordinator, in MDE's Stormwater, Dam Safety, and Flood Management Program, at flood.maps@maryland.gov for additional information regarding the regulatory requirements for Floodplains and Storm Surges.

The coordinator(s) is advised to contact Matthew C. Rowe, CC-P, Deputy Director of MDE's Water and Science Administration, at (410) 537-3578 for additional information regarding Climate Change and Resiliency.

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258
www.mde.maryland.gov


Cape St. Claire
Sandy Point State Park
Love Point
Eastern Neck National Wildlife Refuge
William Preston Lane Jr. Memorial Brg
Stevensville
Chester
Kangaroo Beach
Queenstown
Hickory Ridge
Grasonville
Dominion
Kent Island
Cox Creek Acres
Queen Annes Acres
Skipping Creek Plantation
Wye Island

MDE Comments for Clearinghouse Project Review: MD20260126-0019

Response Code: R-1 AND C-1

1. Any solid waste including construction, demolition and land clearing debris, generated from the subject project, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible. Contact the Solid Waste Program at (410) 537-3315 for additional information regarding solid waste activities and contact the Resource Management Program at (410) 537-3314 for additional information regarding recycling activities.
2. The Solid Waste Program should be contacted directly at (410) 537-3315 by those facilities which generate or propose to generate or handle hazardous wastes to ensure these activities are being conducted in compliance with applicable State and federal laws and regulations. The Program should also be contacted prior to construction activities to ensure that the treatment, storage or disposal of hazardous wastes and low-level radioactive wastes at the facility will be conducted in compliance with applicable State and federal laws and regulations.
3. The proposed project may involve rehabilitation, redevelopment, revitalization, or property acquisition of commercial, industrial property. Accordingly, MDE's Brownfields Site Assessment and Voluntary Cleanup Programs (VCP) may provide valuable assistance to you in this project. These programs involve environmental site assessment in accordance with accepted industry and financial institution standards for property transfer. For specific information about these programs and eligibility, please Land Restoration Program at (410) 537-3437.
4. Borrow areas used to provide clean earth back fill material may require a surface mine permit. Disposal of excess cut material at a surface mine may requires site approval. Contact the Mining Program at (410) 537-3557 for further details.

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests any final comments on the **draft Preferred Alternative & Conceptual Mitigation – April 2026,** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form): **Agency: Maryland Department of Planning**
____ Provides Comments (below or attached) **___X_ Has No Comments**
Comments:
Signature: Bihui Xu Date: 05/11/2026

Maryland Transportation Authority

CHESAPEAKE
BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency: Maryland Port Administration**
__X__ **Agrees** with the **Study Schedule (without comments)** ____ **Agrees** with the **Study Schedule (with minor comments)*** ____ **Does not agree** with the **Study Schedule*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: N/A
Signature: _____ Date: MAY 11, 2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Bill Doyle
Executive Director
Maryland Department of Transportation
Maryland Port Administration
World Trade Center
401 East Pratt Street
Baltimore, MD 21202-3117

Dear Bill Doyle:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.

3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

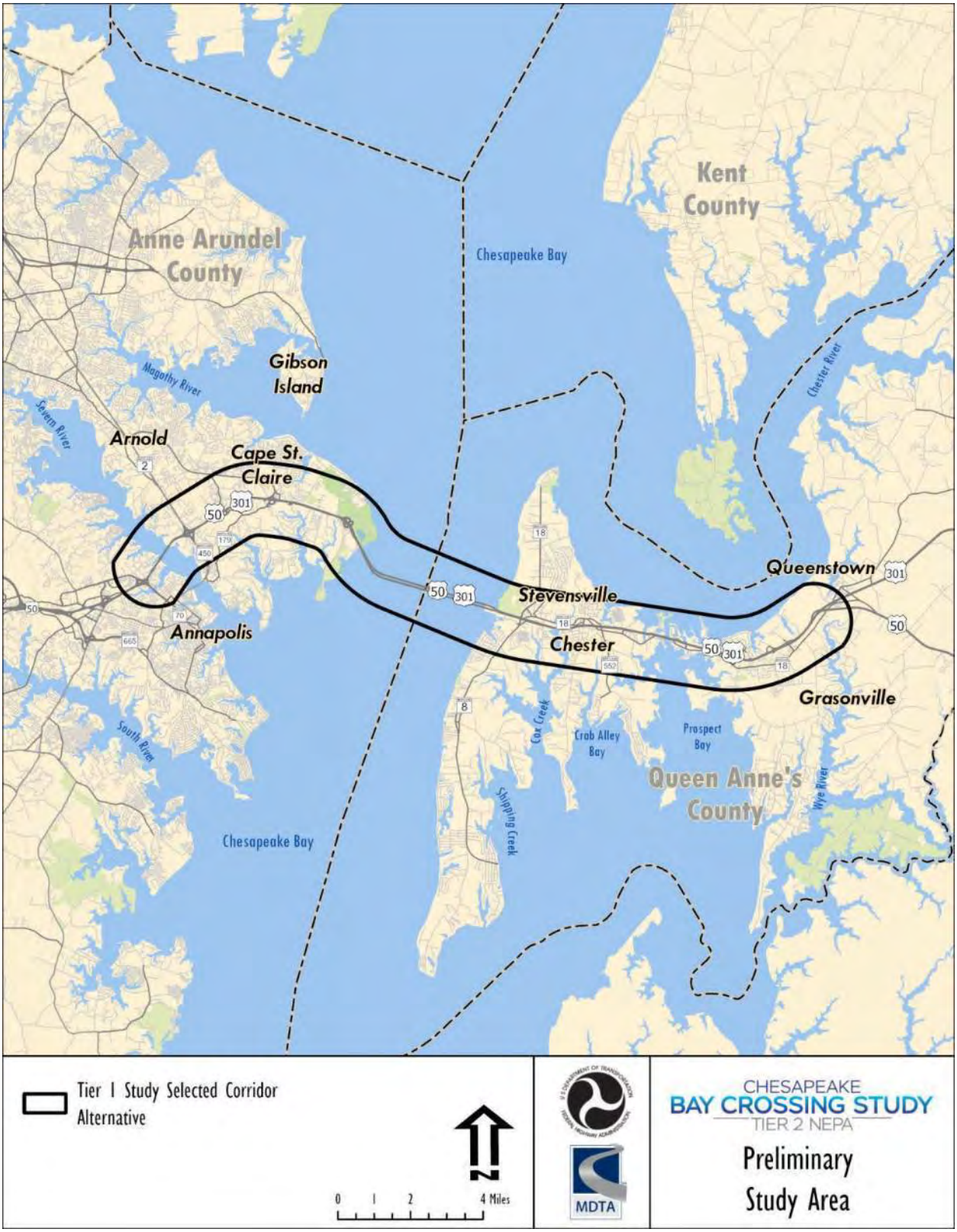


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Dominic Scurti, MDOT MPA, Director of Planning
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Maryland Port Administration

Signature: [signature] Date: 6/26/23

Print Name: Brian Miller

Title: Interim Acting Executive Director

From:	Sarah Williamson
To:	Emma Beck
Subject:	FW: MDTA Bay Crossing Study Tier 2 NEPA - USCG Navigation Impact Report
Date:	Tuesday, March 19, 2024 1:31:48 PM
Attachments:	image001.png

From: Shreeve, Rob <robert.shreeve@aecom.com>
Sent: Tuesday, March 19, 2024 12:46 PM
To: dscurti@marylandports.com; apenafiel@marylandports.com; wrichardson@marylandports.com
Cc: Heather Lowe <Hlowe@mdta.state.md.us>; Eric Almquist <ealmquist@rkk.com>; Sarah Williamson <sarahw@cri.biz>
Subject: MDTA Bay Crossing Study Tier 2 NEPA - USCG Navigation Impact Report

As part of the Bay Crossing Study:Tier 2 NEPA (BCST2), MDTA has been coordinating with the US Coast Guard (USCG). For the USCG's review, they have requested that we prepare the Navigation Impact Report (Section 3 of the Bridge Permit Application). We can set up a time to discuss the data request below.

It would be appreciated if you could provide some information to us, such as:

- List of commercial vessels likely navigating through the Bay Bridge, including
  - Vessel name;
  - Registration/documentation numbers;
  - Vessel type;
  - Vessel owner contact information (company/individual name, address, contact info.);
  - Primary vessel mooring location (include waterway milepoint, if known);
  - Vessel overall length;
  - Vessel beam;
  - Vessel draft (depth of hull below waterline at full load);
  - Vessel air draft (height of the highest fixed point of the vessel above the waterline, when empty);
- Specialized vessels that use the waterway (e.g. vessels which have limited maneuverability due to inherent design or mode of operation);
- Safety margin required by vessel to navigate through the bridge(s);
- Vessel transit frequencies under proposed bridge(s), transit speeds, and load configurations;
- Vessel traffic characteristics (to include if tug assist is required for transit through the bridge(s) due to limited horizontal clearance).
- Potential impact to existing and future cruise ship ports-of- call/terminals
- Potential impact to ports supporting post-Panamax vessels
- Potential impact to vessels that produce unique products for the region (Note the combined clearance requirement of the vessel and the helper boat/tug.)

Annual cargo movements (cargo types and quantities);

- Provide waterway dependant facilities that should be contacted as part of the study;
- Describe land use zoning and future port development plans;
- Describe future vessel size and traffic trends;

We understand the difficulty in answering some of the future looking questions, but they are important since the new crossing is likely to affect navigation for next 100 years.

If you have questions or comments about this matter, feel free to call or email me.

Sincerely,

Rob Shreeve

Senior Environmental Project Manager, Environmental and Transportation Planning
robert.shreeve@aecom.com

AECOM
4 North Park Drive
Suite 3000
Hunt Valley, United States
443-677-3974
aecom.com
Delivering a better world
LinkedIn | Twitter | Facebook | Instagram



Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests final review and any comments on the **Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose & Need Summary, the following agency (by signing this form):

Agency: Maryland Port Administration

X **Provides Comments (below or attached)**

____ **Has No Comments**

Comments:

- Errata Comment 27 - [Regarding the Bayonne Bridge] Not sure this is worth commenting on because the text in the drat P&N (2004.06.26) is correct, but the errata response is inaccurate. By replacing Bayonne Bridge/215ft with Verrazzano Bridge/230ft, the reconstruction date of 2017 is no longer correct. BUT the text in the draft P&N took the date out and adequately addresses the MPA comment.

- All other comments have been addressed.

Signature: Amanda Peñafiel Date: 7/11/24

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests any final comments on the **Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** Maryland Port Administration
X **Provides Comments (below or attached)** **____ Has No Comments**
Comments: Navigational clearance is not discussed in the ARDS section. It's only mentioned in Section 4.4 (Modifications from Study's NOI – Structure Type-Tunnel). MPA believes there should be some mention of vertical navigational clearance in the actual ARDS section even if it's just a note stating that the USCG established clearance will be utilized in each of the build alternatives.
Signature: Amanda Peñafiel Date: 03/27/2025

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:_____MDOT State Highway Administration_____**
____ Agrees with the **Study Schedule (without comments)** **__X_ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: Presenting Preliminary Alternatives to the public by fall/winter 2023 seems early considering the MDTA/MDOT SHA kick-off meeting was just held on April 14, 2023. Given that MDOT SHA doesn't know what the impacts will be to the approach roadways yet, we may need more time to evaluate them once we get the alternatives from MDTA. Also please note, this schedule indicates that a couple of public meetings may occur around the same time as CTP tour season.
Signature: Donna Buscemi Date: 5/11/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Cooperating and Participating
Agency

June 2, 2023

Scott Pomento
Director of Planning and Preliminary Engineering
Maryland Department of Transportation
State Highway Administration
707 North Calvert Street
Baltimore, MD 21201-3601

Dear Scott Pomento:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area by law or special expertise. As Lead Agencies, MDTA and FHWA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).

3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.
6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

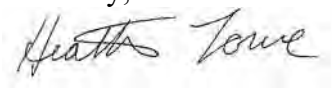
Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

Sincerely,

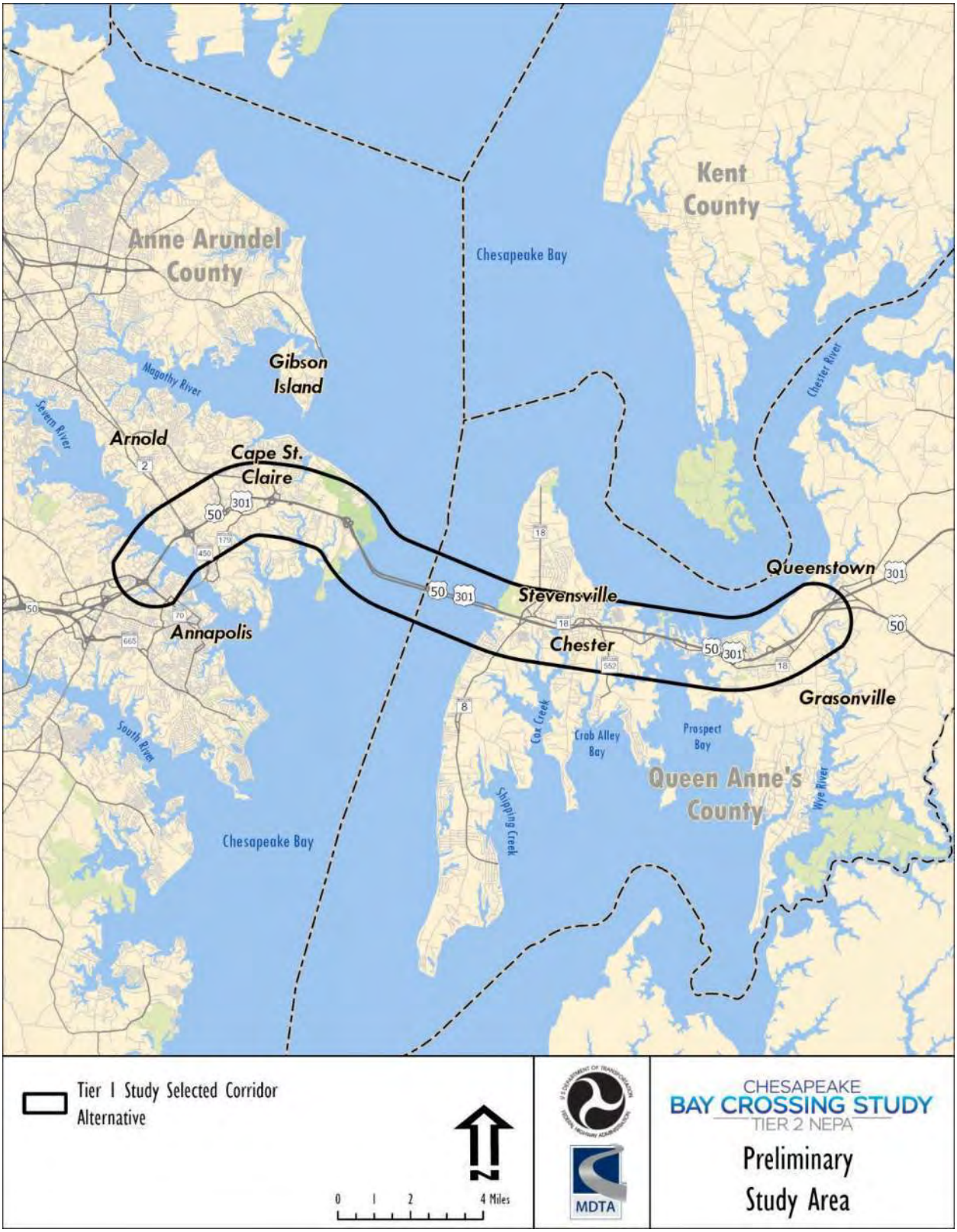


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Donna Buscemi, MDOT SHA, Chief - Environmental Planning Division
Matt Baker, MDOT SHA
Harriet Levine, MDOT SHA Liaison - Engineering
Jen Rohrer, MDOT SHA Liaison
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: MDOT SHA

Signature: Eric Beckett Date: 6/6/2023

Print Name: Eric Beckett

Title: Deputy Director, OPPE

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Cultural Resources Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Cultural Resources Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Cultural Resources, the following agency (by signing this form): **Agency:____Maryland State Highway Administration_____**
_X__ Concures with the Cultural Resources Methodology (without comments) **____ Agrees with the Cultural Resources Methodology (with minor comments)*** **____ Does not agree with the Cultural Resources Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Buscemi Date: 11/17/2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:____Maryland State Highway Administration_____**
__X__ Concures with the Indirect & Cumulative Effects Methodology (without comments) **____ Agrees with the Indirect & Cumulative Effects Methodology (with minor comments)*** **____ Does not agree with the Indirect & Cumulative Effects Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Buscemi Date: 11/17/2023

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Air Quality Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Air Quality Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Air Quality, the following agency (by signing this form): **Agency:____SHA**_____
__X_ **Concurs** with the **Air Quality Methodology (without comments)** ____ **Agrees** with the **Air Quality Methodology (with minor comments)*** ____ **Does not agree** with the **Air Quality Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Buscher Date: ___12/12/2023_____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:___SHA**_____ ____
_X___ **Concurs** with the **Natural Environmental Methodology (without comments)** ____ **Agrees** with the **Natural Environmental Methodology (with minor comments)*** ____ **Does not agree** with the **Natural Environmental Methodology*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Bacon Date: 2/13/2024

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:____SHA**_____
____ **Concurs** with the **Socioeconomics & Land Use Methodology (without comments)** _**X**__ **Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** ____ **Does not agree** with the **Socioeconomics & Land Use Methodology*** ****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **Page 2, American with Disability Act 1990 as amended**—please add "1990, as amended by the ADA Amendments Act of 2008…." **Page 2, Federal Uniform Relocation and Reas Estate Acquistion Policies Act of 1970**—am providing copy of the revised summary of the Relocation Assistance Program of the MD State Highway Administration (revised Feb. 10, 2016) **Page 3, Farmland Protection Policy Act of 1981-per the Act,** Please define "farmland" **Page 3, Maryland Smart and Sustainable Growth Acto of 2009,** please add "land use ordianances, **the bill defines the current requirements of consistency."** **Page 4, FHWA Techanical Advisory T6640.8A**—may want to include also: "23 CFR 774 Section 4f Resources"
Signature:  Date: 2/26/2024

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:** Maryland State Highway Administration
X **Concurs with the Draft Purpose and Need Summary (without comments)** ____ **Agrees with the Draft Purpose and Need Summary (with minor comments)*** ____ **Does not agree with the Draft Purpose and Need Summary** * **If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.*
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Buscemi **Date:** 7/29/2024

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Noise Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Noise Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Noise Methodology, the following agency (by signing this form): **Agency:____Maryland State Highway Administration (SHA)_____**
__X__ **Concurs** with the **Noise Methodology (without comments)** ____ **Agrees** with the **Noise Methodology (with minor comments)*** ____ **Does not agree** with the **Noise Methodology*** **If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this agreement form.*
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: Donna Bussi Date: 9/17/24

From:	Donna Buscemi
To:	Heather Lowe
Cc:	Sarah Williamson; Ray Moravec; sburnett; Dennis Atkins (Design); Barrett Kiedrowski
Subject:	RE: BCST2 - Reminder of Scoping Comment Deadline - 1/13/25
Date:	Monday, January 13, 2025 3:14:03 PM
Attachments:	image003.png

Hi Heather,
We completed a review of the NOI and additional project information and have no comments.

Thanks for the opportunity to comment!
Donna



roads.maryland.gov

Donna Buscemi
Deputy Director for Project Development & Environmental Approvals
Office of Planning and Preliminary Engineering
410.545.8558 **office**
dbuscemi@mdot.maryland.gov
Maryland State Highway Administration
707 North Calvert Street, Baltimore, MD 21202-3601

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:_____Maryland State Highway Administration_____**
____ **Concurs with the Draft ARDS (without comments)** **__X__ Agrees with the Draft ARDS (with minor comments)*** ____ **Does not agree with the Draft ARDS*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: See minor comments in the ARDS file on SHA's MS Teams page.
Signature: _____ Date: 3/31/2025

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: Maryland State Highway Administration

X **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)**

____ **Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree** with the **Preferred Alternative & Conceptual Mitigation***

****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: _____ Date: 5/13/2026

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:** Maryland Transit Administration
X **Agrees** with the **Study Schedule (without comments)** ____ **Agrees** with the **Study Schedule (with minor comments)*** ____ **Does not agree** with the **Study Schedule*** ****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: [signature] Date: 5/25/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Kate Sylvester
Deputy Director

Maryland Department of Transportation
Maryland Transit Administration
William Donald Schaefer Tower
6 St. Paul Street
Baltimore, MD 21201-1614

Dear Kate Sylvester:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.

2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

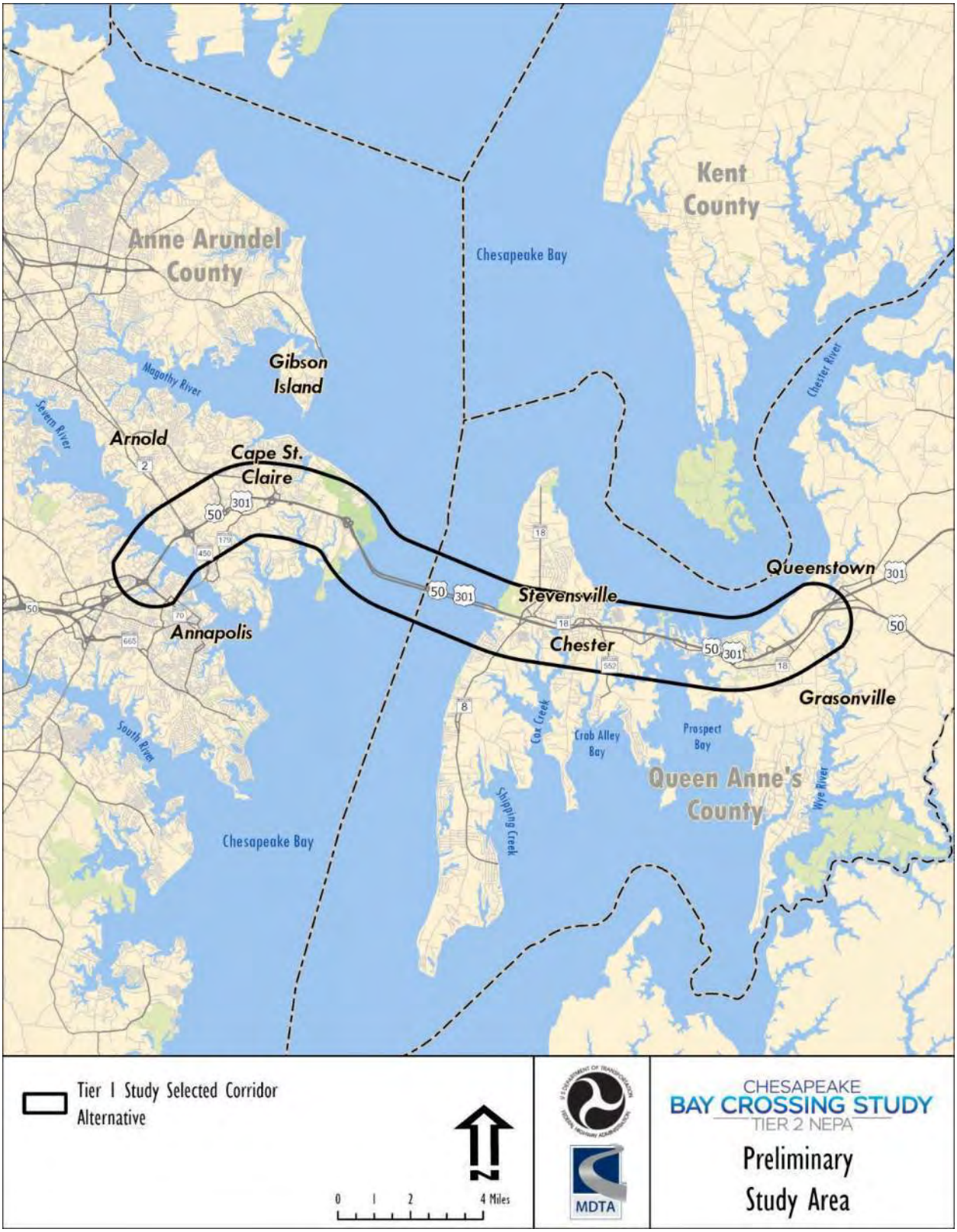


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Lauren Molesworth, MTA, Environmental Planning Manager
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☑ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Maryland Transit Administration

Signature:  Date: 07/17/2023

Print Name: Kate Sylvester

Title: Deputy Administrator, Chief Planning, Programming, Engineering Officer

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests final review and any comments on the **Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose & Need Summary, the following agency (by signing this form): **Agency:___Maryland Transit Administration _____**
____ Provides Comments (below or attached) **_X___ Has No Comments**
Comments:
Signature: _____ Date:___7/12/2024_____

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) requests any final comments on the **Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:___Maryland Transit Administration_____**
__X__ **Provides Comments (below or attached)** **____ Has No Comments**
Comments: With the inclusion of bus improvements, the ARDS will explore financial support for the bus improvements. MTA is interested in learning about the financial support options. Will MTA be expected to provide the financial support to encourage transit use?
Signature: _____ Date: _3/14/2025_____

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: NOAA Fisheries, Greater Atlantic Region, Habitat and Ecosystem Services Division

____ **Agrees** with the **Study Schedule (without comments)**

__X_ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

(1) The anticipated coordination timeframe for the resource assessment methodologies is designated "Winter 2023 – Summer 2023". Please confirm that this exercise will be completed by Summer 2023 and provide information regarding when these assessments will occur and when the results will be available for agency review in the coordination plan.

(2) We are concerned that FHWA intends to identify the preliminary alternatives prior to the completion of any resource assessment or the review of responses to the NOI. Please clarify how the findings of the BCS resource assessment efforts will be used to inform the developments of alternatives. We have provided our agreement with the assumption that some consideration of mapped natural resources will be considered during the development of the initial suite of alternatives.

(3) Because you indicated that you would seek to complete your consultations with NMFS as part of this NEPA process, we can support this timeline provided that adequate time is allotted for the completion of these consultations. We have assumed that your timeline considers these requirements, though they are not stated explicitly. For reference, the essential fish habitat (EFH) assessment, Fish and Wildlife Coordination Act (FWCA) consultation and any Endangered Species Act (ESA) consultation should be initiated concurrent with the release of the DEIS and completed in advance of the FEIS since any project changes as a result of the consultation should be included in the FEIS. Project schedules must accommodate these consultations and their specified timelines (e.g., 60 days for expanded EFH consultation, initiated upon receipt of a complete description of the action). We cannot concur on a selected alternative or mitigation until the required consultations are completed.

Signature: _____ Date: 05/12/2023

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. John Bullard
Regional Administrator
National Oceanic Atmospheric Administration
National Marine Fisheries Service
Greater Atlantic Region Office
55 Great Republic Drive
Gloucester, MA 01930

Dear Mr. Bullard:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Endangered Species Act and other laws and regulations. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any

issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

JEANETTE J MAR

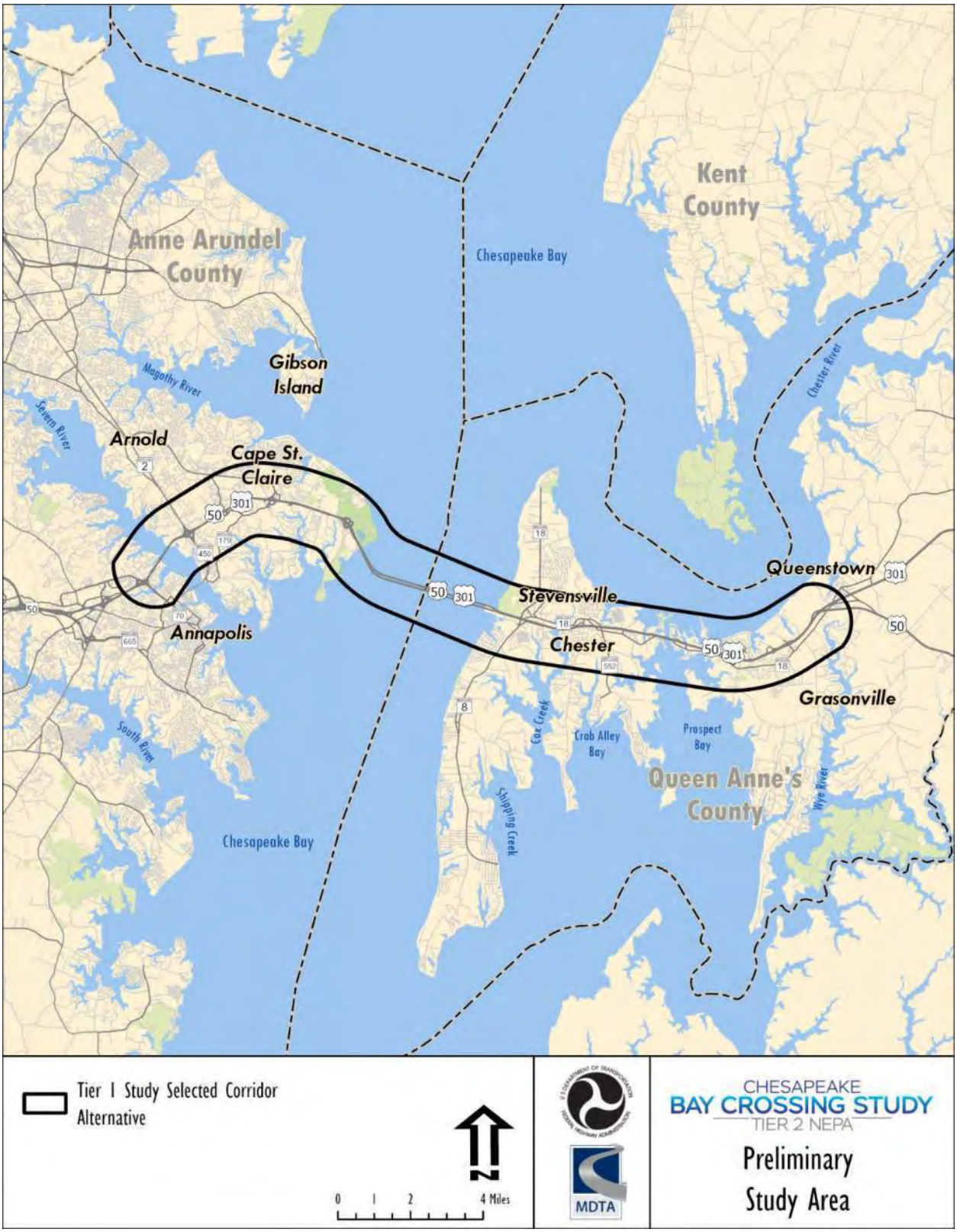
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:29:48 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Ms. Kimberly Damon-Randall, NOAA NMFS, Protective Resources Division
Ms. Karen Greene, NOAA NMFS, Mid-Atlantic Field Office Supervisor and EFH Coordinator
Mr. Jonathan Watson, NOAA NMFS, Marine Habitat Resource Specialist
Mr. Brian Hopper, NOAA NMFS, Marine Habitat Resource Specialist
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

June 30, 2023

Valeriya Remezova
Division Administrator
Federal Highway Administration
Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

RE: Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act Study
Cooperating and Participating Agency Invitation

Dear Ms. Remezova:

Thank you for your June 1, 2022, letter inviting us to be a cooperating and participating agency on the preparation of environmental documents pursuant to the National Environmental Policy Act (NEPA) for the Chesapeake Bay Crossing Tier 2 Study (the Study). The goals of the Study include evaluating the potential alternatives and their associated impacts for a new crossing of the Chesapeake Bay in the vicinity of the U.S. 50/ U.S. 301 corridor near Annapolis, Maryland. This corridor was previously identified as an outcome of the Tier 1 Environmental Impact Statement (EIS) for this project. In accordance with the Council on Environmental Quality's NEPA Implementing Procedures (40 CFR §1501.6, Cooperating agencies), we accept your invitation to participate as a cooperating agency to help foster a collaborative process and interagency coordination on these projects.

Our role and degree of involvement is dependent on existing staff and fiscal resources, and our contribution to the process will be limited to participating in project meetings and providing written comments in response to your documents prepared as part of the NEPA process. We will provide technical information identifying aquatic species and habitats of concern, identification of issues to be considered and evaluated during the NEPA process and guidance on evaluating, avoiding, and minimizing project effects to our trust resources. At this time, we are unable to undertake any data collection, conduct analyses, or prepare any sections of the NEPA document as our staff and resources are fully committed to other obligatory programs of NOAA Fisheries.

Please note that our involvement as a cooperating agency does not constitute an endorsement of this project, nor does it obviate the need for consultations required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Fish and Wildlife Coordination Act (FWCA), and the Endangered Species Act (ESA). As project design moves forward, should adverse impacts to essential fish habitat (EFH) or other NOAA trust resources be anticipated, consultation with us under the Section 305(b) of MSA and FWCA is required. Similarly, potential impacts to species protected under the ESA should be coordinated with our Protected

Resources Division. Please also be aware the proposed timelines for all projects posted on the Permitting Dashboard that include NOAA Fisheries milestones must be provided to us for review and approval prior to their posting.

Consultation Authorities

The estuarine waters in the Study corridor have been designated EFH for several federally managed species. The MSA requires federal agencies such as the U.S. Department of Transportation to consult with us on any action or proposed action authorized, funded, or undertaken by such agency that may adversely affect EFH identified under the MSA. This process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in the consultation process. Similarly, the FWCA requires that all federal agencies consult with us when proposed actions might result in modifications to a natural stream or body of water. It also required that they consider the effects that these projects would have on fish and wildlife and must also provide for improvement of these resources. Under this authority, we work to protect, conserve and enhance species and habitats for a wide range of aquatic resources such as shellfish, diadromous species, and other commercially and recreationally important species that are not managed by the federal fishery management councils and do not have designated EFH. Please see our website (https://www.fisheries.noaa.gov/new-england-mid-atlantic/habitat-conservation/essential-fish-habitat-assessment-consultations) for further information regarding your agency's obligations under the MSA and FWCA.

Endangered species under the jurisdiction of NOAA Fisheries may be present in the project area. The federal action agency is responsible for determining whether the proposed action may affect these species. If you determine that the proposed action may affect a listed species, your determination of effects along with justification and a request for concurrence should be submitted to the Section 7 Program email account at nmfs.gar.esa.section7@noaa.gov. Guidance and tools to assist you in your effects determination are available on our website at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultations-greater-atlantic-region.

Conclusion

We look forward to working with you and the Bay Crossing Study team as the Study moves forward. If you have any questions regarding this matter, please contact staff in Annapolis, MD field office. For queries related to the MSA/FWCA, contact Jonathan Watson (jonathan.watson@noaa.gov) in our Habitat and Ecosystem Services Division. For queries regarding threatened and endangered species listed by us under the ESA, contact Brian Hopper in our Protected Resources Division (brian.d.hopper@noaa.gov).

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat and Ecosystem Services

cc: J. Mar (FHWA)
J. DaVia (USACE)
H. Lowe (MDTA)
K. Greene, J. Watson (NMFS HESD)
J. Anderson, B Hopper (NMFS PRD)

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:___NMFS- Habitat and Ecosystem Services Division _____**
__X__ **Concures** with the **Indirect & Cumulative Effects Methodology (without comments)** **____ Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)*** **____ Does not agree** with the **Indirect & Cumulative Effects Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _____ Date: ____11/16/2023_____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form):

Agency: National Oceanic and Atmospheric Administration, National Marine Fisheries Service

____ **Concurs** with the **Natural Environmental Methodology (without comments)**

__X__ **Agrees** with the **Natural Environmental Methodology (with minor comments)***

____ **Does not agree** with the **Natural Environmental Methodology***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

(1) Note that the approach detailed in the NETR errata to delineate the presence of early-emerging species (*Zannichellia palustris*) of submerged aquatic vegetation (SAV) is not sufficient to fully describe the spatial coverage. Nevertheless, the use of the entire time series (1971 - present) of survey data available from the Virginia Institute of Marine Sciences (VIMS) should be sufficient to designate the vast majority of potential SAV habitat for the purposes of evaluating the relative effects of the alternatives. We recommend that any estimated impacts associated with the Alternatives Retained for Detailed Study (ARDS) on SAV should be noted as incomplete due to the lack of this spring survey data. Once an alignment is chosen, more site specific data will be needed to fully describe potential impacts..

(2) Note that the data source cited in L.2.d.(iii)(b)(3) is no longer functional. We recommend that you coordinate with MDNR to determine where the current mapping for designated anadromous fish spawning habitats is currently found. Also, ensure that striped bass (*Morone saxatilis*) spawning areas are represented in your anadromous fish data sources.

Signature: _____ Date: 2/5/2024

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:___NOAA Fisheries _____**
_X__ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **___ Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: _____ Date: 7/16/2024

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

January 13, 2025

Valeria Remezova
Maryland Division Administrator
USDOT Federal Highway Administration
31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201

RE: Docket Number FHWA–2024–0073
Scoping Comments for the Notice of Intent to Prepare an Environmental Impact Statement for the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA)

Dear Ms. Pavona:

We have reviewed the March 25, 2024, *Federal Register* Notice of Intent (NOI) for the Federal Highway Administration (FHWA) to prepare an Environmental Impact Statement (EIS) for the Chesapeake Bay Crossing Tier 2 National Environmental Policy Act (NEPA) Study (Study). The goals of the Study are to evaluate the impacts associated with a new crossing of the Chesapeake Bay along the U.S. Route 50/301 corridor (Rte. 50). This corridor, which contains existing Rte. 50 and the associated Gov. William Preston Lane Jr. Memorial Bridge (Bay Bridge), was selected as the Recommended Preferred Corridor Alternative for a new crossing at the conclusion of the Chesapeake Bay Crossing Tier 1 NEPA Study. In the NOI, FHWA proposes to evaluate the impacts associated with seven Alternatives Retained for Detailed Study (ARDS), including the No Action alternative. The ARDS include several different lane configurations for east-bound (EB) and west-bound (WB) sections of Rte. 50 within the defined study corridor.

We are responding to your request for information as a cooperating agency on this project with legal jurisdiction and special expertise over NOAA trust resources and as a consulting agency under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Fish and Wildlife Coordination Act (FWCA), and the Endangered Species Act (ESA). We are also an action agency for the Study to the extent that NMFS may issue Incidental Take Authorization (ITAs) under the Marine Mammal Protection Act (MMPA) in response to a request from the applicant.

Herein, we provide information and technical assistance related to resources in the Study area and recommended analyses for the EIS. We also provide technical assistance specific to consultation and authorization requirements and their respective sufficiency needs.

General Comments

Based on the information presented in the NOI, it is our understanding that there are two anticipated construction phases for the proposed project, as the proposed ARDS only includes two separate bridge crossings to replace the existing two spans of Rte. 50 over the Chesapeake Bay. We understand that certain ARDS, including a double-decker bridge and a tunnel, were

eliminated from further consideration based on various criteria. The double-decker bridge was screened from further evaluation because it would "not provide the redundancy" and "would not be reasonable from a resiliency perspective". Neither of these criteria are specifically highlighted in the Purpose and Need section of the NOI. In addition, a single span bridge with the proposed capacities was not evaluated as part of the ARDS. Because it may present fewer environmental impacts, we recommend that the Project team evaluate the impacts associated with a single bridge span and/or a double-span with shared in-water structures (e.g., similar to Mario M. Cuomo Bridge) in the EIS to compare with the impacts of the ARDS currently proposed in the NOI. This evaluation should include both temporary (e.g., construction infrastructure, underwater noise, turbidity, temporal disturbance) and permanent impacts (e.g., fills). This information and clarification will help inform our recommendations and understanding of feasible and reasonable Project alternatives at an early stage.

There are also several indirect impacts that should be fully described in the EIS, as they are reasonably-foreseeable outcomes resulting from the replacement of the existing Bay Bridge. We note that the study corridor was altered early in the Tier 2 NEPA process and no longer includes the existing Rte. 50 crossing of the Severn River. However, the proposed ARDS include expanding lanes on Rte. 50 immediately adjacent to this crossing. It seems likely that funneling down the proposed four or five WB lanes of traffic into the existing three WB lanes of traffic on the Severn River Bridge, where traffic bottlenecks are presently known to occur, would result in the need for roadway improvements and expansions to accommodate the anticipated traffic. As a result, the Study should consider the indirect impacts associated with expanding capacity (e.g., full bridge replacement) on the Severn River Bridge, as this is a reasonably-foreseeable outcome of expanded traffic capacity in the adjacent study corridor. We also recommend that the expansion (i.e., deepening, widening) of the existing shipping channel be evaluated as an indirect impact resulting from the project. Following the collapse of the Francis Scott Key Bridge in 2024, the existing Bay Bridge is the only major height-restricting structure that remains between the Port of Baltimore and the Atlantic Ocean. We anticipate that new Bay Bridge spans will present greater clearance and therefore will allow larger commercial vessels to call on the Port of Baltimore. This coupled with the proposed expansion of port facilities in the Baltimore area make it likely that the project could induce greater environmental impacts associated with waterborne commerce. Finally, we recommend that a hydrodynamic study be completed to evaluate the indirect effects of additional in-water structures (e.g., pier islands, culverted road crossings) on the movement of water through the Study corridor. This study should be specific to crossings of major tidal waterbodies (e.g., Bay Bridge, Kent Island Narrows) and should consider a range of tidal conditions that can be reasonably anticipated through the life of the project.

Resources under NOAA Fisheries Jurisdiction and for Which it has Special Expertise

The project overlaps with significant resources under NOAA Fisheries jurisdiction, including habitats important for federally managed fish species and protected species. The Study area supports fishery resources and overlaps with important regional commercial and recreational fisheries, including but not limited to striped bass (*Morone saxatilis*) and blue crab (*Callinectes sapidus*). Here we highlight some resources of concern for consideration in the EIS.

Essential Fish Habitat
The Project area includes important habitats for a range of federally managed fish species. Habitats in the Project area include soft bottom to structured habitats (e.g., oyster reef) as well as submerged aquatic vegetation (SAV) and shellfish beds. We provided technical guidance to FHWA as part of the Natural Resources Technical Report (NRTR) methodology document to ensure that these areas are fully described in the EIS.

The study corridor overlaps with designated Habitat Areas of Particular Concern (HAPC) for summer flounder (*Paralichthys dentatus*). The designation of HAPCs highlights the importance of juvenile summer founder rearing habitats and complex habitat in this area and creates an obligation to evaluate potential adverse impact to such habitats and consider measures which would minimize that adverse effect. Areas within the study corridor are also annually colonized by submerged aquatic vegetation (SAV), primarily widgeon grass (*Ruppia maritima*) and horned pondweed *(Zannichellia palustris*). SAV is designated a HAPC for summer flounder because it has been demonstrated to be preferred feeding and resting habitat (Orth and Heck, 1980; Lascara, 1981; Rogers and Van Den Avyle, 1983; Heck and Thoman, 1984) for this recreationally and commercially valuable species. HAPCs are a subset of EFH that are either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. Because of this, individual, cumulative and synergistic effects are a particular concern in these habitats. The Mid-Atlantic Fishery Management Council has defined the summer flounder HAPC as all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH. Because SAV, especially widgeon grass, can exhibit large spatial fluctuations from year to year the widely accepted practice for defining SAV habitat is to consider areas identified by the Virginia Institute of Marine Science (VIMS) as supporting SAV based on surveys conducted in the five most recent years. Any area mapped in those five years is considered to be habitat that supports SAV, even if SAV is not found there on a given date during the growing season. Furthermore, because the VIMS SAV survey does not occur during the height of the growing season for horned pondweed, additional surveys may be warranted to fully describe the occurrence of this species within the study corridor.

The project will likely also result in permanent and/or temporary impacts to other productive aquatic habitats. This includes emergent tidal wetlands, beach strand habitat, intertidal flats, sub-tidal shallows, and oyster reef habitat. Tidal marshes and mudflats are both designated as Special Aquatic Sites under the Clean Water Act due to their unique ecological functions and sensitivity to anthropogenic impacts. The spatial configuration of these habitats and their current habitat functions should be fully described as part of this EIS to allow for impacts associated with the project to be fully disclosed. Field surveys are likely necessary to ensure accurate delineation. This should include delineation of tidal wetlands, including details regarding dominant wetland vegetation type. Furthermore, the NOI details impacts to spawning habitat for horseshoe crab (*Limulus polyphemus*) spawning habitat. The prevalence of spawning activity in these areas should be further defined through surveys during the spawning season.

Protected Species
Threatened or endangered species under our jurisdiction including Atlantic sturgeon (*Acipenser oxyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*) may be present in the Project

area. In addition, four species of federally threatened or endangered sea turtles under our jurisdiction occur seasonally in the waters of Chesapeake Bay from late April – mid November of each year: the threatened Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead (*Caretta caretta*), the endangered Kemp's ridley (*Lepidochelys kempii*), and the endangered leatherback (*Dermochelys coriacea*). On April 6, 2016, NMFS published the final rule listing eleven Green sea turtle (*Chelonia mydas*) DPSs. Eight DPSs were listed as threatened and three as endangered. The DPS found in U.S. Atlantic waters, the North Atlantic DPS, is listed as threatened. Due to the inability to distinguish between these populations away from the nesting beach, we consider green sea turtles endangered wherever they occur in U.S. waters.

We have created a new App, the Section 7 Mapper, to assist Federal action agencies in identifying the ESA-listed species and critical habitat in their project action area: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-species-critical-habitat-information-maps-greater. Within the Section 7 Mapper, we have included data layers that represent our best estimate of the spatial and temporal range of listed species' life stages, behaviors, and critical habitat in our Region. It is important to note that use of this App does not replace the section 7 consultation process. We are providing the Section 7 Mapper as a technical assistance tool and expect action agencies will use it as a first step in determining if a proposed federal action overlaps with listed species or critical habitat. In addition, NOAA's Chesapeake Bay Office operates and maintains the Chesapeake Bay Interpretive Buoy System (CBIBS) - a network of observing platforms (buoys) that collect meteorological, oceanographic, and water-quality data and relay that information in near real time. There is an active buoy at the mouth of the Severn River, approximately 3.5 miles south west of the Bay Bridge. The latest data from this buoy and key points up and down the Bay is available at a website (https://www.buoybay.noaa.gov/locations/annapolis) or via apps available for Android and iPhone/iPad. Data available at this site and on the mobile apps are "raw" and have not been scrubbed for any anomalies. The buoys also collect data from fish that have been collected and implanted with telemetry tags, including Atlantic sturgeon. This data is not publicly available, but can be accessed by contacting NOAA's Chesapeake Bay Office.

As the lead federal action agency, you are responsible for determining the nature and extent of effects and for coordinating with our Protected Resources Division as appropriate. Our website (https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultations-greater-atlantic-region) has guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. Should you have any questions about the section 7 consultation process, please contact Brian Hopper at (301) 758-3074 or brian.d.hopper@noaa.gov.

Finally, species protected under the Marine Mammal Protection Act (MMPA) such as common bottlenose dolphin (*Tursiops truncatus*) have been identified in the Project areas. Our website (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-policies-guidance-and-regulations) has guidance and tools to assist action agencies with this consultation process. Please coordinate with Benjamin Laws (Benjamin.Laws@noaa.gov) at our Headquarters office as necessary to ensure adequate protection for these species.

Avoidance, Minimization, Mitigation and Monitoring Measures

In addition to alternatives, the EIS must evaluate mitigation measures to avoid and minimize adverse impacts to NOAA trust resources. As described in the NOAA Mitigation Policy for Trust Resources (NAO 216-123, Section 3.06) impact avoidance and minimization must be considered and fully and fairly evaluated through the alternative development process before compensatory mitigation is considered; this is known as the mitigation sequence. The mitigation sequence clearly dictates that compensating for unavoidable adverse impacts should be viewed as mitigation of last resort. As described in the NOAA Mitigation Policy, the level and type of uncertainty associated with compensatory mitigation may warrant increased amounts of compensation to assure that impacts are sufficiently offset.

Further, the EIS must clearly identify which mitigation measures are included as part of the proposed action and thus evaluated in the analysis, and the likelihood of selection and implementation of additional proposed measures (e.g., measures are proposed as required; measures are optional and could be implemented by the Project team at their discretion). The document should provide information on how mitigation measures are considered in the context of the effects level (negligible, minor, moderate, major), how mitigation would offset those levels, and the effectiveness of any proposed mitigation.

Conclusion

Thank you for considering our comments during this important scoping process. We will continue to support FHWA's efforts to advance this study through our participation in the regulatory and planning processes. We look forward to continuing to work with you as this study continues.

Should you have any questions regarding these comments and/or the EFH consultation, please contact Jonathan Watson in our Habitat and Ecosystem Services Division at (978) 675-2180 or jonathan.watson@noaa.gov. For questions regarding ESA and Section 7 comments, please contact Brian Hopper in our Protected Resources Division at (301) 758-3074 or Brian.d.Hopper@noaa.gov. For questions regarding MMPA Incidental Take Authorizations, please contact Ben Laws in the Office of Protected Resources at (301) 427-8425 or Benjamin.Laws@noaa.gov.

Sincerely,

GREENE.KAREN.M.1365830785 Digitally signed by GREENE.KAREN.M.1365830785 Date: 2025.01.13 17:56:07 -05'00'

Karen M. Greene
Mid-Atlantic Field Branch Chief
Habitat and Ecosystem Services Division

cc:
Jamie Pavona, FHWA
Alexander Bienko, FHWA
Heather Lowe, MDTA
Joesph DaVia, USACE
Kevin Schabow, NOAA
Karen Greene, NOAA
Brian Hopper, NOAA
Timothy Cardiasmenos, NOAA
Dale Youngkin, NOAA
Jaclyn Daly, NOAA
Ray Li, USFWS
Christine Mazerella, USEPA
Mark Eberle, NPS
Tammy Roberson, MDE
Tony Redman, MDNR

Works Cited

Heck, K.L., T.A. Thoman. 1984. The nursery role of seagrass meadows in the upper and lower reaches of the Chesapeake Bay. Estuaries 7: 70–92.

Lascara, J. 1981. Fish predator-prey interactions in areas of eelgrass (*Zostera marina*). M.S. thesis, College of William and Mary, Williamsburg, VA. 81pp.

Orth, R.J., K.L. Heck, Jr. 1980. Structural components of eelgrass (*Zostera marina*) meadows in the lower Chesapeake Bay - fishes. Estuaries 3: 278–288.

Rogers, S.G. M.J. Van Den Avyle. 1983. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) – summer flounder. US. Fish and Wildlife Service. FWS/OBS-82/11.15 U.S. Army Corps of Engineers, TR EL-82-4. 14p.

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form):

Agency: NOAA Fisheries

____ **Concurs** with the **Draft ARDS (without comments)**

X **Agrees** with the **Draft ARDS (with minor comments)***

____ **Does not agree** with the **Draft ARDS***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Continue to evaluate shared in-water structures as a method for minimizing the duration and extent of proposed impacts to essential fish habitat and other NOAA trust resources.

Signature: _____ Date: 3/31/2025

Outlook

Re: Bay Crossing Study - MMPA Coordination

From Benjamin Laws - NOAA Federal <benjamin.laws@noaa.gov>
Date Tue 7/8/2025 11:10 AM
To Maddy Sigrist <msigrist@rkk.com>
Cc Sarah Williamson <sarahw@cri.biz>; Eric Almquist <ealmquist@rkk.com>; Justin Reel <jreel@rkk.com>

Hi Maddy,

At this stage in my view this is strictly a NEPA process, and there is no MMPA compliance per se with regard to publishing an FEIS/ROD. In some cases where we anticipate potentially needing to adopt an EIS, we may find benefit in engagement as a cooperating agency, but I don't foresee that here, and my team's current workload would preclude our participation in that capacity strictly for providing subject matter expertise. Overall, my summary is that my program does not have the need or capacity to participate in this NEPA process (noting that GARFO may decide differently), and that it is too early to begin strictly MMPA-related discussions. Note that from an MMPA perspective, we would not expect it appropriate to seek to influence project design in this case, but would instead work to perform any necessary analysis of marine mammal-related impacts once design is further along.

Thanks,
Ben

On Tue, Jul 8, 2025 at 10:07 AM Maddy Sigrist <msigrist@rkk.com> wrote:

> Good morning, Ben,
>
> We are working on the Tier 2 NEPA Bay Crossing Study (BCST2) and received your contact information from Jonathan Watson, NOAA Habitat and Ecosystem Services, who we are coordinating with regarding Essential Fish Habitat. The Bay Crossing Study addresses existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the U.S. 50/301 corridor near Annapolis Maryland, approximately 18 miles south of the Francis Scott Key Bridge. The Bay Crossing Study is considering the environmental impacts of six build alternatives and the no-build alternative. We are currently working to incorporate information about the potential effects on marine mammals into the BCST2 NEPA Natural Environment Technical Report and Draft Environmental Impact Statement.
>
> The Bay Crossing Study is estimated to have permit decisions by 2031, with construction beginning after that. The project will likely include pile driving to support bridge pier construction, however, since it is in very preliminary stages, construction means and methods have not yet been determined.

We want to ensure we have adequately documented marine mammal concerns in the DEIS, and that we are in compliance with the MMPA when we publish the FEIS and ROD. Would it be helpful to meet in the next couple of weeks to discuss the MMPA coordination process and to determine appropriate BMPs, or are we too early in the process to discuss these elements? Please let us know your preferred path forward. We look forward to working with you.

Thank you,

Maddy

MADELINE SIGRIST, PWS, QP

Project Scientist III, Natural Resources

RK&K

700 East Pratt Street, Suite 500

Baltimore, MD 21202

410.812.4249 C

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--

Ben Laws

Incidental Take Program Supervisor

Office of Protected Resources
NOAA Fisheries | U.S. Department of Commerce
(301) 427-8425



From:	alexander.bienko
To:	jonathan.watson; Brian D Hopper - NOAA Federal
Cc:	Karen Greene - NOAA Federal; Remezova, Valeriya (FHWA); Odom, Shaneka (FHWA); Castaneda, Lourdes (FHWA); Millington, Chris (FHWA); Melissa Williams; Heather Lowe
Subject:	Maryland BCST2 Draft Section 7 BA and EFH Assessment
Date:	Friday, November 28, 2025 10:15:38 AM
Attachments:	FHWA Request NOAA to Initiate Section 7 Formal Consultation for CBCS 11.26.25.pdf BCST2_EFH Assessment_DRAFT_2025.10.29.docx BCST2_EFH Assessment_DRAFT_2025.10.29.pdf BCST2_Sturgeon and Turtle_BA_Draft_20251031_compressed.pdf BCST2_Sturgeon and Turtle_BA_Draft_10312025.docx

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Good Morning Jonathan and Brian!

Please find attached the letter requesting consultation for Section 7 and EFH. In addition, a Word and PDF versions of the EFH Assessment and the Section 7 draft Biological Assessment can be found attached.

Thank you both for your assistance in the process so far. If you have any questions, comments, or are unable to download the attachments, please reach out.

Best,

Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA – Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201
(410) 779-7148

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
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(410) 962-4440
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November 26, 2025

In Reply Refer To:
HDA-MD

Mr. Michael Pentony
Regional Administrator
Greater Atlantic Regional Fisheries Office
NOAA Fisheries Service
55 Great Republic Drive
Glouchester, MA 01930

Subject: Chesapeake Bay Crossing Study Tier 2 Environmental Impact Statement
Anne Arundel and Queen Anne Counties, Maryland
Initiation of Formal Section 7 Endangered Species Act Consultation
Initiation of Essential Fish Habitat Consultation

Dear Mr. Pentony:

The Federal Highway Administration (FHWA) is the lead federal agency for the Maryland Transportation Authority (MDTA) preparation of a Tier 2 Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the Chesapeake Bay Crossing Study (CBCS). This letter is to initiate Section 7 Formal Consultation (50 CFR §402.14) under the Endangered Species Act (ESA) and Essential Fish Habitat (EFH) Consultation under the Magnuson-Stevens Fishery Conservation and Management Act for the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) in Anne Arundel and Queen Anne Counties, Maryland.

The Bay Bridge is a two span bridge each 4.3-miles in length over the Chesapeake Bay on U.S. 50/301 connecting Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The original span opened in 1952 with the second span opening in 1973. The proposed action involves constructing two new spans and demolishing the two existing spans with a proposed sequencing of build first new span, demolish first original span, build second new span, demolish second original span.

In-water work associated with both the construction of new spans and removal of the original spans has the potential for both lethal and non-lethal take of individuals of listed species under the ESA. A review of the National Oceanic and Atmospheric Administration (NOAA) Fisheries Greater Atlantic Region ESA Section 7 Mapper indicated that the federally listed Atlantic sturgeon (*Acipenser oxyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*) may be present within the Tier 2 EIS area. In addition, four species of federally listed sea turtles occur seasonally in the waters of the Chesapeake Bay from late April to mid-November of each year:

loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*). Designated critical habitat for listed species is not present within the project limits.

In-water work associated with both the construction of new spans and removal of the original spans has the potential to affect EFH protected under the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Fisheries has indicated that the following federally managed fish species occur within the Tier 2 EIS area: Atlantic butterfish (*Peprilus triacanthus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), clearnose skate (*Raja eglanteria*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), and windowpane flounder (*Scophthalmus aquosus*).

In accordance with Section 7 of the ESA, a Biological Assessment (BA) to analyze the potential affects on sturgeon and turtle species listed or eligible for listing under the ESA and designated critical habitat for such species has been prepared and is transmitted with this letter. In accordance with the Magnuson-Stevens Fishery Conservation and Management Act, an EFH Assessment was prepared and is transmitted with this letter as well.

FHWA in coordination with MDTA has determined that the action is likely to adversely affect Atlantic sturgeon, shortnose sturgeon, loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. The action is also determined to have an adverse indirect effect to submerged aquatic vegetation as well as adversely affect Habitat Area of Particular Concern for summer flounder.

Thank you in advance for working with the FHWA and for your continued support with this Tier 2 EIS. If you have any questions or concerns, please contact Alexander Bienko, FHWA Maryland Division Environmental Specialist, at alexander.bienko@dot.gov.

Sincerely,

Valeriya Remezova
Division Administrator

cc:
Karen Greene, NOAA Fisheries
Brian Hopper, NOAA Fisheries
Jonathan Watson, NOAA Fisheries
Melissa Williams, Maryland Transportation Authority

Bienko, Alexander <alexander.bienko@dot.gov>

BCST2 Revised EFH Assessment

Bienko, Alexander (FHWA) <alexander.bienko@dot.gov> Fri, Mar 6, 2026 at 3:22 PM
To: "jonathan.watson" <jonathan.watson@noaa.gov>
Cc: Karen Greene - NOAA Federal <karen.greene@noaa.gov>, "Castaneda, Lourdes (FHWA)" <Lourdes.Castaneda@dot.gov>, "Millington, Chris (FHWA)" <Chris.Millington@dot.gov>

Happy Friday Jonathan!

Based on this weeks coordination meeting, the EFH assessment has been updated. I've attached the clean version of the newest updated EFH assessment as well as the Appendix B List of Considerations and Commitments as a PDF.

If you would like the tracked change version of either document, please let me know. If you have any questions, please reach out.

[Quoted text hidden]

2 attachments

Appendix B_List of Considerations and Commitments.pdf
337K

BCST2_EFH Assessment_Revised_2026.03.06_Clean.docx
12564K

From:	Jonathan Watson - NOAA Federal
To:	Heather Lowe
Cc:	Brian D Hopper - NOAA Federal; Sarah Williamson; Emma Beck; Karen Greene - NOAA Federal; Bienko, Alexander (FHWA)
Subject:	Re: BCST2 DEIS Notice of Availability
Date:	Monday, March 9, 2026 3:44:08 PM
Attachments:	image001.png

Hi Heather,

We (NMFS-HESD) have reviewed the DEIS and NETR and have three very minor comments for your consideration:

(1) The Multi-species pile driving calculator is described as the "NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO) Multi-Species Pile Driving Calculator (NMFS 2024)." While a calculator specific to GARFO existed several years ago, the current iteration of the tool was developed and is managed by our Office of Protected Resources in NOAA Fisheries' headquarters office. In that sense, it would be more accurate to describe it as "NOAA Fisheries Multi-Species Pile Driving Calculator (NMFS 2024)." This could be changed in both the DEIS and the NETR for accuracy.

(2) DEIS Pg 4-105 - The following statement is misleading: "Chesapeake Bay fish stock assessments for bluefish and summer flounder could be conducted by a fisheries stock assessment biologist based on this recent ChesMMAP data; however, current stock assessments are not publicly available." It would be more accurate to state that these species are managed as a coastwide stock; therefore, no stock assessment specific to the Chesapeake Bay exists. The stock assessments for the coastwide stocks are publicly available through the Mid-Atlantic Fishery Management Council (MAFMC).

(3) NETR pg 13-31 - Similar to comment 2 above, there is a misleading statement here about the availability of stock assessment information, which reads: "...bluefish and summer flounder, and stock assessment data for these species are not publicly available." The stock assessments, which are completed on the coast wide stock, are public documents available through MAFMC.

Overall, this is a very thorough document. Thank you for working with us over the past several years on its development. We appreciate your efforts to address our comments on the draft EFH Assessment and draft Biological Assessment.

Jonathan

On Fri, Jan 23, 2026 at 4:43 PM Sarah Williamson <sarahw@cri.biz> wrote:

> Good Afternoon,
>
> It was brought to our attention that there was a typo in the letter sent out earlier today. The attached letter has been revised to correctly identify the RPA as Alternative C (6-8-6).
>
> Have a good weekend.

Regards,

Sarah Williamson | *Bay Crossing Study Team*

Coastal Resources, Inc. | Facebook | LinkedIn | Instagram

25 Old Solomons Island Road, Annapolis, MD 21401

Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From: Sarah Williamson
Sent: Friday, January 23, 2026 1:04 PM
To: Blair.jones@dot.gov; alexander.bienko@dot.gov; chris.millington@dot.gov; lourdes.castaneda@dot.gov; joseph.davia@usace.army.mil; april.e.sparkman@usace.army.mil; hal.r.pitts@uscg.mil; Charles.d.bullock@uscg.mil; witman.timothy@epa.gov; glyn.rebecca@epa.gov; fitzgerald.megan@epa.gov; boos.patrick@epa.gov; french.emily@epa.gov; mazzarella.christine@epa.gov; blair.aaronM@epa.gov; mark_eberle@nps.gov; Wendy_O'Sullivan@nps.gov; Christine_Yott@nps.gov; Jacob_Ross@nps.gov; abbi_huntzinger@nps.gov; Ray_li@fws.gov; trevor_clark@fws.gov; karen.greene@noaa.gov; brian.d.hopper@noaa.gov; Jonathan.Watson@noaa.gov; tammy.roberson@maryland.gov; Amanda.sigillito@maryland.gov; Danielle.spendiff1@maryland.gov; jon.stewart@maryland.gov; William.seiger@maryland.gov; dbuscemi@mdot.state.md.us; TPenders@mdot.maryland.gov; Jlombardo.consultant@mdot.maryland.gov; abrun3@mdot.maryland.gov; DAtkins@sha.state.md.us; rmoravec@mdot.maryland.gov; harriet.levine@jacobs.com; sburnett@wtbco.com; Gwendolyn.gibson@maryland.gov; roland.limpert@maryland.gov; Rachel.temby@maryland.gov; melissac.day1@maryland.gov; kmiller@achp.gov; april.cummings@fema.dhs.gov; tessa.nolan@fema.dhs.gov; Jamie.carpenter@fema.dhs.gov; Katherine.charbonneau@maryland.gov; nick.kelly@maryland.gov; charlotte.shearin@maryland.gov; Kathryn.durant@maryland.gov; lmolesworth@mta.maryland.gov; lbarcena@mdot.maryland.gov; bihui.xu@maryland.gov; brooks.phelps@maryland.gov; Russell.strickland@maryland.gov; marcia.deppen@maryland.gov; chas.eby@maryland.gov; dscurti@marylandports.com; jlemke@marylandports.com;

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Subject: BCST2 DEIS Notice of Availability

Dear BCST2 Interagency Team,

Please see the attached letter announcing the availability of the BCST2 DEIS. We are very excited to have reached this milestone, and your participation has been key!

All documents are available for viewing and download on the Study website at https://www.baycrossingstudy.com

More specifically, you can access the DEIS and supporting technical documents here: https://www.baycrossingstudy.com/study-process/tier-2-study/draft-environmental-statement-eis

and the additional State Documents MDTA prepared here: https://www.baycrossingstudy.com/study-process/tier-2-study/draft-environmental-statement-eis/state-analyses/

MDTA welcomes your comments on the DEIS.

MDTA will hold public hearings on the following dates:

- Virtual hearing - February 9th
- In-person hearings:
  - February 10th at Broadneck High School in Anne Arundel County; and
  - February 12th at Kent Island High School in Queen Anne's County.

Comments from the public and Cooperating and Participating agencies will be accepted through March 9th, 2026.

Regards,

Sarah Williamson | *Bay Crossing Study Team*

Coastal Resources, Inc. | Facebook | LinkedIn | Instagram

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From: Bienko, Alexander <alexander.bienko@dot.gov>
Sent: Wednesday, March 18, 2026 3:06 PM
To: brian.d.hopper@noaa.gov
Cc: karen.greene@noaa.gov; jonathan.watson@noaa.gov; Castaneda, Lourdes (FHWA) <Lourdes.Castaneda@dot.gov>; Millington, Chris (FHWA) <chris.millington@dot.gov>
Subject: BCST2 Section 7 Formal Consultation Request

Good Afternoon Brian!
FHWA would like to thank you for your continued involvement in the Bay Crossing Tier 2 EIS and your assistance in getting the project to this point. With that, FHWA would like to officially request Section 7 formal consultation on the project. The attached PDF contains the Biological Assessment for Atlantic Sturgeon, Shortnose Sturgeon, and Sea Turtles. I've also attached an errata sheet for tracking how previous comments have been addressed.

Please inform FHWA when you've determined that the consultation package submitted is complete so that the federal permitting dashboard can be kept up to date.

Thank you!
Alex Bienko

Alexander Bienko
Environmental Specialist

FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
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Bienko, Alexander <alexander.bienko@dot.gov>

Initiation of EFH Consultation for the Bay Crossing Tier 2 NEPA Study

1 message

Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov> Thu, Mar 26, 2026 at 8:00 AM
To: "Bienko, Alexander (FHWA)" <alexander.bienko@dot.gov>
Cc: Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>, Karen Greene - NOAA Federal <karen.greene@noaa.gov>, Heather Lowe <hlowe@mdta.state.md.us>, Dale Youngkin - NOAA Federal <dale.youngkin@noaa.gov>, Lou Chiarella - NOAA Federal <lou.chiarella@noaa.gov>, "Castaneda, Lourdes (FHWA)" <Lourdes.Castaneda@dot.gov>, "Millington, Chris (FHWA)" <chris.millington@dot.gov>

Hi Alex,

We reviewed the Essential Fish Habitat (EFH) assessment provided on March 6, 2026, for the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) Study (BCST2). NOAA Fisheries is a cooperating agency in this NEPA process and we have provided comments throughout, most recently in our comments on the draft Environmental Impact Statement (dEIS) dated March 9, 2026. We appreciate the effort invested in preparing these documents and the multiple opportunities we have had to review and comment on previous draft EFH assessments.

We have determined that **we have sufficient information on which to consult pursuant to the Magnuson Stevens Fishery Conservation and Management Act**, in accordance with our milestone initiation date (March 31, 2026) established on the Federal Permitting Dashboard.

Our milestone for completing this EFH consultation is June 1, 2026. However, since we initiated prior to that date, **we intend to complete our EFH consultation on or before Monday, May 25, 2026**. We look forward to working with you and the rest of the team as this project continues to move forward.

Please continue to coordinate with Brian Hopper (brian.d.hopper@noaa.gov) from our Protected Resources Division regarding your consultation pursuant to Section 7 of the Endangered Species Act. Should you have any questions regarding these comments or our EFH consultation, please contact me (978-657-2180; jonathan.watson@noaa.gov) in our Annapolis Field Office.

Best,

Jonathan

--

Jonathan Watson
Marine Habitat Resource Specialist, GARFO HESD
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Megan Bolcar

From: Maddy Sigrist <msigrist@rkk.com>
Sent: Wednesday, May 6, 2026 8:38 AM
To: Jonathan Watson - NOAA Federal
Cc: Sarah Williamson; Heather Lowe; Eric Almquist; Alex Nussbaum; Megan Bolcar; Bienko, Alexander
Subject: BCST2 - EFH Assessment Update

Good morning, Jonathan,

The EFH Assessment has been updated to refer to the Preferred Alternative as opposed to the MDTA Recommended Preferred Alternative. The revised version is saved in the following SharePoint location:
BCST2_EFH Assessment_Revised_2026.05.01_Clean.docx

Please let me know if you have any questions.

Thank you,
Maddy

MADELINE SIGRIST, PWS, QP
Project Scientist III, Natural Resources

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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

ESSENTIAL FISH HABITAT ASSESSMENT

Maryland Transportation Authority
MDTA

March 2026

Revised May 2026

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APPENDICES

Appendix A: National Marine Fisheries Service (NMFS) Multi-Species Pile Driving Calculator Output

Appendix B: List of Mitigation Commitments and Considerations

Appendix C: Summary of Why Clearnose Skate EFH Is Not Designated Within the Action Area

ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
ARDS	Alternatives Retained for Detailed Study
ASMFC	Atlantic States Marine Fisheries Commission
BMPs	Best Management Practices
CB3MH	Upper Chesapeake Bay Watershed
CB4MH	Middle Central Chesapeake Bay Watershed
CBBMP	Chesapeake Bay Benthic Monitoring Program
CBP	Chesapeake Bay Program
CFPP	Chesapeake Fish Passage Prioritization
ChesMMAP	Chesapeake Bay Multispecies Monitoring and Assessment Program
CO_2	Carbon Dioxide
COMAR	Code of Maryland Regulations
DO	Dissolved Oxygen
EFH	Essential Fish Habitat
ESC	Erosion and Sediment Control
ERP	Environmental Review Program
FHWA	Federal Highway Administration
FMP	Fishery Management Plan
GARFO	Greater Atlantic Regional Fisheries Office
HAPC	Habitat Areas of Particular Concern
IBI	Index of Biotic Integrity
LOD	Limits of Disturbance
MAFMC	Mid-Atlantic Fishery Management Council
MARMAP	Marine Resources Monitoring, Assessment and Prediction Program
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDTA	Maryland Transportation Authority
MLW	Mean Low Water
MPN	Most Probable Number
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEFSC	North East Fisheries Science Center
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOB	Natural Oyster Bar
NTU	Nephelometric Turbidity Unit
PCBs	Polychlorinated Biphenyls
ppm	Parts per million
ppt	Parts per thousand
PSFA	Public Shellfish Fishery Area
RMS	Root-mean-square sound pressure level
SAV	Submerged Aquatic Vegetation
SEL_{cum}	Cumulative Sound Exposure Level
SEL_{ss}	Single Strike Sound Exposure Level

SWM	Stormwater Management
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
VIMS	Virginia Institute of Marine Science
ZSFP	Zone of Safe Fish Passage

1 EXECUTIVE SUMMARY

The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA) to address existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. The MDTA and FHWA are preparing an Environmental Impact Statement (EIS) for Tier 2 of the Bay Crossing Study (Tier 2 Study) pursuant to the National Environmental Policy Act (NEPA).

During development of the Draft EIS, National Oceanic and Atmospheric Administration (NOAA) Fisheries indicated that Essential Fish Habitat (EFH) exists for the following species that occur within the Tier 2 Study action area: Atlantic butterfish (*Peprilus triacanthus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), and windowpane flounder (*Scophthalmus aquosus*). The project action area (Action Area) described in this document includes suitable habitat for these federally-managed fish species and other aquatic life. Demolition of the existing bridge and construction of a new bridge and approaches would have long-term and short-term adverse effects on federally-managed fish species. Activities such as pier construction, dredging, blasting, and filling would adversely affect federally-managed fish species. However, FHWA and the MDTA will work with NOAA Fisheries to develop measures to avoid and minimize adverse impacts to federally-managed fish, their prey, and habitats to the maximum extent practicable and work to offset unavoidable adverse impacts.

Construction of the Preferred Alternative would adversely affect several priority habitats including emergent tidal wetlands, and natural oyster bars. The action may result in temporary adverse effects to submerged aquatic vegetation (SAV).

2 INTRODUCTION

The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA). The Bay Crossing Study is addressing existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. Each tier of the Bay Crossing Study involves development of an Environmental Impact Statement (EIS), in compliance with National Environmental Policy Act (NEPA), to describe potential significant environmental effects and inform the evaluation of alternatives. Tier 1 of the Bay Crossing Study (Tier 1 Study) was completed in April 2022. At that time, FHWA issued a Final EIS/Record of Decision (FEIS/ROD) identifying Corridor 7, the corridor that includes the Bay Bridge and its approaches, as the Selected Corridor Alternative for further evaluation. Tier 2 of the Bay Crossing Study (Tier 2 Study) was launched in June 2022 to focus on a project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). The Tier 2 NEPA process was initiated formally with the publication of a Notice of Intent (NOI) to prepare an EIS in the Federal Register on November 15, 2024. The MDTA identified the Alternatives Retained for Detailed Study (ARDS), which are the NEPA range of reasonable alternatives for evaluation in the Tier 2 Study EIS. Subsequently, the MDTA identified the MDTA Recommended Preferred Alternative, which Cooperating Agencies concurred with in May 2026 and is now referred to as the Preferred Alternative. A *Natural Environment Technical Report (NETR)* and *Draft EIS* were published on January 23, 2026.

Alternative C has been identified from among seven alternatives retained for detailed study (ARDS) as the Preferred Alternative. Alternative C meets the Tier 2 Study Purpose and Need and has the least environmental impact of the retained build alternatives. The Magnuson-Stevens Fishery Conservation and Management Act does not define an action area. The MDTA determined the project action area for federally-managed fish species described in this document (Action Area) to include direct and indirect fisheries impacts within the vicinity of the Bay Bridge. **Figure 2-1** shows the Action Area, which includes: the potential footprint for construction of the new bridge under Alternative C and demolition of the old bridge; dredging areas; and estimated underwater effects, including areas of increased underwater noise due to pile driving and blasting, and areas of decreased water quality due to turbidity and sedimentation.

The purpose of this EFH Assessment is to evaluate potential effects of the Preferred Alternative on EFH based on the Action Area, in accordance with the 1996 Amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity” (16 USC 1802(10)). National Oceanic and Atmospheric Administration (NOAA) Fisheries has indicated that the following federally-managed fish species occur within the Tier 2 Study Action Area: Atlantic butterfish (*Peprilus triacanthus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), and windowpane flounder (*Scophthalmus aquosus*).

2.1 Project Description and Background

The Bay Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne’s County on the Eastern Shore. The original span

opened in 1952, and the second span opened in 1973. See the *Draft EIS* for additional details regarding the background of the Bay Crossing Study.

A wide range of engineering and environmental considerations were evaluated for the ARDS, which included one no-build alternative and six build alternatives as detailed in the *Draft EIS*. Alternative A (the no-build alternative) is not the Preferred Alternative because it would not increase roadway capacity or mobility, correct roadway deficiencies, or provide the navigational clearance established by the U.S. Coast Guard. Alternative A would also require substantial maintenance and related lane closures that would worsen congestion over time and compound existing traffic congestion, mobility, and roadway deficiency issues. Each of the six build alternatives meets the Tier 2 Study's purpose and need and would therefore be reasonable to implement. However, the build alternatives differ in the degree of transportation benefit they would provide as well as the likely environmental impacts and cost. The Preferred Alternative, Alternative C (6-8-6 South) (**Figure 2-2**), would have the least impact to natural, cultural, and socioeconomic resources compared to the other build alternatives. Among the build alternatives considered, Alternative C would result in the least impact to wetlands and non-tidal surface waters; benthic habitat, historic oyster bottom, and submerged aquatic vegetation (SAV).

The Preferred Alternative would replace the existing Bay Bridge spans with two new bridge spans and would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction), eight lanes on a new bridge (four per direction), and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). Construction activities would include, but are not limited to, pile driving; dredging; placement of fill/structure for piers, pier protection systems, and pier islands; increased vessel traffic; and demolition and removal of existing structures, including blasting. The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. The approach roadways would remain on the existing roadway alignment, except where necessary to connect to the new bridge spans. Thus, the five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans. The Preferred Alternative could include a bicycle/pedestrian shared use path (SUP) along a new bridge. The MDTA has identified SUP connections to existing and proposed trails and recreational facilities on the Eastern Shore and Western Shore.

Figure 2-1: Essential Fish Habitat within the Action Area

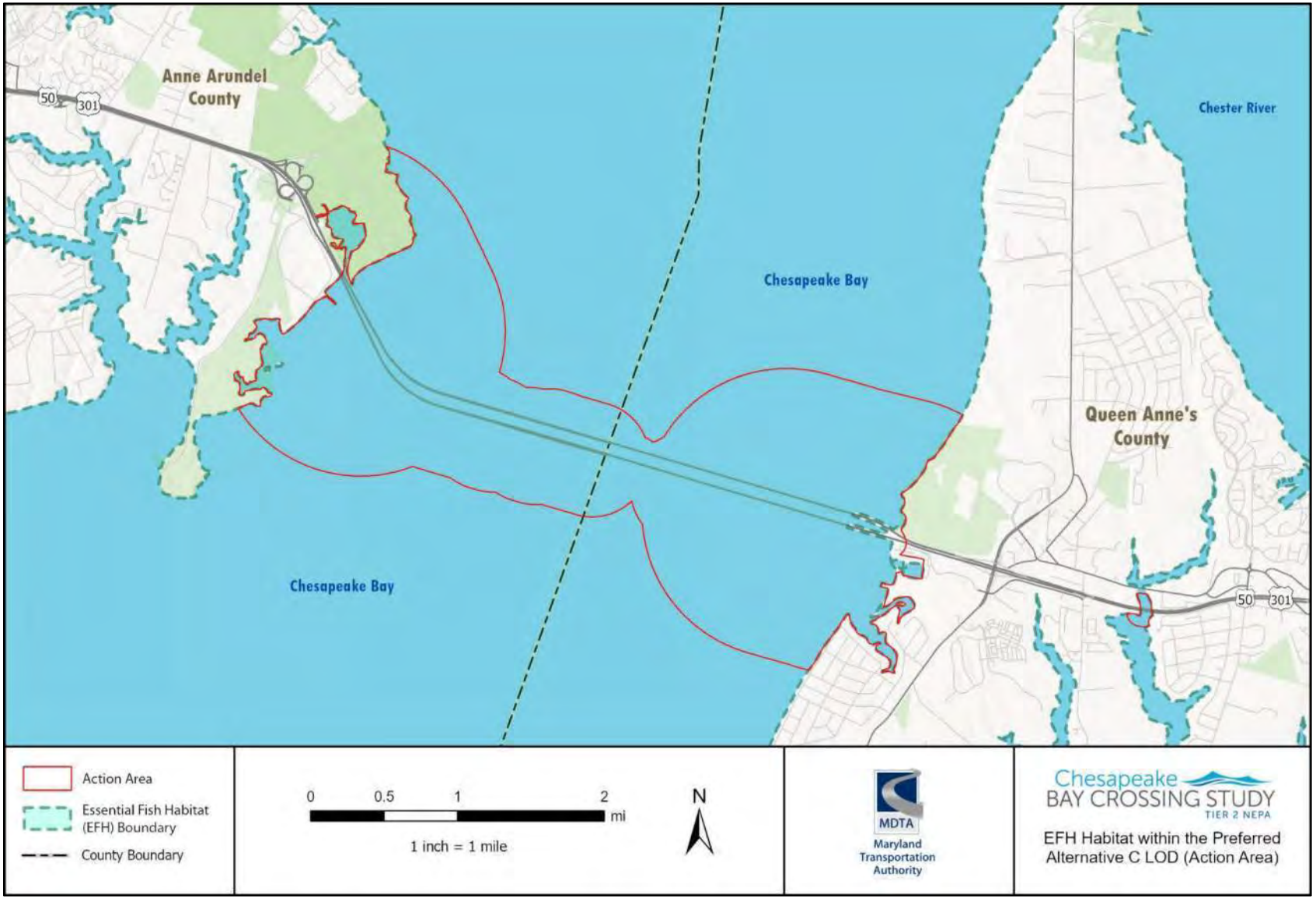


Figure 2-2: The Preferred Alternative



The Tier 2 Study is currently in preliminary engineering for the Preferred Alternative and as such, design, construction, and demolition means and methods are based on preliminary assumptions. Construction of the new bridge spans would likely occur in multiple phases. Phasing of the Preferred Alternative may involve building one span at a time: the first new bridge span may be built, then one existing bridge span could be demolished (mechanically and with blasting), and the new bridge span would be in use while the second new bridge span is built. Once both new bridge spans are complete, the second span of the existing bridge could be demolished. The exact order and timing of construction have yet to be determined, however, a preliminary construction sequence is included in **Table 2-1**:

Table 2-1: Preliminary Construction Sequence

Construction Activity	Construction Years
Construction of Bridge 1 (eastbound) – Occurring during years 1 through 5	
Start Construction, Bridge 1	1
Construct landings (work completed on land)	1-4
Constructing approaches and main span	1-5
Trestles and water access construction	1
Dredging for eastbound bridge	1-2
Transport and disposal of dredge	1-2
Substructure/pier protection construction	1-3
Superstructure construction	2-5
Complete construction, Bridge 1	5
Demolition of existing eastbound bridge – Occurring during years 6 through 7	
Start demolition, existing eastbound bridge	6
Blasting (total of 9 blast events)	6-7
Cantilever Deck Truss Spans (3 spans and 4 piers)	
Cantilever Deck Truss Spans (9 spans and 8 piers)	
Through Truss Spans (3 spans and 4 piers)	
250' Simple Deck Truss Spans (4 simple spans/4 piers)	
300' Simple Deck Truss Spans (6 simple spans/5 piers)	
Suspension Spans (3 suspension spans/4 piers)	
Dismantling	6-7
Complete demolition, existing eastbound bridge	7
Construction of Bridge 2 (westbound) – Occurring during years 7 through 13	
Start construction, Bridge 2	7
Construct landings (work completed on land)	7-13
Constructing approaches and main span	7-13
Trestles and water access construction	7
Dredging for westbound bridge	7-8
Transport and disposal of dredge	7-8
Substructure/pier protection construction	7-12
Superstructure construction	8-13
Complete construction, Bridge 2	13
Demolition of existing westbound bridge – Occurring during years 14 through 15	
Start demolition, existing westbound bridge	14
Blasting (7 total blast events)	14-15
Cantilever Deck Truss Spans (3 spans and 3 piers)	
Cantilever Deck Truss Spans (9 spans and 8 piers)	
Through Truss Spans (3 spans and 4 piers)	
Suspension Spans (3 suspension spans/4 piers)	
Dismantling	14-15
Complete demolition, existing westbound bridge	15

The following sections include initial assumptions based on the current design and best available information from similar bridge projects including the Francis Scott Key Bridge, Tappan Zee Bridge, and Nice-Middleton Bridge. Information regarding anticipated construction methods and current assumptions of each phase follows.

Construction phase:

Dredging:

Based on existing conditions within the Chesapeake Bay, dredging would likely be necessary to create access channels to support demolition and construction activities. Considering input from previous similar dredging efforts, a target depth of nine feet below the mean low water (MLW) level was assumed. The dredging areas were established using the "Maryland bathymetry Chesapeake Bay contours" data at both shores of the Bay (Western and Eastern Shores). The northern limit of dredging was assumed to have an approximate offset of 50-feet north of the existing piers of the existing westbound span (to be demolished), and the southern limit was assumed to have an approximate offset of 60-feet from the southern edge of the proposed eastbound span.

The total dredge area at both shores of the Bay would be approximately 50.2 acres (2.2 million square feet), totaling 16.4 acres on the Western Shore and 33.8 acres on the Eastern Shore. These areas exclude the footprints of the proposed and existing bridge pier footings. The total dredged volume within the dredging area is approximately 308,800 cubic yards. Applying a bulking factor of 1.3 to the dredged volume, the volume of spoil to be hauled is approximately 401,500 cubic yards and it is proposed to be hauled via barge. For the eastbound bridge, bucket dredging would likely take about 14 days within construction years 1 and 2 and for the westbound bridge bucket dredging would likely take about 7 days within construction years 7 and 8.

For access in shallow areas, dredging would need to be wide enough to facilitate equipment mobility, loading and unloading material barges, and erecting structures. The dredge area totals 50.2 acres and includes side slopes of up to 3:1 horizontal to vertical, which will prevent the material from sloughing back into the excavation areas. Additionally, based on the greater expanse of shallow water from the eastern shoreline, it is anticipated that more dredging would be required along the eastern shoreline than the western shoreline.

Dredging would occur prior to the construction of temporary trestles that facilitate the loading and unloading of barges and support vessels. Multiple access points (dredged channels or trestles) may be needed depending on the work configuration and the specific construction equipment needed. Access and dredging details would be evaluated and further refined in future design phases.

The MDTA expects the dredge sediment to be clean, based on sediment analysis from the USACE 50 Foot Project, which includes the main channel that runs through the Action Area. Sediment will be tested during geotechnical investigations and prior to disposal to determine the appropriate beneficial reuse or disposal site(s). Potential dredge disposal sites include Masonville Cove and Cox Creek dredged material containment facilities (DMCF). Utilizing Masonville Cove DMCF and Cox Creek DMCF would facilitate safe and efficient loading, transport, and placement of dredge material. Both sites are owned and operated by the Maryland Port Administration (MPA), are adjacent to the Patapsco River, and are accessible by barge for placement operations.

Masonville Cove DMCF has a permitted capacity of 10.4 million cubic yards (mcy) on 101 acres. Cox Creek DMCF has a permitted capacity of 14.7 mcy on 241 acres. Both facilities have plans in place to incorporate the creation of wildlife habitat and community access for recreation including birdwatching. The Bay Crossing Study has coordinated with MPA and determined that either DMCF would have the capacity to accommodate the dredging volumes generated by the build alternative. MPA would require that the material suitability and operational plans be approved prior to placement in accordance with their *Right of Entry Application*.

Bridge/Access Construction:

Preliminary engineering assumptions include using a trestle for temporary construction access in waters less than 10 feet deep below MLW. Based on the Francis Scott Key Bridge Rebuild Project design, the MDTA assumes trestle piers would be constructed every 38 feet supported on 36-inch steel pipe piles. Preliminary engineering assumes that bridge piers would be constructed with 36-inch square pre-stressed concrete piles as well as 36-inch, 48-inch, and 96-inch driven steel pipe piles. Pier protection fenders would likely be supported on 48-inch driven steel pipe piles. Pier protection dolphins are assumed to include 19.6-inch-wide sheet pile, backed by 14-inch steel H-piles. Pier protection would be built with the corresponding bridge. **Table 2-2** and **Table 2-3** provide the estimated number and type of proposed piles and piers for the eastbound and westbound bridges, respectively.

Table 2-2: Eastbound Bridge – Assumed Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**1,741**	**77**
36” Pre-stressed Square Piles	132	18
36” Steel Pipe Piles	240	10
48” Steel Pipe Piles	1,231	43
96” Steel Pipe Piles	138	6
Trestle Piers		
36” Steel Pipe Piles	628	157*
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,513**	**258**

**A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*

*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore, 116 sheet piles and 116 Steel H-piles are required per dolphin.*

Table 2-3: Westbound Bridge – Assumed Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**2,014**	**80**
36” Pre-stressed Square Piles	176	21
36” Steel Pipe Piles	270	10
48” Steel Pipe Piles	1,412	43
96" Steel Pipe Piles	156	6
Trestle Piers		
36” Steel Pipe Piles	628	157*
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,786**	**261**

** A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*

*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore 116 sheet piles and 116 Steel H-piles are required per dolphin.*

The following are construction assumptions based on preliminary engineering:

- Multiple foundation types could be used by the contactor; however to provide the most impactful estimate of noise, currently, the MDTA assumes the main span is supported by multiple driven steel pipe piles, which require impact and vibratory hammering, and the approach span piles are assumed to be pre-stressed square concrete piles installed by impact hammer.
    - Noise attenuation in the form of bubble curtains would be used.
- Currently, a cable-stayed or suspension bridge is being considered, for the purpose of NEPA.
- Piers would have some form of pier protection. Preliminary design assumes 2 fenders and 22 dolphins would be installed on both the eastbound and westbound bridges, respectively, to provide collision protection.
- Trestles would likely be used for temporary construction access to facilitate pier placement for the new bridge within the dredged area. The preliminary design assumes a trestle pier would be constructed every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier. Trestles would remain in place until construction is complete.
- Other temporary construction methods including cofferdams and other dewatering devices for pile driving may be used.
- Dredging in the shallows up to approximately 9-foot depth is assumed necessary to access areas for pier construction.
- It is assumed, based on the Francis Scott Key Bridge Test Pile Exposure Analysis assumptions, that impact driving would take a maximum of 2 hours per pile.
    - Due to equipment availability, it is assumed that up to eight 96” steel pipe piles may be driven in one day and up to 16 piles of other pile sizes could be driven in one day.

    - For the eastbound bridge, a total of about 120 days of pile driving is anticipated throughout years 1-5 of construction.
    - For the westbound bridge, a total of about 138 days of pile driving is anticipated throughout years 7-13 of construction.
- Throughout the duration of construction, an effective 12-hour quiet period of no pile driving will be implemented each day.
- For staging areas, the MDTA anticipates using the existing MDTA piers that are currently used for bridge maintenance. Additional staging areas may be needed, which will be determined during final design. Additional staging areas are anticipated to include public or private locations in the Baltimore Harbor area, which would not result in additional environmental impacts. Staging areas may also include mooring locations within the Chesapeake Bay. Mooring locations in the Chesapeake Bay may have additional environmental impacts, though the MDTA will commit to avoiding areas of oyster beds or SAV.

Temporary lights may be used during construction for extended day or night work, which may impact federally-managed fish species utilization of habitat; however, the use of aesthetic and continuous roadway lighting would be determined in final design. Navigation, aviation, and traffic control lighting are included on the existing bridges and will be included on the new bridges, as required by regulation.

Demolition phase:

Demolition of the existing bridge spans would occur following construction of each new span. During the demolition phase, noise and vibration impacts from blasting would likely have the most pronounced impacts to federally-managed fish species. The following are the demolition assumptions based on preliminary design:

- Mechanical removal would be employed wherever possible; however, blasting may be necessary when water depths or pier element size makes mechanical removal infeasible.
- Temporary trestles would be used where water depths are less than 10 feet to perform demolition activities, as needed.
- Marine cranes affixed to barges would be used where water depths are deeper than 10 feet below MLW to perform demolition activities, as needed.
- Steel bracing elements are anticipated to be torch cut and heavy lift marine cranes would be used to maneuver cut pieces.
- Shielding barges are anticipated for the removal and transportation of bridge elements from the water.
- Terrestrial demolition of bridge decks, girders, substructures, and abutments is anticipated to use saw cutting, excavators, and slab grab buckets. All demolition debris would be disposed of in accordance with regulatory permits and applicable laws and regulations.

3 EXISTING CONDITIONS

Descriptions of existing conditions including bathymetry, submerged substrates, and aquatic resources are included in this section to provide an overview of the physical characteristics, plant and animal species, and habitat types within the Action Area. Additional information on existing conditions is included in the *Natural Environment Technical Report*.

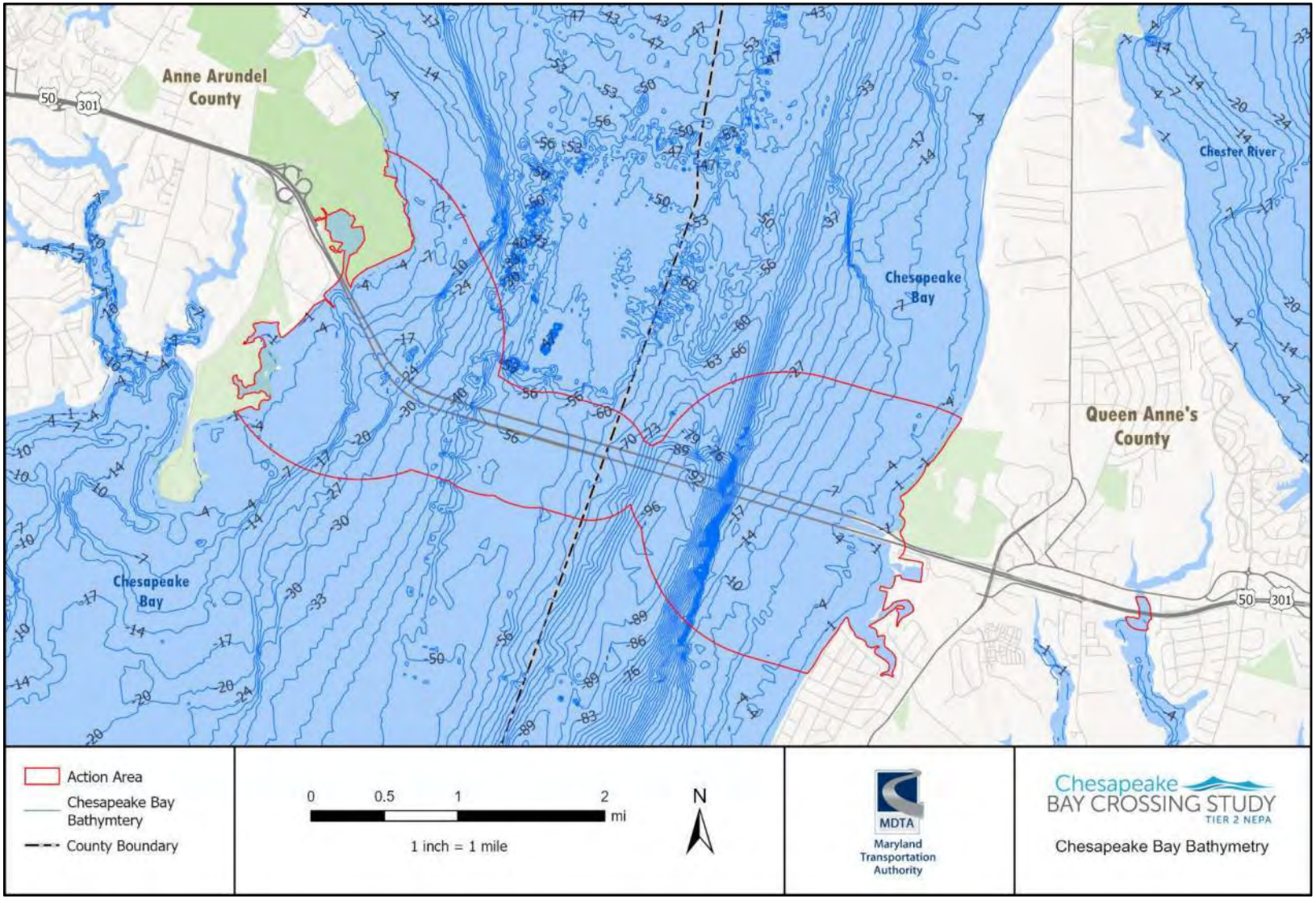
3.1 Bay Morphology and Bathymetry

The Bay Bridge is located at one of the narrowest points of the Bay, which influences the physical, chemical, and biological properties of the Action Area. This narrow point of the Bay has distinct hydrodynamics; is a crucial migratory pathway for fish; and provides distinct habitat for marine life, including the bridge foundations themselves, broad shallows, and a deep channel.

Within the Action Area, as depicted in **Figure 3-1**, the Chesapeake Bay is deepest in the center and east of the county boundary, within the Chesapeake Bay Auxiliary navigation channel. As expected, the Bay becomes shallower towards the shorelines, with broad shallow water habitat areas on either shore. The shallows of the Chesapeake Bay (1 to 3 feet) within the Action Area extend channelward approximately 800 to 950 feet from the western shoreline in Anne Arundel County, and approximately 1,200 to 1,300 feet from the eastern shoreline in Queen Anne's County. Areas with depths from approximately 3 feet to 12 feet generally extend from about 2,100 to 2,200 feet from the western shoreline and 3,900 to 4,700 feet from the eastern shoreline.

The Chesapeake Bay has an average depth of approximately 40 feet within the Action Area, with the main channel depth approximately 56 feet, and the Chesapeake Bay Bridge Auxiliary channel depth approximately 92 feet. **Figure 3-1** illustrates the bathymetry of the Chesapeake Bay.

Figure 3-1: Chesapeake Bay Bathymetry within the Action Area*



*Negative numbers represent contours for the elevation below sea level, and the close contours are indicative of varying steep slopes within the deeper areas.

3.2 Submerged Substrates

The Chesapeake Bay bottom is primarily formed by layers of Magothy, Matawan, and Monmouth formations, which are overlaid by sandy material in the shallow areas and loose silty clay material in the deeper channels. The waves and tide move fine silt, clay, and organic material out of the sand and deposit them in lower energy areas along the bottom. Surficial sand is generally found in the areas that are most affected by wave action and tidal fluctuations. There have been no indications of contaminated materials in the substrates tested for the USACE Baltimore Harbor and Channels 50-Foot Project in the vicinity of the Bay Bridge. Submerged substrate characteristics are described in the *Natural Environment Technical Report*.

The surficial sediments in the shallow areas of the shorelines within the Action Area contain benthic organisms that form an important part of the food web. Cultch areas that provide points of attachment for oyster spat are found in shallower areas (less than 26 feet deep) and generally found as inclusions in the sandy bottom but may also be incorporated into organic/silt mud areas. Potential benthic macroinvertebrate habitat, which largely aligns with state mapped historic oyster bottom, are located throughout the Action Area and addressed in **Section 3.4**.

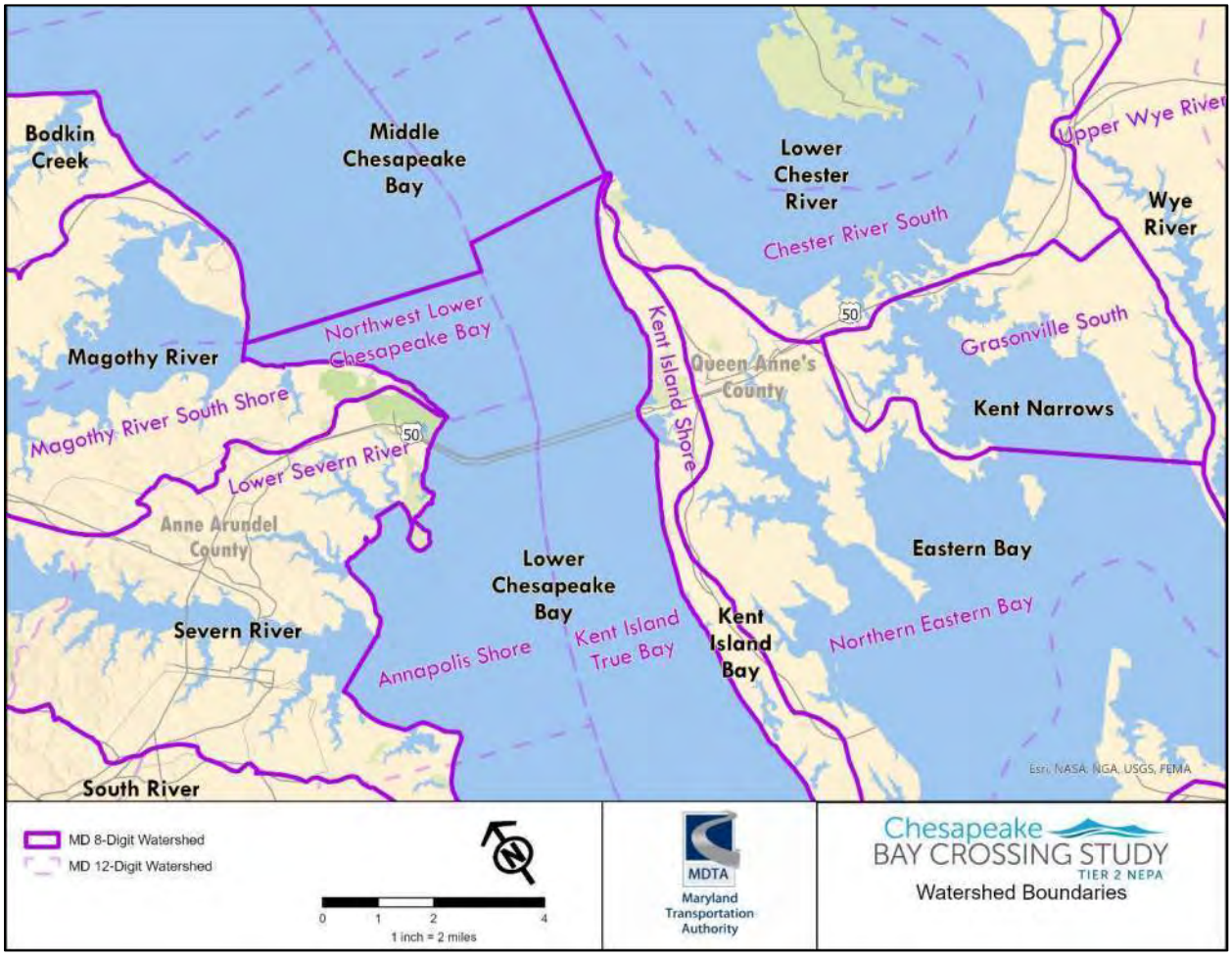
3.3 Water Quality

Watersheds

The Action Area spans three major state-designated 6-digit watersheds: West Chesapeake Bay, Chesapeake Bay Proper, and Chester River. Within each of these major watersheds, the Action Area crosses the Severn River, Magothy River, Lower Chesapeake Bay, Eastern Bay, and Kent Island Bay Maryland Department of the Environment (MDE) 8-digit watersheds and the Lower Severn River, Magothy River South Shore, Northwest Lower Chesapeake Bay, Annapolis Shore, Kent Island True Bay, Northern Eastern Bay, and Kent Island Shore MD 12-digit sub-watersheds, which are shown in **Figure 3-2**.

All MDE 8-digit watersheds crossed by the Action Area have been listed on the 303(d) impaired waters list due to poor water quality. Total maximum daily loads (TMDLs) have been completed for many of the pollutants, though some are still awaiting an approved TMDL. Pollutants such as fecal coliform, polychlorinated biphenyls (PCBs) in fish tissue, elevated levels of phosphorus and nitrogen, total suspended solids (TSS), and unknown pollutants (based on benthic Indices of Biotic Integrity or IBIs) have been documented within the Action Area. More details on watershed characteristics are included in the *Draft EIS* and *Natural Environment Technical Report.*

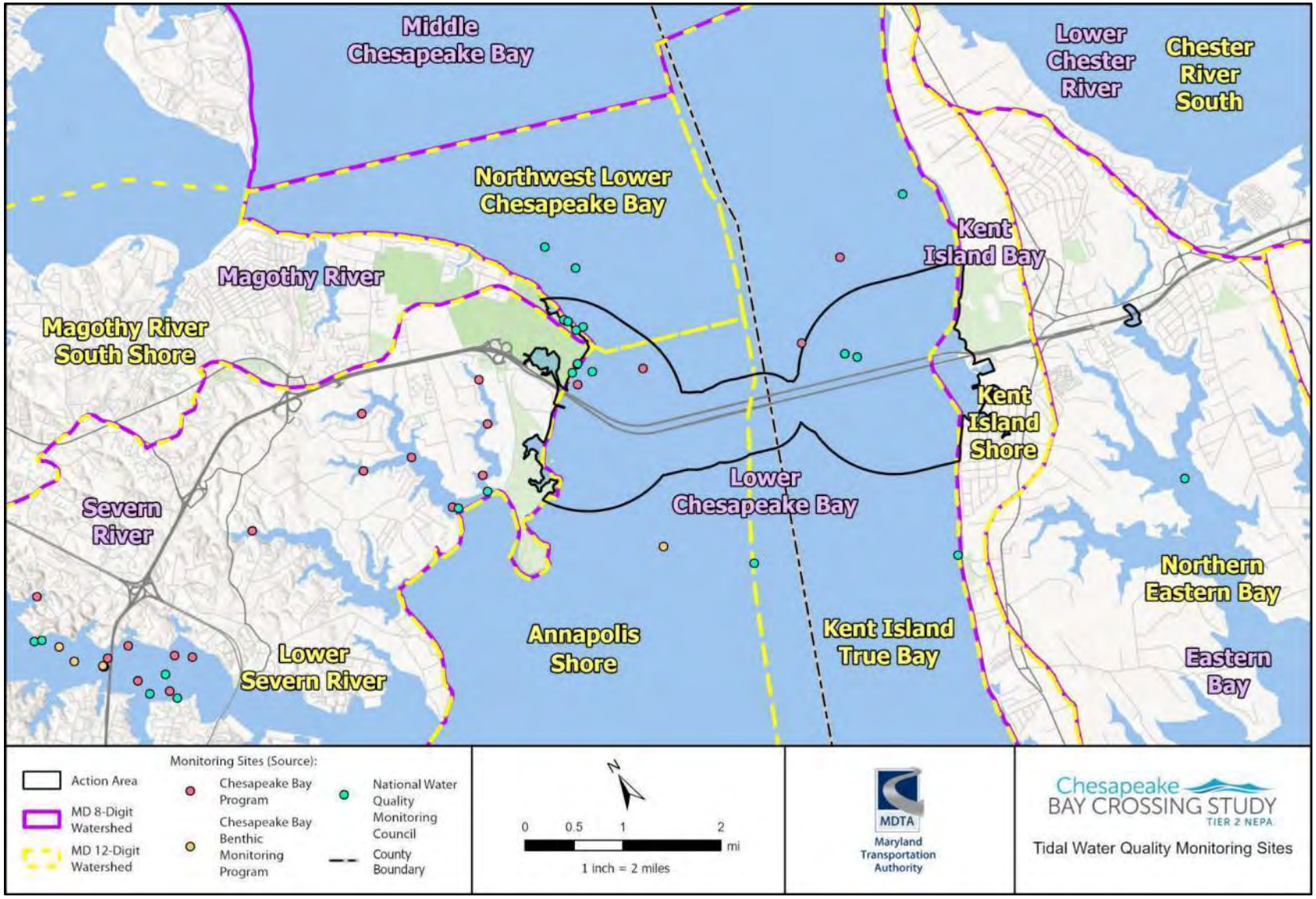
Figure 3-2: Sub-watersheds



Surface Water Quality

Nontidal and tidal waterways have different state and federally regulated water quality criteria. They also have guidelines that are not regulated criteria, intended to identify stress levels for aquatic biota. Monitoring locations utilized for water quality analyses within the Action Area are illustrated in **Figure 3-3**. Surface water quality of water bodies within the Action Area is described in more detail in the *Draft EIS* and *Natural Environment Technical Report.*

Figure 3-3: Water Quality Monitoring Sites



Major tidal waterways within and adjacent to the Action Area include the Chesapeake Bay, Mezick Pond, and Cox Creek. The Chesapeake Bay is designated by MDE as a Use II tidal waterway, or tidal waters designated for supporting estuarine and marine aquatic life and shellfish harvesting. East of U.S. 50/301, most surface flow is directed toward Mezick Pond and flanking wetlands, which are located within Sandy Point State Park, with hydrology directly connecting to the Chesapeake Bay. This area is largely influenced by the tides and floodplain, and therefore a mostly tidal estuarine system exists. Within the Eastern Bay Watershed, Cox Creek is a large Use II perennial tidal waterway which extends north and south of U.S. 50/301. Large areas of estuarine common reed (*Phragmites australis*) wetlands are located along the western bank of Cox Creek, on the south side of U.S. 50/301.

Tidal grab sample and in situ water quality data collected in the Annapolis Shore, Northern Eastern Bay, and Kent Island True Bay MD 12-digit watersheds were reviewed for this assessment, since these watersheds directly cross the Action Area and drain into the Chesapeake Bay in the vicinity of the Action Area. Water quality data was gathered from MDE, Maryland Department of Natural Resources (MDNR) Eyes on the Bay Program and other monitoring programs accessed through the Chesapeake Bay Program (CBP). In situ data were obtained from MDNR's Chesapeake Bay Benthic Monitoring Program (CBBMP). It should be noted that in-situ data collected at one point in time are not representative of the full range of water quality conditions throughout the year in which data was collected, or across years.

Salinity within the Action Area generally ranges from 0.5 to 22.32 parts per thousand (ppt), and conductivity generally ranges from 3,100 to 35,500 UMHO/cm. Temperatures range from 1.0 to 30.9°C, pH ranges from 6.8 to 9.6, dissolved oxygen (DO) levels range from 0.09 to 17.8 mg/L, total suspended solids (TSS) range from 0 to 134 mg/L, Enterococcus bacteria levels range from 10 to 2,010 MPN/100mL, and Fecal Coliform bacteria levels range from 1 to 1,100 MPN. Tidal water quality within and surrounding the Action Area indicates many sampling locations are in compliance with current state and federal criteria and acceptable ranges of predicted stressors to aquatic biota. However, observations indicate that pH, DO, Enterococcus Bacteria, and Fecal Coliform Bacteria levels in the vicinity of the Action Area are not in compliance with Code of Maryland Regulations (COMAR) criteria for Use II waterways. In general, water quality is better within the main stem of the Chesapeake Bay than in adjacent tidal creeks due to tidal flushing.

High pH, low DO, and high bacteria levels may be caused by industrial, agricultural, and urban discharges of nutrient runoff. High pH levels can result in decreased reproduction, growth, biodiversity, and damage to fish organs and long-term exposures can result in death (EPA CADDIS, 2025). High pH levels could also affect the distribution of SAV within the Action Area. Waters with low DO are unlikely to support SAV, and low DO can affect aquatic community structure by altering the food web in favor of species and life stages that are more tolerant to low oxygen conditions. Low DO can also have acute effects on aquatic life resulting in biological impairments and even death. High bacteria levels in water can adversely impact fish by depleting oxygen levels as they decompose.

3.4 Aquatic Resources

Subtidal Benthic Habitat

Bottom substrates within the Action Area, based on MDNR's Chesapeake Bay Bottom Survey data (Smith et al., 2001), are mapped in the Annapolis Shore, Kent Island True Bay, and Kent Island Shore 12-digit watersheds. The Chesapeake Bay Bottom Survey geodatabase characterizes bottom type designations determined by MDNR's acoustic bay bottom survey conducted from 1974 to 1983 and includes natural oyster rubble and sand within the Action Area. Because this dataset is up to 30 years old and areas identified as cultch bottom when the survey was conducted may have degraded since the time of the survey, quantitative impacts were not calculated using this data source. More information on bottom substrates is discussed in the *Draft EIS*.

Benthic Macroinvertebrates

Benthic macroinvertebrate data was available from MDNR for the Action Area. Benthic macroinvertebrate data is used to calculate the Chesapeake Bay IBI (Bay-IBI), which varies based on salinity regime and bottom substrate (Weisberg et al., 1997; Llansó and Dauer, 2002). Benthic IBI scores within the vicinity of the Action Area range from "meets restoration goals" to "severely degraded." Benthic habitat, characteristics, and available data are discussed in more detail in the *Draft EIS*.

Submerged Aquatic Vegetation

SAV is designated as a Habitat Area of Particular Concern (HAPC) for summer flounder by the Mid-Atlantic Fisheries Management Council and is considered a priority habitat by NOAA Fisheries and MDNR resource managers. Within the Action Area, SAV has been identified on the eastern shoreline of the Chesapeake Bay mainstem along Terrapin Nature Park, north of the existing Chesapeake Bay Bridge. Within the period 2019 through 2023, SAV was only mapped within this area in 2019, and coverage was sparse.

Review of historical mapping revealed that SAV beds were much more abundant from 1971 through the early 2000s than they are currently. Numerous studies suggest that increases in nutrient loading are the primary cause of these declines.

As shown in **Figure 3-4**, SAV has been documented along the northern side of the eastern terminus of the Bay Bridge within the Action Area. The extent of SAV present in the vicinity of the Action Area was determined through an analysis of the existing and historical SAV beds documented by the Virginia Institute of Marine Science (VIMS) SAV monitoring program.

The 5-year average extents of SAV were determined using a GIS overlay of the Action Area with the VIMS data from 2019 through 2023. The MDTA analyzed SAV density from year to year, utilizing the 2000 to 2023 annual datasets from VIMS. MDNR considers any area mapped in those 5 years to be habitat that supports SAV, even if SAV is not found there on a given date during the growing season. This analysis revealed historic patterns and trends that enhanced understanding of SAV in the Action Area. The extent of SAV coverage would be re-evaluated at the time of permitting based on the 5-year composite coverage from VIMS.

From 2019 through 2023, 6 species of SAV were documented in the VIMS survey segments that are crossed by the Action Area (e.g., CBP segments). These 6 SAV species were all documented

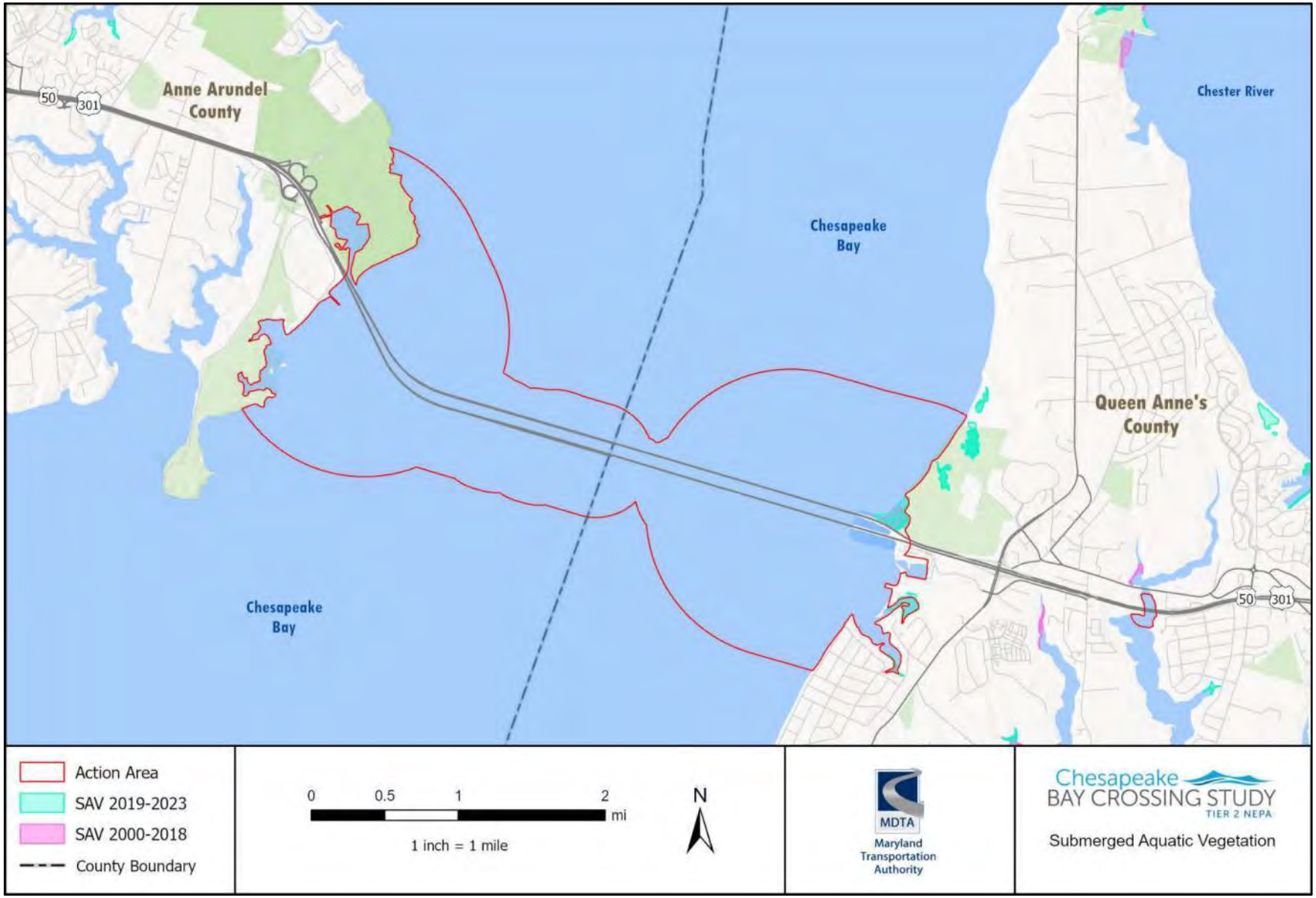
in 2019 in segment CB4MH. From 2020-2023, there were no recorded SAV ground survey observations within segment CB4MH. SAV likely to inhabit the Action Area range from freshwater to mesohaline species that can tolerate moderate salinity levels. These species are typically found in the middle and upper reaches of the Chesapeake Bay (see **Table 3-1**). Surveys conducted by VIMS occur later in the growing season; therefore, the presence and density of horned pondweed (*Zannichellia palustris*) beds is often underrepresented as the species senesces during warmer months. SAV habitat and the VIMS data development are discussed in detail in the *Natural Environmental Technical Report.*

Table 3-1: SAV Species Documented within the Action Area from 2019-2023*

Common Name	Scientific Name
Eurasian watermilfoil	*Myriophyllum spicatum*
Sago pondweed	*Stuckenia pectinata*
Redhead grass	*Potamogeton perfoliatus*
Common elodea	*Elodea canadensis*
Horned pondweed	*Zannichellia palustris*
Widgeon grass	*Ruppia maritima*

***Species identified only in 2019. All other years had no recorded VIMS SAV ground survey observations.

Figure 3-4: Submerged Aquatic Vegetation within the Action Area



Oyster Beds

The eastern oyster (*Crassostrea virginica*) is a critical component of the Chesapeake Bay ecosystem. Oyster habitat is typically brackish or salt water from 8 to 35 feet deep (CBP, 2023).

Information on the locations and characteristics of oyster beds within the Action Area was obtained from MDNR's Maryland Shellfish GIS layers, which provide locations of significant oyster features, including legally described Natural Oyster Bars (NOBs), designated Oyster Sanctuaries and oyster seeding areas, Public Shellfish Fishery Areas, and historic oyster bars, sites where watermen have engaged in oyster harvesting for centuries (MD iMap, 2023).

Oyster beds are located throughout the Chesapeake Bay. Within the Action Area north of the Bay Bridge, historic oyster habitat exists from approximately 1,400 feet to 4,500 feet off the Anne Arundel County shoreline towards the main channel. South of the Bay Bridge, historic oyster habitat exists from approximately 1,800 feet to 5,200 feet off the Anne Arundel County shoreline towards the main channel. See **Figure 3-5** for the location of oyster beds and habitat. This contiguous area of historic oyster habitat from the Magothy River, north of the Bay Bridge to the Severn River, south of the Bay Bridge, encompasses more than 2,000 acres. Oyster plantings and NOBs are located within the Action Area north and south of the Bay Bridge and oyster sanctuaries are located within Cox Creek in Queen Anne's County within the Action Area.

Fish

Information on tidal fish communities within the vicinity of the Action Area was compiled from the VIMS Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP) online database (VIMS, n.d.). The ChesMMAP survey is used to describe fish assemblages in the Chesapeake Bay. For additional discussion of ChesMMAP, see the *Natural Environment Technical Report*. Tidal data from ChesMMAP was received from VIMS on January 18, 2024. Twenty-six species were detected at stations sampled from 2013 through 2023 and within 5 miles of the Bay Bridge. This 5-mile extent of the Chesapeake Bay mainstem on either side of the bridge captures the mouth of the Magothy and Severn Rivers on the western shoreline and north to Love Point on the Eastern Shore. Species documented are included in **Table 3-2**.

Figure 3-5: Oyster Beds and Habitat within the Action Area

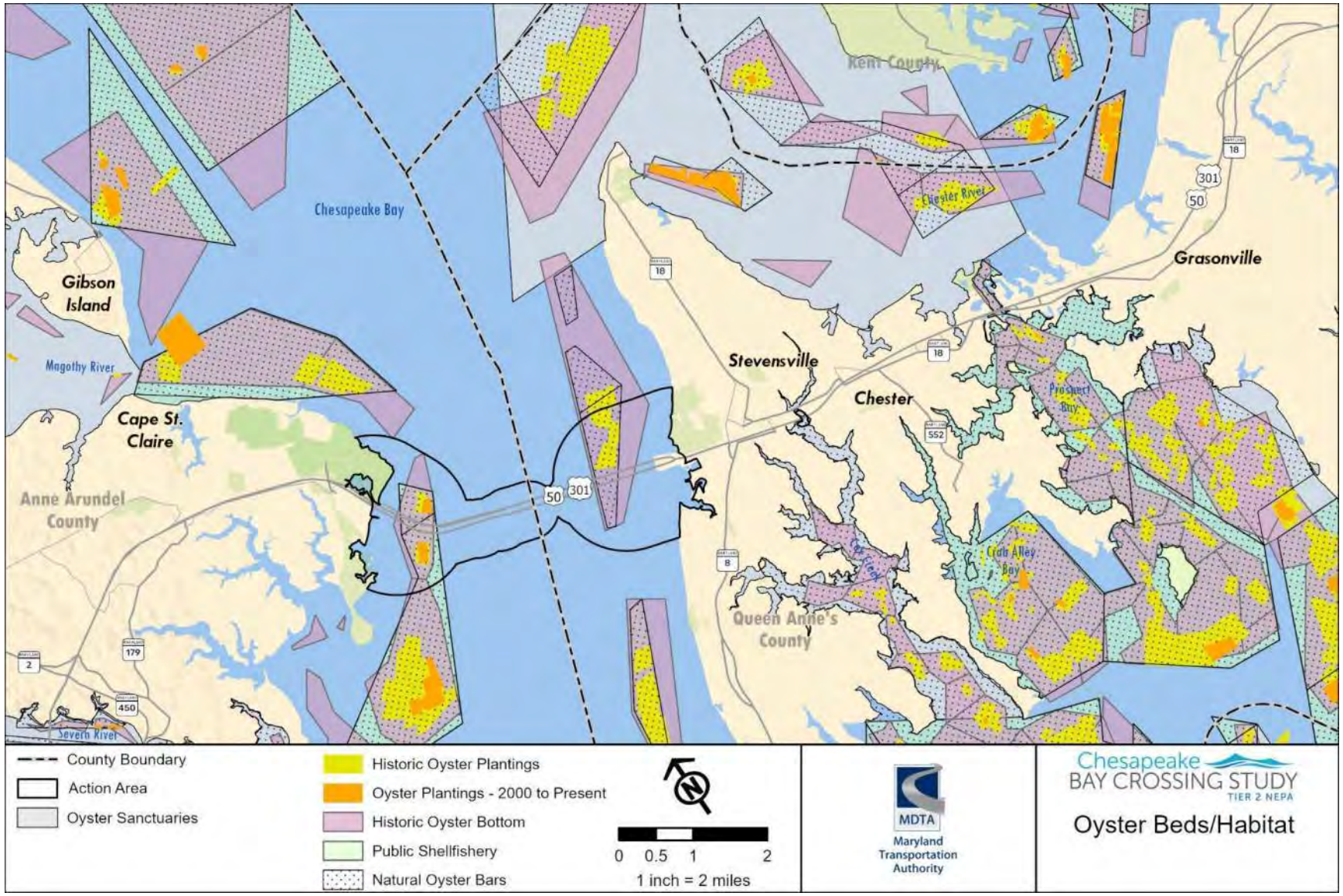


Table 3-2: Fish Species Documented Within 5 Miles of the Bay Bridge (2013-2023)

Common Name	Scientific Name	Common Name	Scientific Name
Alewife	*Alosa pseudoharengus*	Harvestfish	*Peprilus paru*
American eel	*Anguilla rostrata*	Hogchoker	*Trinectes maculatus*
American shad	*Alosa sapidissima*	Oyster toadfish	*Opsanus tau*
Atlantic croaker	*Micropogonias undulatus*	Rough scad	*Trachurus lathami*
Atlantic menhaden	*Brevoortia tyrannus*	Silver perch	*Bairdiella chrysoura*
Atlantic sturgeon	*Acipenser oxyrinchus*	Spanish mackerel	*Scomberomorus maculatus*
Bay anchovy	*Anchoa mitchilli*	Spot	*Leiostomus xanthurus*
Blue catfish	*Ictalurus furcatus*	Striped anchovy	*Anchoa hepsetus*
Blueback herring	*Alosa aestivalis*	Striped bass	*Morone saxatilis*
Bluefish	*Pomatomus saltatrix*	Summer flounder	*Paralichthys dentatus*
Channel catfish	*Ictalurus punctatus*	Weakfish	*Cynoscion regalis*
Cownose ray	*Rhinoptera bonasus*	White catfish	*Ameiurus catus*
Gizzard shad	*Dorosoma cepedianum*	White perch	*Morone americana*

Source: VIMS ChesMMAP

MDNR Environmental Review Program (ERP) indicated a diverse range of resident and migratory finfish species inhabit the tidal portion of the Chesapeake Bay and potentially occur in the vicinity of the Bay Bridge. The Chesapeake Fish Passage Prioritization (CFPP) project tool and MDNR's diadromous fish GIS data indicate that there are various diadromous species within the Action Area. The mainstem Chesapeake Bay is a significant migratory pathway for all diadromous species migrating/emigrating to/from the upper Bay and its tributaries. See the *Natural Environment Technical Report* for additional information regarding fish species.

Based on a review of the CFPP project tool and MDNR's diadromous fish GIS data, the species in **Table 3-3** are either documented to occur (D), likely to occur (L), or potentially occur (P) within these watersheds. Per MDNR ERP, areas including Whitehall Creek and Weems Creek are habitat for white perch and yellow perch.

Table 3-3: Diadromous Fish Species in the Action Area[1]

Common Name	Lower Severn River	Kent Island Shore	Northern Eastern Bay
Alewife	D	D	D
Blueback herring	L	--	L
American shad	D	D	D
Hickory shad	D	D	D
Striped bass	D	L	L
White perch	D	L	L
Yellow perch	D	--	--

[1] Note that the absence of these species in certain watersheds does not mean that they do not occur, rather that they are not specifically noted in the CFPP project tool and MDNR GIS data. The CFPP project tool uses waterbody feature center lines to display this information; therefore, certain species are likely unaccounted for in watersheds including open tidal portions of the Chesapeake Bay.

American eels are also found throughout all tidal and nontidal watersheds crossed by the Action Area. Special attention has been given to American eel management in recent years, due to their ecological and economic importance, and their declining numbers. American eels are catadromous, meaning they primarily live in rivers and estuaries but return to the ocean to spawn.

Fish Blockages

Information regarding fish blockages within the Action Area was obtained from the CFPP database, which was reviewed for all watersheds crossed by the Action Area. MDNR's Fish Blockage Locations GIS shapefile (MD iMap, 2017) and the North Atlantic Aquatic Connectivity database were used to supplement fish blockage information in the CFPP database. Four migration barriers exist in the Lower Severn River 12-digit watershed. These barriers can affect the historical range for the diadromous species that utilize the watershed. The culverts that carry tidal waterways under U.S. 50/301 within the Action Area are not listed as fish blockages in the CFPP database.

4 ESSENTIAL FISH HABITAT DESIGNATIONS

4.1 Essential Fish Habitat Within the Action Area

The Mid-Atlantic Fishery Management Council (MAFMC) (created by the MSA) is the regional fishery management council responsible for development of Fishery Management Plans (FMPs) for marine fisheries in U.S. federal waters (3-to-200 miles off the coasts) within the Mid-Atlantic region, including the portion of the Chesapeake Bay spanned by the Tier 2 Study Action Area. Based on text descriptions from the FMPs, the MDTA identified six species, included in **Table 4-1**, that are likely to occur within the Action Area. The following habitat parameter assumptions were used to assess fish habitat within the Action Area: a depth ranging from 0 to 92 feet below Mean Low Water (MLW), a salinity range of 5 to 18 ppt, and a water temperature range of 40° to 83 °F (4° to 28 °C). EFH for the species and life stages shown in **Table 4-1** is present within the Action Area. See **Appendix C** for an explanation of why Clearnose skate (*Raja eglanteria*) do not have EFH within the Action Area.

Table 4-1: EFH Designations Within the Action Area

Species Present	Life Stage(s)	Habitat
Atlantic butterfish *(Peprilus triacanthus)*	Eggs, larvae, juvenile, adults	Pelagic estuaries including the Chesapeake Bay, bottom depths between 33-1,150 feet, upper 650 feet of water column, water temps 40-81.5 °F, salinity above 5ppt.
Black sea bass *(Centropristis striata)*	Juvenile, adults	Inshore estuaries, water temps >43 °F, structured habitats (natural and man-made), “mixing” salinity zone.
Bluefish *(Pomatomus saltatrix)*	Juvenile, adults	Major estuaries, “mixing” salinity zone.
Scup *(Stenotomus chrysops)*	Juvenile, adults	Estuaries, “mixing” salinity zone, water temps >45 °F, salinity above 5ppt.
Summer flounder *(Paralichthys dentatus)*	Larvae, juvenile, adults	Pelagic estuaries, “mixing” salinity zone, nearshore, water temps >37 °F, depths between 30-230 feet.
Windowpane flounder *(Scophthalmus aquosus)*	Juvenile, adults	Estuaries, sandy substrate, “mixing” salinity zone, maximum depth of 200 feet.

4.2 Managed Fish Species

This section includes a brief summary of ecological information compiled from NOAA Fisheries' EFH source documents and other relevant sources.

4.2.1 Atlantic Butterfish

The Atlantic butterfish is a migratory species that ranges from Newfoundland and the Gulf of St. Lawrence to the Atlantic and Gulf coasts of Florida. Butterfish are a fast-growing, short-lived pelagic species that form loose schools, often near the surface. Based on the available habitat in the Action Area, eggs, larvae, juvenile, and adult Atlantic butterfish are likely to occur within the Action Area based on ecological and salinity tolerances of the species. Butterfish migrate seasonally, wintering near the edge of the continental shelf in the Middle Atlantic Bight and moving inshore in the spring into southern New England and Gulf of Maine waters. Butterfish occur throughout the entire mid-Atlantic shelf during the summer, from sheltered bays and estuaries, such as the Chesapeake Bay, out to depths of approximately 650 feet (about 200 meters) (Cross et al., 1999).

Butterfish spawning occurs from May to October in the Middle Atlantic Bight, on the continental shelf, inshore areas, and bays and estuaries, including the Chesapeake Bay, where spawning begins as early as late May and peaks in June and July. Butterfish eggs and larvae are pelagic and occur from the outer continental shelf to higher salinity parts of estuaries in the Middle Atlantic Bight. Butterfish eggs are approximately 0.68 to 0.82 mm in size, butterfish larvae are approximately 2.6 to 16 mm in size, and both eggs and larvae weigh less than 2 grams (Robins and Ray, 1986). Based on the Northeast Fisheries Science Center's (NEFSC) Marine Resources Monitoring, Assessment and Prediction program ichthyoplankton survey, eggs can be found in water temperatures ranging from 43º to 79ºF (6º to 26ºC) but can be found most often in water temperatures ranging from 52º to 63ºF (11º to 17ºC). Eggs are found in surface waters at depths ranging from 33 to 5,740 feet (10 to 1,750 meters) but are mostly found at depths less than 650 feet (200 meters). Butterfish larvae can be found in water temperatures ranging from 45º to 79ºF (7º to 26ºC) and depths ranging from 33 to 4,100 feet (10 to 1,250 meters) but occur most often in water temperatures ranging from 48º to 66ºF (9º to 19ºC) and depths less than 820 feet (250 meters). Butterfish eggs tolerate estuarine to full seawater (about 25 to 33 ppt), and butterfish larvae tolerate salinity levels ranging from 6.4 to 37.4 ppt. Butterfish eggs and larvae are common in high salinity zones of estuaries in the Middle Atlantic Bight, and in the mixing zone of the Chesapeake Bay (Cross et al., 1999).

Juvenile and adult butterfish are pelagic and form loose schools near the surface. Juvenile butterfish are approximately 16 to 120 mm in size and typically weigh approximately 0.06 to 36 g, and adult butterfish are approximately 121 mm to 31 cm in size and typically weigh approximately 36 to 712 g (Robins and Ray, 1986). Both juveniles and adults are tolerant of wide water temperatures (14º to 71ºF (4.4º to 21.6º C)) and salinity (5 to 32 ppt) ranges. Juvenile and adult butterfish are often found over sand, mud, and mixed substrates. During the summer months, butterfish occur inshore where they remain at shallow depths and are frequently observed on shallow flats, in sheltered bays and estuaries, and in the surf zone. Smaller juvenile butterfish often form groups beneath floating objects, such as jellyfish, while larger juveniles are pelagic schooling fishes which are found near the bottom during the day and disperse upwards at night. Butterfish are primarily planktivorous and feed on a variety of planktonic prey, including mollusks, crustaceans, worms, coelenterates, small fish, and ctenophores (Cross et al., 1999).

Butterfish are managed under the Mackerel, Squid, Butterfish FMP. The FMP is administered by the MAFMC and includes commercial quotas, recreational limits, as well as other thresholds as defined on the MAFMC website (www.mafmc.org).

4.2.2 Black Sea Bass

The black sea bass is a warm temperate migratory species that ranges from Southern Nova Scotia and the Bay of Fundy to southern Florida and into the Gulf of Mexico. The black sea bass exists as two populations, or stocks: the Middle Atlantic stock and the South Atlantic stock. Black sea bass are seasonal migrants. Based on the available habitat in the Action Area, juvenile and adult black sea bass are likely to occur within the Action Area based on ecological and salinity tolerances of the species. When water temperatures dip below 57ºF (14ºC) in the autumn, the Middle Atlantic stock migrates south and offshore to wintering areas in deeper waters between New Jersey and North Carolina. As bottom waters warm above 45ºF (7ºC) in the spring, the stock migrates inshore to coastal areas and bays, including the Chesapeake Bay.

Black sea bass spawning occurs from May to July in the Middle Atlantic population, primarily along the inner continental shelf during inshore migrations. Black sea bass eggs are pelagic and typically found in water ranging from 54º to 75ºF (12º to 24ºC) at depths less than 120 feet (50 meters), according to the NEFSC Marine Resources Monitoring, Assessment and Prediction Program (MARMAP) ichthyoplankton survey. Black sea bass eggs are not often found in estuaries. Black sea bass larvae are also pelagic and are most commonly found in waters ranging from 52º to 79ºF (11º to 26ºC) at depths less than 392 feet (200 meters). Similarly to their eggs, black sea bass larvae are seldom found in estuaries. Black sea bass eggs and larvae are sensitive to extremely low or high salinity levels, and larvae prefer salinity levels ranging from 30 to 35 ppt (Steimle et al., 1999).

Juvenile black sea bass are most abundant in oceanic waters and polyhaline estuaries. They are most commonly encountered in the spring and summer where they are generally associated with structurally complex habitats and steep depth gradients. Juvenile black sea bass display extremely high site fidelity and use a variety of man-made habitats including artificial reefs, shipwrecks, bridge abutments, piers, and pilings. In the Mid-Atlantic Bight, most black sea bass nurseries occur at depths less than 65 feet (20 meters). Within estuaries, older juveniles use habitats less than 33 feet (10 meters) deep. Growth rates of juvenile black sea bass vary with temperature, salinity, DO levels and prey quality. They prefer intermediate salinities between 28 and 36 ppt, however they may occur at salinities as low as 8 ppt. Juveniles prefer temperatures between 40 º to 65º F (4 to18 ºC), and a wide range of depths (between 3 feet to 460 feet (1 to 140 meters) (Drohan et.al., 2007).

Adult black sea bass prefer deeper waters (6 to 125 feet (2 to 38 meters)) and salinity levels greater than 20 ppt in the summer, when they can be found occupying mussel beds, rocky bottom areas, artificial reefs, wrecks, and other structures. Adult black sea bass are approximately 11 to 60 cm in size and typically weigh approximately 24 to 3,390 g (Robins and Ray, 1986). Adult black sea bass are found at much greater depths (typically 197 to 492 feet (60 to 150 meters)) and prefer water temperatures ranging from 48º to 54ºF (9º to 12ºC). Adult black sea bass prefer salinity levels ranging from 15 to 35 ppt and are intolerant of DO levels less than 2 parts per million (ppm). Adult black sea bass prey on epibenthic invertebrates as well as small fish and squid (*Lolliguncula brevis*) (Steimle et al., 1999).

Black sea bass are managed under the Summer Flounder, Scup, and Black Sea Bass FMP. This FMP is administered jointly by the Atlantic States Marine Fisheries Commission (ASMFC) and MAFMC, and includes commercial quotas, recreational limits, as well as other thresholds as defined on the MAFMC website (www.mafmc.org).

4.2.3 Bluefish

The bluefish is a migratory species that is found in the Atlantic Ocean from Maine to Florida, and around the world in temperate coastal regions (Fahay et al., 1999). Bluefish are a pelagic species, inhabiting the water column anywhere from the surface to the ocean floor, but are usually found between 25 to 33 feet deep. Based on the available habitat in the Action Area, juvenile and adult bluefish are likely to occur within the Action Area based on ecological and salinity tolerances of the species. Juvenile bluefish are approximately 4 to 24 cm in size and weigh approximately <2 to 145 g (Dooley, 1990). Juvenile bluefish generally occur in estuaries from May through October in Mid-Atlantic waters (Shepherd, 2006). Bluefish migrate seasonally, moving north in spring and

summer as water temperatures rise and then south in autumn and winter to waters in the South Atlantic Bight (NOAA Fisheries, 2025).

Based on VIMS bottom trawl surveys within the Chesapeake Bay tributaries between 1988 and 1999, juvenile bluefish prefer salinity ranges greater than 16 ppt, with the majority of fish in the 31 ppt to 32 ppt range (Shepherd, 2006) but are known to enter estuaries where salinity is less than 10 ppt (SMS, 2005). Most juveniles occur between 75.2°F and 78.8°F (24° to 26°C) and at DO levels of 6 to 8 ppm (Shepherd and Packer, 2006). Bluefish cannot tolerate temperatures below 50°F (10°C) or above 86.7°F (30.4°C) (SMS, 2005), and as a pelagic open water species, bluefish are not well adapted to hypoxic conditions. Juveniles prefer sandy ocean bottoms but will also inhabit mud, silt, or clay ocean bottoms or vegetated areas (NOAA Fisheries, 2025). Disturbances that increase water turbidity may affect distribution and feeding of bluefish due to a reliance on vision to locate prey.

Adult bluefish live in both inshore and offshore areas and favor warmer water (NOAA Fisheries, 2025). Adult bluefish are approximately 25 to 115 cm in size and weigh approximately 163 g to 6.8 kg (Dooley, 1990). Spawning occurs in open ocean waters and takes place twice a year. It is also possible that the species has a long spawning period, and the eggs do not survive during the middle of the season, which gives the appearance of two separate spawning periods. Once bluefish hatch and are able to swim, they appear in nursery areas in estuaries and along the continental shelf in late May to mid-June with a second stock of juveniles appearing in estuaries in late August (Shepherd and Packer, 2006). Juveniles from both seasons migrate toward North Carolina in October. The current bluefish FMP was implemented in 1990 and prepared cooperatively by the MAFMC and the ASMFC. The FMP limits recreational and commercial fishing for the bluefish (these fishing limits are described in detail on the MAFMC website (www.mafmc.org)).

4.2.4 Scup

Scup is a migratory species that is found in the Atlantic Ocean from Maine to Cape Hatteras, North Carolina (Steimle et al., 1999), although it has been found as far south as Florida coastal areas and bays in the spring. Based on the available habitat in the Action Area, juvenile and adult scup are likely to occur within the Action Area based on ecological and salinity tolerances of the species. The life history of scup is typical of most demersal fishes, with pelagic eggs and larvae, and a gradual transition to the demersal adult stage. There are two stocks of scup: Mid-Atlantic and South Atlantic, however the South Atlantic population has not been assessed and so the population status is unknown (NOAA, 2025). The Middle Atlantic Bight scup population appears to make extensive seasonal migrations and is commonly found during the summer in larger estuaries such as the Chesapeake Bay and in coastal waters.

Scup spawn once a year beginning in spring when water temperatures are greater than 50°F (10°C), along the inner continental shelf off southern New England from May through August, with a peak in June to July. Most spawning occurs in southern New England in shoal waters less than 33 feet deep until late June, when scup move into deeper waters. As inshore temperatures drop below 46°F (8°C) in the winter, scup migrate to warmer waters along the outer continental shelf to about 200 meters deep. Juveniles follow adults to the mid to outer continental shelf south of Long Island, although some remain in larger and deeper estuaries during warmer winters. During the summer and early fall, juveniles and adults are common in most larger estuaries and coastal areas in open and structured habitats. Juvenile scup appear in estuaries such as the Chesapeake

Bay in June, migrate south for the winter, and return in the spring. Juvenile scup feed during the day, primarily on polychaetes, epibenthic amphipods, and other small crustaceans, mollusks and fish eggs and larvae. Copepods and mysids are also important to early juvenile diets. Juvenile scup are approximately 1.5 to 13 cm in size and weigh approximately 0.05 to 45 g. Juvenile scup have been collected at bottom temperatures of 45° to 65°F (7°to 18°C) in the spring and 59° to 72°F (15° to 22°C) in the fall at salinities of 18 to 33 ppt, and DO levels greater than 4 ppm.

Adult scup reside in the Middle Atlantic Bight from spring to fall and are generally found on a variety of structured habitats such as mussel beds, reefs, or rough bottom. Adult scup are approximately 15.5 to 46 cm in size and weigh approximately 79 g to 2.1 kg. Smaller adult scup are commonly found in larger bays and estuaries such as the Chesapeake Bay, but larger scup tend to be found in deeper waters. Adult scup are benthic feeders and forage on a variety of prey, including small crustaceans, polychaetes, mollusks, small squid, vegetable detritus, insect larvae, hydroids, sand dollars, and small fish. When scup move inshore, they gradually accumulate food reserves from the spring into the fall to support extra energy demands of migration, reproductive development, and reduced feeding in winter. Adult scup can be found at bottom water temperatures of 43° to 81°F (6° to 27°C), and their winter distribution is mostly limited by their preferred lower limit of 45°F (7°C). Adult scup are found primarily in waters with the salinity range of 20 to 31 ppt and DO levels greater than or equal to 4 ppm.

4.2.5 Summer Flounder

Summer flounder exhibit strong seasonal inshore-offshore movements, although they are not as migratory as other species (Packer et al., 1999). Their geographical range encompasses the shallow estuarine waters and outer continental shelf from Nova Scotia to Florida; however, they are most abundant within the Middle Atlantic Bight from Cape Cod, MA to Cape Hatteras, NC. Based on the available habitat in the Action Area, larvae, juvenile, and adult summer flounder are likely to occur within the Action Area based on ecological and salinity tolerances of the species. Adult flounder normally inhabit shallow coastal and estuarine waters such as those of the Chesapeake Bay during the warmer months at depths of 40 to 50 feet (12 to 15 meters) and move offshore during colder months to the outer continental shelf, as deep as 150 meters. Some older adults have been shown to remain offshore year-long; however, due to overfishing most summer flounder are three years of age or less.

Tagging studies have shown that fish which spend their summer in a particular bay tend to return to that same bay in the following year. Migration timing of inshore fish varies across regions but typically occur around late April and early May. Summer flounder migrate to the outer continental shelf beginning in September or October, and it is believed that spawning occurs within the territorial waters south of Cape Cod. Summer flounder adults average 30-50cm in length and they are found in salinities of 15ppt or more. Preferred habitat for summer flounder includes sandy/shell substrates or artificial reefs (Packer et al., 1999). Information regarding summer flounder HAPC, SAV, is included in **Section 4.3**.

Estuaries, such as the Chesapeake Bay, serve as an important nursery area for juvenile summer flounders, at intermediate or high salinities. Summer flounder spawn during the fall and winter as fish move offshore to the open ocean areas of the continental shelf. The older and larger fish migrate first each year, timed by the beginning of the spawning migration period which can vary by latitude (Packer et al., 1999).

Larval summer flounder are planktonic and most abundant at depths of 10 to 70 meters between September and February (Packer et al., 1999). Larval summer flounder are approximately 8.1 to 17 mm in size and weigh less than 2 g (Robins and Ray, 1986). Larvae are most abundant at temperatures ranging from 48° to 64°F (9° to 18°C), and salinities of 20 to 35ppt. Once larval to juvenile metamorphosis begins, they leave the water column and settle to the bottom where they bury in the sediment and develop into juveniles. Juvenile summer flounder are distributed inshore and in many estuaries throughout the species range during spring, summer, and fall. Juvenile summer flounder are approximately 18 to 390 mm in size and weigh approximately 0.04 to 666 g (Robins and Ray, 1986). Some juveniles will migrate offshore to deeper waters with adult fish during the colder months, however most will remain inshore. Juvenile summer flounder inhabit many estuarine habitats such as marsh creeks, seagrass beds, mud flats, and open bay areas, in similar temperature and salinity profiles as larval summer flounder.

Adult summer flounder are often found in temperatures from 48° to 79°F (9° to 26°C) in the fall, 39° to 55°F (4° to 13°C) in the winter, 36° to 68°F (2° to 20°C) from the spring, and 48° to 81°F (9° to 27°C) in summer, and high salinity portions of estuaries. Adult summer flounder are approximately 28 to 94 cm in size and weigh approximately 232 g to 12 kg (Robins and Ray, 1986). They are opportunistic feeders; however, fish and crustaceans make up the majority of their diet. They are most active during daylight hours and can be commonly found in seagrass and sand habitats. (Packer et al., 1999). DO effects on summer flounder adults have not been investigated.

Despite various literature suggesting several separate stock populations of summer flounder within the Atlantic Ocean habitats, summer flounder are managed and assessed as a single stock by the MAFMC within the U.S. Exclusive Economic Zone. Spring surveys have shown that the Chesapeake Bight is a significant habitat for this species, particularly for juvenile summer flounder.

4.2.6 Windowpane Flounder

The windowpane flounder is a fast-growing left-eyed flounder species found from the Gulf of St Lawrence to Florida. Windowpane flounder make seasonal movements as bottom temperatures decrease, though their movements are less significant than other more migratory species. Based on the available habitat in the Action Area, juvenile and adult windowpane flounder are likely to occur within the Action Area based on ecological and salinity tolerances of the species. Both adult and juvenile flounder make seasonal movements from estuarine areas such as the Chesapeake Bay and shallow coastal waters into deeper areas during the autumn but are wide ranging throughout the year along the continental shelf, according to NEFSC bottom trawl survey data (Chang et al., 1999).

Windowpane flounder spawning occurs throughout most of the year in the Middle Atlantic Bight, with separate peaks in the spring and autumn. Spawning occurs at or near the bottom in high-salinity areas of estuaries within the Middle Atlantic Bight, though spawning is not common in the Chesapeake Bay. Windowpane flounder eggs are pelagic and are found along the nearshore continental shelf in the Middle Atlantic Bight in water temperatures ranging from 41° to 68°F (5° to 20°C) at depths less than 230 feet (70 meters), according to the NEFSC MARMAP ichthyoplankton survey. Larvae are planktonic and are found across a similar geographic range to eggs, in water temperatures ranging from 37° to 66°F (3° to 19°C) at depths less than 230 feet

(70 meters). Windowpane flounder eggs and larvae are not common in the Chesapeake Bay (Chang et al., 1999).

Adult and juvenile windowpane flounder occur in nearshore bays and estuaries throughout the Middle Atlantic Bight throughout most of the year, moving into deeper waters in the winter. Juvenile windowpane flounder are approximately 11 mm to 21 cm in size and weigh approximately 0.02 to 106 g. Adult windowpane flounder are approximately 22 to 46 cm in size and weigh approximately 121 g to 1.05 kg (Robins and Ray, 1986). Both adult and juvenile flounder are typically found in waters less than 246 feet (75 meters) deep and at temperatures ranging from 39° to 75°F (4° to 24°C), on fine sandy sediment bottoms. Both adult and juvenile flounder tolerate salinity ranging from 15 to 33 ppt and DO levels ranging from 2 to 13 mg/l. Juvenile windowpane flounder prey upon small worms, fish, and crustaceans, especially mysid shrimp (Chang et al., 1999).

Windowpane flounder are managed by the New England Fishery Management Council (NEFMC) and NOAA Fisheries under the Northeast Multispecies FMP. This FMP includes commercial quotas, recreational limits, as well as other thresholds as defined on the NEFMC website (www.nefmc.org).

4.2.7 Prey Species of Managed Fish

Federally-managed fish species prey upon other fish species within the project area. Prey species are important to an assessment of federally-managed fish species occurrence because fish species often travel based on the migratory patterns of their prey. Any impacts to these prey species are likely to result in behavioral modifications to the federally-managed fish species as they adapt to the changing prey conditions. Prey species of each of the federally-managed fish species are discussed below.

Prey species within the project area that are consumed by butterfish include a wide variety of planktonic prey, including crustaceans, mollusks, small fish, and a variety of other invertebrate species (Cross et al., 1999). Plankton can be found in the Chesapeake Bay throughout the year.

Prey species within the project area that are consumed by black sea bass and scup include small crustaceans such as juvenile blue crab (*Callinectes sapidus*), mollusks such as mussels, multiple species of small pelagic baitfish, squid, and a variety of other aquatic invertebrates. Blue crab are found along the Atlantic coast from Massachusetts Bay to northern South America. Blue crabs are abundant throughout the Chesapeake Bay during the summer and male crabs winter in shallow grass beds, muddy-bottom areas, and deep water throughout the bay, while female crabs winter in saltier waters near the mouth of the bay (MDNR, 2007c). Blue crabs are managed by MDNR within the Action Area under the Chesapeake Bay Blue Crab FMP. This FMP includes commercial quotas, recreational limits, as well as other thresholds.

Prey species within the project area that are consumed by bluefish include bay anchovies, squid, butterfish, round herring (*Etrumeus sadina*), alewife, American shad, white perch, Atlantic menhaden, and blueback herring (Buckel et al., 1998).

Alewife and blueback herring are often managed together and collectively known as "river herring." Alewife spawn in coastal rivers in the spring when water temperatures reach 60.8°F (16°C) to 66.2°F (19°C), and blueback spawn in coastal rivers in temperatures of 69.8°F (21 °C)

to 75.2°F (24°C) (Haas-Castro, 2006). River herring have been managed since 1985 by ASMFC under the FMP for American shad and river herring to stop exploitation of the species. American shad are found from Labrador to northern Florida (Haas-Castro, 2006). Shad migrate to the Chesapeake Bay in the spring for spawning and leave the Bay by summer. The American shad is managed by ASMFC under the FMP for American shad and river herring. White perch inhabit the Chesapeake Bay and its tidal tributaries. Mid-Atlantic Acoustic Telemetry Observation System data for 2021 through 2024 from the Chesapeake Bay North Array, located just south of the Bay Bridge, indicates that tagged white perch were detected in the area around the Bay Bridge in March and April. They are found in open waters close to the shore and upstream tributaries (Lippson, 2006) and reside throughout the year within the Chesapeake Bay and its tributaries. White perch spawn in fresh or brackish water during the summer (Jordan and Evermann, 1896 to 1900).

Atlantic menhaden are an important food source for many predatory fish species in the Chesapeake Bay, including bluefish and summer flounder. They are common throughout the Chesapeake Bay from spring to fall. Menhaden are a migratory species and typically migrate from the Chesapeake Bay to deeper waters off the coast in late fall (VIMS, 2025a). Menhaden are managed by the ASMFC Atlantic Menhaden Management Board (ASMFC, 2025).

Other small forage fish species common in the Chesapeake Bay that are preyed upon by bluefish and summer flounder include Atlantic silversides (*Menidia menidia*), bay anchovies (*Anchoa mitchilli)*, killifishes (*Cyprinodontiformes* family), gizzard shad, and spot. Atlantic silversides are one of the most common forage fish species found in the Bay and are common in shallow waters of the Bay during the summer (CBP, 2025a). Bay anchovies are another abundant forage fish species found throughout the Bay. The striped killifish and mummichog are the most common killifish species found in the Chesapeake Bay. Mummichog can tolerate a wider salinity range and can be found in fresher water than the striped killifish, which prefers more saline waters (CBP, 2025b and CBP, 2025c). Gizzard shad are found year-round in fresh to slightly brackish waters in the Chesapeake Bay region. Mid-Atlantic Acoustic Telemetry Observation System data for 2021 through 2024 from the Chesapeake Bay North Array indicates that gizzard shad are common in the area around the Bay Bridge in November and December. Adult gizzard shad are tolerant of brackish to saline waters, while juveniles are less tolerant of salinity than adults and are more commonly found upstream in freshwater habitats (MDNR, 2007a). Spot are found in the Chesapeake Bay from spring to fall, before moving offshore to spawn. Spot are known to aggregate around a sand shoal near Sandy Point State Park during the summer (J. Watson – NOAA Fisheries, personal communication, January 7, 2026). Juveniles are more widespread than adults and can be found in the bay as well as freshwater habitats (MDNR, 2007b).

Prey species within the project area that are consumed by windowpane flounder include small worms, fish, and crustaceans, especially mysid shrimp (Chang et al., 1999). Mysid shrimp are abundant in the Chesapeake Bay and are an important food source for many juvenile and adult fish species (Sea Grant, 2021).

4.3 Habitat Areas of Particular Concern Within the Action Area

SAV, or rooted macrophytes, are important HAPCs for the growth and protection of juvenile summer flounder. SAV is present within and surrounding the Action Area. The Fisheries Management Councils and NOAA Fisheries provide conservation, management, and research

priority to HAPCs because they are critical elements of healthy ecosystems and sustainable fisheries.

4.3.1 SAV Habitat and Requirements

Summer flounder HAPC is defined by MAFMC as, “all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH…”. SAV beds serve as vital habitat for summer flounder in several life stages. Juvenile summer flounder favor eelgrass for shelter and feeding, as preferred prey species are attracted to eelgrass beds. Macroalgae beds are also used by juvenile flounder, as they offer similar ecological benefits to eelgrass beds. Adult flounder use seagrass and macroalgae beds as foraging habitat by sheltering in sandy areas within or adjacent to beds and using seagrass or macroalgae as visual cover to capture prey moving within the beds (Packer et al, 1999). SAV beds also serve as essential habitat for many other species.

SAV is present within the Action Area along the shoreline and shallows near Terrapin Nature Park, according to VIMS SAV GIS data from 2019-2023. The Chesapeake Bay Program Tier 1 SAV habitat areas include clear, shallow water (i.e., less than 1 meter deep) where sunlight can reach the bottom sediment. Turbidity in the water column limits the depth at which SAV can grow and can cause SAV dieback at high levels (VIMS, 2025b). Sediment can be trapped in epiphytic growth common on SAV plants, limiting their ability to photosynthesize by weighing them down and moving them out of the zone where photosynthetically-active radiation may reach. Excess nutrients in the water column contribute to algal blooms, which can shade underlying SAV and limit growth or cause die-back. Physical impact to SAV beds from dredging, debris, and boat propellers can uproot and damage SAV plants, eliminating sections of or even entire SAV beds.

5 ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

The Tier 2 Study is in preliminary engineering for the Preferred Alternative and as such, design, construction, and demolition means and methods are based on preliminary assumptions. Impact analysis is estimated from preliminary design assumptions based on best professional judgement and information gathered from similar bridge construction projects. Dredging, pile driving for construction of the temporary trestles and new bridge, fill for pier protection, demolition of the existing bridges, and construction of roadway approaches would all cause adverse effects to EFH. Permanent impacts and extended temporary impacts (i.e., fills in place longer than 12 months) are both anticipated to result in short and long-term adverse effects to EFH. Details regarding construction activities, including the sequence of construction, are included in **Section 2.1**.

Table 5-1 summarizes the estimated impact of the Preferred Alternative to EFH and other aquatic habitats found within the Action Area. Impacts to EFH in acres were determined by overlaying the EFH boundaries from the NOAA Fisheries EFH Mapper with the Action Area in GIS. All EFH boundaries for federally-managed fish species were reviewed to ensure they accurately reflect the EFH text descriptions and were amended as needed.

Table 5-1: Action Area EFH and Aquatic Habitat Impacts

EFH Resource/Habitat	Impact (acres)
Atlantic butterfish* EFH – Adult, Juvenile, Larvae, and Egg	1,289
Black sea bass EFH – Adult and Juvenile Bluefish EFH – Adult and Juvenile Scup EFH – Adult and Juvenile Summer flounder EFH – Adult, Juvenile, and Larvae Windowpane flounder EFH – Adult and Juvenile	4,013
Tidal Wetlands (Acres)	9
Tidal Waterways** (Acres)	4,013
SAV† (Acres)	22
NOB (Acres)	729
Historic Oyster Bottom (Acres)	1,065
Oyster Plantings (Acres)	38
Oyster Sanctuaries (Acres)	15
Public Shellfisheries (Acres)	372

EFH boundaries derived from the NOAA Fisheries EFH Mapper – New England/Mid-Atlantic Region at: https://www.habitat.noaa.gov/protection/efh/newInv/index.html
** Atlantic butterfish EFH boundaries were amended from the NOAA-mapped EFH boundaries to more accurately reflect butterfish habitat as described in the EFH text description and only includes depths of 33 feet and greater.*
*** Tidal waterways are considered diadromous fish migrating, rearing, and ranging habitats.*
† The Action Area's 500-foot buffer of the Preferred Alternative LOD accounts for potential turbidity effects to SAV. The areas covered by the existing Bay Bridge structural elements were not excluded from the EFH impact numbers reported above.

The MDTA is committed to implementing appropriate mitigation measures to avoid and minimize adverse impacts to federally-managed fish species, their designated EFH, and HAPC identified within the Action Area. During final design, the MDTA, in consultation with NOAA Fisheries, would use the latest and evolving technologies, and techniques from similar projects in the area, to determine project-specific protection measures for aquatic resources. During construction, methods to minimize impacts within the Action Area would be implemented to the greatest extent practicable.

Potential construction BMPs to minimize impacts to federally-managed fish species were adapted from the *NOAA Fisheries/FHWA BMP Manual* (NMFS Greater Atlantic Regional Fisheries Office [GARFO], 2017) and the *FHWA Programmatic Essential Fish Habitat Consultation and General Concurrence for Select Transportation Actions in the NMFS Greater Atlantic Region* (NMFS GARFO, 2024). The MDTA will commit to and implement the avoidance and minimization measures listed as commitments and will consider all other measures/methods listed as considerations. Considerations will be coordinated and evaluated further during final design. A complete list of commitments and considerations is included in **Appendix B**.

5.1 Dredging

5.1.1 Impact Types, Magnitude, and Duration

Construction of the Preferred Alternative would include approximately 50.2 acres of dredging in shallow areas of the Chesapeake Bay. The exact timing of anticipated dredging is unknown; however, an estimated two thirds of the dredging would take place in the first and second years of construction to accommodate the eastbound bridge. The remaining dredging would occur when construction of the westbound bridge starts. Dredging for the eastbound bridge is estimated to take up to 14 days to complete and dredging for the westbound bridge is estimated to take up to 7 days to complete.

Turbidity and Sedimentation

Dredging would result in the destruction and degradation of benthic habitat and potential smothering of benthic populations through deposition of dredge-induced suspended sediment downstream of the dredging zone. Turbid water resulting from dredging adversely effects vision in fish, which can inhibit their predation success and limit their movements. Turbidity and sedimentation impacts from dredging would be temporary.

Reduced Water Quality

Dredging would potentially result in respiratory issues in fish, including gill injury, from the generation of suspended solids/turbidity, re-suspension of contaminants, and release of nutrients from the bottom sediments. The resulting eutrophication of the waters and increased biological oxygen demand would potentially result in reduced dissolved oxygen in the shallow water areas. Bluefish are not well-adapted to low DO levels; summer flounder are highly sensitive to DO levels less than 3 ppm; adult black sea bass are intolerant of DO levels less than 2 ppm; and adult scup are found primarily in waters with DO levels greater than or equal to 4 ppm.

Dredging could result in a decreased photic zone for SAV within the Action Area due to increased turbidity, which could limit growth. The Preferred Alternative preliminary LOD has been developed to avoid direct adverse effects to SAV. SAV is mapped outside the LOD, north of the existing bridge; therefore, shading impacts are not anticipated, and the direct impact of SAV from dredging or fill placement is not anticipated. However, SAV is located within the Action Area and construction could result in indirect adverse effects to SAV. Ground disturbances (i.e., dredging, grading) could indirectly affect SAV by increasing turbidity and sedimentation, which could adversely affect photosynthesis.

Water quality impacts from dredging would be temporary.

Habitat Alteration

Dredging would result in changes to bottom sediments and bathymetry in the shallow areas of the Action Area and would convert and/or completely fill bottom habitat of federally-managed fish species and their prey. Dredging is likely to result in fish and benthic organism mortality due to direct impact to benthic organisms and the removal of benthic habitat by dredge equipment. Existing habitat within the proposed dredging footprint would be permanently impacted. However, after initial dredging, the dredged areas would be left to restore naturally over a number of years, and benthic habitat would recover.

Fish Passage and Migration Habitat

Dredging could disrupt normal foraging and migration behaviors of federally-managed fish species within the Action Area, but this would be a temporary impact. Dredging for the eastbound and westbound bridges will be separate events in the construction schedule allowing for normal foraging and migration behaviors before, after, and between dredging events.

Vessel Interaction

Impacts to federally-managed fish species from vessel interaction are unlikely because dredging would utilize slow-moving vessels that fish can readily avoid. Impacts to SAV are possible from vessel movement and shading and would be temporary impacts.

Impingement/Entrainment and Entanglement

Fish entanglement and entrainment are unlikely to occur during dredging, given the current design assumptions.

5.1.2 Avoidance, Minimization, and Mitigation

5.1.2.1 Commitments Related to Dredging

Turbidity and Sedimentation

- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls, such as turbidity curtains.
- Only use mechanical dredging.

Reduced Water Quality

- Only use clean fill.
- Evaluate dredge material to determine the appropriate disposal method and location.
- Remove cofferdams, turbidity curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.

Habitat Alteration

- Employ an Independent Environmental Monitor (IEM).
- Coordinate with the NOAA Fisheries GARFO and MDNR on specific recommended time-of-year restriction dates, based on the proposed activities and location.
- Incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV shall be mitigated at a ratio of at least 3:1, depending on the nature and scale of impacts.

- Coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.

Vessel Interaction

- Do not operate or moor vessels in or immediately adjacent to SAV in such a way that could shade or otherwise impact SAV.

5.1.2.2 Considerations Related to Dredging:

Turbidity and Sedimentation

- Use operational modifications such as conducting the work at low tide to limit sedimentation and turbidity.
    - This may include using an environmental bucket on mechanical dredges, reducing lift speeds, using small diameter cutterhead dredges, and/or limiting the use of large hopper dredges.
- Prohibit side-casting or temporary storage of dredged material in the waterway.
- Prohibit unfiltered or unprocessed overflows from barges into the water and ensure that any barge transfer is accomplished without generating sediment plumes.

Reduced Water Quality

- Monitor water quality to determine whether temperature and DO levels remain within a close threshold to background levels, as determined in coordination with NOAA Fisheries and MDNR in final design, and if levels fluctuate beyond this threshold, contact NOAA Fisheries and MDNR within 24 hours to determine appropriate actions.

Habitat Alteration

- Minimize maintenance dredging to the greatest extent practicable.
- Within the dredged area, leave benthic contours to restore naturally. If not restored within a certain time period (to be determined during final design in coordination with NOAA Fisheries and MDNR) then consider active restoration of bottom contours with clean sand fill.
- Design the dredge footprint to avoid sensitive habitats to the greatest extent practicable and provide appropriate buffers to protect these areas from accretion of sediment resuspended during dredging.
- Develop a project schedule and plan prior to construction, which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.
- Complete pre- and post-construction monitoring to determine fishery resources present, habitat impacts, and mitigation needs. Determine the project was completed as intended by documenting the extent of permanent fills, demolition material removal, and recovery of dredged areas.

- Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
- Prioritize beneficial uses of suitable sediments that contribute to habitat restoration and enhancement. The MDTA will coordinate with NOAA Fisheries Habitat and Ecosystem Services Division (HESD) in final design, prior to determining any commitment(s) for sediment beneficial use.
- Ensure that any proposed dredging is necessary to maintain target depths. Evaluate recent bathymetric surveys to determine the existing depths of the proposed dredge area.
- Avoid and minimize all activities (including work footprint, structures, shading, temporary and permanent fill, excavation, etc.) in shallow water habitats and sensitive habitats such as SAV, mudflats, salt marsh, areas containing shellfish, and intertidal areas.
- Provide compensatory mitigation for all unavoidable impacts to EFH and sensitive habitats.

Fish Passage and Migration Habitat

- Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.
- Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from habitat.
- Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.

Vessel Interaction

- Reduce vessel speeds in inshore areas, or otherwise minimize wake damage to shorelines, and consider no-wake zones in highly sensitive areas, such as spawning habitat and SAV beds. Identify appropriate vessel routes in the design process to minimize impacts to shorelines and shallow water habitats.
- Work to minimize the effects of increased vessel traffic when conducting in-water actions.
- Ensure that vessels are operated in adequate water depths to avoid propeller scour and grounding at all tides. Use shallow draft vessels that maximize the navigational clearance between the vessel and the bottom in shallow areas.

Impingement/Entrainment and Entanglement

- Ensure any in-water lines, ropes, or chains are made of materials and installed in a manner (properly spaced) to minimize the risk of entanglement by using thick, heavy, and taut lines that do not loop or entangle. Lines can be enclosed in a rigid sleeve.
- Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.
- Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.
- Employ screening (1 mm wedgewire or better technology with maximum intake velocity of 0.5 fps) on any water intakes (e.g., pumps) drawing from surface tidal waters to minimize impingement/entrainment of fish and nekton.

5.2 Pile Driving and Pier Protection

5.2.1 Impact Types, Magnitude, and Duration

Underwater Noise/Hydroacoustic Energy

According to Popper and Hawkins, underwater noise resulting from pile driving can cause a variety of adverse effects on fish, ranging from minor behavioral changes to fatal injuries. Noise can cause a wide range of behavioral changes in fish, which vary by fish species and can vary by age and time of day within the same species. Behavioral changes can include changes in swimming speed and avoidance of, or attraction to, sound sources. This could include avoidance of migration routes if a continuous sound source is present along a migration route. Noise can also affect foraging behavior, as noise can either mask relevant sounds fish use to locate prey, or resemble prey sounds. Sound exposure may also result in hearing loss in fish. Fish are known to experience temporary hearing loss from anthropogenic noise, which could be worsened by continuous sound exposure. Sound exposure may cause physiological stress responses in fish, though this subject is understudied and poorly understood. Fish can also be injured or killed by sound, especially from intense impulsive noise sources (such as pile driving). Severe injuries to fish caused by noise typically result from rapid oscillation of the swim bladder walls, which can result in damage to surrounding organs (Popper and Hawkins, 2019). Fish kills can attract predators to the area, including other fish, birds, and mammals (C. Kucera - FHWA, personal communication, January 22, 2026). These predators may then be affected by construction and demolition operations, compounding their effects.

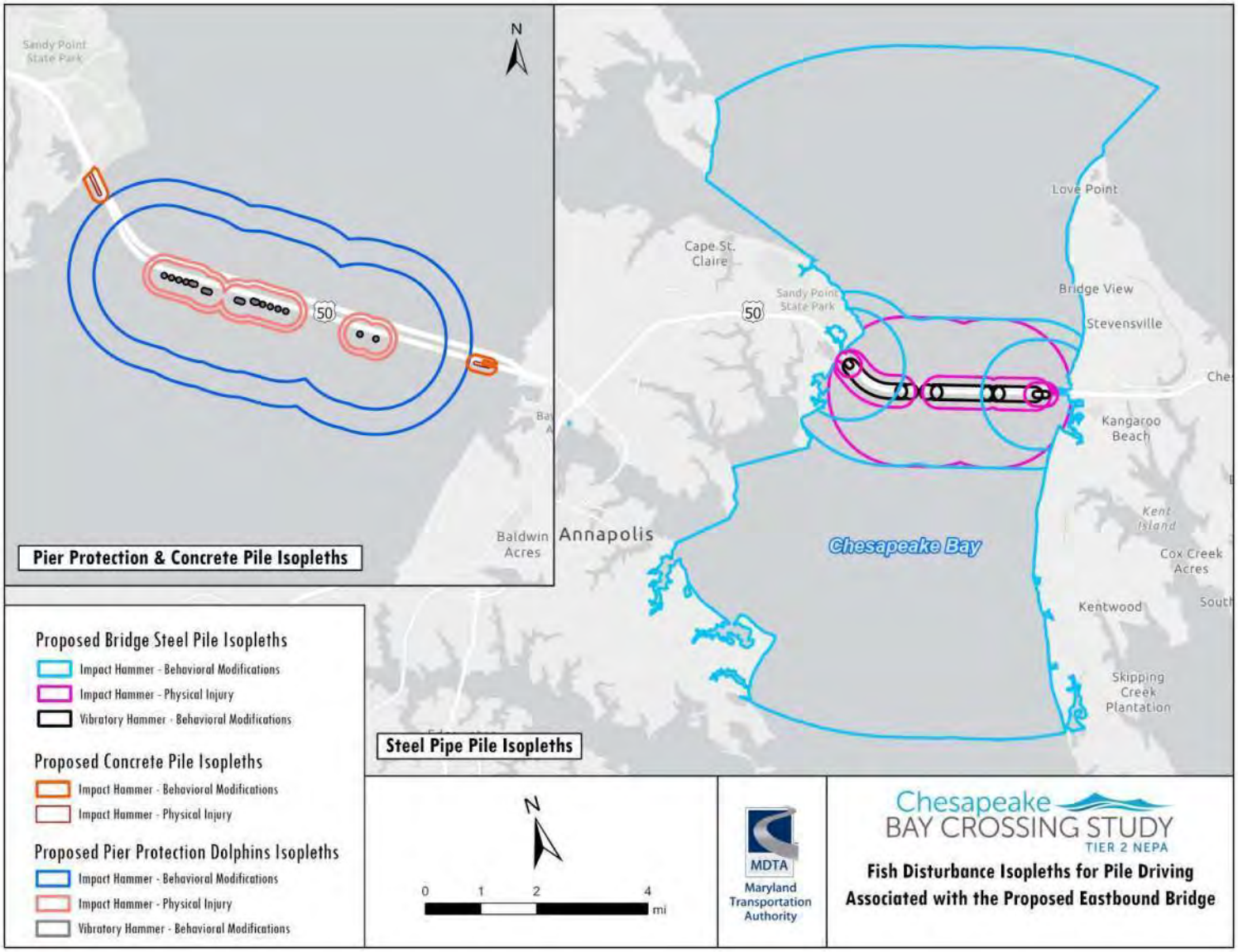
Compared to other adverse effects, underwater noise and vibrations would likely have the most pronounced short-term adverse effects on federally-managed fish species. All life stages of federally-managed fish species with designated EFH in the Action Area would likely be affected by underwater noise, since the current design assumptions indicate that pile driving could occur throughout years 1 through 3 of construction of the eastbound bridge and its pier protection, and years 7 through 12 for the westbound bridge and its pier protection, for a total of 9 years of intermittent pile driving. It is estimated that pile driving would be required on about 120 days for eastbound bridge construction within a 3-year window, and on about 138 days for westbound bridge construction within a 6-year window. It is important to understand that although the pile driving time would be protracted, it may not necessarily occur on consecutive days and when it occurs, it may not always occur for a full 12-hour period. Exact timing for pile driving has not been determined, but it could possibly take place throughout multiple seasons of the year, with breaks for time-of-year restrictions to protect aquatic species, for adverse weather conditions, to set-up or break-down equipment, and to conduct other construction activities.

A 12-hour quiet period will be implemented on days when pile driving is conducted to minimize underwater noise effects; however, extended periods of noise throughout the middle Chesapeake Bay are likely to affect migration patterns. Disrupted or delayed migration patterns may affect spawning success. Proposed mitigation measures aim to avoid population-level effects; however, population numbers may be affected, as multiple year classes of federally-managed fish and their prey may be affected by far-reaching and high-intensity underwater noise and vibrations caused by pile driving. The fact that pile driving for the eastbound and westbound bridges would likely be intermittent, both seasonally and daily, may allow for localized recovery of species.

Noise disturbance is quantified as a circular area emanating from a point source (in this case, pile driving), indicated by an underwater isopleth. As shown in **Figure 5-1**, the distance of the sound effects of pile driving is dependent upon the pile size, material, and methods used. Note that individual pile driving isopleth extents were merged for each pile type and are shown in **Figure 5-1**. Up to 16 piles could be driven at any given time, resulting in concurrent isopleths or zones of fish injury/behavioral modification.

Though specific construction means and methods have not been developed, estimates of pile types and installation methods were assumed based on construction means and methods of similar projects, including Nice-Middleton Bridge and Francis Scott Key Bridge, and to provide the most conservative reasonable estimate of impacts. Actual noise levels resulting from pile driving operations for the pile types and sizes assumed during preliminary design are not available at this time. Therefore, the extent of pile installation noise impacts were calculated using proxy noise levels for pile driving provided by the National Marine Fisheries Service Multi-Species Pile Driving Calculator (NMFS Calculator) (NMFS, 2025). Proxy sound levels were used for the Peak, Single Strike Sound Exposure Level (SELss), and Root Mean Square (RMS) Unattenuated Single Strike Level. Calculations were completed for multiple bridge pier types based on current design assumptions, including: impact hammer installation of 36” square concrete piles; impact hammer and vibratory hammer installation of 36” steel pipe piles, 48” steel pipe piles (for bridge pier and fender installation), 96” steel pipe piles, and 14” steel H-piles and 19.6” sheet piles for dolphin pier protection. Conservative estimates were used for all instances. When a proxy was not available for a specific pile type, a larger pipe proxy was included in the calculations to provide the highest underwater noise estimate.

Figure 5-1: Fish Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge



To estimate the behavioral modifications and physical injury to federally-managed fish species from impact and vibratory hammer operations, the MDTA included the following assumptions in the NMFS Calculator: installation of up to 16 piles per day, 30 minutes per pile (vibratory) and then 2,500 strikes per pile (impact), based on the Underwater Noise Monitoring Plan for the Francis Scott Key Bridge Project. It is assumed that steel piles will initially be driven with a vibratory hammer through softer, sandy soils prior to using an impact hammer through stiffer material, as practicable. In the NMFS Calculator, the Distance Associated with Single Strike Level/Measurement Distance (meters) and Transmission Loss Constant values were maintained at their default values, 10 and 15, respectively. Bubble curtains would be installed around all piles to minimize impacts; therefore, noise attenuation is expected. Calculations were completed with attenuation levels set at 10 dB for bridge pile installation, a conservative estimate based on the MDTA's documentation of higher levels of attenuation in other recent bridge projects. Dolphin pier protection installation calculations were completed with attenuation levels set at 5 dB based on the assumption that only a less protective bubble curtain system would be feasible in this scenario. Highly effective multi-ring bubble curtain systems are feasible for single pile installation, however dolphin construction involves driving connected sheet piles in a large circle, and only a single ring, perimeter bubble curtain is feasible.

Table 5-2 provides a summary of the pile driving isopleths resulting from impact and vibratory hammers for each of the proposed pile types that would likely cause onset of physical injury and behavioral modification to fish. Isopleths (in feet) provided by the NMFS Calculator include peak threshold, cumulative Sound Exposure Level (SEL_{cum}) for physical injury, and RMS threshold for behavioral modification.

Table 5-2: NMFS Calculator Summary: Response of Fish to Impact and Vibratory Hammer Operation

Pile Type	Impact Hammer			Vibratory Hammer
	Onset of Physical Injury		Behavior Modification	Behavior Modification
	Peak threshold (FT)	SEL_{cum} (FT)	RMS Threshold (FT)	RMS Threshold (FT)
36" Square Concrete	2.8	82.4	382.5	N/A
36" Steel Pipe	13.1	1,120.3	5,199.8	328.1
48" Steel Pipe	20.7	606.3	4,459.8	706.8**
48" Steel Pipe (60" Steel Pipe Proxy)*	13.1	1,522.8	7,068.4	706.8**
96" Steel Pipe	60.6	7,068.4	32,808.4	706.8**
14" Steel H-Pile	20.7	960.8	4,459.8	15.23
AZ Sheet Pile	13.1	1,522.8	7,068.4	152.3

Note: SEL_{cum} for fish >2g and fish <2g are the same value and therefore only presented once.
**In order to create an increasing trend in noise effect between all steel pipe pile sizes, two 48" steel pipe proxies were used to create a range of likely impacts. The noise proxy levels for a 48" steel pipe did not produce the expected impacts for the SEl_{cum} and RMS Threshold and therefore the noise proxy for a 60" steel pipe was used instead.*
***The NMFS Calculator only includes vibratory proxies for 36" steel pipes and 72" steel pipes. Therefore, for every steel pipe greater than 36" in diameter, 72" steel pipe sound proxy levels were used.*
*Sound proxy levels used were not attenuated and a 10dB attenuation was then added in the NMFS Calculator. See **Appendix A** for the NMFS Calculator output.*

Pile driving (via impact hammer) the 96" steel pipe piles would likely result in the largest ensonified area of all pile types, as indicated in **Table 5-2**. Up to 12 hours of noise due to piling driving is anticipated on days when pile driving is proposed. See **Figure 5-1** for a visual representation of the isopleths associated with all pile driving activities. The resulting isopleths for installation of piles for the main bridge spans, pier protection, and trestle(s) would potentially result in physical injury and likely result in behavior modification to fish. Accurate fish stock counts for the middle Chesapeake Bay are not known at this time; therefore, exact mortality and behavior modification numbers for federally-managed fish species cannot be determined.

Underwater noise and vibrations would be temporary impacts, but would have the potential to cause fish kills and to affect fish populations in the Bay given the protracted duration of this activity.

Turbidity and Sedimentation

Turbidity and sedimentation resulting from pile driving operations could potentially cause respiratory issues for federally-managed fish species and limit the areas where they can swim safely. Turbidity and sedimentation from pile driving would be temporary impacts.

Reduced Water Quality

Fill and other construction materials used during pile driving operations have the potential to introduce contaminants into the Action Area and increase turbidity conditions, both of which can have adverse health effects on federally-managed fish species including reduced respiration and

vision. Pile driving operations have the potential to decrease DO levels in the water column, as nutrients from the underlying sediments are released, creating high oxygen demand, and resulting in reduced oxygen levels for fish species. Reduced water quality from pile driving would be a temporary impact to federally-managed fish species.

Habitat Alteration

Trestle construction would result in long-term temporary fills and construction of bridge piles and pier protection would result in permanent fills. Permanent fills from pier construction and pier protection would result in irretrievable loss of bottom habitat and/or habitat conversion. Temporary fills associated with pile driving would degrade habitat for federally-managed fish species. Fill impacts will be quantified during design.

Potential temporary impacts to habitat from pile driving would include sediment disturbance, shading from structures, noise, and physical obstruction, which can adversely affect the foraging and migratory behavior of federally-managed fish species. Pile driving also has the potential to increase turbidity and sedimentation, which can negatively impact SAV by limiting photosynthesis and negatively impact fish by reducing respiration and vision.

Vessel Interaction

Operating vessels in or near SAV beds during pile driving and pier protection operations can result in mortality or degradation of SAV through physical impact or shading, which could be a temporary or permanent impact, depending on the duration of impact.

Fish Passage and Migration Habitat

Noise impacts and turbidity from pile driving affect the ability of migratory fish to navigate to their spawning grounds. Temporary structures and turbidity control measures used for pile driving have the potential to block the movements of federally-managed fish species through migratory pathways. Pile driving operations can affect water flow and water quality, which affect fish movement and respiration. The effects on fish passage and migration would be temporary.

Impingement/Entrainment and Entanglement

Dewatering and turbidity control measures used during pile driving and pier protection operations have the potential to trap fish. Water intakes such as pumps used for dewatering during pile driving operations can impinge/entrain fish and cables, ropes, and utility lines can entangle fish. These impingement/entrainment impacts would be temporary.

5.2.2 Avoidance, Minimization, and Mitigation

5.2.2.1 Commitments Related to Pile Driving

Underwater Noise/Hydroacoustic Energy

- Develop an Underwater Noise Monitoring Plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise.
- Implement an effective quiet time of no pile driving for 12 hours per day.
- Use noise attenuation and minimization measures during pile driving, including:
    - Use a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The

effectiveness of the bubble curtain attenuation shall be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities.
    - Using a "soft start" or "ramping up" pile driving (e.g., driving does not begin at 100% energy). This soft start technique will involve a low-energy start-up (e.g., hammer operated at 50% capacity) over a period of up to 20 minutes to allow fish to leave the area.
    - Initially drive steel piles with a vibratory hammer through softer, sandy soils prior to using an impact hammer through stiffer material, as practicable and as appropriate.
    - Using cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.
- Include methods to document fish stuns/kills in the Underwater Noise Monitoring Plan and coordinate these methods with NOAA Fisheries HESD.

Turbidity and Sedimentation

- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains.

Reduced Water Quality

- Only use clean fill.
- Avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.
- Remove cofferdams, turbidity curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.
- Minimize raw concrete or grout contact with the water to the maximum extent practicable.

Habitat Alteration

- Employ an Independent Environmental Monitor (IEM).
- Coordinate with the NOAA Fisheries GARFO and MDNR on specific recommended time-of-year restriction dates, based on the proposed activities and location.
- Coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.

Fish Passage and Migration Habitat

- From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. To maintain the ZSFP, 96"

steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96" piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP. The contractor shall use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15. The project team will work with NOAA Fisheries and MDNR to refine and approve ZSFP locations and the migratory focal period during Final Design and permitting.

Vessel Interaction

- Do not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.

5.2.2.2 Considerations Related to Pile Driving

Underwater Noise/Hydroacoustic Energy

- Conduct noise-generating work in a way that minimizes acoustic effects and avoids injury to federally-managed fish species. Explore potential attenuation measures based on the NMFS Calculator.
- Use noise attenuation and minimization measures during pile driving, such as:
    - Surrounding all piles with a bubble curtain, isolation casing, or dewatered cofferdam. Contained bubble curtains will be utilized to the extent practicable. Where use of a contained bubble curtain is not feasible, use of an uncontained bubble curtain would be evaluated.
    - Using vibratory hammers and construction phasing to minimize acoustic impacts to fish. Balance with potential impacts to other species, including marine mammals.
    - Minimizing the number and size of temporary and permanent piles.
    - Using concrete piles and pre-cast piles versus steel piles to reduce underwater noise, as practicable and as appropriate.
    - Using drilled shafts instead of hammered piles, as practicable and as appropriate.

Turbidity and Sedimentation

- Use operational modifications such as conducting the work at low tide to limit sedimentation and turbidity.
- Position new structures to avoid altering natural sediment accretion rates and patterns.

Reduced Water Quality

- Monitor water quality to determine whether temperature and DO levels remain within a close threshold to background levels, as determined in coordination with NOAA Fisheries and MDNR in final design, and if levels fluctuate beyond this threshold, contact NOAA Fisheries and MDNR within 24 hours to determine appropriate actions.
- Consider alternatives to the use of pressure treated (Chromated Copper Arsenate or Alkaline Copper Quaternary, etc.) piles or other in-water structures, as practicable and as appropriate.

Habitat Alteration

- Place a geotextile barrier under any temporary access fills to ensure that any fill would be removed completely at the end of construction.
- Develop a project schedule and plan prior to construction, which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.
- Complete pre- and post-construction monitoring to determine fishery resources present, habitat impacts, and mitigation needs. Determine the project was completed as intended by documenting the extent of permanent fills, demolition material removal, and recovery of dredged areas.
- Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
- Use waterline pile cap/pier footings to avoid dredging to construct footings below the mudline.
- Avoid and minimize all activities (including work footprint, structures, shading, temporary and permanent fill, excavation, etc.) in shallow water habitats and sensitive habitats such as SAV, mudflats, salt marsh, areas containing shellfish, and intertidal areas.
- Provide compensatory mitigation for all unavoidable impacts to EFH and sensitive habitats.
- Work with engineers to consider the potential for designs that enhance underwater habitat.

Fish Passage and Migration Habitat

- Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.
- Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.
- Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from habitat.

Impingement/Entrainment and Entanglement

- Allow all fish to exit an enclosed area prior to any dewatering. Trapped fish greater than 5 inches long observed during dewatering shall be captured and released from the dewatering area except for invasive species (snakehead, blue catfish, flathead catfish) that will be disposed of.
- Employ screening (1 mm wedge wire or better technology with maximum intake velocity of 0.5 fps) on any water intakes (e.g., pumps) drawing from surface tidal waters to minimize impingement/entrainment of fish and nekton.
- Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.
- Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.

5.3 Demolition

5.3.1 Impact Types, Magnitude, and Duration

The preliminary design assumes most of the demolition would be accomplished through mechanical means; however, it is assumed that based on the depth and size of some existing piers, blasting would likely be required to remove select bridge elements. Mechanical demolition is unlikely to result in adverse effects to federally-managed fish species with implementation of appropriate avoidance and minimization measures, however blasting would adversely affect federally-managed fish species.

According to current design assumptions, blasting would likely occur in years 6 and 7 for the eastbound bridge, totaling 9 blast events, and would likely occur again in years 14 and 15 for the westbound bridge, totaling 7 blasting events. Blasting instances are considered intense, discrete impact events.

Underwater Noise/Hydroacoustic Energy

Blasting would have an acute adverse effect on fish in close proximity to the charge; however, the duration of impact would likely be short. Blasting produces pressure waves that can cause swim bladders to rupture, causing severe injury or mortality. The acoustic effects of blasting affect fish hearing and tissues. Blasting can also increase water turbidity and sedimentation in the area surrounding the blasting event, resulting in decreased water quality and impacts on fish respiration and vision. Juveniles and adults of all federally-managed fish species and larval summer flounder would be affected by blasting within the Action Area.

Turbidity and Sedimentation

Blasting could result in increased turbidity and sedimentation, which have the potential to cause temporary adverse effects to federally-managed fish species and their habitat through smothering of SAV and other benthic habitat and reduced vision and respiration in fish.

Reduced Water Quality

Saw operations during mechanical demolition produce effluent that can be toxic to fish if it enters the water column. The turbidity and sedimentation resulting from demolition can reduce water quality and negatively affect vision and respiration. These potential water quality effects of demolition would be temporary.

Habitat Alteration

Temporary structures and fill used in demolition can degrade or remove benthic habitat.

Vessel Interaction

Operating vessels in or near SAV beds during demolition operations can result in mortality or degradation of SAV through physical impact or shading. Vessel impacts during demolition would be temporary.

Fish Passage and Migration Habitat

Noise impacts and turbidity from blasting affect the ability of migratory fish to navigate to their spawning grounds. Temporary structures and turbidity control measures used for demolition have the potential to block the movements of federally-managed fish species through migratory pathways. Demolition can affect water quality, which affects fish vision, movement, and respiration. Impacts to fish passage and migration from demolition would be temporary.

Impingement/Entrainment and Entanglement

Dewatering and turbidity control measures used during demolition operations have the potential to trap fish. Cables, ropes, and utility lines used during demolition can entangle fish. Impingement/entrainment impacts from demolition would be temporary.

5.3.2 Avoidance, Minimization, and Mitigation

5.3.2.1 Commitments Related to Demolition

Underwater Noise/Hydroacoustic Energy

- Continue to coordinate to minimize the use of blasting.
- Develop an Underwater Noise Monitoring Plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise.
- Include methods to document fish stuns/kills in the Underwater Noise Monitoring Plan and coordinate these methods with NOAA Fisheries HESD.
- Employ scare charges and fish deterrent boats ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting danger zone.
- Develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will evaluate the following measures:
    - Detonation bore hole stemming, capping, or filling;
    - Firing all charges in a single firing circuit with a delayed detonation between each charge;
    - Focusing blast energy towards a solid substrate rather than towards the water column;
    - Employing noise attenuating devices such as bubble curtains;
    - Conducting the blasting during periods of low water or low tide;
    - Using rubber blasting mats to reduce debris and acoustic signature;
    - Employing scare charges;
    - Installing appropriate monitoring devices to confirm the impact distance to adaptively manage the Demolition Plan;
    - Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and
    - Using adaptive management actions between blast events to minimize fish mortality.

Turbidity and Sedimentation

- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains and bridge netting to catch falling debris.
- Minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the applicable techniques:
    - Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell;
    - Remove piles slowly to reduce sediment sloughing off in the water column;
    - Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal;
    - Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.
- Prevent sediment and debris from entering the water using nets, tarps, and pans when demolishing bridge superstructures; remove demolition debris that falls into the water.

Reduced Water Quality

- Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.
- Remove cofferdams, turbidity curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.

Habitat Alteration

- Employ an Independent Environmental Monitor (IEM).
- Coordinate with the NOAA Fisheries GARFO and MDNR on specific recommended time-of-year restriction dates, based on the proposed activities and location.
- Remove temporary structures and fills including monitoring devices in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation.

Fish Passage and Migration Habitat

- From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges.

Vessel Interaction

- Do not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.

5.3.2.2 Considerations Related to Demolition

Underwater Noise/Hydroacoustic Energy

- Use mechanical demolition methods, instead of blasting, when possible.
- Schedule timing of blasting events to minimize impacts to federally-managed species. This will be coordinated with NOAA Fisheries during final design and construction. To minimize duration and magnitude of impact, any required blasting would likely take place during times of lower biological activity, which is still to be determined.
- Conduct noise-generating work in a way that minimizes acoustic effects and avoids injury to federally-managed fish species. Explore potential attenuation measures based on the NMFS Calculator.

Reduced Water Quality

- Monitor water quality to determine whether temperature and DO levels remain within a close threshold to background levels, as determined in coordination with NOAA Fisheries and MDNR in final design, and if levels fluctuate beyond this threshold, contact NOAA Fisheries and MDNR within 24 hours to determine appropriate actions.

Habitat Alteration

- Develop a project schedule and plan prior to construction, which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.
- Fill all depressions left by the piles with clean substrate appropriate for the site if the depression does not naturally aggrade.
- Complete pre- and post-construction monitoring to determine fishery resources present, habitat impacts, and mitigation needs. Determine the project was completed as intended by documenting the extent of permanent fills, demolition material removal, and recovery of dredged areas.
- Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
- Provide compensatory mitigation for all unavoidable impacts to EFH and sensitive habitats.
- Leave existing anchor blocks to provide underwater habitat.
- Work with engineers to consider the potential for designs that enhance underwater habitat.
- Determine the exact number and location(s) of shielding barges during permitting. These barges would be positioned underneath the existing bridge decks to capture any debris that may be released during demolition. All proposed barges would be located in areas already assumed for impact.

Fish Passage and Migration Habitat

- Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.

- Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.
- Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from habitat.

Impingement/Entrainment and Entanglement

- Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.
- Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.

5.4 Upland Runoff and Land Cover Change

5.4.1 Impact Types, Magnitude, and Duration

Turbidity and Sedimentation

Land cover change can result in increased erosion, turbidity, and sedimentation, which have the potential to cause adverse effects to federally-managed fish species and their habitat through smothering of SAV and other benthic habitat and reduced vision and respiration in fish. The effects of increased turbidity and sedimentation could be temporary or permanent in nature, depending on the duration of construction and stabilization measures implemented.

Reduced Water Quality

Adverse effects within the Action Area may include pollution from stormwater runoff resulting from increased impervious area, potentially resulting in long-term loss of forage and prey species that are sensitive to changes in water quality (EPA CADDIS, 2025).

Roadway maintenance and stormwater runoff may convey particulates, metals, oil and grease, organics, nutrients, and other substances to EFH. These runoff constituents can be grouped as heavy metals, salt, organic molecules, and nutrients (Trombulak and Frissell, 1999). As noted in **Section 3**, pH and bacteria levels sampled within the Action Area are already above regulated water quality criteria. Additional impervious area resulting from the Preferred Alternative construction activities may increase the levels of pH and bacteria in EFH and may further affect federally-managed fish species and their prey. Water quality impacts would be temporary.

Habitat Alteration

Erosion, sedimentation, shading, and reduced water quality resulting from nearshore construction can reduce habitat quality for federally-managed fish species. Habitat alteration due to nearshore construction would be temporary.

Vessel Interaction

Operating vessels in or near SAV beds during nearshore operations can result in mortality or degradation of SAV through physical impact or shading. Vessel impacts to SAV would be temporary.

Fish Passage and Migration Habitat

Temporary barriers such as turbidity curtains have the potential to block federally-managed fish species' access to foraging areas and migratory pathways.

Impingement/Entrainment and Entanglement

Dewatering and turbidity control measures used during nearshore operations have the potential to trap fish. Cables, ropes, and utility lines can entangle fish. Impingement/entrainment impacts due to nearshore construction would be temporary.

5.4.2 Avoidance, Minimization, and Mitigation

The increase in impervious surfaces related to the project would be managed through implementation of erosion and sediment control BMPs along with water quality monitoring plans, which will document compliance with state water quality standards.

5.4.2.1 Commitments Related to Upland Runoff and Land Cover Change

Turbidity and Sedimentation

- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, and cofferdams. The MDTA will specify the measures to be used in the construction plans:
    - Install erosion control measures prior to ground disturbance;
    - Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector;
    - Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.
- Prevent sediment and debris from entering the water using geo-textile fabric, hay bales, or other methods. Use nets, tarps, and pans when demolishing bridge superstructures; remove demolition debris that falls into the water.

Reduced Water Quality

- Remove contaminants and sediments from water discharge prior to entering aquatic habitats.

- Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.
- Minimize raw concrete or grout contact with the water to the maximum extent practicable.
- Avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.
- Remove silt and turbidity curtains, or other diversion structures, only after water quality is consistent with ambient levels.
- Only use clean fill.

Habitat Alteration

- Employ an Independent Environmental Monitor (IEM).
- Coordinate with the NOAA Fisheries GARFO and MDNR on specific recommended time-of-year restriction dates, based on the proposed activities and location.

Vessel Interaction

- Do not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.

5.4.2.2 Considerations Related to Upland Runoff and Land Cover Change

Turbidity and Sedimentation

- Use operational modifications such as conducting the work at low tide to limit sedimentation and turbidity.
- Position new structures to avoid altering natural sediment accretion rates and patterns.

Reduced Water Quality

- Minimize the amount of new impervious surfaces and maintain a vegetated buffer between the water and upland activities.
- Incorporate stormwater controls to minimize pollutants in aquatic habitats, including determining whether the proposed bridge could include measures to collect runoff and route it to upland features for treatment prior to discharge.
- Monitor water quality to determine whether temperature and DO levels remain within a close threshold to background levels, as determined in coordination with NOAA Fisheries and MDNR in final design, and if levels fluctuate beyond this threshold, contact NOAA Fisheries and MDNR within 24 hours to determine appropriate actions.

Habitat Alteration

- Place a geotextile barrier under any temporary access fills to ensure that any fill would be removed completely at the end of construction.
- Develop a project schedule and plan prior to construction, which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.

- Complete pre- and post-construction monitoring to determine fishery resources present, habitat impacts, and mitigation needs. Determine the project was completed as intended by documenting the extent of permanent fills, demolition material removal, and recovery of dredged areas.
- Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
- Orient artificial lighting on crossings to avoid illumination of the surrounding waters at night.
- Design bridge abutments to minimize disturbances to banks and locate them outside of the floodplain.
- Avoid and minimize all activities (including work footprint, structures, shading, temporary and permanent fill, excavation, etc.) in shallow water habitats and sensitive habitats such as SAV, mudflats, salt marsh, areas containing shellfish, and intertidal areas.
- Incorporate measures that increase the ambient light transmission under the bridge including:
    - maximizing the height of the structure;
    - minimizing the width of the structure; and
    - the number of instream pilings/piers.

Fish Passage and Migration Habitat

- Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.
- Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.
- Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from habitat.

Impingement/Entrainment and Entanglement

- Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.
- Employ screening (1 mm wedgewire or better technology with maximum intake velocity of 0.5 fps) on any water intakes (e.g., pumps) drawing from surface tidal waters to minimize impingement/entrainment of fish and nekton.
- Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.

6 CONCLUSION

FHWA, in coordination with the MDTA, has determined that the Chesapeake Bay Crossing Study Preferred Alternative will result in substantial adverse effects to EFH. This assessment is based on preliminary design, construction, and demolition methods. The exact suite of construction measures will be defined in final design in coordination with NOAA Fisheries.

The project's Action Area contains suitable habitat for Atlantic butterfish, black sea bass, bluefish, scup, summer flounder, and windowpane flounder. Based on current design assumptions, noise and vibration impacts from pile driving would likely have the most pronounced short-term adverse effects on federally-managed fish species, potentially resulting in physical injury or behavior modification. The MDTA and FHWA, in coordination with NOAA Fisheries, have committed to implementing a ZSFP and other BMPs to minimize adverse effects to federally-managed and migratory fish species and will continue to coordinate to determine whether it is practicable to implement additional BMPs to further minimize these effects.

The action would likely result in permanent, substantial adverse effects to EFH that include physical, chemical, or biological alterations of the waters or substrate and potential loss of, or injury to, benthic organisms, prey species, and their habitat, and other ecosystem components. Adverse effects to EFH could include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The action may result in temporary adverse effects to summer flounder HAPC. The MDTA is dedicated to ensuring that adverse effects to EFH and HAPC within the project area are avoided, minimized, or otherwise offset to the greatest extent practicable.

FHWA is requesting an expanded EFH consultation due to the potential for substantial adverse effects to EFH. Additional consultation may be necessary during design once more detailed information is available.

7 REFERENCES

7.1 Federal Regulations and Executive Orders

Contents of fishery management plans (16 USC 1853(a)(7))

Essential Fish Habitat definition (16 USC § 1802(10))

Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 USC § 1801 et seq.)

7.2 State Regulations

Annotated Code of Maryland (Nat. Res. § 4-213)

Maryland Water Quality Standards. (COMAR 26.08.02)

7.3 Literature Cited and References

Atlantic States Marine Fisheries Commission (ASMFC). 2025. Atlantic Menhaden. Retrieved 2025: https://asmfc.org/species/atlantic-menhaden/

Bigelow, H.B. and W.C. Shroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wild. Serv. Service, Fish. Bull. 53. 577 p.

Buckel, A.B., M.J. Fogarty, and D.O. Conover. 1998. Foraging habits of bluefish, Pomatomus saltatrix, on the U.S. east coast continental shelf. Fish. Bull. 97:758-775.

Bullis, H.R., Jr. and J.R. Thompson. 1965. Collections by the exploratory fishing vessels *Oregon, Silver Bay, Combat*, and *Pelican* made during 1956-1960 in the southwestern North Atlantic. U.S. Fish Wild. Serv. Spec. Sci. Rep. Fish. 510. 130 p.

CBP. 2023. DataHub, Version 4.9.2. Retrieved December 2023: https://datahub.chesapeakebay.net/.

CBP. 2025a. Field Guide, Atlantic Silverside. Retrieved July 2025: https://www.chesapeakebay.net/discover/field-guide/entry/atlantic-silverside

CBP. 2025b. Field Guide, Mummichog. Retrieved July 2025: https://www.chesapeakebay.net/discover/field-guide/entry/mummichog

CBP. 2025c. Field Guide, Striped Killfish. Retrieved July 2025: https://www.chesapeakebay.net/discover/field-guide/entry/striped-killifish

Chang, S., P.L.Berrien, D.L. Johnson, and W.W.Morse. 1999. Essential fish habitat source document: Windowpane, (*Scophthalmus aquosus*), Life History and Habitat Characteristics. NOAA Tech. Mem. NMFS-NE-137.

Cross, S., C.A. Zetlin, P.L.Berrien, D.L. Johnson, and C. McBride. 1999. Essential fish habitat source document: Butterfish, (*Peprilus triacanthus*), Life History and Habitat Characteristics. NOAA Tech. Mem. NMFS-NE-145.

Dooley, J.K., 1990. Pomatomidae. p. 721-722. In J.C. Quero, J.C. Hureau, C. Karrer, A. Post and L. Saldanha (eds.) Check-list of the fishes of the eastern tropical Atlantic (CLOFETA). JNICT, Lisbon; SEI, Paris; and UNESCO, Paris. Vol. 2. (Ref. 9986). Retrieved September 2025: https://www.fishbase.se/popdyn/LWRelationshipList.php?ID=364&GenusName=Pomatomus&SpeciesName=saltatrix&fc=311

Drohan, A.F., J.P. Manderson, P.L.Berrien, and D.B Packer. 2007. Essential fish habitat source document: Black sea bass, (*Centropristis striata*), Life History and Habitat Characteristics. Second Edition NOAA Tech. Mem. NMFS-NE-200.

EPA. 2025. Causal Analysis/Diagnosis Decision Information System (CADDIS). Retrieved July 2025: www.epa.gov/caddis/ph

Fahay MP, Berrien PL, Johnson DL, Morse WW. 1999. Essential Fish Habitat Source Document: Bluefish, Pomatomus saltatrix, Life History and Habitat Characteristics. NOAA Technical Memorandum, NMFS-NE-144. Available at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Fitz, E.S., Jr. and F.C. Daiber. 1963. An introduction to the biology of *Raja eglanteria* Bosc 1802 *and Raja erinacea* Mitchill 1825 as they occur in Delaware Bay. Bull. Bingham Oceanogr. Collect., Yale Univ. 18 (3): 69-97.

Geer, P.J. 2002. Summary of essential fish habitat description and identification for Federally managed species inhabiting Virginia waters of Chesapeake Bay 1988-1999. Virginia Mar. Res. Rep. VMRR 2001-03, Jan. 2001, Revised June 2002. 169 p.

Haas-Castro, R. 2006. American shad. Retrieved from: http://www.nefsc.noaa.gov/sos/ spsyn/ af/shad/

Haas-Castro, R. 2006. River herring. Retrieved from: http://www.nefsc.noaa.gov/sos/ spsyn/ af/herring/

Jordan and Evermann. 1896-1900. White Perch Morone americana (Gmelin) 1789. Received from: http://www.gma.org/fogrn/Morone _ americana.htm#d0e3 8148

Llansó, R.J. and D.M. Dauer. 2002. Methods for calculating the Chesapeake Bay benthic index of biotic integrity. Final Report, Chesapeake Bay Benthic Monitoring Program, p.24.

Lippson, A.J. and Lippson, R.L. 2006. Life in the Chesapeake Bay. The Johns Hopkins University Press. Baltimore, MD.

Maryland Integrated Mapping Application (MD iMap). 2023. https://imap.maryland.gov/.

McEachran, J.D. and Musick. 1975. *Species of skates (Pisces: Rajidae) which occur.* Fish. Bull. 73:110.

MD iMap. 2017. https://imap.maryland.gov/.

MD iMAP. January 2018. *Maryland Bathymetry – Chesapeake Bay Contours.* https://data.imap.maryland.gov/datasets/maryland::maryland-bathymetry-chesapeake-bay-contours/about.

Maryland Department of the Environment (MDE). 2024b. Maryland's Searchable Integrated Report Database [Combined 303(d)/305(b) List]. Retrieved February 2024: http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/303d.aspx.

MDE. 2015. Total Maximum Daily Load of Polychlorinated Biphenyls in the Magothy River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Final Report. Approved by EPA March 16, 2015. Retrieved December 2023: https://mde.maryland.gov/programs/water/TMDL/DocLib_Magothy_02131001/Magothy_River_PCB_TMDL_fa.pdf.

Maryland Department of Natural Resources (MDNR). 2007a. *Maryland Fish Facts – American Gizzard Shad (Dorosoma cepedianum)*. Retrieved from: https://www.nrc.gov/docs/ML0833/ML083390023.pdf

MDNR. 2007b. *Maryland Fish Facts – Spot (Leiostomus xanthurus)*. Retrieved from: https://dnr.maryland.gov/fisheries/Pages/fish-facts.aspx?fishname=spot

MDNR. 2007c. *Maryland Fish Facts – Bluecrab (Callinectes sapidus)*. Retrieved from: https://web.archive.org/web/20110419161530/http:/www.dnr.state.md.us/fisheries/fishfacts/bluecrab.asp

National Marine Fisheries Service (NMFS) Greater Atlantic Regional Fisheries Office (GARFO). 2017. *NOAA Fisheries/FHWA Best Management Practices (BMPs) Manual for Transportation Actions in the Greater Atlantic Region*.

New England Fishery Management Council (NEFMC), 2017. Final Omnibus Essential Fish Habitat Amendment 2, Volume 2: EFH and HAPC Designation Alternatives and Environmental Impacts.

NMFS. 2025. *NOAA Fisheries*. Optional Multi-Species Pile Driving Calculator (Version 2.1). Retrieved September 2025 from: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools

NMFS GARFO. 2024. *FHWA Programmatic Essential Fish Habitat Consultation and General Concurrence for Select Transportation Actions in the NMFS Greater Atlantic Region*.

NOAA Fisheries. 2025. Bluefish overview. Retrieved from: https://www.fisheries.noaa.gov/species/bluefish

NOAA Fisheries. 2025. Scup overview. Retrieved from: https://www.fisheries.noaa.gov/species/scup

Packer, D.B., S.J. Griesbach, P.L.Benien, C.A.Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: summer flounder, (*Paralichthys dentatus*), life history and habitat characteristics. NOAA Tech. Mem. NMFS-NE-151 , 88 p

Park, C. 2012. A Dictionary of Environment and Conservation. Oxford University Press. Retrieved December 2023: 10.1093/acref/9780198609957.001.0001.

Popper, A.N. and A.D. Hawkins. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. Journal of Fish Biology. Volume 94: 692-713.

Robins, C.R. and G.C. Ray, 1986. A field guide to Atlantic coast fishes of North America. Houghton Mifflin Company, Boston, U.S.A. 354 p. (Ref. 7251). Retrieved September 2025: https://www.fishbase.se/popdyn/LWRelationshipList.php?ID=492&GenusName=Peprilus&SpeciesName=triacanthus&fc=425

Sea Grant Maryland. 2021. Mysterious Mysids: Maryland Sea Grant-funded scientists are using innovative methods to study this elusive but important Bay shrimp species. Retrieved from: https://www.mdsg.umd.edu/onthebay-blog/mysterious-mysids-maryland-sea-grant-funded-scientists-are-using-innovative-methods

Shepherd, G.R., and D.B. Packer. 2006. Essential Fish Habitat Source Document: Bluefish, Pomatomus saltatrix, Life History and Habitat Characteristics, 2nd Edition. NOAA Technical Memorandum, NMFS-NE-198, 89 p

Smith, G.F., K.N. Greenhawk, D.G. Bruce, and E.B. Roach. 2001. A digital presentation of the Maryland oyster habitat and associated bottom types in the Chesapeake Bay (1974-1983). Journal of Shellfish Research 20(1):197-206. June.

Smithsonian Marine Station (SMS) at Fort Pierce. 2005. Species Information: Bluefish. Retrieved from: http:/ /www.sms.si.edu/IRLSpec/Pomatom _ saltat.htm

Steimle, F.W., C.A. Zetlin, P.L.Berrien, and S. Chang. 1999. Essential fish habitat source document: Black sea bass, (*Centropristis striata*), life history and habitat characteristics. NOAA Tech. Mem. NMFS-NE-143.

Steimle, F.W., C.A. Zetlin, P.L.Berrien, D.L. Johnson, and S. Chang. 1999. Essential fish habitat source document: Scup, (*Stenotomus chrysops*), life history and habitat characteristics. NOAA Tech. Mem. NMFS-NE-149.

Struhsaker, P. 1969. Demersal fish resources: Composition, distribution, and commercial potential of the Continental Shelf stocks off Southeastern United States. U.S. Fish Wildl. Serv. Fish. Ind. Res. 4: 261-300.

Trombulak. S.C., Frissell, C. 1999. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology. Volume 14, No. 1: 18-30.

Versar. 2022. Chesapeake Bay Water Quality Monitoring Program: Long-term Benthic Monitoring and Assessment Component Level 1 Comprehensive Report. July 1984-December 2021 (Volume 1). Available at: https://www.baybenthos.versar.com/Docs/LTB_2021_Volume1.pdf.

VIMS. 2025a. Menhaden Background. Retrieved 2025: https://www.vims.edu/research/units/legacy/menhaden/about/

VIMS. 2025b. SAV Monitoring and Restoration. Retrieved 2025: https://www.vims.edu/research/units/programs/sav/

VIMS. n.d. Chesapeake Bay Multispecies Monitoring and Assessment Program (ChesMMAP). Retrieved December 2023: https://www.vims.edu/research/units/programs/multispecies_fisheries_research/chesmmap/

Weisberg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz, and J.B. Frithsen 1997. An estuarine benthic index of biotic integrity (B-IBI) for Chesapeake Bay. Estuaries, 20, pp.149-158.

APPENDIX A

NOAA MARINE FISHERIES SERVICE (NMFS) MULTI-SPECIES PILE DRIVING CALCULATOR OUTPUT

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	190	156	166
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	202		

OTHER INFO 0

NOTES 36" Square Concrete Pile - Using Proxy of 30" Square Concrete Pile Tyle II

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	0.9	25.1	25.1	116.6
Isopleth (feet)	2.8	82.4	82.4	382.5

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.0	158.3	2.5
Isopleth (feet)	0.1	519.5	8.2

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.1	0.0	1.6	0.1	0.0
AUD INJ ONSET (Peak isopleth, feet)	0.2	0.1	5.2	0.2	0.1
AUD INJ ONSET (SEL_{cum} isopleth, meters)	184.4	23.5	285.4	163.9	61.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	605.1	77.2	936.4	537.6	200.4
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	25.1	NO LF CET.			
Behavior (RMS isopleth, feet)	82.4				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	173	183
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	219		

OTHER INFO 0

NOTES 36" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	4.0	341.5	341.5	1,584.9
Isopleth (feet)	13.1	1,120.3	1,120.3	5,199.8

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.1	2152.4	34.1
Isopleth (feet)	0.3	7,061.8	112.0

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	2,507.2	319.9	3,880.0	2,227.3	830.3
AUD INJ ONSET (SEL_{cum} isopleth, feet)	8,225.9	1,049.5	12,729.6	7,307.6	2,723.9
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	341.5	NO LF CET.			
Behavior (RMS isopleth, feet)	1,120.3				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	165
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	210

OTHER INFO 0

NOTES 36" Steel pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	100.0
ISOPLETHS (feet)	328.1

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	59.0	2.2
ISOPLETHS (feet)	193.7	7.1

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	68.2	26.2	55.7	87.7	29.5
AUD INJ ONSET (SELcum isopleth, feet)	223.6	85.9	182.7	287.9	96.9
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	10,000.0	NO LF CET.			
Behavior (RMS isopleth, feet)	32,808.4				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	203	169	182
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	215		

OTHER INFO 0

NOTES 48" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	6.3	184.8	184.8	1,359.4
Isopleth (feet)	20.7	606.2	606.2	4,459.8

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.2	1164.8	29.3
Isopleth (feet)	0.5	3,821.6	96.1

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.5	0.2	11.7	0.5	0.2
AUD INJ ONSET (Peak isopleth, feet)	1.8	0.5	38.3	1.5	0.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	1,356.8	173.1	2,099.7	1,205.4	449.3
AUD INJ ONSET (SEL_{cum} isopleth, feet)	4,451.6	568.0	6,888.8	3,954.6	1,474.1
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	292.9	NO LF CET.			
Behavior (RMS isopleth, feet)	960.8				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	175	185
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	221		

OTHER INFO 0

NOTES 48" Steel Pipe - Using proxy for 60" steel pipe to assume higher SELss and RMS values

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	4.0	464.2	464.2	2,154.4
Isopleth (feet)	13.1	1,522.8	1,522.8	7,068.4

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.1	2925.9	46.4
Isopleth (feet)	0.3	9,599.5	152.3

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	3,408.2	434.9	5,274.3	3,027.8	1,128.6
AUD INJ ONSET (SEL_{cum} isopleth, feet)	11,181.9	1,426.7	17,304.0	9,933.6	3,702.8
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	170
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	215

OTHER INFO 0

NOTES 48" Steel Pipe - Using 72" Steel Pipe Proxy

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	215.4
ISOPLETHS (feet)	706.8

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	127.2	4.6
ISOPLETHS (feet)	417.3	15.2

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	146.9	56.4	120.0	189.0	63.6
AUD INJ ONSET (SELcum isopleth, feet)	481.8	185.1	393.6	620.2	208.8
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	21,544.3	NO LF CET.			
Behavior (RMS isopleth, feet)	70,683.6				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	210	185	195
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	8		
Number of strikes per pile	2500		
Number of strikes per day	20000		
Cumulative SEL at measured distance	228		

OTHER INFO 0

NOTES 96" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth	
		Fish ≥ 2 g	Fish < 2 g		
ISOPLETHS (meters)	18.5	2,154.4	2,154.4	10,000.0	Fishes present
Isopleth (feet)	60.6	7,068.4	7,068.4	32,808.4	

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth	
ISOPLETHS (meters)	0.5	8555.5	215.4	Sea Turtles present
Isopleth (feet)	1.5	28,069.2	706.8	

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	1.6	0.5	34.1	1.4	0.5
AUD INJ ONSET (Peak isopleth, feet)	5.2	1.5	112.0	4.5	1.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	9,965.8	1,271.5	15,422.0	8,853.2	3,300.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	32,696.1	4,171.6	50,597.2	29,045.9	10,827.1
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	2,154.4	NO LF CET.			
Behavior (RMS isopleth, feet)	7,068.4				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	170
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	8
Duration to drive pile (minutes)	30
Duration of sound production in day	14400
Cumulative SEL at measured distance	212

OTHER INFO 0

NOTES 96" Steel Pipe - Using 72" Steel Pipe proxy

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
	RMS Isopleth
Fishes present	
ISOPLETHS (meters)	215.4
ISOPLETHS (feet)	706.8

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
	SEL_{cum} Isopleth	RMS Isopleth
Sea Turtles present		
ISOPLETHS (meters)	80.1	4.6
ISOPLETHS (feet)	262.9	15.2

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	92.5	35.5	75.6	119.1	40.1
AUD INJ ONSET (SELcum isopleth, feet)	303.5	116.6	247.9	390.7	131.5
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	21,544.3	NO LF CET.			
Behavior (RMS isopleth, feet)	70,683.6				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	203	172	182
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	218		

OTHER INFO 0

NOTES 14" Steel H-pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth	
		Fish ≥ 2 g	Fish < 2 g		
ISOPLETHS (meters)	6.3	292.9	292.9	1,359.4	Fishes present
Isopleth (feet)	20.7	960.8	960.8	4,459.8	

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth	
ISOPLETHS (meters)	0.2	1846.1	29.3	Sea Turtles present
Isopleth (feet)	0.5	6,056.9	96.1	

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.5	0.2	11.7	0.5	0.2
AUD INJ ONSET (Peak isopleth, feet)	1.8	0.5	38.3	1.5	0.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	2,150.5	274.4	3,327.8	1,910.4	712.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	7,055.3	900.2	10,918.1	6,267.7	2,336.3
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	292.9	NO LF CET.			
Behavior (RMS isopleth, feet)	960.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	145
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	190

OTHER INFO 0

NOTES 14" Steel H-pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	4.6
ISOPLETHS (feet)	15.2

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	2.7	0.1
ISOPLETHS (feet)	9.0	0.3

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	3.2	1.2	2.6	4.1	1.4
AUD INJ ONSET (SELcum isopleth, feet)	10.4	4.0	8.5	13.4	4.5
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	175	185
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	221		

OTHER INFO 0

NOTES 24" AZ Sheet Pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	4.0	464.2	464.2	2,154.4
Isopleth (feet)	13.1	1,522.8	1,522.8	7,068.4

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.1	2925.9	46.4
Isopleth (feet)	0.3	9,599.5	152.3

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	3,408.2	434.9	5,274.3	3,027.8	1,128.6
AUD INJ ONSET (SEL_{cum} isopleth, feet)	11,181.9	1,426.7	17,304.0	9,933.6	3,702.8
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	160
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	205

OTHER INFO 0

NOTES AZ Steel Sheet - loudest

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	46.4
ISOPLETHS (feet)	152.3

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	27.4	1.0
ISOPLETHS (feet)	89.9	3.3

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	31.6	12.2	25.8	40.7	13.7
AUD INJ ONSET (SELcum isopleth, feet)	103.8	39.9	84.8	133.6	45.0
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	4,641.6	NO LF CET.			
Behavior (RMS isopleth, feet)	15,228.3				

APPENDIX B

LIST OF COMMITMENTS AND CONSIDERATIONS

Avoidance and Minimization Commitments:

Underwater Noise/Hydroacoustic Energy

- Develop an Underwater Noise Monitoring Plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise.
- Include methods to document fish stuns/kills in the Underwater Noise Monitoring Plan and coordinate these methods with NOAA Fisheries Habitat and Ecosystem Services Division.
- Use noise attenuation and minimization measures during pile driving, including:
    - Use a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation shall be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities.
    - Using a “soft start” or “ramping up” pile driving (e.g., driving does not begin at 100% energy). This soft start technique will involve a low-energy start-up (e.g., hammer operated at 50% capacity) over a period of up to 20 minutes to allow fish to leave the area.
    - Initially drive steel piles with a vibratory hammer through softer, sandy soils prior to using an impact hammer through stiffer material, as practicable and as appropriate.
    - Using cushion blocks to drive concrete piles with an impact hammer, as practicable and as appropriate.
- Implement an effective quiet time of no pile driving for 12 hours per day.
- Develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity. The Demolition Plan will evaluate the following measures:
    - Detonation bore hole stemming, capping, or filling;
    - Firing all charges in a single firing circuit with a delayed detonation between each charge;
    - Focusing blast energy towards a solid substrate rather than towards the water column;
    - Employing noise attenuating devices such as bubble curtains;
    - Conducting the blasting during periods of low water or low tide;
    - Using rubber blasting mats to reduce debris and acoustic signature;
    - Employing scare charges;
    - Installing appropriate monitoring devices to confirm the impact distance to adaptively manage the Demolition Plan;
    - Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and
    - Using adaptive management actions between blast events to minimize fish mortality.
- Continue to coordinate to minimize the use of blasting.
- Employ scare charges and fish deterrent boats ahead of blasting activities. Use low weight/energy repellent charges that startle fish from the area prior to blasting, and

minimize the time between repellent activities and blasting, such that fish are not allowed a recovery period to re-enter the blasting danger zone.

Turbidity and Sedimentation

- Only use mechanical dredging.
- Prevent sediment and debris from entering the water using geo-textile fabric, hay bales, or other methods. Use nets, tarps, and pans when demolishing bridge superstructures; remove demolition debris that falls into the water.
- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as turbidity curtains, silt curtains, settling basins, bridge netting and cofferdams. The MDTA will specify the measures to be used in the construction plans:
    - Install erosion control measures prior to ground disturbance;
    - Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the MDE inspector;
    - Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.
- Minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the applicable techniques:
    - Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell;
    - Remove piles slowly to reduce sediment sloughing off in the water column;
    - Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal;
    - Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.

Reduced Water Quality

- Only use clean fill.
- Evaluate dredge material to determine the appropriate disposal method and location.
- Remove cofferdams, turbidity curtains, silt curtains, or other diversion structures only after water quality is consistent with ambient levels outside the structure.
- Avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the contractor.
- Minimize raw concrete or grout contact with the water to the maximum extent practicable.
- Remove contaminants and sediments from water discharge prior to entering aquatic habitats.
- Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter surface waters untreated.

Habitat Alteration

- Employ an Independent Environmental Monitor (IEM).
- Coordinate with the NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO) and MDNR on specific recommended time-of-year restriction dates, based on the proposed activities and location.
- Coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds.
- Incorporate necessary measures to avoid, minimize, or otherwise offset impacts to SAV, as appropriate. Impacts to SAV shall be mitigated at a ratio of at least 3:1, depending upon the nature/scale of the impacts.
- Remove temporary structures and fills including monitoring devices in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation.

Fish Passage and Migration Habitat

- From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. To maintain the ZSFP, 96" steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96" piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP. The contractor shall use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15. The project team will work with NOAA Fisheries and MDNR to refine and approve ZSFP locations and the migratory focal period during Final Design and permitting.

Vessel Interaction

- Do not operate or moor vessels in, or immediately adjacent to, SAV in such a way that could shade or otherwise impact SAV.

Avoidance and Minimization Considerations:

Underwater Noise/Hydroacoustic Energy

- Conduct noise-generating work in a way that minimizes acoustic effects and avoids injury to federally-managed fish species. Explore potential attenuation measures based on the NMFS Calculator.
- Use noise attenuation and minimization measures during pile driving, such as:
    - Surrounding all piles with a bubble curtain, isolation casing or dewatered cofferdam. Contained bubble curtains will be utilized to the extent practicable.

Where use of a contained bubble curtain is not feasible, use of an uncontained bubble curtain would be evaluated.
    - Using vibratory hammers and construction phasing to minimize acoustic impacts to fish. Balance with potential impacts to other species, including marine mammals.
    - Minimizing the number and size of temporary and permanent piles.
    - Using concrete piles and pre-cast piles versus steel piles to reduce underwater noise, as practicable and as appropriate.
    - Using drilled shafts instead of hammered piles, as practicable and as appropriate.
- Use mechanical demolition methods, instead of blasting, when possible.

Schedule timing of blasting events to minimize impacts to federally-managed species. This will be coordinated with NOAA Fisheries during Final Design and Construction. To minimize duration and magnitude of impact, any required blasting would take place during times of lower biological activity, which is still to be determined.

Turbidity and Sedimentation

- Use operational modifications such as conducting the work at low tide to limit sedimentation and turbidity.
    - This may include using an environmental bucket on mechanical dredges, reducing lift speeds, using small diameter cutterhead dredges, and/or limiting the use of large hopper dredges.
- Prohibit side-casting or temporary storage of dredged material in the waterway.
- Prohibit unfiltered or unprocessed overflows from barges into the water and ensure that any barge transfer is accomplished without generating sediment plumes.
- Position new structures to avoid altering natural sediment accretion rates and patterns.

Reduced Water Quality

- Monitor water quality to determine whether temperature and DO levels remain within a close threshold to background levels, as determined in coordination with NOAA Fisheries and MDNR in Final Design, and if levels fluctuate beyond this threshold, contact NOAA Fisheries and MDNR within 24 hours to determine appropriate actions.
- Minimize the amount of new impervious surfaces and maintain a vegetated buffer between the water and upland activities.
- Incorporate stormwater controls to minimize pollutants in aquatic habitats, including determining whether the proposed bridge could include measures to collect runoff and route it to upland features for treatment prior to discharge.
- Consider alternatives to the use of pressure treated (Chromated Copper Arsenate or Alkaline Copper Quaternary, etc.) piles or other in-water structures, as practicable and as appropriate.

Habitat Alteration

- Minimize maintenance dredging to the greatest extent practicable.
- Within the dredged area, leave benthic contours to restore naturally and if not restored within a time period, to be determined during Final Design in coordination with NOAA Fisheries and MDNR, then consider active restoration of bottom contours with clean sand fill.
- Design the dredge footprint to avoid sensitive habitats to the greatest extent practicable and provide appropriate buffers to protect these areas from accretion of sediment resuspended during dredging.
- Complete pre- and post-construction monitoring to determine fishery resources present, habitat impacts and mitigation needs. Determine the project was completed as intended by documenting the extent of permanent fills, demolition material removal, and recovery of dredged areas.
- Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
- Prioritize beneficial uses of suitable sediments that contribute to habitat restoration and enhancement. The MDTA will coordinate with NOAA Fisheries Habitat and Ecosystem Services Division (HESD) in final design, prior to determining any commitment(s) for sediment beneficial use.
- Ensure that any proposed dredging is necessary to maintain target depths. Evaluate recent bathymetric surveys to determine the existing depths of the proposed dredge area.
- Avoid and minimize all activities (including work footprint, structures, shading, temporary and permanent fill, excavation, etc.) in shallow water habitats and sensitive habitats such as SAV, mudflats, salt marsh, areas containing shellfish, and intertidal areas.
- Provide compensatory mitigation for all unavoidable impacts to EFH and sensitive habitats.
- Fill all depressions left by the piles with clean substrate appropriate for the site, if the depression does not naturally aggrade.
- Place a geotextile barrier under any temporary platforms and/or access fills to ensure that any fill would be removed completely at the end of construction.
- Use waterline pile cap/pier footings to avoid dredging to construct footings below the mudline.
- Work with engineers to consider the potential for designs that enhance underwater habitat.
- Develop a project schedule and plan prior to construction which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.
- Leave existing anchor blocks to provide underwater habitat.
- Determine the exact number and location(s) of shielding barges during permitting. These barges would be positioned underneath the existing bridge decks to capture any debris that may be released during demolition. All proposed barges would be located in areas already assumed for impact.
- Orient artificial lighting on crossings to avoid illumination of the surrounding waters at night.

- Design bridge abutments to minimize disturbances to banks and locate them outside of the floodplain.
- Incorporate measures that increase the ambient light transmission under the bridge including:
    - maximizing the height of the structure;
    - minimizing the width of the structure; and
    - minimizing the number of instream pilings/piers.

Fish Passage and Migration Habitat

- Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.
- Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from habitat.
- Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.

Vessel Interaction

- Reduce vessel speeds in inshore areas, or otherwise minimize wake damage to shorelines, and consider no-wake zones in highly sensitive areas, such as spawning habitat and SAV beds. Identify appropriate vessel routes in the design process to minimize impacts to shorelines and shallow water habitats.
- Work to minimize the effects of increased vessel traffic when conducting in-water actions.
- Ensure that vessels are operated in adequate water depths to avoid propeller scour and grounding at all tides. Use shallow draft vessels that maximize the navigational clearance between the vessel and the bottom in shallow areas.

Impingement/Entrainment and Entanglement

- Ensure any in-water lines, ropes, or chains are made of materials and installed in a manner (properly spaced) to minimize the risk of entanglement by using thick, heavy, and taut lines that do not loop or entangle. Lines can be enclosed in a rigid sleeve.
- Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.
- Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.
- Employ screening (1 mm wedgewire or better technology with maximum intake velocity of 0.5 fps) on any water intakes (e.g., pumps) drawing from surface tidal waters to minimize impingement/entrainment of fish and nekton.
- Allow all fish to exit an enclosed area prior to any dewatering. Trapped fish greater than 5 inches long observed during dewatering shall be captured and released from the dewatering area except for invasive species (snakehead, blue catfish, flathead catfish) that will be disposed of.

APPENDIX C

SUMMARY OF WHY CLEARNOSE SKATE EFH IS NOT DESIGNATED WITHIN THE ACTION AREA

Summary of Why Clearnose Skate EFH Is Not Designated Within the Action Area

Essential Fish Habitat (EFH) for clearnose skate (*Raja eglanteria*) is not designated within the Action Area based on the text descriptions included in the fisheries management plan that defines EFH for skate species: *Final Omnibus Essential Fish Habitat Amendment 2, Volume 2: EFH and HAPC Designation Alternatives and Environmental Impacts* prepared by the New England Fishery Management Council in cooperation with the National Marine Fisheries Service. Text descriptions on page 163 of the fisheries management plan indicate that Clearnose skate EFH is designated within high salinity zones of the Chesapeake Bay. While this conflicts with the information provided in Table 28 of the document, which indicates EFH for this species in the mixing zone, NOAA Fisheries reached out to VIMS for their ChesMMAP trawl data and that survey has not ever identified a Clearnose skate within the Action Area in its 20 plus years of monitoring. Although this does not prove absence of the species within the Action Area, it is an indicator that Clearnose skate do not frequent the Action Area. NOAA Fisheries indicated that this species can be removed from consideration for this project, based on monitoring data and the errors in Table 28 of the fisheries management plan. See the attached correspondence with NOAA Fisheries.

Maddy Sigrist

From: Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov>
Sent: Tuesday, February 10, 2026 3:24 PM
To: Maddy Sigrist
Cc: Sarah Williamson; Megan Bolcar; Alex Nussbaum; Eric Almquist
Subject: Re: BCST2 EFH Designation Question

EXTERNAL EMAIL: Do not click links or open attachments unless you trust the 'Sender' and know the content is safe.

Hi Maddy,

Here is the underlying fisheries management plan document that defines EFH for the skate species. The document is a bit confusing - thanks for encouraging me to take another look.

Table 28 (hyperlinked) indicates that the Chesapeake Bay mixing zone (0.5<salinity<25 ppt) is EFH for clearnose (juv, adult), little (adult), and winter (adult). The text then goes on to say the following:

Little Skate (pg 157) "Chesapeake Bay would no longer be designated as EFH for little skate (juveniles or adults) if the proposed designations are approved " pg 157
Winter Skate (pg 159): "The other significant change was the elimination of EFH in Chesapeake Bay"

So, this seems to eliminate these two species. Finally, the EFH text description for clearnose skate is:

Text descriptions:

For clearnose skate (*Raja eglanteria*), essential fish habitat is designated anywhere within the geographic areas that are shown on the following maps and listed in Table 28 and meets the conditions described below. Additional habitat-related information for this species can be found in Appendix B.

Juveniles: Sub-tidal benthic habitats in coastal and inner continental shelf waters from New Jersey to the St. Johns River in Florida as shown on Table 28, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 28. Essential fish habitat for juvenile clearnose skates occurs from the shoreline to 30 meters, primarily on mud and sand, but also on gravelly and rocky bottom.

Adults: Sub-tidal benthic habitats in coastal and inner continental shelf waters from New Jersey to Cape Hatteras as shown on Map 96, including the high salinity zones of Chesapeake Bay, Delaware Bay, and the other bays and estuaries listed in Table 28. Essential fish habitat for adult clearnose skates occurs from the shoreline to 40 meters, primarily on mud and sand, but also on gravelly and rocky bottom.

This conflicts with Table 28, which stipulates EFH in the mixing zone. I reached out to VIMS for their ChesMMAP trawl data and that survey hasn't ever picked up a skate in 20+ years of effort. Absence from the survey does not indicate true absence, but is an indicator.

At this point, I think it's safe to remove clearnose skate EFH from consideration based on the text description and clear errors in Table 28. I will confirm with my team and let you know if I hear differently.

Apologies for the confusion on our end.

Jonathan

On Tue, Feb 10, 2026 at 10:22 AM Maddy Sigrist <msigrist@rkk.com> wrote:

Good morning, Jonathan,

We have not included adult Clearnose skate as having EFH designation in the BCST2 EFH Assessment. In a recent review of the document, it has come to our attention that adult Clearnose skate were included in the EFH designation for the Bay Bridge Protection Project, which has an overlapping action area.

After original review of the FMPs/EFH text descriptions, we did not include Clearnose skate as having EFH designation within the BCST2 Action Area. We then added juvenile Clearnose skate to the BCST2 EFH designation based on your DEIS comment below from the attached comments:

6. Pg 4-82, Section 4.5.7.2, paragraph 4: Based on our reading of the EFH designations and the associated abundance designations in the Estuarine Living Marine Resources: Mid-Atlantic Regional Distribution and Abundance Database, some additional species and/or life stages should be included in the EFH assessment. This includes all life stages of butterfish, which are all designated as common in the mixing zone (0.5 ppt < salinity < 25 ppt) of Chesapeake Bay during summer months. Also, juvenile black seabass are designated as common in the mixing zone of Chesapeake Bay. Juvenile clearnose skate also have designated EFH in the mixing zone (see footnote to Table 28 in the Omnibus Essential Fish Habitat Amendment 2, Vol 2). You're correct to disregard the mapper on Atlantic herring and red hake, but the document would benefit from an explanation of how this conclusion was determined such as describing the salinity or other habitat preferences for the species and contrasting this with on-site salinity or habitat characteristics. We acknowledge that it can be confusing to use the designations and the ELMR database to verify the delineations in the mapper and appreciate the effort.

Are adult Clearnose skate expected to be present within the BCST2 Action Area? Do they need to be added to the BCST2 EFH Assessment as an EFH designated species?

Thank you,

Maddy

MADELINE SIGRIST, PWS, QP

Project Scientist III, Natural Resources

RK&K

700 East Pratt Street, Suite 500

Baltimore, MD 21202

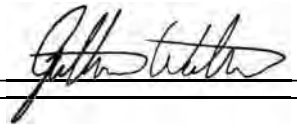
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Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form): **Agency: NOAA Fisheries .**
____ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)** **_X_ . Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)*** **____ Does not agree** with the **Preferred Alternative & Conceptual Mitigation*** ***If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: We appreciate your attention to our comments in the updated documents. Our only remaining suggestion is that you may consider defining what "direct" impacts are (e.g., permanent fills, dredging) such that the reader understands the distinction between direct and indirect impacts. This term first appears in section 3.3 and a definition may be appropriate in that section.
Signature:  Date: 5/13/2026

Bienko, Alexander <alexander.bienko@dot.gov>

BCST2 BA and Revised Demolition Conceptual Analysis

Megan Bolcar <meganb@cri.biz> Thu, May 28, 2026 at 11:33 AM
To: Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>
Cc: Sarah Williamson <sarahw@cri.biz>, "Yanchik, Brian (FHWA)" <brian.yanchik@dot.gov>, "Toni, Melissa (FHWA)" <melissa.toni@dot.gov>, "Kucera, Charlotte" <charlotte.kucera@dot.gov>, Heather Lowe <hlowe@mdta.state.md.us>, Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov>, "Bienko, Alexander" <alexander.bienko@dot.gov>

Hi Brian,

Thanks for your time in joining the BCST2 meeting today to discuss the Demolition Report Conceptual Analysis draft comment responses. The revised, tracked-changes Appendix F: Demolition Conceptual Analysis; comment response errata; and compiled BA are available to download via the SharePoint link below. The clean version of the updated Demolition Conceptual Analysis draft is included in the BA as an appendix; please note no other updates or edits were made to the main body of the BA since the previous submittal.

BCST2 Sturgeon and Turtle BA Draft 20260522

Please let me know if you have any difficulty accessing the link. Thank you!

Megan Bolcar | *Environmental Scientist*

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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Biological Assessment
Atlantic Sturgeon, Shortnose Sturgeon and Sea Turtles

Maryland Transportation Authority
MDTA

May 2026

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ABBREVIATIONS AND ACRONYMS

ARDS	Alternatives Retained for Detailed Study
BA	Biological Assessment
CBBMP	Chesapeake Bay Benthic Monitoring Program
COMAR	Code of Maryland Regulations
CBP	Chesapeake Bay Program
DEIS	Draft Environmental Impact Statement
DPS	Distinct Population Segments
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESC	Erosion and Sediment Control
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
IBI	Index of Biotic Integrity
LOD	Limit of Disturbance
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDTA	Maryland Transportation Authority

MLLW	Mean Lower Low Water
NEPA	National Environmental Policy Act
NETR	Natural Environment Technical Report
NOAA Fisheries	NOAA National Marine Fisheries Service
NOB	Natural Oyster Bars
NWQMC	National Water Quality Monitoring Council
ROD	Record of Decision
SAV	Submerged Aquatic Vegetation
SUP	Shared Use Path
SWM	Stormwater Management
TOYR	Time of Year Restriction
VIMS	Virginia Institute of Marine Science
ZSFP	Zone of Safe Fish Passage

1 INTRODUCTION

The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA). The Bay Crossing Study is addressing existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. Each tier of the Bay Crossing Study involves development of an Environmental Impact Statement (EIS), in compliance with the National Environmental Policy Act (NEPA), to describe potential significant environmental effects and inform the evaluation of alternatives. Tier 1 of the Bay Crossing Study (Tier 1 Study) was completed in April 2022. At that time, FHWA issued a Final Environmental Impact Statement /Record of Decision (FEIS/ROD) identifying Corridor 7, the corridor that includes the Bay Bridge and its approaches, as the Selected Corridor Alternative for further evaluation. Tier 2 of the Bay Crossing Study (Tier 2 Study) was launched in June 2022 to focus on a project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). In December 2024 the MDTA identified the Alternatives Retained for Detailed Study (ARDS), which are the NEPA range of reasonable alternatives for evaluation in the Tier 2 Study EIS. Since then, the MDTA Recommended Preferred Alternative was identified as Alternative C, a Build Alternative that includes construction of two new spans as well as demolition of the existing bridge spans. A Natural Environment Technical Report (NETR) and Draft EIS (DEIS) were prepared by the MDTA and FHWA and made available for the public in January 2026. The MDTA requested cooperating agency concurrence on Alternative C as the Preferred Alternative, and concurrence from all cooperating agencies was received as of May 2026.

This Biological Assessment (BA) evaluates the potential effects of the Preferred Alternative on aquatic species under NOAA National Marine Fisheries Service (NOAA Fisheries) jurisdiction that are federally listed under the Endangered Species Act (ESA). A review of the NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper on December 5, 2023, indicated that the federally listed Atlantic sturgeon (*Acipenser oxyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*) may be present within the Tier 2 Study area. In addition, four species of federally listed sea turtles occur seasonally in the waters of Chesapeake Bay from late April – mid November of each year: loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*). Designated critical habitat for listed species is not present within the Tier 2 Study area. The information gathered from the December 5, 2023, review of the Section 7 Mapper was again confirmed on March 9, 2026. No changes in the listed species or designated critical habitat had occurred.

The Preferred Alternative is in the early stages of preliminary engineering. As the design progresses through NEPA and into final design, the MDTA, in coordination with FHWA, will continue to consult with NOAA Fisheries to develop a bridge design and construction means and methods that avoid and minimize impacts and ensure the protection of listed species.

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 United States Code [USC] 1531 *et seq.*), the MDTA, on behalf of FHWA, has prepared this Biological Assessment (BA) to analyze the potential effects on sturgeon and turtle species listed or eligible for listing under the ESA and designated critical habitat for such species.

2 CONSULTATION HISTORY

Early coordination with NOAA Fisheries has been conducted throughout the Tier 2 Study. Additional Tier 2 Study coordination and regular interagency coordination meetings have been occurring with NOAA Fisheries and other resource agencies before and during development of the DEIS, since July 2022. Coordination history for the Tier 2 Study is summarized in **Table 2-1**, and copies of correspondence are provided in **Appendix A**.

Table 2-1: NOAA Fisheries Coordination History – Tier 2 Study

Date	Coordination
June 30, 2023	NOAA Fisheries accepted FHWA's invitation to be a Cooperating Agency on the Tier 2 Study.
December 5, 2023	A list of federally listed species under NOAA Fisheries jurisdiction with the potential to occur in the vicinity of the Tier 2 Study area was obtained from the NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper.
March 2024	NOAA Fisheries reviewed the Notice of Intent (NOI) for FHWA to prepare an EIS for the Tier 2 Study.
January 13, 2025	NOAA Fisheries provided comments on the NOI.
February 5, 2025	The NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper was reviewed again to confirm no changes occurred to the species list obtained on December 5, 2023.
April 30, 2025	A draft of the NETR was provided to the Cooperating and Participating Agencies, including NOAA Fisheries, for review. (NOAA Fisheries provided comments on the NETR that were addressed in subsequent drafts of the NETR and DEIS.)
August 11, 2025	A draft of the DEIS was provided to the Cooperating and Participating Agencies, including NOAA Fisheries, for review. (Comments have been considered and incorporated in the DEIS, as well as this BA and the NETR.)
November 28, 2025	A draft of this BA was provided to NOAA Fisheries for review.
January 15, 2026	NOAA Fisheries provided comments to FHWA on the draft BA. Comments have been considered and incorporated in this BA.
February 23, 2026	A revised draft of this BA was provided to NOAA Fisheries for review.
March 6, 2026	NOAA Fisheries provided comments to FHWA on the draft BA. Comments have been considered and incorporated in this BA.
March 9, 2026	The NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper was reviewed to confirm no changes to listed species or critical habitat in the Action Area. No changes have occurred.
March 18, 2026	FHWA initiated formal consultation with NOAA Fisheries for the Tier 2 Study.

Additional coordination with NOAA Fisheries will occur for species and habitat protected under the Marine Mammal Protection Act (MMPA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). In accordance with the MMPA, the MDTA will coordinate with NOAA Permits and Conservation Division to secure an Incidental Harassment Authorization (IHA) for impacts on bottlenose dolphins. The IHA will include appropriate BMPs to minimize harassment to the extent practicable. The MSA is the primary Federal law that governs fisheries resources and management in the United States. NOAA Fisheries regulates essential fish habitat (EFH) and habitat areas of particular concern (HAPC). Pursuant to section 305(b)(2) of the MSA, FHWA and the MDTA, acting as FHWA's designated non-Federal representative, have prepared an EFH Assessment. MMPA and EFH coordination are discussed further in the DEIS and the NETR, and the impacts to EFH and HAPC are evaluated in the EFH Assessment.

3 PROPOSED PROJECT

The Bay Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern shore. The original span opened in 1952, and the second span opened in 1973. Today, the two-lane original span typically carries eastbound traffic, and the three-lane second span typically carries westbound traffic. However, lanes on the bridge can be reversed to accommodate periods of heavy traffic. The approaches along U.S. 50/301 on each shore have six lanes (three lanes for each travel direction). The Bay Bridge has become one of Maryland's most iconic and recognizable landmarks, used by millions of Maryland residents and other travelers every year.

A wide range of engineering and environmental considerations were evaluated for the ARDS, which included one no-build alternative and six build alternatives as detailed in the DEIS. Alternative A (the no-build alternative) is not the Preferred Alternative because it would not increase roadway capacity or mobility, correct roadway deficiencies, or provide the navigational clearance established by the U.S. Coast Guard. Alternative A would also require substantial maintenance and related lane closures that would worsen congestion over time and compound existing traffic congestion, mobility, and roadway deficiency issues. Each of the six build alternatives meets the Tier 2 Study's purpose and need and would therefore be reasonable to implement. However, the build alternatives differ in the degree of transportation benefit they would provide as well as the likely environmental impacts and cost. The Preferred Alternative, Alternative C (6-8-6 South), would have the least impact to natural, cultural, and socioeconomic resources compared to the other build alternatives. Therefore, this BA considers impacts as a result of the construction and operation of Alternative C.

The Preferred Alternative (**Figure 3-1**) would replace the existing Bay Bridge spans with two new bridge spans and would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction), eight lanes on a new bridge (four per direction), and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). Construction activities would include, but are not limited to, pile driving; dredging; placement of fill/structure for piers, pier protection systems, and pier islands; increased vessel traffic; and demolition (including blasting) and removal of existing structure. Further detail on construction activities are discussed in **Section 3.1**. The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. The approach roadways would remain on the existing roadway alignment, except where necessary to connect to the new bridge spans. Thus, the five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans. The Preferred Alternative could include a bicycle/pedestrian shared use path (SUP) along a new bridge. The MDTA has identified SUP connections to existing and proposed trails and recreational facilities on the Eastern Shore and Western Shore. Though the SUP is only an option at this time, the impacts discussed in this BA include those anticipated from both the construction of the new bridge and the optional SUP, in order to account for all possible impacts to listed species.

Figure 3-1: Vicinity Map



3.1 Construction Methods

The Preferred Alternative is currently in preliminary engineering and as such, design, construction, and demolition means and methods are based on preliminary assumptions. Construction of the new bridge spans would likely occur in multiple phases. Phasing of the Preferred Alternative may involve building one span at a time: the first new bridge span may be built, then one existing bridge span could be demolished (mechanically and with blasting), and the new bridge span would be in use while the second new bridge span is built. Once both new bridge spans are complete, the second span of the existing bridge could be demolished. The exact order and timing of construction have yet to be determined; however, a preliminary construction sequence is found in **Table 3-1**.

Table 3-1: Preliminary Construction Sequence

Construction Activity	Construction Years
Construction of Bridge 1 (eastbound) – Occurring during years 1 through 5	
Start Construction, Bridge 1	1
Construct landings (work completed on land)	1-4
Constructing approaches and main span	1-5
Trestles and water access construction	1
Dredging for eastbound bridge	1-2
Transport and disposal of dredge	1-2
Substructure/pier protection construction	1-3
Superstructure construction	2-5
Complete construction, Bridge 1	5
Demolition of existing eastbound bridge – Occurring during years 6 through 7	
Start demolition, existing eastbound bridge	6
Blasting (total of 18 blast events)	6-7
Superstructure Truss Units	
Cantilever Deck Truss Spans (12 spans, 4 events)	
Through Truss Spans (4 simple spans, 1 event)	
250’ Simple Deck Truss Spans (4 simple spans, 1 event)	
300’ Simple Deck Truss Spans (6 simple spans, 2 events)	
Suspension Spans (3 suspension spans, 1 event)	
Substructure Piers in Deep Water	
4 Column Piers (4 piers, 4 events)	
2 Column Piers (7 piers, 3 events)	
Solid Shaft Piers Under Suspension Span (4 piers, 2 events)	
Dismantling	6-7
Complete demolition, existing eastbound bridge	7
Construction of Bridge 2 (westbound) – Occurring during years 7 through 13	
Start construction, Bridge 2	7
Construct landings (work completed on land)	7-13
Constructing approaches and main span	7-13
Trestles and water access construction	7

Construction Activity	Construction Years
Dredging for westbound bridge	7-8
Transport and disposal of dredge	7-8
Substructure/pier protection construction	7-12
Superstructure construction	8-13
Complete construction, Bridge 2	13
Demolition of existing westbound bridge – Occurring during years 14 through 15	
Start demolition, existing westbound bridge	14
Blasting (16 total events)	14-15
Superstructure Truss Units	
Cantilever Deck Truss Spans (12 spans, 4 events)	
Through Truss Spans (3 spans, 1 event)	
Suspension Spans (3 suspension spans, 1 event)	
Substructure Piers in Deep Water	
4 Column Piers (8 piers, 8 events)	
2 Column Piers (6 piers, 3 events)	
Dismantling	14-15
Complete demolition, existing westbound bridge	15

The following sections include initial assumptions based on the current design and best available information from similar bridge projects including the Francis Scott Key Bridge, Tappan Zee Bridge, and Nice-Middleton Bridge. Information regarding anticipated construction methods and current assumptions of each phase follows.

Based on existing conditions within the Chesapeake Bay, dredging would likely be necessary to create access channels to support demolition and construction activities. Considering input from previous similar dredging efforts, a target depth of nine feet below the mean low water (MLW) level was assumed. The dredging areas were established using the “Maryland bathymetry Chesapeake Bay contours” data at both shores of the Bay (Western and Eastern shores). The northern limit of dredging was assumed to have an approximate offset of 50-feet north of the existing piers of the existing westbound span (to be demolished), and the southern limit was assumed to have an approximate offset of 60-feet from the southern edge of the proposed eastbound span.

The total area to be dredged at both shores of the Bay is approximately 50.2 acres (2.2 million square feet), totaling 16.4 acres on the Western Shore and 33.8 acres on the Eastern shore. These areas exclude the footprints of the proposed and existing bridge pier footings. The total dredged volume within the dredging area is approximately 308,800 cubic yards. Applying a bulking factor of 1.3 to the dredged volume, the volume of spoil to be hauled is approximately 401,500 cubic yards and is proposed to be hauled via barge. For the eastbound bridge, bucket dredging would likely take 14 days of activity within construction years 1 and 2 and for the westbound bridge bucket dredging would likely take 7 days of activity within construction years 7 and 8.

For access in shallow areas, dredging would need to be wide enough to facilitate equipment mobility, loading and unloading material barges, and erecting structures. Depending on the consistency of bottom materials, additional dredging area may be needed because the sides of dredged areas must be sloped back to prevent the material from sloughing back into the excavation areas. The bottom materials may need to be sloped as much as 3:1 horizontal to vertical. Additionally, based on the greater expanse of shallow water from the eastern shoreline, it is anticipated that more dredging would be required along the eastern shoreline than the western shoreline.

Dredging will occur prior to the construction of trestles that facilitate the loading and unloading of barges and support vessels. Multiple access points (dredged channels or trestles) may be needed depending on the work configuration and the specific construction equipment needed. Access and dredging details will be evaluated and further refined in future design phases.

Potential dredge disposal sites include Masonville Cove and Cox Creek dredged material containment facilities (DMCF). Utilizing Masonville Cove DMCF and Cox Creek DMCF will facilitate safe and efficient loading, transport, and placement of dredge material. Both sites are owned and operated by the Maryland Port Administration (MPA), are adjacent to the Patapsco River, and are accessible by barge for placement operations. Masonville Cove DMCF has a permitted capacity of 10.4 million cubic yards (mcy) on 101 acres. Cox Creek DMCF has a permitted capacity of 14.7 mcy on 241 acres. Both facilities have plans in place to incorporate the creation of wildlife habitat and community access for recreation including birdwatching. The Bay Crossing Study has coordinated with MPA and determined that either DMCF will have the capacity to accommodate the dredging volumes generated by the build alternative. MPA will require that the material suitability and operational plans be approved prior to placement in accordance with their *Right of Entry Application*.

Preliminary engineering assumptions include using a trestle for temporary construction access in waters less than 10 feet deep below MLW. Based on the Francis Scott Key Bridge Rebuild Project design, the MDTA assumes trestle piers will be constructed every 38 feet supported on 36-inch steel pipe piles. Preliminary engineering assumes that bridge piers would be constructed with 36-inch square pre-stressed concrete piles as well as 36-inch, 48-inch, and 96-inch driven steel pipe piles. Pier protection fenders would likely be supported on 48-inch driven steel pipe piles. Pier protection dolphins are assumed to include 19.6-inch-wide sheet pile, backed by 14-inch steel H-piles. Pier protection would be built with the corresponding bridge span. It is assumed that up to four pile driving rigs may operate concurrently. **Table 3-2** and **Table 3-3**Table 3-3 provide the estimated number and type of proposed piles and piers for the eastbound and westbound bridges, respectively.

Table 3-2: Eastbound Bridge – Assumed Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**1,741**	**77**
36” Pre-stressed Square Piles	132	18
36” Steel Pipe Piles	240	10
48” Steel Pipe Piles	1,231	43
96” Steel Pipe Piles	138	6
Trestle Piers		
36” Steel Pipe Piles	**628**	**157***
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,513**	**258**

**A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*
*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore, 116 sheet piles and 116 Steel H-piles are required per dolphin.*

Table 3-3: Westbound Bridge – Assumed Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**2,014**	**60**
36” Pre-stressed Square Piles	203	22
36” Steel Pipe Piles	243	9
48” Steel Pipe Piles	1,412	43
96" Steel Pipe Piles	156	6
Trestle Piers		
36” Steel Pipe Piles	**628**	**157***
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,786**	**261**

** A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*
*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore 116 sheet piles and 116 Steel H-piles are required per dolphin.*

The following are construction assumptions based on preliminary engineering:

- Multiple foundation types could be used by the contractor; however, to provide the most impactful estimate of noise, currently, the MDTA assumes the main span is by multiple driven steel-pipe piles, which require impact and vibratory hammering, and the approach span piles are assumed to be pre-stressed square concrete piles installed by impact hammer.
    - Noise attenuation in the form of bubble curtains would be used.
- Currently, a cable-stayed or suspension bridge is being considered.
- Piers would have some form of pier protection. Preliminary design assumes 2 fenders and 22 dolphins will be installed on both the eastbound and westbound bridges, respectively, to provide collision protection.
- Trestles would likely be used for construction access to facilitate pier placement for the new bridge within the dredged area. Trestles would be included for both construction and demolition activities. The preliminary design assumes a trestle pier would be constructed every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier. Trestles would remain in-place until construction is complete, approximately 15 years.
- Other temporary construction methods including cofferdams and other dewatering devices for pile driving may be used.
- Dredging in the shallows up to approximately 9-foot depth is assumed necessary to access areas for pier construction.
- It is assumed, based on the Francis Scott Key Bridge Test Pile Exposure Analysis assumptions, that impact driving would take a maximum of 2 hours per pile.
    - Due to equipment availability, it is assumed that up to 8 96” steel pipe piles may be driven in one day and up to 16 piles of other pile sizes could be driven in one day.
    - For the eastbound bridge, a total of 120 days of pile driving is anticipated throughout years 1-5 of construction.
    - For the westbound bridge, a total of 138 days of pile driving is anticipated throughout years 7-13 of construction.
- Throughout the construction duration an effective 12-hour quiet period of no pile driving will be implemented each day.
- For temporary staging areas, the MDTA anticipates using the existing MDTA piers that are currently used for bridge maintenance. Additional staging areas may be needed, which will be determined during final design. Any additional staging areas may include existing public or private industrial locations in the Baltimore Harbor area or along the major rivers that would facilitate material transportation by barge and which would not result in additional environmental impacts. Staging areas may also include mooring locations within the Chesapeake Bay. Temporary mooring locations in the Chesapeake Bay may have additional bay bottom impacts, however the MDTA will avoid placing moorings in areas of oyster beds or SAV. The specific locations and number of moorings will be determined in final design and coordinated with NOAA Fisheries.

Temporary lights may be used during construction, including in cases of extended construction day or overnight work, which may impact federally-managed fish and sea turtle species utilization of habitat; however, the use of aesthetic and continuous roadway lighting will be determined in final design. Lighting will include required navigation, aviation, and traffic control lighting.

Demolition of the existing bridge spans would occur following construction of each new span. During the demolition phase, noise and vibration impacts from blasting would likely have the most pronounced impacts to federally-managed fish and sea turtle species. The following are the demolition assumptions based on preliminary design:

- Mechanical removal would be employed wherever possible, however blasting may be necessary when water depths or pier element size makes mechanical removal infeasible.
- Trestles would be used where water depths are less than 10 feet to perform demolition activities, as needed.
- Marine cranes affixed to barges would be used where water depths are deeper than 10 feet below MLW to perform demolition activities, as needed.
- Steel bracing elements are anticipated to be torch cut and heavy lift marine cranes will be used to maneuver cut pieces.
- Shielding barges are anticipated for the removal and transportation of bridge elements from the water. These barges would be positioned underneath the existing bridge decks to capture any debris that may be released during demolition.
    - The MDTA will determine the exact number and location(s) of shielding barges during permitting. All proposed barges would be located in areas already assumed for impact.
- Terrestrial demolition of bridge decks, girders, substructures, and abutments is anticipated to use saw cutting, excavators, and slab grab buckets. All demolition debris will be disposed of in accordance with regulatory permits and applicable laws and regulations.

3.2 Impacts from the Preferred Alternative

The Preferred Alternative extends along U.S. 50/301 for approximately 8.3 miles from west of Oceanic Drive to east of Cox Creek. The limit of disturbance (LOD) is the boundary that would include all proposed construction, erosion and sediment control (ESC), stormwater management (SWM), and right-of-way offsets. The impacts to natural resources are summarized in **Table 3-4**. A more detailed discussion of potential impacts from the Preferred Alternative to listed species under NOAA Fisheries' jurisdiction and proposed mitigation measures under consideration is included in **Section 5, Effects Determination**.

Table 3-4: Impact Summary

Resource	Impacts
Nontidal and Tidal Wetlands* (Acres)	6.3
Nontidal and Tidal Waterways* (Acres)	1.1
5-Year SAV 2019-2023 (Acres)	0
Historical SAV 2000-2018 (Acres)	0
Natural Oyster Bar (NOB) (Acres)	10.8

Resource	Impacts
Historic Oyster Bottom (Acres)	24.7
Oyster Plantings (Acres)	0
Oyster Sanctuaries (Acres)	0.6
Public Shellfish Fishery Areas (Acres)	6.5
Essential Fish Habitat (EFH)** (Acres)	138.4
Horseshoe Crab Habitat (Linear Feet)	290
Substrate – Dredging Impacts (Acres)	50.2
Substrate – Dredging Impacts (Cubic Yards)	317,400
Chesapeake Bay Tidal Waters (Acres)	133.8

3.3 Avoidance and Minimization Measures

Avoidance and minimization measures will continue to be evaluated for the Preferred Alternative during final design. This will include implementation of specialized construction methods to ensure the protection of sensitive resources. The MDTA commits to minimizing all in-water fills, both temporary and permanent. Temporary impacts in place for greater than one year are considered permanent impacts to account for the temporal loss of function in these areas. The MDTA has prepared a hydrodynamic modeling report that evaluates the existing hydrodynamic conditions of the broader study area and the MDTA commits to evaluating they hydrologic implications of the proposed design to maintain hydrodynamic conditions to the greatest extent practicable. Specialized construction methods may include time of year restrictions (TOYR), detailed monitoring plans, and project implementation schedules. It is assumed that in-water nets would not be used during demolition or construction, therefore potential impingement/entrainment BMPs have not been considered. Potential construction methods to minimize impacts to federally-managed fish and sea turtle species (adapted from the *NOAA Fisheries/FHWA BMP Manual* (NOAA Fisheries 2017a) and the FHWA Programmatic Essential Fish Habitat Consultation and General Concurrence for Select Transportation Actions in the NMFS Greater Atlantic Region (NOAA Fisheries 2024b)) are summarized in the following sections. The MDTA will commit to the avoidance and minimization methods included in the first list below and will consider all other measures/methods included in the second list below that may or may not be adopted and will be negotiated with the resource agencies.

List of Avoidance and Minimization Commitments:

Underwater Noise/Hydroacoustic Energy

1. Use noise attenuation and minimization measures during pile driving, including:
    a. Use a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation shall be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities.

b. Using a “soft start” or “ramping up” pile driving (e.g., driving does not begin at 100% energy).

c. Initially driving steel piles with a vibratory hammer through softer, sandy soils prior to using an impact hammer through stiffer material, as practicable and as appropriate.

d. Using cushion blocks to drive concrete piles with an impact hammer as practicable and as appropriate.

2. Develop an underwater noise monitoring plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise.
3. Include methods to document fish stuns/kills in the Underwater Noise Monitoring Plan and coordinate these methods with NOAA Fisheries Habitat and Ecosystem Services Division and Protected Resources Division.
4. Implement an effective quiet time of no pile driving for 12 consecutive hours per day.
5. Employ scare charges and fish deterrent boats, I tand monitor for the presence of tagged sturgeon, ahead of blasting activities.
6. Develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval in advance of any detonation activity. The Demolition Plan will evaluate the following measures:
    a. Detonation bore hole stemming, capping, or filling;
    b. Firing all charges in a single firing circuit with a delayed detonation between each charge;
    c. Focusing blast energy towards a solid substrate rather than towards the water column;
    d. Employing noise attenuating devices such as bubble curtains;
    e. Conducting the blasting during periods of low water or low tide;
    f. Using rubber blasting mats to reduce debris and acoustic signature;
    g. Employing scare charges;
    h. Installing appropriate monitoring devices to confirm the impact distance to adaptively manage the Demolition Plan;
    i. Using explosive weights that result in injury/mortality thresholds remaining within 100 feet of the blasting source; and
    j. Using adaptive management actions between blast events to minimize fish mortality.
7. Continue to coordinate to minimize the use of blasting.

Turbidity and Sedimentation

1. Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as silt curtains, settling basins, and cofferdams. The MDTA will specify the measures to be used in the construction plans:
    a. Install erosion control measures prior to ground disturbance;
    b. Inspect daily and maintain continuously in an effective operating condition all ESC measures until such time as they are removed with prior permission from the Maryland Department of the Environment (MDE) inspector;
    c. Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.
2. The MDTA commits to the use of mechanical dredging.
3. Minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the applicable techniques:
    a. Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell;
    b. Remove piles slowly to reduce sediment sloughing off in the water column;
    c. Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal;

d. Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.

4. Prevent sediment and debris from entering the water using geo-textile fabric, hay bales, or other methods. Use nets, tarps, and pans when demolishing bridge superstructures. Remove demolition debris that falls into the water.

Reduced Water Quality

1. Only use clean fill.
2. Avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NOAA Fisheries if there is an essential use identified by the Contractor.
3. Remove cofferdams or other diversion structures only after water quality is consistent with ambient levels outside the structure.
4. Remove contaminants and sediments from water discharge prior to entering aquatic habitats.
5. Evaluate dredge material to determine the appropriate disposal method and location.
6. Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter the Bay untreated.

Habitat Alteration

1. Employ an Independent Environmental Monitor (IEM).
2. Remove temporary structures and fills including monitoring devices in their entirety. Return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation.
3. Coordinate with GARFO on specific recommended time-of-year restriction dates, based on the proposed activities and location.
4. Staging of activities to reduce intensity of disturbance.
5. Avoiding areas where protected species congregate for spawning/foraging or overwintering.
6. Coordinate with NOAA Fisheries and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the action area to determine the presence and extent of SAV beds.

Fish Passage and Migration Habitat

1. From January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width (approximately 7,000 linear feet). The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. To maintain the ZSFP, 96” steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96” piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP. The contractor shall use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15. The project team will work with NOAA Fisheries and MDNR to refine and approve ZSFP locations and the migratory focal period during Final Design and permitting.

Vessel Interaction

1. Do not moor vessels in submerged aquatic vegetation (SAV) or in such a way that could shade SAV.
2. Enforcement of reduced construction vessel speeds (e.g., below 10 knots).
3. Employing species spotters to reduce species/vessel collisions; and keeping appropriate distance from protected species if spotted.

Impingement and Entrainment

1. Use of construction equipment that reduces potential for impingement and entrainment such as utilizing intake screens and using environmental buckets on mechanical dredges.
2. Employing a NOAA Fisheries approved observer during mechanical dredging/removal of demolition debris in case of accidental capture.

List of Avoidance and Minimization Considerations:

Underwater Noise/Hydroacoustic Energy

1. Use of mechanical demolition methods, instead of blasting, when possible.
2. Conduct noise-generating work in a way that minimizes acoustic effects and avoids injury to federally-managed fish species. Explore potential attenuation measures based on the Section 7 Acoustic Tool.
3. Use of noise attenuation and minimization measures during pile driving, such as:
    a. Isolation casing or dewatered cofferdam. Contained bubble curtains would be utilized to the extent practicable. Where use of a contained bubble curtain is not feasible, use of an uncontained bubble curtain would be evaluated. There may be some circumstances in which neither a contained nor uncontained bubble curtain would be feasible, in these circumstances rationale would be provided to the resource agencies prior to driving piles.
    b. Using vibratory hammers and construction phasing to minimize acoustic impacts.
    c. Minimizing the number and size of temporary and permanent piles.
    d. Using concrete piles and pre-cast piles versus steel piles to reduce underwater noise.
    e. Using drilled shafts instead of hammered piles where appropriate.

Turbidity and Sedimentation

1. Position new structures to avoid altering natural sediment accretion rates and pattern.
2. Use operational modifications to minimize turbidity and sedimentation during dredging. This may include using an environmental bucket on mechanical dredges, reducing lift speeds, using small diameter cutterhead dredges, and/or limiting the use of large hopper dredges.
3. Design the dredge footprint to avoid sensitive habitats to the greatest extent practicable and provide appropriate buffers to protect these areas from accretion of sediment resuspended during dredging.
4. Prohibit side-casting or temporary storage of dredged material in the waterway.
5. Prohibit unfiltered or unprocessed overflows from barges into the water and ensure that any barge transfer is accomplished without generating sediment plumes.

Reduced Water Quality

1. Minimize the amount of new impervious surfaces and maintain a vegetated buffer between the water and upland activities.
2. Incorporate stormwater controls to minimize pollutants in aquatic habitats, including determining whether the proposed bridge could include measures to collect runoff and route it to upland features for treatment prior to discharge.
3. Consider alternatives to the use of pressure treated (Chromated Copper Arsenate or Alkaline Copper Quaternary, etc.) piles or other in-water structures, as practicable and as appropriate.

Habitat Alteration

1. Place a geotextile barrier under any temporary platforms and/or access fills to ensure that any fill would be removed completely at the end of construction.
2. Develop a project schedule and plan prior to construction, which avoids or minimizes sediment disturbance, noise, and physical obstruction during sensitive life stages (migration and

spawning) of federally-managed fish species. This may include isolating in-water work or implementing time-of-year restrictions.
3. Complete pre- and post-construction monitoring to determine the project was completed as intended to determine fishery resources present, habitat impacts, and mitigation needs.
4. Use multiple-season biological sampling data (pre- and post-construction) to assess the potential and resultant impacts on habitat and aquatic organisms.
5. Fill all holes left by the piles with clean substrate appropriate for the site.
6. Orient artificial lighting on crossings to avoid illumination of the surrounding waters at night.
7. Design bridge abutments to minimize disturbances to banks and locate them outside of the floodplain.
8. Incorporate measures that increase the ambient light transmission under the bridge including:
    a. maximizing the height of the structure;
    b. minimizing the width of the structure; and
    c. minimizing the number of instream pilings/piers.
9. Consider beneficial use of suitable sediments and give priority to beneficial uses of material that contributes to habitat restoration and enhancement.
10. Ensure that any proposed dredging is necessary to maintain target depths. Evaluate recent bathymetric surveys to determine the existing depths of the proposed dredge area.
11. Use waterline pile cap/pier footings to avoid dredging to construct footings below the mudline.
12. Avoid and minimize all activities (including work footprint, structures, shading, temporary and permanent fill, excavation, etc.) in shallow water habitats and sensitive habitats such as critical habitat, SAV, mudflats, salt marsh, areas containing shellfish, and intertidal areas.
13. Provide compensatory mitigation for all unavoidable impacts to Essential Fish Habitat (EFH) and sensitive habitats.

Fish Passage and Migration Habitat

1. Ensure temporary structures or barriers do not block federally-managed fish species' access to an area, preventing movement in or out of a river or channel.
2. Design projects to maintain adequate flow conditions for fish passage, maintain water quality, and to maintain properly functioning channel, floodplain, riparian, and estuarine conditions.

Vessel Interaction

1. Reduce vessel speeds in inshore areas, or otherwise minimize wake damage to shorelines, and consider no-wake zones in highly sensitive areas, such as spawning habitat and SAV beds. Identify appropriate vessel routes in the design process to minimize impacts to shorelines and shallow water habitats.
2. Consider the effects of increased vessel traffic when conducting in-water actions.
3. Ensure that vessels are operated in adequate water depths to avoid propeller scour and grounding at all tides. Use shallow draft vessels that maximize the navigational clearance between the vessel and the bottom in shallow areas.

Impingement/Entrainment and Entanglement

1. Ensure any in-water lines, ropes, or chains are made of materials and installed in a manner (properly spaced) to minimize the risk of entanglement by using thick, heavy, and taut lines that do not loop or entangle. Lines can be enclosed in a rigid sleeve.
2. Attach any cables or utility lines to structures above the water, instead of locating them in water or within the substrate. Bury and prevent cables or utility lines from coming through the substrate if they are necessary to be in the water.
3. Allow all fish to exit an enclosed area prior to any dewatering. Trapped fish greater than 5 inches long, observed during dewatering shall be captured and released from the dewatering

area except for invasive species (snakehead, blue catfish, flathead catfish) that will be disposed of.

4. Any water intakes (e.g., pumps) drawing from surface tidal waters should employ screening (1 mm wedgewire or better technology with maximum intake velocity of 0.5 fps) to minimize impingement/entrainment of fish and nekton.
5. Properly secure turbidity control measures and design them in a manner that does not block entry to or exit from critical habitat.
6. Monitor turbidity control measures to ensure aquatic species are not entangled or trapped within them.

4 ACTION AREA

The action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR §402.02). *NOAA Fisheries Section 7 Program Technical Guidance* (NOAA Fisheries, 2024a) provides technical assistance for determining the action area. The action area of the Tier 2 Study includes the Tier 2 Study area and any area where stressors may affect listed species. Potential effects would occur during construction of the new bridge spans and pier protection, and removal of the existing bridge spans. The boundaries of the action area for the project have been determined by the likely extent of sedimentation, turbidity, noise, and construction-related vessel traffic, based on current high-level assumptions. A map of the action area is presented in **Appendix B**.

The action area includes areas within the waterway(s) that would experience temporary increases in sediment from dredging, pile driving, and bridge widening; temporary increases in noise from pile-driving activities and demolition of the existing bridge spans; and be affected by construction-related vessels. The action area extends up to 32,808.4 feet from the in-water portion of the Preferred Alternative LOD due to the anticipated noise generated by pile-driving. Sediment and turbidity impacts are expected to occur up to 300-feet from the pile driving locations, and up to 2,000 feet from the dredging locations (NOAA Fisheries, 2025). It is anticipated that the vessel home port location would be in the Baltimore area, in which case construction-related vessel traffic would travel between the Bay Bridge and the Baltimore area when involved in transport of material (a one-way distance of approximately 19 miles). Any vessel traffic to/from home ports is anticipated to be limited to the Federal navigation channel, but may occur anywhere within the extent of the Federal navigation channel.

4.1 NOAA Fisheries Listed Species in the Action Area

A review of the NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper and correspondence from NOAA Fisheries shows that the Preferred Alternative overlaps Section 7 Consultation Areas for six federally listed species that include two fish and four sea turtle species, as shown in **Table 4-1**Table 4-1.

Table 4-1: Federally Listed Species Under NOAA Fisheries Jurisdiction

Common Name	Scientific Name	Federal Status	Federal Register Citation	Species Recovery Plan	Distinct Population Segment (DPS) Potentially Occurring in the Action Area	Behavior in Action Area	Life Stage Potentially Occurring in the Action Area
Atlantic sturgeon	*Acipenser oxyrinchus*	Threatened/ Endangered[1]	77 FR 5880 and 77 FR 5914; February 6, 2012	Recovery Outline for the Atlantic Sturgeon Distinct Population Segments (NOAA Fisheries, 2018)	Gulf of Maine; New York Bight; Chesapeake Bay; Carolina; South Atlantic	Migrating & Foraging	Subadult, Juvenile, Adult
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	32 FR 4001; March 11, 1967	Final Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*) (SSRT, 1998)	Range-wide[2]	Overwintering; Migrating & Foraging	Adult
Loggerhead sea turtle	*Caretta caretta*	Threatened	76 FR 58868, September 22, 2011	Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*) (NOAA Fisheries & USFWS, 2008)	Northwest Atlantic	Migrating & Foraging	Juvenile, Adult
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	35 FR 18319 18322, December 2, 1970	Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (2nd Revision) (USFWS et al., 2011)	Range-wide[2]	Migrating & Foraging	Juvenile, Adult
Green sea turtle	*Chelonia mydas*	Threatened	81 FR 20058, April 6, 2016	Recovery Plan for U.S. Population of Atlantic Green Turtle (*Chelonia mydas*) (The Loggerhead/Green Turtle Recovery Team, 1991)	North Atlantic	Migrating & Foraging	Juvenile, Adult
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	35 FR 8491, June 2, 1970	Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico (NOAA Fisheries & USFWS, 1992)	Range-wide[2]	Migrating & Foraging	Juvenile, Adult

[1] Gulf of Maine DPS is threatened. New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are endangered.
[2] DPS has not been designated for this species.

4.1.1 Atlantic and Shortnose Sturgeon

There are four distinct population segments (DPS) of Atlantic sturgeon listed as endangered (New York Bight, Chesapeake Bay, Carolina, and South Atlantic) and one DPS listed as threatened (Gulf of Maine) under the ESA. The five DPS were listed on February 6, 2012 (77 FR 5880, 77 FR 5914). The marine range for all five DPSs includes marine waters, coastal bays, and estuaries from the Labrador Inlet in Labrador, Canada to Cape Canaveral, Florida. The presence of Atlantic sturgeon has been documented in the action area. Available information on the distribution of Atlantic sturgeon indicates that a majority of the Atlantic sturgeon in the action area will be from the Chesapeake Bay DPS, though individuals from all five DPSs may be present within the action area.

Juvenile, subadult, and adult Atlantic sturgeon are found migrating and foraging throughout the Chesapeake Bay and its tributaries. Adult and subadult stages are present between mid March and late November, while juvenile stages are present year-round. Telemetry data collected from 2021 to 2024 and provided by NOAA Fisheries indicated the presence of Atlantic sturgeon in the Chesapeake Bay North array (located just south of the Bay Bridge), with detections of Atlantic sturgeon occurring mainly during the warmer months (May through July), with additional detections in October through December. The telemetry data provided by NOAA Fisheries are included in **Appendix C**. Atlantic sturgeon are bottom feeders, consuming invertebrates and bottom-dwelling fish. In the Chesapeake Bay system, Atlantic sturgeon spawn between late summer and fall. Threats to the species include fisheries interactions and bycatch, habitat degradation, habitat impediments, and vessel strikes (NOAA Fisheries, 2022a; NOAA Fisheries, 2023a).

Shortnose sturgeon are listed as endangered under the ESA throughout their range and occur in rivers and estuaries along the east coast of the U.S. and Canada (SSSRT 2010). Shortnose sturgeon were initially listed as endangered on March 11, 1967, under the Endangered Species Preservation Act and subsequently listed as endangered under the ESA when it passed in 1973. There are three metapopulations of the shortnose sturgeon (Carolinian Province, Virginian Province, and Acadian Province) within which there are 19 documented populations (NOAA Fisheries, 2023b). Available information on the distribution of shortnose sturgeon indicates that a majority of the shortnose sturgeon in the action area will be from the Virginian Province.

Adult stages of shortnose sturgeon are conservatively assumed to be present year-round throughout the Chesapeake Bay and its tributaries (NOAA Fisheries, 2022a). NOAA Fisheries conservatively assumes that shortnose sturgeon could be overwintering anywhere in the Bay or its tributaries from November 1st to February 28th. Shortnose sturgeon are bottom feeders that feed on mollusks as well as benthic crustaceans and insects (Dadswell, 1979). In the mid-Atlantic region, shortnose sturgeon migrate upriver to spawn from April to May and return downstream after spawning. Threats to the species include habitat impediments, habitat degradation, and fisheries interactions and bycatch (NOAA Fisheries, 2023b).

4.1.2 Sea Turtles

There are 11 DPSs of green sea turtle listed under the ESA. Three are listed as endangered and eight are listed as threatened. Green sea turtles potentially occurring in the action area are in the North Atlantic DPS, listed as threatened on April 6, 2016 (81 FR 20058). Nine DPSs of loggerhead turtles are listed under the ESA. Five are listed as endangered and four are listed as threatened. Loggerhead turtles potentially occurring in the action area are in the Northwest

Atlantic DPS, listed as threatened on September 22, 2011 (76 FR 58868). The leatherback sea turtle and Kemp's ridley sea turtle are listed as endangered throughout their ranges and were initially listed under the Endangered Species Conservation Act and subsequently listed as endangered when the ESA was passed in 1973.

Adult and juvenile stages of the loggerhead, Kemp's ridley, green, and leatherback sea turtles are found migrating and foraging in the Chesapeake Bay and its tributaries. These four species of sea turtles migrate north to the mid-Atlantic in the spring, arriving in May, and leave the area generally by the end of November (NOAA Fisheries, 2022b, 2023c, 2023d, and 2023e). Loggerhead sea turtles forage in coastal areas, feeding mostly on bottom dwelling invertebrates. Kemp's ridley sea turtles foraging in coastal areas consume mostly crabs and occasionally discarded bycatch. Green sea turtles are primarily herbivorous, feeding on algae and seagrasses, and occasionally consuming sponges, invertebrates, and discarded fish. Leatherback sea turtles consume soft-bodied prey such as jellyfish. Threats to the loggerhead, Kemp's ridley, green, and leatherback sea turtles include bycatch in fishing gear, loss and degradation of nesting habitat, vessel strikes, direct harvest of the sea turtles and their eggs, and ocean pollution/marine debris. Additionally, threats to the Kemp's ridley sea turtle include predation of eggs and hatchlings, and threats to the green sea turtle include Fibropapillomatosis, a tumor-causing disease (NOAA Fisheries, 2022b, 2023c, 2023d, and 2023e).

4.1.3 Critical Habitat

Designated critical habitat for listed species is not present in the action area. The furthest extent of the action area is expected to result from noise generated by pile-driving, with the largest potential noise isopleths extending over 6 miles from the pile being driven. The designated critical habitat nearest the project location is located in the Nanticoke and Potomac Rivers. The furthest extent of the estimated noise isopleths occurs north of the southernmost point of Kent Island, which is located north of the mouths of both rivers. Therefore, impacts to designated critical habitat are not anticipated and are not discussed further in this BA.

4.1.4 Additional NOAA Protected Species and Habitat

4.1.4.1 Mammals

The University of Maryland Center for Environmental Science (UMCES) Chesapeake DolphinWatch program compiles reported sightings of bottlenose dolphins from the public and verifies them. A review of the Chesapeake DolphinWatch website indicates that there were nearly 2,000 dolphin sightings in the Chesapeake Bay in 2022 and about 1,500 dolphin sightings in 2023 (UMCES, 2024). Dolphins are typically seen in the Chesapeake Bay from May through October, including around the Bay Bridge. As noted in Section 2, the MDTA will coordinate with NOAA Fisheries to secure an IHA for impacts on bottlenose dolphins and to determine appropriate BMPs. Bottlenose dolphins are protected under the MMPA and not listed under the ESA; therefore, bottlenose dolphins are not discussed further in this document. Additional information on bottlenose dolphins is included in the DEIS and NETR.

4.1.4.2 EFH and HAPC

EFH and HAPC are included in the action area. As noted in Section 2, impacts to EFH and HAPC were evaluated and are presented in the EFH Assessment document. The MDTA will continue to coordinate with NOAA Fisheries to determine and implement appropriate avoidance and minimization measures as design progresses. EFH and HAPC are protected under the MSA and

not the ESA; therefore, EFH and HAPC are not discussed further in this document. Additional information on EFH and HAPC is included in the EFH Assessment, the DEIS, and the NETR.

4.2 Habitat within the Action Area

4.2.1 Waterways

Waterways within the Preferred Alternative action area include Chesapeake Bay and Cox Creek. These tidal waterways are shaped by the region's geological history and the regular fluctuations of the tides.

The Chesapeake Bay is the largest estuary in the United States and contains a diversity of habitats including shallow waters, open waters, deepwater refuge areas, marshes and wetlands, sandy beaches, mud flats, oyster reefs, and other habitat niches that sustain a wide range of aquatic species. The portion of the Bay crossed by the Preferred Alternative is the narrowest point in the mainstem of the Bay, which widens to the north and south where the action area extends up and down the Bay along Federal navigational channels.

The Chesapeake Bay is designated by MDE as a Use II tidal waterway, or tidal waters designated for supporting estuarine and marine aquatic life and shellfish harvesting. North of the bridge, the Bay is identified as within the Upper Chesapeake Bay segment (CB3MH), and south of the bridge, the Bay is identified as within the Middle Central Chesapeake Bay segment (CB4MH). The Chesapeake Bay is a mesohaline system (represented as the MH within the segment identifier above), which means its waters have a low to medium saline content, or are brackish waters, and are typically defined as having salinity between 5 and 18 parts per thousand (Park, 2012).

Cox Creek is a tidal system both north and south of U.S. 50/301 that almost bisects Kent Island. This is a wide system that narrows where it is bridged by U.S. 50/301 and is approximately 575 feet wide north of the roadway and 1,650 feet wide south of the roadway. Although the FEMA 100-year floodplain is associated with this waterway both north and south of the road, there are no vegetated wetlands identified to the north. Large areas of estuarine common reed (*Phragmites australis*) wetland are located along the western bank, on the south side of the road.

4.2.1.1 Water Quality

Water quality data was gathered from MDE, Maryland Department of Natural Resources' (MDNR) Eyes on the Bay Program, and other monitoring programs accessed through the Chesapeake Bay Program (CBP) DataHub to assess water quality during the development of the Tier 2 Study NETR. In addition, water quality data were gathered from the National Water Quality Monitoring Council (NWQMC) database and in situ data were obtained from MDNR's Chesapeake Bay Benthic Monitoring Program (CBBMP). This section summarizes the water quality data for the watersheds within the action area.

Data available within the Chesapeake Bay closest to the Western Shore have sampling locations north of and beyond the action area, however, these locations are along the shoreline of the Chesapeake Bay and flow directly into the action area. Dissolved Oxygen (DO) data for this area reflects existing turbidity and shoreline erosion conditions, since DO and turbidity are inversely related, and provides baseline conditions for the area where the bridge would be constructed.

Recent chemical grab data from this part of the Chesapeake Bay is available for three monitoring locations from the NWQMC database, which indicated approximately 5 percent of pH records, 14

percent of all *Enterococcus* records, and 8 percent of fecal coliform records not meeting Code of Maryland Regulations (COMAR) criteria. Values for pH ranged from 6.1 to 9.0, which violated both the low and high COMAR criteria of 6.5 and 8.5, respectively. In general, DO values met COMAR criteria for the various designated habitats and seasons, with records infrequently falling below specific criteria. Salinity ranged from 1.9 to 16 ppt, depending on sampling event.

Sampling data is captured just north of the Bay Bridge landside connection with Anne Arundel County. In situ and grab sample water quality data for two locations in this area were gathered from the CBP DataHub, where approximately 10 percent of surface pH records exceeded the COMAR criterion of 8.5, with a maximum recorded value of 9.1. All surface DO readings met COMAR criteria for the various designated habitats and seasons, and between 7 percent and 29 percent of bottom DO readings fell below COMAR criteria, depending on the designated habitat and season. The full range of DO values observed across all seasons and habitat types can be found in **Table 4-2**. Chemical grab sample data was available for one monitoring location from the NWQMC database, indicating approximately 8 percent of all fecal coliform records exceeded the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL). Recent in-situ water quality data for one location, available from CBBMP, revealed that there were no exceedances of water quality criteria, however, this location is well south of the action area and flowing away from the Bay Bridge. Salinity ranged from 0.61 to 18.48 ppt, depending on the sampling event, location, and depth (**Table 4-3**).

Recent chemical grab sample data from one location in the Northern Eastern Bay MD 12-digit watershed, located downstream of the build alternatives, were available from the NWQMC database. Approximately 30 percent of all fecal coliform records exceed the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL).

Additional in situ and grab sample water quality data was retrieved from five sampling sites in the Kent Island True Bay MD 12-digit watershed, within the Chesapeake Bay, just north of the Bay Bridge. Data from two sites in the CBP DataHub and three sites in the NWQMC dataset indicated that approximately 9 percent of in situ surface records for pH and less than 1 percent of bottom records exceeded the upper COMAR criterion of 8.5. All surface DO readings met COMAR criteria for the various designated habitats and seasons. Bottom DO readings frequently fell below COMAR criteria, with 12 percent to 51 percent of readings not meeting COMAR criteria, depending on the designated habitat and season. Approximately 1 percent of all fecal coliform records exceeded the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL). Salinity ranged from 0.50 to 22.32 ppt, depending on the sampling event, location, and depth (**Table 4-3**).

Table 4-2 COMAR Water Quality Parameters within 12-digit Watersheds in the Vicinity of the Action Area

Watershed	Source	Number of Sites	Year	Depth (m)	Parameter				
					Temperature (°C)	pH	DO (mg/L)*	Enterococcus (MPN/100mL)	Fecal Coliform (MPN)
Annapolis Shore	CBBMP	1	2018	0.5 / 9	26.30 / 26.37	7.8 / 7.2	6.35 / **4.20** (ppm)	---	---
	CBP	2 / 1	2013 - 2023	0.5 / 4	3.7 - 30.9 / 1 - 28.3	7.1 - **9.1** / 7.1 - 8.4	**4.6** - 15.1 / **0.28** - 12.6	---	---
	NWQMC	1	2013 - 2019	---	---	---	---	---	1 - **23**
Northern Eastern Bay	NWQMC	1	2013 - 2019	---	---	---	---	10 - **2,010** (2013 - 2022)	1 - **1,100**
Kent Island True Bay	CBP	2	2013 - 2023	0.5 / 6	1.3 - 29.6 / 0 - 28	6.9 - **9.6** / 6.8 - **8.7**	5.1 - 17.8 / **0.09** - 12.7	---	---
	NWQMC	1 - 3	2013 - 2019	---	1.2 - 29	7.4 - **8.8**	**4.1** - 14.5	10 - **1,450** (2013 - 2022)	1 – **23**

*In dilute aqueous solutions, 1 mg/L is approximately equivalent to 1 ppm.

Notes:

1. Red values indicate that they exceed/are below COMAR criteria during the listed time period.

2. Data collected at two depths is shown in the same cell separated by a "/," corresponding to the two depths reported in the Depth column.

3. Not all parameters or sites were monitored in each year within the year range.

4. A range of number of sites is presented to note that not all parameters were assessed at all sites for certain watersheds and datasets.

Table 4-3 Salinity and Conductivity within 12-digit Watersheds in the Vicinity of the Action Area

Watershed	Source	Number of Sites	Year	Depth (m)	Parameter	
					Salinity (ppt)*	Conductivity (UMHO/cm)
Annapolis Shore	CBBMP	1	2018	0.5 / 9	3.26 / 5.83 (PSU)	5,972 / 10,340
	CBP	2 / 1	2013 - 2023	0.5 / 4	0.61 - 16.43 / 3.38 - 18.48	3,100 - 27,000 / 6,640 - 30,000
Kent Island True Bay	CBP	2	2013 - 2023	0.5 / 6	0.5 - 16.56 / 4.75 - 22.32	3,120 - 27,200 / 8,940 - 35,500
	NWQMC	1	2013 - 2019	---	2.8 - 15.2	---

*1 PSU is approximately equivalent to 1 ppt.

4.2.2 Bathymetry

The Chesapeake Bay in the Preferred Alternative action area is deepest in the center and east of the county boundary, located within the Chesapeake Bay Bridge Auxiliary Federal navigation channel. As expected, the depth becomes increasingly shallower towards the shorelines. The Chesapeake Bay has an average depth of approximately 40 feet within the action area, with the main channel depth approximately 56 feet, and the Chesapeake Bay Bridge Auxiliary channel depth approximately 92 feet. **Figure 4-1**Figure 4-1 illustrates the bathymetry of the Chesapeake Bay, with the close contours indicative of varying steep slopes within the deeper areas.

The shallows of the Chesapeake Bay (1 to 3 feet) extend channelward approximately 800 to 950 feet from the western shoreline in Anne Arundel County, and approximately 1,200 to 1,300 feet from the eastern shoreline in Queen Anne's County. Areas with depths from approximately 3 feet to 12 feet generally extend from about 2,100 to 2,200 feet from the western shoreline and 3,900 to 4,700 feet from the eastern shoreline. Based on bathymetric analysis, it is anticipated that

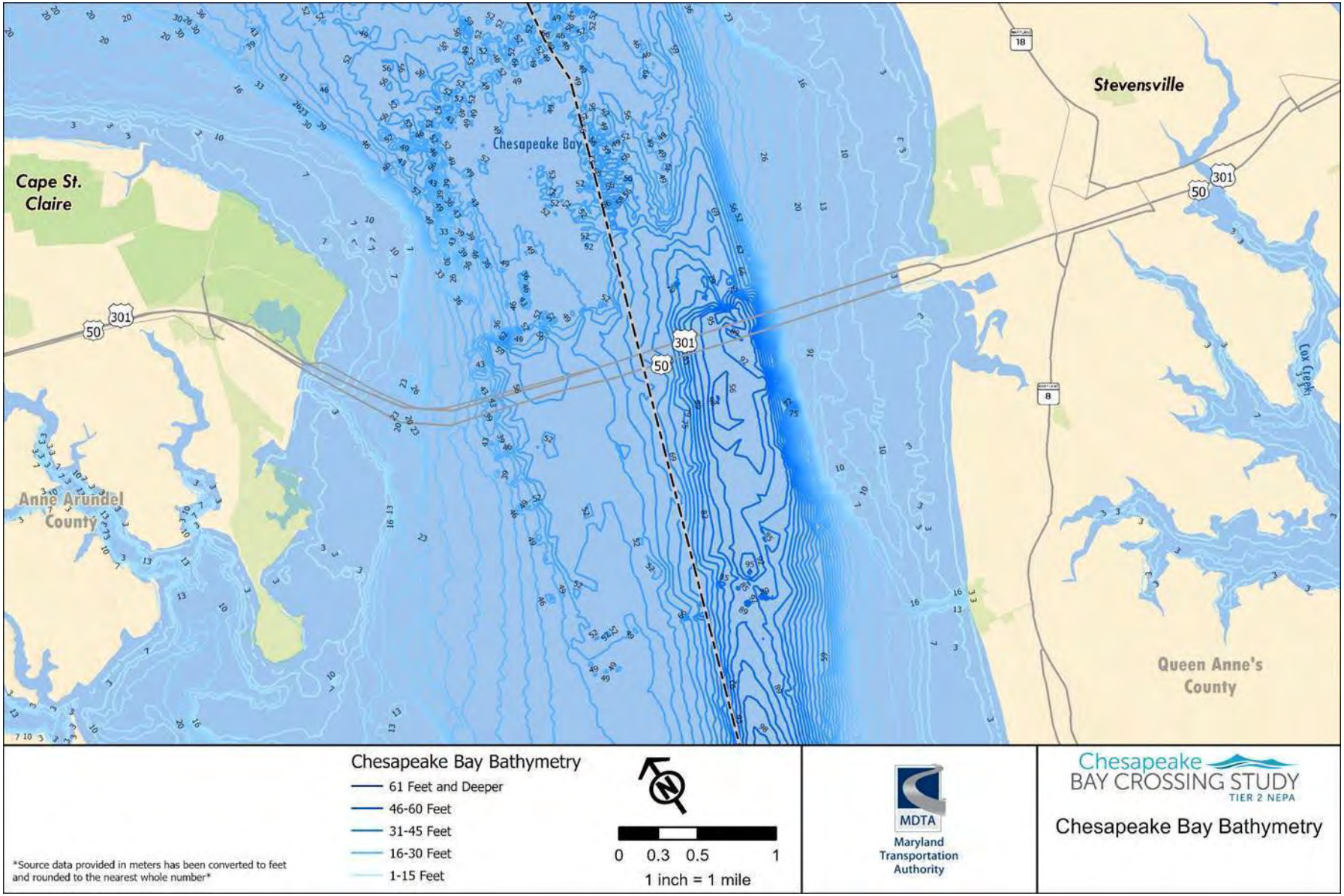
dredging would be required to a depth of 9 feet at mean lower low water (MLLW). Previous agency coordination for other bridge projects that required dredging required mitigation for areas with a water depth of 3 feet or less. Except in the shallow areas along the Anne Arundel and Queen Anne's shorelines, the Chesapeake Bay is deep enough for barge-mounted construction equipment and material barges to perform work adjacent to the existing Bay Bridge.

4.2.3 Bay Depths

The shallowest areas within the action area are along the Anne Arundel County and Queen Anne's County shorelines. From the Anne Arundel County shoreline north of the Bay Bridge, the water depth is approximately 9 feet deep between approximately 1,400 to 1,600 feet channelward. This area is adjacent to the access channel into Mezick Ponds and the Sandy Point State Park marina. The access channel is protected by a 525-foot-long rock groin. From the Anne Arundel County shoreline south of the Bay Bridge, the water depth is approximately 9 feet deep at approximately 2,000 feet channelward. This area is adjacent to the MDTA maintenance yard and dock areas that are used for service vessels.

From the Queen Anne's County shoreline north of the Bay Bridge, the water depth is approximately 9 feet deep at approximately 3,500 to 3,700 feet channelward. This area is adjacent to and north of the peninsula where the Bay Bridge lands and south of the Terrapin Nature Park. From the Queen Anne's County shoreline south of the Bay Bridge, the water depth is approximately 9 feet deep between approximately 3,700 to 4,000 feet channelward. This area is adjacent to the peninsula where the Bay Bridge lands and the Chesapeake Bay Bridge Marina. The channel to access the marina runs southwest away from the Bay Bridge.

Figure 4-1: Chesapeake Bay Bathymetry



4.2.4 Bay Bottom Material

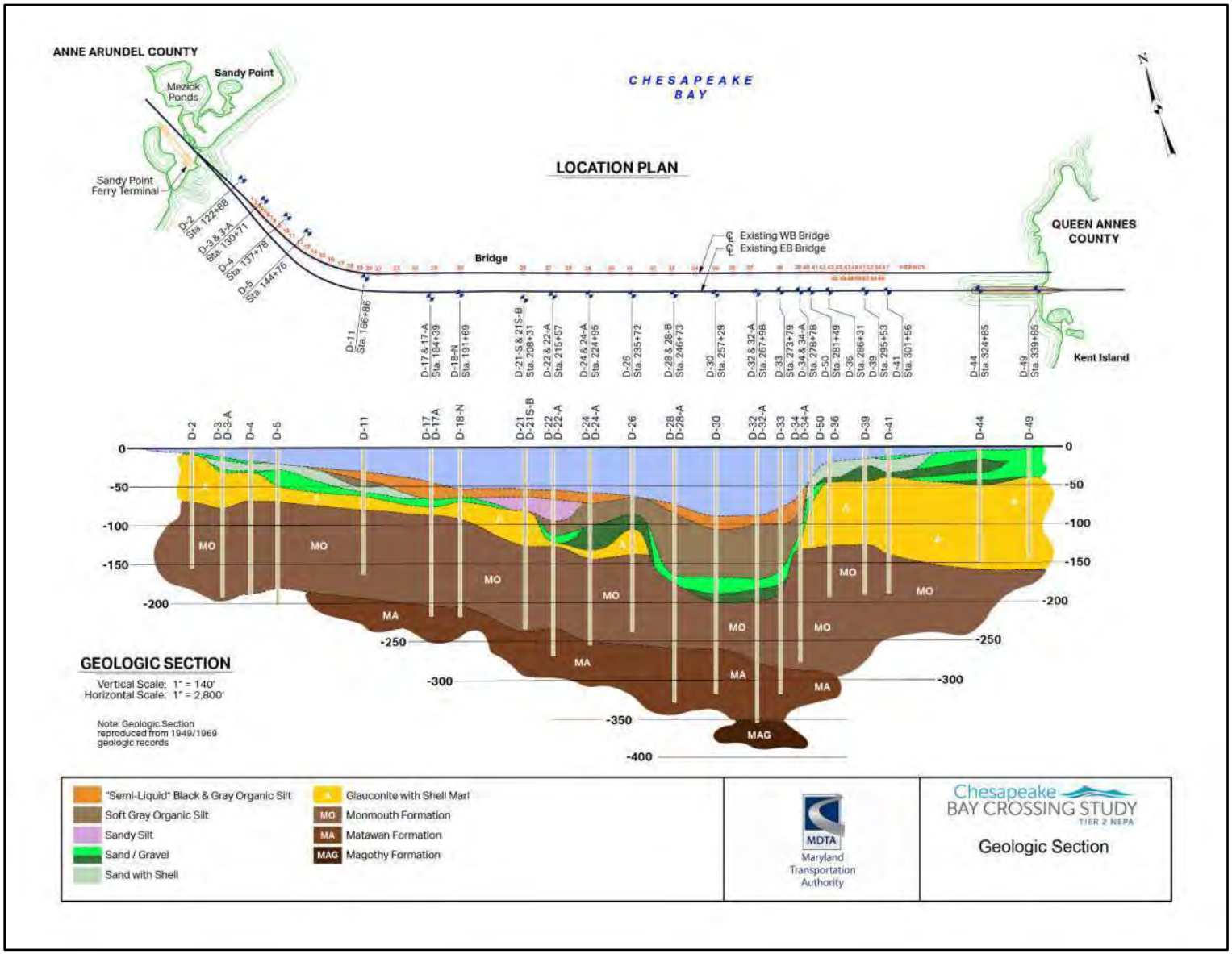
The Chesapeake Bay bottom is primarily formed by layers of Magothy, Matawan, and Monmouth formations, which is overlaid by sandy material in the shallow areas and loose silty clay material in the deeper channels. Surficial sand is generally found in the areas that are most affected by wave action and tidal fluctuations. The waves and tide move fine silt, clay, and organic material out of the sand and deposit them in lower energy areas along the bottom (**Figure 4-2**). Currently there is no indication of contaminated material, as the U.S. Army Corps of Engineers (USACE) 50ft Project has not found contaminated material in the Bay Bridge area (USACE 2017).

Sand: Surficial sand extends approximately 1,100 feet channelward from the Anne Arundel County shore, which corresponds to an approximate 6-foot water depth. Surficial sand extends approximately 4,200 feet channelward from the Queen Anne's County shore which corresponds to an approximate 12-foot water depth. Both shorelines correspond to bottom slopes that are flat (less than 0.5 percent) and near the surface. Geotechnical borings near the shorelines show the Chesapeake Bay bottom is underlain by sand to 50 feet deep where it begins to increase in clay content.

Cultch: Material (such as oyster shells) that has been laid down on oyster grounds and furnishes points of attachment for oyster spat is found in shallower areas (less than 26 feet deep). Cultch areas are generally inclusions in sandy bottom and may be incorporated into organic/silt mud areas.

Silty Clay: Surficial silty clay covers most of the Chesapeake Bay bottom along the action area. Silty clay is generally associated with relatively deep waters (deeper than 6 to 12 feet). Geotechnical borings in the mid-bay show organic silt and silty clay layers from 10 to 50 feet thick, before transitioning to clayey sand below.

Figure 4-2: Geologic Section and Chesapeake Bay Bottom Material



4.2.5 Submerged Aquatic Vegetation (SAV)

Information regarding SAV was obtained from the Virginia Institute of Marine Science (VIMS) SAV monitoring program, which uses multispectral aerial imagery to annually assess the distribution and abundance of SAV in areas including the Chesapeake Bay. Ground surveys are conducted to provide supplementary information, including species data, though not all areas are ground surveyed. This data is then used to develop trends, identify areas of decline and abundance, and to implement strategies of preservation.

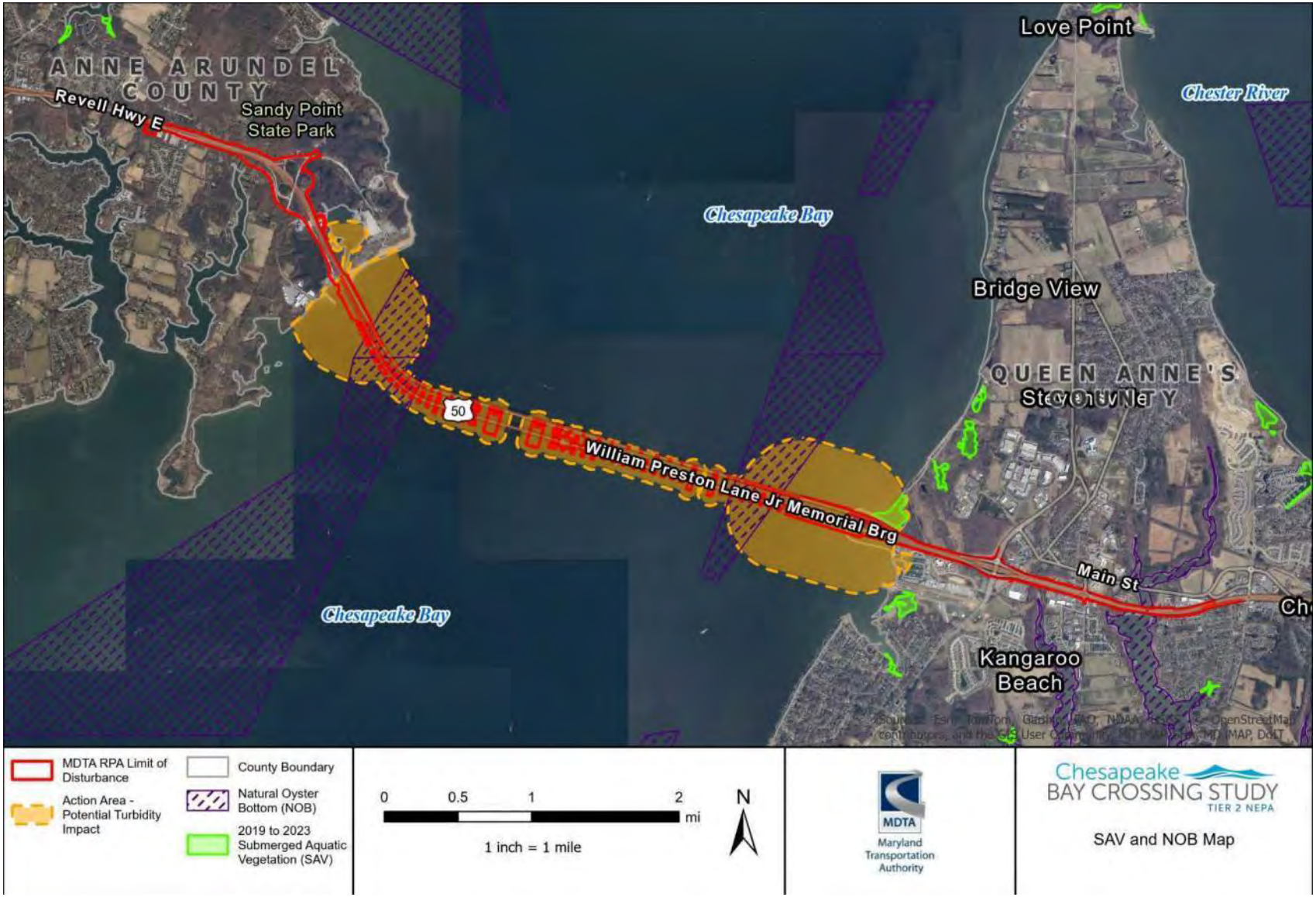
The extent of SAV present was determined through an analysis of existing and historical SAV beds documented by VIMS. The 5-year average extents of SAV were determined using a GIS overlay of the action area with the VIMS data from 2019 through 2023. The MDTA analyzed SAV density from year to year, utilizing the annual datasets from VIMS from 2000 to 2023. MDNR considers any area mapped in those 5 years to be habitat that supports SAV, even if SAV is not found there on a given date during the growing season. This analysis revealed historic patterns and trends that enhanced understanding of SAV in the action area. Historical data from 2000 to 2018 were also reviewed to identify areas that could potentially support SAV again in the future, given the right conditions.

SAV habitat exists north of the eastern terminus for the Bay Bridge, to approximately 1,200 feet north, along the Queen Anne's County shoreline. Records show that SAV has been present in this area in 4 of the last 5 years (2023, 2022, 2021, and 2019) of available data. There are no SAV records south of the eastern terminus of the bridge in Queen Anne's County or for either side of the western terminus of the bridge in Anne Arundel County. Most of the SAV beds within this area in 2023 were identified as dense SAV beds (>70 percent cover). There were no SAV beds in the Cox Creek mainstem or in the Chesapeake Bay mainstem within the action area (**Figure 4-3**).

4.2.6 Natural Oyster Bars (NOBs)

Information on the locations of NOBs was obtained through coordination with MDNR. NOBs exist from approximately 1,500 feet to 4,500 feet off the Anne Arundel County shoreline towards the main channel, extending north and south of the Chesapeake Bay Bridge. NOBs exist from approximately 4,100 feet to 6,200 feet off the Queen Anne's County shoreline towards the main channel, extending north and south of the Chesapeake Bay Bridge. Most tidal crossings along Kent Island cross NOBs, including Cox Creek. Historic oyster bottom habitat generally falls in the same areas as NOBs, with differences in specific boundaries. Cultch areas are found in concentrated areas along both the Anne Arundel and Queen Anne's County shorelines. One oyster planting area, Sandy Point South, is located within the action area, in the vicinity of the Chesapeake Bay Bridge and approximately 3,500 feet from the Anne Arundel County shoreline towards the main channel. Oyster sanctuaries are present where the review area crosses Cox Creek. Public Shellfish Fishery Areas overlap NOBs off the Anne Arundel County shoreline towards the main channel and within Kent Island Narrows and adjacent tidal connections. Approximately 124.8 acres of NOB are located within the Preferred Alternative LOD and potential turbidity impact portions of the action area (**Figure 4-3**).

Figure 4-3: Submerged Aquatic Vegetation (SAV) and Natural Oyster Bars (NOB) Map



4.2.7 Aquatic Habitat and Biota

Within the vicinity of the action area, MDNR CBBMP tidal benthic macroinvertebrate data was available for the Chesapeake Bay. MDNR assessed benthic macroinvertebrate communities at two random sites and one fixed monitoring location, all located upriver of U.S. 50/301. Benthic macroinvertebrate community health varied from “severely degraded” to “meets restoration goals” for these sites, based on benthic index of biotic integrity (IBI) scores. Benthic macroinvertebrate data was not available for Cox Creek.

5 EFFECTS ANALYSIS

The MDTA is currently in the early stages of preliminary engineering for the Preferred Alternative. Specific construction means and methods have not been determined. Therefore, this BA will assess all potential construction means and methods that are being considered and these methods will be further defined during the final design stage. Any major changes to design assumptions that result in the potential for changes in impacts to listed species will be coordinated with NOAA Fisheries and other resource agencies. The following sections include initial assumptions based on the current design and best available information from similar bridge projects including the Francis Scott Key Bridge, Tappan Zee Bridge, and Nice-Middleton Bridge.

Currently, two cable-stayed or suspension bridge spans are being considered for the Preferred Alternative. To construct the bridge spans, trestles could be used to facilitate pier placement for the new bridge and demolition of the piers from the existing bridge. Piers would have some form of pier protection whether it be an island or fender system. Pile driving, dredging, filling of tidal waters and associated aquatic resources, demolition of the existing structure (including blasting), and land-based activities have the potential to impact Atlantic sturgeon, shortnose sturgeon, and sea turtles. Specialized protection measures will be implemented during construction to avoid and minimize impacts to protected species, as discussed in Section 3.3. The MDTA is committed to building upon the work and lessons learned from other recent bridge projects, including the Nice-Middleton Bridge Project and the Francis Scott Key Bridge Project.

5.1 Pile Driving

Pile driving causes pressure waves and sound waves that impact fish. Pressure waves can kill or seriously injure fish by rupturing their swim bladders. The acoustic effects of pile driving can affect the hearing, swim bladders, and tissue of fish, and can cause behavioral impacts (e.g. changes in foraging or movements) (Popper et al. 2013; Caltrans 2020). Similar to sturgeon species, sea turtle species can be adversely affected by underwater noise; however, sea turtles have a higher threshold for behavior disturbance (NOAA Fisheries 2023b).

The distance of the sound effects would be dependent upon pile size, material, and methods of pile driving (Popper et al. 2013; Caltrans 2020). Though specific construction means and methods have not been developed, estimates of noise levels were calculated based on construction means and methods of similar projects, including Francis Scott Key Bridge, to provide the most impactful reasonable estimates of impacts. The Francis Scott Key Bridge is a project in the same geographic region, with similar maximum pile sizes and similar pile materials (the largest piles being 96” steel pipe piles). Actual noise levels resulting from pile driving operations for the pile types and sizes assumed during this initial design are not available at this time; therefore, pile installation noise level estimates were calculated using the NOAA Fisheries Multi-Species Pile Driving Calculator (NOAA Fisheries 2025). Calculations were completed for multiple pile driving scenarios for bridge piers based on the current Tier 2 Study high-level assumptions, including: impact hammer installation of 36” square concrete piles; impact hammer and vibratory hammer installation of 36” steel pipe piles; 48” steel shells (for fender installation); 48” steel pipe piles; 96” steel pipe piles; and 14” steel H-piles and 19.6” sheet piles for dolphin pier protection.

Conservative estimates were used for all instances. As unattenuated sound pressure levels associated with construction of the Preferred Alternative are unknown, proxy sound levels were used for the Peak, SEL_{ss}, and RMS Unattenuated Single Strike Level, as provided by the Multi-Species Pile Driving Calculator. When a proxy was not available for a specific pile type, a larger pipe proxy was included in the calculations to provide the most impactful estimate of noise impacts. The MDTA assumes construction of the Preferred Alternative would require installation of up to 16 piles per day, 2,500 strikes per pile (impact), and 30 minutes per pile (vibratory), based on the Underwater Noise Monitoring Plan for the Francis Scott Key Bridge Project. The Distance Associated with Single Strike Level/Measurement Distance (meters) and Transmission Loss Constant values were maintained at their default values, 10 and 15, respectively. Attenuation is assumed as bubble curtains would be in place. Calculations were completed with attenuation levels set at 10 dB for most pile types, a conservative estimate based on the 15-20 dB of attenuation attained with pile driving associated with the Nice-Middleton Bridge Project. Dolphin pier protection installation calculations were completed with attenuation levels set at 5 dB based on the assumption that the bubble curtain would be less protective in this scenario.

Pile driving will not be continuous for the duration of bridge construction. Pile driving for construction of the first span and its pier protection is expected to occur for approximately 120 days during year 1 through year 3 of construction. Pile driving for construction of the second span and its pier protection is expected to occur for approximately 138 days during year 7 through year 12 of construction. While pile driving will be protracted, it will not happen on a daily basis and when it occurs, it will not always occur for full days. Exact timing of pile driving has not been determined, but it could possibly take place throughout multiple seasons of the year, with breaks for TOYRs coordinated with NOAA Fisheries and MDNR to protect aquatic species, for adverse weather conditions, to set-up or break-down equipment, and to conduct other construction activities.

Assumptions for pile driving information based on similar projects in the region are presented in **Table 5-1**. Estimated sound levels and distances to sturgeon and sea turtle injury and behavioral effects are presented in **Table 5-2** and **Table 5-3**. Isopleths are shown in the mapping included in **Appendix D**; the NOAA Fisheries Multi-Species Pile Driving Calculator output is included in **Appendix E**. Note that one representative pile driving isopleth is shown for each pier and representative isopleths for every pier are shown. In practice, however, a maximum of sixteen piles would be driven at any given time resulting in sixteen concurrent isopleths or zones of fish injury/behavioral modification. Based on the behavior modification impact isopleths generated from pile driving, it is clear that pile driving activities could be phased to accommodate driving up to sixteen piles at a time while still allowing for fish migration.

Table 5-1: Proxy Levels for Underwater Noise

Type of Pile**	Hammer Type	Proxy Type Used	Estimated Peak Noise Level (dB_{Peak})	Estimated Single Strike Sound Exposure Level (dB_{SELss})	Estimated Pressure Level (dB_{RMS})
36" Square Concrete	Impact	30" Square (Type II)	200	166	176
36" Steel Pipe	Impact	36" Steel Pipe	210	183	193
	Vibratory	36" Steel Pipe	N/A	N/A	175
48" Steel Pipe	Impact	48" Steel Pipe	213	179	192
48" Steel Pipe (60" Steel Pipe Proxy)*	Impact	60" Steel Pipe	210	185	195
48" Steel Pipe (72" Steel Pipe Proxy)	Vibratory	72" Steel Pipe	N/A	N/A	180
96" Steel Pipe	Impact	96" Steel Pipe	220	195	205
	Vibratory	72" Steel Pipe	N/A	N/A	180
14" H-Pile	Impact	14" Steel H-Pile	208	177	187
	Vibratory	14" Steel H-Pile	N/A	N/A	150
AZ Sheet Pile	Impact	24" AZ Sheet Pile	205	180	190
	Vibratory	AZ Steel Sheet – Loudest	N/A	N/A	165

**In order to create an increasing trend in noise effect between all steel pipe pile sizes, two 48" steel pipe proxies were used in order to create a range of likely impacts. The noise proxy levels for a 48" steel pipe did not produce the expected impacts for the SELcum and RMS Threshold and therefore the noise proxy for a 60" steel pipe was used instead.*
***The NOAA Fisheries Multi-Species Pile Driving Calculator only includes vibratory proxies for 36" steel pipes and 72" steel pipes. Therefore, for every steel pipe greater than 36" in diameter, 72" steel pipe sound proxy levels were used.*

Table 5-2: Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (ft) to 206 dB_{Peak}	Distance (ft) to SEL_{cum} thresholds (187 dB; 183 dB)	Distance (ft) to Behavioral Disturbance Threshold (150 dB_{RMS})
36" Square Concrete	Impact	2.8	82.4; 82.4	382.5
36" Steel Pipe	Impact	13.1	1,120.3; 1,120.3	5,199.8
	Vibratory	N/A	N/A	328.1
48" Steel Pipe	Impact	20.7	606.3; 606.3	4,459.8
	Vibratory	N/A	N/A	706.8**
48" Steel Pipe (60" Steel Pipe Proxy)*	Impact	13.1	1,522.8; 1,522.8	7,068.4
	Vibratory	N/A	N/A	706.8**
96" Steel Pipe	Impact	60.6	7,068.4; 7,068.4	32,808.4
	Vibratory	N/A	N/A	706.8**
14" H-Pile	Impact	20.7	960.8; 960.8	4,459.8
	Vibratory	N/A	N/A	15.2
AZ Sheet Pile	Impact	13.1	1,522.8; 1,522.8	7,068.4
	Vibratory	N/A	N/A	152.3

**In order to create an increasing trend in noise effect between all steel pipe pile sizes, two 48" steel pipe proxies were used in order to create a range of likely impacts. The noise proxy levels for a 48" steel pipe did not produce the expected impacts for the SELcum and RMS Threshold and therefore the noise proxy for a 60" steel pipe was used instead.*
***The NOAA Fisheries Multi-Species Pile Driving Calculator only includes vibratory proxies for 36" steel pipes and 72" steel pipes. Therefore, for every steel pipe greater than 36" in diameter, 72" steel pipe sound proxy levels were used.*

Table 5-3: Estimated Distances to Sea Turtle Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (ft) to 232 dB_{Peak}	Distance (ft) to SEL_{cum} threshold (184 dB Impact / 198 dB Vibratory)	Distance (ft) to Behavioral Disturbance Threshold (175 dB_{RMS})
36" Square Concrete	Impact	0.1	519.5	8.2
36" Steel Pipe	Impact	0.3	7,061.8	112.0
	Vibratory	N/A	193.7	7.1
48" Steel Pipe	Impact	0.5	3,821.6	96.1
	Vibratory	N/A	417.3**	15.2**
48" Steel Pipe (60" Steel Pipe Proxy)*	Impact	0.3	9,599.5	152.3
	Vibratory	N/A	417.3**	15.2**
96" Steel Pipe	Impact	1.5	28,069.2	706.8
	Vibratory	N/A	417.3**	15.2**
14" H-Pile	Impact	0.5	6,056.9	96.1
	Vibratory	N/A	9.0	0.3
AZ Sheet Pile	Impact	0.3	9,599.5	152.3
	Vibratory	N/A	89.9	3.3

**In order to create an increasing trend in noise effect between all steel pipe pile sizes, two 48" steel pipe proxies were used in order to create a range of likely impacts. The noise proxy levels for a 48" steel pipe did not produce the expected impacts for the SELcum and RMS Threshold and therefore the noise proxy for a 60" steel pipe was used instead.*
***The NOAA Fisheries Multi-Species Pile Driving Calculator only includes vibratory proxies for 36" steel pipes and 72" steel pipes. Therefore, for every steel pipe greater than 36" in diameter, 72" steel pipe sound proxy levels were used.*

Exposure to underwater noise levels of 206 dB peak and 187 dB SEL_{cum} (cumulative sound exposure level) can result in injury to sturgeon, and levels of 232 dB peak, 184 dB SEL_{cum} (impact) and 198 dB SEL_{cum} (vibratory) (permanent threshold shift or PTS) can result in injury to sea turtles. These noise levels refer to the maximum instantaneous sound pressure in water and the cumulative sound exposure level, respectively, expressed in decibels.

The maximum distance to the 206 dB peak for sturgeon is estimated (based on the NOAA Fisheries Multi-Species Pile Driving Calculator outputs) to be 60.6 feet, and the maximum distance to the 187dB SEL_{cum} isopleth for sturgeon is estimated to be 7,068.4 feet, which would occur during impact pile driving of the 96-inch diameter steel pipe piles. To be exposed to potentially injurious levels of noise during impact pile driving of the steel piles, a sturgeon would need to be within 60.6 feet of the pile for a single strike or remain within 7,068.4 feet of the pile

being driven for a prolonged time period. The expectation is that adult and juvenile sturgeon would modify their behavior and move away from the area upon exposure to underwater noise levels of 150 dB_{RMS} (the sound pressure threshold for causing behavioral effects to sturgeon). Given that sturgeon would be exposed to levels of noise that cause behavioral modification (at 32,808.4 feet for impact pile driving with assumed attenuation of 10 dB from bubble curtains) before being exposed to injurious levels of noise (at 7,068.4 feet), sturgeon would be expected to move away from the sound source and never be exposed to potentially injurious levels of underwater noise. If any sturgeon are within 7,068.4 feet of pile driving operations, injury to sturgeon is still not expected to occur. This is because the SEL_{cum} injury threshold is cumulative (requiring prolonged exposure to the noise at that level). For fishes, the Multi-Species Acoustic Tool indicates that there is no consistent data to support tissue/hearing recovery between pile strikes such that repeated strikes have a cumulative effect that can contribute to injury. However, the Multi-Species Acoustic Tool does assume that a 12-hour period of "effective quiet" resets the accumulated sound exposure level (SEL) such that the accumulated energy from multiple strikes would not contribute to injury. The assumption of cumulative effects during pile driving has resulted in generally larger distances to behavioral and physiological thresholds for fishes compared to the NOAA Fisheries GARFO Acoustic Tool spreadsheet previously used for evaluations of acoustic impacts. Sturgeon would be expected to alter behavior and move away from the pile being driven in a matter of seconds once pile driving commences. NOAA Fisheries included estimates of swim speeds for sturgeon in the Tappan Zee Bridge Replacement Biological Opinion based on several studies (Kelly and Klimley 2011; LeBreton et al. 2006; Boysen and Hoover 2009; and Clarke 2011). NOAA Fisheries estimated that shortnose and Atlantic sturgeon have a prolonged swim speed of at least 1.1 feet per second (fps) (35 cm/s) and an escape or burst speed of at least 1.4 fps (45 cm/s). NOAA Fisheries also estimated that sturgeon could sustain their prolonged swim speed for up to 200 minutes without muscle fatigue (NOAA Fisheries, 2017b). Based on the estimated prolonged swim speed, a sturgeon could be expected to exit the maximum SEL_{cum} ensonified area (7,068.4 feet from the pile driving location) within approximately 6,426 seconds, or 107 minutes, and would not reach or exceed the duration at which muscle fatigue would be expected. The initiation of daily pile driving with a soft start technique would also give sturgeon in the area time to move out of the range of any injurious sound waves.

While it is anticipated that sturgeon will leave the area following the initiation of pile driving with a soft start, no active removal of sturgeon from the area will occur, and any sturgeon remaining within 7,068.4 feet for a prolonged period during the impact pile driving of the 96-inch diameter steel pipe piles will be at risk for injury. Additionally, it is possible that multiple pile sizes will be driven simultaneously resulting in multiple overlapping isopleths and therefore a larger overall ensonified area than would occur from a single pile being driven. As specific population data are not available at this time, estimates of the number of sturgeon expected to be exposed to injurious levels of noise cannot be determined; however, the MDTA will continue to coordinate with NOAA Fisheries and will calculate estimates if specific population data are made available.

For sea turtles, the maximum distance to the 232 dB peak is expected to be 1.5 feet, and the maximum distance to the 184 dB SEL_{cum} isopleth is expected to be 28,069.2 feet, which would occur during impact pile driving of the 96-inch diameter steel pipe piles. To be exposed to potentially injurious levels of noise, sea turtles would need to be within 1.5 feet of the pile for a single strike or remain within 28,069.2 feet of the pile being driven for a prolonged time period. Exposure to the 232 dB peak is unlikely to occur because sea turtles are extremely unlikely to be

within 1.5 feet of the pile when pile driving begins. Sea turtles are expected to avoid areas where noise is above 175 dB RMS behavioral threshold, which is an area estimated to extend 706.8 feet from the pile during impact pile driving of the 96-inch diameter steel pipe piles. Sea turtles would be at risk of exposure to injurious levels of noise if they are within 28,069.2 feet of pile driving for a prolonged period of time during impact pile driving of the 96-inch diameter steel pipe piles. While the calculated SELcum isopleth exceeds the behavioral isopleth, the cumulative model assumes a stationary receptor. Because sea turtles are transient and highly mobile, they are expected to move through or away from the area, preventing the accumulation of acoustic energy required to reach the injury threshold. Sea turtle swim speeds vary significantly depending on life stage, but average cruising speeds are estimated to hover around 0.5 m/s to 0.7 m/s (B. Hopper, personal communication, March 16, 2026). Therefore, a sea turtle would be expected to exit the ensonified area (up to 28,0692 feet, or 8,555.5 meters) within approximately 12,222 to 17,111 seconds, or 204 to 285 minutes. Additionally, it is possible that multiple pile sizes will be driven simultaneously resulting in multiple overlapping isopleths and therefore a larger overall ensonified area than would occur from a single pile being driven. As specific population data are not available at this time, estimates of the number of sea turtles expected to be exposed to injurious levels of noise cannot be determined; however, the MDTA will continue to coordinate with NOAA Fisheries and will calculate estimates if specific population data are made available.

As noted above, behavioral effects, such as avoidance or disruption of foraging activities, may occur to sturgeon exposed to noise above 150 dBRMS and to sea turtles exposed to noise above 175 dB RMS. Noise levels are expected to be below 150 dBRMS at distances beyond a maximum of approximately 32,808.4 feet from the pile being installed (during impact pile driving for 96-inch steel pipe piles). Noise levels are expected to be below 175 dB RMS beyond a maximum of approximately 706.8 feet from the pile being installed (during impact pile driving for 96-inch steel pipe piles).

Mitigative measures that will be employed during pile driving include the use of a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles (effectiveness shall be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities); maintaining a ZSFP from January 15 through May 15 as outlined in Section 3.3; using a “soft start” or “ramping up” pile driving (e.g., driving does not begin at 100% energy) to allow listed sturgeon and sea turtle species to move away from areas that may be ensonified to potentially injurious levels; restricting pile driving activity to no more than 12 consecutive hours per day, to allow for a 12-hour effective rest period; initially driving steel piles with a vibratory hammer through softer, sandy soils prior to using an impact hammer through stiffer material, as practicable and appropriate; using cushion blocks to drive concrete piles with an impact hammer as practicable and appropriate; and developing an underwater noise monitoring plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise. Additional mitigative measures that could be employed during pile driving are outlined in Section 3.3.

Avoidance of the ensonified area during active pile driving represents a temporary loss of habitat; however, sturgeon and sea turtles are expected to return to the site when pile driving is not occurring (i.e., during breaks, after typical working hours, weekends). Use of soft start pile driving techniques would allow fish and sea turtles to move away from the area at the beginning of a workday and after a break, so they are not exposed to noise levels reaching the thresholds for

physical injury under most pile-driving scenarios. Injury to listed species resulting from underwater pile-driving noise may still occur due to large sea turtle injury-threshold isopleths expected during the impact pile driving of the 96-inch diameter steel pipe piles, and as no active sturgeon removal will occur prior to pile-driving.

Based on the information above, the MDTA has determined that noise from pile driving is likely to adversely affect listed sturgeon and sea turtle species in the action area. Further evaluation of potential noise impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

The MDTA will continue to coordinate with NOAA Fisheries on mitigative measures through the design process and an Underwater Noise Monitoring Plan will be developed during final design and permitting to ensure that underwater noise thresholds are maintained during construction.

5.2 Dredging

Based on existing conditions within the Chesapeake Bay, it is expected that dredging would be necessary to create access channels to support construction and demolition activities for the Preferred Alternative. Considering input from the MDTA and previous similar dredging efforts, mechanical dredging will be used and a dredging target depth of nine feet below water level is assumed. The dredging areas were established using the "Maryland bathymetry Chesapeake Bay contours" data at both shorelines of the Chesapeake Bay (Western and Eastern Shores). The northern limit of dredging is assumed to occur approximately 50 feet north of the existing westbound span piers (to be demolished) and the southern limit is assumed to be approximately 60 feet from the southern edge of a new eastbound span.

Atlantic and shortnose sturgeon could potentially be affected by dredging activities due to their utilization of the area during seasonal breeding migrations. Their presence may be more often found in deep water habitat such as the federally maintained channels; however, they are bottom feeders and therefore found where suitable forage (e.g., benthic invertebrates such as mollusks and crustaceans) and appropriate habitat conditions (e.g., areas of SAV) are present in shallower waters. The physical disturbance of sediments and entrainment of associated benthic resources could reduce the availability of sturgeon prey species, although recolonization of the opportunistic benthic species would occur relatively quickly. Studies of anadromous fish such as striped bass indicate that adverse effects to fish typically occur at 1,000 mg/L (Burton, 1993), and effects to certain benthic communities could occur at 390 mg/L (EPA, 1986). Both Atlantic sturgeon and shortnose sturgeon are thought to be at least as tolerant of elevated turbidity as other anadromous fish.

Dredges and other mechanisms have the ability to impinge or entrain sturgeon during routine operation. Impingement/entrainment may cause injury or death in certain cases. Sturgeon are not typically susceptible to entrainment in mechanical dredges, because bucket dredges are relatively stationary, and the operation entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge at a slow pace. Additionally, mechanical dredging lacks suction, and the culmination of these factors allows fast, strong swimming sturgeon to move away from dredging activities. The risk of capture by mechanical dredges is higher in areas where large numbers of sturgeon may aggregate, such as overwintering sites or foraging areas. Additionally,

overwintering sturgeon may be less responsive to stimuli and more at risk. Overwintering sturgeon in the action area include juvenile Atlantic sturgeon and adult shortnose sturgeon.

Sturgeon species may be susceptible to entrainment or impingement by dredge equipment used for construction. However, the mobility and ability of adult and sub-adult sturgeon to avoid the low intake velocities of the dredge equipment make impingement unlikely, though juvenile sturgeon may be more susceptible. A list of all documented interactions between dredges and sturgeon reported along the U.S. East Coast was provided to NOAA Fisheries by the USACE in 2012, and included documentation dating back to 1990. One report of a live shortnose sturgeon captured in a dredge bucket in 2009 was not included in the report. The list included four sturgeon captures in dredge buckets: one live Atlantic sturgeon, one recently dead shortnose sturgeon, one decomposed Atlantic sturgeon considered to have been dead prior to the dredge interaction, and one report of capture which was not verified (B. Hopper, personal communication, February 3, 2026).

The documentation by USACE indicates that capture of both Atlantic and shortnose sturgeon by mechanical dredging is possible, though the number of captures due to mechanical dredging is low. Based on this summary data, the project location and the short mechanical dredge window, Atlantic and shortnose sturgeon capture by mechanical dredging associated with construction of the Preferred Alternative, if any, is anticipated to be very low. The MDTA and FHWA are estimating the potential take of one individual of each sturgeon species for each dredging event (total of 4 sturgeon) during project construction.

Turbidity effects from dredging are not anticipated to affect sturgeon species, as the life stages most vulnerable to increased sediment are eggs and non-mobile larvae, which would not be present in the action area. Any sturgeon in the vicinity would be sufficiently mobile to avoid any sediment plume or reductions in dissolved oxygen (NOAA Fisheries, 2017a).

Sea turtles are typically not susceptible to entrainment in mechanical dredging because bucket dredges are relatively stationary, and the operation entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge at a slow pace. Additionally, mechanical dredging lacks suction, and the culmination of these factors allows fast, strong-swimming sea turtles to move away from dredging activities (NOAA Fisheries, 2017a).

Sea turtle species could potentially be affected by dredging activities due to their utilization of the area (generally during the warmer months of April to November). Their presence would most likely be where suitable forage (e.g., benthic invertebrates such as mollusks and crustaceans) and appropriate habitat conditions are present (e.g., areas of SAV). The physical disturbance of sediments and entrainment of associated benthic resources could reduce the availability of sea turtle prey, but the impacted benthic habitat represents a minimal amount of the available habitat in the region, and recolonization of the opportunistic benthic species would occur quickly, making these localized impacts to sea turtle habitat and prey too small to be meaningfully measured.

Dredged areas will be in place throughout the construction duration, although the exact timing of the dredging is unknown. An estimated two thirds of the dredging will take place in the first year of construction to accommodate the eastbound bridge span. This initial dredged area will remain in place for up to 15 years. The remaining one third of dredging will take place at the start of

construction of the westbound bridge span. It is anticipated that dredging during construction of the first span will take approximately 14 days and will occur during year 1 to year 2 of construction, and dredging during construction of the second span will take approximately 7 days and will occur during year 7 to year 8 of construction.

The MDTA will continue to coordinate with NOAA Fisheries regarding mitigative measures through the design process. Avoidance and minimization measures that will be employed include employing an IEM; conducting SAV surveys during the growing season, prior to construction, within nearshore areas of the Action Area to determine the presence and extent of SAV beds; and evaluating dredge material to determine appropriate disposal method and location and use of mechanical dredging methods. The MDTA will commit to the use of an observer during mechanical dredging in case of an accidental capture. A NOAA-Fisheries approved observer will be present to observe the bucket as it comes out of the water and as the load is deposited into the scow during each dredge cycle for sturgeon and sea turtles and/or their parts. The observer will contact NOAA Fisheries and submit an incident report within 24 hours of the capture of any sturgeon or sea turtle (or their parts). Additional avoidance and minimization measures that could be employed to address potential impacts related to dredging are outlined in Section 3.3, and include implementing TOYRs to avoid impacts during sensitive life stages.

The MDTA will prepare a Dredge Material Management Plan, which will include final dredging methods proposed, minimization measures specific to dredging operations, and detailed information regarding the transport and disposal of dredged materials. Required TOYRs for dredging will also be coordinated with the resource agencies. Conditions would include:

- Dredging will be prohibited during certain times of the year to protect shellfish, including oysters. Mechanical dredging within 500 yards of shellfish areas will be prohibited from December 16 through March 14 and from June 1 through September 30 of any year. Hydraulic dredging (which includes hopper dredging and cutterhead pipeline dredges) within 500 yards of shellfish areas will be prohibited from June 1 through September 30. (COMAR 26.24.02.06)
- Dredging within 500 yards of SAV beds will be prohibited between April 15 and October 15 of any year.

Based on the foregoing, the MDTA has determined that dredging may affect but is not likely to adversely affect listed sea turtle species, and is likely to adversely affect listed sturgeon species within the action area. Further evaluation of potential dredging impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

5.3 Turbidity and Habitat Modification

Turbidity due to new bridge construction, existing structure demolition, and land-based activities such as clearing, culvert replacements or in-water fill is expected to occur. Sediment and turbidity impacts are expected to occur up to 300-feet from pile driving locations, and up to 2,000 feet from dredging locations (NOAA Fisheries, 2025). Fill will be placed in-water to accommodate the roadway widening along the south side of the approach to the Cox Creek bridge (approximately 0.6 acres) and the abutments supporting the extension of the widening of the existing bridge (approximately 2.9 acres) though the extent of turbidity resulting from this activity is expected to be contained within the LOD due to the use of sedimentation and turbidity controls. Appropriate

sedimentation and turbidity controls will be used during construction to prevent sediment plumes and sediment movement downstream. Construction timing will be coordinated with the resource agencies with the goal implementing the TOYR for Use I and II streams.

Permanent impacts within the Chesapeake Bay are anticipated to occur in areas of permanent fill within the substrate from bridge substructure elements including piers and pier protection systems (e.g. islands, dolphins, or fender system), as well as any impacts that last longer than one year. Final design will dictate the size and type of piles or footings proposed for pier construction and impacts will be calculated based on the area of new structure/fill at or below the mudline. Estimates of the number of piers, pier size, and area of construction are preliminary but have been developed to provide a conservative estimate of potential impacts. At this preliminary stage of design, quantitative impact calculations include both permanent and temporary effects to the Chesapeake Bay as a total combined impact. Temporary impacts may include geotechnical investigations, temporary mooring piles or mooring ball anchors to stabilize the barges and vessels at the staging areas, in-river BMPs, and removal of existing bridge piers/piles. Approximately 134.8 acres of tidal water bottom impacts are expected due to construction impacts associated with the Preferred Alternative. Anticipated turbidity impacts specific to pier placement, clearing, and dredging include:

- The generation of suspended solids/turbidity and the resultant degradation of surface water quality and sediment quality.
- A decreased photic zone due to increased turbidity.
- Elimination of benthic populations within the dredging zone.
- Deposition of dredge-induced suspended sediment on benthic populations downstream of the dredging zone.

While the temporary increase in suspended sediments may cause Atlantic and shortnose sturgeon to alter their normal movements, these minor movements would be too small to be meaningfully measured or detected. Turbidity is most likely to affect sturgeon if a plume causes a barrier to normal behaviors. However, it is expected that sturgeon would swim through the plume to avoid the area with no adverse effects.

Increased turbidity effects from dredging are not anticipated to affect sturgeon species, as the life stages most vulnerable to increased sediment are eggs and non-mobile larvae, which would not be present in these areas. Any sturgeon in the vicinity would be sufficiently mobile to avoid any sediment plume or reductions in dissolved oxygen. Changes in water quality parameters resulting from discharges, construction activities, and demolition may adversely affect sturgeon. Both species of sturgeon are similarly sensitive to certain water quality parameters. Dissolved oxygen levels below 4.0 mg/L have been shown to have deleterious effects on sturgeon. Likewise, temperatures above 28 degrees C have also been demonstrated to be harmful. Lowered DO, changes in temperature, addition of pollutants, and increased sedimentation may interrupt the basic life functions of sturgeon such as their behavior, foraging ability, migration, and reproduction (NOAA Fisheries 2017a). The action area is located within a large tidal system that experiences substantial natural variability in temperature and DO, and these parameters are also influenced by various local and regional anthropogenic factors. Given the scale of the Chesapeake Bay, and that multiple external factors contributing to temperature and DO would be present throughout the project duration, the effect of the action on changes to these water quality parameters would be insignificant.

Turbidity effects to sea turtles from bridge expansion due to in-water fill are extremely unlikely. One major issue associated with suspended sediments is its effect on the respiration of marine fauna. However, sea turtles breathe air and increased suspended sediments are not likely to affect turtle respiration. The most likely effect is if a sediment plume causes a barrier to normal behaviors. As sea turtles are highly mobile, they are likely to be able to avoid any sediment plumes, which typically only last for a short duration near the bottom (NOAA Fisheries 2017a).

Sea turtles can be affected by impaired water quality through their inability to forage due to sedimentation of their food sources. Sedimentation can bury benthic organisms and SAV and suspended sediments reduce the availability of sunlight to SAV. Because sea turtles breathe air, direct effects of elevated turbidity levels are not likely as many pollutants are not absorbed through sensitive gill structures or during development phases as is the case for fish; however, low DO levels, high temperatures, or release of pollutants that do not adhere to water quality standards may all detrimentally affect benthic communities and small pelagic fish that serve as forage. As noted in **Section 5.2**, recolonization of the opportunistic benthic species would occur relatively quickly (NOAA Fisheries 2017a). As noted above, given the scale of the Chesapeake Bay, and that multiple external factors contributing to temperature and DO would be present throughout the project duration, the effect of the action on changes to these water quality parameters would be insignificant.

Water quality may also be impacted by introducing construction materials to the action area. Materials such as pressure-treated lumber may adversely impact water quality due to leaching, though impacts are expected to be greater in low-flow areas (Metz 2019). Therefore, impacts are expected to be minimal as the action area is in a large tidal system. The MDTA will consider alternatives to the use of pressure-treated lumber and other materials that may have the potential to impact water quality, as applicable and as appropriate.

Rubble will drop to the bottom of the Bay as a result of demolition of the existing concrete bridge piers. A detailed description of the assumed demolition procedures and anticipated impacts can be found in the *Demolition of the Existing Eastbound and Westbound Bridge Piers Conceptual Analysis* (**Appendix F**). During explosive demolition, blast containment measures will be implemented to ensure the rubble produced from the blast is controlled and therefore will likely drop in the immediate vicinity of the piers. The rubble can be removed or used to fill scour holes as appropriate, if scour holes are found to be present and pending coordination with NOAA Fisheries. The degree to which all or some of the debris will be removed will depend on the size of the debris and on environmental factors including depth and composition of the Bay bottom. Bathymetric surveys will be conducted closer to the start of construction, and the data collected will be used to determine the feasibility of removing rubble. Rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place. Beneficial re-use of suitable rubble for artificial reef sites or restoration may be considered. Removal of rubble would be by clamshell bucket and is anticipated to have similar impacts, and avoidance and minimization measures, to dredging as described in Section 5.2. The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.

Rubble that drops to the bottom of the Bay has the potential to impact soft bottom substrates and benthic communities; however, these impacts are limited to an area within and immediately

surrounding the footprint of each blasted pier. The area that would be impacted by falling rubble is relatively small compared to the overall action area, and an even smaller area compared to the soft substrate that is available for foraging throughout the Chesapeake Bay. Therefore, effects on sturgeon and sea turtles from reductions in benthic resources from falling rubble will be too small to be meaningfully measured or detected.

The MDTA will continue to coordinate with NOAA Fisheries on mitigative measures through the design process. Avoidance and minimization measures that will be employed for in-water activities to address potential impacts related to turbidity and habitat modification include only using clean fill; employing an IEM; conducting SAV surveys during the growing season, prior to construction, within nearshore areas of the action area to determine the presence of SAV beds; minimizing the suspension of sediments and disturbance of the substrate when removing piles by implementing applicable techniques outlined in Section 3.3; prevent sediment and debris from entering the water using geo-textile fabric, hay bales or other methods; removing demolition debris that falls into the water; limiting the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as silt curtains, settling basins, and cofferdams; removal of cofferdams or other diversion structures only after water quality is consistent with ambient levels outside the structure; removal of contaminants and sediments from water discharge prior to entering aquatic habitats; evaluate dredge material to determine appropriate disposal method and location; manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter the Bay untreated; remove all obsolete and temporary structures and fills including monitoring devices in their entirety; and return aquatic habitats impacted by temporary activities, fills, or structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation. Additional avoidance and minimization measures that could be employed to address potential impacts related to turbidity and habitat modification are outlined in Section 3.3.

The MDTA will approach design and development with the goal of minimizing and further mitigating potential impacts to water quality associated with the Preferred Alternative. Typically, the most important and easily attainable minimization efforts during construction include successful implementation of strict ESC measures and SWM techniques, which can reduce both impacts to a waterway and its water quality. The MDTA will coordinate with the regulatory agencies regarding any required water quality monitoring program associated with the Preferred Alternative. Development and implementation of a water quality monitoring plan prior to construction will provide real-time comparable data to support consistent management and attainment of water quality standards.

Based on the information above, the MDTA has determined that turbidity and habitat modification may affect but is not likely to adversely affect listed sturgeon and sea turtle species in the action area. Further evaluation of potential turbidity and habitat modification impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

5.4 Increased Vessel Traffic

During construction of the Preferred Alternative, an increase in vessel traffic in the Chesapeake Bay will occur (i.e., barges, support vessels, etc.). The approximate size and type of vessel, travel routes, and number of trips is currently unknown. Sturgeon may be injured or killed as a result of being struck by boat hulls or by propellers. The factors relevant to determining the risk to these

species from vessel strikes vary, but may be related to the size and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the behavior of individuals in the area (e.g., foraging, migrating, overwintering, etc.). Most vessel traffic will be slow moving in the construction area, minimizing potential for collisions with sturgeon. Strikes from construction vessels are possible, but extremely unlikely. Construction vessels will be within deeper waters and have shallow drafts, and, though sturgeon use the upper water column during non-foraging movements and migration and sometimes jump out of the water, sturgeon will typically be at greater depths, substantially reducing construction vessel strike risk (Balazik et al., 2012). In addition to vessel traffic in the immediate Tier 2 Study area, vessel traffic will also result from transportation of dredge material from the Tier 2 Study area to disposal sites. The MDTA has begun preliminary coordination to identify potential dredge disposal sites that may have space for dredge spoils. Dredge spoils associated with the Preferred Alternative are anticipated to be 317,400 cubic yards. As noted in section 5.2, potential dredge disposal sites under consideration and likely to be utilized include Masonville Cove in Baltimore County, MD and Cox Creek in Anne Arundel County, MD.

Sea turtles are more susceptible to vessel strikes from construction vessels than sturgeon, since sea turtles spend more time closer to the surface; however, sea turtles are more vulnerable to being struck by faster moving vessels. Typically, dredge equipment, barges, and support vessels that will be used will move at slow speeds (i.e., on average 8 to 10 knots) and have shallow drafts. Thus, it is extremely unlikely for sea turtles to be struck by these vessels during construction.

Transport of dredge material is expected to take 14 days during construction of the first bridge span, to occur during year 1 to year 2 of construction, and seven days during construction of the second bridge span, to occur during year 7 to year 8 of construction. The exact timing of dredging, and therefore the exact timing of transport of material, is unknown. Additionally, specific timing and duration of vessel traffic beyond transport of dredge material is unknown at this time.

The MDTA will continue to coordinate with NOAA Fisheries on mitigative measures through the design process. Avoidance and minimization measures that will be employed are to avoid mooring vessels in SAV or in such a way that could shade SAV. Additional avoidance and minimization measures that could be employed to address potential impacts resulting from increased vessel traffic are outlined in Section 3.3.

Based on the information above, the MDTA has determined that vessel traffic may affect but is not likely to adversely affect listed sturgeon and sea turtle species in the action area. Further evaluation of potential vessel traffic impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

5.5 Blasting

With the Preferred Alternative, demolition of the existing structure is assumed to occur in two phases. It is anticipated that the first new bridge span will be built, then one existing bridge span will be demolished, and the new bridge span will be in use while the second new bridge span is built. Once both new bridge spans are complete, the second span of the existing bridge will be demolished.

Demolition of the existing structures may include both mechanical means and blasting. Anticipated effects from mechanical demolition are discussed in **Section 5.3**. It is anticipated that blasting will not occur concurrently with pile driving, based on the expected project phasing. If construction of the second new span does begin while demolition of the first existing span is underway, blasting will still not occur concurrently with pile driving as construction would be paused during blasting events. Controlled explosive demolition (blasting) has the potential to impact fish and sea turtles. Negative pressure waves from blasting have been shown to cause swim bladders to rupture, killing fish. Fish species lacking swim bladders are more resistant to explosive pressure waves (Keevin and Hempen, 1997). As sturgeon species do contain swim bladders, Atlantic and shortnose sturgeon are susceptible to impacts from blasting. Limited data is available regarding impacts of blasting on sea turtles, though some studies have demonstrated that blasting can result in mortality to sea turtles. The likelihood of nonlethal damage or delayed mortality in sea turtles resulting from blasting is unknown (Keevin and Hempen 1997). Quantification of impacts to sea turtles from blasting is not possible at this time for the Tier 2 Study due to the lack of specific population data available in the vicinity of the Chesapeake Bay Bridge.

Blasting is anticipated to include 18 blast events during demolition of the first bridge span, to occur during years 6 to 7 of construction, and 16 blast events during demolition of the second bridge span, to occur during years 14 to 15 of construction. As noted in Section 3.3, the MDTA has committed to maintaining a minimum contiguous 7,000-foot-wide ZSFP from January 15 through May 15. Any required blasting will take place during times of lower biological activity (October 1 – December 15); specific dates will be determined during the development of the Demolition Plan and will incorporate the best available data including any updated telemetry data. Adult and subadult Atlantic sturgeon, and adult and juvenile green, Kemp's ridley, leatherback and loggerhead turtles may still be present in the action area through November; juvenile Atlantic sturgeon and adult shortnose sturgeon may be present year-round. Therefore, all life stages of the listed species discussed in this BA may be impacted by blasting, including potential for injury or mortality.

For planning purposes, demolition of the original (1940) Nice-Middleton Bridge (N-MB) performed in late 2023 was used as a proxy for the proposed demolition of the existing Bay Bridge, as the Demolition Plan for the existing Bay Bridge will not be developed until final design and permitting. The MDTA and FHWA have developed demolition assumptions based on the N-MB project due to the similarities in structural components and surrounding habitat when compared to the existing Chesapeake Bay Bridge. If blasting is used on another East Coast project prior to demolition of the existing Bay Bridge, the analysis will be updated using the newer data as the best available science. A detailed description of the assumed demolition procedures and anticipated impacts, as well as justification for using the N-MB project as a proxy, is included in the *Demolition of the Existing Eastbound and Westbound Bridge Piers Conceptual Analysis* (**Appendix F**) and is summarized below.

The superstructure for the existing Bay Bridge spans will likely be demolished similarly to the N-MB. The concrete decks will likely be removed using mechanical means in a way that prevents the materials from falling into the water. Steel beams will likely be lifted off the existing piers. The original steel truss sections from N-MB were rigged in a manner that allowed for quick removal of sections that were dropped in the water with shaped explosive cutting charges. The above water portion of the deep water Bay Bridge piers will likely be removed to an elevation where explosive demolition preparation can be facilitated. The pile bents that are located over shallow water and

the piers that are in less than 40 feet of water (moderate depth) can likely be demolished mechanically. The piers that are in deep water (over 40 feet deep) may need to be demolished mechanically or explosively above the water level and with explosives below the water. The MDTA proposes to leave the four anchor piers and two islands in place.

The N-MB underwater demolition processes were used as a proxy to estimate the impacts of using similar processes for demolition of the Bay Bridge on federally-listed species. It is assumed that the piers will be mechanically demolished above the water surface to an elevation that best facilitates the drilling of vertical holes and loading explosives, typically 6 to 10 feet above the water surface to match deck barge working surfaces. Holes will be drilled and explosives loaded as needed to break apart the piers underwater into pieces that can be removed if necessary. For planning purposes, the general parameters from the approved blast design from the N-MB project are assumed for the proposed Bay Bridge demolition, including:

- 5 decks of explosives per hole.
- 30 pounds of explosives per delay.
- Minimum of 9 milliseconds (ms) delay between explosives.
- Maximum of 17ms delay between decks in the same hole.

The MDTA will evaluate the parameters needed for actual conditions when developing the final blast design for the Bay Bridge. Based on recent similar and nearby projects (e.g., Francis Scott Key Bridge Rebuild, N-MB replacement), the MDTA assumes a time-of-year restriction (TOYR) from December 16 to September 30 on subaqueous blasting will be implemented for the Bay Bridge. Therefore, it is assumed subaqueous blasting of the Bay Bridge would be permitted from October 1 to December 15.

The most appropriate Mortality Zone and Exclusion Zone designations were calculated based on a review of existing published documents and studies used for the N-MB project. The Mortality Zone includes areas where lethal effects to fish are anticipated due to the proximity to blasting and lethal levels of underwater noise. The Exclusion Zone includes areas where effects are expected on fish such as injury and harassment and potential mortality for more susceptible fish.

The formula in Hempen et al. (2007) was used to calculate the Mortality Zone, as described in **Appendix F**. The mortality radius for single, confined shots (MRC) was calculated to be approximately 52 meters (174 feet) around each of the 15 eastbound and 15 westbound piers. For conservative planning, the MRC is added to half the width of the largest piers to be blasted for an adjusted radius of 215 feet around each eastbound pier and 220 feet around each westbound pier. The combined MRC areas result in approximately 5 hectares (13 acres) for each span. The assumed maximum charge to be used is 13.6 kilograms (30 pounds) per delay but these charges will be in the center of the pier. The charges closest to the exterior of the pier will likely be less per delay. Therefore, this Mortality Zone is a conservative (i.e., worst-case scenario) estimate, and a smaller Mortality Zone is anticipated during blasting. The extent of the estimated Mortality Zone is included in the Action Area Map (**Appendix B**).

This planning level demolition analysis uses the Hempen et al. (2005) formula to calculate the conservative (i.e., worst-case scenario) Exclusion Zone, as described in **Appendix F**. The calculations yield an Exclusion Zone radius of 640 meters (2,100 feet) around each pier, for a total combined area of approximately 486 hectares (1,200 acres) for the entire Exclusion Zone

along each span. Similar to the Mortality Zone, this is considered a conservative estimate, as the blast design uses 13.6-kilogram (30-pound) charges located in the interior of the piers and it's likely that lesser charges will be used closest to the exterior of the piers. Therefore, the actual Exclusion Zone where injury and harassment could occur is expected to be smaller for each blast. The extent of the estimated Exclusion Zone is included in the Action Area Map (**Appendix B**).

For subaqueous blasting, avoidance and minimization measures that will be employed include use of scare charges and fish deterrent boats, and monitoring for the presence of tagged surgeon, ahead of blasting activities; developing an underwater noise monitoring plan to describe the underwater noise generated by project activities and adaptive management measures planned to address underwater noise; using nets, tarps, and pans when demolishing bridge superstructures; removing demolition debris that falls into the water; and developing a detailed Demolition Plan in coordination with NOAA Fisheries and submitting to NOAA Fisheries for review and approval in advance of any detonation activity. Fish scare charges will follow the guidance outlined in Managing the Impacts of Blast-Induced Vibration and Overpressure on Fish and Fish Habitat (FHWA, 2019), which states that the use of scare charges using small blasting caps can be effective and should be deployed 30 to 60 seconds prior to the main production blast. Higher charge weight scare charges can be more harmful than effective (McAnuff et al., 1994; Keevin et al., 1997). For this project, it is anticipated that scare charges will follow the procedures used on the N-MB project, and would consist of a series of blasting caps, each containing 0.75 grams of explosives, suspended in the water column surrounding the structure to be blasted. The scare charges would be detonated 15 to 30 seconds prior to the main blast. The location of the scare charges is based on past experience and the intent to drive fish away from the structure being blasted. The MDTA and FHWA believe that placing the charges at far distances from the bridge may potentially drive fish back towards the structure. Therefore, the scare charges will likely be placed in very close proximity to the bridge. Additional avoidance and minimization measures that could be employed to address potential impacts resulting from blasting are outlined in Section 3.3.

Based on the information above, the MDTA has determined that the demolition of the existing Bay Bridge is likely to adversely affect listed sturgeon and sea turtle species under NOAA Fisheries jurisdiction in the action area. Further evaluation of potential demolition impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available.

5.6 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. Future Federal actions that are unrelated to the proposed action are not considered in this section because they will be subject to separate consultation pursuant to Section 7 of the ESA. Any in-water construction or coastal development projects within the action area are activities that would likely need a permit or authorization from the USACE and would therefore be subject to Section 7 consultation.

The MDTA has not identified any future state or private actions that are reasonably certain to occur in the action area that do not have a Federal nexus. Through correspondence with MDE staff, MDE has noted that they are not aware of any state issued projects in the action area that are exempt from Federal authorization. Current conditions include recreational and commercial

fishing activities and point and non-point source pollution through the National Pollution Discharge and Elimination System (NPDES) may affect shortnose sturgeon, Atlantic sturgeon, and sea turtle species in the action area. These activities will continue in some form into the future. The MDTA does not have information on specific interactions between shortnose sturgeon, Atlantic sturgeon, or sea turtle species and state or commercial fisheries operating and point and non-point discharges in the action area.

6 CONCLUSION AND EFFECTS DETERMINATIONS

This Biological Assessment evaluated the potential effects of the proposed Chesapeake Bay Crossing project on Atlantic sturgeon, shortnose sturgeon, loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle based on preliminary design and construction methods. The proposed action is Alternative C from the Tier 2 Study EIS. A summary of the stressors and effect determinations for each species is included in **Table 6-1**. The project has the potential for both lethal and non-lethal take of individuals of these species in various life stages. Noise generated from pile driving has the potential to cause injury or mortality to shortnose sturgeon, Atlantic sturgeon, and sea turtle species. There is potential for interaction with dredge equipment that could result in injury or mortality to shortnose sturgeon and Atlantic sturgeon. Blasting used for demolition of the existing bridge structures also has the potential to result in injury or mortality to shortnose sturgeon, Atlantic sturgeon, and sea turtle species. Additional project-related impacts include increased vessel traffic and habitat modification, though neither increased vessel traffic nor habitat modification are expected to result in adverse effects to listed sturgeon or sea turtle species in the action area.

Table 6-1: Species Effect Determinations by Stressor

Species	Federal Status	Distinct Population Segment (DPS) Potentially Occurring in the Action Area	Stressor	Stressor Effect	Species Determination
Atlantic sturgeon (*Acipenser oxyrinchus*)	Threatened/ Endangered[1]	Gulf of Maine; New York Bight; Chesapeake Bay; Carolina; South Atlantic	Pile driving	LAA	LAA
			Dredging	LAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	Range-wide[2]	Pile driving	LAA	LAA
			Dredging	LAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
Loggerhead sea turtle (*Caretta caretta*)	Threatened	Northwest Atlantic	Pile driving	LAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Range-wide[2]	Pile driving	LAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	

Species	Federal Status	Distinct Population Segment (DPS) Potentially Occurring in the Action Area	Stressor	Stressor Effect	Species Determination
Green sea turtle (*Chelonia mydas*)	Threatened	North Atlantic	Pile driving	LAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Range-wide[2]	Pile driving	LAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	

NLAA = Not likely to adversely affect
LAA = Likely to adversely affect
[1]Gulf of Maine DPS is threatened. New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are endangered.
[2]DPS has not been designated for this species.

FHWA, in coordination with the MDTA, has determined that the action is likely to adversely affect Atlantic sturgeon, shortnose sturgeon, loggerhead sea turtle, Kemp's ridley sea turtle, green sea turtle, and leatherback sea turtle. FHWA, in cooperation with the MDTA, will continue to coordinate with NOAA Fisheries through final design of the project to ensure implementation of appropriate avoidance, minimization, and mitigative protection measures.

7 REFERENCES

Balazik, M.T., K.J. Reine, A.J. Spells, C.A. Fredrickson, M.L. Fine, G.C. Garman, and S.P. McIninch. 2012. The Potential for Vessel Interactions with Adult Atlantic Sturgeon in the James River, Virginia. North American Journal of Fisheries Management, 32:6, 1062-1069, DOI: 10.1080/02755947.2012.716016.

Burton, W.H. 1993. Effects of Bucket Dredging on Water Quality in the Delaware River and the Potential for Effects on Fisheries Resources. Versar, Inc. Columbia, MD.

California Department of Transportation (Caltrans). 2020. Technical Guidance for the Assessment of Hydroacoustic Effects of Pile Driving on Fish. Caltrans Division of Environmental Analysis. Retrieved August 2025: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-manual-a11y.pdf.

Chesapeake Bay Program (CBP). 2023. DataHub, Version 4.9.2. Retrieved December 2023: https://datahub.chesapeakebay.net/.

Clark, D. 2011. Sturgeon Protection. Dredged Material Assessment and Management Seminar. 24-26 May, 2011. Jacksonville, FL. Presentation.

Environmental Protection Agency (EPA). 1986. Quality Criteria for Water. EPA 440/5-86-001.

FHWA. 2019. Managing the Impacts of Blast-Induced Vibration and Overpressure on Fish and Fish Habitat. Publication No. FHWA-FLH/TD-19-001. Retrieved January 2026: https://www.fhwa.dot.gov/clas/pdfs/fhwa-flh-td_19001.pdf.

Hempen, G.L., T.M. Keevin, and H.J. Ruben. 2005. Underwater blast pressures from confined rock removal shots: The Kill van Kull Deepening Project. Pp. 91-100. In: Proceedings of the Thirty-first Annual Conference on Explosives and Blasting Technique, Volume 1, Orlando, Florida. International Society of Explosive Engineers, Cleveland, OH.

Hempen, G.L., T.M. Keevin, and T.L. Jordan. 2007. Underwater blast pressures from a confined rock removal during the Miami Harbor deepening project. International Society of Explosives Engineers. Vol. 1. 12 pp.

Keevin, T.M., and G.L. Hempen. 1997. The Environmental Effects of Underwater Explosions with Methods to Mitigate Impacts. U.S. Army Corps of Engineers St. Louis District. Retrieved September 2025: https://semspub.epa.gov/work/01/550560.pdf.

McAnuff, A.L., M.V. van Bers, and A.C. Curic. 1994. Environmental Effects of Marine Blasting in Canadian Game Rivers. Pp. 479-490. Proceedings of the Twentieth Annual Conference on Explosives and Blasting Techniques, Austin, TX. International Society of Explosive Engineers.

Metz, V. 2019. Use of Preservative-Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures. Factsheet for the Marinas Interagency Coordinating

Committee meeting, May 30, 2019. Coastal Water Quality Program, California Coastal Commission.

NOAA National Marine Fisheries Service (NOAA Fisheries). 2017a. NOAA Fisheries/Federal Highway Administration Best Management Practices Manual For Transportation Activities in the Greater Atlantic Region. Retrieved July 2025: https://media.fisheries.noaa.gov/dam-migration/nmfs-garfo-fhwa-bmp-manual-cover-v1-2017_0.pdf.

NOAA Fisheries. 2017b. Tappan Zee Bridge Replacement Section 7 Biological Opinion NER-16-13822 GARFO-2016-00729. https://doi.org/10.25923/tdgc-t615

NOAA Fisheries. 2018. Recovery Outline for the Atlantic Sturgeon Distinct Population Segments. Office of Protected Resources. Available online: https://www.fisheries.noaa.gov/s3//dam-migration/ats_recovery_outline.pdf

NOAA Fisheries. 2022a. Greater Atlantic Region ESA Section 7 Mapper. Retrieved December 2023: https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=a85c0313b68b44e0927b51928271422a

NOAA Fisheries. 2022b. Loggerhead Turtle. Retrieved December 2023: https://www.fisheries.noaa.gov/species/loggerhead-turtle.

NOAA Fisheries. 2022c. Gulf of Main Distinct Population Segment of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) 5-Year Review: Summary and Evaluation.

NOAA Fisheries. 2023a. Atlantic Sturgeon. Retrieved December 2023: https://www.fisheries.noaa.gov/species/atlantic-sturgeon.

NOAA Fisheries 2023b. National Marine Fisheries Service: Summary of Endangered Species Act Acoustic Thresholds (Marine Mammals, Fishes, and Sea Turtles). Retrieved August 2025: https://www.fisheries.noaa.gov/s3/2023-02/ESA%20all%20species%20threshold%20summary_508_OPR1.pdf.

NOAA Fisheries. 2023b. Shortnose Sturgeon. Retrieved December 2023: https://www.fisheries.noaa.gov/species/shortnose-sturgeon.

NOAA Fisheries. 2023c. Kemp's Ridley Turtle. Retrieved December 2023: https://www.fisheries.noaa.gov/species/kemps-ridley-turtle.

NOAA Fisheries. 2023d. Green Turtle. Retrieved December 2023: https://www.fisheries.noaa.gov/species/green-turtle.

NOAA Fisheries. 2023e. Leatherback Turtle. Retrieved December 2023: https://www.fisheries.noaa.gov/species/leatherback-turtle.

NOAA Fisheries. 2024a. Section 7: Consultation Technical Guidance in the Greater Atlantic Region. https://www.fisheries.noaa.gov/new-england-midatlantic/consultations/section-7-consultation-technical-guidance-greater-atlantic

NOAA Fisheries. 2024b. FHWA Programmatic Essential Fish Habitat Consultation and General Concurrence for Select Transportation Actions in the NMFS Greater Atlantic Region. Retrieved October 2025: https://www.fisheries.noaa.gov/s3/2024-03/FHWA-Programmatic-EFH-Consultation-2024.pdf.

NOAA Fisheries. 2025. Section 7 Effects Analysis: Turbidity in the Greater Atlantic Region. Retrieved November 2025: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-effects-analysis-turbidity-greater-atlantic-region.

NOAA Fisheries and U.S. Fish and Wildlife Service (USFWS). 1992. Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico. Available online: https://repository.library.noaa.gov/view/noaa/15994.

NOAA Fisheries and USFWS. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*). Available online: https://repository.library.noaa.gov/view/noaa/3720.

Park, C. 2012. A Dictionary of Environment and Conservation. Oxford University Press. Retrieved December 2023: 10.1093/acref/9780198609957.001.0001.

Popper, Arthur N., Michele B. Halvorsen, Brandon M. Casper, and Thomas J. Carlson. 2013. U. S. Dept. of the Interior, Bureau of Ocean Energy Management, Headquarters, Herndon, VA. Effects of Pile Sounds on Non-Auditory Tissues of Fish. OCS Study BOEM 2012- 105. 60 pp.

Reine, K., and D. Clark. 1998. Entrainment by Hydraulic Dredges – a Review of Potential Impacts. Technical Note DOER-E1. U.S. Army Engineer Research and Development Center, Vikcsburg, MS.

Shortnose Sturgeon Recovery Team (SSRT). 1998. Final Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared for the National Marine Fisheries Service, National Oceanic and Atmospheric Administration. Available online: https://repository.library.noaa.gov/view/noaa/15971.

Shortnose Sturgeon Status Review Team (SSSRT). 2010. Biological Assessment of Shortnose Sturgeon (*Acipenser brevirostrum*). Report to National Marine Fisheries Service, Northeast Regional Office. November 1, 2010. 417 pp.

The Loggerhead/Green Turtle Recovery Team. 1991. Recovery Plan for U.S. Population of Atlantic Green Turtle *Chelonia mydas*. Prepared for USFWS Southeast Region and National Marine Fisheries Service.

USACE. 2017. Baltimore Harbor and Channels Dredged Material Management Plan Update Final Report. Accessed October 15, 2025: https://www.nab.usace.army.mil/Portals/63/docs/Civil%20Works/DMMP/Balt_Harbor_DMMP_Update_October_2017.pdf?ver=2018-02-08-110956-717.

United States Fish and Wildlife Service (USFWS), NOAA Fisheries, Mexico Secretariat of Environment & Natural Resources, Mexico National Commission of Natural Protected

Areas, and Mexico Federal Attorney of Environmental Protection. 2011. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. Available online: https://repository.library.noaa.gov/view/noaa/4368.

University of Maryland Center for Environmental Science (UMCES). 2024. DolphinWatch. Retrieved March 2024: https://www.umces.edu/dolphinwatch.

APPENDIX A: AGENCY CORRESPONDENCE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

June 30, 2023

Valeriya Remezova
Division Administrator
Federal Highway Administration
Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

RE: Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act Study
Cooperating and Participating Agency Invitation

Dear Ms. Remezova:

Thank you for your June 1, 2022, letter inviting us to be a cooperating and participating agency on the preparation of environmental documents pursuant to the National Environmental Policy Act (NEPA) for the Chesapeake Bay Crossing Tier 2 Study (the Study). The goals of the Study include evaluating the potential alternatives and their associated impacts for a new crossing of the Chesapeake Bay in the vicinity of the U.S. 50/ U.S. 301 corridor near Annapolis, Maryland. This corridor was previously identified as an outcome of the Tier 1 Environmental Impact Statement (EIS) for this project. In accordance with the Council on Environmental Quality's NEPA Implementing Procedures (40 CFR §1501.6, Cooperating agencies), we accept your invitation to participate as a cooperating agency to help foster a collaborative process and interagency coordination on these projects.

Our role and degree of involvement is dependent on existing staff and fiscal resources, and our contribution to the process will be limited to participating in project meetings and providing written comments in response to your documents prepared as part of the NEPA process. We will provide technical information identifying aquatic species and habitats of concern, identification of issues to be considered and evaluated during the NEPA process and guidance on evaluating, avoiding, and minimizing project effects to our trust resources. At this time, we are unable to undertake any data collection, conduct analyses, or prepare any sections of the NEPA document as our staff and resources are fully committed to other obligatory programs of NOAA Fisheries.

Please note that our involvement as a cooperating agency does not constitute an endorsement of this project, nor does it obviate the need for consultations required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Fish and Wildlife Coordination Act (FWCA), and the Endangered Species Act (ESA). As project design moves forward, should adverse impacts to essential fish habitat (EFH) or other NOAA trust resources be anticipated, consultation with us under the Section 305(b) of MSA and FWCA is required. Similarly, potential impacts to species protected under the ESA should be coordinated with our Protected

Resources Division. Please also be aware the proposed timelines for all projects posted on the Permitting Dashboard that include NOAA Fisheries milestones must be provided to us for review and approval prior to their posting.

Consultation Authorities

The estuarine waters in the Study corridor have been designated EFH for several federally managed species. The MSA requires federal agencies such as the U.S. Department of Transportation to consult with us on any action or proposed action authorized, funded, or undertaken by such agency that may adversely affect EFH identified under the MSA. This process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in the consultation process. Similarly, the FWCA requires that all federal agencies consult with us when proposed actions might result in modifications to a natural stream or body of water. It also required that they consider the effects that these projects would have on fish and wildlife and must also provide for improvement of these resources. Under this authority, we work to protect, conserve and enhance species and habitats for a wide range of aquatic resources such as shellfish, diadromous species, and other commercially and recreationally important species that are not managed by the federal fishery management councils and do not have designated EFH. Please see our website (https://www.fisheries.noaa.gov/new-england-mid-atlantic/habitat-conservation/essential-fish-habitat-assessment-consultations) for further information regarding your agency's obligations under the MSA and FWCA.

Endangered species under the jurisdiction of NOAA Fisheries may be present in the project area. The federal action agency is responsible for determining whether the proposed action may affect these species. If you determine that the proposed action may affect a listed species, your determination of effects along with justification and a request for concurrence should be submitted to the Section 7 Program email account at nmfs.gar.esa.section7@noaa.gov. Guidance and tools to assist you in your effects determination are available on our website at: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultations-greater-atlantic-region.

Conclusion

We look forward to working with you and the Bay Crossing Study team as the Study moves forward. If you have any questions regarding this matter, please contact staff in Annapolis, MD field office. For queries related to the MSA/FWCA, contact Jonathan Watson (jonathan.watson@noaa.gov) in our Habitat and Ecosystem Services Division. For queries regarding threatened and endangered species listed by us under the ESA, contact Brian Hopper in our Protected Resources Division (brian.d.hopper@noaa.gov).

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat and Ecosystem Services

cc: J. Mar (FHWA)
J. DaVia (USACE)
H. Lowe (MDTA)
K. Greene, J. Watson (NMFS HESD)
J. Anderson, B Hopper (NMFS PRD)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

January 13, 2025

Valeria Remezova
Maryland Division Administrator
USDOT Federal Highway Administration
31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201

RE: Docket Number FHWA~~2024~~0073
Scoping Comments for the Notice of Intent to Prepare an Environmental Impact Statement for the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA)

Dear Ms. Pavona:

We have reviewed the March 25, 2024, *Federal Register* Notice of Intent (NOI) for the Federal Highway Administration (FHWA) to prepare an Environmental Impact Statement (EIS) for the Chesapeake Bay Crossing Tier 2 National Environmental Policy Act (NEPA) Study (Study). The goals of the Study are to evaluate the impacts associated with a new crossing of the Chesapeake Bay along the U.S. Route 50/301 corridor (Rte. 50). This corridor, which contains existing Rte. 50 and the associated Gov. William Preston Lane Jr. Memorial Bridge (Bay Bridge), was selected as the Recommended Preferred Corridor Alternative for a new crossing at the conclusion of the Chesapeake Bay Crossing Tier 1 NEPA Study. In the NOI, FHWA proposes to evaluate the impacts associated with seven Alternatives Retained for Detailed Study (ARDS), including the No Action alternative. The ARDS include several different lane configurations for east-bound (EB) and west-bound (WB) sections of Rte. 50 within the defined study corridor.

We are responding to your request for information as a cooperating agency on this project with legal jurisdiction and special expertise over NOAA trust resources and as a consulting agency under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Fish and Wildlife Coordination Act (FWCA), and the Endangered Species Act (ESA). We are also an action agency for the Study to the extent that NMFS may issue Incidental Take Authorization (ITAs) under the Marine Mammal Protection Act (MMPA) in response to a request from the applicant.

Herein, we provide information and technical assistance related to resources in the Study area and recommended analyses for the EIS. We also provide technical assistance specific to consultation and authorization requirements and their respective sufficiency needs.

General Comments

Based on the information presented in the NOI, it is our understanding that there are two anticipated construction phases for the proposed project, as the proposed ARDS only includes two separate bridge crossings to replace the existing two spans of Rte. 50 over the Chesapeake Bay. We understand that certain ARDS, including a double-decker bridge and a tunnel, were

eliminated from further consideration based on various criteria. The double-decker bridge was screened from further evaluation because it would "not provide the redundancy" and "would not be reasonable from a resiliency perspective". Neither of these criteria are specifically highlighted in the Purpose and Need section of the NOI. In addition, a single span bridge with the proposed capacities was not evaluated as part of the ARDS. Because it may present fewer environmental impacts, we recommend that the Project team evaluate the impacts associated with a single bridge span and/or a double-span with shared in-water structures (e.g., similar to Mario M. Cuomo Bridge) in the EIS to compare with the impacts of the ARDS currently proposed in the NOI. This evaluation should include both temporary (e.g., construction infrastructure, underwater noise, turbidity, temporal disturbance) and permanent impacts (e.g., fills). This information and clarification will help inform our recommendations and understanding of feasible and reasonable Project alternatives at an early stage.

There are also several indirect impacts that should be fully described in the EIS, as they are reasonably-foreseeable outcomes resulting from the replacement of the existing Bay Bridge. We note that the study corridor was altered early in the Tier 2 NEPA process and no longer includes the existing Rte. 50 crossing of the Severn River. However, the proposed ARDS include expanding lanes on Rte. 50 immediately adjacent to this crossing. It seems likely that funneling down the proposed four or five WB lanes of traffic into the existing three WB lanes of traffic on the Severn River Bridge, where traffic bottlenecks are presently known to occur, would result in the need for roadway improvements and expansions to accommodate the anticipated traffic. As a result, the Study should consider the indirect impacts associated with expanding capacity (e.g., full bridge replacement) on the Severn River Bridge, as this is a reasonably-foreseeable outcome of expanded traffic capacity in the adjacent study corridor. We also recommend that the expansion (i.e., deepening, widening) of the existing shipping channel be evaluated as an indirect impact resulting from the project. Following the collapse of the Francis Scott Key Bridge in 2024, the existing Bay Bridge is the only major height-restricting structure that remains between the Port of Baltimore and the Atlantic Ocean. We anticipate that new Bay Bridge spans will present greater clearance and therefore will allow larger commercial vessels to call on the Port of Baltimore. This coupled with the proposed expansion of port facilities in the Baltimore area make it likely that the project could induce greater environmental impacts associated with waterborne commerce. Finally, we recommend that a hydrodynamic study be completed to evaluate the indirect effects of additional in-water structures (e.g., pier islands, culverted road crossings) on the movement of water through the Study corridor. This study should be specific to crossings of major tidal waterbodies (e.g., Bay Bridge, Kent Island Narrows) and should consider a range of tidal conditions that can be reasonably anticipated through the life of the project.

Resources under NOAA Fisheries Jurisdiction and for Which it has Special Expertise

The project overlaps with significant resources under NOAA Fisheries jurisdiction, including habitats important for federally managed fish species and protected species. The Study area supports fishery resources and overlaps with important regional commercial and recreational fisheries, including but not limited to striped bass (*Morone saxatilis*) and blue crab (*Callinectes sapidus*). Here we highlight some resources of concern for consideration in the EIS.

Essential Fish Habitat
The Project area includes important habitats for a range of federally managed fish species. Habitats in the Project area include soft bottom to structured habitats (e.g., oyster reef) as well as submerged aquatic vegetation (SAV) and shellfish beds. We provided technical guidance to FHWA as part of the Natural Resources Technical Report (NRTR) methodology document to ensure that these areas are fully described in the EIS.

The study corridor overlaps with designated Habitat Areas of Particular Concern (HAPC) for summer flounder (*Paralichthys dentatus*). The designation of HAPCs highlights the importance of juvenile summer founder rearing habitats and complex habitat in this area and creates an obligation to evaluate potential adverse impact to such habitats and consider measures which would minimize that adverse effect. Areas within the study corridor are also annually colonized by submerged aquatic vegetation (SAV), primarily widgeon grass (*Ruppia maritima*) and horned pondweed *(Zannichellia palustris*). SAV is designated a HAPC for summer flounder because it has been demonstrated to be preferred feeding and resting habitat (Orth and Heck, 1980; Lascara, 1981; Rogers and Van Den Avyle, 1983; Heck and Thoman, 1984) for this recreationally and commercially valuable species. HAPCs are a subset of EFH that are either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. Because of this, individual, cumulative and synergistic effects are a particular concern in these habitats. The Mid-Atlantic Fishery Management Council has defined the summer flounder HAPC as all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH. Because SAV, especially widgeon grass, can exhibit large spatial fluctuations from year to year the widely accepted practice for defining SAV habitat is to consider areas identified by the Virginia Institute of Marine Science (VIMS) as supporting SAV based on surveys conducted in the five most recent years. Any area mapped in those five years is considered to be habitat that supports SAV, even if SAV is not found there on a given date during the growing season. Furthermore, because the VIMS SAV survey does not occur during the height of the growing season for horned pondweed, additional surveys may be warranted to fully describe the occurrence of this species within the study corridor.

The project will likely also result in permanent and/or temporary impacts to other productive aquatic habitats. This includes emergent tidal wetlands, beach strand habitat, intertidal flats, sub-tidal shallows, and oyster reef habitat. Tidal marshes and mudflats are both designated as Special Aquatic Sites under the Clean Water Act due to their unique ecological functions and sensitivity to anthropogenic impacts. The spatial configuration of these habitats and their current habitat functions should be fully described as part of this EIS to allow for impacts associated with the project to be fully disclosed. Field surveys are likely necessary to ensure accurate delineation. This should include delineation of tidal wetlands, including details regarding dominant wetland vegetation type. Furthermore, the NOI details impacts to spawning habitat for horseshoe crab (*Limulus polyphemus*) spawning habitat. The prevalence of spawning activity in these areas should be further defined through surveys during the spawning season.

Protected Species
Threatened or endangered species under our jurisdiction including Atlantic sturgeon (*Acipenser oxyrhynchus*) and shortnose sturgeon (*Acipenser brevirostrum*) may be present in the Project

area. In addition, four species of federally threatened or endangered sea turtles under our jurisdiction occur seasonally in the waters of Chesapeake Bay from late April – mid November of each year: the threatened Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead (*Caretta caretta*), the endangered Kemp's ridley (*Lepidochelys kempii*), and the endangered leatherback (*Dermochelys coriacea*). On April 6, 2016, NMFS published the final rule listing eleven Green sea turtle (*Chelonia mydas*) DPSs. Eight DPSs were listed as threatened and three as endangered. The DPS found in U.S. Atlantic waters, the North Atlantic DPS, is listed as threatened. Due to the inability to distinguish between these populations away from the nesting beach, we consider green sea turtles endangered wherever they occur in U.S. waters.

We have created a new App, the Section 7 Mapper, to assist Federal action agencies in identifying the ESA-listed species and critical habitat in their project action area: https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-species-critical-habitat-information-maps-greater. Within the Section 7 Mapper, we have included data layers that represent our best estimate of the spatial and temporal range of listed species' life stages, behaviors, and critical habitat in our Region. It is important to note that use of this App does not replace the section 7 consultation process. We are providing the Section 7 Mapper as a technical assistance tool and expect action agencies will use it as a first step in determining if a proposed federal action overlaps with listed species or critical habitat. In addition, NOAA's Chesapeake Bay Office operates and maintains the Chesapeake Bay Interpretive Buoy System (CBIBS) - a network of observing platforms (buoys) that collect meteorological, oceanographic, and water-quality data and relay that information in near real time. There is an active buoy at the mouth of the Severn River, approximately 3.5 miles south west of the Bay Bridge. The latest data from this buoy and key points up and down the Bay is available at a website (https://www.buoybay.noaa.gov/locations/annapolis) or via apps available for Android and iPhone/iPad. Data available at this site and on the mobile apps are "raw" and have not been scrubbed for any anomalies. The buoys also collect data from fish that have been collected and implanted with telemetry tags, including Atlantic sturgeon. This data is not publicly available, but can be accessed by contacting NOAA's Chesapeake Bay Office.

As the lead federal action agency, you are responsible for determining the nature and extent of effects and for coordinating with our Protected Resources Division as appropriate. Our website (https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-consultations-greater-atlantic-region) has guidance and tools to assist action agencies with their description of the action and analysis of effects to support their determination. Should you have any questions about the section 7 consultation process, please contact Brian Hopper at (301) 758-3074 or brian.d.hopper@noaa.gov.

Finally, species protected under the Marine Mammal Protection Act (MMPA) such as common bottlenose dolphin (*Tursiops truncatus*) have been identified in the Project areas. Our website (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-policies-guidance-and-regulations) has guidance and tools to assist action agencies with this consultation process. Please coordinate with Benjamin Laws (Benjamin.Laws@noaa.gov) at our Headquarters office as necessary to ensure adequate protection for these species.

Avoidance, Minimization, Mitigation and Monitoring Measures

In addition to alternatives, the EIS must evaluate mitigation measures to avoid and minimize adverse impacts to NOAA trust resources. As described in the NOAA Mitigation Policy for Trust Resources (NAO 216-123, Section 3.06) impact avoidance and minimization must be considered and fully and fairly evaluated through the alternative development process before compensatory mitigation is considered; this is known as the mitigation sequence. The mitigation sequence clearly dictates that compensating for unavoidable adverse impacts should be viewed as mitigation of last resort. As described in the NOAA Mitigation Policy, the level and type of uncertainty associated with compensatory mitigation may warrant increased amounts of compensation to assure that impacts are sufficiently offset.

Further, the EIS must clearly identify which mitigation measures are included as part of the proposed action and thus evaluated in the analysis, and the likelihood of selection and implementation of additional proposed measures (e.g., measures are proposed as required; measures are optional and could be implemented by the Project team at their discretion). The document should provide information on how mitigation measures are considered in the context of the effects level (negligible, minor, moderate, major), how mitigation would offset those levels, and the effectiveness of any proposed mitigation.

Conclusion

Thank you for considering our comments during this important scoping process. We will continue to support FHWA's efforts to advance this study through our participation in the regulatory and planning processes. We look forward to continuing to work with you as this study continues.

Should you have any questions regarding these comments and/or the EFH consultation, please contact Jonathan Watson in our Habitat and Ecosystem Services Division at (978) 675-2180 or jonathan.watson@noaa.gov. For questions regarding ESA and Section 7 comments, please contact Brian Hopper in our Protected Resources Division at (301) 758-3074 or Brian.d.Hopper@noaa.gov. For questions regarding MMPA Incidental Take Authorizations, please contact Ben Laws in the Office of Protected Resources at (301) 427-8425 or Benjamin.Laws@noaa.gov.

Sincerely,

Karen M. Greene
Mid-Atlantic Field Branch Chief
Habitat and Ecosystem Services Division

cc:
Jamie Pavona, FHWA
Alexander Bienko, FHWA
Heather Lowe, MDTA
Joesph DaVia, USACE
Kevin Schabow, NOAA
Karen Greene, NOAA
Brian Hopper, NOAA
Timothy Cardiasmenos, NOAA
Dale Youngkin, NOAA
Jaclyn Daly, NOAA
Ray Li, USFWS
Christine Mazerella, USEPA
Mark Eberle, NPS
Tammy Roberson, MDE
Tony Redman, MDNR

Works Cited

Heck, K.L., T.A. Thoman. 1984. The nursery role of seagrass meadows in the upper and lower reaches of the Chesapeake Bay. Estuaries 7: 70–92.

Lascara, J. 1981. Fish predator-prey interactions in areas of eelgrass (*Zostera marina*). M.S. thesis, College of William and Mary, Williamsburg, VA. 81pp.

Orth, R.J., K.L. Heck, Jr. 1980. Structural components of eelgrass (*Zostera marina*) meadows in the lower Chesapeake Bay - fishes. Estuaries 3: 278–288.

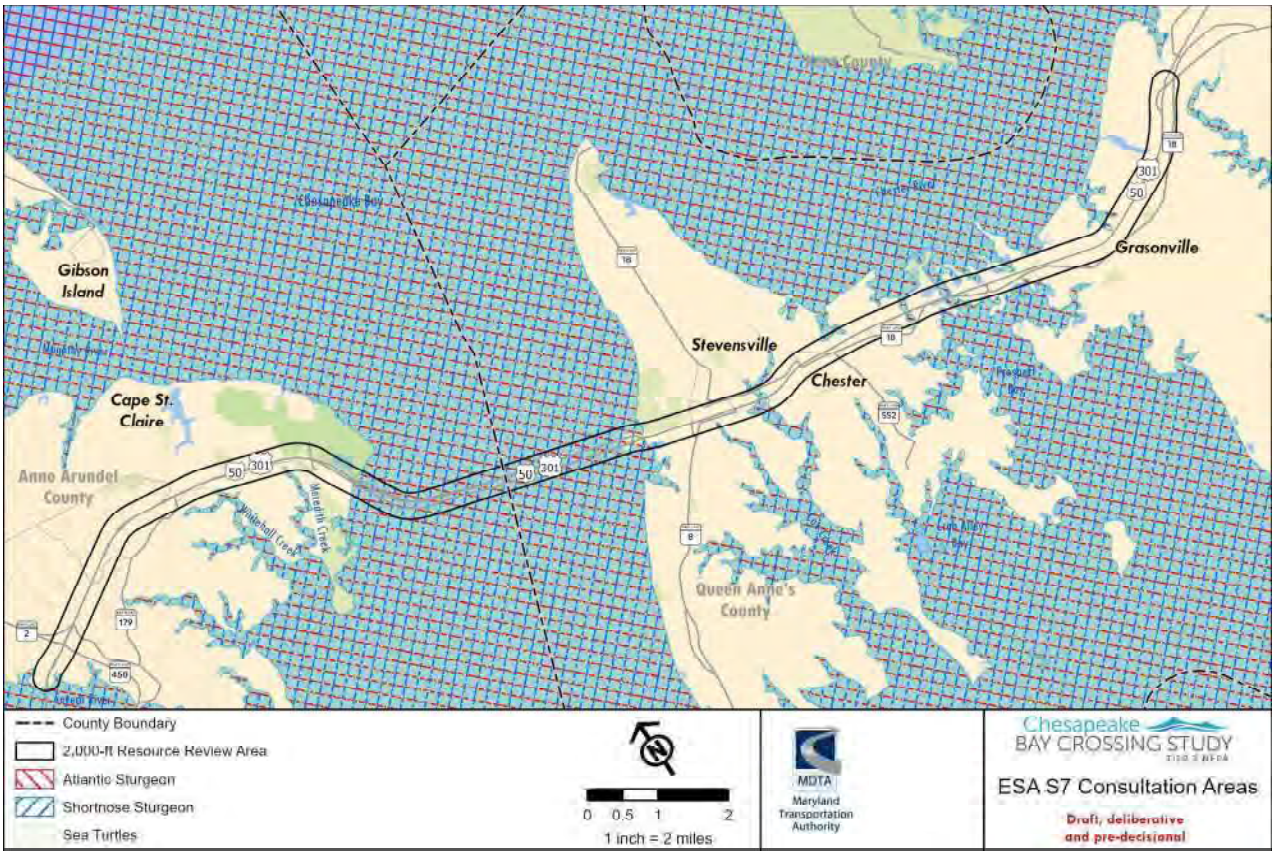
Rogers, S.G. M.J. Van Den Avyle. 1983. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) – summer flounder. US. Fish and Wildlife Service. FWS/OBS-82/11.15 U.S. Army Corps of Engineers, TR EL-82-4. 14p.

Drawn Action Area & Overlapping S7 Consultation Areas

Area of Interest (AOI) Information

Area : 1,284.82 acres

Feb 5 2025 12:44:02 Eastern Standard Time



Summary

Name	Count	Area(acres)	Length(mi)
BCS 2,000 ft Corridor	1	1,118.33	N/A
Atlantic Sturgeon	3	3,492.69	N/A
Shortnose Sturgeon	2	2,328.46	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	4	4,656.93	N/A
Atlantic Large Whales	0	0	N/A
In or Near Critical Habitat	0	0	N/A

BCS 2,000 ft Resource Review Area

#	FID	Shape_Leng	BUFF_DIST	ORIG_FID	Shape_Le_1	Shape_Area	Area(acres)
1	0	105638.774992	1000	0	217554.745333	214414913.751	1,118.33

Atlantic Sturgeon

#	Feature ID	Species	Lifestage	Behavior	Zone
1	ANS_CHB_SUB_MAF	Atlantic sturgeon	Subadult	Migrating & Foraging	Chesapeake Bay
2	ANS_CHB_JUV_MAF	Atlantic sturgeon	Juvenile	Migrating & Foraging	Chesapeake Bay
3	ANS_CHB_ADU_MAF	Atlantic sturgeon	Adult	Migrating & Foraging	Chesapeake Bay

#	From	Until	From (2)	Until (2)	Area(acres)
1	03/15	11/30	N/A	N/A	1,164.23
2	01/01	12/31	N/A	N/A	1,164.23
3	03/15	11/30	N/A	N/A	1,164.23

Shortnose Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone
1	SNS_CHB_ADU_WIN	Shortnose sturgeon	Adult	Overwintering	Chesapeake Bay
2	SNS_CHB_ADU_MAF	Shortnose sturgeon	Adult	Migrating & Foraging	Chesapeake Bay

#	From	Until	From (2)	Until (2)	Area(acres)
1	11/01	02/28	N/A	N/A	1,164.23
2	01/01	12/31	N/A	N/A	1,164.23

Sea Turtles

#	Feature ID	Species	Life Stage	Behavior	Zone
1	GRN_STS_AJV_MAF	Green sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
2	KMP_STS_AJV_MAF	Kemp's ridley sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
3	LTR_STS_AJV_MAF	Leatherback sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
4	LOG_STS_AJV_MAF	Loggerhead sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia

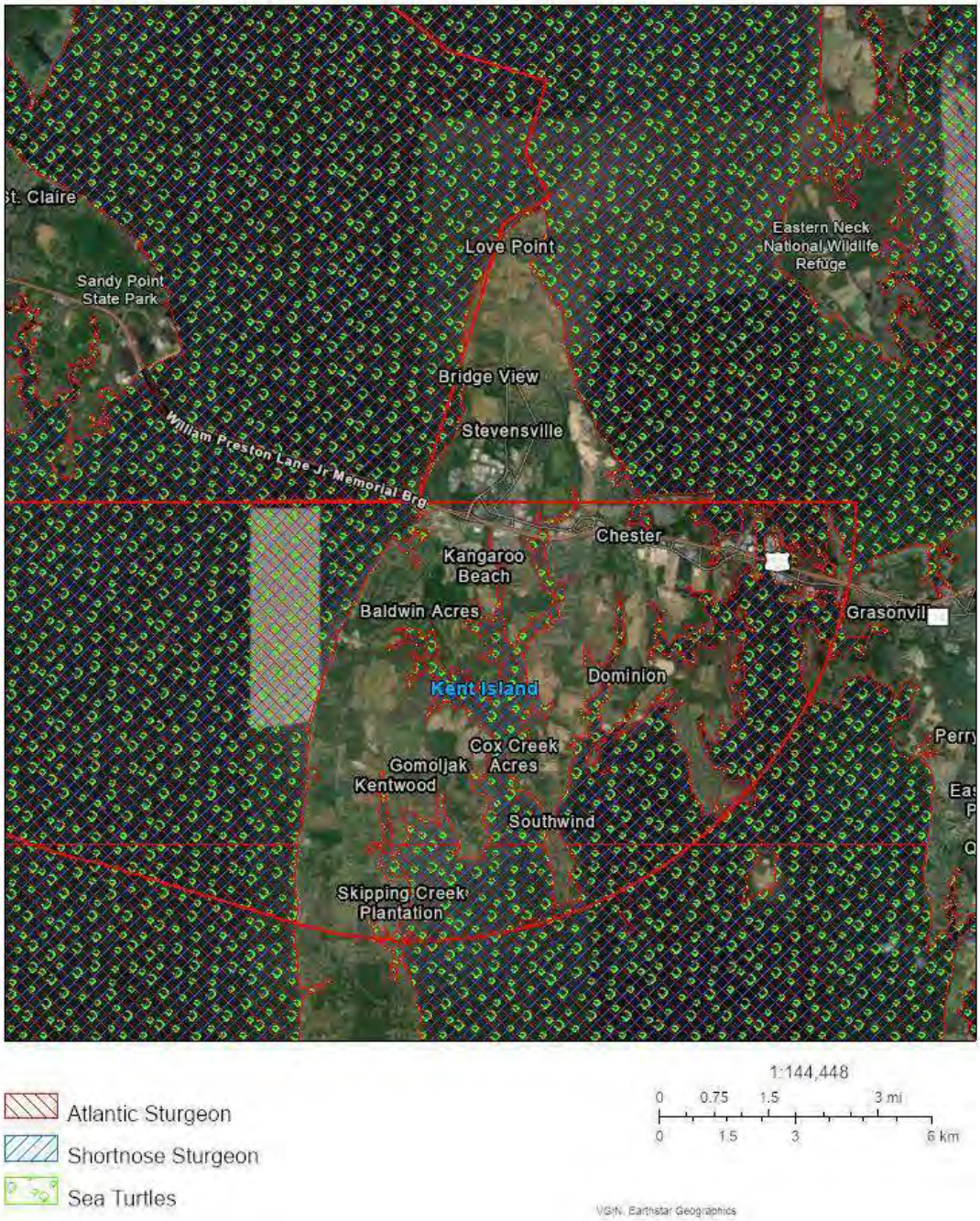
#	From	Until	From (2)	Until (2)	Area(acres)
1	5/1	11/30	*No Data*	*No Data*	1,164.23
2	5/1	11/30	*No Data*	*No Data*	1,164.23
3	5/1	11/30	*No Data*	*No Data*	1,164.23
4	5/1	11/30	*No Data*	*No Data*	1,164.23

Drawn Action Area and Overlapping Section 7 Consultation Areas

Area of Interest (AOI) Information

Area : 3,971,051,493.28 ft²

Mar 9 2026 7:26:23 Eastern Daylight Time



Summary

Name	Count	Area(ft²)	Length(ft)
Atlantic Sturgeon	6	7,643,946,869.06	N/A
Shortnose Sturgeon	4	5,095,964,579.37	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	4	10,140,666,755.31	N/A
Atlantic Large Whales	0	0	N/A
In or Near Critical Habitat	0	0	N/A

Atlantic Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone
1	ANS_CHB_SUB_MAF	Atlantic sturgeon	Subadult	Migrating & Foraging	Chesapeake Bay
2	ANS_CHB_JUV_MAF	Atlantic sturgeon	Juvenile	Migrating & Foraging	Chesapeake Bay
3	ANS_CHB_ADU_MAF	Atlantic sturgeon	Adult	Migrating & Foraging	Chesapeake Bay

#	From	Until	From (2)	Until (2)	Area(ft²)
1	03/15	11/30	Sturgeon	Acipenser oxyrinchus oxyrinchus	2,547,982,289.69
2	01/01	12/31	Sturgeon	Acipenser oxyrinchus oxyrinchus	2,547,982,289.69
3	03/15	11/30	Sturgeon	Acipenser oxyrinchus oxyrinchus	2,547,982,289.69

Shortnose Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone
1	SNS_CHB_ADU_WIN	Shortnose sturgeon	Adult	Overwintering	Chesapeake Bay
2	SNS_CHB_ADU_MAF	Shortnose sturgeon	Adult	Migrating & Foraging	Chesapeake Bay

#	From	Until	From (2)	Until (2)	Area(ft²)
1	11/01	02/28	N/A	N/A	2,547,982,289.69
2	01/01	12/31	N/A	N/A	2,547,982,289.69

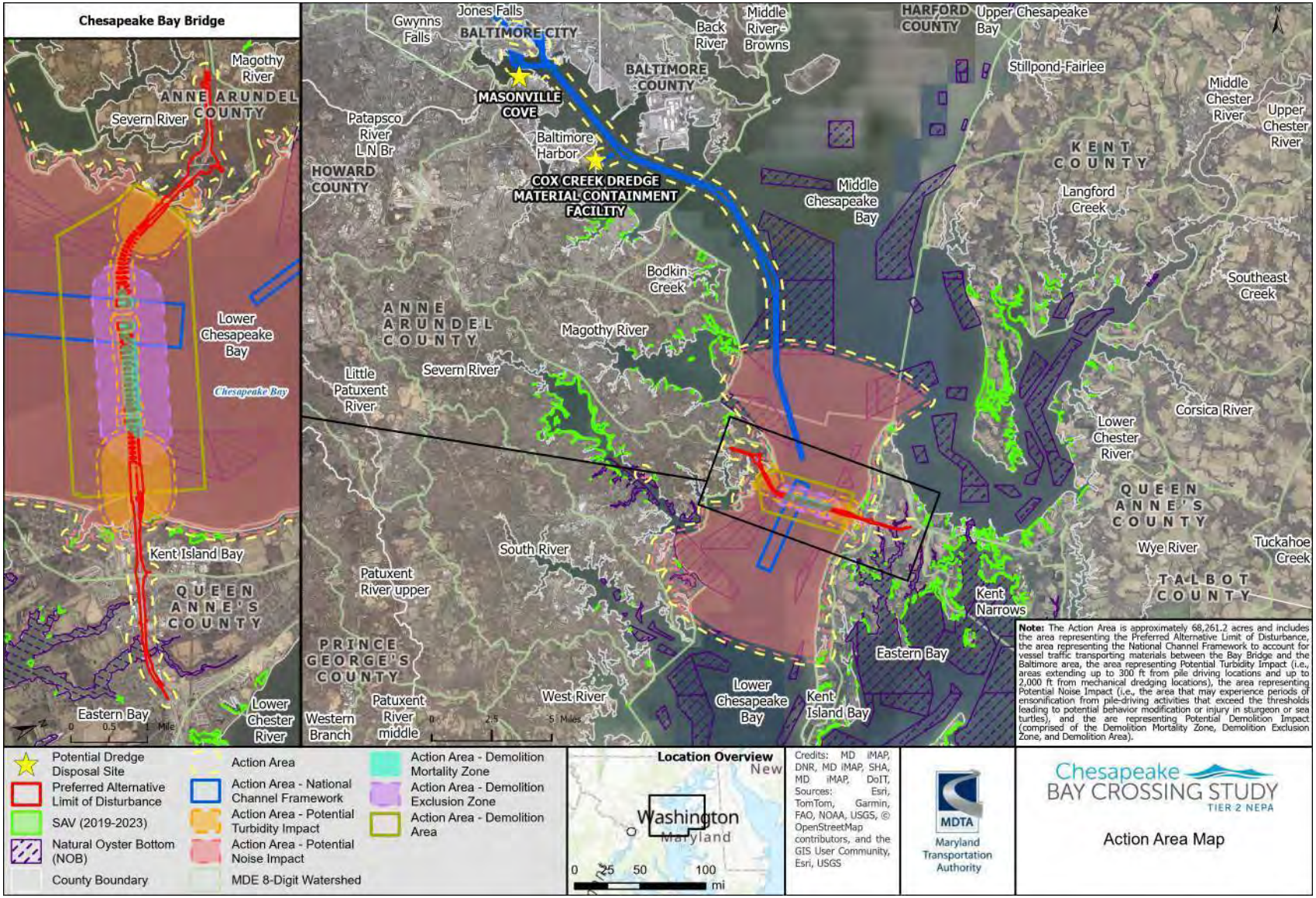
Sea Turtles

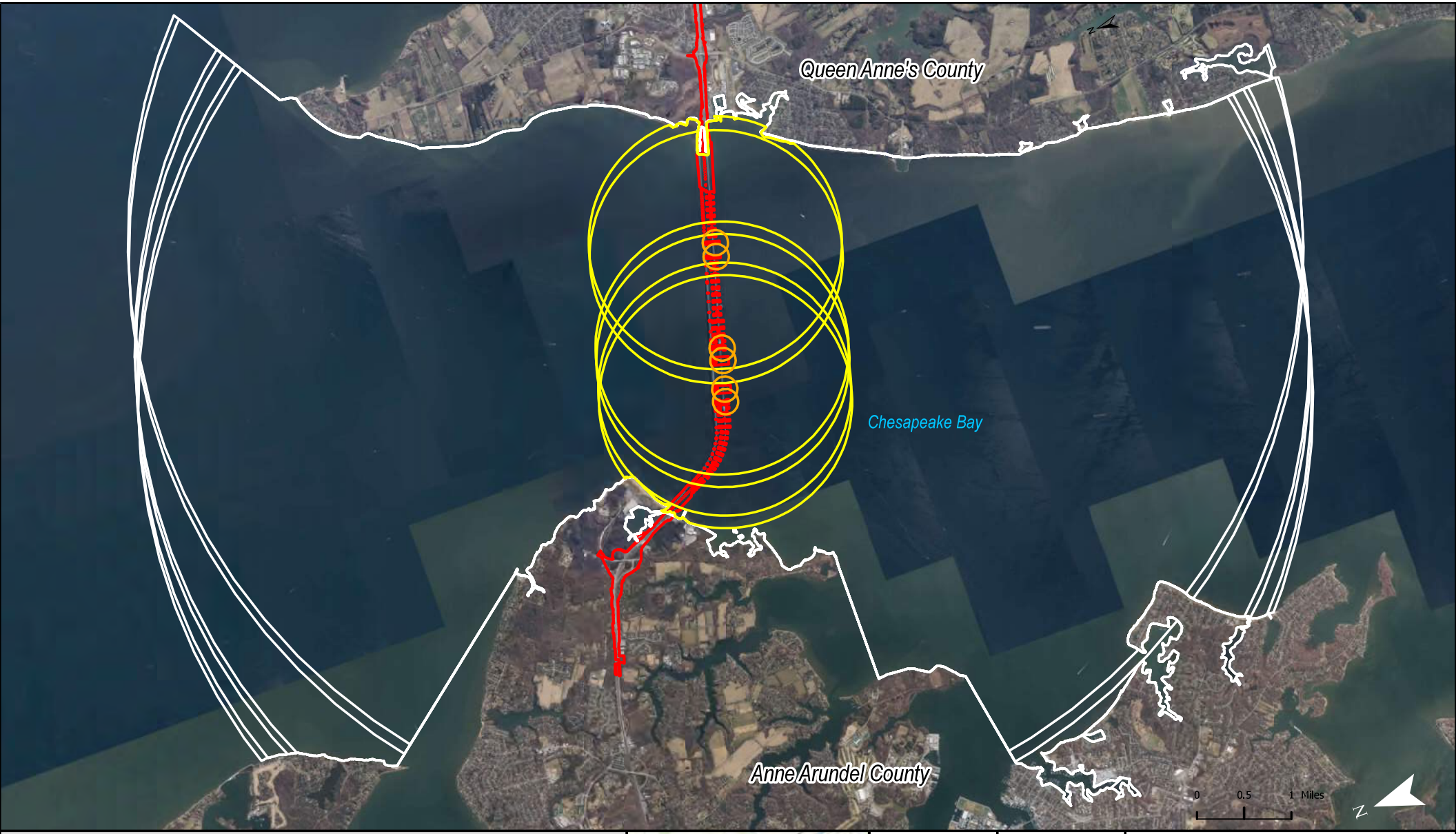
#	Feature ID	Species	Life Stage	Behavior	Zone
1	GRN_STS_AJV_MAF	Green sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
2	KMP_STS_AJV_MAF	Kemp's ridley sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
3	LTR_STS_AJV_MAF	Leatherback sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia
4	LOG_STS_AJV_MAF	Loggerhead sea turtle	Adults and juveniles	Migrating & Foraging	Massachusetts (S of Cape Cod) through Virginia

#	From	Until	From (2)	Until (2)	Area(ft²)
1	5/1	11/30	*No Data*	*No Data*	2,535,166,688.83
2	5/1	11/30	*No Data*	*No Data*	2,535,166,688.83
3	5/1	11/30	*No Data*	*No Data*	2,535,166,688.83
4	5/1	11/30	*No Data*	*No Data*	2,535,166,688.83

DISCLAIMER: Use of this App does NOT replace the Endangered Species Act (ESA) Section 7 consultation process; it is a first step in determining if a proposed Federal action overlaps with listed species or critical habitat presence. Because the data provided through this App are updated regularly, reporting results must include the date they were generated. The report outputs (map/tables) depend on the options picked by the user, including the shape and size of the action area drawn, the layers marked as visible or selectable, and the buffer distance specified when using the "Draw your Action Area" function. Area calculations represent the size of overlap between the user-drawn Area of Interest (with buffer) and the specified S7 Consultation Area. Summary table areas represent the sum of these overlapping areas for each species group.

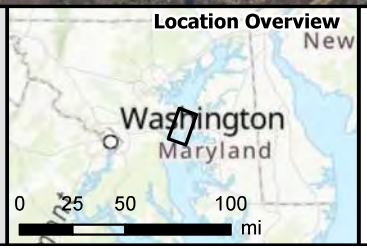
APPENDIX B: ACTION AREA MAP


Chesapeake Bay Bridge
Magothy River
ANNE ARUNDEL COUNTY
Severn River
Lower Chesapeake Bay
Chesapeake Bay
Kent Island Bay
QUEEN ANNE'S COUNTY
Eastern Bay
Lower Chester River
Gwynns Falls
Jones Falls
BALTIMORE CITY
Back River
Middle River - Browns
HARFORD COUNTY
Upper Chesapeake Bay
Stillpond-Fairlee
BALTIMORE COUNTY
MASONVILLE COVE
Middle Chester River
Upper Chester River
Patapsco River L N Br
Baltimore Harbor
KENT COUNTY
HOWARD COUNTY
COX CREEK DREDGE MATERIAL CONTAINMENT FACILITY
Middle Chesapeake Bay
Langford Creek
Bodkin Creek
Southeast Creek
ANNE ARUNDEL COUNTY
Magothy River
Severn River
Little Patuxent River
Corsica River
Lower Chester River
QUEEN ANNE'S COUNTY
South River
Wye River
Tuckahoe Creek
Patuxent River upper
TALBOT COUNTY
Kent Narrows
PRINCE GEORGE'S COUNTY
Eastern Bay
West River
Lower Chesapeake Bay
Kent Island Bay
Western Branch
Patuxent River middle
5 Miles
Note: The Action Area is approximately 68,261.2 acres and includes the area representing the Preferred Alternative Limit of Disturbance, the area representing the National Channel Framework to account for vessel traffic transporting materials between the Bay Bridge and the Baltimore area, the area representing Potential Turbidity Impact (i.e., areas extending up to 300 ft from pile driving locations and up to 2,000 ft from mechanical dredging locations), the area representing Potential Noise Impact (i.e., the area that may experience periods of ensonification from pile-driving activities that exceed the thresholds leading to potential behavior modification or injury in sturgeon or sea turtles), and the are representing Potential Demolition Impact (comprised of the Demolition Mortality Zone, Demolition Exclusion Zone, and Demolition Area).
Potential Dredge Disposal Site
Preferred Alternative Limit of Disturbance
SAV (2019-2023)
Natural Oyster Bottom (NOB)
County Boundary
Action Area
Action Area - National Channel Framework
Action Area - Potential Turbidity Impact
Action Area - Potential Noise Impact
MDE 8-Digit Watershed
Action Area - Demolition Mortality Zone
Action Area - Demolition Exclusion Zone
Action Area - Demolition Area
Location Overview
New
Washington
Maryland
0 25 50 100 mi
Credits: MD iMAP, DNR, MD iMAP, SHA, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Action Area Map



Fish Disturbance Isopleths - 96 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- MDTA RPA Limit of Disturbance

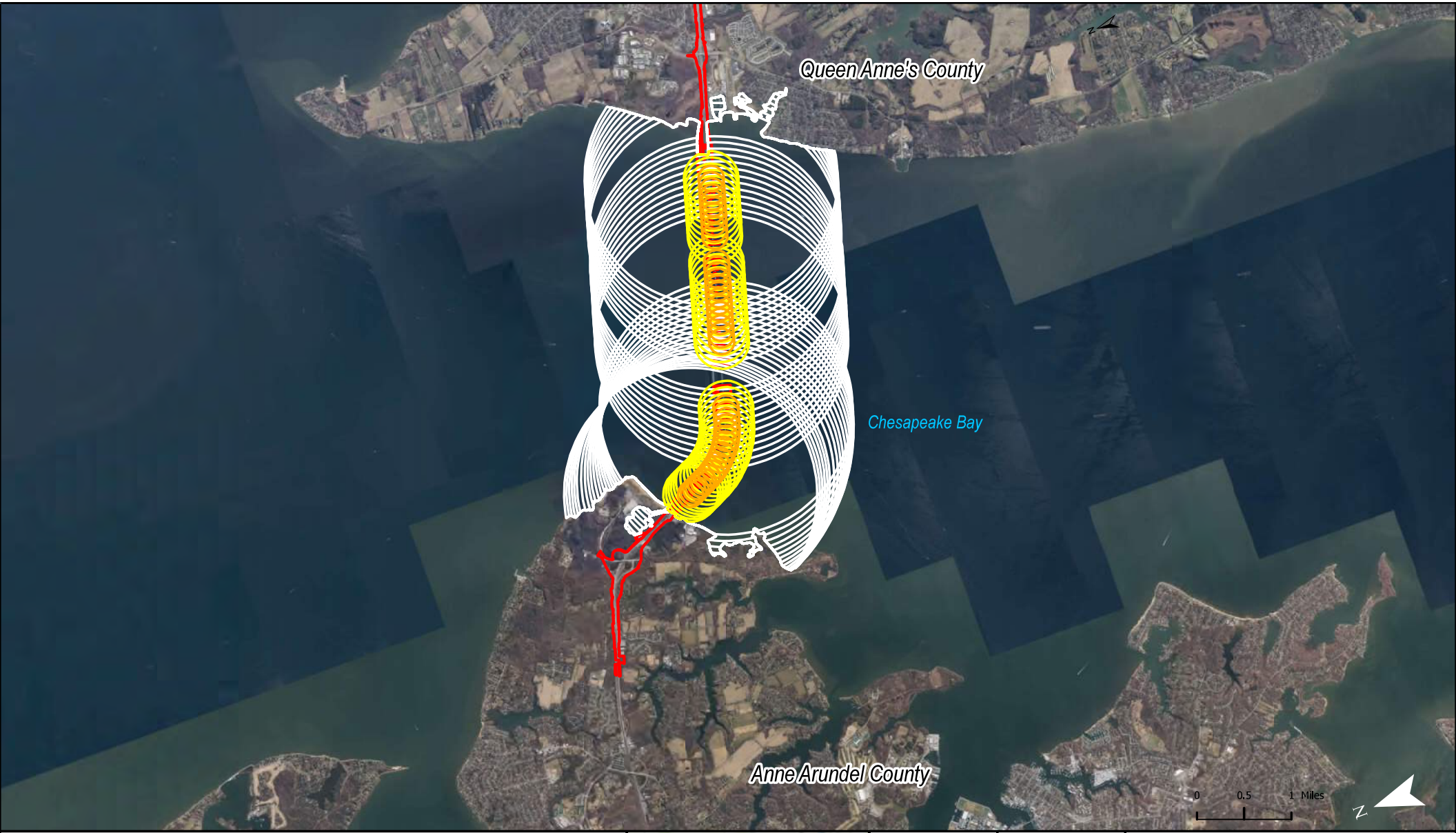


Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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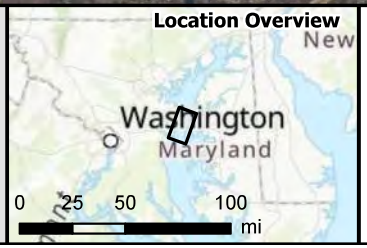
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 1 of 12



Fish Disturbance Isopleths - 48 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- MDTA RPA Limit of Disturbance



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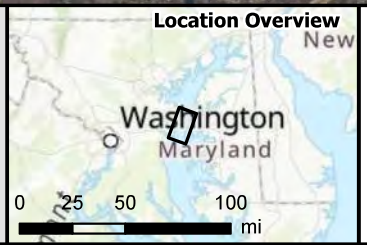
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 2 of 12



Fish Disturbance Isopleths - 36 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- MDTA RPA Limit of Disturbance



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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 3 of 12

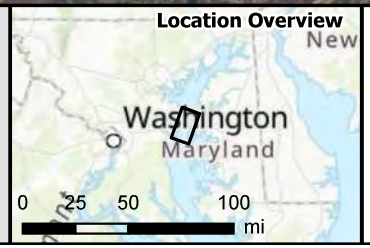


Fish Disturbance Isopleths - 36 inch Square Concrete

Impact Hammer - Behavior Modification

Impact Hammer - Potential Injury

MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

MDTA
Maryland Transportation Authority

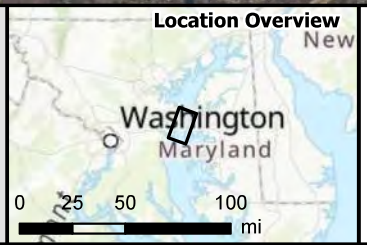
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 4 of 12



Fish Distubance Isopleths - 14 inch H-pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- MDTA RPA Limit of Disturbance



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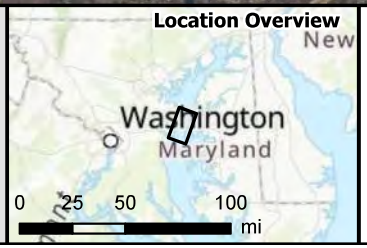
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 5 of 12



Fish Disturbance Isopleths - AZ Sheet Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- MDTA RPA Limit of Disturbance



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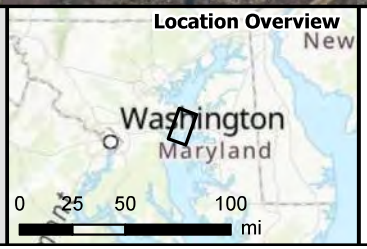
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 6 of 12



Sea Turtle Disturbance Isopleths - 96 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- Vibratory Hammer - Potential Injury
- MDTA RPA Limit of Disturbance

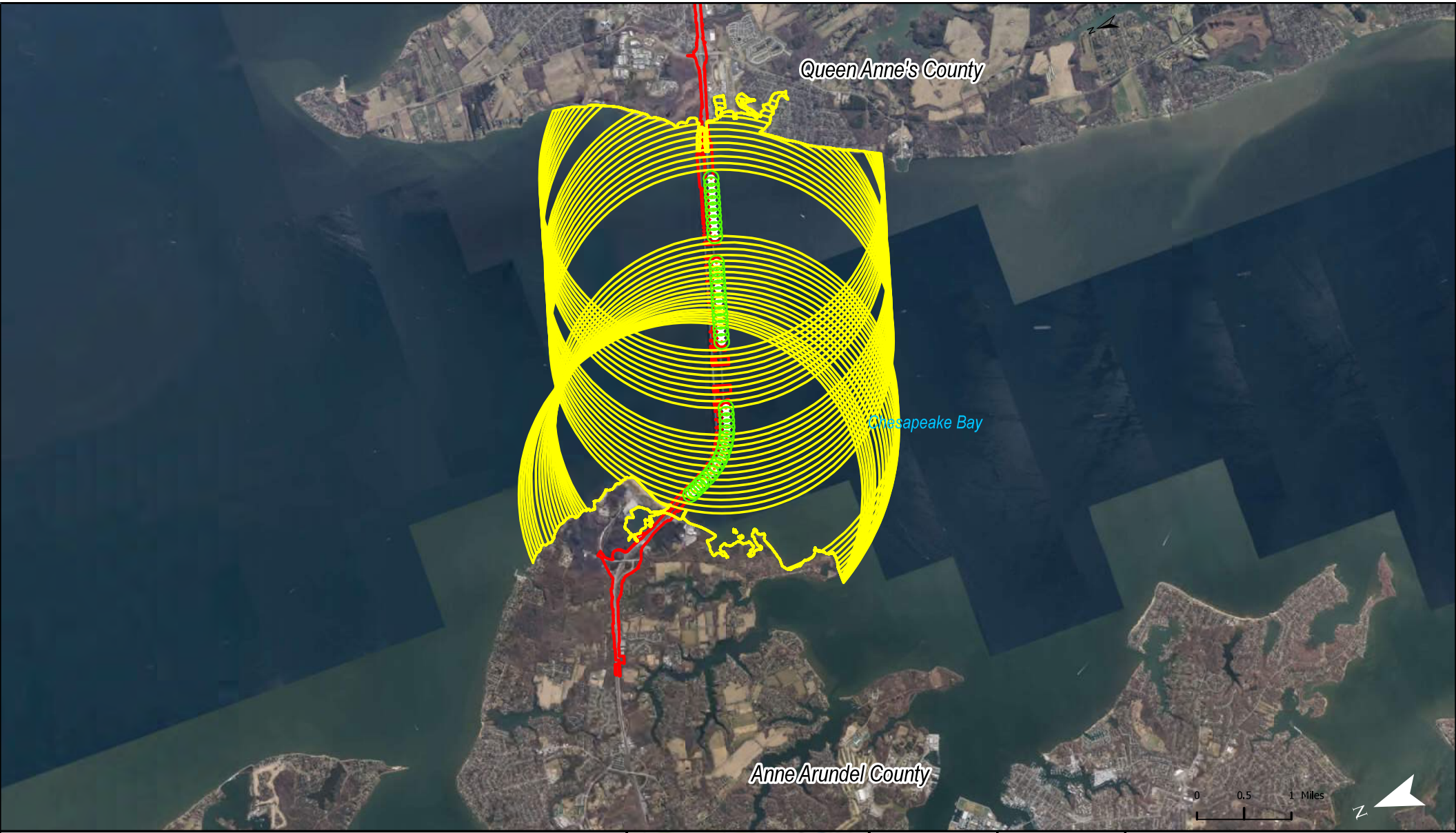


Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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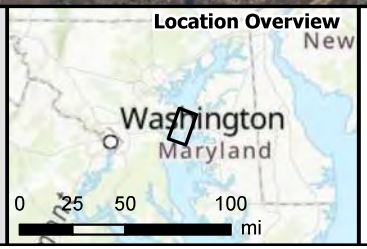
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 7 of 12



Sea Turtle Disturbance Isopleths - 48 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- Vibratory Hammer - Potential Injury
- MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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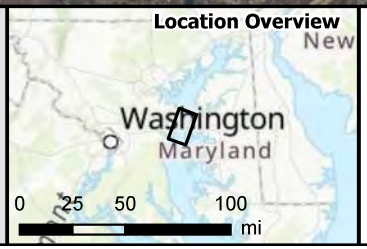
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 8 of 12



SeaTurtle Disturbance Isopleths - 36 inch Steel Pipe Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- Vibratory Hammer - Potential Injury
- MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 9 of 12

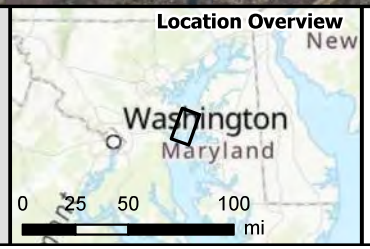


Sea Turtle Disturbance Isopleths - 36 inch Square Concrete

Impact Hammer - Behavior Modification

Impact Hammer - Potential Injury

MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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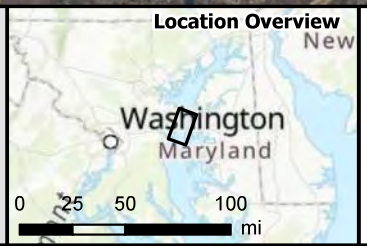
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 10 of 12



Sea Turtle Distubance Isopleths - 14 inch H-pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- Vibratory Hammer - Potential Injury
- MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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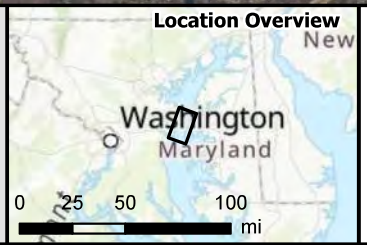
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 11 of 12



SeaTurtle Disturbance Isopleths - AZ Sheet Pile

- Impact Hammer - Behavior Modification
- Impact Hammer - Potential Injury
- Vibratory Hammer - Behavior Modification
- Vibratory Hammer - Potential Injury
- MDTA RPA Limit of Disturbance



Credits: MD iMAP, DNR, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Action Area Map
Potential Noise Impacts
Series Page 12 of 12

APPENDIX C: TELEMETRY DATA

Telemetry Data

Received from NOAA Fisheries 10/1/2025

We would like to acknowledge the contributions of the Atlantic Cooperative Telemetry Network and the following collaborations for providing fish tagging data: Robert Aguilar (Smithsonian Environmental Research Center), Matthew Balazik (Virginia Commonwealth University), Robert Bourdon and Sheila Eyler (U.S. Fish and Wildlife Service), Wilmelie Cruz Marrero (NOAA Chesapeake Bay Office), Benjamin Gahagan (Massachusetts Division of Marine Fisheries / University of Massachusetts), Craig King (Maine Department of Marine Resources), Patrick McGrath (Virginia Institute of Marine Science), Mike O'Brien and David Secor (University of Maryland Center for Environmental Science), Matthew Ogburn (Smithsonian Environmental Research Center), Ian Park (Delaware Department of Natural Resources), Ethan Simpson (Virginia Marine Resources Commission), Chuck Stence (Maryland Department of Natural Resources), and Bethany Williams (NOAA NCCOS).

From:	Jonathan Watson - NOAA Federal
To:	Jeff Gring
Cc:	Sarah Williamson; Wilmelie Cruz - NOAA Federal
Subject:	Figures for Inclusion in BCST2: Telemetry Data for Bay Bridge Array
Date:	Wednesday, October 1, 2025 9:16:42 AM

Hi Jeff,

Please find attached two figures that we would like to see included in the draft EIS for the Bay Crossing Study. We'd recommend that the following description accompany these figures:

Data collected from passive acoustic telemetry at the Chesapeake Bay Bridge North array (2021-2024) offers valuable insights into fish activity in the area, which may be impacted by bridge construction/demolition activities. This data, provided by 12 collaborating researchers, includes detections of 118 tagged individuals across 10 different species originating from the Chesapeake Bay, Delaware Bay, Maine, Massachusetts, and Virginia. The most commonly detected species near the bridge were striped bass, American eel, gizzard shad, cownose ray, and Atlantic sturgeon. Striped bass exhibited consistent detections throughout the year, indicating their year-round presence in the area (see Figures 1-2). In contrast, American eel detections were primarily concentrated at night, with significant seasonal activity in the spring and late fall to early winter. Atlantic sturgeon and cownose ray were detected mainly during the warmer months, while gizzard shad and white perch appeared less frequently. Daily detection patterns showed that striped bass and American eel were more prevalent during cooler periods, whereas migratory species like sturgeon and cownose ray were more commonly observed in the spring and summer. These findings emphasize that several ecologically and economically significant species, including the federally protected Atlantic sturgeon, actively use habitats near the bridge and may be sensitive to noise, habitat changes, or other impacts from construction activities.

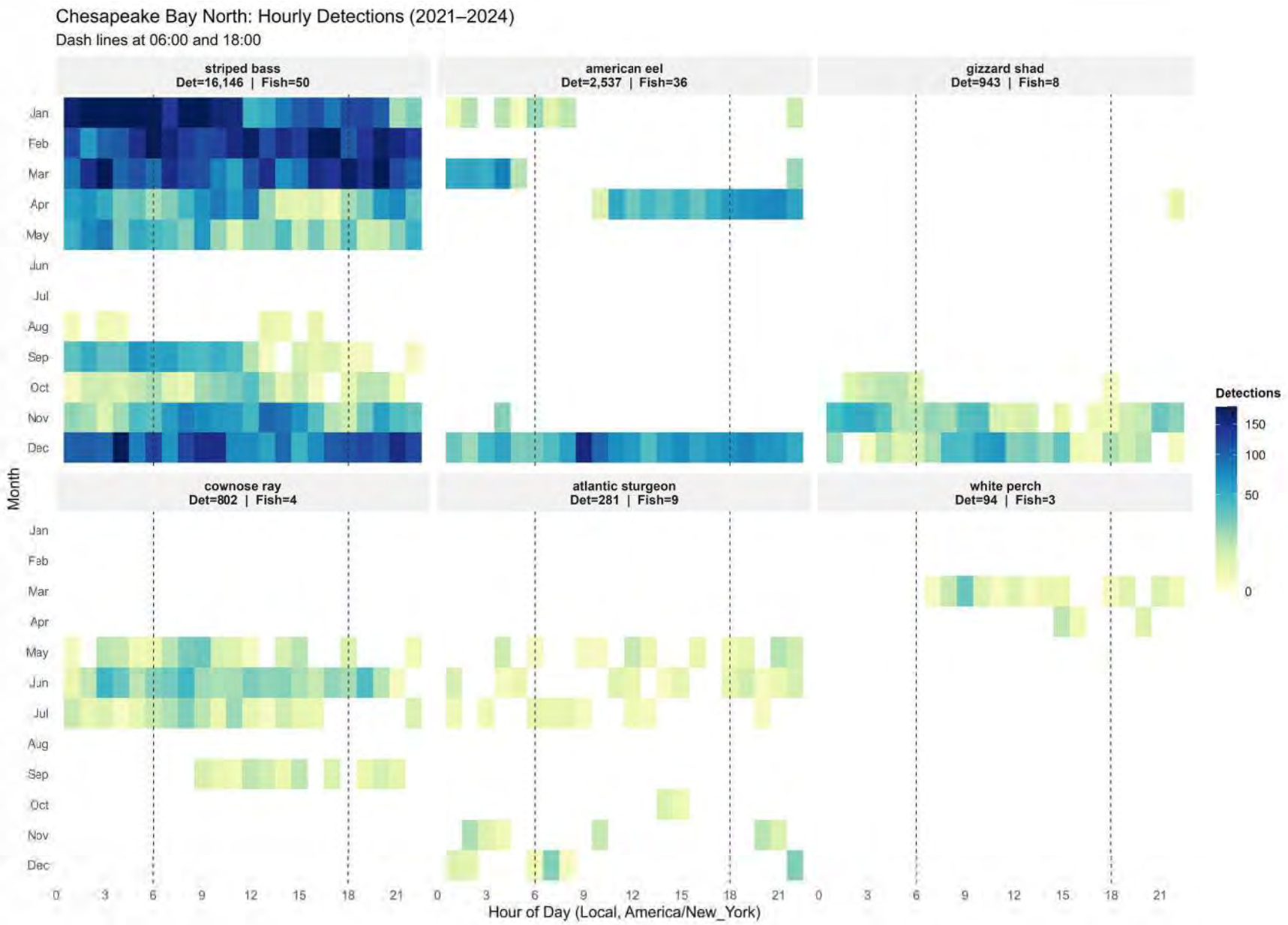
We would like to acknowledge the contributions of the Atlantic Cooperative Telemetry Network and the following collaborations for providing fish tagging data: Robert Aguilar (Smithsonian Environmental Research Center), Matthew Balazik (Virginia Commonwealth University), Robert Bourdon and Sheila Eyler (U.S. Fish and Wildlife Service), Wilmelie Cruz Marrero (NOAA Chesapeake Bay Office), Benjamin Gahagan (Massachusetts Division of Marine Fisheries / University of Massachusetts), Craig King (Maine Department of Marine Resources), Patrick McGrath (Virginia Institute of Marine Science), Mike O'Brien and David Secor (University of Maryland Center for Environmental Science), Matthew Ogburn (Smithsonian Environmental Research Center), Ian Park (Delaware Department of Natural Resources), Ethan Simpson (Virginia Marine Resources Commission), Chuck Stence (Maryland Department of Natural Resources), and Bethany Williams (NOAA NCCOS).

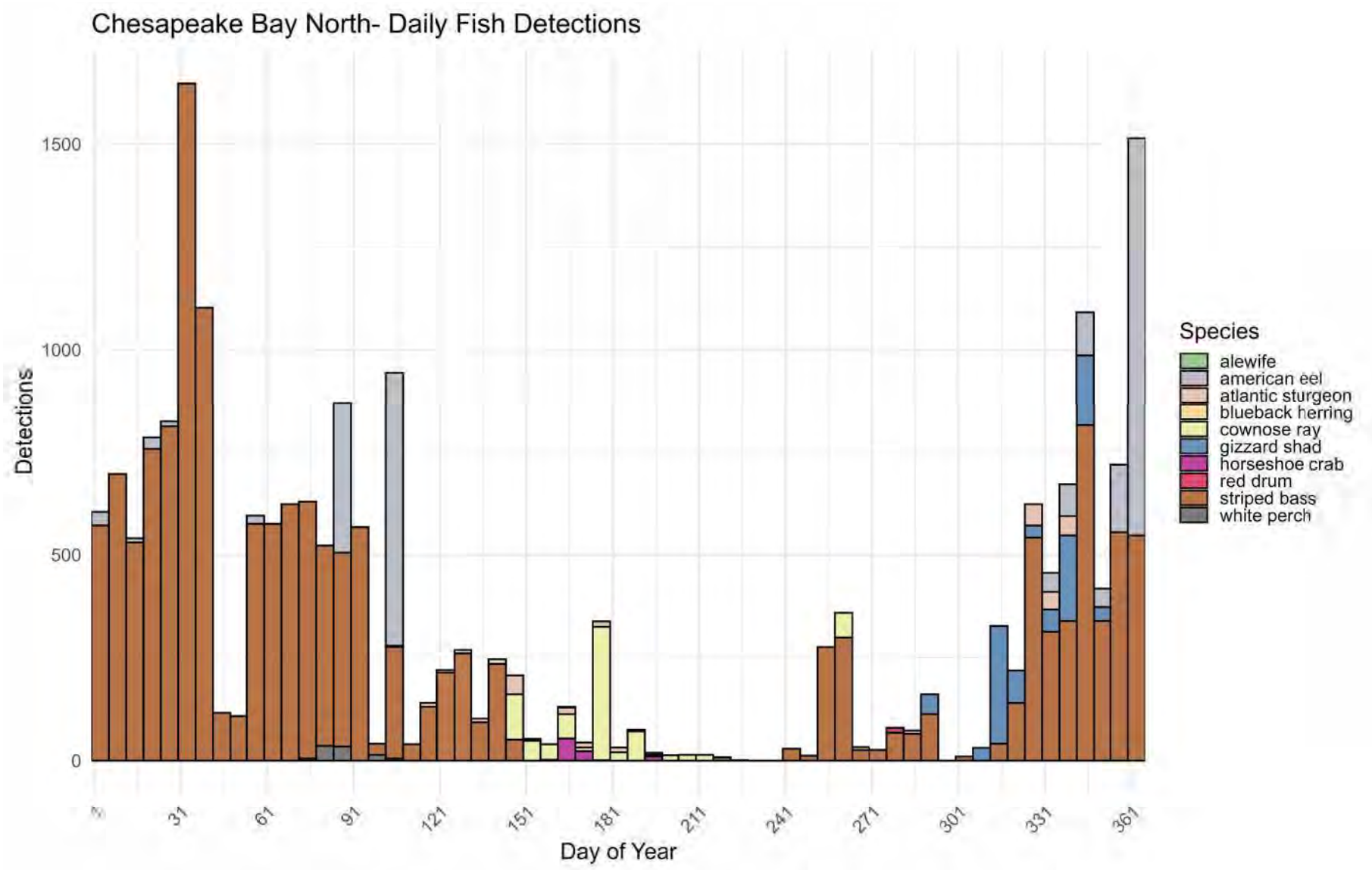
Thanks to both you and Wilmelie for leveraging these very informative data for the NEPA study. Should you have any questions regarding these figures or the accompanying text, please be advised that we will not be able to provide a response until congress appropriates funding.

Jonathan

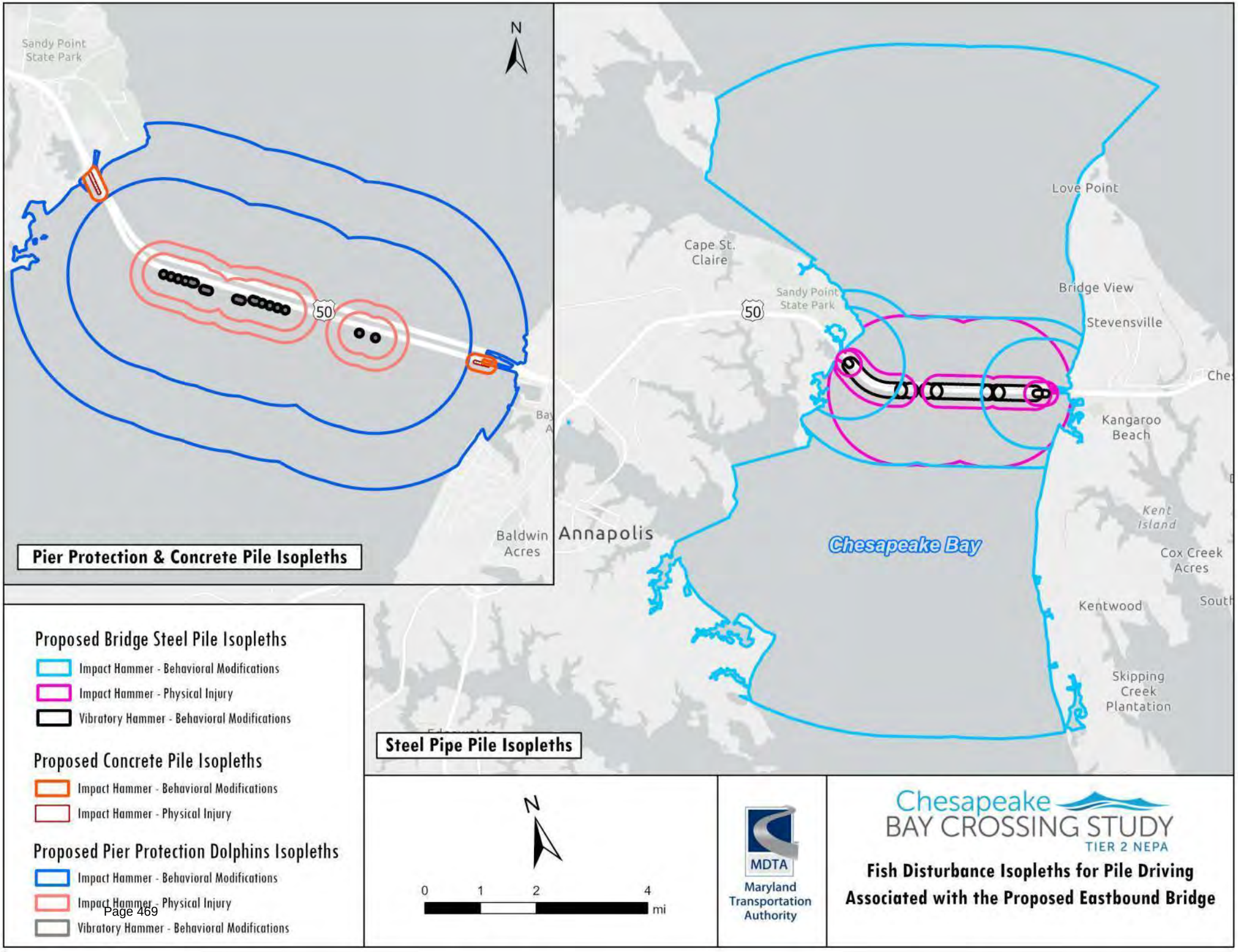
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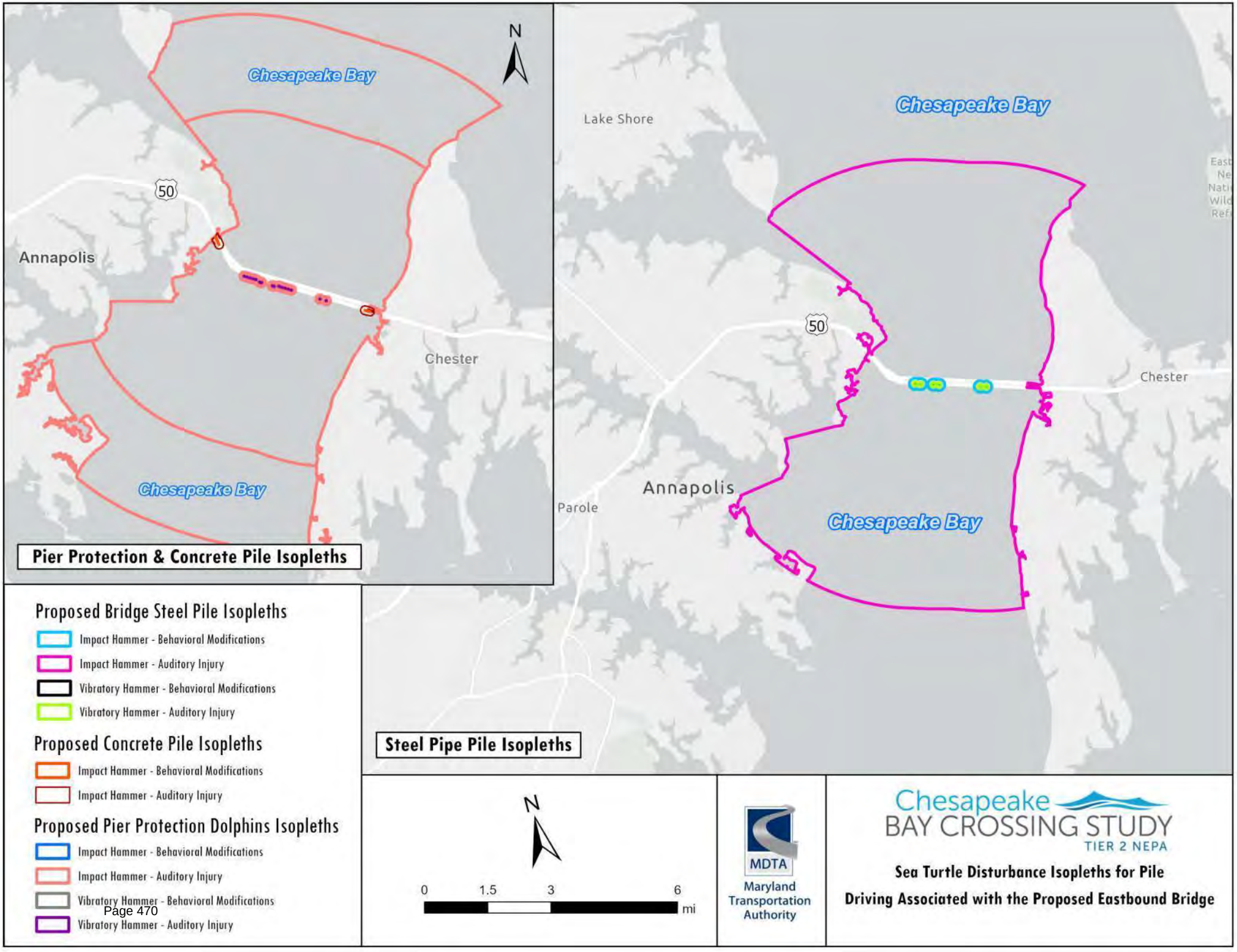
Jonathan Watson
Marine Habitat Resource Specialist, GARFO HESD
NOAA Fisheries | U.S. Department of Commerce
Office: (978) 675-2180
www.fisheries.noaa.gov


Chesapeake Bay North: Hourly Detections (2021–2024)
Dash lines at 06:00 and 18:00
striped bass
Det=16,146 | Fish=50
american eel
Det=2,537 | Fish=36
gizzard shad
Det=943 | Fish=8
cownose ray
Det=802 | Fish=4
atlantic sturgeon
Det=281 | Fish=9
white perch
Det=94 | Fish=3
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
3
6
9
12
15
18
21
Hour of Day (Local, America/New_York)
Detections
150
100
50
0


Chesapeake Bay North- Daily Fish Detections
Detections
1500
1000
500
0
31
61
91
121
151
181
211
241
271
301
331
361
Day of Year
Species
alewife
american eel
atlantic sturgeon
blueback herring
cownose ray
gizzard shad
horseshoe crab
red drum
striped bass
white perch

APPENDIX D: PILE DRIVING NOISE ISOPLETH MAPS


Sandy Point State Park
N
50
Pier Protection & Concrete Pile Isopleths
Baldwin Acres
Annapolis
Cape St. Claire
Sandy Point State Park
Love Point
Bridge View
Stevensville
Kangaroo Beach
Kent Island
Chesapeake Bay
Cox Creek Acres
Kentwood
Skipping Creek Plantation
Steel Pipe Pile Isopleths
Proposed Bridge Steel Pile Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Physical Injury
Vibratory Hammer - Behavioral Modifications
Proposed Concrete Pile Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Physical Injury
Proposed Pier Protection Dolphins Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Physical Injury
Vibratory Hammer - Behavioral Modifications
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MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Fish Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge


Chesapeake Bay
N
50
Annapolis
Chester
Chesapeake Bay
Pier Protection & Concrete Pile Isopleths
Lake Shore
Chesapeake Bay
50
Chester
Annapolis
Parole
Chesapeake Bay
Steel Pipe Pile Isopleths
Proposed Bridge Steel Pile Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Auditory Injury
Vibratory Hammer - Behavioral Modifications
Vibratory Hammer - Auditory Injury
Proposed Concrete Pile Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Auditory Injury
Proposed Pier Protection Dolphins Isopleths
Impact Hammer - Behavioral Modifications
Impact Hammer - Auditory Injury
Vibratory Hammer - Behavioral Modifications
Vibratory Hammer - Auditory Injury
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MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Sea Turtle Disturbance Isopleths for Pile Driving Associated with the Proposed Eastbound Bridge

APPENDIX E: NOAA FISHERIES MULTI-SPECIES PILE DRIVING CALCULATOR OUTPUT

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	190	156	166
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	202		

OTHER INFO 0

NOTES 36" Square Concrete Pile - Using Proxy of 30" Square Concrete Pile Tyle II

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	0.9	25.1	25.1	116.6
Isopleth (feet)	2.8	82.4	82.4	382.5

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.0	158.3	2.5
Isopleth (feet)	0.1	519.5	8.2

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.1	0.0	1.6	0.1	0.0
AUD INJ ONSET (Peak isopleth, feet)	0.2	0.1	5.2	0.2	0.1
AUD INJ ONSET (SEL_{cum} isopleth, meters)	184.4	23.5	285.4	163.9	61.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	605.1	77.2	936.4	537.6	200.4
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	25.1	NO LF CET.			
Behavior (RMS isopleth, feet)	82.4				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	173	183
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	219		

OTHER INFO 0

NOTES 36" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	4.0	341.5	341.5	1,584.9
Isopleth (feet)	13.1	1,120.3	1,120.3	5,199.8

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.1	2152.4	34.1
Isopleth (feet)	0.3	7,061.8	112.0

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	2,507.2	319.9	3,880.0	2,227.3	830.3
AUD INJ ONSET (SEL_{cum} isopleth, feet)	8,225.9	1,049.5	12,729.6	7,307.6	2,723.9
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	341.5	NO LF CET.			
Behavior (RMS isopleth, feet)	1,120.3				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	165
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	210

OTHER INFO 0

NOTES 36" Steel pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	100.0
ISOPLETHS (feet)	328.1

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	59.0	2.2
ISOPLETHS (feet)	193.7	7.1

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	68.2	26.2	55.7	87.7	29.5
AUD INJ ONSET (SELcum isopleth, feet)	223.6	85.9	182.7	287.9	96.9
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	10,000.0	NO LF CET.			
Behavior (RMS isopleth, feet)	32,808.4				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	203	169	182
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	215		

OTHER INFO 0

NOTES 48" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	6.3	184.8	184.8	1,359.4
Isopleth (feet)	20.7	606.2	606.2	4,459.8

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.2	1164.8	29.3
Isopleth (feet)	0.5	3,821.6	96.1

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.5	0.2	11.7	0.5	0.2
AUD INJ ONSET (Peak isopleth, feet)	1.8	0.5	38.3	1.5	0.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	1,356.8	173.1	2,099.7	1,205.4	449.3
AUD INJ ONSET (SEL_{cum} isopleth, feet)	4,451.6	568.0	6,888.8	3,954.6	1,474.1
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	292.9	NO LF CET.			
Behavior (RMS isopleth, feet)	960.8				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	175	185
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	221		

OTHER INFO 0

NOTES 48" Steel Pipe - Using proxy for 60" steel pipe to assume higher SELss and RMS values

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth
		Fish ≥ 2 g	Fish < 2 g	
ISOPLETHS (meters)	4.0	464.2	464.2	2,154.4
Isopleth (feet)	13.1	1,522.8	1,522.8	7,068.4

Fishes present

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	0.1	2925.9	46.4
Isopleth (feet)	0.3	9,599.5	152.3

Sea Turtles present

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	3,408.2	434.9	5,274.3	3,027.8	1,128.6
AUD INJ ONSET (SEL_{cum} isopleth, feet)	11,181.9	1,426.7	17,304.0	9,933.6	3,702.8
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	170
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	215

OTHER INFO 0

NOTES 48" Steel Pipe - Using 72" Steel Pipe Proxy

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	215.4
ISOPLETHS (feet)	706.8

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	127.2	4.6
ISOPLETHS (feet)	417.3	15.2

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	146.9	56.4	120.0	189.0	63.6
AUD INJ ONSET (SELcum isopleth, feet)	481.8	185.1	393.6	620.2	208.8
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	21,544.3	NO LF CET.			
Behavior (RMS isopleth, feet)	70,683.6				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	210	185	195
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	8		
Number of strikes per pile	2500		
Number of strikes per day	20000		
Cumulative SEL at measured distance	228		

OTHER INFO 0

NOTES 96" Steel Pipe

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth	
		Fish ≥ 2 g	Fish < 2 g		
ISOPLETHS (meters)	18.5	2,154.4	2,154.4	10,000.0	Fishes present
Isopleth (feet)	60.6	7,068.4	7,068.4	32,808.4	

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth	
ISOPLETHS (meters)	0.5	8555.5	215.4	Sea Turtles present
Isopleth (feet)	1.5	28,069.2	706.8	

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	1.6	0.5	34.1	1.4	0.5
AUD INJ ONSET (Peak isopleth, feet)	5.2	1.5	112.0	4.5	1.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	9,965.8	1,271.5	15,422.0	8,853.2	3,300.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	32,696.1	4,171.6	50,597.2	29,045.9	10,827.1
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	2,154.4	NO LF CET.			
Behavior (RMS isopleth, feet)	7,068.4				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	170
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	8
Duration to drive pile (minutes)	30
Duration of sound production in day	14400
Cumulative SEL at measured distance	212

OTHER INFO 0

NOTES 96" Steel Pipe - Using 72" Steel Pipe proxy

Attenuation 10

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	215.4
ISOPLETHS (feet)	706.8

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	80.1	4.6
ISOPLETHS (feet)	262.9	15.2

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	92.5	35.5	75.6	119.1	40.1
AUD INJ ONSET (SELcum isopleth, feet)	303.5	116.6	247.9	390.7	131.5
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	21,544.3	NO LF CET.			
Behavior (RMS isopleth, feet)	70,683.6				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	203	172	182
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	218		

OTHER INFO 0

NOTES 14" Steel H-pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth	
		Fish ≥ 2 g	Fish < 2 g		
ISOPLETHS (meters)	6.3	292.9	292.9	1,359.4	Fishes present
Isopleth (feet)	20.7	960.8	960.8	4,459.8	

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth	
ISOPLETHS (meters)	0.2	1846.1	29.3	Sea Turtles present
Isopleth (feet)	0.5	6,056.9	96.1	

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.5	0.2	11.7	0.5	0.2
AUD INJ ONSET (Peak isopleth, feet)	1.8	0.5	38.3	1.5	0.5
AUD INJ ONSET (SEL_{cum} isopleth, meters)	2,150.5	274.4	3,327.8	1,910.4	712.1
AUD INJ ONSET (SEL_{cum} isopleth, feet)	7,055.3	900.2	10,918.1	6,267.7	2,336.3
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	292.9	NO LF CET.			
Behavior (RMS isopleth, feet)	960.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	145
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	190

OTHER INFO 0

NOTES 14" Steel H-pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	4.6
ISOPLETHS (feet)	15.2

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	2.7	0.1
ISOPLETHS (feet)	9.0	0.3

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	3.2	1.2	2.6	4.1	1.4
AUD INJ ONSET (SELcum isopleth, feet)	10.4	4.0	8.5	13.4	4.5
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

IMPACT PILE DRIVING REPORT

VERSION 2.1-Multi-Species: 2025

Chesapeake Bay Crossing Study - Tier 2 NEPA

PRINT IN LANDSCAPE TO CAPTURE ENTIRE SCREEN

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

PROJECT INFORMATION	PEAK	SELss	RMS
Single strike level (dB)	200	175	185
Distance associated with single strike level (meters)	10	10	10
Transmission loss constant	15		
Number of piles per day	16		
Number of strikes per pile	2500		
Number of strikes per day	40000		
Cumulative SEL at measured distance	221		

OTHER INFO 0

NOTES 24" AZ Sheet Pile

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	ONSET OF PHYSICAL INJURY			BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth		RMS Isopleth	
		Fish ≥ 2 g	Fish < 2 g		
ISOPLETHS (meters)	4.0	464.2	464.2	2,154.4	Fishes present
Isopleth (feet)	13.1	1,522.8	1,522.8	7,068.4	

SEA TURTLES

	AUD INJ ONSET		BEHAVIOR	
	Peak Isopleth	SEL_{cum} Isopleth	RMS Isopleth	
ISOPLETHS (meters)	0.1	2925.9	46.4	Sea Turtles present
Isopleth (feet)	0.3	9,599.5	152.3	

MARINE MAMMALS

	LF Cetacean	HF Cetaceans	VHF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (Peak isopleth, meters)	0.3	0.1	7.4	0.3	0.1
AUD INJ ONSET (Peak isopleth, feet)	1.1	0.3	24.1	1.0	0.3
AUD INJ ONSET (SEL_{cum} isopleth, meters)	3,408.2	434.9	5,274.3	3,027.8	1,128.6
AUD INJ ONSET (SEL_{cum} isopleth, feet)	11,181.9	1,426.7	17,304.0	9,933.6	3,702.8
	ALL MM	HF Cet. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	464.2	NO LF CET.			
Behavior (RMS isopleth, feet)	1,522.8				

VIBRATORY PILE DRIVING REPORT

PRINT IN **LANDSCAPE** TO CAPTURE ENTIRE SCREEN

VERSION 2.1-Multi-Species: 2025

(if OTHER INFO or NOTES get cut-off, please include information elsewhere)

Chesapeake Bay Crossing Study - Tier 2 NEPA

PROJECT INFORMATION	RMS
Sound pressure level (dB)	160
Distance associated with sound pressure level (meters)	10
Transmission loss constant	15
Number of piles per day	16
Duration to drive pile (minutes)	30
Duration of sound production in day	28800
Cumulative SEL at measured distance	205

OTHER INFO 0

NOTES AZ Steel Sheet - loudest

Attenuation 5

RESULTANT ISOPLETHS

(Range to Effects)

FISHES

	BEHAVIOR
Fishes present	RMS Isopleth
ISOPLETHS (meters)	46.4
ISOPLETHS (feet)	152.3

SEA TURTLES

	AUD INJ ONSET	BEHAVIOR
Sea Turtles present	SEL_{cum} Isopleth	RMS Isopleth
ISOPLETHS (meters)	27.4	1.0
ISOPLETHS (feet)	89.9	3.3

MARINE MAMMALS

	LF Cetacean	MF Cetaceans	HF Cetaceans	PW Pinniped	OW Pinnipeds
AUD INJ ONSET (SELcum isopleth, meters)	31.6	12.2	25.8	40.7	13.7
AUD INJ ONSET (SELcum isopleth, feet)	103.8	39.9	84.8	133.6	45.0
	ALL MM	HF CET. present	NO VHF CET.	NO PHOCIDS	NO OTARIIDS
Behavior (RMS isopleth, meters)	4,641.6	NO LF CET.			
Behavior (RMS isopleth, feet)	15,228.3				

APPENDIX F: DEMOLITION OF THE EXISTING EASTBOUND AND WESTBOUND BRIDGE PIERS CONCEPTUAL ANALYSIS

CHESAPEAKE
BAY CROSSING STUDY
TIER 2 NEPA

Appendix F

Demolition of the Existing Eastbound and Westbound Bridge Piers Conceptual Analysis

Maryland Transportation Authority
MDTA

DRAFT May 2026

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1 Comparison Between Nice-Middleton Bridge and Bay Bridge Structures

For planning purposes, proposed demolition of the existing Bay Bridge piers was compared to the demolition of the original (1940) Nice-Middleton Bridge (N-MB). The N-MB pier demolition performed in late 2023 was used as a proxy for the proposed demolition of the existing Bay Bridge to obtain a rough estimate for the magnitude of effects of explosive underwater demolition. When the project is under detailed design and construction, the demolition plans would be re-evaluated as necessary to facilitate the most efficient construction and demolition schedule.

The general sequence of demolition of the original N-MB included saw-cutting and lifting of roadway deck slabs, torch cutting and lifting of girders for low-level spans, shape charges to cut and drop truss sections into the river for retrieval (including the main span over the Potomac River Navigation Channel), mechanical demolition of the concrete piers in shallow water, and subaqueous blasting for the deep-water piers.

1.1 Key In-Water Substructural Comparisons

The original N-MB utilized similar structural components to the existing Bay Bridge eastbound (EB) and westbound (WB) spans. Over shallow waters, the bridges are constructed as simple span superstructure units founded on pile bents. Over deeper water, both bridges use truss span superstructure units founded on piers with bell shaped columns with 28-feet to 32-feet diameter footings below the mudline. The longest truss spans use piers with four columns to support the superstructure unit, while shorter spans are supported by piers with two columns. All the piers use concrete diaphragms to connect the columns. See **Figure 1** for a side-by-side comparison of typical piers for the original N-MB and the existing Bay Bridge.

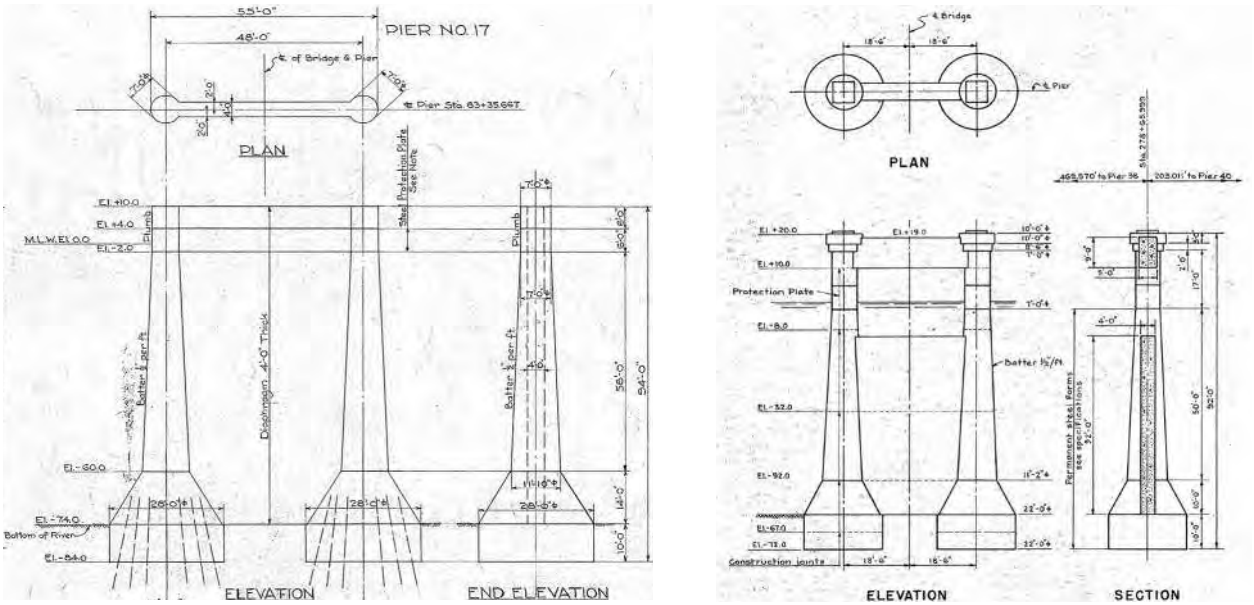


Figure 1 - Typical Piers for N-MB (Left) and Bay Bridge (Right)

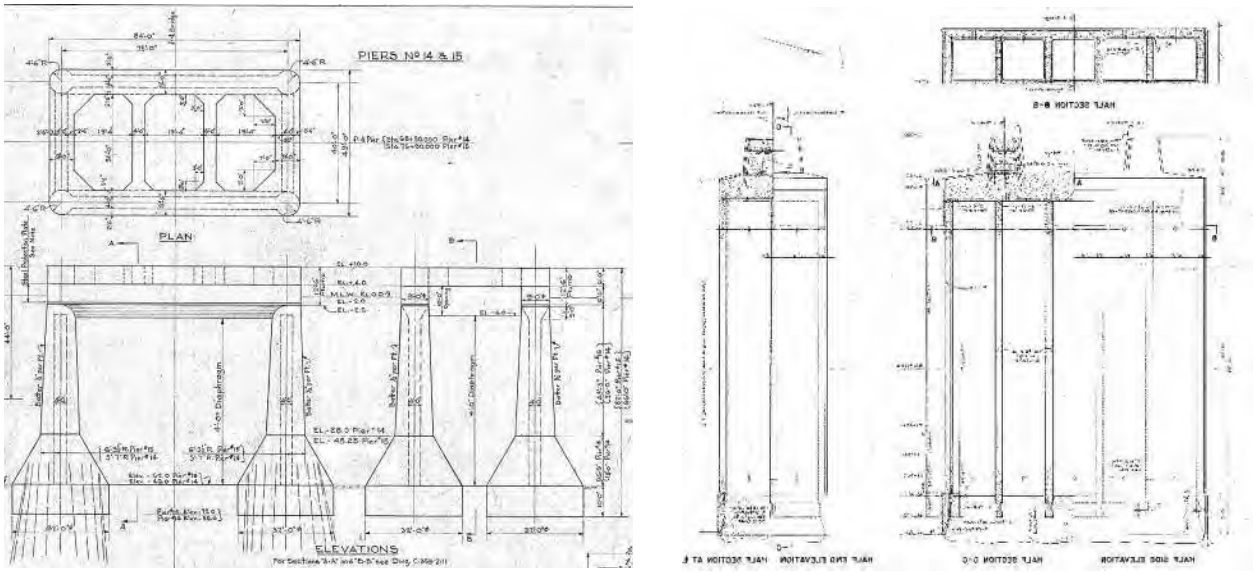


Figure 2 - Main Piers for N-MB Truss Span (Left) and Bay Bridge Suspension Span (Right)

The Bay Bridge differs from the original N-MB by using suspension spans instead of truss spans to cross the main navigation channel. The suspension cables are anchored in massive concrete piers, and the EB span has islands built around the anchorage piers. The suspension spans are supported at the quarter points by towers on large, solid concrete piers. These are similar in mass to the N-MB main span piers but are a different configuration. See **Figure 2** for a side-by-side comparison of the main piers for the original N-MB and the existing Bay Bridge.

1.2 Key Environmental Factor Comparisons

The N-MB carries U.S. 301 over a 1.7-mile-wide section of the Potomac River. The Potomac River is approximately 76 feet deep at its deepest point along the N-MB alignment. The segment of the Potomac River that the N-MB crosses is a tidal, mesohaline waterway. Several aquatic species occur in this segment of the Potomac River, including Atlantic and shortnose sturgeon, various game fish, marine turtles, and marine mammals (primarily dolphins).

The Bay Bridge carries U.S. 50/301 over a 4.5-mile-wide section of the Chesapeake Bay. The Chesapeake Bay is approximately 96 feet deep at its deepest point along the Bay Bridge alignment. The segment of the Chesapeake Bay that the Bay Bridge crosses is a tidal, mesohaline waterway. Several aquatic species occur in this segment of the Chesapeake Bay, including Atlantic and shortnose sturgeon, various game fish, marine turtles, and marine mammals (primarily dolphins).

During construction of the N-MB project, an approximately 2,400-foot-wide Zone of Safe Fish Passage (ZSFP) was maintained across the 1.7-mile-wide Potomac River to limit the effects of underwater noise on fish movement and migration. The MDTA worked with NOAA Fisheries to determine a practicable ZSFP for the Bay Bridge project and determined it will be 7,000-foot-wide across the 4.5-mile-wide Chesapeake Bay from January 15 to May 15. Pile driving and mechanical demolition activities will be staged so that noise levels do not exceed the behavioral modification threshold (150 dB RMS) within the ZSFP. The ZSFP will extend 7,000 feet parallel from each shoreline and would include a diversity of shallow and deepwater habitats. The ZSFP is effective for repetitive activities such as pile driving but won't be implemented for underwater explosive demolition, which is a single instantaneous activity. Explosive demolition will be conducted when fish are not migrating and Best Management Practices (BMPs) will be implemented that drive fish away from the blast site. Based on other similar recent and nearby projects, fish are not likely to be migrating from October through mid-December.

The Demolition Area **(Figures 3 and 4**) is the portion of the Action Area for this consultation that includes the middle Chesapeake Bay, specifically those areas of the Bay surrounding the Bay Bridge where demolition and blasting is proposed and the underwater areas where the consequences of the demolition could be experienced (e.g., increases in suspended sediment from blasting, noise, etc.), and monitoring for marine mammals and fish should be performed prior to blasting. The Demolition Area includes areas where vessels associated with blasting and demolition activities may travel or be anchored. The Demolition Area includes the project footprint of the areas where demolition, habitat modification, and blasting events are proposed, up to a 1,280-meter (4,200-foot) radius around the project site. The total Demolition Area comprises approximately 1,538 hectares (3,800 acres) of tidal open water.

The MDTA had to demolish one span for the N-MB. Whereas, the Bay Bridge has two spans to demolish, each of which are likely to be demolished separately depending on the sequence of

construction for the proposed EB and WB spans. The Demolition Areas are similar, with the WB span's Demolition Area shifted to the north of the EB Demolition Area by approximately 450-feet.

2 Demolition Planning for the Bay Bridge

The existing Bay Bridge EB span is approximately 21,286 linear feet long and the WB span is approximately 21,051 linear feet long. The total bridge length to be demolished is approximately 42,337 linear feet. When the project is under detailed design and construction, the sequencing of demolition would be re-evaluated as necessary to facilitate the most efficient construction and demolition schedule.

2.1 Superstructure and Substructure Above the Water

The superstructure for the existing Bay Bridge spans will likely be demolished similarly to the N-MB. For planning purposes, the anticipated demolition approach is to remove the concrete decks using mechanical means in a manner that prevents the materials from falling into the water. Steel beams will likely be lifted off the existing piers. The original steel truss sections from N-MB were rigged in a manner that allowed for quick removal of sections that were dropped in the water with shaped explosive cutting charges. The above water portion of the deep-water piers will likely be removed to an elevation where explosive demolition preparation can be facilitated (See **Section 3.1.1** for more information).

2.2 Piers – Suspension Span Anchor Piers

The existing Bay Bridge spans use solid concrete piers that are 55-feet wide by 123-feet long (EB) and 96-feet wide by 172-feet long (WB), constructed with a footing on piles below the mudline, to anchor the suspension cables for the span over the main navigation channel. The piers are in deep water (over 40 feet deep). The anchor piers for the EB span are surrounded by man-made islands that are approximately 10-feet above sea level. The anchor piers for the WB span are larger than the EB anchor piers and are not surrounded by islands. The MDTA is planning to leave the four anchor piers and two islands in place, but the decision will be made during final design.

2.3 Pile Bents – Shallow Depth Water

The existing Bay Bridge uses pile bents, a pier constructed with a concrete cap directly on piles, for support of the spans over shallow water. For planning purposes, the anticipated demolition approach is to remove pile bents in shallow water mechanically. There are 67 bents supporting the existing EB span and 89 bents supporting the existing WB span. The total length of bridge with pile bents is approximately 10,599 linear feet or approximately 25% of the total bridge length.

2.4 Piers – Moderate Depth Water

The existing Bay Bridge uses piers, constructed with a footing on piles below the mudline, columns, and a pier cap, for support of the spans over moderate depth water. For planning purposes, the anticipated demolition approach is to remove the piers that are in less than 40 feet

of water (moderate depth) mechanically. There are 39 moderate depth piers supporting the existing EB span and 11 moderate depth piers supporting the existing WB span. The total length of bridge with moderate depth piers is approximately 11,621 linear feet or approximately 27% of the total bridge length.

2.5 Piers – Deep Water

The existing Bay Bridge uses piers, constructed with a footing on piles below the mudline, columns, and a pier cap, for support of the spans over deep water. For planning purposes, the anticipated demolition approach is to demolish the piers that are in deep water (over 40 feet of water) mechanically or explosively above the water level and with explosives below the water. Mechanical means are ineffective in water deeper than 40 feet. Some of the pier will need to be left above the water to accommodate the underwater explosive demolition preparation. There are 15 deep water piers supporting the existing EB span and 15 deep water piers supporting the existing WB span. The total length of bridge with deep water piers is approximately 20,117 linear feet or approximately 48% of the total bridge length.

3 Environmental Effects of Underwater Demolition with Explosives

For planning purposes, the N-MB underwater demolition processes were used to estimate the environmental effects of using similar processes for demolition of the existing Bay Bridge. Given the similarities between the original N-MB and existing Bay Bridge substructure units, it was assumed that similar subaqueous blasting processes will be used for demolition of the Bay Bridge, in order to obtain a rough estimate for the magnitude of effects of explosive underwater demolition. There are 15 EB piers and 15 WB piers that will require subaqueous blasting.

3.1 Underwater Noise Estimation

The MDTA anticipates incorporating BMPs during subaqueous blasting of the deep water piers to minimize impacts to protected resources to the maximum extent practicable. For planning purposes, the N-MB underwater noise modeling process was followed to determine the Demolition Area, Exclusion Zone, and Mortality Zone.

3.1.1 Explosive Loading Assumptions per Pier

The pier concrete conditions will be determined during the final design; however, for planning purposes, the following assumptions were made.

The piers will be mechanically demolished above the water surface to an elevation that best facilitates the drilling of vertical holes and loading of explosives, typically 6 to 10 feet above the water surface to match deck barge working surfaces. Holes will be drilled and explosives loaded as needed to break apart the piers underwater into pieces that can be removed if necessary.

For planning purposes, the general parameters from the approved blast design from N-MB are assumed for the Bay Bridge demolition, including:

- 5 decks of explosives per hole.
- 30 pounds of explosives per delay.
- Minimum of 9 milliseconds (ms) delay between explosions.
- Maximum of 17 ms delay between decks in the same hole.

The MDTA will evaluate the parameters needed depending on actual conditions when developing the final blast design for the Bay Bridge.

3.1.2 Protection of Marine Life

Based on recent similar and nearby projects (e.g., Francis Scott Key Bridge Rebuild, N-MB Replacement), the MDTA assumes a time-of-year restriction (TOYR) from December 16 to September 30 on subaqueous blasting will be implemented for the Bay Bridge. Therefore, it is assumed subaqueous blasting of the Bay Bridge would be permitted from October 1 to December 15.

Two hours before the scheduled blast time, a sonar fish deterrent system should be deployed and swept through the water by boat in the vicinity of the piers to be detonated. Sonar should continue until just before the blast. If the blasting is delayed, sonar fish clearance should be restarted.

Prior to initiating the main blast, fish scare charges will be detonated. These fish scare charges should consist of a series of blasting caps, each containing 0.75 grams of explosives, suspended in the water column surrounding the structure to be blasted. The scare charges should be detonated 15 to 30 seconds prior to the main blast.

The blast should be designed to minimize the impact on marine life in the area through confinement of explosives within the concrete of the structures, using adequate stemming lengths, capping with stone between explosive layers/decks, controlling the weight of explosives detonating at a given time (pounds of explosives per delay), and using detonators to ensure precise firing times.

3.1.3 Subaqueous Blasting Considerations

Blasting of the Bay Bridge's concrete piers with a proper blast design and implementation of BMPs is considered confined blasting, which reduces the energy and shock wave released to the water column. Proper blast design includes the use of stemming and other techniques such as charge delays and proper sequencing to shoot larger charges in the center of the pier. The blast will radiate outward toward the outer edge of the pier so that most of the blast energy is contained to the pier and efficiently demolishes the pier. Mortality Zone and Exclusion Zone estimates were

calculated based on a review of existing published documents and studies used for the N-MB project. See **Figures 3 and 4** for the layout of the Mortality Zone and Exclusion Zone.

Mortality Zone: The Mortality Zone includes areas where lethal effects to fish are anticipated due to the proximity to blasting and lethal levels of underwater noise. The formula in Hempen et al. (2007) was used to calculate the Mortality Zone. Cole's equation for open-water pressures was manipulated using the Hubbs and Rechnitzer (1952) lower bound of lethal pressure value of 280 kilopascal (40 pounds per square inch). This equation was previously used by Hempen et al. (2005).

The mortality radius for single, open water shots (MROW) is calculated as:

$$MROW\ (feet) = 260\ wOW^{1/3}$$

where wOW = the maximum charge weight (in pounds) per delay of a single, open-water blast

This equation was developed as a conservative estimate of pressure from the closest confined holes. The mortality radius for confined shots may be resolved from the confined pressure of the equation and using the low lethal pressure of 40 psi.

The mortality radius for single, confined shots (MRC) is calculated as:

$$MRC\ (feet) = 56\ wC^{1/3}$$

where wC = the maximum charge weight (in pounds) per delay of a single, confined blast

The MRC calculation for the Bay Bridge explosive demolition is shown below.

$$MRC\ (feet) = 56*(30)^{1/3}$$

$$MRC\ (feet) = 174$$

To account for the size of the piers, the width of the largest pier is added to the MRC.

$$MRC\ EB = 174+41 = 215\ feet$$

$$MRC\ WB = 174+46 = 220\ feet$$

The MRC equation is most appropriate for the Bay Bridge explosive demolition. Assuming a maximum amount of explosive per delay of 13.6 kilograms (30 pounds), yields an MRC of approximately 52 meters (174 feet) around each of the 15 EB and 15 WB piers. For conservative planning, the MRC is added to half the width of the largest piers to be blasted for an adjusted radius of 215 feet around each EB pier and 220 feet around each WB pier. The combined MRC

areas result in approximately 5 hectares (13 acres) for each span. The assumed maximum charge to be used is 13.6 kilograms (30 pounds) per delay but these charges will be in the center of the pier. The charges closest to the exterior of the pier will likely be less per delay. Therefore, this Mortality Zone is a conservative (i.e., worst-case scenario) estimate. Based on N-MB, a smaller Mortality Zone is anticipated during blasting.

Exclusion Zone: The Exclusion Zone includes areas where effects on fish such as injury and harassment and potential mortality for more susceptible fish. This planning level demolition analysis used the Hempen et al. (2005) formula to calculate the conservative (i.e., worst-case scenario) Exclusion Zone with an added buffer to account for the sensitivity of marine mammals. This formula has been used in previous explosive demolition projects for Section 7 consultation with NOAA Fisheries and is considered conservative for preventing injury to protected species. This equation is the most appropriate for the Bay Bridge confined blasting pier demolition:

$R = [520 (W)^{1/3}]+500$
where R = the Exclusion Zone radius in feet
W = the maximum pounds of explosives per delay
500 = Conservative buffer added

As previously noted, the maximum pounds of explosive per delay for this project is 13.6 kilograms (30 pounds), which yields an Exclusion Zone radius of 640 meters (2,100 feet) around each pier, for a total combined area of approximately 486 hectares (1,200 acres) for the entire Exclusion Zone along each span. Similar to the Mortality Zone, this is considered a conservative estimate, as the blast design uses 13.6-kilogram (30-pound) charges are located in the interior of the piers and it's likely that lesser charges will be used closest to the exterior of the piers. Therefore, the actual Exclusion Zone where injury and harassment could occur is expected to be smaller for each blast.

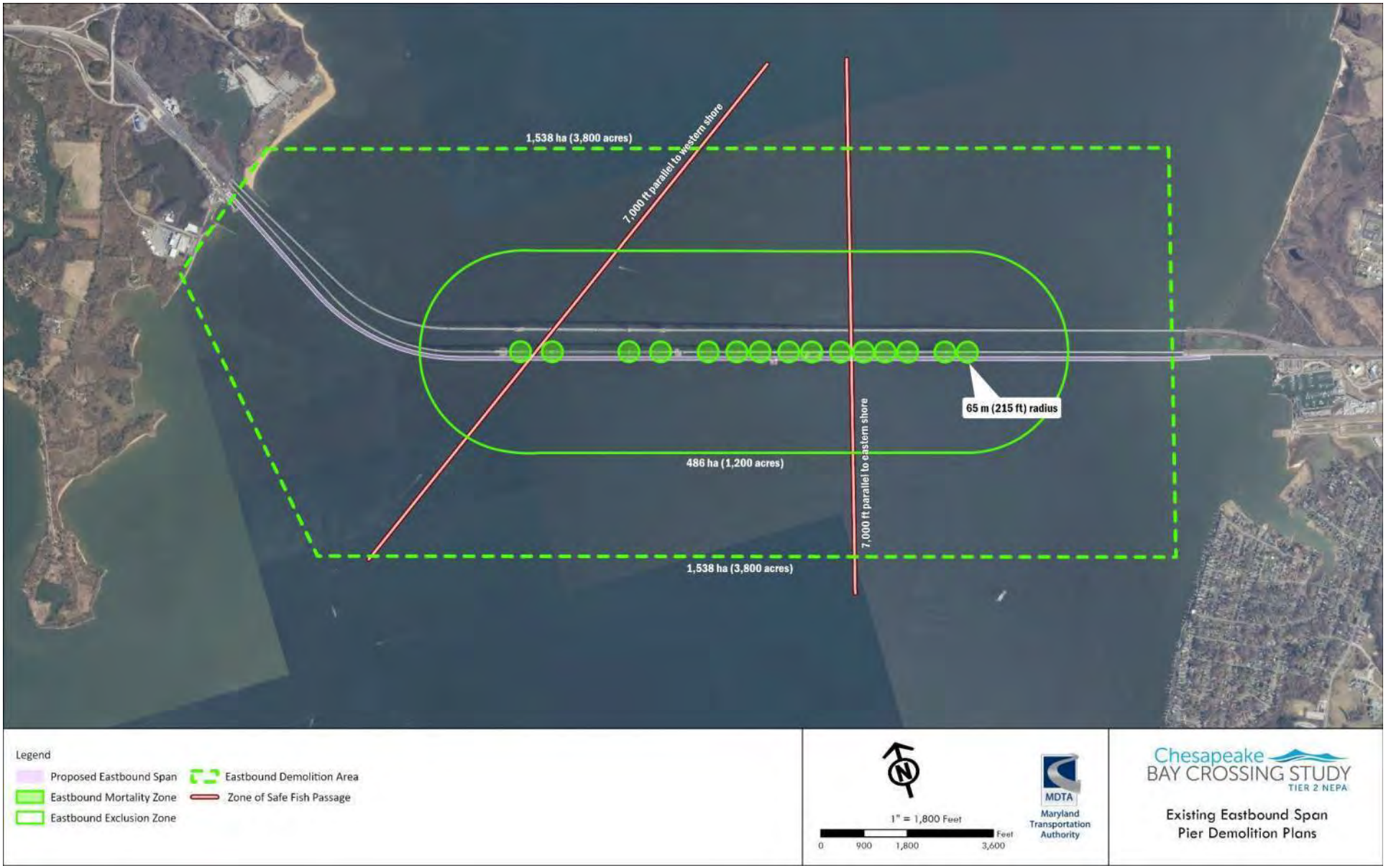


Figure 3 - Mortality Zone and Exclusion Zone for Existing Eastbound Span

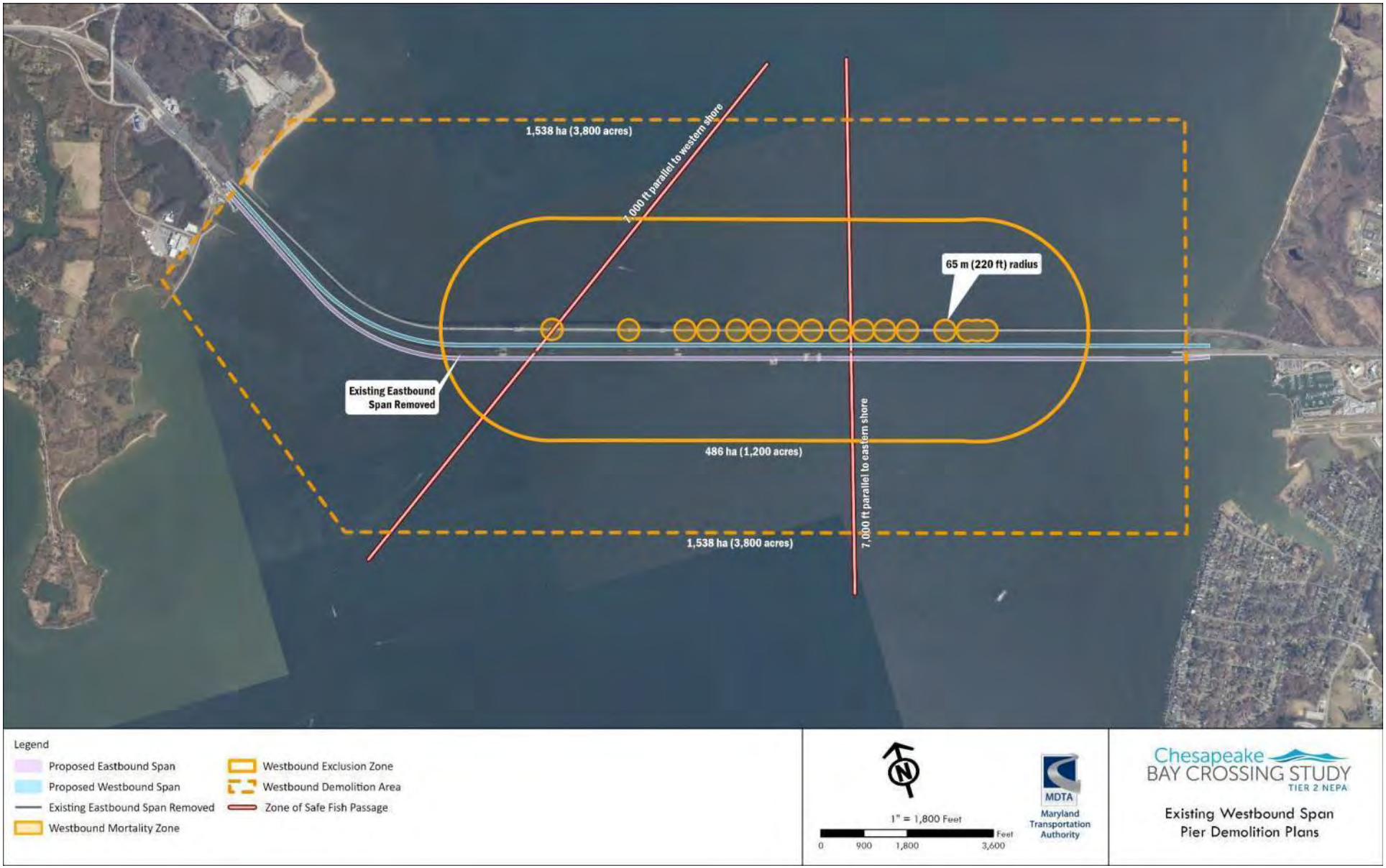


Figure 4 - Mortality Zone and Exclusion Zone for Existing Westbound Span

3.1.4 Monitoring and Reporting

Underwater noise monitoring will be conducted within the Demolition Area during blasting events. If underwater noise monitoring is found to be significantly more than anticipated, MDTA will coordinate with the agencies on potential adaptive management measures.

A sturgeon monitoring program will be implemented prior to blasting events and the blast will not be detonated until the observer confirms that no sturgeons are detected within the Exclusion Zone. If a tagged fish is detected in the Exclusion Zone, the blast would be delayed until the fish swims out of the Exclusion Zone. Boats with spotters will watch for marine mammals. If marine mammals are seen, blasting will be postponed until the Demolition Area is cleared.

Following each blasting event, a search for injured/killed fish using an adequate number of netters and vessels will begin immediately upon receiving the "all clear" and extend for at least 30 minutes. The search area will include all surface waters within at least 150 meters (450 feet) of the center of the blast area, with at least one vessel beginning at the centroid. The search area is more than twice the Mortality Zone and considers mortality and injury to sensitive individuals, the tidal drift, and gives the searchers a reasonably sized area to identify fish at the surface. All individuals of each species will be collected, identified, and enumerated. Within two hours of the blasting event, staff will collect any additional fish on the surface that are believed to be from the blasting event.

3.1.5 Demolition Rubble

Rubble will drop to the bottom of the Bay as a result of mechanical or explosive demolition of the existing concrete bridge piers. The rubble will likely drop in the immediate areas of the piers. The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.

4 Conclusion

For planning purposes, the demolition of the original (1940) N-MB is a reasonable proxy for demolition of the existing Bay Bridge piers. The N-MB pier demolition process should be effective for the existing Bay Bridge piers due to the similarity of the structure designs, water depths, and anticipated species. This analysis used the most conservative (i.e., worst-case scenario), reasonably expected effects. Prior to demolition, the procedures and best management practices should be updated if new information becomes available. If blasting is used on another East Coast project prior to the demolition of the existing Bay Bridge, the analysis will be updated using the newer data as the best available science.

5 References

Hempen, G.L., T.M. Keevin, and H.J. Ruben. 2005. Underwater blast pressures from confined rock removal shots: The Kill van Kull Deepening Project. Pp. 91-100. In: Proceedings of the Thirty-first Annual Conference on Explosives and Blasting Technique, Volume 1, Orlando, Florida. International Society of Explosive Engineers, Cleveland, OH.

Hempen, G.L., T.M. Keevin, and T.L. Jordan. 2007. Underwater blast pressures from a confined rock removal during the Miami Harbor deepening project. International Society of Explosives Engineers. Vol. 1. 12 pp.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
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June 1, 2026

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RE: NMFS Essential Fish Habitat Consultation for the Proposed Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)

Dear Ms. Remezova:

We have reviewed the Essential Fish Habitat (EFH) Assessment, dated March 2026 (revised May 1, 2026), and associated National Environmental Policy Act (NEPA) documentation for the proposed Chesapeake Bay Crossing Study: Tier 2 NEPA Project (BCST2 or Project). The Federal Highway Administration (FHWA) and your non-federal sponsor the Maryland Transportation Administration (MDTA) propose to construct a new crossing of the Chesapeake Bay along the existing U.S. Route 50/301 corridor. In the Draft Environmental Impact Statement (DEIS) MDTA identified Alternative C, consisting of two new four-lane bridges (eight lanes, total) generally located to the south of the existing bridge alignments with eight-lane approaches in the study corridor on either shore (6-8-6 South), as the Preferred Alternative. The study corridor encompasses the existing Gov. William Preston Lane Jr. Memorial Bridge (Bay Bridge) spans connecting Sandy Point in Anne Arundel County to Kent Island in Queen Anne County, Maryland. This corridor was previously identified as an outcome of the Tier 1 NEPA study completed for the Project.

Project History

We have participated as a cooperating agency throughout the NEPA process for both the Tier 1 and Tier 2 Chesapeake Bay Crossing Studies. Our comments have focused on identifying potential impacts to marine, estuarine, and diadromous trust resources. Through our coordination we have identified potential impacts of the Project on existing habitats and provided guidance to ensure that these impacts are avoided, minimized, or otherwise offset to the maximum extent possible. We appreciate the extensive coordination between our agencies throughout these study periods.

This consultation builds upon several key touchpoints and coordination milestones between our agencies. We have issued several letters and comments throughout the NEPA process, including:

- Our May 10, 2021, letter including comments on the Tier 1 DEIS Comments. We evaluated

the potential corridor alternatives, highlighting the presence of historic oyster (*Crassostrea virginica*) reefs, submerged aquatic vegetation (SAV), and anadromous fish migration pathways.

- Our January 13, 2025, letter including our scoping comments on the Tier 2 Notice of Intent (NOI). We outlined the necessary scope of the Tier 2 EFH assessment, identifying underwater acoustics, dredging, and bridge demolition as primary concerns.
- Our March 3, 2026, technical correspondence on Fish Passage. We coordinated directly with MDTA's technical consultants to establish the baseline parameters of the Zone of Safe Fish Passage (ZSFP)
- Our April 15, 2026, comments on the Preferred Alternative and Conceptual Mitigation (PACM) plan, including feedback on the draft plans clarifying typical minimization, mitigation, and monitoring standards.
- Numerous additional concurrence points throughout the Tier 2 NEPA process, as requested by FHWA and MDTA.

Given the large scope and long time horizon of this project, many of the specific technical details, performance standards, and operational triggers for the mitigation measures outlined below should be determined in close coordination with the resource agencies during final project design and permitting. This ongoing coordination is vital to ensure that final plans reflect the best available science and real-time biological conditions.

Project Description

The Preferred Alternative consists of two new bridge spans located immediately adjacent to the existing spans, designed to provide additional traffic capacity. The project involves a multi-year, multi-phased in-water construction and subsequent demolition schedule estimated to span up to 15 years of active construction, including ten years of construction (five for each proposed span) and four years for demolition (two for each existing span) activities. The primary in-water construction and demolition elements include:

*Dredging and Benthic Excavation***:** Mechanical or hydraulic dredging may be necessary for up to approximately 50 acres of estuarine bottom to facilitate construction vessel access, accommodate temporary work barges, and prepare the substrate for bridge pier foundation installation.

*Structural Foundation and Pile Driving***:** The new spans will be supported by a series of concrete piers anchored by up to 15,000 concrete and/or steel piles. Production pile driving will likely involve driving steel pipe piles up to 96 inches in diameter and potentially pre-cast concrete piles using both vibratory and impact hammers.

*Demolition of Existing Spans***:** Following the completion and opening of the new spans, the existing eastbound and westbound bridge structures and their subaqueous piers will undergo a phased demolition process. Pier demolition will likely involve a combination of mechanical dismantling and subaqueous explosive blasting. All demolition rubble deposited on the bay floor will be recovered.

We appreciate that MDTA has described several commitments to employ a suite of Best Management Practices (BMPs), which were informed by our early coordination on this project along with the recommendations detailed in our Best Management Practices Manual (NOAA and FHWA 2018) and our Programmatic EFH Consultation with FHWA (NOAA and FHWA 2024). This also included commitments to further coordination during project design and permitting.

Essential Fish Habitat and Sensitive Habitats in the Project Area

The proposed project corridor and the surrounding waters of the mid-Chesapeake Bay support diverse marine, estuarine, and anadromous fishery resources. The Project action area, or the area anticipated by MDTA to be directly affected by in-water construction activities, contains designated EFH for various life stages of species managed under the Mid-Atlantic Fishery Management Council (MAFMC) and the New England Fishery Management Council (NEFMC).

Designated EFH and Managed Species

The project area supports designated EFH for the following managed species and their respective life stages:

- Summer flounder (*Paralichthys dentatus*): larvae, juveniles, and adults.
- Bluefish (*Pomatomus saltatrix*): juveniles and adults.
- Black sea bass (*Centropristis striata*): juveniles and adults
- Windowpane flounder (*Scophthalmus aquosus*): larvae, juveniles, and adults.
- Butterfish (*Peprilus triacanthus*): eggs, larvae, juveniles, and adults.

These species and their prey use the project area as rearing, ranging, and resting habitats. More broadly, estuarine dependent and facultative species complete their annual movements between shallow tidal tributaries in the warmer months, when primary and secondary productivity are high, and deeper waters of the Chesapeake Bay estuary and Atlantic coastal shelf in the winter. The project will also impact federally managed species and their prey as they make these seasonal movements. This includes impacts to sensitive biogenic habitats (e.g., oyster habitat) and migratory pathways.

Submerged Aquatic Vegetation (SAV):

Summer flounder Habitat Area of Particular Concern (HAPC) is defined as all species of macroalgae and seagrasses, including loose aggregations, within estuarine waters. HAPCs are subsets of EFH that exhibit one or more of the following traits: rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic degradation. Historical SAV distributions are mapped within the broader Chesapeake Bay by the Virginia Institute of Marine Sciences (VIMS). Recent VIMS survey data indicates that direct impacts to SAV within the immediate project limits are unlikely and will be further defined during the project design phase.

Historic Oyster Bottom

The Project action area contains historical oyster shell and cultch bottom including Named Oyster Bars (NOBs) defined by the Maryland Department of Natural Resources. These benthic features provide critical structural complexity, serving as refuge and forage grounds for juvenile black sea bass and summer flounder. We anticipate that these areas will be permanently impacted by bridge construction (i.e., filled) and demolition activities.

Migratory Pathways for Anadromous Fish and Prey Species

The mainstem Chesapeake Bay serves as a critical, geographically constricted migratory pathway and ecological corridor for numerous species that are not federally managed under the MSA but are still considered NOAA trust resources due to their use of marine or estuarine waters for part of their life cycle. Anadromous species such as river herring (alewife *Alosa pseudoharengus* and blueback herring *A. aestivalis,* collectively), American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), and striped bass (*Morone saxatilis*) must migrate past the project area to reach regionally significant spawning grounds in the upper Chesapeake Bay. Many of these species are at or near historic population lows and have shown limited signs of population recovery despite decades of restoration efforts (ASMFC 2020, ASMFC 2024a). Other estuarine species such as bay anchovy (*Anchoa mitchilli*), spot (*Leiostomus xanthurus*), and Atlantic menhaden (*Brevoortia tyrannus*) represent key ecological links and the primary trophic engine of the Chesapeake Bay. Larvae and juveniles of these species grow and forage in the rich mixing zone at the head of the Chesapeake Bay (North and Houde 2001; Roman et al. 2001). Unobstructed movement through this project corridor is vital for these species to navigate between marine environments, estuarine nurseries, and tidal freshwater upstream tributaries to successfully complete their complex life histories.

Because these migratory and forage resources are fundamental to the ecological productivity of the estuary and serve as primary prey for federally managed species (e.g., summer flounder, bluefish), we work to protect, conserve, and restore these populations and their habitats under the authority of both the MSA and the FWCA. We also seek to ensure that large-scale transportation projects do not cause unmitigated blockages or mortality that could undermine regional aquatic biodiversity and recreational and commercial fisheries.

Adverse Project Effects on NOAA Trust Resources and Mitigative Measures

We anticipate that the construction and demolition activities proposed will adversely affect our trust resources, including EFH through a diverse array of direct, indirect, temporary, and permanent impacts that will be avoided, minimized, or otherwise offset in consultation with the resource and regulatory agencies. The pathways and associated mitigative measures are detailed below.

Extended Temporal Impacts

The proposed schedule spans up to 15 years of active in-water construction, followed

immediately by several years of demolition. For estuarine fishes, a nearly continuous decade-long window of disturbance represents a semi-permanent environmental shift. For short-lived forage species such as bay anchovy, which have a typical lifespan of only one to two years, several generations will be subjected to Project impacts associated with dredging, pile driving, and other construction-related stressors. For long-lived migratory species, experiencing many consecutive years of potential disturbance to migratory behaviors and larval nursery habitats presents a compounding risk of consecutive year-class failures. This temporal scale threatens the long-term demographic stability of Chesapeake Bay fish stocks. The BMPs that MDTA has committed to implement in the EFH Assessment will help to mitigate these project effects and we look forward to working with you to further tailor these measures as project designs progress.

Hydroacoustic Noise from Pile Driving and Mechanical Demolition

The installation of up to 15,000 piles and the demolition of the existing spans over a period of up to 15 years represent a substantial, chronic hydroacoustic stressor. We are specifically concerned that the passage of anadromous fish species through the Project area may be influenced by these construction activities. Specifically, river herring, American shad, and hickory shad are highly sensitive to hydroacoustic energy (see review by Popper and Hawkins 2018) and may alter migratory behaviors in response to these stressors. Striped bass may be similarly affected and recent telemetry data presented in the DEIS indicates that striped bass may form pre-spawning aggregations around the Bay Bridge during the winter months (December, January) as they stage for their spring spawning runs.

The modeling presented in the DEIS indicates that the area of behavioral influence (i.e., within the 150 dB RMS isopleth) from several of the anticipated pile driving activities extends across nearly the entire width of Chesapeake Bay. Depending on the duration and extent (e.g., size of piles and number being driven simultaneously), the activity to approximate the effects of a physical barrier, leading to diminished spawning success for these stocks, many of which are already at or near historic lows. For example, the Chesapeake Bay upstream of the project area is among the most important spawning areas for the entire coastwide striped bass population. This population has now experienced several consecutive years of recruitment failure (ASMFC 2024b), rendering access to these spawning habitats particularly important during this period of stock rebuilding. Aside from the behavioral impacts, pile driving activities using an impact hammer and large-diameter steel pipe piles, will generate significant underwater noise that can kill, injure, or stun, fish, including migratory species.

To manage and minimize these chronic pressures, the following concepts are critical to integrate during project design:

- Project Planning Considerate of Generated Noise: To minimize underwater noise associated with hollow steel pipe piles, MDTA should evaluate and use construction materials that generate relatively less underwater noise (e.g., pre-cast concrete piles) where structurally and geotechnically feasible. Furthermore, project schedules should consider avoiding

several simultaneous pile driving activities during the sensitive spring staging and spawning period (January 15 to May 15) to avoid unintended cumulative impacts associated with multiple sources of underwater noise.

- The Underwater Noise Monitoring Plan (UNMP)**:** MDTA should develop a comprehensive, design-phase UNMP to monitor and adaptively manage hydroacoustic energy resulting from construction activities. It should serve as a programmatic framework to validate noise attenuation equipment (e.g., bubble curtains), describe impacts to aquatic life (e.g., documentation of fish kills), and adjust operations in real time when cumulative acoustic impacts exceed acceptable thresholds.
- The Zone of Safe Fish Passage (ZSFP)**:** The UNMP should formally define and protect the ZSFP during the critical migratory focal period of January 15 through May 15, annually. To ensure that migrating striped bass and Alosines can safely navigate past active construction and mechanical demolition noise, the ZSFP should encompass a contiguous, 7,000 linear-foot-wide corridor (equivalent to approximately one-third of the waterway width) encompassing areas of deeper channel edges, as we anticipate that migratory species move along relatively steep channel margin drop-offs as they move upstream. This corridor should remain below the 150 dB RMS behavioral noise threshold. Operating large-impact hammers or noise-intensive mechanical demolition equipment during this window without validating the spatial and acoustic integrity of the ZSFP threatens to significantly disrupt upstream movement to spawning areas.

Demolition Blasting and Substrate Alteration

The proposed demolition of the existing eastbound and westbound bridge concrete piers using subaqueous explosives presents catastrophic localized risks. Confined explosive blasting generates rapid-rise shock waves. Species with physoclistous swim bladders (e.g., black sea bass) or those with highly sensitive hearing abilities (e.g., Alosines) are more likely to experience internal tissue damage, swim bladder rupture, visceral hemorrhaging, and mortality.

The resulting deposition of concrete demolition rubble on the bay floor will physically alter the benthic topography. Unrecovered material can permanently smother soft-bottom benthic habitat, changing the local sediment profile and rugosity. This prevents the recolonization of benthic forage species. While mechanical removal of this demolition debris will cause temporary increased turbidity in the immediate vicinity, we anticipate that complete removal of demolition debris will present the best scenario to recover the functions and values of existing benthic habitats.

Due to the potential for significant injury and mortality to aquatic life and NOAA trust resources, explosive demolition should be avoided and minimized to the maximum extent possible. If explosive demolition is proposed, MDTA should develop a project-specific Blasting Plan concurrent with design. This plan will include measures to avoid, minimize, or otherwise offset impacts associated with blasting and adaptive management approaches to be implemented across multiple blasting events.

Hydrodynamic Effects

We are concerned that the full impact of placing additional pile-supported structures at this relatively narrow section of the mainstem Chesapeake Bay may have implications for regional hydrodynamics that have not been fully described. The DEIS included an evaluation of the physical modifications of the new structure on Bay hydrology, using high-resolution numerical hydrodynamic modeling study (*Chesapeake Bay Crossing Study Tier 2 NEPA Hydrodynamics Report, May 2026*). The model evaluated depth-averaged flow velocity magnitudes and bed shear stresses, comparing existing (baseline) conditions against the proposed bridge configurations (Alternative C, using conservative conceptual pier footprints as a "worst-case" limit of disturbance). The hydrodynamic modeling demonstrates that outside the immediate bridge corridor, proposed depth-averaged flow velocities and bed shear stresses are highly similar to existing conditions, with differences diminishing rapidly with distance. However, the model reveals localized increases in depth-averaged flow velocities and critical bed shear stress exceedance durations immediately adjacent to the proposed pier and dolphin footprints. These localized increases represent substantial hydrodynamic forcing (e.g., increases in peak velocity greater than 40%). The resulting scour and resuspension are expected to alter the sediment transport and deposition dynamics surrounding the pier structures which, in turn, will drive localized substrate conversion in the immediate vicinity of the pier foundations. This represents a permanent change to the natural rugosity and benthic habitat value of these specific areas.

Crucially, the hydrodynamic modeling study was purely physical and failed to evaluate or contemplate the broader water quality implications of these shifting water movements upstream of the project. For example, the modeling did not analyze how the continuous physical presence and cumulative drag force of new pile-supported structures, large pier footings, and remaining structures (e.g., main span pier islands) may influence tidal mixing patterns, which can have implications for spawning and nursery grounds upstream of the project. By modeling only depth-averaged, localized physical flows, the action agency has overlooked potential system-wide, cumulative water quality impacts on EFH. Other studies (e.g., Vickery et al. 2022, Zarzuelo et al. 2023) have noted significant impacts of pile supported structures along with other hydrological modifications (e.g., dredged channels) on tidal estuaries. We encourage MDTA to expand their investigation into these potential project effects and, if necessary, explore methods to mitigate adverse impacts.

Stormwater Runoff, Roadway Debris, and Indirect Estuarine Degradation

The physical deck of the new bridge span represents a large impervious surface that will collect automotive pollutants (e.g., oils, heavy metals) and roadway debris. Direct discharge of untreated stormwater runoff into Chesapeake Bay introduces chronic chemical and physical stressors that degrade the water quality of local EFH. We encourage MDTA to evaluate whether they could partially treat the runoff from the new bay bridge spans and include structural or mechanical stormwater management measures within the final design to capture and manage roadway debris,

suspended solids, and chemical pollutants prior to discharge.

EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, we provide the following Essential Fish Habitat (EFH) conservation recommendations to avoid, minimize, or otherwise offset the substantial adverse effects to EFH documented above. We note that we support the entirety of MDTA's commitments described in the EFH Assessment and anticipate that they will be incorporated into the Project plans. Certain recommendations presented here may be duplicative to those commitments and are included to place emphasis on their incorporation or otherwise refine these mitigative measures.

(1) During the project design phase, develop an alternatives analysis evaluating measures to minimize underwater noise generated during construction activities. This could include designs that use fewer piles (e.g., minimizing temporary trestles) and/or pile materials (e.g., pre-cast concrete piles) that transmit relatively less hydroacoustic energy into the water column.

(2) Develop a project schedule that avoids driving piles that generate the greatest underwater noise (e.g., concurrent driving of large diameter steel pipe piles) during the designated staging, migration, and spawning periods for migratory fishes (January 15 through May 15).

(3) Avoid explosive demolition to the maximum extent practicable. Should explosive demolition be the selected method to dismantle existing structures, consult with the resource agencies to develop a Blasting Plan that includes mitigative measures (e.g., fish deterrents pre-blasting) and potential adaptive management approaches to be implemented to minimize mortality. The timing of the blasting window should be defined in close coordination with us and other resource agencies, considering the most up-to-date fish telemetry data available at the time the Blasting Plan is finalized. That plan should also define how fish kills will be documented and offset.

(4) Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements:

   (a) Monitor and maintain the defined 7,000 foot-wide ZSFP (approximately one-third of the waterway) that encompasses at least one deeper channel edge (i.e., drop-off feature) during the period extending from January 15 through May 15, inclusive. Underwater noise within that zone will be maintained below the 150 dB re 1 µPa RMS behavioral threshold to minimize impacts to fish movements during this sensitive period.

   (b) An adaptive management framework where adjustments will be made to construction activities (e.g., hammer strike energy) and accompanying

mitigative measures (e.g., bubble curtain pressure) to minimize fish kill events and maintain compliance with the 150 dB RMS limit across the entire width of the ZSFP.

(c) Monitoring measures to describe the occurrence of fish that are stunned, injured, or otherwise killed by pile driving activities and thresholds that, when exceeded, trigger a "hold point" requiring cessation of the activity that caused the observed event. The "hold point" will be released in consultation with the resource agencies and may include measures (e.g., operational adjustments) to mitigate future occurrences.

(5) To monitor migratory behavior and validate ZSFP efficacy, deploy or fund an additional acoustic passive acoustic telemetry receiver array (compatible with the ACT/MATOS networks) upstream of the construction corridor to complement the existing array located downstream of the Bay Bridge. Analyze the resulting data to describe fish movement patterns and significant environmental covariates to inform project operations and mitigative measures (e.g., explosive demolition timing, use of bubble curtains). These deployments should occur as soon as possible and prior to production pile driving.

(6) Existing materials (e.g., rubble) or structures that are not necessary as attending bridge infrastructure (e.g., required collision avoidance) should be fully removed. If derelict structures/debris are proposed to remain, MDTA should work with the resource agencies to evaluate the existing and potential habitat impacts. Those discussions should inform the extent to which fill materials remain, in what configurations, and under what management framework.

(7) Conduct a high-resolution, post-demolition side-scan sonar and bathymetric survey of the project area that demonstrates, to the satisfaction of the resource and regulatory agencies, that all structures and debris have been removed in a manner that will allow for natural recovery of benthic habitats and associated ecological functions.

(8) Develop a post-dredging monitoring and adaptive management plan to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function (e.g., prey density), relative to a reference site, after three years.

(9) To protect oyster habitat which provides productive forage and physical structure for various federally managed fish and their prey, prohibit any dredging or subaqueous excavation within the boundaries of a Named Oyster Bar (NOB) and/or within 500 yards of an NOB from December 16 through March 14 and from June 1 through September 30 of any calendar year.

(10) To minimize the adverse impacts of suspended sediment and turbidity plumes on growing plants, prohibit dredging or subaqueous excavation within 500 yards of mapped SAV during the active SAV growing season, from April 15 through

October 15 of any calendar year.

(11) Continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the maximum extent possible, including partial treatment of bridge runoff, to minimize roadway delivery of contaminants (e.g., oils, heavy metals) to surface waters. Incorporate measures to minimize the delivery of roadway debris into surface waters to the maximum extent possible.

(12) Create a compensatory mitigation plan, in coordination with the resource and regulatory agencies, to offset unavoidable permanent impacts to aquatic resources. This should include:

(a) Replacing permanently impacted biogenic habitats (e.g., oyster reef, SAV, emergent tidal wetlands) in-kind, to the maximum extent practicable, at a 3:1 ratio.

(b) Replacing permanently impacted open water habitat at a 2:1 ratio through the enhancement of aquatic habitats that are productive for fish and nekton (e.g., historical fill removal, oyster reef restoration, SAV restoration).

(c) Offset any temporary impacts that are anticipated to be in place for greater than twelve months, to compensate for temporal loss of function.

(d) Prioritize compensatory mitigation projects in areas that are both in proximity to the impact area and in locations where they have likelihood of intended ecological function over relatively long-time horizons. Selection of sites and approaches should be informed by underlying water quality conditions and potential for future anthropogenic disturbance (e.g., creating oyster reefs in areas not subjected to harvest).

(e) Due to the inherent habitat tradeoffs, avoid pursuing artificial reef creation/expansion as a compensatory mitigation mechanism. While suitable as a stewardship activity, the placement of bridge debris in designated reef sites is not suitable as compensatory mitigation to offset the adverse effects of the proposed action on EFH and other NOAA trust resources.

We appreciate the cooperation of the FHWA and MDTA throughout this complex Tier 2 NEPA process. Full implementation of these recommendations is necessary to ensure that the extensive environmental impacts of the Chesapeake Bay Crossing Project are avoided, minimized, and otherwise offset to the maximum extent practicable.

Please note that Section 305(b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including a description of measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305(b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any

disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects pursuant to 50 CFR 600.920(k). This response must be provided within 30 days after receiving our EFH conservation recommendations and at least 10 days prior to the issuance of a FONSI.

Conclusion

We appreciate the close coordination between our agencies, the non-federal sponsor, and the rest of the project team over the past several years to reach this milestone. This is reflected by the level of detail in the EFH Assessment and extent to which our previous recommendations are reflected therein. Should you have any questions regarding these recommendations, please contact Jonathan Watson (978-675-2180; jonathan.watson@noaa.gov) in our Annapolis Field Office. We understand that you initiated formal consultation under section 7 of the Endangered Species Act with our Protected Resources Division on March 18, 2026, and continue to work with the Office of Protected Resources to meet the requirements of the Marine Mammal Protection Act. We will continue to coordinate closely with our colleagues in those offices to ensure a streamlined and consistent process. We look forward to continuing to work with you as this project continues to evolve over the next decade or more.

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat and Ecosystem Services

cc:
FHWA - A. Bienko, B. Yanchik
MDTA - H. Lowe
CRI - S. Williamson
USACE - J. DaVia
NOAA - K. Schabow, K. Greene, B. Hopper, C. Hotchkins, D. Youngkin
USFWS - R. Li
USEPA - C. Mazerella
NPS - M. Eberle
MDE - H. Nelson
MDNR - R. Hansen

Works Cited

Atlantic States Marine Fisheries Commission (ASMFC). 2020. 2020 American Shad Benchmark Stock Assessment and Peer Review Report. 1067 p.

ASMFC. 2024a. River Herring Benchmark Stock Assessment and Peer Review Report. 455 p.

ASMFC. 2024b. Atlantic Striped Bass Stock Assessment Update. 37 p.

Gardner, G. and R.J. Johnston. 2021. Is shoreline armoring a response to marsh migration? Modeling relationships between coastal marshes and private adaptation decisions. Water Resources and Economics 36: 100187

Kornis, M.S., D. Breitburg, R. Balouskus, D.M. Bilkovic, L.A. Davias, S. Giordano, K. Heggie, A.H. Hines, J.M. Jacobs, T.E. Jordan, R.S. King, C.J. Patrick, R.D. Seitz, H. Soulen, T.E. Targett, D.E. Weller, D.F. Whigham, and J. Uphoff Jr. 2017. Linking the abundance of estuarine fish and crustaceans in nearshore waters to shoreline hardening and land cover. Estuaries and Coasts 40: 1464-1486

NOAA and FHWA. 2018. NOAA Fisheries/Federal Highway Administration Best Management Practices Manual For Transportation Activities in the Greater Atlantic Region. 67p.

NOAA and FHWA. 2024. FHWA Programmatic Essential Fish Habitat Consultation and General Concurrence for Select Transportation Actions in the NMFS Greater Atlantic Region. 90p.

North, E.W. and E.D. Houde. 2001. Retention of white perch and striped bass larvae: Biological-physical interactions in Chesapeake Bay estuarine turbidity maximum. Estuaries 24(5); 756-769

Patrick, C.J., D.E. Weller, and M. Ryder. 2016 The relationship between shoreline armoring and adjacent submerged aquatic vegetation in Chesapeake Bay and nearby Atlantic coastal bays. 39: 158-170.

Popper, A.N. and A.D. Hawkins. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. Journal of Fish Biology 94: 692-713

Prosser, D.J., T.E. Jordan, J.L. Nagel, R.D. Seitz, D.E. Weller, and D.F. Whigham. 2018. Impacts of coastal land use and shoreline armoring on estuarine ecosystems: an introduction to a special issue. Estuaries and Coasts 41: 2-18

Roman, M.R., D.V. Holliday, and L.P Sanford. 2001. Temporal and spatial patterns of zooplankton in the Chesapeake Bay turbidity maximum. Marine Ecology Progress Series 213: 215-227

Uphoff, J.H., M. McGinty, R. Lukacovic, J. Mowrer, and B. Pyle. 2011. Impervious surface, summer dissolved oxygen, and fish distribution in Chesapeake Bay subestuaries: Linking watershed development, habitat conditions, and fisheries management. North American Journal of Fisheries Management 31: 554-

Vickery, C.G., P. Wang, and J. Cheng. 2022. Natural and anthropogenic factors controlling circulation at the terminus of a seagrass-covered estuary, Fort DeSoto Bay, West-Central Florida. Journal of Coastal Research 38, 681–698.

Zarzuelo, C., A. Valle-Levinson, A. López-Ruiz, M. Díez-Minguito, and M. Ortega-Sánchez. 2023. Bridge-piling modifications on the momentum balance in an estuary: The role of tides, winds and seasonality. Ocean Engineering 271: 113746

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June 30, 2026

In Reply Refer To:
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Louis A. Chiarella
Assistant Regional Administrator for Habitat and Ecosystem Services
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

RE: NMFS Essential Fish Habitat Consultation for the Proposed Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)

Dear Louis Chiarella:

The Federal Highway Administration (FHWA), as the Lead Federal Agency, along with the Maryland Transportation Authority (MDTA) as the state sponsor, formally acknowledges the receipt of your correspondence dated June 1, 2026. This communication detailed comments and conservation recommendations concerning the Essential Fish Habitat (EFH) Consultation for the Chesapeake Bay Crossing Study Tier 2 NEPA. Pursuant to Section 305(b)(4)(B) of the Magnuson-Stevens Act (MSA), we hereby submit our formal written responses to the provided EFH conservation recommendations in Attachment 1, titled "Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge) EFH Conservation Recommendation Responses." Furthermore, we have provided more detailed explanations for specific responses to these recommendations below. For clarity, comments and concerns submitted by NOAA Fisheries are indicated in **bold** typeface, with subsequent agency responses presented in standard text.

All demolition rubble deposited on the bay floor will be removed.
The Biological Assessment (BA) prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, “rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries.” This commitment will be added to the Final Environmental Impact Statement (FEIS).

The proposed schedule spans up to 15 years of active in-water construction, followed immediately by several years of demolition.
The proposed 15-year schedule includes both construction and demolition. The schedule is not expected to be 15 years of construction followed by several years of demolition.

To minimize underwater noise associated with hollow steel pipe piles, MDTA should evaluate and use construction materials that generate relatively less underwater noise (e.g., pre-cast concrete piles) where structurally and geotechnically feasible. Furthermore, project schedules should consider avoiding several simultaneous pile driving activities during the sensitive spring staging and spawning period (January 15 to May 15) to avoid unintended cumulative impacts associated with multiple sources of underwater noise.
As noted in the EFH Assessment, BA, and FEIS, a Zone of Safe Fish Passage (ZSFP) will be strictly adhered to from January 15 to May 15, consisting of a minimum contiguous 7,000-foot-wide area where noise levels will not exceed 150 dB RMS. 96-inch steel pipe piles will not be driven during this time of year restriction (TOYR) unless underwater noise monitoring results confirm the ZSFP can be maintained. To meet the project schedule, piles may need to be driven simultaneously, but only to the extent that the ZSFP can be maintained during the TOYR. Where structurally and geotechnically practicable, the MDTA will consider the use of construction materials that produce relatively less underwater noise.

MDTA should develop a comprehensive, design-phase Underwater Noise Monitoring Plan (UNMP) to monitor and adaptively manage hydroacoustic energy resulting from construction activities. It should serve as a programmatic framework to validate noise attenuation equipment (e.g., bubble curtains), describe impacts to aquatic life (e.g., documentation of fish kills), and adjust operations in real time when cumulative acoustic impacts exceed acceptable thresholds.
As described in the EFH Assessment, BA, and FEIS, the MDTA commits to "develop a UNMP to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise."

The UNMP should formally define and protect the ZSFP during the critical migratory focal period of January 15 through May 15, annually... the ZSFP should encompass a contiguous, 7,000 linear-foot-wide corridor (equivalent to approximately one-third of the waterway width) encompassing areas of deeper channel edges… This corridor should remain below the 150 dB RMS behavioral noise threshold. Operating large-impact hammers or noise-intensive mechanical demolition equipment during this window without validating the spatial and acoustic integrity of the ZSFP threatens to significantly disrupt upstream movement to spawning areas.
As noted in the EFH Assessment, BA, and FEIS, from January 15 to May 15, a ZSFP will be maintained during pile driving activities, ensuring a minimum contiguous 7,000-foot-wide area where noise levels will not exceed 150 dB RMS. To maintain the ZSFP, 96-inch steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96-inch piles can be driven while maintaining the ZSFP.

While mechanical removal of this demolition debris will cause temporary increased turbidity in the immediate vicinity, we anticipate that complete removal of demolition

debris will present the best scenario to recover the functions and values of existing benthic habitats.
As described in the EFH Assessment, BA, and FEIS, the MDTA commits to, "prevent sediment and debris from entering the water using nets, tarps, and pans when demolishing bridge superstructures" and "remove demolition debris that falls into the water." Additionally, the BA prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, "rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries." This commitment will be added to the FEIS.

Due to the potential for significant injury and mortality to aquatic life and NOAA trust resources, explosive demolition should be avoided and minimized to the maximum extent possible. If explosive demolition is proposed, MDTA should develop a project-specific Blasting Plan concurrent with design. This plan will include measures to avoid, minimize, or otherwise offset impacts associated with blasting and adaptive management approaches to be implemented across multiple blasting events.
As described in the EFH Assessment, BA, and FEIS, the MDTA commits to, "continue to coordinate to minimize the use of blasting" and to "develop a detailed Demolition Plan in coordination with NOAA Fisheries and submit to NOAA Fisheries for review and approval, in advance of any detonation activity."

We are concerned that the full impact of placing additional pile-supported structures at this relatively narrow section of the mainstem Chesapeake Bay may have implications for regional hydrodynamics that have not been fully described... the model reveals localized increases in depth-averaged flow velocities and critical bed shear stress exceedance durations immediately adjacent to the proposed pier and dolphin footprints. These localized increases represent substantial hydrodynamic forcing (e.g., increases in peak velocity greater than 40%). The resulting scour and resuspension are expected to alter the sediment transport and deposition dynamics surrounding the pier structures which, in turn, will drive localized substrate conversion in the immediate vicinity of the pier foundations. This represents a permanent change to the natural rugosity and benthic habitat value of these specific areas.

Crucially, the hydrodynamic modeling study was purely physical and failed to evaluate or contemplate the broader water quality implications of these shifting water movements upstream of the project... By modeling only depth-averaged, localized physical flows, the action agency has overlooked potential system-wide, cumulative water quality impacts on EFH... We encourage MDTA to expand their investigation into these potential project effects and, if necessary, explore methods to mitigate adverse impacts.

The hydrodynamics analysis provided in the FEIS is based on a planning-level regional model that incorporated planning-level concept design assumptions to identify potential changes in flow rates. This level of analysis is appropriate for the current level of engineering. The planning-level model indicates that there would be areas of increases in near-bed velocity primarily within the immediate vicinity of the bridge piers. The piers and pier spacing modify

near-bed flow velocities, turbulence, and shear stresses, leading to changes in sediment deposition and erosion patterns. Modeled changes in flow velocities and sediment transport near the proposed bridge piers are relatively modest. In general, areas within 500 feet of the piers may experience slight increases in shear stress, potentially promoting sediment resuspension.

The intent of the Hydrodynamics Report was to develop sufficient impact data to inform the Tier 2 Study NEPA decision. The MDTA's hydrodynamic model utilized planning-level information and was reviewed by subject matter experts at the University of Maryland's Center for Environmental Science. The regional model was developed to understand the broad-level impacts that could result from the differences between the existing Bay Bridge and the Alternative C concept structure configuration. The hydrodynamic study:

- provided an understanding of the potential scale of impacts to the Chesapeake Bay;
- identified the magnitude of flow changes that could be expected between the existing Bay Bridge and the Alternative C concept structure;
- presented results of the hydrodynamic analysis to the public, agencies, and stakeholders;
- identified the effects from potential pier spacing and pier sizing for Alternative C; and
- informed NEPA decision-making and identification of the Selected Alternative.

The level of detail in the hydrodynamic analysis was appropriate for meeting the study intent and the requirements of NEPA. The results showed that moderate, localized impacts would occur. The MDTA will continue to consult with the agencies regarding potential hydrodynamic impacts as the projects progress.

We encourage MDTA to evaluate whether they could partially treat the runoff from the new bay bridge spans and include structural or mechanical stormwater management measures within the final design to capture and manage roadway debris, suspended solids, and chemical pollutants prior to discharge.
Will comply. As new stormwater innovations become available, the MDTA will continue to evaluate the potential for their inclusion in this bridge design.

FHWA and the MDTA appreciate your careful consideration of the Chesapeake Bay Crossing Study Tier 2 NEPA EFH Assessment. We look forward to continued coordination with NOAA Fisheries regarding the specific Conservation Recommendations to ensure the design and implementation of a structurally sound Bay Bridge while protecting the sensitive and ecologically important species and habitat of the Chesapeake Bay within the Action Area. If you need any further information or assistance, please do not hesitate to contact Chris Millington by email at chris.millington@dot.gov.

Sincerely,

for Valeriya Remezova
Division Administrator

cc: Brian Yanchik, FHWA
Alexander Bienko, FHWA
Jonathan Watson, NOAA
Kevin Schabow, NOAA
Karen. Greene, NOAA
Brian D Hopper, NOAA
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Heather Nelson, MDE
Richelle Hansen, MDNR
Sarah Williamson, CRI

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-1	During the project design phase, develop an alternatives analysis evaluating measures to minimize underwater noise generated during construction activities. This could include designs that use fewer piles (e.g., minimizing temporary trestles) and/or pile materials (e.g., pre-cast concrete piles) that transmit relatively less hydroacoustic energy into the water column.	The bridge will be designed to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will consider avoidance and minimization options for underwater noise and other potential impacts as practicable.
CR-2	Develop a project schedule that avoids driving piles that generate the greatest underwater noise (e.g., concurrent driving of large diameter steel pipe piles) during the designated staging, migration, and spawning periods for migratory fishes (January 15 through May 15).	The MDTA commits to maintaining a Zone of Safe Fish Passage (ZSFP), defined as a minimum contiguous 7,000-foot-wide area, including at least one channel edge, while ensuring noise levels do not exceed 150 dB RMS within this area. The EFH Assessment, BA, and FEIS state: "to maintain the ZSFP, 96” steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96” piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP." Construction schedules and design configurations may require concurrent pile driving of large diameter steel pipe piles. The MDTA will maintain the ZSFP and all applicable performance standards committed to in coordination with NOAA Fisheries during construction. Pile driving operations will be monitored to ensure the ZSFP is maintained.
CR-3	Avoid explosive demolition to the maximum extent practicable.	Will comply. As noted in the EFH, BA and FEIS, the MDTA is committed to continue to coordinate to minimize the use of blasting.
	Should explosive demolition be the selected method to dismantle existing structures, consult with the resource agencies to develop a Blasting Plan that includes mitigative measures (e.g., fish deterrents pre-blasting) and potential adaptive management approaches to be implemented to minimize mortality.	Will comply. As committed to by the MDTA in the EFH, BA, and FEIS, when explosive demolition is required, a Demolition Plan will be developed in coordination with the resources agencies and will include mitigative measures and potential adaptive management approaches.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-3	The timing of the blasting window should be defined in close coordination with us and other resource agencies, considering the most up-to-date fish telemetry data available at the time the Blasting Plan is finalized. That plan should also define how fish kills will be documented and offset.	Will comply. The MDTA will work with the agencies to define how fish kills will be documented and offset during permitting. The MDTA has committed to conduct "required blasting...during times of lower biological activity (October 1 – December 15); specific dates will be determined during the development of the Demolition Plan and will incorporate the best available data including any updated telemetry data." This commitment is outlined in the BA and FEIS.
CR-4	Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements:	Will comply. The MDTA has committed to this in the EFH, BA, and FEIS.
CR-4a	Monitor and maintain the defined 7,000 foot-wide ZSFP (approximately one-third of the waterway) that encompasses at least one deeper channel edge (i.e., drop-off feature) during the period extending from January 15 through May 15, inclusive. Underwater noise within that zone will be maintained below the 150 dB re 1 µPa RMS behavioral threshold to minimize impacts to fish movements during this sensitive period.	Will comply. As noted in the EFH, BA and FEIS, the MDTA is committed to, "from January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges."
CR-4b	An adaptive management framework where adjustments will be made to construction activities (e.g., hammer strike energy) and accompanying mitigative measures (e.g., bubble curtain pressure) to minimize fish kill events and maintain compliance with the 150 dB RMS limit across the entire width of the ZSFP.	Will comply. As described in the BA and FEIS, the MDTA commits to using an adaptive management framework for construction activities and accompanying mitigative measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-4c	Monitoring measures to describe the occurrence of fish that are stunned, injured, or otherwise killed by pile driving activities and thresholds that, when exceeded, trigger a “hold point” requiring cessation of the activity that caused the observed event. The “hold point” will be released in consultation with the resource agencies and may include measures (e.g., operational adjustments) to mitigate future occurrences.	Will comply. To reflect the best available data to date, The MDTA will commit in the FEIS/ROD to coordinate with the regulatory agencies during final design and permitting to determine fish kill thresholds that would trigger construction hold points. The MDTA will further commit to coordinate with the regulatory agencies to define an optimization plan prior to resuming the triggering construction activities.
CR-5	To monitor migratory behavior and validate ZSFP efficacy, deploy or fund an additional acoustic passive acoustic telemetry receiver array (compatible with the ACT/MATOS networks) upstream of the construction corridor to complement the existing array located downstream of the Bay Bridge. Analyze the resulting data to describe fish movement patterns and significant environmental covariates to inform project operations and mitigative measures (e.g., explosive demolition timing, use of bubble curtains). These deployments should occur as soon as possible and prior to production pile driving.	Will comply to additional telemetry deployments prior to production pile driving, when information more relevant to construction of the project is available. The MDTA commits to working with the resource agencies during the concept design phase to determine the timing of these deployments and the level of monitoring needed.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-6	Existing materials (e.g., rubble) or structures that are not necessary as attending bridge infrastructure (e.g., required collision avoidance) should be fully removed. If derelict structures/debris are proposed to remain, MDTA should work with the resource agencies to evaluate the existing and potential habitat impacts. Those discussions should inform the extent to which fill materials remain, in what configurations, and under what management framework.	The BA prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, "rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries." This commitment will be added to the FEIS. The MDTA believes impacts associated with the removal of some large elements of the substructure may be more harmful than leaving these structures intact. Both the EB and WB anchor piers are considered deep water piers (over 40 feet of water) and, if removed, the piers may need to be demolished mechanically or explosively above the water and with explosives below the water. Due to the extent of demolition required, cost, and potential impact to surrounding habitat, the concept level design includes leaving the large substructure elements of the anchor piers, including islands, in place.
CR-7	Conduct a high-resolution, post-demolition side-scan sonar and bathymetric survey of the project area that demonstrates, to the satisfaction of the resource and regulatory agencies, that all structures and debris have been removed in a manner that will allow for natural recovery of benthic habitats and associated ecological functions.	The BA prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, "rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries." This commitment will be added to the FEIS. The MDTA commits to returning bottom elevations approximately to existing and will provide documentation of the post-demolition conditions to the agencies. This commitment will be included in the FEIS/ROD.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-8	Develop a post-dredging monitoring and adaptive management plan to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function (e.g., prey density), relative to a reference site, after three years.	The MDTA commits to a pre-construction and post-construction monitoring plan. This commitment will be included in the FEIS/Record of Decision (ROD).
CR-9	To protect oyster habitat which provides productive forage and physical structure for various federally managed fish and their prey, prohibit any dredging or subaqueous excavation within the boundaries of a Named Oyster Bar (NOB) and/or within 500 yards of an NOB from December 16 through March 14 and from June 1 through September 30 of any calendar year.	As noted in the FEIS: "Dredging within 500 yards of the boundaries of an NOB would have the following time of year restrictions under MDE tidal wetland regulations: no mechanical dredging during the periods December 16 through March 14 and June 1 through September 30 of any year and no hydraulic dredging from June 1 through September 30 of any year. The time of year restriction for dredging within the boundaries of an NOB, regardless of method, extends from December 16 through March 14 and June 1 through September 30 of any year. The MDTA has minimized potential dredging impacts by committing to only using mechanical dredging rather than hydraulic dredging, which has the potential for greater impacts to aquatic habitats and species. Operational BMPs could be employed to further reduce impact to the Chesapeake Bay bottom, which would help protect water quality." "The MDTA intends to observe the time-of-year restrictions for aquatic biota to the greatest extent practicable. It is anticipated that not all time-of-year restrictions will be able to be employed due to schedule constraints and the possibility of conflicting time-of-year restrictions. To address this, the MDTA will work with the resource and regulatory agencies [during final design] to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements." As a construction sequencing plan develops during final design, FHWA and the MDTA commit to coordinating a working meeting with the relevant regulatory agencies to discuss in-water time-of-year restrictions as related to construction schedules and costs.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-10	To minimize the adverse impacts of suspended sediment and turbidity plumes on growing plants, prohibit dredging or subaqueous excavation within 500 yards of mapped SAV during the active SAV growing season, from April 15 through October 15 of any calendar year.	As noted in the FEIS: "Dredging is restricted within 500 yards of SAV beds from April 15 through October 15 of any year." "The MDTA intends to observe the time-of-year restrictions for aquatic biota to the greatest extent practicable. It is anticipated that not all time-of-year restrictions will be able to be employed due to schedule constraints and the possibility of conflicting time-of-year restrictions. To address this, the MDTA will work with the resource and regulatory agencies [during final design] to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements." As a construction sequencing plan develops during final design, FHWA and the MDTA commit to coordinating a working meeting with the relevant regulatory agencies to discuss in-water time-of-year restrictions as related to construction schedules and costs.
CR-11	Continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the maximum extent possible, including partial treatment of bridge runoff, to minimize roadway delivery of contaminants (e.g., oils, heavy metals) to surface waters. Incorporate measures to minimize the delivery of roadway debris into surface waters to the maximum extent possible.	Will comply. As new stormwater innovations become available, the MDTA will continue to evaluate their potential for inclusion in this bridge design.
CR-12	Create a compensatory mitigation plan, in coordination with the resource and regulatory agencies, to offset unavoidable permanent impacts to aquatic resources. This should include:	A Compensatory Mitigation Plan (CMP) will be developed in coordination with the resource agencies during the permitting phase. All of the items listed in the conservation recommendations will be considered in the final CMP.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-12a	Replacing permanently impacted biogenic habitats (e.g., oyster reef, SAV, emergent tidal wetlands) in-kind, to the maximum extent practicable, at a 3:1 ratio.	The MDTA will replace biogenic habitat impacts in-kind to the greatest extent practicable. The CMP will be developed during the permitting phase, and the MDTA will implement the mitigation concurrent with project construction. The replacement ratios included in the Preferred Alternative and Conceptual Mitigation (PACM) plan for restoration or in-kind creation are 3:1 for oyster reef and SAV impacts, and 2:1 for emergent tidal wetlands. These replacement ratios are established by USACE and MDE. Final mitigation ratios will be determined during development of the CMP in coordination with regulatory agencies.
CR-12b	Replacing permanently impacted open water habitat at a 2:1 ratio through the enhancement of aquatic habitats that are productive for fish and nekton (e.g., historical fill removal, oyster reef restoration, SAV restoration).	The MDTA will replace tidal open water impacts with out-of-kind mitigation at a 2:1 replacement ratio through mitigation activities such as historic fill removal, oyster seeding and substrate expansion, and SAV planting. These mitigation activities, as well as several others, are included in the PACM plan as potential mitigation activities to replace unavoidable impacts to tidal open water. The CMP will be developed in coordination with the resource agencies during the permitting phase. The CMP will identify which of the mitigation activities listed in the PACM plan will be included in the tidal mitigation package. The MDTA will implement the mitigation concurrent with project construction.
CR-12c	Offset any temporary impacts that are anticipated to be in place for greater than twelve months, to compensate for temporal loss of function.	For temporal loss of function, the MDTA will mitigate in-kind to the greatest extent practicable. Temporary impacts will be identified during the final design phase. Compensatory mitigation and the replacement ratios for temporal loss of function will be identified in the CMP to be developed in coordination with the resource agencies during the permitting phase. The MDTA will implement mitigation for temporal loss of function concurrent with project construction.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-12d	Prioritize compensatory mitigation projects in areas that are both in proximity to the impact area and in locations where they have likelihood of intended ecological function over relatively long-time horizons. Selection of sites and approaches should be informed by underlying water quality conditions and potential for future anthropogenic disturbance (e.g., creating oyster reefs in areas not subjected to harvest).	The MDTA will prioritize compensatory mitigation projects based on the 2008 Federal Mitigation Rule and MDE's Tidal Mitigation Plan Guide, which align with NOAA Fisheries' recommendation. The order of preference for a mitigation site location per the regulation is as follows: 1. On-site mitigation (adjacent to impacted area or on the same property) 2. Off-site mitigation: 2a. Within the impacted 8-digit MDE watershed(s) 2b. Within the same 6-digit MDE watershed(s) or 8-digit Federal HUC 2c. Within the adjacent 8-digit HUCs, or the same drainage basin and physiographic region (only if there is ecological justification that it will replace the lost acreage and function of the impacts). The mitigation site searches detailed in the PACM follow this order of preference, and will be re-verified when the CMP is developed during the permitting phase and in coordination with regulatory agencies. In addition, only sites considered to be feasible by the MDTA and the regulatory agencies will be selected. The MDTA will implement a site protection instrument at mitigation sites for the project as necessary. In addition, the MDTA will comply with MDE's requirement that oyster seeding or substrate expansion mitigation activities occur at an oyster sanctuary to ensure protection in perpetuity.
CR-12e	Due to the inherent habitat tradeoffs, avoid pursuing artificial reef creation/expansion as a compensatory mitigation mechanism. While suitable as a stewardship activity, the placement of bridge debris in designated reef sites is not suitable as compensatory mitigation to offset the adverse effects of the proposed action on EFH and other NOAA trust resources.	The MDTA understands that some tidal waters mitigation options like artificial reef creation/expansion are less preferable and are noted as such in the PACM plan. However, the MDTA will keep them as potential options as a final mitigation package will not be selected during the NEPA phase. A CMP will be developed during the permitting phase in coordination with regulatory agencies.

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

July 28, 2026

In Reply Refer To:
HDA-MD

Louis A. Chiarella
Assistant Regional Administrator for Habitat and Ecosystem Services
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

RE: NMFS Essential Fish Habitat Consultation for the Proposed Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)

Dear Louis Chiarella:

The Federal Highway Administration (FHWA), as the Lead Federal Agency, along with the Maryland Transportation Authority (MDTA) as the state sponsor, acknowledge your follow-up email dated July 9, 2026, regarding FHWA's response to Conservation Recommendation-5 (CR-5), clarifying the requested timing of telemetry array deployment and length of monitoring. Based on subsequent meetings to discuss the additional recommendations, we hereby submit our formal revised written response to EFH (CR-5) in Attachment 1, titled "Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge) EFH Conservation Recommendation Responses". CR-5, and FHWA's original and revised response are also included below:

CR-5 (from NOAA 6/01/26): To monitor migratory behavior and validate ZSFP efficacy, deploy or fund an additional acoustic passive acoustic telemetry receiver array (compatible with the ACT/MATOS networks) upstream of the construction corridor to complement the existing array located downstream of the Bay Bridge. Analyze the resulting data to describe fish movement patterns and significant environmental covariates to inform project operations and mitigative measures (e.g., explosive demolition timing, use of bubble curtains). These deployments should occur as soon as possible and prior to production pile driving.

FHWA's original response (6/29/26): Will comply to additional telemetry deployments prior to production pile driving, when information more relevant to construction of the project is available. The MDTA commits to working with the resource agencies during the concept design phase to determine the timing of these deployments and the level of monitoring needed.

FHWA's revised response: The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available

and the project is fully funded for final design. The MDTA will collect at least two years (2 springs & 2 summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design.

FHWA and the MDTA appreciate your careful consideration of the Chesapeake Bay Crossing Study Tier 2 NEPA EFH Assessment. We look forward to continued coordination with NOAA Fisheries regarding the specific Conservation Recommendations to ensure the design and implementation of a structurally sound Bay Bridge while protecting the sensitive and ecologically important species and habitat of the Chesapeake Bay within the Action Area. If you need any further information or assistance, please do not hesitate to contact Chris Millington by email at chris.millington@dot.gov.

Sincerely,

for Valeriya Remezova
Division Administrator

cc: Brian Yanchik, FHWA
Alexander Bienko, FHWA
Jonathan Watson, NOAA
Kevin Schabow, NOAA
Karen. Greene, NOAA
Brian D Hopper, NOAA
Cara Hotchkins, NOAA
Dale Youngkin, NOAA
Joe DaVia, USACE
Ray Li, USFWS
Christine Mazerella, USEPA
Mark Eberle, NPS
Heather Lowe, MDTA
Heather Nelson, MDE
Richelle Hansen, MDNR
Sarah Williamson, CRI

Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge) EFH Conservation Recommendation Responses
Revised 7/23/2026

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-1	During the project design phase, develop an alternatives analysis evaluating measures to minimize underwater noise generated during construction activities. This could include designs that use fewer piles (e.g., minimizing temporary trestles) and/or pile materials (e.g., pre-cast concrete piles) that transmit relatively less hydroacoustic energy into the water column.	The bridge will be designed to meet structural integrity, engineering efficiency, and up-to-date engineering practices. Once these design criteria have been met, the MDTA will consider avoidance and minimization options for underwater noise and other potential impacts as practicable.
CR-2	Develop a project schedule that avoids driving piles that generate the greatest underwater noise (e.g., concurrent driving of large diameter steel pipe piles) during the designated staging, migration, and spawning periods for migratory fishes (January 15 through May 15).	The MDTA commits to maintaining a Zone of Safe Fish Passage (ZSFP), defined as a minimum contiguous 7,000-foot-wide area, including at least one channel edge, while ensuring noise levels do not exceed 150 dB RMS within this area. The EFH Assessment, BA, and FEIS state: "to maintain the ZSFP, 96” steel pipe piles will not be driven from January 15 through May 15, unless underwater noise monitoring results demonstrate 96” piles can be driven while ensuring a minimum contiguous 7,000-foot-wide ZSFP." Construction schedules and design configurations may require concurrent pile driving of large diameter steel pipe piles. The MDTA will maintain the ZSFP and all applicable performance standards committed to in coordination with NOAA Fisheries during construction. Pile driving operations will be monitored to ensure the ZSFP is maintained.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR- 3	Avoid explosive demolition to the maximum extent practicable.	Will comply. As noted in the EFH, BA and FEIS, the MDTA is committed to continue to coordinate to minimize the use of blasting.
	Should explosive demolition be the selected method to dismantle existing structures, consult with the resource agencies to develop a Blasting Plan that includes mitigative measures (e.g., fish deterrents pre-blasting) and potential adaptive management approaches to be implemented to minimize mortality.	Will comply. As committed to by the MDTA in the EFH, BA, and FEIS, when explosive demolition is required, a Demolition Plan will be developed in coordination with the resources agencies and will include mitigative measures and potential adaptive management approaches.
	The timing of the blasting window should be defined in close coordination with us and other resource agencies, considering the most up-to-date fish telemetry data available at the time the Blasting Plan is finalized. That plan should also define how fish kills will be documented and offset.	Will comply. The MDTA will work with the agencies to define how fish kills will be documented and offset during permitting. The MDTA has committed to conduct "required blasting...during times of lower biological activity (October 1 – December 15); specific dates will be determined during the development of the Demolition Plan and will incorporate the best available data including any updated telemetry data." This commitment is outlined in the BA and FEIS.
CR-4	Develop an Underwater Noise Monitoring Plan (UNMP) that defines proposed measures to minimize, monitor, and adaptively manage hydroacoustic energy resulting from project pile installation and mechanical demolition activities, including the following elements:	Will comply. The MDTA has committed to this in the EFH, BA, and FEIS.
CR-4a	Monitor and maintain the defined 7,000 foot-wide ZSFP (approximately one-third of the waterway) that encompasses at least one deeper channel edge (i.e., drop-off feature) during the period extending from January 15 through May 15, inclusive. Underwater noise within that zone will be maintained below the 150 dB re 1 µPa RMS behavioral threshold to minimize impacts to fish movements during this sensitive period.	Will comply. As noted in the EFH, BA and FEIS, the MDTA is committed to, "from January 15 through May 15 (the anadromous fish migratory period), ensure a minimum contiguous Zone of Safe Fish Passage (ZSFP) equivalent to approximately one-third the waterway width - approximately 7,000 linear feet. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate to their spawning grounds around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges."

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-4b	An adaptive management framework where adjustments will be made to construction activities (e.g., hammer strike energy) and accompanying mitigative measures (e.g., bubble curtain pressure) to minimize fish kill events and maintain compliance with the 150 dB RMS limit across the entire width of the ZSFP.	Will comply. As described in the BA and FEIS, the MDTA commits to using an adaptive management framework for construction activities and accompanying mitigative measures to minimize fish kills and maintain compliance with the 150 dB RMS threshold.
CR-4c	Monitoring measures to describe the occurrence of fish that are stunned, injured, or otherwise killed by pile driving activities and thresholds that, when exceeded, trigger a "hold point" requiring cessation of the activity that caused the observed event. The "hold point" will be released in consultation with the resource agencies and may include measures (e.g., operational adjustments) to mitigate future occurrences.	Will comply. To reflect the best available data to date, The MDTA will commit in the FEIS/ROD to coordinate with the regulatory agencies during final design and permitting to determine fish kill thresholds that would trigger construction hold points. The MDTA will further commit to coordinate with the regulatory agencies to define an optimization plan prior to resuming the triggering construction activities.
CR-5 (Response revised per further coordination 7/23/2026)	To monitor migratory behavior and validate ZSFP efficacy, deploy or fund an additional acoustic passive acoustic telemetry receiver array (compatible with the ACT/MATOS networks) upstream of the construction corridor to complement the existing array located downstream of the Bay Bridge. Analyze the resulting data to describe fish movement patterns and significant environmental covariates to inform project operations and mitigative measures (e.g., explosive demolition timing, use of bubble curtains). These deployments should occur as soon as possible and prior to production pile driving.	The MDTA will fund additional telemetry deployments prior to production pile driving when information more relevant to construction of the project is available and the project is fully funded for final design. The MDTA will collect at least two years (2 springs & 2 summers) of pre-construction data to monitor migratory behavior and validate ZSFP efficacy. The MDTA will coordinate with the agencies on the details of the initial deployment and two-year data collection and will consider the potential for long-term management of the arrays by resource agencies during final design.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-6	Existing materials (e.g., rubble) or structures that are not necessary as attending bridge infrastructure (e.g., required collision avoidance) should be fully removed. If derelict structures/debris are proposed to remain, MDTA should work with the resource agencies to evaluate the existing and potential habitat impacts. Those discussions should inform the extent to which fill materials remain, in what configurations, and under what management framework.	The BA prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, "rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries." This commitment will be added to the FEIS. The MDTA believes impacts associated with the removal of some large elements of the substructure may be more harmful than leaving these structures intact. Both the EB and WB anchor piers are considered deep water piers (over 40 feet of water) and, if removed, the piers may need to be demolished mechanically or explosively above the water and with explosives below the water. Due to the extent of demolition required, cost, and potential impact to surrounding habitat, the concept level design includes leaving the large substructure elements of the anchor piers, including islands, in place.
CR-7	Conduct a high-resolution, post-demolition side-scan sonar and bathymetric survey of the project area that demonstrates, to the satisfaction of the resource and regulatory agencies, that all structures and debris have been removed in a manner that will allow for natural recovery of benthic habitats and associated ecological functions.	The BA prepared for Endangered Species Act Section 7 consultation was coordinated with NOAA Fisheries and states, "rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater harm to benthic environments compared to leaving the rubble in place...The decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NOAA Fisheries." This commitment will be added to the FEIS. The MDTA commits to returning bottom elevations approximately to existing and will provide documentation of the post-demolition conditions to the agencies. This commitment will be included in the FEIS/ROD.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-8	Develop a post-dredging monitoring and adaptive management plan to describe benthic recovery in dredged areas and identify and define measures to restore or otherwise offset documented losses of function (e.g., prey density), relative to a reference site, after three years.	The MDTA commits to a pre-construction and post-construction monitoring plan. This commitment will be included in the FEIS/Record of Decision (ROD).
CR-9	To protect oyster habitat which provides productive forage and physical structure for various federally managed fish and their prey, prohibit any dredging or subaqueous excavation within the boundaries of a Named Oyster Bar (NOB) and/or within 500 yards of an NOB from December 16 through March 14 and from June 1 through September 30 of any calendar year.	As noted in the FEIS: "Dredging within 500 yards of the boundaries of an NOB would have the following time of year restrictions under MDE tidal wetland regulations: no mechanical dredging during the periods December 16 through March 14 and June 1 through September 30 of any year and no hydraulic dredging from June 1 through September 30 of any year. The time of year restriction for dredging within the boundaries of an NOB, regardless of method, extends from December 16 through March 14 and June 1 through September 30 of any year. The MDTA has minimized potential dredging impacts by committing to only using mechanical dredging rather than hydraulic dredging, which has the potential for greater impacts to aquatic habitats and species. Operational BMPs could be employed to further reduce impact to the Chesapeake Bay bottom, which would help protect water quality." "The MDTA intends to observe the time-of-year restrictions for aquatic biota to the greatest extent practicable. It is anticipated that not all time-of-year restrictions will be able to be employed due to schedule constraints and the possibility of conflicting time-of-year restrictions. To address this, the MDTA will work with the resource and regulatory agencies [during final design] to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements." As a construction sequencing plan develops during final design, FHWA and the MDTA commit to coordinating a working meeting with the relevant regulatory agencies to discuss in-water time-of-year restrictions as related to construction schedules and costs.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-10	To minimize the adverse impacts of suspended sediment and turbidity plumes on growing plants, prohibit dredging or subaqueous excavation within 500 yards of mapped SAV during the active SAV growing season, from April 15 through October 15 of any calendar year.	As noted in the FEIS: "Dredging is restricted within 500 yards of SAV beds from April 15 through October 15 of any year." "The MDTA intends to observe the time-of-year restrictions for aquatic biota to the greatest extent practicable. It is anticipated that not all time-of-year restrictions will be able to be employed due to schedule constraints and the possibility of conflicting time-of-year restrictions. To address this, the MDTA will work with the resource and regulatory agencies [during final design] to develop a construction plan and BMPs that provide protection for sensitive resources in compliance with all statutory requirements." As a construction sequencing plan develops during final design, FHWA and the MDTA commit to coordinating a working meeting with the relevant regulatory agencies to discuss in-water time-of-year restrictions as related to construction schedules and costs.
CR-11	Continue to evaluate opportunities to treat stormwater from the proposed bridge spans and roadway surfaces to the maximum extent possible, including partial treatment of bridge runoff, to minimize roadway delivery of contaminants (e.g., oils, heavy metals) to surface waters. Incorporate measures to minimize the delivery of roadway debris into surface waters to the maximum extent possible.	Will comply. As new stormwater innovations become available, the MDTA will continue to evaluate their potential for inclusion in this bridge design.
CR-12	Create a compensatory mitigation plan, in coordination with the resource and regulatory agencies, to offset unavoidable permanent impacts to aquatic resources. This should include:	A Compensatory Mitigation Plan (CMP) will be developed in coordination with the resource agencies during the permitting phase. All of the items listed in the conservation recommendations will be considered in the final CMP.

Attachment 1 - Chesapeake Bay Crossing Study: Tier 2 NEPA, Governor William Preston Lane Jr. Memorial Bridge (Bay Bridge)
EFH Conservation Recommendation Responses

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-12a	Replacing permanently impacted biogenic habitats (e.g., oyster reef, SAV, emergent tidal wetlands) in-kind, to the maximum extent practicable, at a 3:1 ratio.	The MDTA will replace biogenic habitat impacts in-kind to the greatest extent practicable. The CMP will be developed during the permitting phase, and the MDTA will implement the mitigation concurrent with project construction. The replacement ratios included in the Preferred Alternative and Conceptual Mitigation (PACM) plan for restoration or in-kind creation are 3:1 for oyster reef and SAV impacts, and 2:1 for emergent tidal wetlands. These replacement ratios are established by USACE and MDE. Final mitigation ratios will be determined during development of the CMP in coordination with regulatory agencies.
CR-12b	Replacing permanently impacted open water habitat at a 2:1 ratio through the enhancement of aquatic habitats that are productive for fish and nekton (e.g., historical fill removal, oyster reef restoration, SAV restoration).	The MDTA will replace tidal open water impacts with out-of-kind mitigation at a 2:1 replacement ratio through mitigation activities such as historic fill removal, oyster seeding and substrate expansion, and SAV planting. These mitigation activities, as well as several others, are included in the PACM plan as potential mitigation activities to replace unavoidable impacts to tidal open water. The CMP will be developed in coordination with the resource agencies during the permitting phase. The CMP will identify which of the mitigation activities listed in the PACM plan will be included in the tidal mitigation package. The MDTA will implement the mitigation concurrent with project construction.
CR-12c	Offset any temporary impacts that are anticipated to be in place for greater than twelve months, to compensate for temporal loss of function.	For temporal loss of function, the MDTA will mitigate in-kind to the greatest extent practicable. Temporary impacts will be identified during the final design phase. Compensatory mitigation and the replacement ratios for temporal loss of function will be identified in the CMP to be developed in coordination with the resource agencies during the permitting phase. The MDTA will implement mitigation for temporal loss of function concurrent with project construction.

CR #	NOAA Fisheries Conservation Recommendation	FHWA Response
CR-12d	Prioritize compensatory mitigation projects in areas that are both in proximity to the impact area and in locations where they have likelihood of intended ecological function over relatively long-time horizons. Selection of sites and approaches should be informed by underlying water quality conditions and potential for future anthropogenic disturbance (e.g., creating oyster reefs in areas not subjected to harvest).	The MDTA will prioritize compensatory mitigation projects based on the 2008 Federal Mitigation Rule and MDE's Tidal Mitigation Plan Guide, which align with NOAA Fisheries' recommendation. The order of preference for a mitigation site location per the regulation is as follows: 1. On-site mitigation (adjacent to impacted area or on the same property) 2. Off-site mitigation: 2a. Within the impacted 8-digit MDE watershed(s) 2b. Within the same 6-digit MDE watershed(s) or 8-digit Federal HUC 2c. Within the adjacent 8-digit HUCs, or the same drainage basin and physiographic region (only if there is ecological justification that it will replace the lost acreage and function of the impacts). The mitigation site searches detailed in the PACM follow this order of preference, and will be re-verified when the CMP is developed during the permitting phase and in coordination with regulatory agencies. In addition, only sites considered to be feasible by the MDTA and the regulatory agencies will be selected. The MDTA will implement a site protection instrument at mitigation sites for the project as necessary. In addition, the MDTA will comply with MDE's requirement that oyster seeding or substrate expansion mitigation activities occur at an oyster sanctuary to ensure protection in perpetuity.
CR-12e	Due to the inherent habitat tradeoffs, avoid pursuing artificial reef creation/expansion as a compensatory mitigation mechanism. While suitable as a stewardship activity, the placement of bridge debris in designated reef sites is not suitable as compensatory mitigation to offset the adverse effects of the proposed action on EFH and other NOAA trust resources.	The MDTA understands that some tidal waters mitigation options like artificial reef creation/expansion are less preferable and are noted as such in the PACM plan. However, the MDTA will keep them as potential options as a final mitigation package will not be selected during the NEPA phase. A CMP will be developed during the permitting phase in coordination with regulatory agencies.

Outlook

Fwd: Info: Essential Fish Habitat Consultation for Bay Crossing Study Tier 2 NEPA study

From Sarah Williamson <sarahw@cri.biz>
Date Thu 7/30/2026 8:16 PM
To Kayla Minton <kaylam@cri.biz>; Megan Bolcar <meganb@cri.biz>

Sarah Williamson | *Sr. Environmental Scientist & Owner*
Coastal Resources, Inc. | Facebook | LinkedIn
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000
Direct 443-837-2155
Cell 443-995-4131

Begin forwarded message:

From: Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov>
Date: July 30, 2026 at 5:00:33 PM EDT
To: "Bienko, Alexander" <alexander.bienko@dot.gov>
Cc: Karen Greene - NOAA Federal <karen.greene@noaa.gov>, Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>, "Yanchik, Brian (FHWA)" <Brian.Yanchik@dot.gov>, Heather Lowe <hlowe@mdta.state.md.us>, Sarah Williamson <sarahw@cri.biz>, "Davia, Joseph P CIV CENAB CENAD (US)" <joseph.davia@usace.army.mil>, Kevin Schabow - NOAA Federal <kevin.schabow@noaa.gov>, Cara Hotchkin - NOAA Federal <cara.hotchkin@noaa.gov>, Dale Youngkin - NOAA Federal <dale.youngkin@noaa.gov>, Ray Li <ray_li@fws.gov>, "Mazzarella, Christine" <Mazzarella.Christine@epa.gov>, "Eberle, Mark D" <mark_eberle@nps.gov>, Heather Nelson -MDE- <hnelson@maryland.gov>, Richelle Hanson -DNR- <richellea.hanson@maryland.gov>, "Millington, Chris (FHWA)" <chris.millington@dot.gov>, "Perez, Keilyn (FHWA)" <keilyn.perez@dot.gov>
Subject: Re: Info: Essential Fish Habitat Consultation for Bay Crossing Study Tier 2 NEPA study

Hi Alex,

Thank you for providing and updated response to our Essential Fish Habitat (EFH) Conservation Recommendation (CR) #5 issued in our June 1, 2026, consultation letter. We appreciate the Federal Highway Administration's incorporation of our CRs into project plans and have no concerns regarding the clarifications offered in your July 28, 2026, letter. As we mentioned, the more extensive the dataset available from these telemetry

studies, the more we anticipate being able to tailor any specific protective measures (e.g., specific configurations of the Zone of Safe Fish Passage) for NOAA trust resources managed under the Magnuson Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act. We look forward to working with you and the rest of the project team as the project progresses. Please let me know if you have any questions or whether you require this response in a letter format.

Best,

Jonathan

On Tue, Jul 28, 2026 at 7:47 AM Bienko, Alexander <alexander.bienko@dot.gov> wrote:

> Good Morning Jonathan!
> Per our conversation last week on updating language regarding Conservation Recommendation-5 (CR-5) for the EFH Consultation for the Chesapeake Bay Crossing Study Tier 2 NEPA, FHWA has revised the language for CR-5. The attached letter shows the original language sent on June 29th, 2026 with the revised language that will be included in the NEPA document.
>
> We appreciate working with you on getting to this point and look forward to continued engagement as the project progresses. If you have any questions, please reach out.
>
> Best,
> Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
alexander.bienko@dot.gov

> On Thu, Jul 9, 2026 at 10:41 AM Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov> wrote:
>
> > Hi Alex,
> >
> > We have received and reviewed your responses to our June 1, 2026, letter. In several of your responses, you note that several of our conservation recommendations were already listed as commitments in your consultation documents. As we indicated in our letter, we appreciate your early coordination and inclusion of these commitments and we reiterated several measures for the record. We greatly appreciate your attention to our comments and recommendations and look forward to working with the project team as plans are developed. We anticipate that the vast majority of these recommendations will be implemented during the design and construction phases of the Project.
> >
> > The only measure that would be helpful to implement more quickly is adding another acoustic receiver array upstream of the Bay Bridge array (see map in this news story). That would allow for a more extensive dataset to inform protection measures such as the timing for any explosive demolition. I just spoke with my colleague in the NOAA Chesapeake Bay Office (NCBO) about how they maintain the existing arrays. Basically,

he said they have an MOU with Maryland DNR's Fishing and Boating Services to deploy and maintain the array at the Bay Bridge. The resulting data are managed by NCBO with technical analysis support from UMES. Let me know if you'd like me to set up a meeting to discuss the current workflows and how FHWA may support that work to better inform environmental mitigation measures.

Best,

Jonathan

On Wed, Jul 8, 2026 at 2:41 PM Bienko, Alexander <alexander.bienko@dot.gov> wrote:

> Good Afternoon Jonathan!
> I was just notified that an attachment that was supposed to go with the letter was not included, which was an oversight. Please find the attachment attached. In addition, as for next steps, please let me know if you would like to set up a call to discuss the response letter and the attachment.
>
> Thanks!
> Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
alexander.bienko@dot.gov

On Tue, Jun 30, 2026 at 1:24 PM Bienko, Alexander <alexander.bienko@dot.gov> wrote:

> Good Afternoon Jonathan!
>
> Please find attached FHWA's response letter on the conservation recommendations letter that was sent over on June 1st, 2026 pursuant to the Magnuson-Stevens Fishery Conservation and Management Act for the Bay Crossing Tier 2 NEPA study. FHWA is also grateful for the extensive coordination to date on this project and looks forward to continued engagement as the project progresses.
>
> Based on the attached response letter, please let FHWA and the project team know if you would like to meet to discuss any responses to the conservation recommendations.
>
> You may contact me (alexander.bienko@dot.gov; 410-779-7148) if you have any questions.
>
> Thanks!
> Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148

alexander.bienko@dot.gov

On Mon, Jun 1, 2026 at 1:02 PM Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov> wrote:

> Hi Alex,
>
> Please find attached our letter responding to your request for consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act for the Bay Crossing Tier 2 NEPA study. We appreciate the extensive coordination with the project team to date and look forward to many years of continued coordination as the project moves toward design and construction. Please contact me (jonathan.watson@noaa.gov; 978-675-2180) in our Annapolis Field Office if you have any questions.
>
> Best,
>
> Jonathan
> --
> **Jonathan Watson**
> *Marine Habitat Resource Specialist, GARFO HESD*
> NOAA Fisheries | U.S. Department of Commerce
> Office: (978) 675-2180
> www.fisheries.noaa.gov

Bienko, Alexander <alexander.bienko@dot.gov>

Bay Crossing Biological Opinion

Bienko, Alexander <alexander.bienko@dot.gov> Mon, Aug 10, 2026 at 2:37 PM
To: Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>
Cc: Jonathan Watson - NOAA Federal <jonathan.watson@noaa.gov>, Christine Vaccaro - NOAA Federal <christine.vaccaro@noaa.gov>, Mark Capone - NOAA Federal <Mark.Capone@noaa.gov>, Heather Lowe <hlowe@mdta.state.md.us>

Brian!
FHWA would like to express our gratitude in coordinating and working with NOAA during the consultation process to get to the submittal of the Biological Opinion. We look forward to continued coordination on this project as it moves forward.

Best,
Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
alexander.bienko@dot.gov

On Mon, Aug 10, 2026 at 2:30 PM Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov> wrote:

> Good afternoon,
>
> Attached, please find our signed Biological Opinion and transmittal letter.
>
> Please carefully review the Opinion's Incidental Take Statement (ITS), including the reasonable and prudent measures (RPMs) and associated terms and conditions (TCs) necessary to minimize and monitor the take of shortnose and Atlantic sturgeon. We will be happy to address any questions or concerns you may have.
>
> Thank you for your cooperation and assistance throughout this consultation process. Please pass along a thank you to the various members of your team who helped assemble the data necessary to complete this consultation.
>
> Regards,
> -Brian

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

August 10, 2026

Alexander Bienko
Environmental Program Manager
FHWA - Maryland Division
George H. Fallon Federal Building
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

Re: FHWA Chesapeake Bay Crossing Bridge Project on the Chesapeake Bay in Maryland

Dear Mr. Bienko,

Enclosed is the biological opinion (Opinion), issued under Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, for the Federal Highway Administration's (FHWA) Chesapeake Bay Crossing Bridge replacement project.

In this Opinion, we conclude that the action is likely to adversely affect, but not likely to jeopardize the continued existence of five distinct population segments (DPS) of Atlantic sturgeon and the endangered shortnose sturgeon. We also conclude that the action as a whole may affect, but is not likely to adversely affect the threatened Northwest Atlantic DPS of loggerhead sea turtles and North Atlantic DPS of green sea turtles; or endangered Kemp's ridley sea turtles, and leatherback sea turtles.

Our Opinion includes an Incidental Take Statement (ITS), which is an exemption from the prohibition of take of listed species. Incidental take is defined as "take of listed fish or wildlife species that results from, but is not the purpose of carrying out an otherwise lawful activity conducted by a federal agency or applicant" [50 CFR §402.02]. "Otherwise lawful activities" are those actions that meet all State and Federal legal requirements, including any state endangered species laws or regulations, except for the prohibition against taking in ESA section 9. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of this ITS.

The ITS specifies reasonable and prudent measures (RPMs) necessary to minimize and monitor take of Atlantic sturgeon and shortnose sturgeon. The measures described in the ITS are non-discretionary, and must be undertaken by you so that they become binding conditions for the exemption in section 7(o)(2) to apply. You have a continuing duty to regulate the activity covered by the ITS. If you (1) fail to assume and implement the terms and conditions or (2) fail to require any contractors to adhere to the terms and conditions of the ITS through enforceable terms that are added to permits and/or contracts as appropriate, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, you must report the progress of the action and its impact on listed species to us as specified in the ITS [50 CFR §402.14(i)(3)] (See U.S. Fish and Wildlife Service and National Marine Fisheries Service's Joint Endangered Species Act Section 7 Consultation Handbook (1998) at 4-49).

This concludes formal consultation on the proposed action. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals consequences of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes a consequence to listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In the event that the amount or extent of incidental take exempted in this Opinion is exceeded, section 7 consultation must be reinitiated immediately.

Thank you for working cooperatively with my staff throughout the consultation process. We look forward to continuing to work cooperatively with your office to minimize the effects of FHWA projects on listed species. Should you have any questions about this correspondence please contact Brian Hopper at (301) 758-3074 or brian.d.hopper@noaa.gov.

Our Habitat and Ecosystem Services Division (HESD) is responsible for overseeing programs related to Essential Fish Habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act and other NOAA trust resources under the Fish and Wildlife Coordination Act (FWCA). HESD is currently coordinating with you on the EFH consultation. If you have any questions or comments regarding the EFH consultation process, please contact Jonathan Watson of our Habitat and Ecosystem Services Division at (978) 675-2180 or jonathan.watson@noaa.gov.

Sincerely,



Christine Vaccaro
Acting Assistant Regional Administrator
for Protected Resources

CC: Lowe, MDTA; Bienko, FHWA; Watson, NMFS HESD
ECO: GARFO-2026-00635
File Code: G:\Shared drives\NMFS GAR PRD Section 7\Section 7 Team\Section 7\Non-Fisheries\FHWA_State DOTs\Formal\Chesapeake Bay Crossing

NATIONAL MARINE FISHERIES SERVICE
ENDANGERED SPECIES ACT SECTION 7 CONSULTATION
BIOLOGICAL OPINION

AGENCY:	Federal Highways Administration
ACTIVITY CONSIDERED:	Federal Highways Administration's Funding for the Bay Crossing Replacement Project GARFO-2026-00635
CONDUCTED BY:	National Marine Fisheries Service Greater Atlantic Regional Fisheries Office
DATE ISSUED:	August 10, 2026
APPROVED BY:	 Christine Vaccaro Acting Assistant Regional Administrator for Protected Resources

DOI Address: https://doi.org/10.25923/tdme-rr45

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1 INTRODUCTION

This is the biological opinion (Opinion) of NOAA's National Marine Fisheries Service (NMFS) issued pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, on the effects of the Federal Highway Administration's (FHWA) funding and authorization of the proposed Chesapeake Bay Crossing project, carried out in coordination with the Maryland Transportation Authority (MDTA). Other anticipated federal actions associated with the project include permit authorization under Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act by the U.S. Army Corps of Engineers, Baltimore District, and issuance of a Bridge Permit by the U.S. Coast Guard.

This Opinion is based on the best scientific and commercial data available, including but not limited to information provided in the Biological Assessment (BA) received on March 18, 2026, past consultations with the FHWA, scientific papers, and other sources of information as cited in this Opinion. We will keep a complete administrative record of this consultation at our NMFS Greater Atlantic Regional Fisheries Office (GARFO). Formal consultation was initiated on March 18, 2026.

1.1 Application of ESA Section 7(a)(2) Standards – Analytical Approach

This section reviews the approach used in this Opinion to apply the standards for determining jeopardy as set forth in section 7(a)(2) of the ESA and as defined by 50 CFR §402.02 and 50 CFR §402.14 (the consultation regulations). The Endangered Species Consultation Handbook, March 1998, issued jointly by NMFS and the United States Fish and Wildlife Service (USFWS) and the section 7 regulations provided additional guidance for this analysis. In conducting analyses of actions under section 7 of the ESA, we take the following steps, as directed by the consultation regulations:

- Describes the proposed action and identifies the action area (Section 3);
- Evaluates the current rangewide status of the species with respect to biological requirements indicative of survival and recovery (Section 4);
- Evaluates the relevance of the environmental baseline in the action area to biological requirements and the species' current status (Section 5);
- Evaluates the effects of the action and determines whether the proposed action affects the abundance, reproduction, or distribution of the species (Section 6);
- Determines and evaluates any cumulative effects within the action area (Section 7); and,
- Evaluates whether the effects of the proposed action, taken together with any cumulative effects and the environmental baseline, can be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the affected species (Section 8).

In completing the last step, we determine whether the action under consultation is likely to jeopardize the ESA-listed species. If so, we must identify a reasonable and prudent alternative(s)

(RPA) to the proposed action that avoids jeopardy and meets the other regulatory requirements for an RPA (see 50 CFR §402.02). In making these determinations, we must rely on the best available scientific and commercial data.

This Biological Opinion was prepared by NMFS pursuant to section 7(a)(2) of the ESA and implementing regulations at 50 CFR §402. On March 30, 2026, in Center for Biological Diversity v. Burgum, No. 24-cv-04651 (N.D. Cal.), the U.S. District Court for the Northern District of California vacated aspects of four provisions from the 50 CFR §402 regulations governing interagency consultation under section 7 of the Endangered Species Act and reinstated the provisions that were previously in effect. Consistent with the Court's ruling, these are the governing provisions for this consultation:

- "Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration."[1] 50 CFR §402.02 (2018).
- 50 CFR §402.16(a): "(a) Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and . . . ." (50 CFR §402.16(a) (2023)).

Some of the information and analyses considered in this consultation (i.e., the consultation request package submitted by FHWA and MDTA) were prepared under the version of the 50 CFR §402 regulations in effect prior to the Court's order. We have reviewed the information and analyses and confirm that the content of that information and those analyses, including the identification and analyses of effects, would be the same under either version of the applicable

1 This definition includes the second sentence of the definition of "effects of the action." That sentence provided the definition of "environmental baseline" in effect as of 2018. In the 2019 rule amending the 50 CFR part 402 regulations, the Services established "environmental baseline" as a stand alone definition. 84 Fed. Reg. 44976, 45016 (August 27, 2019). In the 2024 rule, the Services made minor revisions to the "environmental baseline" definition. 89 Fed. Reg. 24268, 24298 (April 5, 2024). The Court's ruling did not touch upon that definition of "environmental baseline," and it therefore remains valid. The definition is also fully consistent with the definition of "effects of the action" from 2018.

regulations. While revisions to the regulations were proposed in November 2025 (90 FR 52600), no final rule to revise the regulations has been issued.

1.2 Analytical Approach to the Proposed Action

The bridge replacement is currently in the preliminary engineering phase; as such, final construction means and methods have not been determined. Accordingly, this effects analysis is based on the description in the BA, which incorporates all construction activities that are currently anticipated. As described in the BA and DEIS, this is based on the design and engineering carried out to date, inclusive of consideration of the best available information from similar regional bridge construction and demolition projects, including the Francis Scott Key Bridge Rebuild, the Tappan Zee Bridge Replacement, and the Nice-Middleton Bridge Replacement. As the design progresses through final engineering and permitting, stressor characterizations and the associated effects determinations will be re-evaluated in coordination with us and consultation will be reinitiated if necessary.

Effects are assessed for each principal stressor category identified from the construction and demolition program: pile driving; dredging; turbidity; habitat modification; increased vessel traffic; and blasting associated with demolition of the existing eastbound and westbound bridge spans. For each stressor, the analysis characterizes: (1) the nature and magnitude of the stressor; (2) the spatial and temporal extent of exposure; (3) the life stages and behaviors of listed species most likely present during the relevant construction windows; and (4) the likely individual- and population-level consequences, including potential for injury, mortality, behavioral disruption, and habitat loss.

As described in the BA, FHWA and MDTA used the NMFS Multi-Species Pile Driving Calculator to predict distances to identified acoustic thresholds. The proxy sounds levels used, are consistent with the instructions provided with the calculator and when a proxy was not available for a specific pile type, the next nearest largest pile type was used. Calculations assumed 10 dB attenuation[2] for the use of bubble curtains, and considered the installation of up to 16 piles per day, 2,500 strikes per pile (impact), and 30 minutes of vibratory driving for piles installed with a vibratory hammer. Established formulas (Hempen *et al*. (2005, 2007)) were used to predict effects from blasting. The information incorporated into the BA and our resulting effects determinations reflect the full range of reasonably likely outcomes across all assumed construction scenarios.

[2] This value is grounded in monitored field verification from the Nice-Middleton Bridge Replacement, the primary analog project for this consultation. Per the Underwater Noise Monitoring Plan 2021 Annual Report (AECOM/SCM, January 2022), the contained air bubble curtain system was tested using an on/off protocol during individual pile drives (per NMFS guidance), documenting a 15–20 dB reduction in instantaneous maximum sound levels for 66-inch precast concrete cylinder piles and 48-inch steel fender piles. Fish kills observed during the first two 48-inch fender piles (driven before the curtain was operational) did not recur once the contained curtain was implemented. The 10 dB value applied here is conservative relative to this realized range and falls within the broader published range of 5–15 dB reported for bubble curtain systems (Molnar *et al.* 2020, WSDOT 2020), exceeding NMFS' generic default of 5 dB where site-specific analog data support a higher value. Attenuation performance will be confirmed via test pile prior to production driving (see Section 3.6.1).

The effects analysis is organized by stressor rather than by species, to enable a clear accounting of each construction activity's contribution to total exposure. A species-level synthesis and effects determination table are provided at the end of this section.

The effects analysis incorporates all avoidance and minimization measures that the FHWA and MDTA have committed to include and implement as part of the proposed action. As explained above, measures that are under consideration, but not yet committed to (as described in the BA), are not incorporated into the effects analysis.

2 CONSULTATION HISTORY

This section of the Opinion identifies the significant milestones in the consultation history; note that not all meetings and correspondence that occurred during the consultation period are noted here. The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by MDTA and FHWA. The Bay Crossing Study addresses existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. Each tier of the Bay Crossing Study involves development of an Environmental Impact Statement (EIS), in compliance with the National Environmental Policy Act (NEPA), to describe potential significant environmental effects and inform the evaluation of alternatives. Early coordination with us has been conducted throughout the Tier 1 and Tier 2 Studies. Tier 1 of the Bay Crossing Study (Tier 1 Study) was completed in April 2022. At that time, FHWA issued a Final Environmental Impact Statement /Record of Decision (FEIS/ROD) identifying Corridor 7, the corridor that includes the Bay Bridge and its approaches, as the Selected Corridor Alternative for further evaluation. Tier 2 of the Bay Crossing Study (Tier 2 Study) launched in June 2022 to focus on a project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7). Additional Tier 2 Study coordination and regular interagency coordination meetings have been occurring with NMFS and other resource agencies before and during development of the DEIS, since July 2022. Coordination history for the Tier 2 Study is summarized below:

Table 1. Consultation Coordination History

Date	Coordination History
June 30, 2023	NMFS accepted FHWA and MDTA's invitation to be a Cooperating Agency on the Tier 2 Study.
December 5, 2023	A list of federally listed species under NMFS jurisdiction with the potential to occur in the vicinity of the Tier 2 Study area was obtained from the NMFS Greater Atlantic Region ESA Section 7 Mapper.
March 2024	NMFS reviewed the Notice of Intent (NOI) for FHWA and MDTA to prepare an EIS for the Tier 2 Study.
January 13, 2025	NMFS provided comments on the NOI.

February 5, 2025	The NMFS Greater Atlantic Region ESA Section 7 Mapper was reviewed again to confirm no changes occurred to the species list obtained on December 5, 2023.
April 30, 2025	A draft of the Natural Environment Technical Report (NETR) was provided to the Cooperating and Participating Agencies, including NMFS, for review. (NMFS provided comments on the NETR that were addressed in subsequent drafts of the NETR and DEIS.)
August 11, 2025	A draft of the DEIS was provided to the Cooperating and Participating Agencies, including NMFS, for review. (Comments were considered and incorporated in the DEIS, as well as the BA and the NETR.)
November 28, 2025	A draft of the BA was provided to NMFS for review.
January 15, 2026	NMFS provided comments to FHWA and MDTA on the draft BA. Comments were considered and incorporated in the subsequent draft BA.
February 23, 2026	A revised draft of the BA was provided to NMFS for review.
March 6, 2026	NFMS provided comments to FHWA and MDTA on the draft BA. Comments were considered and incorporated in the subsequent BA.
March 9, 2026	The NMFS Greater Atlantic Region ESA Section 7 Mapper was reviewed to confirm no changes to listed species or critical habitat in the Action Area.
March 18, 2026	FHWA requested initiation of formal consultation with NMFS for the proposed action. We deemed the information submitted by FHWA and MDTA sufficient to assess the effects of the proposed action on ESA-listed species and that the information constituted the best scientific and commercial data available (50 CFR §402.14(c)(-(d)); ESA formal section 7 consultation was initiated on this date.

3 DESCRIPTION OF THE PROPOSED ACTION

This Opinion considers the effects of the FHWA's proposed funding, authorization, and construction of a new crossing of the Chesapeake Bay along the existing U.S. Route 50/301 corridor. As noted above, authorizations or permits are also anticipated to be issued by the USACE and the USCG. However, as construction is not expected to begin until after 2031, there are not yet any draft permits available for review. As such, for the purposes of this consultation we expect that any permits/authorizations issued by these federal agencies will be consistent with

the scope of the proposed action as described here. In the event that either permit/authorization would result in effects not considered in this Opinion, consultation would need to be reinitiated.

The Draft Environmental Impact Statement (DEIS) identified Alternative C, consisting of two new four-lane bridges (eight lanes, total) located to the south of the existing bridge alignments with six-lane approaches in the study corridor on either shore (6-8-6 South), as the Preferred Alternative. The study corridor encompasses the existing Gov. William Preston Lane Jr. Memorial Bridge (Bay Bridge) spans connecting Sandy Point in Anne Arundel.

The proposed action consists of new eastbound (EB) and westbound (WB) bridge spans, located immediately adjacent to the existing spans, designed to provide additional traffic capacity. The project involves a multi-year, multi-phased in-water construction and subsequent demolition schedule estimated to span five to six years of active construction, with an additional one to two years for demolition of each existing bridge span. As described in the BA, FHWA and MDTA developed a preliminary construction duration with two general activities, construction of two new spans and demolition of the two existing spans, as follows:

- Construct first bridge span plus approach roads: years 1 to 5;
- Demolish first bridge span: years 6 to 7;
- Construct second bridge span plus approach roads: years 7 to 13; and
- Demolish second bridge span: years 14 to 15.

Work will not begin until after the completion date of environmental review and permitting, which is currently estimated to be completed on June 30, 2031[3].

The primary in-water construction and demolition elements are described in detail in the DEIS and BA and are summarized below.

Dredging and Benthic Excavation
Mechanical dredging will be conducted over approximately 50.2 acres of estuarine bottom to facilitate construction vessel access, accommodate temporary work barges, and prepare the substrate for bridge pier foundation installation.

Structural Foundation and Pile Driving
The new spans will be supported by a series of concrete piers anchored by 15,299 piles (7,513 eastbound and 7,786 westbound). Production pile driving will likely involve driving steel pipe piles up to 96 inches in diameter using both vibratory and impact hammers. The BA states that piles may be installed concurrently (i.e., multiple piles driven simultaneously).

[3] See permitting schedule available at: https://www.permits.performance.gov/permitting-project/dot-projects/chesapeake-bay-crossing-study-tier-2-eis

To construct the new bridge spans and demolish the existing bridges, temporary pile-supported trestles would be built for project-related vessels to use as a staging area. Additional staging areas may include mooring locations within the action area. Installation of temporary mooring may require pile driving or placement of mooring anchors.

Demolition of Existing Spans
Following the completion and opening of the first new span, the existing EB structure and its subaqueous piers will undergo a phased demolition process. The process repeats for the westbound bridge structures and their subaqueous piers. Pier demolition will involve a combination of mechanical dismantling and subaqueous explosive blasting. Demolition of the existing Bay Bridge's eastbound and westbound spans will require subaqueous explosive demolition of deep-water concrete piers located in water depths exceeding 12.2 meters (m) (40 feet (ft)), where mechanical means of removal are not feasible. There are 15 deep-water piers in the existing eastbound span and 15 deep-water piers in the existing westbound span that will require subaqueous blasting, for a total of 30 blast-subject structures across the two demolition phases. The total length of bridge supported by deep-water piers is approximately 6,132 linear m (20,117 linear ft), constituting approximately 48 percent of the total bridge length to be demolished.

Non-blasting demolition activities include:

- Mechanical demolition of pile bents (shallow water) — 67 EB + 89 WB bents, approximately 25 percent of total bridge length
- Mechanical demolition of moderate-depth piers (<12.2 m (40 ft) water) — 39 EB + 11 WB piers, approximately 27 percent of bridge length
- Above-water mechanical demolition of deep-water piers — the portion of every deep-water pier removed mechanically before blast-hole drilling can begin
- Superstructure/deck removal — saw-cutting and lifting of deck slabs, torch-cutting and lifting of girders

The BA states that rubble will be removed to the maximum extent practicable, and to the extent that removal would not result in greater impacts to benthic environments compared to leaving the rubble in place. In addition, the decision to remove, re-use, or leave rubble in place, or to use rubble to fill scour, will be determined in coordination with NMFS.

The BA describes commitments to employ a suite of Best Management Practices (BMPs), which were informed by our early coordination on this project along with the recommendations detailed in our Best Management Practices Manual (NOAA 2017). We consider these BMPs, referred to in the BA as BMP Commitments, to be part of the proposed action. In the BA, FHWA and MDTA also identified several avoidance and minimization measures, referred to as BMP Considerations, that would continue to be considered as project plans are finalized, but have not been adopted as part of the proposed action. Therefore, these BMP Considerations are not part of the proposed action and are not addressed in our effects analysis nor are they considered in

our jeopardy analysis. They are, however, incorporated by reference as Conservation Recommendations. The BMPs that are part of the proposed action are outlined below.

3.1 Dredging and Benthic Excavation

The proposed action includes dredging necessary to create access channels to support both demolition and construction activities. Mechanical dredging will be used to reach a target depth of nine feet below the mean low water (MLW) level and to a width necessary to facilitate equipment mobility, loading and unloading material barges, and erecting structures. The total dredge area at both shores of the Bay would be approximately 50.2 acres (2.2 million square feet), totaling 16.4 acres on the western shore and 33.8 acres on the eastern shore. These areas exclude the footprints of the proposed and existing bridge pier footings. The total dredged volume is approximately 236,095 cubic meters (308,800 cubic yards). Applying a bulking factor of 1:3 to the dredged volume, the volume of spoil to be hauled is approximately 311,556 cubic meters (401,500 cubic yards), which would be loaded to a barge for transfer to an existing disposal site (additional information below).

The dredging areas were established using the "Maryland bathymetry Chesapeake Bay contours" data at both shorelines of the Chesapeake Bay (Western and Eastern Shores). The northern limit of dredging is expected to occur approximately 15.2 m (50 ft) north of the existing westbound span piers (to be demolished) and the southern limit is expected to be approximately 18.3 m (60 ft) from the southern edge of a new eastbound span.

Dredging will occur through the duration of construction, although the exact timing of the dredging (i.e., which months) is unknown. An estimated two-thirds of the dredging will take place in the first year of construction to accommodate the eastbound bridge span. This initial dredged area will remain in place for up to 15 years. The remaining one-third of dredging will take place at the start of construction of the westbound bridge span. For the eastbound bridge, mechanical dredging is expected to take a total of about 14 days within construction years 1 and 2 and for the westbound bridge mechanical dredging is expected to take a total of about 7 days within construction years 7 and 8. To support vessel/equipment access in shallow areas, the dredged area would need to be wide enough to facilitate equipment mobility, loading and unloading material barges, and erecting structures. Based on the greater expanse of shallow water from the eastern shoreline, it is anticipated that more dredging would be required along the eastern shoreline than the western shoreline.

As described in the BA, FHWA and MDTA expect the dredge sediment to be clean (i.e., free from contaminants), based on sediment analysis from the USACE 50 Foot Project, which includes the main channel that runs through the project area. Sediment will be tested during geotechnical investigations and prior to disposal to determine the appropriate beneficial reuse or disposal site(s). Potential dredge disposal sites include Masonville Cove and Cox Creek dredged material containment facilities (DMCF). Both sites are owned and operated by the Maryland Port Administration (MPA), are adjacent to the Patapsco River, and are accessible by barge for placement operations; at both sites material would be placed in existing, contained facilities and in upland locations.

3.2 Structural Foundations and Pile Driving

Preliminary engineering assumptions incorporated into the proposed action include using a trestle for temporary construction access in waters less than 3 m (10 ft) deep below MLW. Based on the Francis Scott Key Bridge Rebuild Project design, FWHA and MDTA expect that the temporary trestle piers will be constructed every 11.6 m (38 ft) supported on 36-inch steel pipe piles. Preliminary engineering considers that bridge piers would be constructed with 36-inch square pre-stressed concrete piles as well as 36-inch, 48-inch, and 96-inch driven steel pipe piles. Pier protection fenders would be supported on 48-inch driven steel pipe piles. Pier protection dolphins are described to include 19.6-inch-wide sheet pile, backed by 14-inch steel H-piles. Pier protection would be built with the corresponding bridge span. The proposed action includes use of up to four pile driving rigs that may operate concurrently. Tables 2 and 3 provide the estimated number and type of proposed piles and piers for the eastbound and westbound bridges, respectively.

Table 2. Eastbound Bridge - Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**1,741**	**77**
36” Pre-stressed Square Piles	132	18
36” Steel Pipe Piles	240	10
48” Steel Pipe Piles	1,231	43
96” Steel Pipe Piles	138	6
Trestle Piers		
36” Steel Pipe Piles	**628**	**157***
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,513**	**258**

**A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*

*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore, 116 sheet piles and 116 Steel H-piles are required per dolphin.*

Table 3. Westbound Bridge - Pile Summary

Pile Type and Size	Total Piles	Total Piers
Bridge Piers	**2,014**	**60**
36” Pre-stressed Square Piles	203	22
36” Steel Pipe Piles	243	9
48” Steel Pipe Piles	1,412	43
96" Steel Pipe Piles	156	6
Trestle Piers		
36” Steel Pipe Piles	**628**	**157***
Pier Protection	**5,144**	**24**
48” Steel Pipe Piles for fenders	40	2
19.6” Sheet Piles (For Dolphins)	2,552**	22
14” Steel H-Piles (For Dolphins)	2,552**	
Grand Total	**7,786**	**261**

** A trestle pier is anticipated every 38 feet, beginning on land and extending one bridge pier beyond the limits of dredging (extending to 10-feet below MLW). Four 36-inch steel pipe piles are assumed to be required for each trestle pier.*
*** Pier protection dolphins have a diameter of 60’ and a circumference of 188.5’. Sheet piles and Steel H-piles would be constructed around the circumference of each dolphin and therefore 116 sheet piles and 116 Steel H-piles are required per dolphin.*

The proposed action incorporates the following construction assumptions based on preliminary engineering:

- Multiple foundation types could be used by the contractor; however, to ensure that the full extent of potential effects of underwater noise are considered, the proposed action considers the main span to be supported by multiple driven steel-pipe piles, which will require impact and vibratory hammering, and the approach span piles are expected to be pre-stressed square concrete piles installed by impact hammer.
    - Noise attenuation in the form of bubble curtains would be used for all pile driving.
- a cable-stayed or suspension bridge would be installed on the substructure.
- Piers would have some form of pier protection. Preliminary design includes 2 fenders and 22 dolphins installed on both the eastbound and westbound bridges, respectively, to provide collision protection.
- The proposed action includes trestles for construction access to facilitate pier placement for the new bridge within the dredged area. Trestles are included for both construction and demolition activities. The preliminary design includes a trestle pier every 11.6 m (38 ft), beginning on land and extending one bridge pier beyond the limits of dredging (extending to 3 m (10 ft) below MLW). Four 36-inch steel pipe piles are installed for each trestle pier. Trestles would remain in-place until construction is complete, approximately 15 years after which they will be removed. Removal is expected to be carried out with a vibratory hammer or cutting below the mudline.

- Other temporary construction methods including sheetpile cofferdams and other dewatering devices for pile driving may be used.
- Dredging in the shallows up to approximately 2.7 m (9 ft) depth is assumed necessary to access areas for pier construction.
- It is assumed, based on the Francis Scott Key Bridge Test Pile Exposure Analysis assumptions, that impact driving would take a maximum of 2 hours per pile.
    - up to 8 96-inch steel pipe piles may be driven in one day and up to 16 piles of other pile sizes could be driven in one day.
    - For the eastbound bridge, a total of 120 days of pile driving is anticipated across years 1-5 of construction.
    - For the westbound bridge, a total of 138 days of pile driving is anticipated across years 7-13 of construction.
- Throughout the construction duration an effective 12-hour quiet period of no pile driving will be implemented each day.
- For temporary staging areas, FHWA and MDTA anticipate using the existing MDTA piers that are currently used for bridge maintenance. Additional staging areas may be needed, which will be determined during final design. Any additional staging areas may include existing public or private industrial locations in the Baltimore Harbor area that would facilitate material transportation by barge. Staging areas may also include mooring locations within the Chesapeake Bay. Temporary mooring locations in the Chesapeake Bay may have additional bay bottom impacts, however FHWA and MDTA will avoid placing moorings in areas of oyster beds or submerged aquatic vegetation (SAV). The specific locations and number of moorings will be determined in final design and coordinated with NMFS.

Temporary lights may be used during construction, including in cases of extended construction day or overnight work.

Mitigation measures that will be employed during pile driving include the use of a bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles (effectiveness shall be demonstrated with a test pile and underwater noise program prior to initiating production pile driving activities); maintaining a Zone of Safe Fish Passage (ZSFP) from January 15 through May 15; using a "soft start[4]" or "ramping up" pile driving (e.g., driving does not begin at 100 percent energy) to allow sturgeon and sea turtles to move away from areas that may be ensonified to potentially injurious levels; restricting pile driving activity to no more than 12 consecutive hours per day, to allow for a 12-hour effective rest period; initially driving steel piles with a vibratory hammer through softer,

[4] For purposes of analysis, we applied the following NMFS recommended "soft start" for impact pile driving: (1) Initiate driving with an initial set of three single strikes by the hammer at 40% of its maximum energy; (2) Stop and wait for one full minute; (3) Deliver a second set of three strikes at 40% energy; (4) Stop and wait for another one full minute; (5) Deliver a final set of three strikes at 40% energy; (6) Stop and wait for a final one full minute; and (7) Begin continuous impact driving at the full operational rate and energy.

sandy soils prior to using an impact hammer through stiffer material, as practicable and appropriate; using cushion blocks to drive concrete piles with an impact hammer as practicable and appropriate; and developing an underwater noise monitoring plan to describe the underwater noise generated by project activities and adaptive management measures planned to address the underwater noise.

3.3 Demolition of Existing Spans

Demolition of the existing structures is expected to occur in two phases. It is anticipated that the first new bridge span will be built, then one existing bridge span will be demolished, and the new bridge span will be in use while the second new bridge span is built. Once both new bridge spans are complete, the second span of the existing bridge will be demolished.

Demolition of the existing structures may include both mechanical means and blasting. It is anticipated that blasting will not occur concurrently with pile driving, based on the expected project phasing. If construction of the second new span does begin while demolition of the first existing span is underway, blasting will still not occur concurrently with pile driving as construction would pause during blasting events.

The following are the demolition assumptions based on preliminary design:

- Mechanical removal would be employed wherever possible; however, blasting may be necessary when water depths or pier element size makes mechanical removal infeasible. As such, the proposed action considers both demolition techniques.
- Temporary trestles would be used where water depths are less than 10 feet to perform demolition activities, as needed.
- Marine cranes affixed to barges would be used where water depths are deeper than 10 feet below MLW to perform demolition activities, as needed.
- Steel bracing elements are anticipated to be torch cut and heavy lift marine cranes would be used to maneuver cut pieces.
- Shielding barges are anticipated for the removal and transportation of bridge elements from the water. These barges are positioned underneath the existing bridge decks to capture any debris that may be released during demolition.
- Terrestrial demolition of bridge decks, girders, substructures, and abutments is anticipated to use saw cutting, excavators, and slab grab buckets. All demolition debris would be disposed of in accordance with regulatory permits and applicable laws and regulations; disposal is expected to occur at existing locations.

Any blasting required during demolition would occur between October 1 and December 15. Blasting is anticipated to include 18 blast events during demolition of the first bridge span, to occur during years 6 to 7 of construction, and 16 blast events during demolition of the second bridge span, to occur during years 14 to 15 of construction. During explosive demolition, blast containment measures (e.g., confined blasting, bubble curtain, micro-second delay sequencing) will be implemented to ensure the rubble produced from the blast is controlled and therefore will

likely drop in the immediate vicinity of the piers. For demolition that does not involve blasting, FHWA and MDTA have committed to maintaining a minimum contiguous 2,134 m (7,000 ft) wide ZSFP from January 15 through May 15. Specific dates for blast events within the October 1 and December 15 window will be determined during the development of the Demolition Plan and will incorporate the best available data including any updated telemetry data that provides information on the presence of ESA listed species in the action area. Following each blasting event, a search for injured/killed fish will begin immediately upon receiving the "all clear" and extend for at least 30 minutes. The search area will include all surface waters within at least 150 m (450 ft) of the center of the blast area, with at least one vessel beginning at the centroid.

3.4 Vessels to Support Project Activities

Based on the construction phasing for the proposed action, construction-related vessel activity will be distributed across an approximately 15-year program. The project vessels will include tug boats, support vessels, and barges with large excavators. Construction vessels will primarily serve Bridge 1 (eastbound; years 1–5) and Bridge 2 (westbound; years 7–13), with demolition of the existing eastbound span occurring in years 6–7 and the existing westbound span in years 14–15. The anticipated home port for construction vessels is the Baltimore area, representing a one-way transit distance of approximately 30.6 kilometers (km) (19 miles (mi)) through the Federal navigation channel between the Port of Baltimore and the bridge site. Dredge material transport alone is estimated to require approximately 14 days of barge activity during years 1–2 and approximately 7 days during years 7–8, with a total dredge volume of approximately 236,095 cubic meters (308,800) cubic yards (approximately 306,969 cubic meters (401,500 cubic yards) bulked) proposed for disposal at Masonville Cove or Cox Creek DMCF via barge. Trained observers will be onboard all vessels along with operable and effective monitoring equipment.

3.5 Fish Deterrents During Blasting

FHWA and MDTA propose to employ fish deterrent activities before each blast to minimize the potential for exposure of sturgeon to blasting activities. Beginning approximately two hours prior to each scheduled detonation, a sonar fish deterrent system, consistent with the system used during the demolition of the Nice Bridge, will be deployed and continuously swept through the water column by vessel in the vicinity of the planned detonation. Sonar sweeping will continue until immediately before detonation; if a blast is delayed for any reason, the sonar fish clearance protocol will be restarted from the beginning of the two-hour window. In addition to the sonar deterrent system, fish scare charges will be detonated immediately prior to each main blast event. For planning purposes, the general parameters from the approved blast design from the Nice Bridge project are assumed for the proposed Bay Bridge demolition, including: 5 decks of explosives per hole; 13.6 kilograms (30 pounds) of explosives per delay; minimum of 9 milliseconds delay between explosives; and maximum of 17 milliseconds delay between decks in the same hole. Scare charges will consist of a series of blasting caps, each containing 0.75 grams (0.003 ounces) of explosives, suspended in the water column surrounding the structure to be blasted, and will be detonated 15 to 30 seconds before the main production blast. Consistent with guidance in FHWA (2019), scare charges will be placed in close proximity to the bridge

structure rather than at far distances, as placement at greater distances from the structure has the potential to drive fish back toward the blast zone rather than away from it. The acoustic deterrent program will be used in conjunction with a sturgeon monitoring program whereby receivers will be monitored for detections of tagged sturgeon. The blast will not be detonated until an observer confirms that no tagged sturgeon are detected within the Exclusion Zone[5]. If a tagged individual is detected within the Exclusion Zone, detonation will be delayed until the fish has moved beyond the zone boundary.

3.6 Best Management Practices

FHWA and MDTA will employ the measures listed below to avoid, minimize, and monitor potential effects of the proposed work on Atlantic and shortnose sturgeon and sea turtles. These measures are part of the proposed action under consultation:

3.6.1 Underwater Noise/Hydroacoustic Energy

- Use noise attenuation and minimization measures during pile driving, including:
    - A bubble curtain system that achieves 10 dB or greater attenuation for bridge piles and 5 dB or greater attenuation for dolphin pier protection piles. The effectiveness of the bubble curtain attenuation shall be demonstrated through underwater noise monitoring of each pile type prior to initiating production pile driving activities.
    - Using a "soft start" or "ramping up" pile driving (e.g., three 3-strike sequences at 40 percent of full power). Parameters of soft starts will be determined and coordinated with NMFS in design.
    - Where softer sandy soils are at the surface, use a vibratory hammer for initial pile driving through the softer soils prior to using an impact hammer through stiffer material as practicable and as appropriate.
    - Cushion blocks to drive concrete piles with an impact hammer as practicable and as appropriate.
- Develop and implement an underwater noise monitoring plan to monitor and minimize the underwater noise generated by pile driving and use adaptive management if underwater noise is above estimated levels. Adaptive management measures will be determined in consultation with NMFS during design.
- Include methods to document fish stuns/kills in the Underwater Noise Monitoring Plan and provide the Underwater Noise Monitoring Plan for review and approval by NMFS prior to the start of any noise generating activities.

[5] FHWA and MDTA calculated an Exclusion Zone radius of 640 m (2,100 ft) around each pier, for a total combined area of approximately 486 hectares (1,200 acres) for the entire Exclusion Zone.

- Implement an effective quiet time of no pile driving for 12 consecutive hours per 24-hour period.
- Employ scare charges and fish deterrent sonar from boats, and monitor for the presence of tagged sturgeon, ahead of blasting activities.
- Develop a detailed Demolition Plan in coordination with NMFS and submit to NMFS for review and approval in advance of any detonation activity. The Demolition Plan will address the following measures:
    - Detonation bore hole stemming, capping, or filling;
    - Firing all charges in a single firing circuit with a delayed detonation between each charge;
    - Focusing blast energy towards a solid substrate rather than towards the water column;
    - Evaluating the feasibility of noise attenuating devices;
    - Conducting the blasting during periods of low water or low tide;
    - Using rubber blasting mats to reduce debris and acoustic signature;
    - Employing scare charges;
    - Installing hydrophones to confirm the impact distance to adaptively manage the Demolition Plan;
    - Using explosive weights that result in injury/mortality thresholds that do not exceed 30.5 m (100 ft) of the blasting source; and
- Use adaptive management actions between blast events to minimize fish mortality.
- Continue to coordinate with NMFS throughout project design and construction to minimize the use of blasting.

3.6.2 Turbidity and Sedimentation

- Limit the amount and extent of turbidity and sedimentation by using appropriate sedimentation and turbidity controls such as silt curtains, settling basins, and cofferdams. FHWA and MDTA will specify the measures to be used in the construction plans:
- Install erosion control measures prior to ground disturbance;
- Inspect daily and maintain continuously in an effective operating condition all Erosion and Sediment Control (ESC) measures until such time as they are removed with prior permission from the Maryland Department of the Environment (MDE) inspector;
- Upon project completion, remove and stabilize all temporary construction materials with sediment and erosion control measures to prevent reentry into waterways.
- Use only mechanical dredging.
- Minimize the suspension of sediments and disturbance of the substrate when removing piles by implementing the applicable techniques:

    - Remove piles with a vibratory hammer, rather than by direct pull, jetting, or clamshell;
    - Remove piles slowly to reduce sediment sloughing off in the water column;
    - Strike or vibrate the pile to break the bond between the sediment and pile to minimize the pile breakage, and reduce the amount of sediment sloughing off the pile during removal;
- Place piles on a barge equipped with a basin to contain all attached sediment and runoff water after removal.
- Prevent sediment and debris from entering the water using geo-textile fabric, hay bales, or other methods. Use nets, tarps, and pans when demolishing bridge superstructures. Remove demolition debris that falls into the water to the maximum extent practicable, and to the extent that removal of rubble would not result in greater harm to benthic environments compared to leaving demolition rubble in place. The decision to remove, re-use, or leave rubble in place, or use rubble to fill scour, will be determined prior to the start of demolition, using the best available data at the time and in coordination with NMFS.

3.6.3 Water Quality

- Only use clean fill in the water.
- In the event that any timber piles are installed, avoid, to the greatest extent practicable, the use of creosote piles or other in-water structures, and coordinate with NMFS if the Contractor identifies a need to use creosote piles.
- Remove cofferdams or other diversion structures only after water quality is consistent with ambient levels outside the structure.
- Remove contaminants and sediments prior to discharging water into aquatic habitats from construction activities such as excavations, cofferdams, settling basins, and sediment ponds.
- Evaluate dredge material to determine the appropriate disposal method and location.
- Manage concrete wash water and cooling water effluent from concrete saw operations to ensure they do not enter the Bay untreated.

3.6.4 Habitat Alteration

- Employ an Independent Environmental Monitor (IEM) that would monitor compliance with environmental and conservation commitments and report to the regulatory agencies and MDTA concurrently.
- Remove temporary structures and fills in their entirety, including monitoring devices placed for underwater noise monitoring during pile driving and blasting. Return aquatic habitats impacted by temporary activities, fills, or

structures to pre-construction or better condition, including contours, elevations, substrate, and vegetation.

- Coordinate with NMFS on specific recommended time-of-year restriction (TOYR) dates for construction and demolition.
- Stage construction activities to reduce intensity of disturbance where appropriate and practicable. Staging of construction activities will be coordinated with the agencies during design.
- Avoid areas where protected species congregate for spawning/foraging or overwintering, if identified prior to or during construction. Currently, no specific spawning, foraging, or overwintering areas are known.
- Coordinate with NMFS and MDNR during Final Design to determine if SAV surveys would be informative of permit conditions. If so, conduct SAV surveys during the growing season, prior to construction, within nearshore areas of the action area to determine the presence and extent of SAV beds.

3.6.5 Fish Passage and Migration Habitat

- From January 15 through May 15 (the anadromous fish migratory period), a minimum contiguous ZSFP equivalent to approximately one-third the waterway width (approximately 2,134 linear m (7,000 linear ft) will be maintained. The ZSFP will allow federally-managed fish species, including migratory fish, to safely navigate around undesirable noise (i.e., above the 150 dB RMS behavioral threshold) and turbidity levels. The ZSFP will encompass the channel edges. To maintain the ZSFP, piles will not be driven from January 15 through May 15, unless underwater noise models or monitoring results demonstrate those piles can be driven while ensuring a minimum contiguous 2,134 m-wide (7,000 ft-wide) ZSFP. The contractor shall use pile driving underwater noise monitoring results to determine an acceptable pile driving sequence of construction that ensures the ZSFP is achieved from January 15 through May 15. The project team will work with NOAA Fisheries and MDNR to refine and approve ZSFP locations and the migratory focal period during Final Design and permitting.

3.6.6 Vessel Interaction

- Moor vessels outside of areas with SAV or in such a way that will not shade SAV.
- Operate construction vessel at reduced speeds (i.e., below 18.5 kilometers per hour (km/h) (10 knots(kts))) for all vessels and in all locations with safety exemptions, as needed.
- Employ species spotters to reduce species/vessel collisions; and keep appropriate distance from protected species if spotted.

3.6.7 Impingement and Entrainment

- Use construction equipment that reduces potential for impingement and entrainment such as environmental buckets on mechanical dredges.
- Employ a NMFS approved observer during mechanical dredging and removal of demolition debris in case of accidental capture.

3.7 Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area (project area) involved in the action" (50 CFR §402.02). Effects of the action are defined in 50 CFR §402.02 (2018) as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline…. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration." The action area is all areas where the proposed action, inclusive of interrelated and interdependent actions, may affect listed species and critical habitat.

The action area includes the Chesapeake Bay surrounding the William Preston Lane, Jr. Memorial Bridge (38.991596 latitude, -76.372357 longitude) in Maryland where construction, demolition, project-related vessel traffic, and habitat modification will occur as described above. The boundaries of the action area for the project have been determined by the anticipated extent of sedimentation, turbidity, noise, and vessel traffic, based on the description of the proposed action in the BA as informed by current high-level assumptions regarding design and construction/demolition activities.

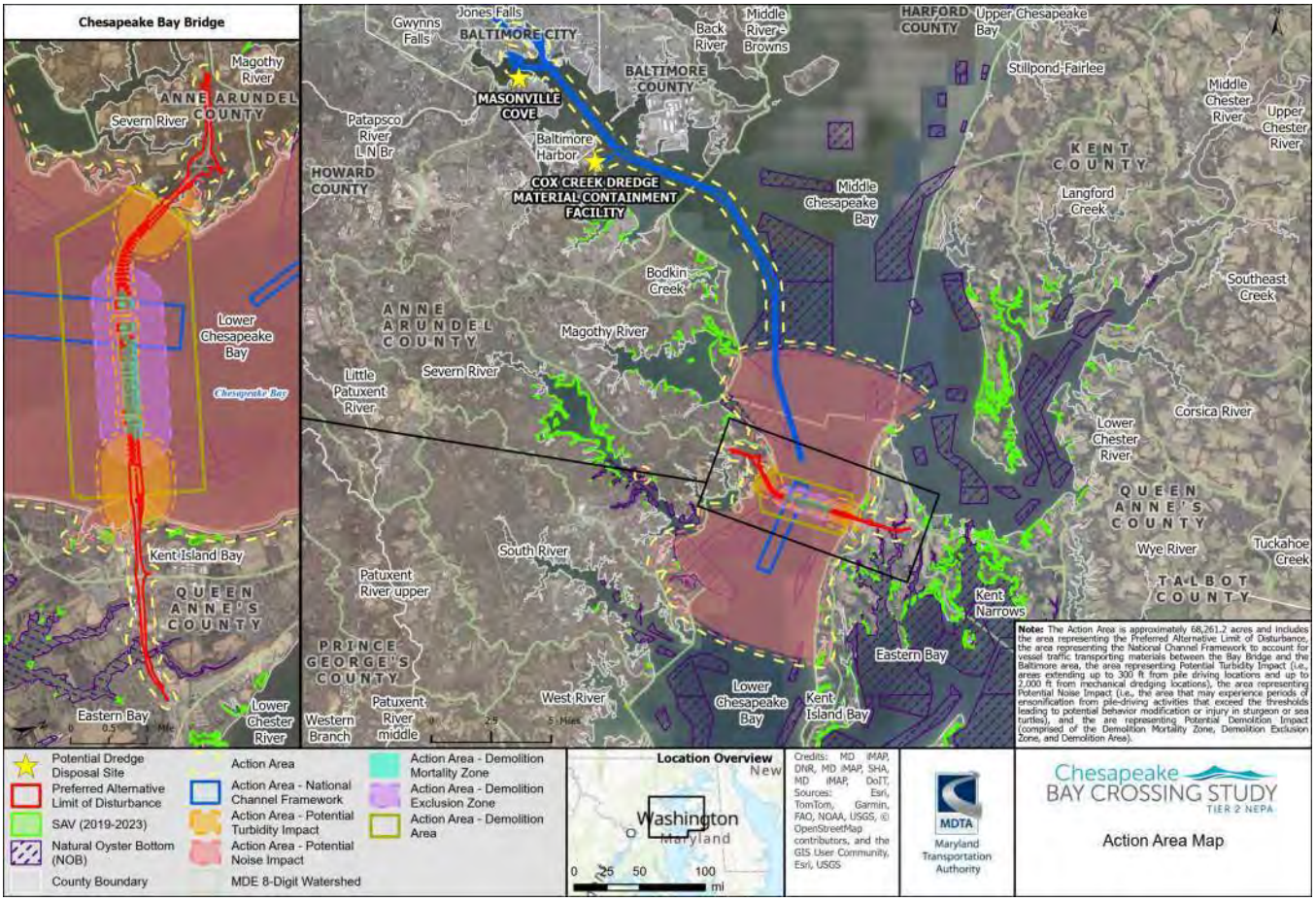
The action area includes areas within the waterway(s) that would experience temporary increases in sediment from dredging, pile driving, and demolition; temporary increases in noise from pile-driving activities and demolition of the existing bridge spans; and vessel routes traveled by project-related vessels between the project site and the Port of Baltimore. Noise generated by bridge demolition blasting is expected to be detectable within an approximately 1,200-acre area surrounding the bridge, representing the outer extent of potential underwater sound propagation from blasting rather than an area of physical habitat disturbance (see Benthic Habitat Modification – Blasting, below). The action area extends up to 10,000 m (32,808.4 ft) from the in-water portion of the proposed action Limit of Disturbance[6] (LOD) due to the anticipated noise generated by pile-driving. Sediment and turbidity impacts are expected to occur up to 91.4 m (300 ft) from the pile driving locations, and up to 731.5 m (2,400 ft) from the dredging locations (Burton 1993, FHWA 2012). It is anticipated that the vessel home port location would be in the Baltimore area, in which case construction-related vessel traffic would travel between the Bay

[6] The BA states that the limit of disturbance (LOD) is the boundary that would include all proposed construction, erosion and sediment control (ESC), stormwater management (SWM), and right-of-way offsets.

Bridge and the Baltimore area when involved in transport of material (a one-way distance of approximately 30.6 km (19 miles)). Any vessel traffic to/from home ports is anticipated to be limited to the Federal navigation channel extending from the Port of Baltimore to the project site.

Therefore, for the purpose of this consultation, the action area is defined as the approximately 338.39 square kilometer area (83,643 acres) within the Chesapeake Bay where in-water construction and demolition will occur and project vessels are likely to transit or operate (Figure 1).

Figure 1. Chesapeake Bay Crossing – Action Area



4 STATUS OF LISTED SPECIES

We have determined that the action considered in this biological opinion may affect the following endangered or threatened species under our jurisdiction (Table 4):

Table 4. ESA Listed Species in the Action Area

ESA-Listed Species - Common Name	Latin Name	Distinct Population Segment (DPS)	Federal Register (FR) Citation	Recovery Plan
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Gulf of Maine; New York Bight; Chesapeake Bay; Carolina; South Atlantic	77 FR 5880 and 77 FR 5914	In Development. Recovery Outline available online[7]
Shortnose sturgeon	*Acipenser brevirostrum*	Range-wide	32 FR 4001	NMFS 1998a
Green sea turtle	*Chelonia mydas*	North Atlantic DPS	81 FR 20057	NMFS & USFWS 1991
Loggerhead sea turtle	*Caretta caretta*	Northwest Atlantic DPS	76 FR 58868	NMFS & USFWS 2008
Kemp's ridley sea turtle	*Lepidochelys kempii*	Range-wide	35 FR 18319	NMFS *et al.* 2011
Leatherback sea turtle	*Dermochelys coriacea*	Range-wide	35 FR 849	NMFS & USFWS 1992

There is no designated critical habitat for species under our jurisdiction in the action area.

4.1 Species Not Likely to be Adversely Affected by the Proposed Action

We have determined that the proposed action considered in this Opinion is not likely to adversely affect the following ESA-listed species: leatherback sea turtle, Kemp's ridley sea turtle, North Atlantic DPS of green sea turtles, and Northwest Atlantic DPS of loggerhead sea turtle. The rationale for this "not likely to adversely affect" (NLAA) determination is presented below.

4.1.1 Sea Turtles

The four species of sea turtles considered here are highly migratory. One of the main factors influencing sea turtle presence in the action area is seasonal temperature patterns (Ruben and Morreale 1999) as waters in this area are not warm enough to support sea turtle presence year-

[7] https://www.fisheries.noaa.gov/resource/document/recovery-outline-atlantic-sturgeon-distinct-population-segments; last accessed June 24, 2026

round. In general, sea turtles move up the U.S. Atlantic coast from southern wintering areas to foraging grounds as water temperatures warm in the spring. The trend reverses in the fall as water temperatures cool. By December, sea turtles have passed Cape Hatteras, returning to more southern waters for the winter (Braun-McNeill and Epperly 2002, Ceriani *et al*. 2012, Griffin *et al.* 2013, James *et al.* 2005b, Mansfield *et al.* 2009, Morreale and Standora 2005, Morreale and Standora 1998, NEFSC and SEFSC 2011, Shoop and Kenney 1992, TEWG 2009, Winton *et al*. 2018).

Juvenile and occasionally adult sea turtles opportunistically forage in the Chesapeake Bay from May through the end of November, with the highest concentrations of sea turtles present from June to October. In the fall, as water temperatures cool, most sea turtles leave the region's waters by the end of November.

The most abundant species in the Chesapeake Bay is loggerhead sea turtle followed closely by the Kemp's ridley sea turtles. Distribution and abundance models by Duke University suggest that Kemp's ridley are abundant near the mouth of the Chesapeake Bay (DiMatteo & Sparks 2023). Loggerhead turtle habitat was predicted to extend farther north than Kemp's ridley habitat and was generally found in deeper areas of the middle Bay (DiMatteo & Sparks 2023). Recent satellite-telemetry studies found that both species spend most of their time engaged in area-restricted search behavior, generally interpreted to be foraging (Barco *et al*. 2017, 2018b). Home range analyses (Barco *et al*. 2018b) identified presumed foraging habitat for Kemp's ridley turtles in the southwestern corner of the Bay, the James and York Rivers, and several other nearshore locations (approximately 193 km (120 mi) south of the Bridge), although there was extensive variation in home range size and location among individuals (DiMatteo *et al*. 2021). In contrast, presumed loggerhead turtle foraging habitat was found primarily in the center of the Bay (between Mobjack Bay and Tilghman Island – approximately 37 km (23 mi) south of the Bridge), into the waters of southern Maryland, with some additional habitat closer to shore (Barco *et al.* 2017). Green sea turtles are also present and leatherback sea turtles occur less frequently, in the Chesapeake Bay.

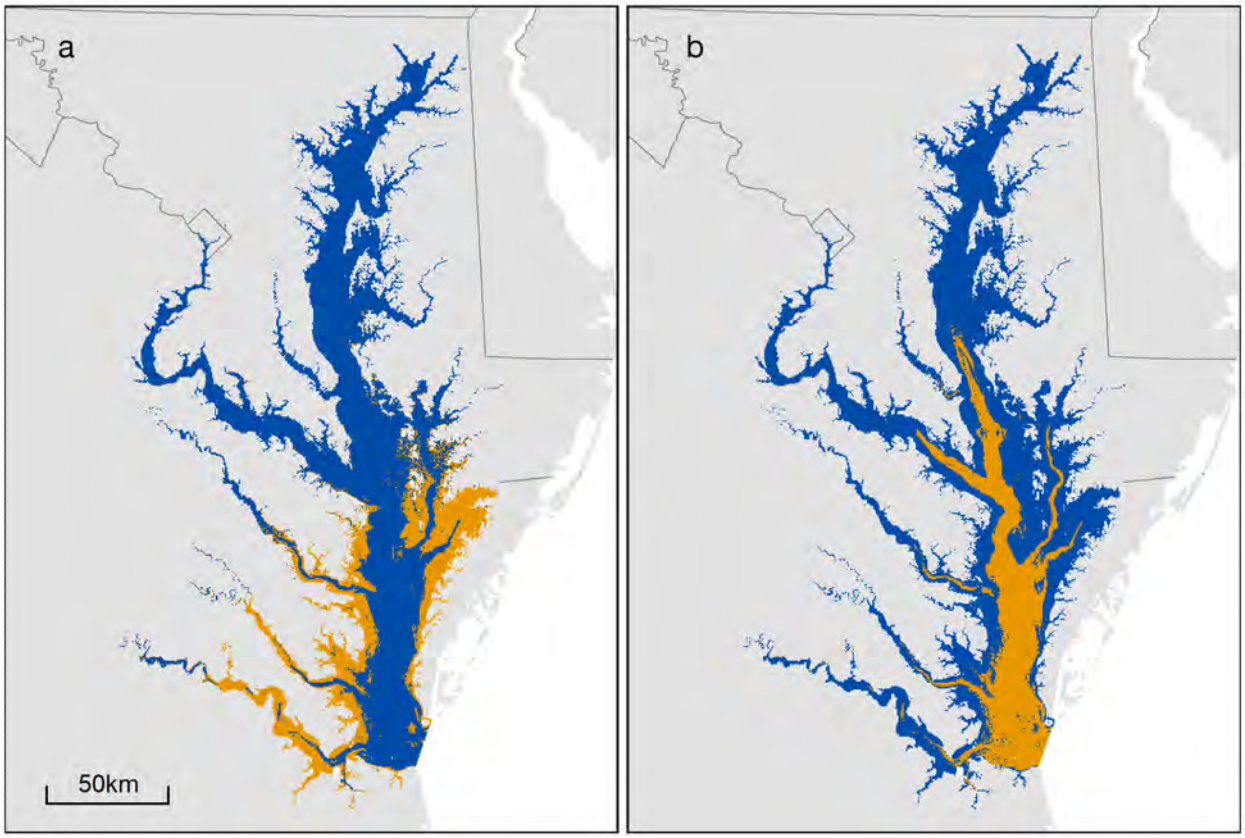
The functional ecology of these four sea turtle species is varied. Loggerhead sea turtles are primarily carnivorous feeding mainly on mollusks and crustaceans. Kemp's ridley sea turtles are omnivorous feeding primarily on crabs and crustaceans. Green sea turtles are herbivores feeding mainly on algae and seagrasses, though they may also forage on sponges and invertebrates. Leatherback sea turtles are specialized feeders and prey primarily upon jellyfish.

Additional background on life history and population status can be found in the most recent 5-year reviews (NMFS & U.S. FWS, 2023) and recovery plans: loggerhead (NMFS (National Marine Fisheries Service) & U.S. FWS (U.S. Fish and Wildlife Service), 2008), Kemp's ridley (NMFS (National Marine Fisheries Service) *et al.*, 2011), green (NMFS (National Marine Fisheries Service) & U.S. FWS (U. S. Fish Wildlife Service), 1991), and leatherback (NMFS (National Marine Fisheries Service) & U.S. FWS (U.S. Fish and Wildlife Service), 1992).

4.1.1.1 Sea Turtle Presence in the Action Area

Based on our professional judgment and experience with other section 7 consultations conducted in the Chesapeake Bay, we conclude that sea turtles are unlikely to be present in the action area on any given day, and that any presence, if it occurred, would be infrequent, transient, and of short duration. This conclusion is supported by the following factors, and by the absence of any documented sea turtle sightings, strandings, or telemetry detections in the immediate vicinity of the Bay Bridge - an absence that would be unexpected if turtles regularly used this specific location.

Figure 2. Important habitat (orange) for (a) the Kemp's ridley random pseudo-absence model and (b) the loggerhead target group absence model. Blue areas were modeled areas that were not classified as important (from DiMatteo *et al*. 2022)



The action area lies at or near the northernmost extent of regularly used and modelled sea turtle habitat within the Chesapeake Bay (Figure 2). Habitat suitability modeling using satellite telemetry (DiMatteo *et al*. 2022) predicts Kemp's ridley foraging habitat concentrated in the southwestern Bay, tidal rivers, and shallow coastal areas well south of the Bay Bridge, with "almost no important habitat" identified anywhere in Maryland waters of Chesapeake Bay. This pattern is corroborated by stranding records from 2008-2012: of 224 documented Kemp's ridley strandings in the Bay, none occurred north of latitude 38.8° N (DiMatteo *et al*. 2022,

citing Barco *et al*. 2015) - the action area, at approximately 38.99° N, lies north of this documented range entirely. Loggerhead foraging habitat, while extending somewhat farther north, remains concentrated in the deeper central and southern Bay (DiMatteo *et al*. 2022; Barco *et al*. 2018a). Aerial line-transect surveys similarly found consistently lower sea turtle density in the northern Bay stratum encompassing the action area than in the southern Bay, and fall (September–October) encounter rates in the Bay were too low to support density or abundance estimates at all, regardless of survey effort or availability corrections (Barco *et al.* 2018a).

The modelling results from DiMatteo *et al*. (2022) are further supported by the salinity of the action area. The Chesapeake Bay at the Bridge is mesohaline, with salinity of 5 to 18 parts per thousand. The marine prey base for all four species - mollusks, crustaceans, sea grasses, and gelatinous zooplankton - becomes less abundant as salinity decreases, making the action area comparatively poor foraging habitat relative to the higher-salinity waters to the south where turtles are known to concentrate.

Considered together, these factors support our determination that sea turtle occurrence in the action area, when it happens at all, is a rare, transient, opportunistic event rather than indication of sustained use. The stressor-specific analyses that follow are structured accordingly: each first notes that the probability of an individual turtle being present at a given place and time in the action area is low, and each then addresses, as a separate, secondary basis for the NLAA determination, what would be expected even in the unlikely event that a turtle was present.

4.1.1.2 Effects of the Proposed Action on Sea Turtles

As stated above, leatherback, green, Kemp's ridley, and loggerhead sea turtles are unlikely to be present in the action area on any given day, and any presence would be infrequent, transient, and of short duration. Although sea turtles are not expected to be present in the action area during in-water construction and demolition activities carried out from May through November, the implementation of BMPs (soft starts, bubble curtains, acoustic deterrents, observers) makes exposure to stressors unlikely. Nevertheless, to comprehensively assess potential impacts, the following sections evaluate pile driving, dredging, turbidity, vessel traffic, habitat modification, and blasting in the unlikely event that sea turtles are present in the action area while in-water activities are occurring.

Pile Driving and Removal

Noise created by pile driving and removal activities can physically injure animals or change animal behavior. NMFS has established thresholds, based on the best available scientific information, for when the onset of auditory injury from exposure to impulsive noise sources and for when behavioral responses to non-explosive noises are anticipated[8]. The onset of auditory injury thresholds considers peak noise (i.e., instantaneous exposure) and cumulative noise (i.e., cumulative sound exposure level (SELcum or cSEL), the accumulation of energy over time). For sea turtles, exposure to impulsive (e.g., impact pile driving) underwater noise levels of 230

[8] https://www.fisheries.noaa.gov/s3/2025-09/ESA-AllSpeciesThresholdSummary-2025-508-OPR1-9.16.25-.pdf

dB Peak, is expected to result in the onset of acoustic injury. The SELcum is not an instantaneous maximum noise level but represents a measure of the accumulated energy over a specific period of time (e.g., typically, a 12 or 24 hour period, within which multiple noise events may take place); for sea turtles, this threshold is 184 dB for impulsive noise sources (e.g., impact pile driving) and 198 dB for non-impulsive sources (e.g., vibratory pile driving). Noise can also interfere with an animal's behavior; behavioral effects, such as avoidance or disruption of foraging activities, may occur in sea turtles exposed to noise (non-explosives) around 175 dB RMS. Here, we consider the potential for sea turtles in the action area to be exposed to noise above these thresholds during pile driving.

Pile driving for construction of the first span and its pier protection is expected to occur for approximately 120 days during year 1 through year 3 of construction. Pile driving for construction of the second span and its pier protection is expected to occur for approximately 138 days during year 7 through year 12 of construction. In addition, piles will be driven to install mooring piles and construct a temporary trestle for project-related vessel access in waters less than 3 m (10 ft) deep below MLW. Based on the Francis Scott Key Bridge Rebuild Project design, the MDTA assumes trestle piers will be constructed every 11.6 m (38 ft) supported on 36-inch steel pipe piles. The mooring piles, trestle, and supporting piles will be removed after the project's completion. Pile driving will not happen on a daily basis and, when it occurs, FHWA and MDTA have committed to no more than 12 hours of pile driving per day.

Table 5. Estimated Distances to Sea Turtle Auditory Injury and Behavioral Disturbance Thresholds

Type of Pile	**Hammer Type**	**Distance (ft) to 230 dB_{Peak}**	**Distance (ft) to SEL_{cum} threshold (184 dB Impact / 198 dB Vibratory)**	**Distance (ft) to Behavioral Disturbance Threshold (175 dB_{RMS})**
36" Square Concrete	Impact	0.1	519.5	8.2
36" Steel Pipe	Impact	0.3	7,061.8	112.0
	Vibratory	N/A	193.7	7.1
48" Steel Pipe	Impact	0.5	3,821.6	96.1
	Vibratory	N/A	417.3**	15.2**
48" Steel Pipe (60" Steel Pipe Proxy)*	Impact	0.3	9,599.5	152.3
	Vibratory	N/A	417.3**	15.2**
96" Steel Pipe	Impact	1.5	28,069.2	706.8

Type of Pile	Hammer Type	Distance (ft) to 230 dB_{Peak}	Distance (ft) to SEL_{cum} threshold (184 dB Impact / 198 dB Vibratory)	Distance (ft) to Behavioral Disturbance Threshold (175 dB_{RMS})
	Vibratory	N/A	417.3**	15.2**
14" H-Pile	Impact	0.5	6,056.9	96.1
	Vibratory	N/A	9.0	0.3
AZ Sheet Pile	Impact	0.3	9,599.5	152.3
	Vibratory	N/A	89.9	3.3

The best available scientific information (Accomando *et al*. 2025) indicates that exposure to underwater noise levels at or above of 230 dB peak (for impulsive sounds), and at or above 184 dB SELcum (24 hours; impulsive sounds) and 198 dB SELcum (24 hours; non-impulsive sounds) can result in auditory injury to sea turtles. These noise levels refer to the maximum instantaneous sound pressure in water and the cumulative sound exposure level, respectively, expressed in decibels.

We note that the BA states it is possible that multiple pile sizes could be driven simultaneously, resulting in overlapping isopleths and a larger overall ensonified area than would result from a single pile being driven (BA at 5-6, 5-7). The BA does not commit to a specific concurrent pile-driving scenario, and the NMFS Multi-Species Pile Driving Calculator used in this analysis evaluates one pile at a time. Accordingly, our peak and RMS isopleth distances, which are governed by the loudest single source, remain a defensible outer bound even under concurrent driving. However, our SELcum calculations, which depend on total accumulated energy, do not account for the additive contribution of multiple simultaneously active piles and may underestimate the cumulative isopleth in any area where multiple pile-driving rigs are operating concurrently. The BMPs FWHA and MDTA committed to include the development of an underwater noise monitoring plan to describe the underwater noise generated by project activities and adaptive management measures to address the underwater noise. We will coordinate with FHWA and MDTA during the development of the plan, but also acknowledge that this consultation may need to be reinitiated if the final plan includes concurrent pile driving that appears to exceed our estimated effects.

For sea turtles, the distance to the 230 dB peak threshold is predicted to be 0.1 to 1.5 feet, depending on pile type (see Table 5); this means that to experience auditory injury a sea turtle would need to be within 0.46 m (0.1 to 1.5 feet) of a pile being installed with an impact hammer. Even considering a single pile strike, exposure to noise above 230 dB peak is extremely unlikely

to occur because pile driving will begin with a "soft start" where a reduced hammer energy is used. Underwater noise is not expected to exceed the 230 dB peak threshold during the soft-start period but is expected to be loud enough that sea turtles would begin swimming away from the noise source. By initiating impact pile driving with a localized, low-energy source (three 3-strike sequences at 40 percent of full power), the procedure provides a behavioral warning mechanism. This sub-lethal acoustic stimulus is expected to provoke an immediate avoidance response, allowing sea turtles to actively swim away from the sound source and avoid the immediate vicinity before sound pressure levels ramp up to full operational energy, which prevents exposure to acoustic thresholds that could result in injury. Presumably, the soft start is loud enough to be above the behavioral threshold, but below the threshold to cause injury and any sea turtles in the area would avoid the sound source before they are exposed to "full strength" pile driving. As such, sea turtles are extremely unlikely to be within 0.46 m (1.5 feet) of the pile when the soft start ends and full energy pile driving begins as any sea turtles that close to the pile would have already moved away.

Sea turtles are expected to avoid areas where noise is above 175 dB RMS behavioral threshold, which in all cases, is an area significantly larger than the area where noise would exceed the peak injury threshold (e.g., for the 96-inch steel pipe piles it extends over 213.4 m (700 ft) from the pile). As such, after impact driving begins, we expect sea turtles would be deterred from the area by the noise and would not approach to within a close enough distance to be exposed to noise above the peak threshold. Therefore, exposure to noise above the peak injury threshold is extremely unlikely to occur.

The calculations to establish the distance to the cumulative noise thresholds for impact and vibratory pile driving considered pile installation over a full day, with up to 12 hours of pile driving; thus, it considers the installation of multiple piles in a day. To be exposed to noise above the cumulative injury threshold, a sea turtle would need to remain within approximately 2.7 m to 8,534.4 m (9 to 28,000 ft) or approximately 8.5 km (5 mi) of all piles installed in a 24-hour period. As outlined in Table 6, for nearly all pile types, while the calculated SELcum isopleth exceeds the behavioral isopleth in all pile installation scenarios (Table 6), we still do not expect that a sea turtle would remain close enough to any piles being installed for the full duration of pile driving in a day. This is because sea turtles in the action area are transient and highly mobile; therefore, they are not expected to remain in any particular area for more than a few minutes to a few hours. Telemetry and distributional studies summarized elsewhere in this Opinion (DiMatteo *et al*. 2020; Barco *et al*. 2017) describe home ranges and movement patterns for sea turtles in the Bay that are outside of, and not concentrated within, the area ensonified above the cumulative threshold. Because turtles move through - rather than remain stationary - within a given area of the Bay, including the action area, the SELcum metric, which assumes continuous exposure at a fixed location for the full averaging period, overstates the exposure any single transiting individual would actually accumulate over 12 hours. Sea turtle swim speeds vary significantly depending on life stage, but average cruising speeds are estimated to hover around 0.5 m/s to 0.7 m/s (1.6 ft/s to 2.3 ft/s) (Kinoshita *et al*. 2021). With the implementation

of a soft start, it would take approximately 20 minutes for the hammer to reach full energy during the installation of the largest piles considered (96-inch piles). Therefore, once the soft start begins, a sea turtle would be expected to exit the area ensonified above the 175 dB RMS behavioral threshold (up to 215.4 m (706.8 ft) from the pile) during the first 20 minutes and before the hammer reaches full power. This swim-speed calculation demonstrates that an individual sea turtle would not remain within the behavioral disturbance isopleth for the full 12-hour working day; however, it does not by itself demonstrate that a turtle would exit the much larger area within which the cumulative (SELcum) injury threshold could be exceeded (up to approximately 8.5 km (5 mi) in diameter, discussed above). Our conclusion regarding the cumulative threshold rests on the unlikely presence of sea turtles near the Bridge. Furthermore, should a sea turtle enter the area, the implementation of BMPs—coupled with the species' transient, wide-ranging movements in the Bay—ensures that potential effects are extremely unlikely to occur. As a result, sea turtles are not likely to be adversely affected.

The avoidance response itself - increased swim speed and directional movement away from the noise source - imposes a minor, short-duration energetic cost that is well within the normal swim capacity of sea turtles. At the speeds used in the exit-time calculation above (0.5 to 0.7 m/s (1.6 ft/s to 2.3 ft/s)), this is not a forced or maximal-effort swim and considering the relatively small distance an individual would need to swim to avoid noise above the 175 dB threshold (no more than 215.4 m (706.8 ft)), this response would be limited to a very short period of time (less than 10 minutes). We also consider the temporary loss of access to foraging habitat within the ensonified area for the duration of active pile driving. Given the 12-hour daily working limit, any individual displaced during active driving is expected to regain access to the area during the intervening rest period, limiting the foraging loss associated with any single event to a period of hours.

Because pile driving for this project will recur intermittently over 258 days across a multi-year construction schedule, we also considered whether repeated, intermittent displacement could impose a cumulative energetic or nutritional cost distinct from any single avoidance event. Based on our best professional judgement, sea turtles seasonally occupying the Chesapeake Bay are unlikely to occur in the area ensonified by pile-driving. This conclusion is supported by our prior section 7 consultations in this part of the Bay, and by the absence of any documented sea turtle sightings, strandings, or telemetry detections in the immediate vicinity of the Bay Bridge — an absence that would be unexpected if turtles regularly used this specific location. In addition, according to studies by Barco *et al*. (2017, 2018b) and DiMatteo *et al*. (2022) the Bay supports a broad foraging range for the species present, and availability of alternative foraging habitat outside the ensonified area during active pile driving reduces the likelihood that repeated displacement, if it were to occur, would result in a measurable reduction in individual foraging success, growth, or reproductive fitness over the course of a season. While no population or individual-level data specific to Chesapeake Bay sea turtles are available to quantify this further, our conclusion is based on the temporal and spatial limits on exposure described elsewhere in this section, and consistent with the general finding that the magnitude of any energetic

consequence of displacement depends on its temporal and spatial scale which in this case is very small in space and time.

Based on this analysis, the implementation of BMPs and the unlikely occurrence of sea turtles in the action area make exposure to elevated pile driving noise extremely unlikely to occur. Therefore, potential behavioral effects resulting from increased underwater noise associated with pile installation are discountable. As such, effects of exposure to pile driving will not impact any individual sea turtle's ability to carry out any essential behaviors such as resting, foraging or migrating and/or affect the fitness of any individuals.

Dredging

Mechanical dredging entails lowering the open bucket or clamshell through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge. The bucket operates without suction or hydraulic intake, moves relatively slowly through the water column and affects only a small area of the aquatic bottom at any time. In order to be captured in a dredge bucket, an animal must be on the bottom directly below the dredge bucket as it contacts the substrate and remain stationary as the bucket closes. Species captured in dredge buckets can be injured or killed if entrapped in the bucket or buried in sediment during dredging and/or when sediment is deposited into the dredge scow. Species captured and emptied out of the bucket can suffer stress or injury, which can lead to mortality.

Sea turtles are not known to be vulnerable to entrapment in mechanical dredges (Dickerson *et al*. (1998, 2004, 2019)), presumably because they are able to avoid the dredge bucket. As described above, sea turtles are unlikely to occur in the action area. Furthermore, should a sea turtle be present at the dredge site, direct capture in the mechanical dredge bucket or injury/mortality resulting from dredging operations is extremely unlikely; therefore, potential effects are discountable. Based on this information, the likelihood of an interaction between a sea turtle and the mechanical dredge is extremely unlikely. Therefore, effects to sea turtles from mechanical dredging activities described as part of the proposed action are extremely unlikely to occur and are discountable.

Turbidity

In-water construction, demolition, dredging activities, geotechnical borings, and removal of temporary piles and cofferdams will generate localized, temporary increases in suspended sediment and turbidity in the action area. As described in Section 6.3.2, mechanical dredging is expected to produce TSS concentrations of up to approximately 445 mg/L near the bottom, with plumes dissipating to background levels within approximately 732 m (2,400 ft) of the dredge location. Pile driving and removal are expected to produce more localized and lower-magnitude increases, on the order of 5.0 to 10.0 mg/L above background within approximately 91 m (300 ft) of the pile being driven. Blasting is expected to generate short-duration TSS concentrations of approximately 350 to 600 mg/L, persisting for less than 30 minutes following each event. These are the same turbidity source terms and spatial extents used to assess effects to sturgeon

elsewhere in this Opinion (Section 6.3), and we rely on them here as the best available estimate of the turbidity conditions to which sea turtles could be exposed.

There are no directed studies quantifying the physiological effects of suspended sediment on sea turtles. However, unlike fish, sea turtles do not rely on gills for respiration, so the primary pathway by which elevated TSS causes physiological harm in fish - impaired oxygen uptake across the gill surface - is not applicable. Sea turtles are highly mobile, air-breathing, and capable of readily traversing zones of elevated turbidity without becoming trapped in the sediment plume itself, unlike more sedentary or substrate-associated organisms. Given this, the primary route by which turbidity could affect sea turtles is behavioral: a plume dense enough to obscure vision or create a perceived barrier could cause a sea turtle to alter its course, delaying or redirecting movement rather than causing direct injury.

Applying the TSS levels and spatial extents described above, we expect any turbidity-related avoidance behavior by sea turtles to be limited to the localized areas immediately surrounding active dredging (within approximately 732 m (2,400 ft)), pile installation and removal (within approximately 91 m (300 ft)), and individual blast events (for less than 30 minutes post-detonation). These areas represent a small fraction of the total action area and of the width of the Chesapeake Bay at the Bay Bridge crossing (approximately 7.2 km (4.5 mi)), leaving sea turtles ample unaffected water column through which to continue migrating or foraging while avoiding the immediate plume. Because sea turtles are transient in the action area and are not expected to hold station within these localized zones, we expect any behavioral modification to consist of, at most, a brief course adjustment around the plume rather than a sustained avoidance of the action area or a barrier to movement through it.

Based on this information, we expect the effects of re-suspended sediment on sea turtles resulting from in-water construction, demolition, dredging, and removal of temporary piles and cofferdams when added to baseline conditions, to be limited to brief, localized behavioral adjustments that do not rise to the level of a barrier to normal behavior. These effects are too small to be meaningfully measured, evaluated, or detected and are, therefore, insignificant.

Vessel Traffic

Vessel strikes are a known source of injury and mortality for sea turtles. Increased vessel activity in the action area associated with the construction and demolition activities of the proposed action would pose a theoretical risk of increased collision-related injury and mortality for sea turtles. In general, sea turtles are vulnerable to a range of vessel types and speeds depending on the environment. Sea turtle collision risk is thought to be at least in part commensurate with vessel speed (Hazel *et al*. 2007; Shimada *et al.* 2017). Hazel *et al*. (2007) found that green sea turtles were unlikely to actively avoid vessels traveling faster than 4 km/h (2.1 kts), indicating that 18.5 km/h (10 kts) speed restrictions may not be protective for this and potentially other sea turtle species.

Based on our best professional judgement, sea turtles seasonally occupying the Chesapeake Bay are not likely to occur in the navigation channel between the Bay Bridge and the Port of Baltimore or the immediate project area where vessels will operate. The Bay Bridge is located at the northern extent of their range and we consider the Port of Baltimore – approximately 30.6 km (19 m) north – to be outside of their range. This conclusion is supported by our prior section 7 consultations in this part of the Bay, and by the absence of any documented sea turtle sightings, strandings, or telemetry detections in the immediate vicinity of the Bay Bridge, the Federal Navigation Channel, and the Port of Baltimore - an absence that would be unexpected if turtles regularly used this specific location. As described above, sea turtles are unlikely to occur in the action area; however, as detailed below, if a sea turtle were to be present at the project site or the navigation channel, the risk of a vessel strike would be extremely unlikely.

According to the BA, the approximate size and type of vessel, travel routes, and number of trips is currently unknown. Therefore, to analyze the risk of vessel interactions, we found it necessary to develop a proxy involving similar deep-water foundation installation and demolition. We identified the following projects as potential proxies for project-related vessel traffic in the action area for the Bay Crossing Project:

- The Hampton Roads Bridge-Tunnel (HRBT) Expansion Project: A relevant, multi-year estuarine bridge project with dense vessel traffic in sea turtle foraging habitat.
- The Governor Harry W. Nice/Senator Thomas "Mac" Middleton Memorial Bridge Replacement: A localized Maryland project (Potomac River) involving large-diameter piles and extensive barge/tug traffic.

Our analytical framework draws from the construction and demolition parameters of the Governor Mario M. Cuomo Bridge and the Hampton Roads Bridge-Tunnel Expansion projects to classify potential traffic into the following three distinct operational tiers based on vessel displacement and transit velocity:

- Tier 1: Heavy-Displacement / Slow-Moving Construction Vessels
    - Proxy Specs: Crane/derrick barges, material transport barges (45.7-91.4 m (150–300 ft) in length), and attendant ocean-going or coastal tugboats (18.3-30.5 m (60–100 ft)).
    - Operational Character: Highly predictable, slow-moving (4–6 kts), deep drafts.

- Tier 2: Medium-Displacement Support & Service Craft
    - Proxy Specs: Anchor-handling boats, dive support vessels, and fuel/water barges (12.2-24.4 m (40–80 ft)).
    - Operational Character: Moderate speeds (8–12 kts), operating dynamically around the bridge structures.

- Tier 3: Light-Displacement / High-Speed Crew Transfer Vessels

- Proxy Specs: Rigid-hull inflatable boats (RHIBs), center-consoles, or small commercial vessels (6.1-12.2 m (20–40 feet)).

Operational Character: Highly mobile, frequent transits, traveling at planing speeds (>15–20 kts). Operation at planing speeds (>15–20 kts) is limited to documented safety exemptions (e.g., emergency response, adverse weather requiring expedited transit) and is not representative of routine daily operations.

For purposes of this analysis, spatial and temporal routing assumes low-displacement, high-speed crew transfer vessels will frequently traverse the shoals flanking the bridge spans during peak summer foraging months (June–September), as well as the following:

- The Channel-to-Shoal Transit: Assume that all larger vessels (Tiers 1 & 2) will originate from major industrial staging areas (e.g., the Port of Baltimore) and utilize the 50-foot Federal Navigation Channel to reach the bridge.
- The Shallow Zone Assumption: Assume that all vessels, particularly Tier 3 crew transfer vessels, will routinely transit outside the main navigation channel, crossing the shallow shoals and flats (< 9.1 m (30 ft)) flanking Sandy Point and Kent Island to access the shallow-water bridge bents.

Although, based on our best professional judgement, sea turtles are not expected to be present in the action area, this section will address the effects of vessel traffic in the unlikely event of sea turtles co-occurring with vessels in the action area. By analyzing the maximum anticipated daily transits, we ensure that the subsequent risk determination encompasses the highest potential exposure scenario in the unlikely event that sea turtles occur within the action area:

- Tier 1 (Barges/Tugs): Up to 4 round-trips per day (material deliveries or transport of dredge material).
- Tier 2 (Support Craft): Up to 10 round-trips per day (equipment and safety monitoring).
- Tier 3 (Crew Boats): Up to 30 round-trips per day (shift changes, inspector transits, and courier runs).
- Total Project Fleet Estimate: up to 44 round-trips (88 linear transits) per day within the action area.

In the unlikely event that a sea turtle is present within the action area, project-related vessels would pose a potential collision risk. In areas where high densities of sea turtles aggregate, including parts of Chesapeake Bay south of the action area, vessel-animal collisions are a measurable and increasing source of mortality and injury for sea turtles; the percentage of stranded loggerhead sea turtles with injuries that were apparently caused by vessel strikes increased from approximately 10 percent in the 1980s to over 20 percent in 2004, although some stranded turtles may have been struck post-mortem (NMFS and USFWS 2008). Sea turtles are expected to be most vulnerable to vessel strikes in coastal foraging areas and may not be able to

avoid collisions when vessel speeds exceed 1 m/s (2 kts) (Hazel *et al.* 2007). The recovery plan for loggerhead sea turtles (NMFS and USFWS 2008) notes that, from 1997 to 2005, 14.9 percent of all stranded loggerheads in the U.S. Atlantic and Gulf of Mexico were documented as having some type of propeller or collision injuries, although it is not known what proportion of these injuries occurred before or after the turtle died.

Vessels traveling at higher speeds pose a higher risk to sea turtles relative to other species, like marine mammals; sea turtles require more stringent speed reductions before lethal injury probabilities are reduced. To reduce the risk of lethal injury to loggerhead sea turtles from vessel strikes by 50 percent, Sapp (2010) found that small vessels (3 to 6 m (10 to 30 ft) in length) had to slow down to 3.9 m/s (7.5 kts); the probability of lethal injury decreased by 60 percent for vessels idling at 2.1 m/s (4 kts). Foley *et al*. (2008) further indicated that vessel speed greater than 2.1 m/s (4 kts) may cause serious injury or mortality to sea turtles. The most informative study of the relationship between ship speed and collision risk was conducted on green sea turtles (Hazel *et al.* 2007). Green sea turtles often failed to flee approaching vessels. Hazel *et al*. (2007) concluded that green sea turtles rarely fled when encountering fast vessels (greater than 5 m/s (10 kts)), infrequently fled when encountering vessels at moderate speeds of around 3.1 m/s (6 kts), and frequently fled when encountering vessels at slow speeds of approximately 1 m/s (2 kts). Based on the observed responses of green sea turtles to approaching boats, Hazel *et al*. (2007) further concluded that sea turtles rely primarily on vision rather than hearing to avoid vessels; although both may play a role in eliciting responses, sea turtles may habituate to vessel sound and be more likely to respond to the sight of a vessel rather than the sound of a vessel. The potential for collisions between vessels and sea turtles, thus, increases at night and during inclement weather. Based on these findings, vessel speed restrictions may be inconsequential to reducing strike risk at anything but the slowest speeds (less than 1 m/s (2 kts)) due to the relatively low rate of flee responses of sea turtles.

Compared to the baseline of approximately 34,302 annual vessel transits in the upper Chesapeake Bay and Federal Navigation Channel, project vessels represent a small fraction of overall vessel activity in the action area, distributed across an approximately 15-year construction and demolition program rather than concentrated in a single season. There are limited measures that prove to be effective at reducing collisions between sea turtles and vessels (Schoeman *et al.* 2020). The relatively small size of turtles and the significant time spent below the surface makes their observation by vessel operators extremely difficult, which reduces the effectiveness of trained observers to mitigate vessel strike risk on sea turtles. Nevertheless, the use of trained lookouts would serve to reduce potential collisions. In addition to the observers, strike avoidance measures that are specifically geared towards sea turtles include:

- Do not moor vessels in SAV or in such a way that could shade SAV.
- Enforcement of reduced construction vessel speeds (e.g., below 18.5 km/h (10 kts)).
- Keeping appropriate distance from protected species if spotted.

Although vessel strike risk to sea turtles is expected to be reduced with the application of monitoring and mitigation measures, some unavoidable effects on sea turtles may occur, primarily due to the difficulty in detecting sea turtles. Though vessel speed restrictions are designed primarily to reduce impact to marine mammals, they would also reduce potential impacts to sea turtles. However, sea turtle collisions may still occur at slow speeds, and individuals would still be vulnerable when vessels travel over 1 m/s (2 kts). Additionally, effective detection of sea turtles in low visibility conditions (nighttime, fog, inclement weather) is likely low, even with the application of alternative monitoring technologies, thereby increasing the vulnerability of sea turtles to vessel strike risk during these periods, even with all other mitigative measures implemented.

We recognize that project-related vessel activity, estimated at up to 44 round-trips (88 linear transits) per day on peak activity days and approximately 27,500 total transits over the ~15-year construction and demolition schedule, represents a measurable increase over the approximately 34,300 annual baseline transits in the upper Bay and Federal Navigation Channel - on the order of a 5 percent increase in some years, concentrated on active construction days rather than distributed evenly across the year. However, because the primary determinant of strike risk is the probability that a sea turtle and a vessel occupy the same location at the same time, and because we have concluded that sea turtles are unlikely to be present in the action area (Section 4.1.1.1), in addition to the mitigation measures described above, we conclude that the risk of a vessel strike associated with the project is extremely unlikely to occur, and discountable.

Habitat Modification

Sea turtle species could potentially be affected by geotechnical borings, in-water construction, demolition, and dredging activities in the unlikely event they occur in the action area (generally during the peak warmer months of June to October). Their presence in the Bay would most likely be where suitable forage (e.g., benthic invertebrates such as mollusks and crustaceans) and appropriate habitat conditions are present (e.g., depth, temperature, salinity). Preferred foraging habitat for Kemp's ridley turtles was identified in the southwestern corner of Chesapeake Bay, the James and York rivers, and several other nearshore locations, though there was extensive variation in home range size and location among individuals (DiMatteo *et al*. 2020). Loggerhead foraging habitat was found primarily in the center of the Bay, into the waters of southern Maryland, with some additional habitat closer to shore (Barco *et al.* 2017). Like Kemp's ridleys, there was extensive variation in the size and location of individual home ranges. Due to this variation, the mobility of sea turtles, the absence of physical barriers, and the presence suitable habitat features (temperature, salinity, and bathymetry), sea turtles may be opportunistically foraging within the action area. The physical disturbance of sediments and entrainment of associated benthic resources could reduce the availability of sea turtle prey, but the impacted benthic habitat represents a minimal amount of the available habitat in the region, and recolonization of the opportunistic benthic species would occur quickly (Blake *et al*. 1996, Van Dolah *et al*. 1992), making these localized impacts to sea turtle habitat and prey too small to be meaningfully measured, detected, or evaluated and, therefore, insignificant.

Blasting

As stated above, sea turtles are unlikely to be present in the action area on any given day, and any presence would be infrequent, transient, and of short duration. They are even less likely to occur as water temperatures cool in the fall. Although sea turtles are not expected to be present in the action area during blasting, the use of acoustic deterrents and protected species observers makes exposure to blasting extremely unlikely. Nevertheless, to comprehensively assess potential impacts, this section will address the effects of blasting in the unlikely event of sea turtles co-occurring with blasting operations in the action area. Limited data is available regarding impacts of blasting on sea turtles, though some studies have demonstrated that blasting can result in mortality to sea turtles. The likelihood of nonlethal damage or delayed mortality in sea turtles resulting from blasting is unknown (Keevin and Hempen 1997).

Any required blasting will occur between October 1 and December 15, a window selected to reduce, though not fully eliminate, overlap with the period of peak sea turtle abundance in the Chesapeake Bay (June through October). The blasting window necessarily begins during the tail end of that peak period; the rationale for why this overlap does not meaningfully increase risk is addressed in the discussion that follows.

First, sea turtle abundance in the Chesapeake Bay declines sharply after the summer peak. The BA documents that adult and juvenile sea turtles are present from May through the end of November; with highest concentrations from June through October. Sea turtles cannot survive in Chesapeake Bay when water temperatures fall below 18°C–20°C (64.4°F-68°F) (typically October to November). Because the Upper Bay cools rapidly in early autumn, any turtle lingering there is at extreme risk of becoming "cold-stunned" and stranded. Therefore, by October, animals are actively migrating south and out of the Bay in response to declining water temperatures. The absence of sea turtles in the action area is supported by aerial line-transect surveys in the region. Barco *et al*. (2018a) found consistently lower sea turtle density in the northern Bay stratum encompassing the action area than in the southern Bay, and fall (September–October) encounter rates in the Bay were too low to support density or abundance estimates at all, regardless of survey effort or availability corrections. While we do not assert that no turtles remain in the Bay in October, the best available survey data indicate that detectable presence drops sharply entering the blasting window, rather than opening during a period of peak abundance.

Second, even accounting for the low baseline probability of sea turtles occurring in the action area, exposure to injurious blast pressure requires an extraordinary degree of spatial and temporal overlap. To experience injurious overpressure, an individual would need to be positioned within the immediate vicinity of a specific pier - the Mortality Zone extends only 65.5–67 m (215–220 ft), and the Exclusion Zone extends 640 m (2,100 ft) - at the exact instant of detonation during one of only 34 total discrete blast events (distributed across two non-consecutive construction years). The probability of such exposure occurring depends on two compounding conditions: (1) the low likelihood of an individual being present in the action area on a given day; and (2) the further requirement that, if present, the turtle be positioned within this narrow footprint at the exact millisecond of a blast. Given the transient, wide-ranging movement patterns of sea turtles

and the brief, localized nature of each detonation, the chance of this precise spatial and temporal alignment is extremely remote.

Third, protected species observers will monitor the Exclusion Zone for sea turtles (and other listed species) prior to and during each blast event as part of the blast monitoring protocol described in the RPMs/Terms and Conditions, which provides an additional means of confirming the absence of turtles before detonation. In addition, the same avoidance and minimization measures described in Section 3 to reduce sturgeon exposure - pre-blast fish deterrent sonar sweeps and fish scare charges detonated 15 to 30 seconds ahead of the main blast - will be deployed in the water column immediately prior to each blast event. While these measures were designed and tested with fish species, sea turtles are known to be sensitive to underwater impulsive noise and are reasonably expected to respond similarly to pre-blast deterrent activity by moving away from the immediate blast area, providing an additional, though non-quantified, reduction in exposure risk.

Taken together, these factors—the unlikely baseline presence of sea turtles, a blasting schedule aligned with the declining edge of seasonal presence, the action area's position at the periphery of regularly used habitat, the localized spatial footprint of potential injury, the small number of discrete blast events, and the implementation of pre-blast deterrents—demonstrate that physical exposure resulting in injury or mortality is extremely unlikely to occur.

With respect to potential behavioral disruption, the pre-blast fish deterrent sonar sweeps and scare charges are brief and localized, operating for only 15 to 30 seconds immediately preceding each of the 34 discrete detonations rather than continuously over extended periods. Given that sea turtles are unlikely to occur in the action area initially, combined with the transient mobility of individuals and the brief, localized nature of both the deterrents and the detonations, the probability of a sea turtle encountering these stressors and experiencing a detectable behavioral response is extremely remote.

Because exposure leading to injury, mortality, or behavioral disruption is extremely unlikely to occur, we conclude that the effects of blasting on leatherback, Kemp's ridley, the Northwest Atlantic DPS of loggerhead, and the North Atlantic DPS of green sea turtles are discountable.

Non-blasting demolition

Physical strike and debris. Demolition rubble from mechanical removal of piers and pile bents will drop to the Bay bottom in the immediate vicinity of each structure. After reviewing the best available information, as discussed above, it is our professional opinion that the possibility of encountering a sea turtle during non-blasting demolition is extremely unlikely. Although sea turtles are not expected to be present in the action area, the use of protected species observers on project-related vessels makes exposure to falling debris extremely unlikely. Therefore, we anticipate the likelihood of a sea turtle being struck by falling demolition debris to be extremely unlikely, and discountable.

Turbidity. See turbidity analysis above; the conclusion reached there (insignificant, discountable effects) applies equally to turbidity generated by non-blasting demolition activities.

Vessel traffic. Vessel activity associated with mechanical demolition at each of the 206 mechanically demolished structures is encompassed within the project's overall vessel traffic analysis above including the density and duration-based rationale developed there, and does not represent an additional, separately quantified source of vessel-strike risk to sea turtles.

For the reasons discussed above, non-blasting demolition activities are not expected to cause effects on sea turtles that can be meaningfully measured, detected, or evaluated, and are, therefore, insignificant. The risk of direct physical strike is discountable.

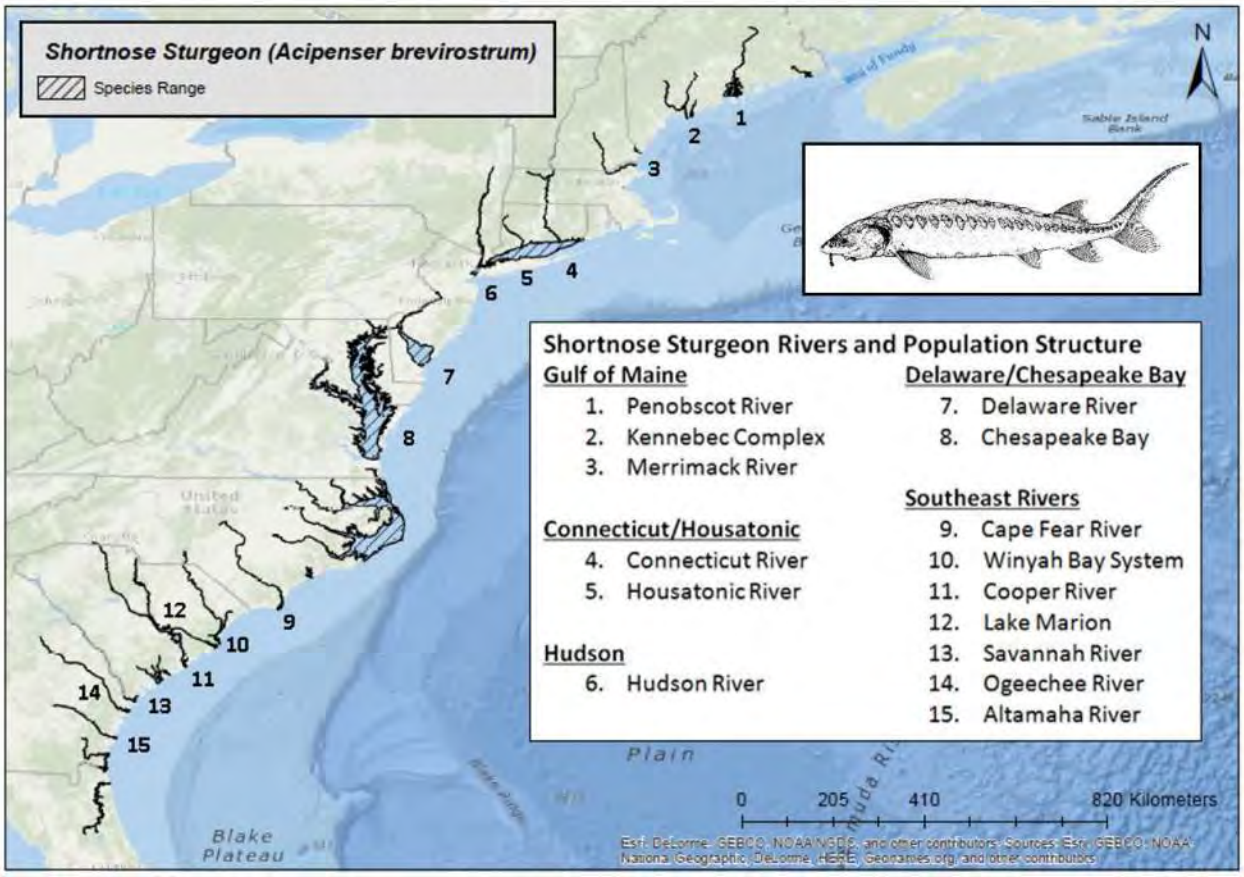
4.2 Listed Species Likely to be Adversely Affected by the Proposed Action

This section will focus on the status of the species of shortnose and Atlantic sturgeon (all 5 DPSs), summarizing information necessary to establish the environmental baseline and to assess the effects of the proposed action.

4.2.1 Shortnose Sturgeon

Shortnose sturgeon are fish that occur in rivers and estuaries along the East Coast of the U.S. and Canada (SSSRT (Shortnose Sturgeon Status Review Team), 2010). They have a head covered in bony plates, as well as protective armor called scutes extending from the base of the skull to the caudal peduncle. Other distinctive features include a subterminal, protractile tube-like mouth, and chemosensory barbels for benthic foraging (SSSRT (Shortnose Sturgeon Status Review Team), 2010). Sturgeon have been present in North America since the Upper Cretaceous period, more than 66 million years ago. More thorough discussions can be found in the cited references as well as the SSSRT's Biological Assessment (2010). The information below is a summary of available information on the species. Detailed information on the populations that occur in the action area is provided below while details on activities that impact individual shortnose sturgeon in the action area can be found in *Environmental Baseline* section.

Figure 3. Geographic range of shortnose sturgeon



4.2.1.1 Life History and General Habitat Use

There are differences in life history, behavior and habitat use across the range of the species. Current research indicates that these differences are adaptations to unique features of the rivers where these populations occur. For example, there are differences in larval dispersal patterns in the Connecticut River (MA) and Savannah River (GA) (Parker, 2007). There are also morphological and behavioral differences. Growth and maturation occur more quickly in southern rivers but fish in northern rivers grow larger and live longer. See Table 6 for shortnose sturgeon general life history attributes.

Table 6. General Life History Summary for Shortnose Sturgeon (range-wide)

Stage	Size (mm)	Duration	Behaviors/Habitat Used
Egg	3-4	13 days post spawn	stationary on bottom; Cobble and rock, fresh, fast flowing water
Yolk Sac Larvae	7-15	8-12 days post hatch	Photonegative; swim up and drift behavior; form aggregations with other YSL; Cobble and rock, stay at bottom near spawning site
Post Yolk Sac Larvae	15 – 57	12-40 days post hatch	Free swimming; feeding; Silt bottom, deep channel; fresh water
Young of Year	57 – 140 (north); 57-300 (south)	From 40 days post-hatch to one year	Deep, muddy areas upstream of the saltwedge
Juvenile	140 to 450-550 (north); 300 to 450-550 (south)	1 year to maturation	Increasing salinity tolerance with age; same habitat patterns as adults
Adult	450-1100 average; (max recorded1400)	Post-maturation	Freshwater to estuary with some individuals making nearshore coastal migrations

Shortnose sturgeon live on average for 30-40 years (Dadswell *et al.* 1984). Males mature at approximately 5-10 years and females mature between age 7 and 13, with later maturation occurring in more northern populations (Dadswell *et al.* 1984). Females typically spawn for the first time 5 years post-maturation (age 12-18; Dadswell 1979; Dadswell *et al.* 1984) and then spawn every 3-5 years (Dadswell 1979; Dadswell *et al.* 1984;). Males spawn for the first time approximately 1-2 years after maturity with spawning typically occurring every 1-2 years (Kieffer and Kynard 1996; NMFS 1998; Dadswell *et al.* 1984). Shortnose sturgeon are iteroparous (spawning more than once during their life) and females release eggs in multiple "batches" during a 24 to 36-hour period (total of 30,000-200,000 eggs). Multiple males are likely to fertilize the eggs of a single female.

Cues for spawning are thought to include water temperature, day length, and river flow (Brundage, 2018; Kynard *et al*., 2016). Shortnose sturgeon spawn in freshwater reaches of their natal rivers when water temperatures reach 9–15°C (48.2–59°F) in the spring (Kynard *et al*., 2016). Spawning occurs over gravel, rubble, and/or cobble substrate (Kynard *et al.,* 2016) in areas with average bottom velocities between 0.4 and 0.8 m/s (1.3 and 2.6 ft/s). Depths at spawning sites are highly variable, ranging from 1.2-27 m (4-89 ft) (multiple references in (SSSRT, 2010)). Eggs are small and demersal and stick to the rocky substrate where spawning occurs. Following spawning, adult shortnose sturgeon disperse quickly down river to summer foraging grounds areas and remain in areas downstream of their spawning grounds throughout the remainder of the year (Kynard *et al.*, 2016).

Shortnose sturgeon occur in waters between 0 – 34°C (0 – 93.2°F) (Dadswell *et al.*, 1984; Heidt & Gilbert, 1978); with temperatures above 28°C (84.2°F) considered to be stressful. Depths used are highly variable, ranging from shallow mudflats while foraging to deep channels up to 30 m (98.4 ft) (Dadswell *et al*., 1984; Kynard *et al*., 2016). Salinity tolerance increases with age.

Young-of-the-year must remain in freshwater; however, adults have been documented in the ocean with salinities of up 30 parts per thousand (Kynard *et al*., 2016). Dissolved oxygen affects distribution, with preference for dissolved oxygen levels at or above 5 milligrams per liter and adverse effects anticipated for prolonged exposure to dissolved oxygen less than 3.2 milligrams per liter (Kynard *et al*., 2016).

Shortnose sturgeon feed on benthic insects, crustaceans, mollusks, and polychaetes (Kynard *et al.* 2016). Both juvenile and adult shortnose sturgeon primarily forage over sandy-mud bottoms, which support benthic invertebrates (Carlson and Simpson 1987, Kynard *et al.* 2016). Shortnose sturgeon have also been observed feeding off plant surfaces (Dadswell *et al.* 1984).

In northern rivers, shortnose sturgeon aggregate during the winter months in discrete, deep (3-10 m (9.8-32.8 ft) freshwater areas with minimal movement and foraging (Brundage 2018, Buckley and Kynard 1985, Dadswell 1979, Dovel *et al.* 1992, Kynard *et al.* 2016). In the winter, adults in southern rivers spend much of their time in the slower moving waters downstream near the salt-wedge and forage widely throughout the estuary (Collins and Smith 1993, Weber *et al.* 1998). Pre-spawning sturgeon in some northern and southern systems migrate into an area in the upper tidal portion of the river in the fall and complete their migration in the spring (Kynard *et al.* 2016). Older juveniles typically occur in the same overwintering areas as adults while young of the year remain in freshwater (Jenkins *et al.* 1993).

4.2.1.2 Listing History

Shortnose sturgeon were listed as endangered in 1967 (32 FR 400, March 11, 1967), and the species remained on the endangered species list with the enactment of the ESA in 1973. The species remains listed as endangered throughout their range. Shortnose sturgeon are thought to have been abundant in nearly every large East Coast river prior to the 1880s (Kynard *et al.* 2016). Pollution and overfishing, including bycatch in the shad fishery, were listed as principal reasons for the species' decline. The species remains listed as endangered throughout its range. While the 1998 Recovery Plan refers to Distinct Population Segments (DPS), the process to designate DPSs for this species has not been undertaken. The SSSRT published a Biological Assessment for shortnose sturgeon in 2010. The report summarized the status of shortnose sturgeon within each river and identified stressors that continue to affect the abundance and stability of these populations.

4.2.1.3 Current Status

There is no current total population estimate for shortnose sturgeon range wide. Information on populations and metapopulations is presented below. In general, populations in the Northeast are larger and more stable than those in the Southeast (SSSRT 2010). Population size throughout the species' range is considered to be stable; however, most riverine populations are below the historic population sizes and most likely are below the carrying capacity of the river (Kynard 1997, Kynard *et al.* 2016).

4.2.1.4 Population Structure

There are 19 documented populations of shortnose sturgeon ranging from the St. Johns River, Florida (possibly extirpated from this system) to the Saint John River in New Brunswick, Canada. There is a large gap in the middle of the species range with individuals present in the Chesapeake Bay separated from populations in the Carolinas by a distance of more than 400 km (248.5 mi). Currently, there are significantly more shortnose sturgeon in the northern portion of the range.

Recent developments in genetic research as well as differences in life history support the grouping of shortnose sturgeon into five genetically distinct groups, all of which have unique geographic adaptations (see SSSRT 2010, Waldman *et al.* 2002, Wirgin *et al.* 2005). These groups are: 1) Gulf of Maine; 2) Connecticut and Housatonic Rivers; 3) Hudson River; 4) Delaware River and Chesapeake Bay; and 5) Southeast. The Gulf of Maine, Delaware/Chesapeake Bay and Southeast groups function as metapopulations[9]. The other two groups (Connecticut/Housatonic and the Hudson River) function as independent populations.

While there is migration within each metapopulation (i.e., between rivers in the Gulf of Maine and between rivers in the Southeast) and occasional migration between populations (e.g., Connecticut and Hudson), interbreeding between river populations is limited to very few individuals per generation; this results in morphological and genetic variation between most river populations (SSSRT 2010, Wirgin *et al.* 2005, Wirgin *et al.* 2002). Indirect gene flow estimates from mtDNA indicate an effective migration rate of less than two individuals per generation. This means that while individual shortnose sturgeon may move between rivers, very few sturgeon are spawning outside their natal river; it is important to remember that the result of physical movement of individuals is rarely genetic exchange.

4.2.1.5 Summary of Status of Metapopulations

In NMFS's Greater Atlantic Region, shortnose sturgeon are known to spawn in the Kennebec, Androscoggin, Merrimack, Connecticut, Hudson, and Delaware Rivers (SSSRT 2010). Shortnose sturgeon are also known to occur in the Penobscot, Sheepscot, Saco and Potomac Rivers; although it is unclear if spawning is currently occurring in those systems (SSSRT 2010, Wippelhauser *et al*. 2015 and Altenritter *et al*. 2017).

Gulf of Maine Metapopulation

Tagging and telemetry studies indicate that shortnose sturgeon are present in the Penobscot, Kennebec, Androscoggin, Sheepscot, and Saco Rivers (SSSRT 2010, Wippelhauser *et al*. 2015

[9] A metapopulation is a group of populations in which distinct populations occupy separate patches of habitat separated by unoccupied areas (Levins 1969). Low rates of connectivity through dispersal, with little to no effective movement, allow individual populations to remain distinct as the rate of migration between local populations is low enough not to have an impact on local dynamics or evolutionary lineages (Hastings and Harrison 1994). This interbreeding between populations, while limited, is consistent, and distinguishes metapopulations from other patchy populations.

and Altenritter *et al*. 2017). Individuals have also been documented in smaller coastal rivers; however, the duration of presence has been limited to hours or days and the smaller coastal rivers are thought to be only used occasionally (Zydlewski *et al.* 2011).

Since the removal of the Veazie and Great Works Dams (2013 and 2012, respectively), in the Penobscot River, shortnose sturgeon range from the Bay to the Milford Dam. Shortnose sturgeon now have access to their full historical range. Adult and large juvenile sturgeon have been documented to use the river. While potential spawning sites have been identified, no spawning has been documented. Foraging and overwintering are known to occur in the river. Nearly all pre-spawn females and males have been documented to return to the Kennebec or Androscoggin Rivers. Robust design analysis with closed periods in the summer and late fall estimated seasonal adult abundance ranging from 636-1285 (weighted mean), with a low estimate of 602 (95 percent CI: 409.6-910.8) and a high of 1306 (95 percent CI: 795.6-2176.4) (Fernandes 2008; Fernandes *et al.* 2010; Dionne 2010 in Maine DMR 2010). These studies predate the tagging and telemetry data discussed above (e.g., Zydlewski *et al*. 2011; Altenritter *et al.* 2017a, 2017b) documenting substantial movement of shortnose sturgeon among Gulf of Maine rivers, including to and from the Penobscot. Because the robust design closure assumption may not hold if individuals moved among rivers during the nominal "closed" summer and late-fall sampling windows, these seasonal abundance figures should be treated as dated and potentially imprecise, rather than as a current, defensible estimate of Penobscot River abundance.

Kennebec/Androscoggin/Sheepscot
The estimated size of the adult population (>50 centimeters (>19.7 inches) tail length (TL)) in this system, based on a tagging and recapture study conducted between 1977-1981, was 7,200 (95 percent CI = 5,000 - 10,800; Squiers *et al.* 1982). A population study conducted 1998-2000 estimated population size at 9,488 (95 percent CI = 6,942 -13,358; Squiers 2003) (Squiers 2003) suggesting that the population exhibited significant growth between the late 1970s and late 1990s. Spawning is known to occur in the Androscoggin and Kennebec Rivers. In both rivers, there are hydroelectric facilities located at the base of natural falls thought to be the natural upstream limit of the species. The Sheepscot River is used for foraging during the summer months.

Merrimack River
The historic range in the Merrimack extended to Amoskeag Falls (Manchester, New Hampshire, River Kilometer (RKM) 116 (River Mile (RM) 72); Piotrowski 2002); currently shortnose sturgeon cannot move past the Essex Dam in Lawrence, Massachusetts (RKM 46 (RM 28.6)). Based on a study conducted 1987-1991, the adult population was estimated at 32 adults (20–79; 95 percent confidence interval; B. Kynard and M. Kieffer unpublished information). More recent gill-net sampling efforts conducted by Kieffer indicate a dramatic increase in the number of adults in the Merrimack River. Sampling conducted in the winter of 2009 resulted in the capture of 170 adults. Preliminary estimates suggest that there may be approximately 2,000

adults using the Merrimack River annually. Spawning, foraging and overwintering all occur in the Merrimack River.

Recent shortnose sturgeon surveys on the Merrimack River were conducted on behalf of the Massachusetts Department of Transportation in winter 2020-2021 and winter 2022-2023. Side Scan Sonar and acoustic monitoring was used for monitoring/counting of shortnose sturgeon for an updated population estimate across a long river reach in a one to two-day period. The results of the 2020-2021 survey estimated the population of overwintering shortnose sturgeon at 3,786 individuals, and the 2022-2023 overwintering shortnose sturgeon survey estimated the population to be 3,424 individuals (MADOT 2023). Both of the shortnose sturgeon population estimates from this 2023 study exceeded the previous population estimates of individuals in the Merrimack River.

Tagging and tracking studies demonstrate movement of shortnose sturgeon between rivers within the Gulf of Maine, with the longest distance traveled between the Penobscot and Merrimack Rivers. Genetic studies indicate that a small, but statistically insignificant amount of genetic exchange likely occurs between the Merrimack River and these rivers in Maine (King *et al.* 2014). The Merrimack River population is genetically distinct from the Kennebec-Androscoggin-Penobscot population (SSSRT 2010). In the fall of 2014, a shortnose sturgeon tagged in the Connecticut River in 2001 was captured in the Merrimack River.

Connecticut River Population

The Holyoke Dam divides the Connecticut River shortnose population; until major modifications were implemented at the project's fish passage facilities in 2016, there was limited successful passage upstream of the Dam. Fishways have been operational at the project since the 1950s, however we have no information on sturgeon passage until 1975. Upstream passage between 1975-1999 was an average of four fish per year. From 1999 through 2016, all shortnose sturgeon collected in the lifts were released back downstream given concerns about the risk of mortality from downstream passage. Following fishway upgrades and studies, upstream passage resumed in 2017. Since 2017, the number of shortnose sturgeon passed upstream has ranged between a low of 18 and a high of 91.

The number of sturgeon passing downstream of the Dam annually is largely unknown although some information is available from tagging and tracking studies. Despite this historical separation, fish collected upstream and downstream of the dam are not genetically distinct (Kynard 1997, Wirgin *et al.* 2005, Kynard *et al.*2012). The most recent estimate of the number of shortnose sturgeon upstream of the dam, based on captures and tagging from 1990-2005 is approximately 328 adults (CI = 188–1,264 adults; B. Kynard, USGS, unpubl. Data in SSSRT 2010); this compares to a previous Peterson mark-recapture estimate of 370–714 adults (Taubert 1980a). Using four mark-recapture methodologies, the long-term population estimate (1989-2002) for the lower Connecticut River ranges from 1,042-1,580 (Savoy 2004). Comparing 1989-1994 to 1996-2002, the population exhibits growth on the order of 65-138 percentr. The population in the Connecticut River is thought to be stable, but at a small size.

As described in SSSRT (2010), the historic range of shortnose sturgeon in the Connecticut River is considered to be from the Turners Falls Dam (Turners Falls, MA; RKM 198 (RM 123)) to Long Island Sound. Construction of the Turners Falls Dam was completed in 1798; the dam was built on a natural falls-rapids that, based on available information, is expected to be impassable by sturgeon. As such, Turners Falls is considered to be the historic upstream boundary of shortnose sturgeon in the Connecticut River; however, there have been anecdotal sightings of sturgeon upstream of the dam in recent years. In the summer of 2017, an angler reported a catch of a shortnose sturgeon upstream of the Turners Falls Dam; the species identification was verified by review of a photograph but NMFS was not able to verify the location of the capture. Similarly, in 2024 video was shared with NMFS that appears to show one or two shortnose sturgeon; the reported location was upstream of the Turners Falls Dam in the Connecticut River but again NMFS was not able to verify the location of the video. Following the report in 2017, USGS biologists carried out a series of gillnet surveys in the upper Connecticut River targeting shortnose sturgeon. However, despite extensive sampling from 2020-2024, no shortnose sturgeon were collected. While not targeting shortnose sturgeon, no shortnose sturgeon were captured in electrofishing or gillnet surveys conducted between Vernon Dam and Turners Falls Dam from June - October 2015; these studies were carried out in support of project relicensing. There are also no records of shortnose sturgeon detected in boat electrofishing carried out by Vermont Yankee from 1968-2011. Standardized methodology was used from 1991 through 2014 to sample the reach from Vernon Dam to approximately five miles downstream. With some exceptions due to extreme flow conditions, sampling was conducted monthly from July through October at 4 to 5 sites for general species collections and twice monthly from July through October at six sites for targeted anadromous species collections. Despite decades of electrofishing surveys that documented at least 35 species, no shortnose sturgeon were ever collected in those studies (Aquatec 1993, 1995, Normandeau, 1997-2016).

Environmental DNA (eDNA) sampling has also been carried out in this reach of the Connecticut River. Environmental DNA is the genetic material shed by organisms in the water column. Water is collected and then the eDNA is separated out, amplified, and identified to species. This technique samples areas and identify species whose DNA is present in the water. Typically, this means that an individual from that species occurred in the area; however, “false positives” can be triggered by introduction of contaminated materials (e.g., fishing waders that haven’t been cleaned) or digestion of prey (excreting the prey DNA into the water column by the predator species). As described in a November 2018 report filed with Federal Energy Regulatory Commission (FERC), First Light collected a total of 170 water samples in July and August 2018 below Vernon Dam and in the Turners Falls Impoundment. No shortnose sturgeon DNA was detected.

As reported in a December 2024 filing with FERC, eDNA sampling of bottom water from the Turners Falls impoundment to Bellow Falls dam was carried out by the Connecticut River Conservancy (CRC) in summer 2024. CRC reports positive detections of shortnose sturgeon

upstream of the Turners Falls Dam. This includes reports of positive detections at sites between Turners and Vernon and one site between Vernon and Bellows Falls; of the eleven sites sampled, five were reported as having positive detections in at least one replicate. To date, these results have not been published and we are not aware of any peer review of the techniques or findings. However, together, the available information indicates that at least occasional individual shortnose sturgeon may be present upstream of the Turners Falls Dam. We do not know how these individuals came to be present in this area. At this time there is no evidence to support that there is a self-sustaining (i.e., reproductive) population of shortnose sturgeon in this reach of the river. We have no information on how shortnose sturgeon accessed this reach or how many sturgeon may be present in this area but based on the detections being limited to a small number of apparent positive detections of eDNA (Buckman and Garner 2024), anecdotal reports, and no captures of any individuals in any fisheries surveys carried out in this reach we consider the number to be likely very small.

Spawning in the Connecticut River primarily occurs in the reach upstream of the Holyoke Dam, just below the Turners Falls project (i.e., Rock Dam and Cabot Station). The abundance of pre-spawning adults was estimated each spring between 1994–2001 at a mean of 142.5 spawning adults (CI =14–360 spawning adults) (Kynard *et al.* 2012). There is more recent evidence of at least limited spawning downstream of Holyoke Dam. During ichthyoplankton sampling in the Connecticut River during 2005 and 2006, three shortnose sturgeon larvae were captured downstream of Holyoke Dam (one in 2005 and two in 2006; Kleinschmidt, 2006, 2007; SSSRT, 2010), with a determination made that these larvae were too far downstream from the Rock Dam or Cabot Station spawning sites to have originated there. Additionally, shortnose sturgeon eggs (n=70) were captured on egg mats placed downstream of Holyoke Dam in 2021 by Connecticut Department of Energy and Environmental Protection (CT DEEP) (CRASC 2021; HG&E 2023). Eggs were also captured during similar surveys performed in 2022, with 36 eggs and two hatched larvae found on the mats (HG&E 2023). Divers have also observed juvenile sturgeon in 2021 and 2022 while searching for mussels in the Springfield, CT area (HG&E 2023). Overwintering and foraging occur in both the upper and lower portions of the river. Occasionally, sturgeon have been captured in tributaries to the Connecticut River including the Deerfield River and Westfield River. Additionally, a sturgeon tagged in the CT river was recaptured in the Housatonic River (T. Savoy, CT DEEP, pers. comm.). Three individuals tagged in the Hudson were captured in the CT, with one remaining in the river for at least one year (Savoy 2004).

Hudson River Population

The Hudson River population of shortnose sturgeon is the largest in the United States. Studies indicate an extensive increase in abundance from the late 1970s (13,844 adults (Dovel *et al.* 1992), to the late 1990s (56,708 adults (95% CI 50,862 to 64,072; Bain *et al.* 1997). This increase is thought to be the result of high recruitment (31,000 – 52,000 yearlings) from 1986-1992 (Woodland and Secor 2007). Woodland and Secor (2007) examined environmental conditions throughout this 20-year period and determined that years in which water temperatures

drop quickly in the fall and flow increases rapidly in the fall (particularly October), are followed by high levels of recruitment in the spring. This suggests that these environmental factors may index a suite of environmental cues that initiate the final stages of gonadal development in spawning adults. The population in the Hudson River exhibits substantial recruitment and is considered to be stable at high levels.

Delaware River-Chesapeake Bay Metapopulation
Shortnose sturgeon range from Delaware Bay up to at least Scudders Falls (RKM 223 (RM 139)); there are no dams within the species' range on this river. The population is considered stable (comparing 1981-1984 to 1999-2003) at around 12,000 adults (ERC 2006b, Hastings *et al.* 1987). Spawning occurs primarily between Scudders Falls and the Trenton rapids. Overwintering and foraging also occur in the river. Shortnose sturgeon have been documented to use the Chesapeake-Delaware Canal (C&D Canal) to move from the Chesapeake Bay to the Delaware River.

In Chesapeake Bay, shortnose sturgeon have most often been found in Maryland waters of the mainstem bay and tidal tributaries such as the Susquehanna, Potomac, and Rappahannock Rivers (Kynard *et al.* 2016, SSSRT 2010). Spells (1998), Skjeveland *et al.* (2000), and Welsh *et al.* (2002) all reported one capture each of adult shortnose sturgeon in the Rappahannock River. Recent documented use of Virginia waters of Chesapeake Bay is currently limited to two individual shortnose sturgeon: one captured in 2016 (Balazik 2017) and a second sturgeon (a confirmed gravid female) caught in 2018 in the James River (Balazik, pers. comm. 2018).

Spawning has not been documented in any tributary to the Bay although suitable spawning habitat and two pre-spawning females with late-stage eggs have been documented in the Potomac River (Kynard et al 2009). Current information indicates that shortnose sturgeon are present year-round in the Potomac River with foraging and overwintering taking place there (Kynard *et al.* 2009). Shortnose sturgeon captured in the Chesapeake Bay are not genetically distinct from the Delaware River population.

Southeast Metapopulation
There is no evidence of shortnose sturgeon between the mouth of Chesapeake Bay and the Carolinas. Shortnose sturgeon are only thought to occur in the Cape Fear River and Yadkin-Pee Dee River in North Carolina and are likely present in very small numbers.

The Altamaha River supports the largest known population in the Southeast with successful self-sustaining recruitment. The most recent population estimate for this river was 6,320 individuals (95% CI = 4,387-9,249; DeVries 2006). The population contains more juveniles than expected. Comparisons to previous population estimates suggest that the population is increasing; however, there is high mortality between the juvenile and adult stages in this river. This mortality likely results from incidental capture in the shad fishery, which occurs at the same time as the spawning period (DeVries 2006).

The only available estimate for the Cooper River is of 300 spawning adults at the Pinoplis Dam spawning site (based on 1996-1998 sampling; Cooke *et al.* 2004). This is likely an underestimate of the total number of adults as it would not include non-spawning adults. Estimates for the Ogeechee River were 266 (95% CI=236-300) in 1993 (Weber 1996, Weber *et al.* 1998); a more recent estimate (sampling from 1999-2004; (Fleming *et al.* 2003)) indicates a population size of 147 (95% CI = 104-249). While the more recent estimate is lower, it is not significantly different from the previous estimate. Available information indicates the Ogeechee River population may be experiencing juvenile mortality rates greater than other southeastern rivers.

Spawning is also occurring in the Savannah River, the Congaree River, and the Yadkin-Pee Dee River. There are no population estimates available for these rivers. Occurrence in other southern rivers is limited, with capture in most other rivers limited to fewer than five individuals. Shortnose sturgeon are extremely rare or possibly extirpated from the St. Johns River in Florida as only a single specimen was found by the Florida Fish and Wildlife Conservation Commission during extensive sampling of the river in 2002/2003. In these river systems, shortnose sturgeon occur in nearshore marine, estuarine, and riverine habitat.

4.2.1.6 Threats

Shortnose sturgeon are long-lived and slow growing, therefore, stock productivity is relatively low, which makes the species vulnerable to rapid decline and slow recovery (Musick 1999). In well studied rivers (e.g., Hudson, upper Connecticut), researchers have documented significant year-to-year recruitment variability (up to 10-fold over 20 years in the Hudson and years with no recruitment in the Connecticut). However, this pattern is not unexpected given the life history characteristics of the species and natural variability in hydrologic cues relied on for spawning.

The small amount of effective movement between populations means recolonization of currently extirpated river populations is expected to be very slow and any future recolonization of any rivers that experience significant losses of individuals would be expected to be very slow. Despite the significant decline in population sizes over the last century, gene diversity in shortnose sturgeon is moderately high in both mtDNA (Quattro *et al.* 2002, Wirgin *et al.* 2005) and nDNA (King *et al.* 2001) genomes.

A population of sturgeon can go extinct as a consequence of demographic stochasticity (fluctuations in population size due to random demographic events); the smaller the metapopulation (or population); the more prone it is to extinction. Anthropogenic impacts acting on top of demographic stochasticity further increase the risk of extinction.

All shortnose sturgeon populations are highly sensitive to increases in juvenile mortality that would result in chronic reductions in the number of sub-adults, and thereby, reductions in the number of spawning adults (Gross *et al.* 2002, Secor *et al.* 2002). Populations of shortnose sturgeon that do not have reliable natural recruitment are at increased risk of experiencing

population decline leading to extinction (Secor *et al.* 2002). Elasticity analysis[10] of shortnose sturgeon indicate that the highest potential for increased population size and stability comes from young-of-the-year and juveniles as compared to adults (Gross *et al.* 2002); that is, increasing the number of young-of-the-year (YOY) and juveniles has a more significant long-term impact to the population because the more juveniles YOY fish that survive the more adult population/ spawners there will ultimately be.

The Shortnose Sturgeon Recovery Plan (NMFS 1998) and the Shortnose Sturgeon Status Review Team's Biological Assessment of shortnose sturgeon (2010) identify habitat degradation or loss and direct mortality as principal threats to the species' survival. Natural and anthropogenic factors continue to threaten the recovery of shortnose sturgeon and include: poaching, bycatch in riverine fisheries, habitat alteration resulting from the presence of dams, in-water and shoreline construction, including dredging; degraded water quality which can impact habitat suitability and result in physiological effects to individuals including impacts on reproductive success; direct mortality resulting from dredging as well as impingement and entrainment at water intakes; and, loss of historical range due to the presence of dams. Shortnose sturgeon are also occasionally killed as a result of research activities. The total number of sturgeon affected by these various threats is not known. Changing environmental conditions, particularly shifts in seasonal temperature regimes and changes in the location of the salt wedge, may impact shortnose sturgeon in the future. More information on threats experienced in the action area is presented in the *Environmental Baseline* section of this Opinion.

4.2.1.7 Survival and Recovery

The 1998 Recovery Plan outlines the steps necessary for recovery and indicates that each population may be a candidate for downlisting (i.e., to threatened) when it reaches a minimum population size that is large enough to prevent extinction and will make the loss of genetic diversity unlikely; the minimum population size for each population has not yet been determined. The Recovery Outline contains three major tasks: (1) establish delisting criteria; (2) protect shortnose sturgeon populations and habitats; and (3) rehabilitate habitats and population segments. We know that in general, to recover, a listed species must have a sustained positive trend of increasing population over time. To allow that to happen for sturgeon, individuals must have access to enough habitat in suitable condition for foraging, resting and spawning. In many rivers, particularly in the Southeast, habitat is compromised and continues to impact the ability of sturgeon populations to recover. Conditions must be suitable for the successful development of early life stages. Mortality rates must be low enough to allow for recruitment to all age classes so that successful spawning can continue over time and over generations. There must be enough suitable habitat for spawning, foraging, resting and migrations of all individuals. Habitat connectivity must also be maintained so that individuals can migrate between important habitats without delays that impact their fitness. The loss of any population or metapopulation would result in the loss of biodiversity and would create (or widen) a gap in the species' range.

10 Elasticity analysis is used to understand a species' population growth rate relative to life history traits (fecundity, growth, and survival), which can be applied in the development of management efforts.

4.2.1.8 Summary of Status

Shortnose sturgeon remain listed as endangered throughout their range, with populations in the Northeast being larger and generally more stable than populations in the Southeast. All populations are affected by mortality incidental to other activities, including dredging, power plant intakes and shad fisheries where those still occur, and impacts to habitat and water quality that affect the ability of sturgeon to use habitats and impacts individuals that are present in those habitats. While the species is overall considered to be stable (i.e., its trend has not changed recently, and we are not aware of any new or emerging threats that would change the trend in the future), we lack information on abundance and population dynamics in many rivers. We also do not fully understand the extent of coastal movements and the importance of habitat in non-natal rivers to migrant fish. While the species has high levels of genetic diversity, the lack of effective movement between populations increases the vulnerability of the species should there be a significant reduction in the number of individuals in any one population or metapopulation as recolonization is expected to be very slow. All populations, regardless of size, are faced with threats that result in the mortality of individuals and/or affect the suitability of habitat and may restrict the further growth of the population. Additionally, there are several factors that combine to make the species particularly sensitive to existing and future threats; these factors include: the small size of many populations, existing gaps in the range, late maturation, the sensitivity of adults to very specific spawning cues which can result in years with no recruitment, and the impact of losses of young of the year and juveniles to population persistence and stability.

4.2.2 Atlantic Sturgeon

The section below describes the Atlantic sturgeon listing, provides life history information that is relevant to all DPSs of Atlantic sturgeon, and provides information specific to the status of each DPS of Atlantic sturgeon. Below, we also provide a description of which Atlantic sturgeon DPSs are likely to occur in the action area and provide information on the use of the action area by Atlantic sturgeon.

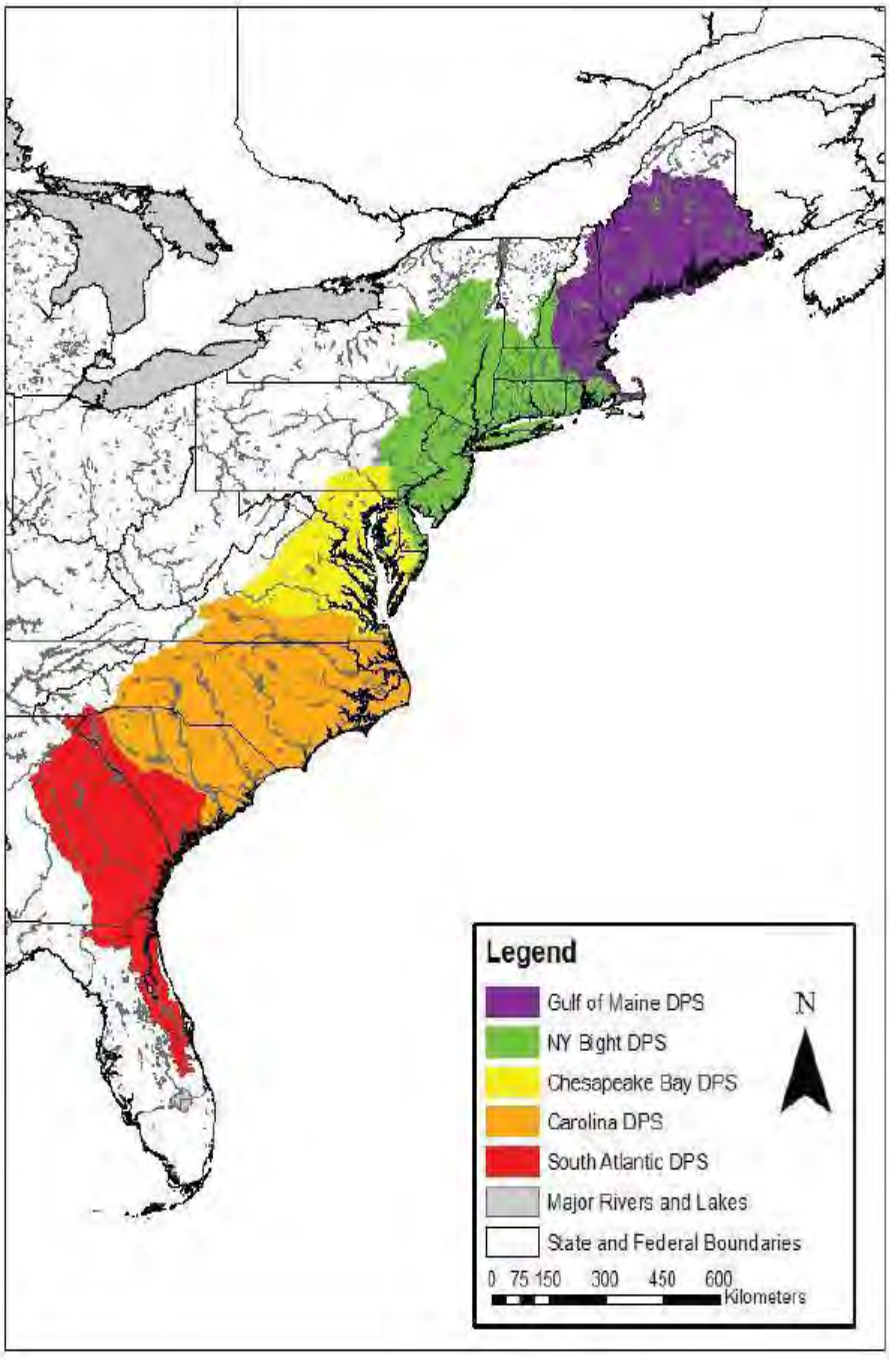
The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) is one of two subspecies of *A. oxyrinchus*, the other being the Gulf sturgeon, *A. o. desotoi*. It is distributed along the eastern coast of North America from Hamilton Inlet, Labrador, Canada to Cape Canaveral, Florida, USA. On February 6, 2012, NMFS listed five DPSs of Atlantic sturgeon under the ESA: Gulf of Maine (GOM), New York Bight (NYB), Chesapeake Bay (CB), Carolina, and South Atlantic (77 FR 5880 and 77 FR 5914). The Gulf of Maine DPS is listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered. Critical habitat has been designated for the five DPSs of Atlantic sturgeon (82 FR 39160, August 17, 2017) in rivers of the eastern United States. The conservation objective identified in the final rule is to increase the abundance of each DPS by facilitating increased successful reproduction and recruitment to the marine environment. The action area does not overlap with critical habitat designated for any DPS of Atlantic sturgeon.

Information available from the 2007 Atlantic sturgeon status review (ASSRT 2007), 2012 final listing rules (77 FR 5880 and 77 FR 5914, February 6, 2012), 2017 Atlantic States Marine Fisheries Commission (ASMFC) benchmark stock assessment and 2024 update (ASMFC 2017, 2024), 2017 critical habitat designations (NMFS 2017a; NMFS, (National Marine Fisheries Service),, 2017), and recent 5-year reviews for each of the five listed DPSs (NMFS, 2022a, 2022b, 2022c, 2023a, 2023b) were used to summarize the life history, population dynamics, and status of the species.

Table 7. Atlantic sturgeon resources incorporated by reference.

2007 Atlantic Sturgeon Status Review	Final Listing Rules	2017 ASMFC Benchmark Stock Assessment	Material Supporting the Designation of Atlantic Sturgeon Critical Habitat	Five-Year Reviews	Critical Habitat Listing
(ASSRT, 2007)	(77 FR 5880 and 77 FR 5914; February 6, 2012)	(ASMFC, 2017)	(NMFS, 2017a)	Gulf of Maine, New York Bight, and Chesapeake Bay DPSs (NMFS, 2022a, 2022b, 2022c) and Carolina and South Atlantic DPSs (NMFS, 2023a, 2023b)	82 FR 39160

Figure 4. Map depicting the general northern and southern boundaries to the coastline of each of the five Atlantic sturgeon DPSs. The extent to which each DPS is depicted inland is for general illustration purposes only, since the regulatory definitions of each DPS do not include a western boundary.



4.2.2.1 Life History and General Habitat Use

Atlantic sturgeon are a long-lived (approximately 60 years), late maturing, estuarine dependent, anadromous[11] species (ASSRT 2007; Balazik *et al*., 2010; Hilton *et al*., 2016; Sulak & Randall, 2002). Adult sturgeon reach sexual maturity between the ages of 5 to 34 years. Sturgeon originating from rivers in lower latitudes (e.g., South Carolina rivers) mature faster than those originating from rivers located in higher latitudes (e.g., Saint Lawrence River) (NMFS 2017a; NMFS, (National Marine Fisheries Service), 2017).

Atlantic sturgeon spawn in freshwater (ASSRT 2007; NMFS 2017a; NMFS, (National Marine Fisheries Service), 2017) at sites with flowing water and hard bottom substrate (Bain *et al*., 2000; Balazik *et al*., 2012; Gilbert, 1989; Greene *et al*., 2009; Hatin *et al*., 2002; Mohler, 2003; Smith & Clugston, 1997; Vladykov & Greeley, 1963). Water depths of spawning sites are highly variable, but may be up to 27 m (88.6 ft) (Bain *et al*., 2000; Crance, 1987; Leland, 1968; Scott & Crossman, 1973). Based on tagging records, Atlantic sturgeon return to their natal rivers to spawn (ASSRT 2007). Spawning intervals range from one to five years in males (Caron et al., 2002; Collins, Smith, *et al*., 2000; Smith, 1985) and two to five years for females (Stevenson & Secor, 1999; Van Eenennaam *et al*., 1996; Vladykov & Greeley, 1963). Males spawn more frequently than females, and females can spawn in consecutive years, but female spawning periodicity is more variable than males (Breece *et al*., 2021). The number of eggs produced by females ranges from 400,000 to approximately 4 million depending on body size and age (Hilton *et al*., 2016; Van Eenennaam & Doroshov, 1998; Van Eenennaam *et al.*, 1996). Therefore, large-sized Atlantic sturgeon are particularly important given that egg production correlates with age and body size (Dadswell, 2006; Smith *et al*., 1982; Van Eenennaam & Doroshov, 1998; Van Eenennaam *et al*., 1996).

Some Atlantic sturgeon river populations may have up to two spawning seasons comprised of different spawning adults (Balazik, Farrae, *et al*., 2017; Balazik & Musick, 2015; Collins, Smith, *et al*., 2000; Denison *et al*., 2023), although the majority likely just have just one, either in the spring or fall.[12] There is evidence of spring and fall spawning for the Chesapeake, Carolina, and South Atlantic DPSs (77 FR 5914, February 6, 2012; ASSRT, 2007; Balazik, Farrae, *et al.,* 2017; Collins, Smith, *et al*., 2000; Denison *et al.*, 2023), and spring spawning for the Gulf of Maine and New York Bight DPSs (NMFS 2017a). In the Chesapeake Bay DPS, telemetry and empirical data suggest that there may be two potential spawning runs in the James River: a spring run from late March to early May and a fall run around September after an extended

[11] Anadromous refers to a fish that is born in freshwater, spends most of its life in the sea, and returns to freshwater to spawn.

[12] Although referred to as spring spawning and fall spawning, the actual time of Atlantic sturgeon spawning may not occur during the astronomical spring or fall season Balazik, M. T., & Musick, J. A. (2015). Dual annual spawning races in Atlantic sturgeon [Scientific Journal]. *PLoS ONE*, *10*(5), e0128234. https://doi.org/10.1371/journal.pone.0128234 .

staging period in the lower river (Balazik *et al*. 2012a, Balazik and Musick 2015, Balazik *et al*. 2017a). The results of genetic analyses show that there is some limited gene flow between the populations but, overall, the spawning populations are genetically distinct (Balazik, Farrae, *et al*., 2017; Balazik *et al*., 2012; Balazik & Musick, 2015). Fall spawning activity has also been documented in the Pamunkey River, a tributary of the York River, and in Marshyhope Creek, a tributary of the Nanticoke River (Hager *et al*., 2014; Richardson & Secor, 2016; Secor *et al*., 2022).

Water temperature appears to play the primary role in triggering the timing of spawning migrations (Hilton *et al*., 2016). Spawning migrations generally occur during February-March in southern systems, April-May in Mid-Atlantic systems, and May-July in New England and Canadian systems (Hilton *et al*., 2016). Male sturgeon begin upstream spawning migrations when waters reach approximately 6°C (43°F) (Hilton *et al*., 2016), and remain on the spawning grounds throughout the spawning season (Bain, 1997). Females begin spawning migrations when temperatures are closer to 12° to 13°C (54° to 55°F) (Dovel & Berggren, 1983; Smith, 1985), make rapid spawning migrations upstream, and quickly depart following spawning (Bain, 1997).

Following spawning, males move downriver to the lower estuary and remain there until outmigration in the fall (Bain, 1997; Bain *et al*., 2000; Balazik *et al.*, 2012; Breece *et al*., 2013; Dovel & Berggren, 1983; Greene *et al*., 2009; Hatin et al., 2002; Ingram *et al*., 2019; Smith, 1985; Smith *et al.*, 1982). Females move downriver and may leave the estuary and travel to other coastal estuaries until outmigration to marine waters in the fall (Bain, 1997; Bain *et al*., 2000; Balazik *et al.*, 2012; Breece *et al*., 2013; Dovel & Berggren, 1983; Greene *et al.*, 2009; Hatin *et al.*, 2002; NMFS 2017a; NMFS, (National Marine Fisheries Service), 2017; Smith, 1985; Smith *et al*., 1982).

Atlantic sturgeon deposit eggs on hard bottom substrate. They hatch into the yolk sac larval stage approximately 94 to 140 hours after deposition (Mohler, 2003; Murawski & Pacheco, 1977; Smith *et al*., 1980; Van Den Avyle, 1984; Vladykov & Greeley, 1963). Hatchlings are assumed to undertake a demersal existence, seek cover in the bottom substrate and yolk sac larvae (i.e., free embryos less than 4 weeks old, with total lengths (TL) less than 30 mm (1.2 in) (Van Eenennaam *et al*., 1996)) are assumed to inhabit the same riverine or estuarine areas where they were spawned (Bain *et al.*, 2000; Kynard & Horgan, 2002).

After about eight days, the free embryo exhausts the yolk sac and becomes (post yolk sac) larvae (Kynard & Horgan, 2002). Post yolk sac larvae drift downstream where they eventually settle, become demersal, and start foraging in freshwater reaches above the salt front (Kynard & Horgan, 2002). Shortly after, they become young of year and then juveniles.

The juvenile stage can last months to years in the brackish waters of the natal estuary (ASSRT 2007; Calvo *et al.*, 2010; Collins, Rogers, et al., 2000; Dadswell, 2006; Dovel & Berggren, 1983; Greene *et al*., 2009; Hatin *et al*., 2007; Holland & Yelverton, 1973; Kynard & Horgan, 2002;

Mohler, 2003; Schueller & Peterson, 2010; Secor *et al*., 2000; Waldman *et al*., 1996). Upon reaching the subadult phase, individuals enter the marine environment, mixing with adults and subadults from other river systems (Bain, 1997; Dovel & Berggren, 1983; Hatin *et al*., 2007; McCord *et al.*, 2007; NMFS, 2017a; NMFS, (National Marine Fisheries Service), 2017). Once subadult Atlantic sturgeon have reached maturity (i.e., adult stage), they will remain in marine or estuarine waters that are typically less than 50 m (164 ft) deep, only returning far upstream to the spawning areas when they are ready to spawn (ASSRT 2007; Bain, 1997; Breece *et al*., 2016; Dunton *et al*., 2012; 2015; Savoy & Pacileo, 2003).

Table 8. General descriptions of Atlantic sturgeon life history stages*

Age Class	Size	Duration	Description
Egg	~2 mm – 3 mm diameter (Van Eenennaam *et al*., 1996, p. 773)	Hatching occurs ~3-6 days after egg deposition and fertilization (ASSRT, 2007, p. 4)	Fertilized or unfertilized
Yolk-sac larvae (YSL)	~6 mm – 14 mm (Bath *et al*., 1981, pp. 714-715)	8-12 days post hatch (ASSRT, 2007, p. 4)	Negative photo-taxic, nourished by yolk sac
Post yolk-sac larvae (PYSL)	~14 mm – 37 mm (Bath *et al*., 1981, pp. 714-715)	12-40 days post hatch	Free swimming; feeding; Silt/sand bottom, deep channel; fresh water
Young of Year (YOY)	0.3 grams <410 mm TL	From 40 days to 1 year	Fish that are > 3 months and < 1 year; capable of capturing and consuming live food
Juveniles	>410 mm and <760 mm TL	1 year to time at which first coastal migration is made	Fish that are at least 1 year old, are not sexually mature, and do not make coastal migrations.
Subadults	>760 mm and <1500 mm TL	From first coastal migration to sexual maturity	Fish that are not sexually mature but make coastal migrations

Age Class	Size	Duration	Description
Adults	>1500 mm TL	Post-maturation	Fish that are sexually mature

* The size ranges are only guidelines for the life stages, which are more dependent on behavior (e.g., if a sturgeon is measured to be <760 mm total length, but is reported to have traveled in offshore marine waters, it is most likely a subadult and not a juvenile). See https://media.fisheries.noaa.gov/dam-migration/ans_life_stage_behavior_descriptions_20191029_508.pdf for more information.

Population Dynamics

The ASMFC evaluated the status of Atlantic sturgeon in 2017 using fisheries- dependent and -independent sources in order to inform a variety of population parameters. One index of population abundance used by the ASMFC for estimating Atlantic sturgeon abundance in Northeast U.S. waters is the Northeast Area Monitoring and Assessment Program (NEAMAP) trawl surveys. The Review Panel for the ASMFC (2017) stock assessment encouraged use of this index, in addition to others discussed in the stock assessment, to assess trends in Atlantic sturgeon abundance. It currently meets the recommended minimum standard of 15 years for use in a trend analysis. For our analyses, we are relying on the population estimates derived from the NEAMAP swept area biomass, which takes into account the catchability rate (i.e., net efficiency x availability). We consider that the NEAMAP surveys sample an area utilized by Atlantic sturgeon but do not sample all the locations and times where Atlantic sturgeon are present. We also consider that the trawl net captures some, but likely not all, of the Atlantic sturgeon present in the sampling area. Atlantic sturgeon that occur in estuaries or rivers, and also north of Cape Cod or south of Cape Hatteras, are not included in the population index. As the estimates from Boucher (2025) are derived directly from empirical data with fewer assumptions than have been required to model Atlantic sturgeon populations to date, we determined that they are the best available information. Based on the latest population estimates in Boucher (2025), the overall minimum abundance of Atlantic sturgeon in nearshore U.S. Atlantic waters from Cape Cod to Cape Hatteras is estimated to be 47,044 fish, using the average estimates from the spring and fall surveys across the years of 2010-2023, and assuming 100 percent catchability.

Although NEAMAP only covers the Mid-Atlantic region, we consider its resulting estimates to represent the best available index of abundance in the marine environment and to be reliable for use as a proxy for broader regional abundance estimates. Based on genetic frequencies of occurrence in the sampled area, this regional population estimate was subsequently partitioned by DPS using the 'Mid-Atlantic (MID) Offshore' percentage breakdowns in Kazyak *et al.* (2021a), as that study region most closely aligns with the NEAMAP survey area (Table 9). It is important to note that the NEAMAP-based estimates do not include young of year fish and juveniles in the rivers. The NEAMAP surveys are conducted in ocean waters that include the preferred depth ranges of sub-adult and adult Atlantic sturgeon and take place during seasons that coincide with known Atlantic sturgeon coastal migration patterns in the ocean.

Table 9. Summary of minimum swept area population estimates of Atlantic sturgeon based upon the NEAMAP survey swept area model.

DPS	Estimated Ocean Population Abundance
Gulf of Maine	184
NY Bight	31,797
Chesapeake Bay	5,951
Carolina	4,276
South Atlantic	4,836
Canada	0
Total	47,044

It is important to note, the NEAMAP-based estimates do not include YOY fish and juveniles in the rivers; however, those Atlantic sturgeon life stages are at minimal risk from the proposed actions since they are rare to absent within the action area. In addition, although these population estimates are current through 2023, there are other recent studies and indications that the abundance of specific DPSs and spawning river populations may be smaller at present than currently estimated (Kazyak *et al*. 2020a; NMFS 2022a, 2022b, 2022c; White *et al*. 2022).

Precise estimates of population growth rate (intrinsic rates) are unknown for the five listed DPSs of Atlantic sturgeon due to a lack of long-term abundance data. The ASMFC (2017) stock assessment referenced a population viability assessment (PVA) that was done to determine population growth rates for the five DPSs based on a few long-term survey programs, but most results were statistically insignificant or utilized a model that would not converge. The population growth rates reported from that PVA ranged from -1.8 percent to 4.9 percent (ASMFC 2017). In the ASMFC (2024) stock assessment update, nine fishery-independent surveys were developed into indices of relative abundance for Atlantic sturgeon. Most indices either had no trend over the time series or were increasing. The individual indices were then combined to develop a coastwide index of relative Atlantic sturgeon abundance. The coastwide index was variable from 1990-2022 but had been steadily increasing since 2013 (ASMFC, 2024).

The genetic diversity of Atlantic sturgeon throughout its range has been well-documented (ASSRT 2007, Bowen and Avise 1990, O'Leary *et al.* 2014, Ong *et al.* 1996, Waldman *et al.* 1996, Waldman and Wirgin 1998, Kazyak *et al.* 2021, White *et al.* 2021). Overall, these studies

have consistently found populations to be genetically diverse, and the majority can be readily differentiated. Relatively low rates of gene flow reported in population genetic studies (Fritts *et al.* 2016, Savoy *et al.* 2017, Wirgin *et al.* 2002) indicate that Atlantic sturgeon typically return to their natal river to spawn, despite extensive mixing in coastal waters.

Based on fishery-independent, fishery dependent, tracking, and tagging data, Atlantic sturgeon appear to primarily occur inshore of the 50 m (164 ft) depth contour (Dunton *et al.* 2012, Dunton *et al.* 2010, Erickson *et al.* 2011, Laney *et al*. 2007, O'Leary *et al*. 2014, Stein *et al*. 2004a, b, Waldman *et al*. 2013, Wirgin *et al.* 2015a, Wirgin *et al.* 2015b). However, they are not restricted to these depths and excursions into deeper (e.g., 75 m (250 ft)) continental shelf waters have been documented (Colette and Klein-MacPhee 2002, Collins and Smith 1997, Erickson *et al.* 2011, Stein *et al.* 2004b, Timoshkin 1968). Data from fishery-independent surveys and tagging and tracking studies also indicate that some Atlantic sturgeon may undertake seasonal movements along the coast (Dunton *et al.* 2010; Erickson *et al.* 2011; Wippelhauser 2012; Oliver *et al.* 2013; Post *et al.* 2014; Hilton *et al.* 2016; Altenritter *et al*. 2017; Breece *et al.* 2017; Wippelhauser *et al.* 2017; Rothermel *et al.* 2020; Kahn *et al.* 2023). For instance, studies found that satellite-tagged adult sturgeon from the Hudson River concentrated in the southern part of the Mid-Atlantic Bight, at depths greater than 20 m (66 ft), during winter and spring; while, in the summer and fall, Atlantic sturgeon concentrations shifted to the northern portion of the Mid-Atlantic Bight at depths less than 20 m (66 ft) (Erickson *et al*. 2011).

In the marine range, several marine aggregation areas occur adjacent to estuaries and/or coastal features formed by bay mouths and inlets along the U.S. eastern seaboard (i.e., waters off North Carolina; Chesapeake Bay; Delaware Bay; New York Bight; Massachusetts Bay; Long Island Sound; and Connecticut and Kennebec River Estuaries). Depths in these areas are generally no greater than 25 m (82 ft) (Bain *et al.* 2000, Dunton *et al.* 2010, Erickson *et al.* 2011, Laney *et al*. 2007, O'Leary *et al.* 2014, Oliver *et al*. 2013, Savoy and Pacileo 2003, Stein *et al*. 2004b, Waldman *et al*. 2013, Wippelhauser 2012, Wippelhauser and Squiers 2015). Although additional studies are still needed to clarify why Atlantic sturgeon aggregate at these sites, there is some indication that they may serve as thermal refugia, wintering sites, or marine foraging areas (Stein *et al.* 2004a; Dunton *et al.* 2010; Erickson *et al*. 2011; Breece *et al.* 2017; Rothermel *et al.* 2020).

Status

Atlantic sturgeon were once present in 38 river systems and, of these, spawned in 35 (ASSRT 2007). They are currently present in 36 rivers and are probably present in additional rivers that provide sufficient forage base, depth, and access (ASSRT 2007). The benchmark stock assessment evaluated evidence for spawning tributaries and sub-populations of U.S. Atlantic sturgeon in 39 rivers (ASSRT 2007). They confirmed (eggs, embryo, larvae, or young of year observed) spawning in ten rivers, considered spawning highly likely (adults expressing gametes, discrete genetic composition) in nine rivers, and suspected (adults observed in upper reaches of tributaries, historical accounts, presence of resident juveniles) spawning in six rivers (ASSRT

2007). Spawning in the remaining rivers was unknown (ten) or suspected historical (four) (ASMFC 2017). The decline in abundance of Atlantic sturgeon has been attributed primarily to the large U.S. commercial fishery, which existed for the Atlantic sturgeon through the mid-1990s. Based on management recommendations in the Interstate Fisheries Management Program (ISFMP), adopted by the Commission in 1990, commercial harvest in Atlantic coastal states was severely restricted and ultimately eliminated from most coastal states (ASMFC 1998a). In 1998, the Commission placed a moratorium on all Atlantic sturgeon fisheries until the spawning stock could be restored to a level where 20 subsequent year classes of adult females were protected (ASMFC 1998a, b). In 1999, NMFS closed the U.S. EEZ to Atlantic sturgeon retention, pursuant to the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) (64 FR 9449, February 26, 1999). However, all state fisheries for sturgeon were closed prior to this.

As described in the listing rules, and in the 2022 and 2023 5-year reviews, the most significant known threats to Atlantic sturgeon are incidental catch, dams that block access to spawning habitat in southern rivers, poor water quality, dredging of spawning areas, water withdrawals from rivers, vessel strikes, and climate instability (e.g., impacts water temperature, salinity, dissolved oxygen, contaminants).

ASMFC 2017 indicates that based on historic removals and estimated effective population size, all five Atlantic sturgeon DPSs are depleted relative to historical levels. However, the 2017 stock assessment does provide some evidence of population recovery at the coastwide scale, and mixed population recovery at the DPS scale (ASMFC 2017). The 2017 stock assessment also concluded that a variety of factors (i.e., bycatch, habitat loss, and ship strikes) continue to impede the recovery rate of Atlantic sturgeon (ASMFC 2017). Over the long term, changing environmental conditions may affect Atlantic sturgeon by affecting the location of spawning, distribution of prey, water temperature, and water quality (ASMFC 2017).

Elevated temperatures could modify range and migratory patterns (Hare *et al.* 2016, Kynard *et al.* 2016), cues for spawning migration that result in an earlier spawning season (Denison *et al*. 2023), and thus, alter the time of year sturgeon may or may not be present within the action area. This may cause an increase or decrease in the number of sturgeon present in the action area. However, spawning may not be triggered solely by water temperature. Although the results lack consensus in the scientific community, some research suggests that day length (which would not be affected by changing conditions) and river flow (which could be affected) are contributing factors (Forsythe *et al.* 2012). Therefore, it is not possible to predict how any change in water temperature alone will affect the seasonal movements of sturgeon through the action area.

Changes in water temperature may also alter the forage base and thus, foraging behavior of sturgeon (Hare *et al*. 2016, Mayfield and Cech 2004). Any forage species that are temperature-dependent may also shift in distribution as water temperatures warm and cause a shift in the distribution of sturgeon (Hare *et al*. 2016; Jetter *et al*. 2023). However, because we do not know

the adaptive capacity of this species or how much of a change in temperature would be necessary to cause a shift in distribution, it is not possible to predict how these changes may affect foraging sturgeon. If sturgeon distribution shifted with prey distribution, it is likely that there would be minimal, if any, impact on the availability of food, and they would be able to continue to meet their foraging needs. Similarly, if sturgeon shifted to areas where different forage was available and were able to obtain sufficient nutrition from that new source of forage, any effects would also be minimal. The greatest potential for effects would be if sturgeon shifted spatially or temporally to areas where insufficient forage was available; however, the likelihood of this happening is unknown.

Increasing hypoxia, in combination with increasing temperature, affects juvenile sturgeon metabolism and survival (Secor and Gunderson 1998, Kieffer *et al.* 2011). A multivariable bioenergetics and survival model predicted that within the Chesapeake Bay, a 1°C increase in Bay-wide temperature reduced suitable habitat for juvenile Atlantic sturgeon by 65 percent (Niklitschek and Secor 2005). These studies highlight the importance of the availability of water with suitable temperature, salinity and DO; climate conditions that reduce the amount of available habitat with these conditions could reduce the productivity of Atlantic sturgeon (McBryan *et al*. 2013). However, there is significant uncertainty, due to a lack of specific scientific data, on the degree to which these effects may be experienced and the degree to which Atlantic sturgeon will be able to successfully adapt to any such changes (Hare *et al.* 2016, Shackell *et al*. 2014). Any activities occurring within and outside the action area that contribute to changing environmental conditions are also expected to affect Atlantic sturgeon in the action area (Hare *et al*. 2016). While we can make some predictions on the likely effects of these changes on these species and critical habitat, without modeling and additional scientific data, these predictions remain speculative (Hare *et al*. 2016, Shackell *et al*. 2014). Additionally, these predictions do not take into account the adaptive capacity of this species, which uses varied habitat types and forage, and may allow them to deal with change better than predicted (Dunton *et al*. 2015; Hare *et al*. 2016; McLean *et al*. 2014).

Despite the depleted status, the ASMFC stock assessment update did include signs that the coastwide index is above the 1998 value (100 percent probability). The New York Bight and Carolina DPS indices also had a greater than 50 percent chance of being above their 1998 value; however, the indices from the Chesapeake Bay and South Atlantic DPSs only had a 27 percent and 31 percent chance, respectively, of being above the 1998 value. Total mortality from the tagging model was very low at the coastwide level. Small sample sizes made mortality estimates at the DPS levels more difficult. The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs all had a less than 50 percent chance of having a mortality rate higher than the threshold. The Gulf of Maine DPS had a 55.5 percent probability of being above the mortality threshold (ASMFC 2024). The 2017 stock assessment and 2024 update describe that the DPS-level estimates of mortality from the tagging model had wide credible intervals, so one cannot conclude with statistical certainty whether any of the DPS-level mortality estimates are above or below its respective thresholds. The Atlantic sturgeon is a data-limited species, and the ASMFC

acknowledged that there are several limitations and sources of uncertainty in the data used in the 2017 assessment and 2024 update. Those factors need to be taken into account when evaluating stock status by DPS (ASMFC 2024). For those reasons, we consulted the latest 5-year reviews for each DPS for additional status information. No changes to the classification for any DPS are recommended in the 5-year reviews (NMFS 2022 a, b, and c, NMFS 2023 a, b).

Recovery Goals for All DPSs

A Recovery Plan has not been completed for any DPS of Atlantic sturgeon. In 2018, NMFS published a Recovery Outline[13] to serve as an initial recovery-planning document. In this, the recovery vision is stated, "Subpopulations of all five Atlantic sturgeon DPSs must be present across the historical range. These subpopulations must be of sufficient size and genetic diversity to support successful reproduction and recovery from mortality events. The recruitment of juveniles to the sub-adult and adult life stages must also increase and that increased recruitment must be maintained over many years. Recovery of these DPSs will require conservation of the riverine and marine habitats used for spawning, development, foraging, and growth by abating threats to ensure a high probability of survival into the future." The Recovery Outline also includes steps that are expected to serve as an initial recovery action plan. These include protecting extant subpopulations and the species' habitat through reduction of threats; gathering information through research and monitoring on current distribution and abundance; and addressing vessel strikes in rivers, the effects of changing environmental conditions, and bycatch.

Critical Habitat

Critical habitat has been designated for the five DPSs of Atlantic sturgeon (82 FR 39160, August 17, 2017) in rivers of the eastern United States.

4.2.2.2 Gulf of Maine DPS of Atlantic sturgeon

The Gulf of Maine DPS of Atlantic sturgeon includes Atlantic sturgeon that are spawned in the watersheds that drain into the Gulf of Maine from the Maine/Canada border and extending southward to Chatham, Massachusetts, as well as Atlantic sturgeon held in captivity that are progeny of such fish. The marine range of Atlantic sturgeon from the Gulf of Maine DPS extends from Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. The riverine range of the Gulf of Maine DPS and the adjacent portion of the marine range are shown in Figure 4. Genetic analyses indicate the presence of Atlantic sturgeon belonging to the Gulf of Maine DPS in many parts of the marine range including the Gulf of Maine, the Bay of Fundy, and the New York Bight. In their mixed-stock analysis of 1,704 Atlantic sturgeon encountered across the U.S. Atlantic coast, Kazyak *et al*. (2021) did not observe any Atlantic sturgeon from the Gulf of Maine DPS south of Cape Hatteras. Of the 41 individuals captured in the NORTH region of the study (north of Cape Cod), 36 (87.8 percent) were assigned to the Gulf of Maine DPS.

[13] https://media.fisheries.noaa.gov/dam-migration/ats_recovery_outline.pdf; last accessed July 26, 2024.

Within this range, Atlantic sturgeon historically spawned in the Penobscot, Kennebec, Androscoggin, Sheepscot, and Merrimack Rivers (ASSRT 2007). Spawning habitat is available and accessible in the Penobscot, Androscoggin, Kennebec, Merrimack, and Piscataqua (inclusive of Cocheco and Salmon Falls) Rivers. Spawning has been documented in the Kennebec River, and information from Wippelhauser *et al*. (2017) confirms the location of occurrence between RKM 70 and 75 (RM 43.5 and 46.6). During this study from 2009-2011, eight sturgeon, including one male in spawning condition, were also captured in the Androscoggin River estuary, which suggests that spawning may be occurring in the Androscoggin River as well (Wippelhauser et al., 2017). However, additional evidence such as the capture of a spawning female, sturgeon eggs, or larvae is not yet available to confirm that spawning for the Gulf of Maine DPS is occurring in that river.

Atlantic sturgeon that spawn elsewhere continue to use habitats within all of these rivers as part of their overall marine range (ASSRT 2007). Additionally, Atlantic sturgeon that spawn in the Gulf of Maine DPS have been detected off of Delaware (Wirgin *et al*. 2015a, Kazyak *et al*. 2021) and as far south as Cape Hatteras. The movement of subadult and adult sturgeon between rivers, including to and from the Kennebec River and the Penobscot River, demonstrates that coastal and marine migrations are key elements of Atlantic sturgeon life history for the Gulf of Maine DPS as well as likely throughout the entire range (ASSRT 2007; Fernandes et al., 2010). Acoustic tag detections suggest that the adults that forage in the Penobscot River travel to the Kennebec River to spawn (Altenritter *et al*. 2017, Wippelhauser *et al*. 2017). Data from the Altenritter *et al*. (2017) study indicate that, based on the temporal and spatial predictability of habitat use, the Penobscot River estuary is important for subadult Atlantic sturgeon of the Gulf of Maine DPS. The Saco River also supports a large aggregation of Atlantic sturgeon that forage on sand lance in Saco Bay and within the first few kilometers of the Saco River, primarily from May through October. Some sturgeon also overwinter in Saco Bay (Hylton *et al*., 2018; Little, 2013), which suggests that the river provides important wintering habitat as well, particularly for subadults. However, none of the new information indicates recolonization of the Saco River for spawning. It remains questionable whether sturgeon larvae could survive in the Saco River even if spawning were to occur because of the presence of the Cataract Dam at RKM 10 (RM 6.2) of the river (Little, 2013), which limits access to the freshwater reach. Some sturgeon that spawn in the Kennebec have subsequently been detected foraging in the Saco River and Bay (Novak *et al*., 2017; Wippelhauser *et al*., 2017).

Dadswell et al. (2016) describes characteristics of the seasonal aggregation of sturgeon in the Bay of Fundy, but does not identify the natal origin of each of the 1,453 Atlantic sturgeon captured and sampled for their study. However, based on Wirgin *et al.* (2012) and Stewart *et al.* (2017), NMFS considers the results of Dadswell *et al*. (2016) as representative of the movement of the Gulf of Maine DPS of Atlantic sturgeon. Dadswell *et al*. (2016) determined subadult and adult Atlantic sturgeon occur seasonally (approximately May to September) in the Bay of Fundy for foraging, and many return in consecutive years. Fork length (FL) of the 1,453 sampled sturgeon ranged from 45.8 to 267 centimeters (18 to 105 inches), but the majority (72.5 percent)

were less than 150 centimeters (59 inches) FL. The age of the Atlantic sturgeon (i.e., 4 to 54 years old) is also indicative of the two different life stages. Detailed seasonal movements of Atlantic sturgeon, a number of which are likely Gulf of Maine DPS origin, to and from the Bay of Fundy are described in Beardsall et al. (2016).

There are no abundance estimates for the Gulf of Maine DPS or for the Kennebec River spawning population. However, we have estimated subadult and adult abundance in nearshore marine waters from Cape Cod to Cape Hatteras and concluded that, at a minimum, approximately 727 adult and subadult Atlantic sturgeon may comprise the DPS, based upon the NEAMAP survey swept area model (Boucher, 2025). We expect this estimate (727 adult and subadults) to represent a minimum abudance for the total population based on stock assessments and that the NEAMAP trawls are mid-Atlantic centered. The ASSRT (2007) status review estimated that the number of spawning adults in the Gulf of Maine DPS was less than 300 per year, but that estimate was based on a comparison to the larger Hudson and Altamaha River spawning populations and not an actual number. Wippelhauser and Squiers (2015) reviewed the results of studies conducted in the Kennebec River System from 1977-2001. In total, 371 Atlantic sturgeon were captured, but the abundance of adult Atlantic sturgeon in the Kennebec spawning population could not be estimated because too few tagged fish were recaptured (i.e., 9 of 249 sturgeon).

Another method for assessing population viability is through determinations of effective population size (N_e)[14], which measures how many adults contributed to producing the next generation based on genetic determinations of parentage from the offspring. Effective population size is always less than the total abundance of a population, because it is a measure of parents in an idealized panmictic and stable population because it is only a measure of parentage, which is less than the total abundance of a population because not all adults successfully reproduce. Measure of effective population size is used to inform whether a population is at risk of inbreeding and loss of adaptive potential. Thus, the effective population size can be a key variable to evaluate population viability and extinction risk (Frankham *et al*., 2014; Hoban *et al.*, 2020). As a general rule, a minimum N_e of 50 and a minimum of 500 have been widely used in conservation biology as thresholds to avoid inbreeding depression and maintain long-term evolutionary potential, respectively (Clarke *et al*., 2024; Franklin, 1980; Jamieson & Allendorf, 2012). However, other authors have suggested that minimum N_e thresholds of 100 and 1,000 are needed to maintain a populations' fitness and evolutionary potential (Frankham *et al*., 2014; Pérez-Pereira et al., 2022). The effective population size of the Gulf of Maine DPS has been

[14] Effective Population Size (N_e) is defined as the size of a hypothetical ideal population (or the number of ideal individuals) that would experience the same rate of genetic drift as the population under consideration Wang, J., Santiago, E., & Caballero, A. (2016). Prediction and estimation of effective population size. *Heredity*, *117*(4), 193-206. https://doi.org/10.1038/hdy.2016.43 , Wright, S. (1969). *Evolution and the genetics of populations. 2. The theory of gene frequencies*. University of Chicago Press. https://books.google.com/books?id=HemscDlWXCQC&printsec=copyright#v=onepage&q&f=false . Therefore, it is in most cases less than the total number of individuals in the population. See https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/effective-population-size.

assessed in three recent studies based on sampling of adult Atlantic sturgeon captured in the Kennebec River in multiple years. The studies yielded very similar results which were an effective population size of: 63.4 (95% CI=47.3-91.1)(ASMFC, 2017), 67 (95% CI=52.0–89.1) (Waldman et al., 2019), and 79.4 (95% CI=60.3-111.7)(White *et al*., 2021).

The current status of the Gulf of Maine DPS is affected by historical and modern fisheries dating as far back as the 1800s (Squiers *et al.,* 1979; Stein *et al*., 2004; ASMFC 2007). Incidental capture of Atlantic sturgeon in state and Federal fisheries continues today. As explained above, we have estimates of the number of subadults and adults killed as a result of bycatch in fisheries authorized under Northeast FMPs. At this time, we are not able to quantify the impacts from other threats or estimate the number of individuals killed as a result of other anthropogenic threats. Habitat disturbance and direct mortality from anthropogenic sources are the primary concerns.

Some of the impacts from the threats that contributed to the decline of the Gulf of Maine DPS have been removed (e.g., directed fishing), or reduced as a result of improvements in water quality and removal of dams (e.g., the Edwards Dam on the Kennebec River in 1999, the Veazie Dam on the Penobscot River). There are strict regulations on the use of fishing gear in Maine state waters that incidentally catch sturgeon. In addition, there have been reductions in fishing effort in state and federal waters, which most likely would result in a reduction in bycatch mortality of Atlantic sturgeon. A significant amount of fishing in the Gulf of Maine is conducted using trawl gear, which is known to have a much lower mortality rate for Atlantic sturgeon caught in the gear compared to sink gillnet gear (ASMFC 2007). Atlantic sturgeon from the GOM DPS are not commonly taken as bycatch in areas south of Chatham, MA, with only 8 percent (e.g., 7 of the 84 fish) of interactions observed in the Mid Atlantic/Carolina region being assigned to the Gulf of Maine DPS (Wirgin and King, 2011). Tagging results also indicate that Gulf of Maine DPS fish tend to remain within the waters of the Gulf of Maine and only occasionally venture to points south. However, data on Atlantic sturgeon incidentally caught in trawls and intertidal fish weirs fished in the Minas Basin area of the Bay of Fundy (Canada) indicate that approximately 35 percent originated from the Gulf of Maine DPS (Wirgin *et al.* 2012). This figure reflects only the three DPSs for which mixed-stock assignments were reported in that study and does not represent the full composition of the Minas Basin aggregation; the same dataset found that the majority of individuals sampled (approximately 60 percent) originated from Canadian populations, which are not part of any of the five U.S. DPSs addressed in this Opinion.

As noted previously, studies have shown that in order to rebuild, Atlantic sturgeon can only sustain low levels of bycatch and other anthropogenic mortality (Boreman, 1997; ASMFC, 2007; Kahnle *et al.*, 2007; Brown and Murphy, 2010). NMFS has determined that the Gulf of Maine DPS is at risk of becoming endangered in the foreseeable future throughout all of its range based on the following: (1) significant declines in population sizes and the protracted period during

which sturgeon populations have been depressed; (2) the limited amount of current spawning; and (3) the impacts and threats that have and will continue to affect recovery.

In 2018, we announced the initiation of a 5-year review for the Gulf of Maine DPS. We reviewed and considered new information for the Gulf of Maine DPS that has become available since this DPS was listed as threatened in February 2012. We completed the 5-year review for the Gulf of Maine DPS in February 2022 (NMFS 2022a); the review includes a summary of additional information available since the listing determination, including information on life history and threats. Based on the best scientific and commercial data available at the time of the review, we concluded that no change to the listing status is warranted.

4.2.2.3 NY Bight DPS of Atlantic sturgeon

The New York Bight DPS of Atlantic sturgeon includes Atlantic sturgeon that are spawned in the watersheds that drain into coastal waters (including bays and sounds) from Chatham, Massachusetts to the Delaware-Maryland border on Fenwick Island, as well as Atlantic sturgeon held in captivity that are progeny of such fish. Within this range, Atlantic sturgeon historically spawned in the Connecticut, Delaware, Hudson, and Taunton Rivers (Murawski and Pacheco 1977, Secor 2002, ASSRT 2007, ASMFC 2017b). Spawning still occurs in the Delaware and Hudson Rivers. There is no recent evidence (within the last 15 years) of spawning in the Taunton River (ASSRT 2007). Atlantic sturgeon that are spawned elsewhere continue to use habitats within the Connecticut and Taunton Rivers as part of their overall marine range (ASSRT 2007, Savoy 2007, Wirgin and King 2011).

In 2014, several presumed age-0 Atlantic sturgeon were captured in the Connecticut River; the available information indicates that successful spawning took place in 2013 by a small number of adults. Genetic analysis of the juveniles indicates that the adults were likely migrants from the South Atlantic DPS (Savoy *et al*. 2017). As noted by the authors, this conclusion is counter to prevailing information regarding straying of adult Atlantic sturgeon. As these captures represent the only contemporary records of possible natal Atlantic sturgeon in the Connecticut River and the genetic analysis is unexpected, more information is needed to establish the frequency of spawning in the Connecticut River and whether there is a unique Connecticut River population of Atlantic sturgeon. At this time, we are not able to conclude whether the juvenile sturgeon detected are indicative of sustained spawning in the river or whether they were the result of a single spawning event due to unique straying of the adults from the South Atlantic DPS's spawning rivers (see additional explanation in NMFS 2022b).

There is uncertainty related to trends in abundance for the New York Bight DPS (ASMFC, 2017). There are no abundance estimates for the entire DPS or for the entirety (i.e., all age classes) of the Hudson River or Delaware River populations. We also have no estimate of any potential spawning population in the Connecticut River. Collecting this information has proven difficult and time consuming given the Atlantic sturgeon's life history, the environments in which they occur, and mixing of the DPSs in estuarine and marine waters (NMFS 2022b).

The ASMFC concluded for their 2024 stock assessment update that abundance of the New York Bight DPS is depleted relative to historical levels, that there is a 59 percent probability that the New York Bight DPS abundance has increased since the implementation of the 1998 fishing moratorium, and a 20.2 percent probability that mortality for the New York Bight DPS exceeds the mortality threshold used for the assessment (ASMFC 2017). Moreover, new information suggests that the ASMFC conclusions primarily reflect the status and trend of only the Hudson River spawning population. The ASMFC did not estimate the abundance of the New York Bight DPS or otherwise quantify the trend in abundance because of the limited available information. In addition, as mentioned previously, the DPS-level estimates of mortality from the tagging model had wide credible intervals, so one cannot conclude with statistical certainty whether any of the DPS-level mortality estimates are above or below its respective thresholds.

Although there are no overall abundance estimates for the entire New York Bight DPS, there are some abundance estimates for specific life stages (e.g., natal juvenile abundance, spawning run abundance, and effective population size). Recent analyses suggest that the abundance of juvenile Atlantic sturgeon belonging to the Hudson River spawning population has increased, with double the average catch rate for the period from 2012–2019 compared to the previous eight years, from 2004–2011 (Pendleton and Adams, 2021). Standardizing juvenile catch data using zero-inflated modeling to account for environmental influences - such as water temperature and salt front positioning - has further clarified juvenile relative abundance trends and sampling catchability during periods of low density (DuFour and Qian, 2023). A study by Stich *et al*. (2025) found that relative abundance of juveniles increased from 2004 to 2015 prior to declining through 2022. Results also showed that detection-corrected indices for adult sturgeon indicated a consistent increase in relative abundance that was not readily apparent in raw catch indices (Stich *et al*. 2025). Furthermore, integrating genetic assignment and demographic data has helped refine adult abundance indices, demonstrate strong spawning reach fidelity, and characterize effective population size for the Hudson River spawning stock (White *et al*. 2024).

There is limited new information on the spawning population abundance in the Hudson River since the time of listing; Kazyak *et al.* (2020) used side scan sonar technology in conjunction with detections of previously tagged Atlantic sturgeon to estimate a Hudson River spawning run size of 466 sturgeon (95% CRI = 310-745) in 2014. Another method for assessing the number of spawning adults is through determinations of effective population size (the number of individuals that effectively participates in producing the next generation, as discussed above (See NMFS 2022b for more information). The estimates of effective population size for the Hudson River spawning population from separate studies and based on different age classes are relatively similar to each other: 198 (95% CI=171.7-230.7) based on sampling of subadults captured off of Long Island across multiple years, 156 (95% CI=138.3-176.1) based on sampling of natal juveniles in multiple years (O'Leary *et al*. 2014; Waldman *et al*. 2019), and 144.2 (95% CI=82.9-286.6) based on samples from a combination of juveniles and adults (ASMFC 2017).

As described in the Status Review and listing rule, in addition to capture in fisheries operating in Federal waters, bycatch and mortality also occur in state fisheries; however, the primary fishery (shad) that impacted juvenile sturgeon in the Hudson River, closed and there is no indication that it will reopen soon.

In the Hudson River, sources of mortality include vessel strikes and entrainment in dredges. Impingement at water intakes including the Danskammer, Roseton, Indian Point, and Salem and Hope Creek (on the Delaware River) power plants have also occurred, although a few of those plants are no longer active. Recent information from surveys of juveniles indicates that the number of young Atlantic sturgeon in the Hudson River is increasing compared to recent years, but is still low compared to the 1970s. There is currently not enough information regarding any life stage to establish a trend for the entire Hudson River population. Kazyak *et al*. (2020) integrated side-scan sonar with acoustic telemetry to estimate size of the 2014 spawning run for the Hudson River (N=466, 95% CI = 310-745). Taking reported spawning intervals into account, the estimate appears similar to the historical total adult population estimate by Kahnle *et al*. (2007).

There is no total abundance estimate for the Delaware River population of Atlantic sturgeon. Harvest records from the 1800s indicate that this was historically a large population with an estimated 180,000 adult females prior to 1890 (Secor and Waldman 1999, Secor 2002). Sampling in 2009 to target young of year Atlantic sturgeon in the Delaware River (i.e., natal sturgeon) resulted in the capture of 34 young of year, ranging in size from 178 to 349 mm TL (Fisher 2009) and the collection of 32 young of year Atlantic sturgeon in a separate study (Brundage and O'Herron in Calvo *et al.* 2010). Genetics information collected from 33 of the 2009-year class young of year indicates that at least three females successfully contributed to the 2009-year class (Fisher 2011). Therefore, while the capture of young of year in 2009 provides evidence that successful spawning is still occurring in the Delaware River, the relatively low numbers suggest the existing riverine population is limited in size. The Delaware Division of Fish and Wildlife (DFW) has conducted juvenile abundance surveys in the Delaware River in most years since 2010. The estimated abundance in 2014 was 3,656 (95% CI = 1,935–33,041) age 0-1 juvenile Atlantic (Hale *et al*. 2016). Estimates for the Delaware River effective population size by the same authors and using the same methods as described above for the Hudson River were: 108.7 (95% CI=74.7-186.1) and 40 (95% CI=34.7-46.2) for samples from subadults and natal juveniles, respectively (O'Leary *et al*. 2014, Waldman *et al*. 2019), and 56.7 (95% CI=42.5-77.0) based on samples from a combination of juveniles and adults (ASMFC 2017).

White *et al*. (2022) estimated the number of adults (N_s) in the Delaware River that successfully reproduced in order to create a cohort of offspring by using genetic pedigrees constructed from progeny genotypes. N_s estimates the number of successful breeders and is not synonymous with effective population size (N_e) or effective number of breeders (N_b) as these metrics describe genetic processes (e.g., inbreeding and genetic drift; Jamieson & Allendorf, 2012; Waldman e*t*

al., 2019; Wang *et al*., 2016). White *et al*. (2022) estimated that N_s ranged from 42 (95 percent CI: 36-64) spawners in 2014 to 130 (95% CI: 116-138) spawners in 2017 during the years from 2013 to 2019. Because N_s only includes adults that generate at least one offspring during a single breeding season, it sets a lower bound on the size of the spawning run. Nevertheless, the genetics information indicates that at least 42 to 130 adults successfully contributed to the 2014- and 2017-year classes. White *et al*. (2022) concluded that bias in the data when sample size of offspring is small may result in the N_s being underestimated, as such, the N_s for Delaware River Atlantic sturgeon is likely between 125 and 250. Hale *et al.* (2016) estimated that 3,656 (95% CI = 1,935-33,041) early juveniles (young of year, age zero to one) utilized the Delaware River estuary as a nursery in 2014. Because White *et al*. (2021) found that the differences in estimated N_e between Atlantic sturgeon populations roughly corresponded to the differences in total population size, the Hudson River has one of the largest estimates of N_e while the Delaware River has one of the smallest estimates.

While the White *et al*. (2021) study did not address the status of short- and long-term viability of either population, the differences in estimated population size for the Hudson and Delaware River spawning populations and in N_e support the notion that the Hudson River spawning population is the more robust of the two spawning groups, as discussed in the 2022 Status Review and 2012 listing rule. This trend is further supported by genetic analyses that demonstrates Atlantic sturgeon originating from the Hudson River spawning population were more prevalent in mixed aggregations than sturgeon originating from the Delaware River spawning population, even when sampling occurred in areas and at times that targeted for adults belonging to the Delaware River spawning population (Wirgin *et al*., 2015; Wirgin *et al*., 2018).

As mentioned, there is no overall abundance estimate for the New York Bight DPS. Using Boucher (2025), we have estimated adult and subadult abundance of the New York Bight DPS, based on the estimated abundance of Atlantic sturgeon in nearshore marine waters from Cape Cod to Cape Hatteras (Boucher, 2025) and available information on the genetic composition of Atlantic sturgeon in those waters (Kazyak *et al*., 2021), to be at a minimum, approximately 24,963 Atlantic sturgeon, based upon the NEAMAP survey swept area model (Boucher, 2025). This number encompasses many age classes since subadults can be as young as one year old when they first enter the marine environment, and adults can live as long as 64 years *(Balazik et al*., 2012; Hilton *et al*., 2016).

Some of the impacts from the threats that contributed to the decline of the New York Bight DPS have been removed (e.g., directed fishing) or reduced as a result of improvements in water quality since passage of the Clean Water Act (CWA). In addition, there have been reductions in fishing effort in state and federal waters, which may result in a reduction in bycatch mortality of Atlantic sturgeon. Nevertheless, areas with persistent, degraded water quality, habitat impacts from dredging, continued bycatch in state and federally managed fisheries, vessel strikes, and changing environmental conditions remain significant threats to the New York Bight DPS.

In the marine range, New York Bight DPS Atlantic sturgeon are incidentally captured in federal and state managed fisheries, reducing survivorship of subadult and adult Atlantic sturgeon (Stein *et al.* 2004, ASMFC 2007). Recent estimates of adults and subadults were based upon the NEAMAP ocean population estimates from Boucher (2025) and the latest bycatch assessment by Hocking (2025). Based on mixed stock analysis results presented by Wirgin and King (2011), over 40 percent of the Atlantic sturgeon bycatch interactions in the Mid Atlantic Bight region were sturgeon from the New York Bight DPS. Individual-based assignment and mixed stock analysis of samples collected from sturgeon captured in Canadian fisheries in the Bay of Fundy indicated that approximately 1-2 percent were from the New York Bight DPS. The mixed stock analysis in Kazyak *et al*. (2021) determined that 37.5 percent of the Atlantic sturgeon bycatch interactions in the Mid-Atlantic Bight region were fish from the New York Bight DPS, however, Kazyak *et al*. (2020) found that 71.4 percent of the captures in the larger GARFO region (Maine to Virginia) were from the New York Bight DPS.

In the Hudson and Delaware Rivers, dams do not block access to historical habitat. The Holyoke Dam on the Connecticut River blocks further upstream passage; however, the extent that Atlantic sturgeon would historically have used habitat upstream of Holyoke is unknown. Connectivity may be disrupted by the presence of dams on several smaller rivers in the New York Bight region. Because no Atlantic sturgeon occur upstream of any hydroelectric projects in the New York Bight region, passage over hydroelectric dams or through hydroelectric turbines is not a source of injury or mortality in this area.

New York Bight DPS Atlantic sturgeon may also be affected by degraded water quality. In general, water quality has improved in the Hudson and Delaware over the past decades (Lichter *et al.* 2006, EPA, 2008). Both the Hudson and Delaware rivers, as well as other rivers in the New York Bight region, were heavily polluted in the past from industrial and sanitary sewer discharges. While water quality has improved and most discharges are limited through regulations, many pollutants persist in the benthic environment. This can be particularly problematic if pollutants are present on spawning and nursery grounds as developing eggs and larvae are particularly susceptible to exposure to contaminants. On December 1, 2022, the EPA issued a determination that revised Water Quality Standards are necessary for the Delaware River Estuary to meet the requirements of the Clean Water Act. Specifically, the EPA determined that the aquatic life designated uses and corresponding dissolved oxygen criterion in Zones 3, 4, and RKM 126.8 to 112.7 (RM 78.8 to 70.0) of Zone 5 of the Delaware River Estuary must be revised to protect the propagation of resident and migratory fish species, including Atlantic and shortnose sturgeon, which are likely experiencing adverse effects under the currently applicable Water Quality Standards that were established in 1967 (see EPA's proposed rule at 90 FR 46483, September 29, 2025).

Vessel strikes occur in the Delaware and Hudson rivers. A summary of recently available information is included in a recent assessment by NMFS (2022 b). NMFS has only minimum counts of the number of Atlantic sturgeon that are struck and killed by vessels because only

sturgeon that are found dead with evidence of a vessel strike are counted. Research, including a study that intentionally placed Atlantic sturgeon carcasses along the Delaware River in areas used by the public, suggests that most Atlantic sturgeon carcasses are not found and, when found, many are not reported to NMFS or to our sturgeon salvage coinvestigators (Balazik *et al.* 2012b, Balazik, pers. comm. in ASMFC 2017, Fox *et al.* 2020). Based on the reporting rates in their study, Fox *et al*. (2020) estimated that a total of 199 and 213 carcasses were present along the Delaware Estuary shoreline in 2018 and 2019, respectively. Delaware State University (DSU) collaborated with the Delaware Division of Fish and Wildlife (DDFW) in an effort to document vessel strikes in 2005. Approximately 200 reported carcasses with over half attributed to vessel strikes based on a gross examination of wounds have been documented through 2019 (DiJohnson 2019). One hundred thirty-eight (138) sturgeon carcasses were observed on the Hudson River and reported to the NYSDEC between 2007 and 2015. Of these, 69 are suspected of having been killed by vessel strike. Genetic analysis has not been completed on any of these individuals to date, given that the majority of Atlantic sturgeon in the Hudson River belong to the New York Bight DPS; we assume that the majority of the dead sturgeon reported to NYSDEC belonged to the New York Bight DPS. Given the time of year in which the fish were observed (predominantly May through July), it is likely that many of the adults were migrating through the river to the spawning grounds.

Studies have shown that to rebuild, Atlantic sturgeon can only sustain low levels of anthropogenic mortality (Boreman 1997, ASMFC, 2007, Kahnle *et al.* 2007, Brown and Murphy 2010). There are no empirical abundance estimates of the number of Atlantic sturgeon in the New York Bight DPS. We determined that the New York Bight DPS is currently at risk of extinction due to: (1) precipitous declines in population sizes and the protracted period in which sturgeon populations have been depressed; (2) the limited amount of current spawning; and (3) the impacts and threats that have and will continue to affect population recovery.

In 2018, we announced the initiation of a 5-year review for the New York Bight DPS. We reviewed and considered new information for the New York Bight DPS that has become available since this DPS was listed as endangered in February 2012. We completed the 5-year review for the DPS in February 2022 (NMFS 2022b); the review includes a summary of additional information available since the listing determination, including information on life history and threats. Based on the best scientific and commercial data available at the time of the review, we concluded that no change to the listing status is warranted.

4.2.2.4 Chesapeake Bay DPS of Atlantic sturgeon

The Chesapeake Bay DPS includes the following: all anadromous Atlantic sturgeon that spawn or are spawned in the watersheds that drain into the Chesapeake Bay and into coastal waters from the Delaware-Maryland border on Fenwick Island to Cape Henry, Virginia. The marine range of Atlantic sturgeon from the Chesapeake Bay DPS extends from Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida. Within this range, Atlantic sturgeon historically spawned in the Susquehanna, Potomac, James, York, Rappahannock, and Nottoway Rivers

(ASSRT 2007). Based on the review by Oakley (2003), 100 percent of Atlantic sturgeon habitat is currently accessible in these rivers since most of the barriers to passage (i.e., dams) are located upriver of where spawning is expected to have historically occurred (ASSRT 2007). Recent data confirms that Chesapeake Bay Atlantic sturgeon are most prevalent in the marine environment throughout the Mid-Atlantic Bight from Delaware to Cape Hatteras (Kazyak *et al*., 2021).

At the time of listing, the James River was the only known spawning river for the Chesapeake Bay DPS (ASSRT 2007, Hager, 2011, Balazik *et al*. 2012). Since the listing, evidence has been provided of both spring and fall spawning populations for the James River, as well as fall spawning in the Pamunkey River, a tributary of the York River, and fall spawning in Marshyhope Creek, a tributary of the Nanticoke River (Hager *et al*. 2014, Kahn *et al*. 2014, Balazik and Musick 2015, Richardson and Secor 2016, Secor *et al.* 2021). Detections of acoustically-tagged adult Atlantic sturgeon along with historical evidence suggests that Atlantic sturgeon belonging to the Chesapeake Bay DPS may be spawning in the Mattaponi and Rappahannock rivers as well (Hilton *et al*. 2016, ASMFC 2017a, Kahn *et al.* 2019). However, information for these populations is limited and the research is ongoing.

Age to maturity for Chesapeake Bay DPS Atlantic sturgeon is unknown. However, Atlantic sturgeon riverine populations exhibit clinal variation with faster growth and earlier age to maturity for those that originate from southern waters, and slower growth and later age to maturity for those that originate from northern waters (75 FR 61872, October 6, 2010). There is currently no total abundance estimate for the Chesapeake Bay DPS; however, we have estimated subadult and adult abundance in nearshore marine waters from Cape Cod to Cape Hatteras and concluded that, at a minimum, approximately 10,332 Atlantic sturgeon of those two age classes comprise the DPS, based upon the NEAMAP survey swept area model (Boucher, 2025). Tagging and research captures provided annual run estimates for the Pamunkey River from 2013 to 2018, and suggest a spawning run of up to 222 adults but with yearly variability, likely due to spawning periodicity (Kahn, 2019). Research in the Nanticoke River system suggests a small adult population based on a small total number of captures (i.e., 26 sturgeon) and the high rate of recapture across several years of study (Secor *et al.*, 2022). By comparison, 373 different adult-sized Atlantic sturgeon (i.e., total count does not include recaptures of the same fish and this is likely a minimum count) were captured in the James River from 2009 through spring 2014 (Balazik & Musick, 2015). Most recently, Coleman *et al.* (2024) estimated that 32 (95% confidence interval [CRI] = 23-47) and 70 (95% CRI = 49-105) Atlantic sturgeon used the Marshyhope Creek-Nanticoke River system in 2020 and 2021, respectively. In both years, high spawning run connectivity between Marshyhope Creek and the upper Nanticoke River was observed. Overall, run estimates supported previous hypotheses that this river system supports a very small population and that both Marshyhope Creek and the upper Nanticoke River serve as important areas for spawning activity (Coleman *et al*., 2024).

There are also several estimates of effective population (N_e) size for Atlantic sturgeon spawned in the James River although only one study examined the effective population size of both the

spring and fall spawning populations. Nevertheless, the estimates of effective population size from separate studies and based on different age classes are similar. They are: 62.1 (95% CI=44.3-97.2) based on sampling of subadults captured off of Long Island across multiple years; 32 (95% CI=28.8-35.5) based on sampling of natal juveniles and adults in multiple years (Waldman *et al*., 2019); 40.9 (95% CI=35.6-46.9) based on samples from a combination of juveniles and adults (ASMFC 2019); and 44 (95% CI=26-79) and 46 (95% CI=32-71) for the spring and fall spawning populations, respectively, based on sampling of adults (Balazik, Farrae, *et al*., 2017). There is a single estimate of 12.2 (95% CI = 6.7-21.9) for the Nanticoke River system (Secor *et al*., 2022), and also a single estimate of 7.8 (95% CI=5.3-10.2) for the York River system based on samples from adults captured in the Pamunkey River (ASMFC 2017).

Several threats play a role in shaping the current status of Chesapeake Bay DPS Atlantic sturgeon. Historical records provide evidence of the large-scale commercial exploitation of Atlantic sturgeon from the James River and Chesapeake Bay in the 19th century (ASMFC 1998a; ASSRT 2007; Bushnoe *et al*., 2005; Hildebrand & Schroeder, 1928; Secor, 2002; Vladykov & Greeley, 1963) as well as subsistence fishing and attempts at commercial fisheries as early as the 17th century (ASSRT 2007; Balazik *et al*., 2010; Bushnoe *et al*., 2005; Secor, 2002). Habitat disturbance caused by in-river work, such as dredging for navigational purposes, reduced available spawning habitat in the James River (ASSRT 2007; Bushnoe *et al*., 2005; Holton & Walsh, 1995). At this time, we do not have information to quantify this loss of spawning habitat.

Decreased water quality also threatens Atlantic sturgeon of the Chesapeake Bay DPS, especially since the Chesapeake Bay system is vulnerable to the consequences of nutrient enrichment due to a relatively low tidal exchange and flushing rate, large surface-to-volume ratio, and strong stratification during the spring and summer months (ASMFC 1998b; ASSRT 2007; EPA 2008; Pyzik *et al*., 2004). These conditions contribute to reductions in dissolved oxygen levels throughout the Bay. The availability of nursery habitat, in particular, may be limited given the recurrent hypoxia (low dissolved oxygen) conditions within the Bay (Niklitschek & Secor, 2005, 2010). Heavy industrial development during the 20th century in rivers inhabited by sturgeon impaired water quality and impeded these species' recovery.

Although there have been improvements in some areas of the Bay's health, the ecosystem remains in poor condition. In 2022, the Chesapeake Bay Foundation gave the overall health index of the Bay a grade of 32 percent (D+) based on the best available information about the Chesapeake Bay for indicators representing three major categories: pollution, habitat, and fisheries (Chesapeake Bay Foundation, 2022). The score remained unchanged from 2020; however, of the 13 indicators assessed, three improved, three declined, and seven stayed the same. While 32 percent is one percent lower than the state of the Bay score in 2018, this was an 18.5 percent increase from the first State of the Bay report in 1998 which gave the Bay a score of 27 percent (D). According to the Chesapeake Bay Foundation, the unchanged score is largely a result of failures to make needed changes on farmland to reduce pollution, but noted improvements due to the promising results from oyster reef restoration, regulations allowing the

striped bass population to rebuild by 2029, less phosphorous in the water and a smaller dead zone. At this time, we do not have sufficient information to quantify the extent that degraded water quality affects habitat or individuals in the James River or throughout the Chesapeake Bay.

Vessel strikes of Atlantic sturgeon have been observed in the James River (ASSRT ASMFC, 2017; 2007; Balazik, Reine, *et al*., 2012; NMFS, 2022a). More than 100 Atlantic sturgeon carcasses have been salvaged in the James River since 2007 and additional carcasses were reported but could not be salvaged (Greenlee *et al*., 2019). Many of the salvaged carcasses had evidence of a fatal vessel strike. In addition, vessel struck Atlantic sturgeon have been found in other parts of the Chesapeake Bay DPS's range including in the York and Nanticoke river estuaries, within Chesapeake Bay, and in marine waters near the mouth of the Bay since the DPS was listed as endangered (NMFS Sturgeon Salvage Permit Reporting; Secor *et al*., 2021). New research, including a study conducted along the Delaware River that intentionally placed Atlantic sturgeon carcasses in areas used by the public, suggests that most Atlantic sturgeon carcasses are not found and, when found, many are not reported to NMFS or to our sturgeon salvage co-investigators (Balazik, pers. comm. in ASMFC 2017; Balazik, Reine, *et al*., 2012; Fox *et al*., 2020). There has been an increased number of vessel struck sturgeon reported in the James River in recent years (ASMFC 2017). However, it is unknown to what extent the numbers reflect increased carcass reporting.

In the marine and coastal range of the Chesapeake Bay DPS from Canada to Florida, fisheries bycatch in federally and state-managed fisheries poses a threat to the DPS, reducing survivorship of subadults and adults and potentially causing an overall reduction in the spawning population (ASMFC 2007; ASSRT 2007; Stein *et al*., 2004). Of the of Atlantic sturgeon incidentally caught in the Bay of Fundy, about 1 percent were Chesapeake Bay DPS fish (Wirgin *et al.* 2012). Studies have shown that Atlantic sturgeon can only sustain low levels of bycatch mortality (Boreman 1997, ASMFC 2007, Kahnle *et al.* 2007). The Chesapeake Bay DPS is currently at risk of extinction given: (1) precipitous declines in population sizes and the protracted period in which sturgeon populations have been depressed; (2) the limited amount of current spawning; and (3) the impacts and threats that have and will continue to affect the potential for population recovery.

In 2018, we announced the initiation of a 5-year review for the Chesapeake Bay DPS. We reviewed and considered new information for the Chesapeake Bay DPS that has become available since this DPS was listed as endangered in February 2012. We completed the 5-year review for the Chesapeake Bay DPS in February 2022 (NMFS 2022c); the review includes a summary of additional information available since the listing determination, including information on life history and threats. Based on the best scientific and commercial data available at the time of the review, we concluded that no change to the listing status is warranted.

4.2.2.5 Carolina DPS of Atlantic sturgeon

The Carolina DPS includes all Atlantic sturgeon that spawn or are spawned in the watersheds (including all rivers and tributaries) from Albemarle Sound southward along the southern Virginia, North Carolina, and South Carolina coastal areas to Charleston Harbor. The marine range of Atlantic sturgeon from the Carolina DPS extends from the Hamilton Inlet, Labrador, Canada, to Cape Canaveral, Florida.

Rivers in the Carolina DPS considered to be spawning rivers include the Neuse, Roanoke, Tar-Pamlico, Cape Fear, and Northeast Cape Fear rivers, and the Santee-Cooper and Pee Dee river (Waccamaw and Pee Dee rivers) systems. Historically, both the Sampit and Ashley Rivers had spawning populations at one time. However, the spawning population in the Sampit River is believed to be extirpated and the current status of the spawning population in the Ashley River is unknown. We have no information, current or historical, of Atlantic sturgeon using the Chowan and New Rivers in North Carolina. Recent telemetry work by Post *et al*. (2014) indicates that Atlantic sturgeon do not use the Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina. These rivers are short, coastal plains rivers that most likely do not contain suitable habitat for Atlantic sturgeon. Fish from the Carolina DPS likely use other river systems than those listed here for their specific life functions.

Historical landings data indicate that between 7,000 and 10,500 adult female Atlantic sturgeon were present in North Carolina prior to 1890 (Armstrong and Hightower 2002, Secor 2002). Secor (2002) estimates that 8,000 adult females were present in South Carolina during that same period. Reductions from the commercial fishery and ongoing threats have drastically reduced the numbers of Atlantic sturgeon within the Carolina DPS. Currently, the Atlantic sturgeon spawning population in at least one river system within the Carolina DPS has been extirpated, with a potential extirpation in an additional system. The ASSRT estimated the remaining river populations within the DPS to have fewer than 300 spawning adults; this is thought to be a small fraction of historic population sizes (ASSRT 2007). There is currently no total abundance estimate for the Carolina DPS; however, we have estimated subadult and adult abundance in nearshore marine waters from Cape Cod to Cape Hatteras and concluded that, at a minimum, approximately 2,617 Atlantic sturgeon of those two age classes comprise the DPS, based upon the NEAMAP survey swept area model (Boucher, 2025).

There are also several estimates of effective population (N_e) size for Atlantic sturgeon spawned in Abermarle Sound and the Pee Dee River (spring and fall spawning runs). This information is tabulated in Table 10.

Table 10. Available Estimates of Effective Population Sizes (N_e) in the Carolina DPS.

River	Effective Population Size (N_e) (95% CI)	Sample Size	Collection Years	Reference
	14.2 (11.8-17.1)	37	1998-2008	ASMFC (2017)

River	Effective Population Size (N_e) (95% CI)	Sample Size	Collection Years	Reference
Albemarle Sound	19.0 (16.5–20.6)	88	1998, 2006-2011, 2013-2014	Waldman *et al*. (2019)
	29.5 (24.2-36.3)	71	1998, 2006-2009, 2012, 2015 2016	White *et al*. (2021)
Pee Dee	Fall Run – 82 (60.3-122.1)	50	2011, 2012, 2017-2019	White *et al.* (2021)
	Spring Run – 16.4 (12.8-20.6)	66	2012, 2017-2019	White *et al*. (2021)

The Carolina DPS was listed as endangered under the ESA as a result of a combination of habitat curtailment and modification, overutilization (i.e., being taken as bycatch) in commercial fisheries, and the inadequacy of regulatory mechanisms in ameliorating these impacts and threats.

The modification and curtailment of Atlantic sturgeon habitat resulting from dams, dredging, and degraded water quality is contributing to the status of the Carolina DPS. Dams have curtailed Carolina DPS Atlantic sturgeon spawning and juvenile developmental habitat by blocking over 60 percent of the historical sturgeon habitat upstream of the dams in the Cape Fear and Santee-Cooper River systems. Water quality (velocity, temperature, and dissolved oxygen) downstream of these dams, as well as on the Roanoke River, has reduced, which modifies and curtails the extent of spawning and nursery habitat for the Carolina DPS. Dredging in spawning and nursery grounds modifies the quality of the habitat and is further curtailing the extent of available habitat in the Cape Fear and Cooper Rivers, where Atlantic sturgeon habitat has already been modified and curtailed by the presence of dams. Reductions in water quality from terrestrial activities have modified habitat utilized by the Carolina DPS. In the Pamlico and Neuse systems, nutrient-loading and seasonal anoxia are occurring, associated in part with concentrated animal feeding operations (CAFOs). Heavy industrial development and CAFOs have degraded water quality in the Cape Fear River. Water quality in the Waccamaw and Pee Dee rivers is affected by industrialization and riverine sediment samples contain high levels of various toxins, including dioxins. Additional stressors arising from water allocation and climate change threaten to exacerbate water quality problems that are already present throughout the range of the Carolina DPS. The removal of large amounts of water from the system will alter flows, temperature, and DO. Existing water allocation issues will likely be compounded by population growth and potentially, by changing environmental conditions. Changing environmental conditions are also predicted to elevate water temperatures and exacerbate nutrient-loading, pollution inputs, and lower DO, all of which are current stressors to the Carolina DPS.

Overutilization of Atlantic sturgeon from directed fishing caused initial severe declines in Atlantic sturgeon populations in the Southeast, from which they have never rebounded. Further, continued overutilization of Atlantic sturgeon as bycatch in commercial fisheries is an ongoing

impact to the Carolina DPS. Little data exists on bycatch in the Southeast and high levels of bycatch underreporting are suspected. Stress or injury to Atlantic sturgeon taken as bycatch but released alive may result in increased susceptibility to other threats, such as poor water quality (e.g., exposure to toxins and low DO). This may result in reduced ability to perform major life functions, such as foraging and spawning, or even post-capture mortality.

As a wide-ranging anadromous species, Carolina DPS Atlantic sturgeon are subject to numerous Federal (U.S. and Canadian), state and provincial, and inter-jurisdictional laws, regulations, and agency activities. While these mechanisms have addressed impacts to Atlantic sturgeon through directed fisheries, there are currently no mechanisms in place to address the significant risk posed to Atlantic sturgeon from commercial bycatch. Though statutory and regulatory mechanisms exist that authorize reducing the impact of dams on riverine and anadromous species, such as Atlantic sturgeon, and their habitat, these mechanisms have proven inadequate for preventing dams from blocking access to habitat upstream and degrading habitat downstream. Further, water quality continues to be a problem in the Carolina DPS, even with existing controls on some pollution sources. Current regulatory regimes are not necessarily effective in controlling water allocation issues (e.g., no restrictions on interbasin water transfers in South Carolina, the lack of ability to regulate non-point source pollution, etc.).

In the 2023 5-year review for the Carolina DPS, NMFS Southeast Regional Office reviewed and considered new information for the DPS that has become available since listing this DPS as endangered in February 2012. In the review, NMFS concluded that the Carolina DPS's demographic risk is "High" because of its productivity (i.e., relatively few adults compared to historical levels and irregular spawning success), abundance (i.e., riverine populations vary significantly and abundance is generally low in the DPS, overall), and spatial distribution (i.e., riverine populations and connectivity vary, creating inconsistent population coverage across the DPS and potentially limited ability to repopulate extirpated river populations). However, NMFS also concluded that the Carolina DPS' potential to recover is also "High" because man-made threats that have a major impact on the species' ability to persist have been identified (e.g., bycatch in federally-managed fisheries, dams blocking access to spawning habitat, dredging, vessel strikes), the DPS' response to those threats are well understood, management or protective actions to address major threats are primarily under U.S. jurisdiction or authority, and management or protective actions are technically feasible even if they require further testing (e.g., gear modifications to minimize dredge or fishing gear interactions). The review includes a summary of additional information available since the listing determination, including information on life history and threats. Based on the best scientific and commercial data available at the time of the review, the review concluded that no change to the listing status is warranted (NMFS 2023a).

4.2.2.6 South Atlantic DPS of Atlantic sturgeon

The South Atlantic DPS includes all Atlantic sturgeon that spawn or are spawned in the watersheds (including all rivers and tributaries) of the Ashepoo, Combahee, and Edisto Rivers

(ACE) Basin southward along the South Carolina, Georgia, and Florida coastal areas to the St. Johns River, Florida.

Rivers known to have current spawning populations within the range of the South Atlantic DPS include the Combahee, Edisto, Savannah, Ogeechee, Altamaha, St. Marys, and Satilla Rivers. Recent telemetry work by Post *et al.* (2014) indicates that Atlantic sturgeon do not use the Sampit, Ashley, Ashepoo, and Broad-Coosawhatchie Rivers in South Carolina. These rivers are short, coastal plains rivers that most likely do not contain suitable habitat for Atlantic sturgeon. Post *et al*. (2014) also found Atlantic sturgeon only use the portion of the Waccamaw River downstream of Bull Creek. Due to manmade structures and alterations, spawning areas in the St. Johns River are not accessible and therefore do not support a reproducing population.

Secor (2002) estimates that 8,000 adult females were present in South Carolina prior to 1890. Prior to the collapse of the fishery in the late 1800s, the sturgeon fishery was the third largest fishery in Georgia. Secor (2002) estimated from U.S. Fish Commission landing reports that approximately 11,000 spawning females were likely present in the state prior to 1890. Reductions from the commercial fishery and ongoing threats have drastically reduced the numbers of Atlantic sturgeon within the South Atlantic DPS. Currently, the Atlantic sturgeon spawning population in at least one river system within the South Atlantic DPS has been extirpated. The Altamaha River population of Atlantic sturgeon, with an estimated 343 adults spawning annually, is believed to be the largest population in the Southeast, yet is estimated to be only 6 percent of its historical population size. The ASSRT estimated the abundances of the remaining river populations within the DPS, each estimated to have fewer than 300 spawning adults, to be less than one percent of what they were historically (ASSRT 2007). There is currently no total abundance estimate for the South Atlantic DPS; however, we have estimated subadult and adult abundance in nearshore marine waters from Cape Cod to Cape Hatteras and concluded that, at a minimum, approximately 6,154 Atlantic sturgeon of those two age classes comprise the DPS, based upon the NEAMAP survey swept area model (Boucher 2025).

The South Atlantic DPS was listed as endangered under the ESA as a result of a combination of habitat curtailment and modification, overutilization (i.e., being taken as bycatch) in commercial fisheries, and the inadequacy of regulatory mechanisms in ameliorating these impacts and threats.

The stock assessment also estimated effective population sizes (N_e) when possible. For the South Atlantic DPS, the assessment reported N_e for the Edisto, Savannah, Ogeechee, and Altamaha rivers (Table 11). Additional estimates of N_e have been conducted since the completion of the assessment, including for additional river systems; Table 11 reports those estimates. White *et al*. (2021) cautions that because the populations they considered were sampled at varying temporal scales and intensities and represented a mixture of single and mixed-cohort samples, the N_e estimates they report should be interpreted with reservation as they technically represent a value between true N_e and the effective number of breeders. They also

state that while their estimates are valuable for comparing the general magnitude of difference among populations, they should not be used to make inferences about long-term population viability (White *et al*., 2021).

Table 11. Available estimates of Effective Population Sizes (N_e) in the rivers of the South Atlantic DPS.

River	Effective Population Size (N_e) (95% CI)	Sample Size	Collection Years	Reference
Edisto	55.4 (36.8-90.6)	109	1996-2005	ASMFC (2017)
	Fall Run – 48.0 (44.7-51.5)	1,154	1996-2004	Farrae *et a*l. (2017)
	Fall Run (82 (60.3-122.1)	373	1996, 1998, 2001-2003, 2005	White *et al*. (2021)
	Spring Run – 13.3 (12.1-14.6)	198	1998, 2003	Farrae *et al*. (2017)
	Spring Run – 16.4 (12.8-20.6)	123	1998, 2003	White *et al*. (2021)
	60.0 (51.9-69.0)	145	1996, 1998, 2005	Waldman *et al*. (2018)
Savannah	126.5 (88.1-205)	98	2000-2013	ASMFC (2017)
	123 (103.1-149.4)	161	2013, 2014, 2017	Waldman *et al.* (2018)
	154.5 (99.6-287.7)	134	2000, 2007, 2208, 2013, 2017, 2018	White *et al.* (2021)
Ogeechee	32.2 (26.9-38.8)	115	2003-2015	ASMFC (2017)
	26 23.9–28.2	200	2007-2009, 2014-2017	Waldman *et al*. (2018)
	23.9 (22.2-25.7)	197	2007-2009, 2014-2017	Fox *et al.* (2019)
	Spring Run – 31.1 (24.3-40.2)	92	2003, 2007, 2009, 2014, 2015, 2016	White *et al*. (2021)
	Fall Run – 56.5 (36.3-103.6)	55	2003, 2004, 2008, 2009, 2015, 2016	White *et al.* (2021)
Altamaha	111.9 (67.5-216.3)	186	2005-2015	ASMFC (2017)
	149 (128.7–174.3)	245	2005, 2011, 2014, 2016-2017	Waldman *et al*. (2018)
	142.1 (124.2-164.0)	268	2005, 2011, 2014-2017	Fox *et al*. (2019)
	141.7 (73.4-399)	189	2005, 2010, 2011, 2018	White *et al*. (2021)
Satilla	21 (18.7–23.2)	68	2015-2016	Waldman *et al*. (2018)
	11.4 (9.1-13.9)	74	2010, 2014, 2016	White *et al*. (2021)

River	Effective Population Size (N_e) (95% CI)	Sample Size	Collection Years	Reference
St. Marys	1 (1.3–2.0)	14	2014-2015	Waldman *et al*. (2018)

The modification and curtailment of Atlantic sturgeon habitat resulting from dredging and degraded water quality is contributing to the status of the South Atlantic DPS. Maintenance dredging is currently modifying Atlantic sturgeon nursery habitat in the Savannah River and modeling indicates that the proposed deepening of the navigation channel will result in reduced DO and upriver movement of the salt wedge, curtailing spawning habitat. Dredging is also modifying nursery and foraging habitat in the St. Johns River. Reductions in water quality from terrestrial activities have modified habitat utilized by the South Atlantic DPS Non-point source inputs are causing low DO in the Ogeechee River and in the St. Marys River, which completely eliminates juvenile nursery habitat in summer. Low DO has also been observed in the St. Johns River in the summer. Sturgeon are more sensitive to low DO and the negative (metabolic, growth, and feeding) effects caused by low DO increase when water temperatures are concurrently high, as they are within the range of the South Atlantic DPS. Additional stressors arising from water allocation and climate change threaten to exacerbate water quality problems that are already present throughout the range of the South Atlantic DPS. Large withdrawals of over 240 million gallons per day (mgd) of water occur in the Savannah River for power generation and municipal uses. However, users withdrawing less than 100,000 gallons per day (gpd) are not required to get permits, so actual water withdrawals from the Savannah and other rivers within the range of the South Atlantic DPS are likely much higher. The removal of large amounts of water from the system will alter flows, temperature, and DO. Water shortages and "water wars" are already occurring in the rivers occupied by the South Atlantic DPS and will likely be compounded in the future by population growth and potentially by climate change. Climate change is also predicted to elevate water temperatures and exacerbate nutrient-loading, pollution inputs, and lower DO, all of which are current stressors to the South Atlantic DPS.

Overutilization of Atlantic sturgeon from directed fishing caused initial severe declines in Atlantic sturgeon populations in the Southeast, from which they have never rebounded. Further, continued overutilization of Atlantic sturgeon as bycatch in commercial fisheries is an ongoing impact to the South Atlantic DPS. The loss of large, mature subadults and adults as a result of bycatch impacts Atlantic sturgeon populations because they are a long-lived species, have an older age at maturity, have lower maximum fecundity values, and a large percentage of egg production occurs later in life. Little data exist on bycatch in the Southeast and high levels of bycatch underreporting are suspected. However, fisheries are known to incidentally catch Atlantic sturgeon throughout the marine range of the species and in some riverine waters as well. Because Atlantic sturgeon mix extensively in marine waters and may access multiple river systems, they are subject to catch in multiple fisheries throughout their range. In addition, stress or injury to Atlantic sturgeon taken as bycatch but released alive may result in increased susceptibility to other threats, such as poor water quality (e.g., exposure to toxins and low DO).

This may result in reduced ability to perform major life functions, such as foraging and spawning, or even post-capture mortality.

As a wide-ranging anadromous species, Atlantic sturgeon are subject to numerous Federal (U.S. and Canadian), state and provincial, and inter-jurisdictional laws, regulations, and agency activities. While these mechanisms have addressed impacts to Atlantic sturgeon through directed fisheries, there are currently no mechanisms in place to address the significant risk posed to Atlantic sturgeon from commercial bycatch. Though statutory and regulatory mechanisms exist that authorize reducing the impact of dams on riverine and anadromous species, such as Atlantic sturgeon, and their habitat, these mechanisms have proven inadequate for preventing dams from blocking access to habitat upstream and degrading habitat downstream. Further, water quality continues to be a problem in the South Atlantic DPS, even with existing controls on some pollution sources. Current regulatory regimes are not necessarily effective in controlling water allocation issues (e.g., no permit requirements for water withdrawals under 100,000 gpd in Georgia, no restrictions on interbasin water transfers in South Carolina, the lack of ability to regulate non-point source pollution.)

In the 2023 5-year review for the South Atlantic DPS, NMFS Southeast Regional Office reviewed and considered new information for the DPS that has become available since this DPS was listed as endangered in February 2012. In the review, NMFS concluded that the South Atlantic DPS' demographic risk is "High" because of its productivity (i.e., relatively few adults compared to historical levels and irregular spawning success), abundance (i.e., riverine populations vary significantly and abundance is generally low in the DPS, overall), and spatial distribution (i.e., riverine populations and connectivity vary, creating inconsistent population coverage across the DPS and potentially limited ability to repopulate extirpated river populations). However, NMFS also concluded that the South Atlantic DPS' potential to recover is also "High" because man-made threats that have a major impact on the species' ability to persist have been identified (e.g., bycatch in federally-managed fisheries, dams blocking access to spawning habitat, dredging, vessel strikes), the DPS' response to those threats are well understood, management or protective actions to address major threats are primarily under U.S. jurisdiction or authority, and management or protective actions are technically feasible even if they require further testing (e.g., gear modifications to minimize dredge or fishing gear interactions). The review includes a summary of additional information available since the listing determination, including information on life history and threats. Based on the best scientific and commercial data available at the time of the review, the review concluded that no change to the listing status is warranted (NMFS 2023b).

5 ENVIRONMENTAL BASELINE

Environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early

section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR §402.02). The environmental baseline for this Opinion includes the effects of several activities that may affect the survival and recovery of the listed species and critical habitat in the action area. The activities that shape the environmental baseline in the action area of this consultation generally include dredging operations, water quality, fisheries, scientific research, shipping and other vessel traffic, and recovery activities associated with reducing those impacts.

5.1 Federal Actions that have Undergone Section 7 Consultation

We have undertaken a number of formal and informal section 7 consultations to address the effects of federal actions on threatened and endangered species in the action area. Each of those consultations sought to develop ways to reduce the probability of adverse impacts of the action on listed species. A description of each is provided below with a focus on effects to shortnose and Atlantic sturgeon as these are the species being evaluated in the remainder of this Opinion.

5.1.1 EPA's Water Quality Criteria for the Chesapeake Bay and Tidal Tributaries (F/NER/2010/05732)

In the 2012 Biological Opinion, we consider the effects of EPA's approval of nutrient and sediment enrichment criteria (total maximum daily loads or TMDLs) for Maryland, Virginia, and the District of Columbia expressed as dissolved oxygen, water clarity and chlorophyll a criterion for the Chesapeake Bay and its tidal tributaries. In the Opinion, we concluded that the proposed action was likely to adversely affect but not likely to jeopardize the continued existence of shortnose sturgeon. The Opinion includes an Incidental Take Statement exempting the non-lethal take of shortnose sturgeon (harassment (i.e., avoidance or displacement) where habitat conditions will temporarily impair normal behavior patterns, particularly when dissolved oxygen levels fall below those protective of shortnose sturgeon).

The Chesapeake Bay Program Office has quantified the dissolved oxygen criterion attainment condition for open water (OW), deep water (DW), and deep channel (DC) for moving three-year periods from 1985-1987 to 2019-2021. EPA's analysis shows that water quality conditions in the Bay are not improving as readily as expected due to impacts from climate instability. EPA has concluded that the attainment measures for take detailed above and outlined in detail in the 2012 Opinion have not been exceeded.

5.1.2 Vessel Activity and Military Operations

Potential sources of adverse effects to Atlantic sturgeon from Federal vessel operations in or near the action area include operations of the U.S. Navy (USN) and the U.S. Coast Guard (USCG), which maintain the largest Federal fleets, as well as the Bureau of Ocean Energy Management (BOEM), Maritime Administration (MARAD), Environmental Protection Agency (EPA), NOAA, and ACOE. We have conducted formal consultations with the USN, USCG, EPA, and NOAA on their vessel-based operations. We have also conducted section 7 consultations with BOEM and MARAD on vessel traffic related to energy projects in the Greater Atlantic Region and implemented conservation measures. Through the section 7 process, where applicable, we

have and will continue to establish conservation measures for all these agency vessel operations to avoid or minimize adverse effects to listed species. To date, ocean-going vessels and military activities have not been identified as significant threats to sturgeon in the marine environment, but when vessels move into estuarine systems, such as the action area, the possibility exists for interactions between vessels and sturgeon.

In 2024, we completed formal consultation with BOEM regarding the Construction, Operation, Maintenance, and Decommissioning of the Maryland Wind Offshore Energy Project. The anticipated lethal take of Atlantic and shortnose sturgeon over the 35-year life of the project, inclusive of construction, operations, and decommissioning of Maryland Wind the Mar Win Construction Campaign, Momentum Wind Construction Campaign, and Future Development Construction Campaign from vessels operating in the Chesapeake Bay entrance area (to/from ports in MD and VA) is anticipated as follows:

Port	Species/DPS	Vessel Strike Mortality
MD and VA (transiting in Chesapeake Bay Entrance)	NYB DPS Atlantic Sturgeon	2
	Chesapeake Bay DPS Atlantic sturgeon	1

5.1.3 EPA's Registration of Pesticides containing Chlorpyrifos, Diazinon, and Malathion (F/FPR/2017/9241)

In 2017, NMFS completed an Opinion on the EPA's registration of certain pesticides (NMFS 2017d). Effects ranged from killing species directly to reductions in prey, and impaired growth. Species likely to be affected include Atlantic sturgeon (all five DPSs). In specifying the ITS, NMFS identified surrogates for anadromous fish (NMFS 2017d).

5.1.4 Research and Other Permitted Activities

Research activities either conducted or funded by Federal agencies within the action area may adversely affect Alantic and shortnose sturgeon. Several section 7 consultations on research activities have recently been completed, as described below.

Fish Surveys funded by the USFWS (GARFO-2023-00492)

USFWS Region 5 provides funds to 13 states and the District of Columbia under the Dingell-Johnson Sport Fish Restoration Grant program and the State Wildlife Grant Program. Vermont and West Virginia are the only two Northeast states that do not use these funds to conduct ongoing surveys in marine, estuarine or riverine waters where NMFS listed species are present. The eleven other states (Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia) and the District of Columbia are anticipated to carry out a total of 116 studies under these grant programs, mostly on an annual basis. There are several broad categories of fisheries surveys including: hook and

line; beach seine; bottom and surface trawl; fishway trap; fish lift; boat and backpack electrofishing; long line; fyke net; dip net; eel pot; fish pot; staked and drifted gill net; haul seine; hoop net; trap net; cast net; plankton net; push net; pound net; jugging; Virginia Crab dredge; and, trotline. These surveys occur in state waters (rivers, bays, estuaries, and in nearshore ocean waters), generally from Maine through Virginia. Several of the studies occur in the action area, specifically the Chesapeake Bay and middle to lower portions of the rivers that empty into the Bay in Maryland and Virginia waters. In Maryland, some of the survey activities covered in the consultation occur in the action area.

We reinitiated the biological opinion in 2023 which bundled the eleven independent actions carried out by USFWS (i.e., awarding of each grant fund to each state is an independent action). The biological opinion provides an ITS by activity and provided a summary by state. Of the 116 surveys proposed for funding in the 2023 Opinion, ESA-listed species (including shortnose sturgeon and Atlantic sturgeon) have been incidentally captured in 27 of them. Thirteen of the 27 surveys have resulted in captures of ESA-listed species over the past ten years. Overall, we anticipate that the surveys to be funded by USFWS and carried out in Virginia and Maryland over a five-year period (2023-2027) will result in the capture of up to four shortnose sturgeon (up to two may be lethal) and 183 Atlantic sturgeon (up to 11 may be lethal) (Table 12). There are five projects in Maryland and Virginia waters with reported takes from 2013-2023 (Maryland Pound Net Surveys, Maryland Striped Bass Gillnet Surveys, Virginia Juvenile Fish Trawl Surveys, Virginia ChesMMAP Trawl Surveys, and Virginia American Shad Gillnet Surveys) with one additional project that has resulted in takes dating back to the 2000s (Virginia Striped Bass Gillnet Surveys). This includes 98 reported takes of Atlantic sturgeon (two from Maryland Pound Net Surveys (both takes occurred in the Potomac River), eight from the Maryland Striped Bass Gillnet Surveys (one of the takes occurred in the Potomac River), one from the Virginia ChesMMAP Trawl Surveys, 62 from the Virginia Juvenile Fish Trawl Surveys, and 25 from the Virginia American Shad Gillnet Surveys). No takes of shortnose sturgeon have been reported.

Table 12. Take exempt for USFWS surveys carried out by Maryland and Virginia from 2023-2026

Study	shortnose sturgeon	Total Atlantic sturgeon	GOM DPS Atlantic sturgeon	NYB DPS Atlantic sturgeon	CB DPS Atlantic sturgeon	Carolina DPS Atlantic sturgeon	SA DPS Atlantic sturgeon
MD Coastal Bays	0	1	0	1	0	0	0
MD striped bass drift gillnet	0	5 (1 lethal)	1	2 (1 lethal)	1	0	1
MD pound nets	0	5	1	2	1	0	1
MD TOTAL	**0**	**11 (1 lethal)**	**2**	**5 (1 lethal)**	**2**	**0**	**2**
VA juvenile fish	1	55	6	27	8	3	11
VA ChesMMAP	1	2	1 GOM, CB, or SA	1	1 GOM, CB, or SA	0	1 GOM, CB, or SA
VA striped bass gillnet	1 (1 lethal)	2 (1 lethal)	0	0	2 (1 lethal)	0	0
VA shad gillnet	1 (1 lethal)	113 (9 lethal)	2	2	105 (9 lethal(	2	2
VA TOTAL	**4 (2 lethal)**	**172 (10 lethal)**	**9**	**30**	**116 (10 lethal)**	**5**	**14**

Section 10 Permits

We have issued research permits under section 10(a)(1)(A) of the ESA, which authorizes activities for scientific purposes or to enhance the propagation or survival of the affected species. The permitted activities can only be authorized when they are found to be not likely to jeopardize the continued existence of the listed species and are consistent with the purposes of the ESA, as outlined in section 2 of the Act.

Two section 10(a)(1)(A) permits are currently in effect for research activities on Atlantic sturgeon and shortnose sturgeon captured within the action area for this consultation. Permit 20134 is issued to the U.S. Fish and Wildlife Service and authorizes the collection, tagging, and sampling of live juvenile and adult Atlantic sturgeon and the mortality of up to 50 Atlantic sturgeon eggs and larvae; this permit expires in 2027. Permit 24016 is issued to Dr. Jason Kahn and authorizes the collection, tagging, and sampling of live juvenile and adult shortnose and Atlantic sturgeon, the mortality of a small number of shortnose Atlantic sturgeon eggs and larvae, and the unintentional mortality of a small number of shortnose and Atlantic sturgeon; this permit expires in 2031.

5.2 Non-Federally Regulated Fisheries

Atlantic sturgeon and shortnose sturgeon may be vulnerable to capture, injury, and mortality in fisheries occurring in Maryland state waters. Prior to listing, an Atlantic sturgeon "reward program" where fishermen received monetary rewards for reporting captures of Atlantic sturgeon, operated in Maryland. During its active run, commercial watermen voluntarily reported 1,710 live catches of Atlantic sturgeon. Additionally, the program recorded 32 shortnose sturgeon in the upper Chesapeake Bay between 1996 and 2000. Below, we discuss the different fisheries authorized by the state of Maryland and any available information on interactions between these fisheries and Atlantic sturgeon or shortnose sturgeon.

American shad fishery

Maryland authorizes only a catch-and-release recreational hook-and-line fishery for American shad; the commercial fishery has been closed since 1980. Recreational shad anglers are known to incidentally capture Atlantic sturgeon, representing a potential low-level source of injury or mortality within the action area.

Striped Bass Fishery

A commercial striped bass fishery is authorized in Maryland, including in the mainstem Chesapeake Bay, using pound net, gill net, and hook-and-line gear. Atlantic and shortnose sturgeon may be captured in any of these gear types operating in or near the action area; no estimates of sturgeon bycatch specific to the Maryland striped bass fishery are available. Coastwide, the striped bass fishery has historically accounted for a substantial share of reported Atlantic sturgeon recaptures, and gear soak time, season, and location are understood to be more important than gear type alone in determining bycatch mortality risk.

State Gillnet Fisheries

Large- and small-mesh gillnet fisheries occur in Maryland state waters, including portions of the upper Chesapeake Bay overlapping the action area. Atlantic sturgeon are known to be captured in gillnet gear; a historical reward program that operated in Virginia documented the majority of reported Atlantic sturgeon captures in drift gillnets and pound nets. State-reported gillnet bycatch of Atlantic sturgeon in Maryland waters has been low in recent years relative to other states in the region.

Poundnet Fishery

Pound nets with large mesh and stringer leaders are set in the Chesapeake Bay, including within or near the action area, and entanglement in this gear can be a source of injury or mortality to sturgeon. Atlantic sturgeon are known to become entrapped in pound nets and have been routinely documented in Maryland waters through historical reward-tagging programs. Modified leader requirements adopted under the Marine Mammal Protection Act's Bottlenose Dolphin Take Reduction Plan apply seasonally to some Virginia pound net gear but do not extend to the Maryland action area.

Horseshoe Crab
A horseshoe crab bait fishery occurs in Maryland waters, primarily using hand harvest, bottom trawl, and dredge methods, with a smaller biomedical-use fishery also authorized. Bycatch rates of Atlantic sturgeon in the horseshoe crab fishery have been documented as low (approximately 0.05 percent) in prior bycatch assessments, and a historical Maryland sturgeon reward program recorded only a single crab-pot capture of a wild Atlantic sturgeon over an 11-year period.

Other Fisheries
Blue crab, American eel, and Atlantic croaker fisheries also occur within or near the action area. Sturgeon are not known to interact meaningfully with the eel fishery. Atlantic sturgeon interactions with the Atlantic croaker fishery have been documented but not quantitatively assessed for Maryland waters specifically; a mortality rate of approximately 5 percent has been estimated for sturgeon captured in commercial trawls generally.

State Recreational Fisheries
Shortnose and Atlantic sturgeon have been documented in Maryland recreational fisheries; however, recreational bycatch risk in the open mainstem Bay - including the action area - is expected to be substantially lower than in tidal tributaries. The lower risk is due to the lack of ecological and operational overlap between sturgeon and local recreational fishing effort. Angling at the bridge is heavily concentrated around the physical pilings and focused on pelagic or structure-associated species, primarily striped bass (*Morone saxatilis*). The dominant fishing modalities—including trolling, mid-water chumming, and vertical jigging—do not deploy gear within the benthic zone occupied by sturgeon. Furthermore, the high-tackle, heavy-scent bottom-fishing practices targeting invasive ictalurids, which represent a primary source of sturgeon bycatch in tidal tributaries, are absent from this mesohaline portion of the mainstem. Consequently, while sturgeon physically pass through the action area, their exposure to recreational fishing stressors (e.g., hooking, trailing line, handling) is minimized by both their rapid, transient behavior and the mid-water nature of the localized fishery.

5.3 Other Activities

5.3.1 Maritime Industry

Private and commercial vessels, including fishing vessels, operating in the action area of this consultation also have the potential to interact with Atlantic and shortnose sturgeon. The effects of fishing vessels, recreational vessels, or other types of commercial vessels on ESA-listed species may involve disturbance or injury/mortality due to collisions or entanglement in anchor lines. The Port of Baltimore typically has over 100 vessel arrivals and departures per day and had approximately 3,000 inbound and 3,000 outbound commerce-carrying vessel trips in 2021 (ACOE 2021). According to the Sturgeon Stranding Database, between 2021 and 2026, eleven reports originated from Maryland; however, all of these reports were outside of the action area and only one showed signs of a vessel interaction (a “clean cut" with the back third of the fish missing). That individual was salvaged in 2025 at Elk Neck State Park – approximately 63 km

(39 mi) northeast of the Bridge. Listed species may also be affected by fuel oil spills resulting from vessel accidents. Fuel oil spills could affect animals through the food chain. However, these spills typically involve small amounts of material that are unlikely to adversely affect listed species. Larger oil spills may result from severe accidents, although these events would be rare and involve small areas. No direct adverse effects on Atlantic or shortnose sturgeon resulting from fishing vessel fuel spills have been documented.

5.3.2 Water Quality

Water quality data for the action area were obtained from multiple sources, including the Maryland Department of Natural Resources (MDNR) Eyes on the Bay Fixed Station Monthly Monitoring Program, MDNR's Chesapeake Bay Benthic Monitoring Program (CBBMP), the Chesapeake Bay Program (CBP) DataHub, the National Water Quality Monitoring Council (NWQMC) database, and near real-time data from the NOAA Chesapeake Bay Interpretive Buoy System (CBIBS) Annapolis buoy (Station AN), located approximately 5.6 km (3.5 mi) southwest of the Bay Bridge at the mouth of the Severn River. MDNR operates three dedicated long-term fixed monitoring stations in the immediate vicinity of the Bay Bridge: CB3.3C (Bay Bridge North), CB3.3E (Bay Bridge Northeast), and CB3.3W (Bay Bridge Northwest). These stations have been sampled monthly since 1985 and represent the most directly applicable long-term water quality record for the action area.

Water Temperature

Water temperature in the Chesapeake Bay at the Bay Bridge exhibits strong seasonal variation characteristic of the upper mesohaline mainstem. Surface temperatures at the Bay Bridge stations typically reach their annual minima during January and February, when values approach or occasionally fall near freezing, and their annual maxima during July and August. Long-term monthly mean surface water temperatures at stations CB3.3C, CB3.3W, and CB3.3E range from approximately 2–4°C (35.6-39.2°F) in winter to approximately 27–29°C (80.6-84.2°F) in midsummer, based on the MDNR fixed station monitoring record (MDNR, Eyes on the Bay, 2025). The CBIBS Annapolis buoy recorded a surface water temperature of 23.1°C (73.6°F) on June 10, 2026, consistent with expected early-summer conditions at this location. Annual mean surface water temperature across the monitoring record is approximately 17–18°C (62.6-64.4°F). These thermal conditions are ecologically significant because water temperatures above 28°C (82.4°F) have been demonstrated to have deleterious effects on Atlantic and shortnose sturgeon, and temperatures in this range occur with regularity at the Bay Bridge from approximately June through August.

Salinity

The Chesapeake Bay at the Bay Bridge is classified as a mesohaline system, with salinity typically ranging from 5 to 18 parts per thousand (ppt) depending on season, depth, and freshwater inflow from the Susquehanna River and other tributaries. The Bay Bridge is located within the CB3 segment of the Chesapeake Bay mainstem, characterized by moderate salinity generally ranging from 7 to 13 ppt, though values at the bridge location can exceed this range

during dry periods. The CBIBS Annapolis buoy recorded a surface salinity of 10.4 PSU on June 10, 2026. Long-term monthly mean surface salinities at the Bay Bridge stations generally reach their annual minima in spring (March through May), reflecting peak freshwater inflow from winter snowmelt and spring precipitation, and their annual maxima in late summer and fall (August through November) when tributary flows recede. Based on the MDNR fixed station monitoring record and CBP DataHub data for the action area, surface salinity at the Bay Bridge ranges from approximately 5–8 ppt at spring minima to approximately 13–16 ppt at late-season maxima. The BA documents surface salinity in the broader action area ranging from 0.50 to 22.32 ppt depending on sampling event, location, and depth, with bottom salinities consistently exceeding surface values due to the stratified, two-layer estuarine circulation characteristic of this segment of the Bay. Both Atlantic and shortnose sturgeon exhibit salinity-dependent habitat use across life stages, and the mesohaline conditions at the Bay Bridge represent suitable foraging and migratory habitat for subadult and adult individuals from spring through fall.

pH

Surface water pH in the action area is generally near neutral to slightly alkaline, consistent with the buffered mesohaline conditions of the mid-Bay. Based on CBP DataHub monitoring data for stations in the vicinity of the Bay Bridge, surface pH values typically range from approximately 7.1 to 9.1, with approximately 9–10 percent of surface records exceeding the upper COMAR criterion of 8.5, most commonly during periods of elevated phytoplankton productivity in summer. Bottom pH values show a narrower range and are less subject to photosynthesis-driven excursions. Long-term monthly mean pH at the Bay Bridge stations ranges from approximately 7.4–7.8 in winter to approximately 8.0–8.4 in summer, based on the MDNR fixed station monitoring record (MDNR, Eyes on the Bay, 2025).

Dissolved Oxygen

Bottom dissolved oxygen (DO) conditions at the Bay Bridge reflect the seasonal hypoxic dynamics characteristic of the stratified mesohaline mainstem. Surface DO values generally meet COMAR criteria throughout the year. Bottom DO readings, however, frequently fall below COMAR criteria during the summer stratification period, with 12 to 51 percent of bottom readings in the action area not meeting applicable COMAR criteria depending on season and designated habitat type, based on CBP DataHub monitoring data. Dissolved oxygen levels below 4.0 mg/L are known to have deleterious effects on Atlantic and shortnose sturgeon. The seasonal occurrence of bottom hypoxia at the Bay Bridge is therefore a relevant baseline condition for the effects analysis, as it constrains sturgeon depth distribution during summer and can influence their spatial overlap with construction activities.

5.3.3 Pollution

Anthropogenic sources of marine pollution, while difficult to attribute to a specific Federal, state, local, or private action, may affect Atlantic sturgeon and shortnose sturgeon in the action area. Sources of pollutants in the action area include point and nonpoint sources. Point sources include wastewater treatment facility outfalls and combined sewer overflow (CSO) outfalls.

Nonpoint sources of pollutants include polychlorinated biphenyls (PCBs); pesticides; stormwater runoff; groundwater discharges; and oil spills.

Nutrient loading from land-based sources, such as coastal communities and agricultural operations, is known to stimulate plankton blooms in closed or semi-closed estuarine systems. Nutrients, specifically nitrogen and phosphorus, are essential nutrients for plant growth, but elevated concentrations can result in degradation of the waterbody. Eutrophication is one process that can occur from an overabundance of nutrients. This process starts when algae feed on the excess nutrients that grow and spread, which can, block sunlight, and even potentially release toxins. Many studies have demonstrated the link between phytoplankton toxin production and nutrient availability (Brandenburg *et al.* 2020, Van de Waal *et al.* 2013). Harmful algal blooms affect zooplankton, macroinvertebrates, vertebrates (Landsberg 2002, Shumway *et al.* 2003). Algal blooms can occur naturally when elevated rainfall can increase nutrient loads, suggesting a link between eutrophication and the intensity and frequency of blooms (Philips *et al.* 2010). However, they are frequently associated with elevated nutrient concentrations due to anthropogenic factors. Untreated wastewater effluent during operation of CSOs and untreated stormwater runoff can contain significant amounts of nitrogen and phosphorus from domestic and industrial sources (EPA 2004). Algal blooms often occur during the summer months in slow-moving water and with warm water temperatures and also can occur in coastal environments, similar to the bloom discussed in Fire *et al.* (2012). In coastal waters of New England, blooms of *Alexandrium* can produce toxins and have occurred most often during summer months. Freshwater cyanobacteria or blue-green algae blooms occur in rivers and have the potential to produce toxins that can harm wildlife and aquatic life.

Effects to sturgeon may occur if increased nutrients produce toxic algal blooms that sturgeon ingest through prey items and through their gills also when toxins are present in the water column. Severe algal blooms have been linked to die-offs of sturgeon prey items, including polychaetes, amphipods, and gastropods (Simon and Dauer 1972, Roberts 1979, Landsberg *et al.* 2009) and other filter feeding organisms (Flewelling *et al.* 2004). When filter-feeding shellfish consume toxic microalgae and accumulate the toxins, this transfers toxins up to higher trophic levels, which can negatively impact sturgeon (Landsberg 2002). Fire *et al.* (2012) studied algal bloom impacts on adult shortnose sturgeon in New England waters and results suggested that sturgeon mortality occurred due to saxitoxin exposure through trophic transfer. Fire *et al*. (2012) concluded that the level of toxins that the sturgeon were exposed to were three times higher than the federal regulatory limit for seafood and may have led to the shortnose sturgeons death. However, algal blooms of this magnitude are extremely rare in New England waters. Concentrations of *Alexandrium* observed during the event described by Fire *et al.* (2012) exceeded the highest density of a bloom ever reported for the Gulf of Maine (D. Couture unpublished data, as cited in Fire *et al.* 2012). Uptake of toxins through fish gills is also a potential pathway for effects from algal blooms to sturgeon (Pierce *et al.* 2008, Fire *et al.* 2008). Fire *et al.* examined toxins present in fish collected from Florida waters during a toxic algal bloom (2008). Toxins were found in 91 percent of gill samples (n = 35) (Fire *et al.* 2008). However, Pierce *et al.* (2008) notes that fish have the ability to detoxify toxins and may recover

if removed from contaminated waters. Therefore, if sturgeon do come in contact with toxins in the water column, exposure would be limited and short in duration due to the transient nature and high mobility of sturgeon. In addition, contaminants could degrade habitat if pollution and other factors reduce the food available to sturgeon.

5.3.4 Coastal Development

Coastal development within the action area is dominated by the permanent infrastructure of the William Preston Lane, Jr. Memorial Bridge and localized shoreline stabilization (e.g., riprap, bulkheads) along the shoreline. These activities have a negligible impact on sturgeon foraging and migration because both Atlantic and shortnose sturgeon predominantly utilize the deep-water, offshore benthic channels to transit through the action area, well away from shallow, hardened shorelines. Furthermore, while artificial lighting from the bridge deck, navigation markers, and waterfront properties is an ongoing feature within the action area, it does not present a barrier to sturgeon. As a benthic species, sturgeon adapt to low-light, highly turbid estuarine environments, surface-level artificial light does not penetrate to the depths where sturgeon transit, resulting in no discernable impact on their migratory behavior or habitat utilization.

5.3.5 Vessel Traffic in the Action Area

Commercial, fishing, and recreational vessels use the Chesapeake Bay Federal Navigation Channels regularly. Atlantic and shortnose sturgeon may interact with vessels in the shipping lanes of these waterways if the vessels and individuals overlap in time and space.

There is a constant heavy flow of vessel traffic through the Chesapeake Bay including military, commercial, recreational, and fishing vessels. The Port of Baltimore is one of the nation's major commercial ports, ranking ninth among major U.S. ports for total foreign cargo handled and first nationally for volume of automobiles and light trucks, roll-on/roll-off heavy farm and construction machinery, imported sugar, and imported gypsum (MPA, 2024). In 2023, the Port handled a record 52.3 million tons of foreign cargo valued at approximately $80 billion (MPA, 2024). The Port of Baltimore typically has over 100 vessel arrivals and departures per day and had approximately 3,000 inbound and 3,000 outbound commerce-carrying vessel trips in 2021 (ACOE 2021). Vessel drafts varied greatly, with the Port's 50-foot-deep main shipping channel capable of accommodating some of the largest oceangoing vessels in service, including Neo-Panamax container ships exceeding 165,000 gross tons. The majority of vessels calling at the port contain a draft of 4.6 m (15 feet) or less (data gathered from Waterborne Commerce Statistics Center). According to the Sturgeon Stranding Database, between 2021 and 2026, eleven reports originated from Maryland; however, all of these reports are outside of the action area and only one showed signs of a vessel interaction (a “clean cut" with the back third of the fish missing). That individual was salvaged in 2025 at Elk Neck State Park – approximately 63 km (39 mi) northeast of the Bridge (data gathered from Waterborne Commerce Statistics Center).

5.4 Reducing Threats, Recovery Planning, and Research

5.4.1 Education and Outreach Activities

Education and outreach activities are some of the primary tools that will effectively reduce the threats to all protected species. For example, NMFS has been active in public outreach to educate fishermen about handling and resuscitation techniques for Atlantic sturgeon, and educates recreational fishermen and boaters on how to avoid interactions with these species. NMFS also has a program called "SCUTES" (Student Collaborating to Undertake Tracking Efforts for Sturgeon), which offers educational programs and activities about the movements, behaviors, and threats to sturgeon. NMFS intends to continue these outreach efforts in the action area in an attempt to reduce interactions with protected species, and to reduce the likelihood of injury to protected species when interactions do occur.

5.4.2 Salvage Program

A salvage program is in place for sturgeon. Sturgeon carcasses can provide pertinent life history data and information on new or evolving threats. Their use in scientific research studies can reduce the need to collect live sturgeon. Our Sturgeon Salvage Program is a network of individuals qualified to retrieve and/or use sturgeon carcasses and parts for scientific research and education. All carcasses and parts are retrieved opportunistically and participation in the network is voluntary. These activities are authorized under an ESA section 10 permit held by NMFS GARFO PRD.

5.4.3 Recovery Planning

Several conservation actions aimed at reducing threats to Atlantic and shortnose sturgeon are currently ongoing. NMFS produced a recovery plan outline for Atlantic sturgeon in 2018, which outlines recovery goals and criteria to recover all Atlantic sturgeon DPSs. More information can be found here: https://www.fisheries.noaa.gov/resource/document/recovery-outline-atlantic-sturgeon-distinct-population-segments.

A recovery plan for shortnose sturgeon was produced in 1998 and serves as an outline for how to recover populations of the shortnose sturgeon to levels of abundance at which they no longer require protection under the ESA (SSSRT 1998). More information can be found here: https://repository.library.noaa.gov/view/noaa/15971.

Numerous research activities are underway for sturgeon, involving us and other Federal, state, and academic partners, to obtain more information on the distribution and abundance of sturgeon throughout their range, including in the action area. Efforts are also underway to better understand threats faced by sturgeon and ways to minimize these threats, including bycatch and water quality. Fishing gear research is underway to design fishing gear that minimizes interactions with Atlantic sturgeon while maximizing retention of targeted fish species. Several states are in the process of preparing ESA section 10 Habitat Conservation Plans aimed at minimizing the effects of state fisheries on sturgeon.

5.4.4 Research Activity Guidelines

Research activities aid in the conservation of listed species by furthering our understanding of the species' life history and biological requirements. We recognize, however, that many scientific research activities involve capture and may pose some level of risk to individuals or to the species. Therefore, it is necessary for researchers to minimizes the adverse impacts of their activities on individuals while obtaining crucial information that will benefit the species. Guidelines developed by sturgeon researchers in cooperation with NMFS staff (Moser *et al*. 2000, Damon-Randall *et al*. 2010, Kahn and Mohead 2010) provide standardized research protocols that minimize the risk to sturgeon from capture, handling, and sampling. These guidelines must be followed by any entity receiving a federal permit to do research on Atlantic sturgeon.

5.5 Habitat within the Action Area

Chesapeake Bay

The Chesapeake Bay is approximately 320 km (200 mi) long and extends from Cape Henry and Cape Charles, Virginia to Havre de Grace, Maryland. It is 4.5 km (2.8 mi) wide at its narrowest (between Kent County's Plum Point near Newtown and the Harford County shore near Romney Creek) and 48 km (30 mi) at its widest (just south of the mouth of the Potomac River). Water depth in the bay averages 6.4 m (21 ft), reaching a maximum depth of 53 m (174 ft).

The typical tidal range in the Chesapeake Bay is approximately 0.87 m (2.85 ft), though this varies significantly with time of the month (spring and neap tides), storm activity, and specific location within the Bay. Tides are diurnal in the Chesapeake Bay, with two high and low tides per day. The mean discharge rate of Chesapeake Bay is approximately 2,500 cubic meters per second, over 80 percent of which is supplied by three rivers (the Susquehanna, Potomac, and James Rivers) (Goodrich 1988). Salinity typically ranges from 20-30 parts per thousand within the Chesapeake Bay. There is sufficient mixing so that anoxic waters are not typical within the action area; however, deep channels can become anoxic in the summer, particularly in the mid to upper Chesapeake Bay, causing a significant "dead zone" of hypoxic waters. The bathymetry of the Chesapeake Bay ranges from intertidal shallows to the deep channels, which generally lie within the immediate action area where dredging is proposed and typically range in depth from approximately -6.1 m (-20 ft) in side and/or natural and unmaintained channels to -15 m (-50 ft) within the channel itself. Bottom sediment types primarily include fine sands, silts, with small amounts of small gravel (College of William and Mary 2006).

Project vessels will travel through the Federal Navigation Channel from the Port of Baltimore to the project site. The current authorized depth of the channel is 16.8 m (55 ft), though most of the channel is approximately 15 m (50 ft) deep. The channel follows the natural bathymetry of lower the Chesapeake Bay. This natural channel, however, has been deepened, where needed, to accommodate larger vessels. More information on deepening that has occurred within the Federal Navigation Channel is in the *Environmental Baseline* section.

Cox Creek

Cox Creek is a tidal system both north and south of U.S. 50/301 that almost bisects Kent Island. This is a wide system that narrows where it is bridged by U.S. 50/301 and is approximately 175.3 m (575 ft) wide north of the roadway and 503 m (1,650 ft) wide south of the roadway. Although the FEMA 100-year floodplain is associated with this waterway both north and south of the road, there are no vegetated wetlands identified to the north. Large areas of estuarine common reed (*Phragmites australis*) wetland are located along the western bank, on the south side of the road.

5.5.1 Water Quality

Water quality data was gathered from MDE, Maryland Department of Natural Resources' (MDNR) Eyes on the Bay Program, and other monitoring programs accessed through the Chesapeake Bay Program (CBP) DataHub to assess water quality during the development of the Tier 2 Study NETR. In addition, water quality data from the National Water Quality Monitoring Council (NWQMC) database and in situ data were obtained from MDNR's Chesapeake Bay Benthic Monitoring Program (CBBMP). This section summarizes the water quality data for the watersheds within the action area.

Data available within the Chesapeake Bay closest to the western shore have sampling locations north of and beyond the action area, however, these locations are along the shoreline of the Chesapeake Bay and flow directly into the action area. Dissolved Oxygen (DO) data for this area reflects existing turbidity and shoreline erosion conditions, since DO and turbidity are inversely related, and provides baseline conditions for the area where the bridge would be constructed.

Recent chemical grab data from this part of the Chesapeake Bay is available for three monitoring locations from the NWQMC database, which indicated approximately 5 percent of pH records, 14 percent of all Enterococcus records, and 8 percent of fecal coliform records not meeting Code of Maryland Regulations (COMAR) criteria. Values for pH ranged from 6.1 to 9.0, which violated both the low and high COMAR criteria of 6.5 and 8.5, respectively. In general, DO values met COMAR criteria for the various designated habitats and seasons, with records infrequently falling below specific criteria. Salinity ranged from 1.9 to 16 ppt, depending on sampling event.

Sampling data is captured just north of the Bay Bridge landside connection with Anne Arundel County. In situ and grab sample water quality data for two locations in this area were gathered from the CBP DataHub, where approximately 10 percent of surface pH records exceeded the COMAR criterion of 8.5, with a maximum recorded value of 9.1. All surface DO readings met COMAR criteria for the various designated habitats and seasons, and between 7 percent and 29 percent of bottom DO readings fell below COMAR criteria, depending on the designated habitat and season. The full range of DO values observed across all seasons and habitat types is in Table 13. Chemical grab sample data was available for one monitoring location from the NWQMC database, indicating approximately 8 percent of all fecal coliform records exceeded the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL). Recent

in-situ water quality data for one location, available from CBBMP, revealed that there were no exceedances of water quality criteria, however, this location is well south of the action area and flowing away from the Bay Bridge. Salinity ranged from 0.61 to 18.48 ppt, depending on the sampling event, location, and depth.

Recent chemical grab sample data from one location in the Northern Eastern Bay MD 12-digit watershed, located downstream of the build alternatives, were available from the NWQMC database. Approximately 30 percent of all fecal coliform records exceed the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL).

Additional in situ and grab sample water quality data was retrieved from five sampling sites in the Kent Island True Bay MD 12-digit watershed, within the Chesapeake Bay, just north of the Bay Bridge. Data from two sites in the CBP DataHub and three sites in the NWQMC dataset indicated that approximately 9 percent of in situ surface records for pH and less than 1 percent of bottom records exceeded the upper COMAR criterion of 8.5. All surface DO readings met COMAR criteria for the various designated habitats and seasons (see Table 13). Bottom DO readings frequently fell below COMAR criteria, with 12 percent to 51 percent of readings not meeting COMAR criteria, depending on the designated habitat and season. Approximately one percent of all fecal coliform records exceeded the most stringent COMAR criterion for shellfish harvesting areas (i.e., ≤14 MPN/100 mL). Salinity ranged from 0.50 to 22.32 ppt, depending on the sampling event, location, and depth (Table 14).

Table 13. COMAR Water Quality Parameters

Watershed	Source	Number of Sites	Year	Depth (m)	Parameter				
					Temperature (°C)	pH	DO (mg/L)*	Enterococcus (MPN/100mL)	Fecal Coliform (MPN)
Annapolis Shore	CBBMP	1	2018	0.5 / 9	26.30 / 26.37	7.8 / 7.2	6.35 / **4.20** (ppm)	---	---
	CBP	2 / 1	2013 - 2023	0.5 / 4	3.7 - 30.9 / 1 - 28.3	7.1 - **9.1** / 7.1 - 8.4	**4.6** - 15.1 / **0.28** - 12.6	---	---
	NWQMC	1	2013 - 2019	---	---	---	---	---	1 - **23**
Northern Eastern Bay	NWQMC	1	2013 - 2019	---	---	---	---	10 - **2,010** (2013 - 2022)	1 - **1,100**
Kent Island True Bay	CBP	2	2013 - 2023	0.5 / 6	1.3 - 29.6 / 0 - 28	6.9 - **9.6** / 6.8 - **8.7**	5.1 - 17.8 / **0.09** - 12.7	---	---
	NWQMC	1 - 3	2013 - 2019	---	1.2 - 29	7.4 - **8.8**	**4.1** - 14.5	10 - **1,450** (2013 - 2022)	1 – **23**

*In dilute aqueous solutions, 1 mg/L is approximately equivalent to 1 ppm.

Notes:

1. Red values indicate that they exceed/are below COMAR criteria during the listed time period.

2. Data collected at two depths is shown in the same cell separated by a "/," corresponding to the two depths reported in the Depth column.

3. Not all parameters or sites were monitored in each year within the year range.

Watershed	Source	Number of Sites	Year	Depth (m)	Parameter				
					Temperature (°C)	pH	DO (mg/L)*	Enterococcus (MPN/100mL)	Fecal Coliform (MPN)

4. A range of number of sites is presented to note that not all parameters were assessed at all sites for certain watersheds and datasets.

Table 14. Salinity and Conductivity

Watershed	Source	Number of Sites	Year	Depth (m)	Parameter	
					Salinity (ppt)*	Conductivity (UMHO/cm)
Annapolis Shore	CBBMP	1	2018	0.5 / 9	3.26 / 5.83 (PSU)	5,972 / 10,340
	CBP	2 / 1	2013 - 2023	0.5 / 4	0.61 - 16.43 / 3.38 - 18.48	3,100 - 27,000 / 6,640 - 30,000
Kent Island True Bay	CBP	2	2013 - 2023	0.5 / 6	0.5 - 16.56 / 4.75 - 22.32	3,120 - 27,200 / 8,940 - 35,500
	NWQMC	1	2013 - 2019	---	2.8 - 15.2	---

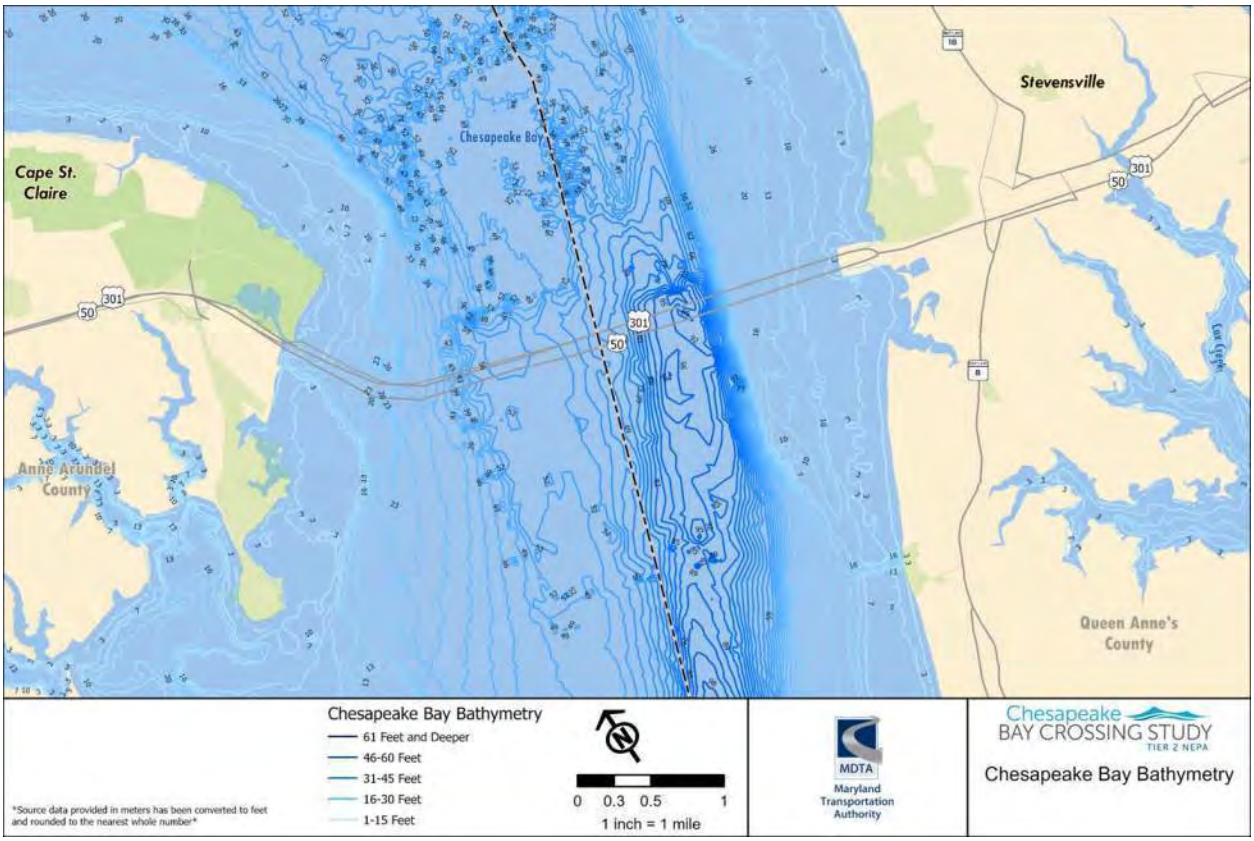
*1 PSU is approximately equivalent to 1 ppt.

5.5.2 Bathymetry

The Chesapeake Bay in the action area is deepest in the center and east of the county boundary, located within the Chesapeake Bay Bridge Auxiliary Federal navigation channel. The depth becomes increasingly shallower towards the shorelines. The Chesapeake Bay has an average depth of approximately 12.2 m (40 ft) within the action area, with the main channel depth approximately 17 m (56 ft), and the Chesapeake Bay Bridge Auxiliary channel depth approximately 28 m (92 ft). Figure 5 illustrates the bathymetry of the Chesapeake Bay, with the close contours indicative of varying steep slopes within the deeper areas.

The shallows of the Chesapeake Bay (0.3 to 0.9 m (1 to 3 ft)) extend channelward approximately 244 to 290 m (800 to 950 ft) from the western shoreline in Anne Arundel County, and approximately 366 to 396 m (1,200 to 1,300 ft) from the eastern shoreline in Queen Anne's County. Areas with depths from approximately 0.9 m to 3.7 m (3 ft to 12 ft) generally extend from about 640 to 671 m (2,100 to 2,200 ft) from the western shoreline and 1,189 to 1,433 m (3,900 to 4,700 ft) from the eastern shoreline.

Figure 5. Chesapeake Bay Bathymetry



Aquatic Substrate and Biota

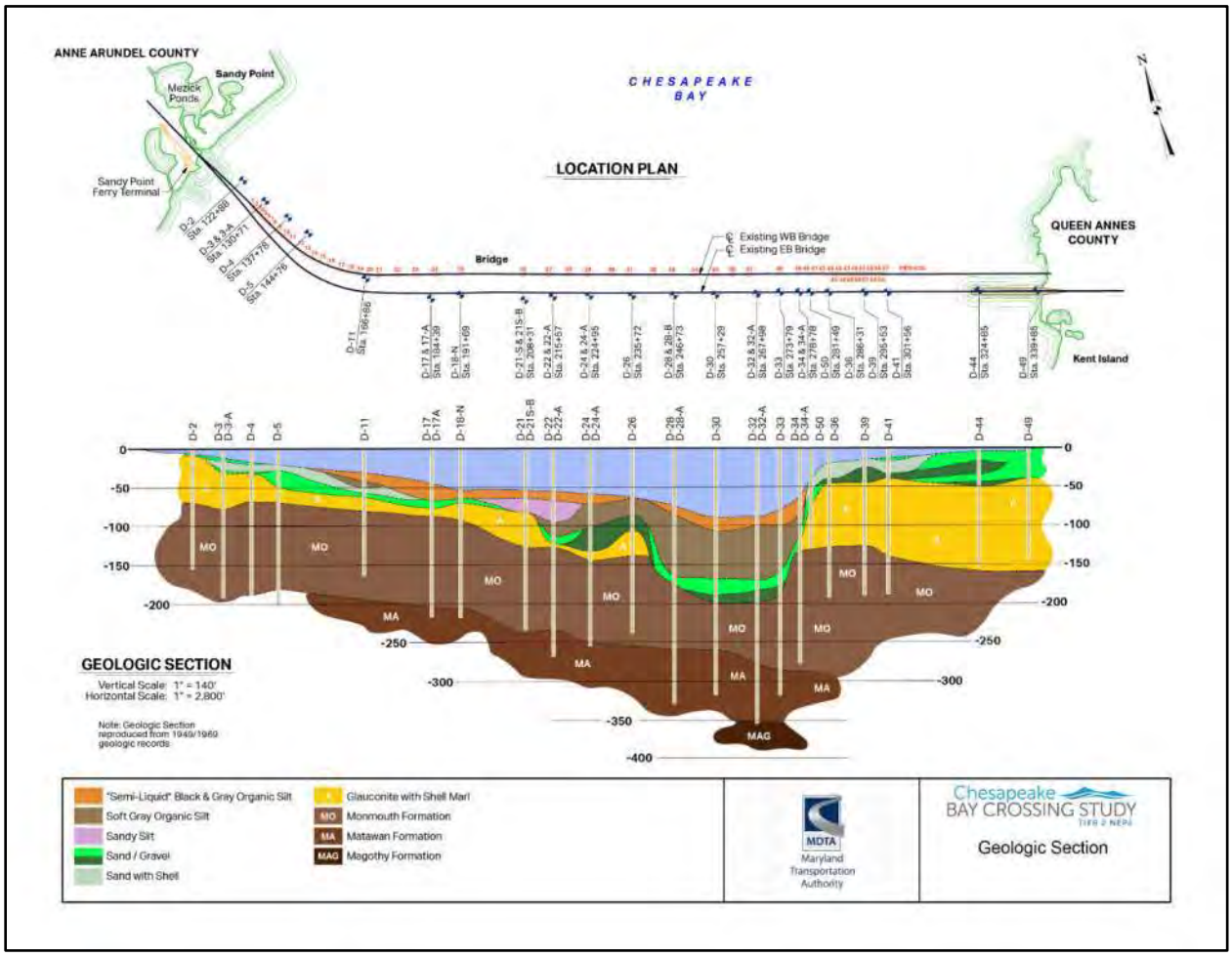
The Chesapeake Bay bottom consists of layers of from the Magothy, Matawan, and Monmouth formations, which is overlaid by sandy material in the shallow areas and loose silty clay material in the deeper channels. Surficial sand is in the areas that are most affected by wave action and tidal fluctuations. The waves and tide move fine silt, clay, and organic material out of the sand and deposit them in lower energy areas along the bottom (Figure 6). Currently there is no indication of contaminated material, as the USACE 50-foot Project has not found contaminated material in the Bay Bridge area (USACE 2017).

Sand: Surficial sand extends approximately 335 m (1,100 ft) channelward from the Anne Arundel County shore, which corresponds to an approximate 1.8 m (6-ft) water depth. Surficial sand extends approximately 1,280 m (4,200 ft) channelward from the Queen Anne's County shore which corresponds to an approximate 3.7 m (12-ft) water depth. Both shorelines correspond to bottom slopes that are flat (less than 0.5 percent) and near the surface. Geotechnical borings near the shorelines show the Chesapeake Bay bottom is underlain by sand to 15.2 m (50 ft) deep where it begins to increase in clay content.

Cultch: Material (such as oyster shells) placed on oyster grounds, furnishes points of attachment for oyster spat in shallower areas (less than 7.9 m (26 ft) deep). Cultch areas are generally inclusions in sandy bottom and may become incorporated into organic/silt mud areas.

Silty Clay: Surficial silty clay covers most of the Chesapeake Bay bottom along the action area. Silty clay is generally associated with relatively deep waters (deeper than 1.8 to 3.7 m (6 to 12 ft)). Geotechnical borings in the mid-bay show organic silt and silty clay layers from 3 to 15 m (10 to 50 ft) thick, before transitioning to clayey sand below.

Figure 6. Chesapeake Bay Geology



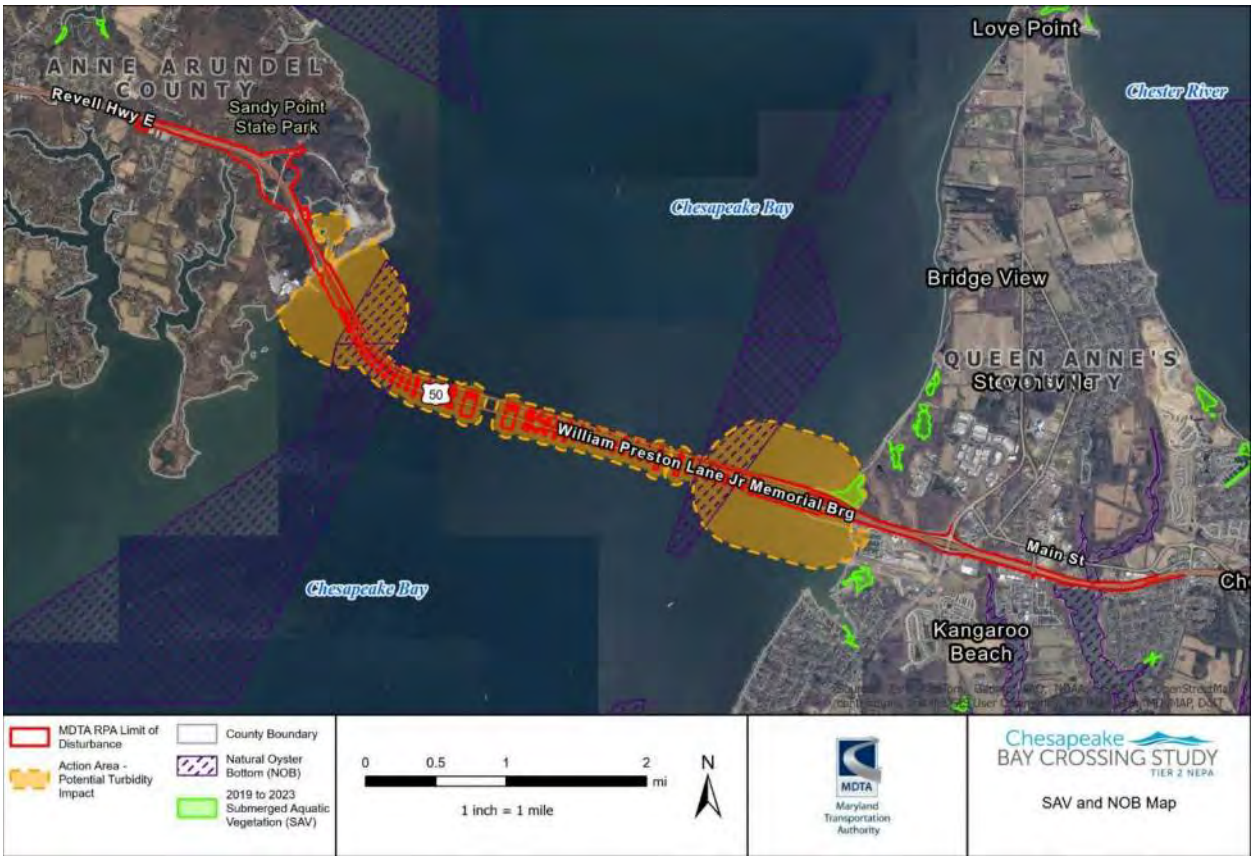
Within the vicinity of the action area, MDNR CBBMP tidal benthic macroinvertebrate data is available for the Chesapeake Bay. MDNR assessed benthic macroinvertebrate communities at two random sites and one fixed monitoring location, all located upriver of U.S. 50/301. Benthic macroinvertebrate community health varied from "severely degraded" to "meets restoration goals" for these sites, based on benthic index of biotic integrity (IBI) scores. Benthic macroinvertebrate data was not available for Cox Creek.

Submerged Aquatic Vegetation (SAV)
Information regarding SAV was obtained from the Virginia Institute of Marine Science (VIMS) SAV monitoring program (Figure 7), which uses multispectral aerial imagery to annually assess the distribution and abundance of SAV in areas including the Chesapeake Bay. Ground surveys provide supplementary information, including species data, though not all areas are ground surveyed. This data identifies trends, areas of decline and abundance, and informs implementation strategies for preservation.

SAV occurs in isolated areas near the action area but not within the footprint of the proposed action and will not be physically affected by construction; it is therefore not carried forward in the effects analysis for listed species.

Natural Oyster Bars (NOB)
Information on the locations of NOBs was obtained through coordination with MDNR (Figure 7). NOBs exist from approximately 457 m to 1,373 m (1,500 ft to 4,500 ft) off the Anne Arundel County shoreline towards the main channel, extending north and south of the Chesapeake Bay Bridge. NOBs exist from approximately 1,250 m to 1,890 m (4,100 ft to 6,200 ft) off the Queen Anne's County shoreline towards the main channel, extending north and south of the Chesapeake Bay Bridge. Of the total benthic habitat within the action area, approximately 124.8 acres consists of natural oyster bar, which may support benthic invertebrate prey utilized by sturgeon; this is accounted for within the *Effects on Listed Species* section.

Figure 7. Submerged Aquatic Vegetation and Natural Oyster Bars



5.6 Status of Listed Species in the Action Area

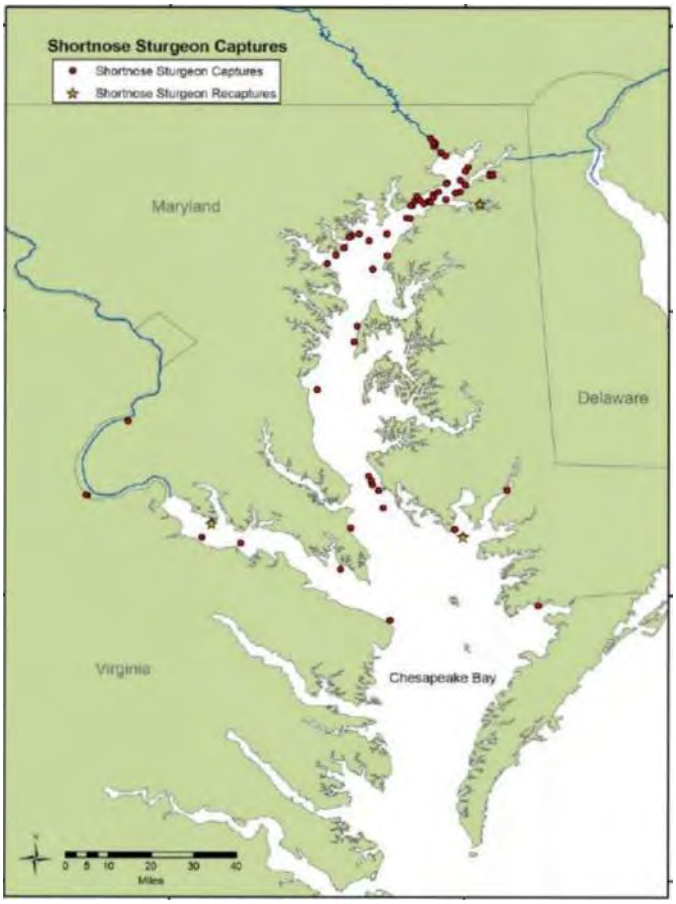
5.6.1 Shortnose Sturgeon

There is very little information about shortnose sturgeon in the mainstem of the Chesapeake Bay. Dadswell *et al.* 1984, reports 13 records of shortnose sturgeon captured in the upper Chesapeake Bay during the 1970s and 1980s. A reward program sponsored by the USFWS to compensate commercial fishermen who reported captures of Atlantic sturgeon in the Chesapeake Bay system (prior to the ESA listing of Atlantic sturgeon) reported a total of 82 shortnose sturgeon captures (including three recaptures) in the Chesapeake Bay and its tributaries from 1996 to 2008 (M.Mangold, USFWS, pers. comm. 2008, SSSRT 2010). Most were caught in the upper (i.e., Kent Island to the mouth of the Susquehanna River and the C&D Canal) and middle (i.e., Fishing Bay and around Hoopers Island) portions of the Bay (SSSRT 2010) (Figure 8). The majority of captures of shortnose sturgeon were outside of the action area. USFWS conduced a sampling study with bottom-gillnetting at 19 sites in the upper Chesapeake Bay during 1998 and 2000 and no shortnose sturgeon were captured (Skjeveland *et al.* 2000, SSSRT 2010).

Kynard (2009) documented a study of shortnose sturgeon in the Potomac River. Targeted sampling for adults was carried out from 2004-2007 (2,932 net hours); one adult female was captured and tagged in 2005 and captured again in 2006 (twice) and 2007. A second adult female was captured by a commercial angler and tagged by the researchers. Despite both adults carrying eggs, successful spawning was not documented during the study. Kynard (2009) concludes that the females are either natal remnants or from a north-central population, likely the Delaware River. Genetic analysis indicates similarities to Delaware River shortnose sturgeon (T. King, unpubl. data cited in Kynard 2009). At this time, it remains unknown if the Potomac River supports a self-sustaining or spawning population of shortnose sturgeon; we also do not know if shortnose sturgeon from the Potomac River would be present in Chesapeake Bay, including within the action area.

A movement study of 13 shortnose sturgeon radio-tagged in the upper Chesapeake Bay and 26 tagged in the Delaware River (near Scudders Falls) showed movement through the C&D Canal (Skjeveland *et al.* 2000, Welsh *et al.* 2002). Distances traveled by shortnose sturgeon (0 to 5.7 km (0 to 3.5 mi) per day) in the upper Chesapeake Bay were similar to those reported by Dadswell *et al.* (1984), but did not appear to follow a specific pattern, such as migrations to spawning grounds (Litwiler 2001). Based on the currently available data, we expect that, shortnose sturgeon found in Chesapeake Bay are most likely migrants from the Delaware River. At this time, it is unknown if there are any tributaries to the Bay where successful spawning of shortnose sturgeon occurs and there are not any self-sustaining populations of shortnose sturgeon in the Bay watersheds.

Figure 8. Shortnose sturgeon captures in the sturgeon reward program from January 1996 through November 2008 (SSSRT 2010)



Anecdotal reports from watermen indicate shortnose sturgeon presence in Gunpowder Falls, which enters the Gunpowder River in Baltimore County, although there has not been any documentation of spawning activity (J. Nichols, NOAA, pers. comm. as referenced in NMFS 2002). Incidental capture of shortnose sturgeon has been reported to the USFWS Reward Program in the Susquehanna River (April 4, 1996; April 24, 1997; April 28, 1998; February 19, 1999; February 6 and 17, 2001; June 2, 2002) and near the mouth of the Rappahannock River (May 1998) (Spells 1998, unpubl. report). However, the amount of freshwater habitat below the Conowingo Dam in the Susquehanna River likely limits the potential for the river to support a spawning population of shortnose sturgeon. If shortnose sturgeon spawning is occurring in tributaries to the Chesapeake Bay, migration to upriver spawning grounds would likely begin when water temperatures in the Bay reach between 8 and 15°C (46.4 and 59°F), approximately mid-March to the beginning of May (SSSRT 2010); however, given that shortnose sturgeon typically remain within their natal river, it is unknown whether shortnose sturgeon would be

migrating from the mainstem Bay into any river for spawning. Regardless, shortnose sturgeon spawning does not occur within the action area due to the relatively high salinity levels present (5 to 18 parts per thousand).

Foraging

A study by Kynard (2009) suggests that habitat is present in the Chesapeake Bay to support all adult activities. There is no information available on habitat use for younger life stages in the Chesapeake Bay; salinity and DO are limiting factors for the presence of younger life stages and likely would limit distribution within the mainstem Bay, including the action area. Warming waters may further degrade foraging habitat within the Chesapeake Bay (Kynard *et al.* 2009). Niklitschek (2001) indicated via modeling that suitable habitats were very restricted during summer months with favorable foraging habitat limited to the upper tidal portions of the upper Bay (work referenced in Secor and Niklitschek 2002). During the summer (May – September) foraging period, 17 shortnose sturgeon have been caught (of 82 overall, including three recaptures) in the Chesapeake Bay by the sturgeon reward program (M.Mangold, USFWS, pers. comm. 2008, SSSRT 2010). Of these, there were two (2) shortnose sturgeon captures documented within or immediately adjacent to the action area for the Bay Crossing Project (SSSRT 2010). Niklitschek (2001) indicated via modeling that suitable habitat was present, but very restricted during summer months with favorable foraging habitat possibly being present in the James River (work referenced in Secor and Niklitschek 2002). Although rare, adult shortnose sturgeon could be within the action area migrating and foraging year-round (Balazik 2017).

Overwintering

A total of 28 out of the 82 total shortnose sturgeon captures within the Chesapeake Bay and its tributaries have been reported to the sturgeon reward program during winter months (M. Mangold, USFWS, pers. comm. 2008; SSSRT 2010). Of the 28 shortnose sturgeon captures reported to the USFWS Sturgeon Reward Program during the winter months (typically defined as November through February), zero (0) occurred within the action area for the Chesapeake Bay Crossing Project (SSSRT 2010).

Based on a review of species-specific physiology, behavioral ecology, and regional telemetry data, we conclude that shortnose sturgeon are not overwintering within the action area. Shortnose sturgeon are physiological ectotherms that experience a severe reduction in osmoregulatory capacity at low water temperatures (<10°C (50°F)). To avoid lethal osmotic stress in mesohaline waters, the species exhibits strict winter fidelity to freshwater or oligohaline refugia. Furthermore, acoustic telemetry arrays operated within the mid-Chesapeake Bay consistently demonstrate that shortnose sturgeon completely vacate the mainstem corridor by late autumn to occupy sedentary overwintering aggregations in the upper Potomac River and the extreme upper reaches of the northern Bay. However, although the action area lacks the requisite freshwater chemistry and low-velocity benthic habitat features necessary to support

overwintering shortnose sturgeon, individual fish may occur within the action area between December and February.

Summary of Shortnose Sturgeon Presence
Based on best available data, although rare, adult shortnose sturgeon may be present within the action area year-round. While outside of the action area, due to the documented use of the Chesapeake Bay by shortnose sturgeon in the winter (M. Mangold, USFWS, pers. comm. 2008, SSSRT 2010), we also assume that adults could be present anywhere in the Maryland portion of the Bay, including the action area year-round, including from November 1 to February 28.

The salinity in the Chesapeake Bay is highly variable, but within the mesohaline portion of the Bay ranges from 5-18 parts per thousand; therefore, early life stages are not present. Similarly, based on the salinity throughout the action area, spawning does not occur.

5.6.2 Atlantic Sturgeon

The marine and estuarine range of all five Atlantic sturgeon DPSs overlaps and extends from Canada through Cape Canaveral, Florida; therefore, Atlantic sturgeon originating from any of five DPSs could occur in the Chesapeake Bay (Dunton *et al*. 2010, 2012, Erickson *et al*. 2011, Wirgin *et al*. 2015a, Kazyak *et al*. 2021a), typically from spring through late fall. Adults may enter the Bay in spring or late summer/early fall and depart after spawning; subadults are present year-round and juveniles may be present in areas with low salinity near their natal rivers (Dovel and Berggren 1983, Secor *et al.* 2002, Welsh *et al.* 2002, Horne and Stence 2016, Balazik 2023). Information on the use of the mainstem Chesapeake Bay is limited; however, based on information from other estuaries we expect sturgeon to be migrating and foraging where suitable forage and appropriate habitat conditions are present. These areas include tidally influenced flats and mud, sand, and mixed cobble substrates (Stein *et al.* 2004a).

Prior to the ESA listing in 2012, a Maryland reward tagging resulted in the reporting of capture of 1,700 Atlantic sturgeon. Five hundred and sixty-seven (567) of these fish were hatchery fish, of which 462 were first time captures (14 percent recapture rate), the remaining captures (1,133) were wild. However, none of these 1,700 Atlantic sturgeon were considered YOY based on length data (S. Minkkinen, USFWS, Pers. Comm. 2006, ASSRT 1998). Since 2014, DNR and its research partners have tagged and released 41 mature adult Atlantic sturgeon in Marshyhope Creek, a major tributary of the Nanticoke River on Maryland's Eastern Shore. Based on repeated captures of ripe males and females with mature eggs, spawning in the Nanticoke watershed is considered highly likely. On November 21, 2025, during the MDNR's Atlantic sturgeon gillnetting survey, an adult female just under 7 feet 10 inches and weighing more than 200 pounds was caught and released - the largest female recorded in the survey's history.

Data collected from passive acoustic telemetry at the Chesapeake Bay Bridge North array (2021-2024) offers valuable insights into fish activity in the area that bridge construction and demolition activities may impact. The array data, compiled by NMFS from 12 collaborating

research institutions through the Atlantic Cooperative Telemetry Network (including the Smithsonian Environmental Research Center, Virginia Commonwealth University, USFWS, the University of Maryland Center for Environmental Science, the Virginia Institute of Marine Science, and state natural resource agencies in Maryland, Delaware, and Virginia, among others), recorded detections of 118 tagged individuals across 10 species, including striped bass, American eel, gizzard shad, cownose ray, and Atlantic sturgeon. Detections of tagged Atlantic sturgeon occurred mainly during the warmer months (May through July), with additional detections in October through December - a pattern consistent with the species' broader seasonal use of the Chesapeake Bay described above. On days when tagged Atlantic sturgeon were detected, individuals were within the vicinity of the bridge for approximately one to four hours, indicating that sturgeon move through the action area rather than remaining in the immediate vicinity of the bridge for extended periods. There were no detections of tagged shortnose by this array during the 2021–2024 period.

Spawning

Given salinities, spawning does not occur in the action area. A number of tributaries to the Chesapeake Bay support spawning populations of Atlantic sturgeon; however, all of them are located south of the action area. Historical research suggests that spawning once occurred in many of the Bay's rivers and tributaries. A review of current spawning habitat availability in the Chesapeake Bay and its tributaries indicates that spawning habitat is available in the James, York, and Appomattox Rivers (Bushnoe *et al.* 2005). There is evidence of both spring and fall spawning populations for the James River, as well as fall spawning in the Pamunkey River, a tributary of the York River, and fall spawning in Marshyhope Creek, a tributary of the Nanticoke River (Hager *et al.* 2014, Kahn *et al.* 2014, Balazik and Musick 2015, Richardson and Secor 2016). In addition, detections of acoustically tagged adult Atlantic sturgeon in the Mattaponi and Rappahannock Rivers at the time when spawning occurs in others rivers, as well as recent evidence in the Potomac River (Balazik 2023) supports the likelihood of Atlantic sturgeon spawning populations in the Mattaponi, Rappahannock, and Potomac Rivers.

Although salinity levels in some areas of Chesapeake Bay may support juveniles, juvenile Atlantic sturgeon are more likely to adapt to higher salinity levels closer to their natal rivers, which are outside of the action area. Subadult and adult Atlantic sturgeon are more likely to occur in the action area in spring, summer, and fall. In June, adults migrate to spawning tributaries, where they may remain until late September, or may remain in spawning tributaries as late as early December based on recent research (Balazik 2023). Atlantic sturgeon use the action area for migration and foraging as subadults and adults.

Summary of Atlantic Sturgeon Presence

Adult Atlantic sturgeon enter the Chesapeake Bay from the Atlantic Ocean in the spring and fall as they migrate to spawning grounds in their natal river; following spawning, they return to the ocean, therefore, they may be present in the Chesapeake Bay from late March (Balazik & Musick 2015) through November, or even as late as early December (Balazik 2023). During this time, adults may utilize the full extent of the bay and may migrate into adjacent tributaries

(Horne and Stence 2016); as such, we expect transient adult Atlantic sturgeon could be present in the action area from late March through early December. We expect subadult Atlantic sturgeon behavior in the Chesapeake Bay to be similar to the adults and they are expected to be present in the Bay from late March (Balazik and Musick 2015) through November, and possibly as late as early December (Balazik 2023), and may utilize the full extent of the Bay while also migrating and foraging the Chesapeake Bay's tributaries (Horne and Stence 2016). We do not expect juvenile Atlantic sturgeon to be present in the action area because they become tolerant to saline water in their natal rivers, which are closer to the mouth of the Bay (Horne and Stence 2016). Early life stages are not present in the action area and, similarly, based on the salinity throughout the action area, spawning is not expected to occur.

6 EFECTS OF THE ACTION

This section of a Biological Opinion assesses the effects of the proposed action on threatened or endangered species or critical habitat. The "effects of the action" are defined at 50 CFR § 402.02 (2018) as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline…. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration." In this section of the Opinion, we address the effects of the proposed action on Atlantic and shortnose sturgeon. We consider these effects on the species within the context of the species status now and projected over the course of the action.

Approach to the Assessment

The bridge replacement is currently in the preliminary engineering phase; as such, final construction means and methods have not been determined. Accordingly, this effects analysis is based on the description in the BA, which incorporates all construction activities that are currently anticipated. As described in the BA and DEIS, these plans are based on the design and engineering carried out to date, inclusive of consideration of the best available information from similar regional bridge construction and demolition projects, including the Francis Scott Key Bridge Rebuild, the Tappan Zee Bridge Replacement, and the Nice-Middleton Bridge Replacement. As the design progresses through final engineering and permitting, stressor characterizations and the associated effects determinations will be re-evaluated in coordination with us and consultation will be reinitiated if necessary.

Effects are assessed for each principal stressor category identified from the construction and demolition program: pile driving; dredging; turbidity and habitat modification; increased vessel traffic; and blasting associated with demolition of the existing eastbound and westbound bridge spans. For each stressor, the analysis characterizes: (1) the nature and magnitude of the stressor; (2) the spatial and temporal extent of exposure; (3) the life stages and behaviors of listed species most likely present during the relevant construction windows; and (4) the likely individual- and

population-level consequences, including potential for injury, mortality, behavioral disruption, and habitat loss.

As described in the BA, the NMFS Multi-Species Pile Driving Calculator was used to predict distances to identified acoustic thresholds. Proxy sounds levels were used, consistent with the instructions provided with the calculator and when a proxy was not available for a specific pile type, the next nearest largest pile type was used. Calculations assumed 10 dB attenuation[15] for the use of bubble curtains, and considered the installation of up to 16 piles per day, 2,500 strikes per pile (impact), and 30 minutes of vibratory driving for piles installed with a vibratory hammer. Established formulas (Hempen *et al.* (2005, 2007)) were used to predict effects from blasting. The information incorporated into the BA and our resulting effects determinations reflect the full range of reasonably likely outcomes across all assumed construction scenarios.

The effects analysis is organized by stressor rather than by species, to enable a clear accounting of each construction activity's contribution to total exposure. A species-level synthesis and effects determination table are provided at the end of this section.

All avoidance and minimization measures that the MDTA has committed to implementing, and FHWA has incorporated into the proposed action, are considered in the effects analysis as part of the proposed action. As explained above, measures that are under consideration but not yet committed to (as described in the BA) are not incorporated into the action or the effects analysis.

Anticipated Stressors

Construction and demolition of the Bridge will introduce the following categories of stressors to the action area over an approximately 15-year construction period.

Underwater Noise from Pile Driving. Construction of two new bridge spans will require installation of a substantial number of driven piles, including 96-inch, 48-inch, and 36-inch steel pipe piles, 36-inch pre-stressed square concrete piles, 14-inch steel H-piles, and AZ sheet piles for pier protection dolphins. Pile driving generates impulsive underwater noise that propagates through the water column and substrate. Exposure at or above threshold levels can cause injury - including barotrauma and swim bladder rupture - and behavioral disturbance, including avoidance of the ensonified area and disruption of migration and foraging. Up to four pile driving rigs may operate concurrently, with production pile driving anticipated for approximately 120 days during construction years 1–5 (eastbound bridge) and 138 days during years 7–13 (westbound bridge). Tables 15 and 16 present estimated distances to sturgeon injury and behavioral thresholds under the full range of assumed pile types and hammer configurations.

Dredging. Both the western and eastern shorelines of the Chesapeake Bay require dredging to create access channels sufficient to support construction and demolition equipment and material

[15] Based on monitored attenuation of 15–20 dB for a contained bubble curtain system on comparable pile types at the Nice-Middleton Bridge Replacement, verified via on/off testing per NMFS guidance (AECOM/SCM 2022). The 10 dB value applied here is conservative relative to this result and consistent with the published range for bubble curtain performance (Molnar *et al*. 2020; WSDOT 2020). Attenuation will be confirmed via test pile prior to production driving.

barges. Mechanical (bucket) dredging is assumed, targeting a depth of 2.7 m (9 ft) below mean lower low water (MLLW) across a total footprint of approximately 50.2 acres (approximately 236,095 cubic meters (308,800 cubic yards)). Dredging activities introduce the potential for physical disturbance of the substrate, entrainment or impingement of benthic-associated species, and localized turbidity. The estimated dredging duration is 14 days for the eastbound bridge (construction years 1–2) and 7 days for the westbound bridge (construction years 7–8).

Turbidity and Habitat Modification. Pile driving, dredging, vessels, and demolition debris will generate suspended sediments in the water column and result in temporary and permanent alteration of substrate conditions across approximately 134.8 acres of tidal water bottom within the action area. Permanent fill associated with new pier footprints, pier protection systems, and approach roadway widening will eliminate a portion of existing soft-bottom benthic foraging habitat used by both sturgeon species. Sediment and turbidity impacts are expected within 91.4 m (300 ft) of pile driving locations and up to 609.6 m (2,000 ft) from dredging locations.

Increased Vessel Traffic. Construction and demolition operations will increase vessel traffic within the action area including transit routes between the project site and the Baltimore Harbor area, a one-way distance of approximately 30.6 km (19 mi). Project-related vessels - including heavy lift barges, material transport barges, trestle work vessels, and support craft.

Blasting. Demolition of the existing bridge spans will require subaqueous explosive demolition of deep-water piers located in water depths exceeding 12.2 m (40 ft). There are 15 deep-water piers in the existing eastbound span and 15 in the existing westbound span subject to this stressor. Blasting is anticipated during 18 events over construction years 6–7 (eastbound demolition) and 16 events over construction years 14–15 (westbound demolition). Explosive demolition generates intense instantaneous pressure waves with demonstrated potential to cause swim bladder rupture, hemorrhage, and mortality in fish at close range, and unknown but potentially lethal or injurious effects in sea turtles. Blast events will be subject to a time-of-year restriction (TOYR) limiting subaqueous blasting to October 1 through December 15. The Mortality Zone and Exclusion Zone for each span were calculated using the Hempen *et al*. (2007) confined-shot formula (MRC) and the Hempen *et al*. (2005) Exclusion Zone formula, respectively, using a maximum charge weight of 30 pounds per delay - consistent with the Nice Bridge precedent blast design. The resulting adjusted Mortality Zone radius is 65.5 m (215 ft) per eastbound pier and 67 m (220 ft) per westbound pier; the Exclusion Zone radius is 640 m (2,100 ft) around each pier.

Geotechnical Investigation. The BA identifies geotechnical investigations as one of several temporary activities contributing to the project's combined 134.8-acre estimate of tidal water bottom impact. The BA does not specify the number or location of borings, the sampling method (e.g., rotary wash boring, Standard Penetration Test sampling, or vibracore sampling), the vessel platform (e.g., jack-up barge or anchored barge), or the duration of the investigation program; these details are expected to be developed during final design. For purposes of this analysis, we assume geotechnical investigations will be conducted using methods standard for bridge foundation design in tidal waters - individual, discrete borings advanced from a barge or

jack-up platform, each requiring on the order of hours rather than days to complete, with any temporary casing removed and the borehole grouted or backfilled on completion.

Temporary Moorings. The BA indicates that staging areas may include temporary mooring locations within the action area, used to stabilize barges and support vessels, and that moorings would be installed as temporary mooring piles or mooring ball anchors. FHWA and MDTA have committed to avoiding placement of moorings in areas of oyster beds or submerged aquatic vegetation (SAV), and to avoid mooring vessels in SAV or in a manner that could shade SAV. The specific number and location of moorings will be determined during final design and coordinated with NMFS.

6.1 Pile Driving

In this section, we provide background information on underwater noise and how it affects listed sturgeon, establish the underwater noise that listed species are likely to be exposed to, and then establish the expected response of the individuals exposed to that noise. This section contains a brief technical background on sound, the characteristics of certain sound types, and metrics used in this consultation that are relevant to the specified activity and to consideration of the potential effects of the specified activity on listed species found later in this document.

The Bay Crossing Project includes the following number and types of piles to be installed using vibratory hammering to the maximum extent possible (i.e., if sediments are soft enough for vibratory hammering) and impact hammering with a soft start:

Table 15. Pile size and number for the Eastbound Bridge

Pile Type and Size (EB)	**Total Piles**
Bridge Piers	**1,741**
36” Pre-stressed Square Piles	132
36” Steel Pipe Piles	240
48” Steel Pipe Piles	1,231
96” Steel Pipe Piles	138
Trestle Piers	
36” Steel Pipe Piles	**628**
Pier Protection	**5,144**
48” Steel Pipe Piles for fenders	40
19.6” Sheet Piles (For Dolphins)	2,552**
14” Steel H-Piles (For Dolphins)	2,552**

Table 16. Pile size and number for the Westbound Bridge

Pile Type and Size (WB)	**Total Piles**
Bridge Piers	**2,014**
36” Pre-stressed Square Piles	203

Pile Type and Size (WB)	Total Piles
36” Steel Pipe Piles	243
48” Steel Pipe Piles	1,412
96" Steel Pipe Piles	156
Trestle Piers	
36” Steel Pipe Piles	**628**
Pier Protection	**5,144**
48” Steel Pipe Piles for fenders	40
19.6” Sheet Piles (For Dolphins)	2,552**
14” Steel H-Piles (For Dolphins)	2,552**

6.1.1 Basic Background on Acoustics and Fish Bioacoustics

This section contains technical background on sound, the characteristics of certain sound types, and metrics used in this consultation when the information is relevant to the specified activity and to consideration of the potential effects of the specified activity on listed species found later in this document.

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the “loudness” of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (µPa)), and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) typically represents the SPL referenced at a distance of 1 m from the source, while the received level is the SPL at the listener’s position (referenced to 1 µPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick 1983). Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

Sound exposure level (SEL; represented as dB re 1 µPa2-s) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (i.e., 100 percent of the acoustic energy). SEL is a cumulative metric; it accumulates

over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source, and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam(s)or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al*. 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (e.g., wind and waves, earthquakes, ice, atmospheric sound), biological (e.g., sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (e.g., vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 hertz (Hz) and 50 kilohertz (kHz) (Mitson 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor and is frequency-dependent. As a result of the dependence on varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al*. 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect a

particular species. The Bay Crossing action area lies within a dynamic ambient noise environment, with natural background noise contributed by natural wind and wave action and a diverse community of vocalizing organisms. Anthropogenic noise sources, including commercial shipping traffic in high-use shipping lanes, also contribute to ambient sound.

In general, sounds fall into one of two types: pulsed and non-pulsed. The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly regarding hearing (e.g., Ward 1997 in Southall *et al*. 2007). Non-impulsive sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI 1995, NIOSH 1998).

Pulsed sound sources (e.g., impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI 1986, 2005, Harris 1998, NIOSH 1998, ISO 2003) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI 1995, NIOSH 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, drilling or dredging, and vibratory pile driving.

Specific to pile driving, the impulsive sound generated by impact hammers is characterized by rapid rise times and high peak levels. Vibratory hammers produce non-impulsive, continuous noise at levels significantly lower than those produced by impact hammers. Rise time is slower, reducing the probability and severity of injury, and sound energy distributes over a greater amount of time (e.g., Nedwell and Edwards 2002, Carlson *et al*. 2005).

The hearing range for most fish ranges from a low of 20 Hz to 1,000 Hz. Most fish in the action area fit into this hearing range, although catfish may hear up to about 3,000 or 4,000 Hz and some of the herring-like fishes can hear sounds to about 4,000 Hz, while a few, and specifically the American shad, can hear to over 100,000 Hz (Bass and Ladich 2008, Popper *et al*. 2003, Popper and Schilt 2008).

An acoustic field from any source consists of a propagating pressure wave, generated from particle motions in the medium that causes compression and rarefaction. This sound wave consists of both pressure and particle motion components that propagate from the source. All fishes have sensory systems to detect the particle motion component of a sound field, while fishes with a swim bladder (a chamber of air in the abdominal cavity) may also be able to detect the pressure component. Pressure detection is primarily found in fishes where the swim bladder (or other air chamber) lies very close to the ear, whereas fishes in which there is no air chamber near the ear primarily detect particle motion (Popper *et al*., 2003). Sturgeon have swim bladders,

but they are not located very close to the ear; thus, sturgeon are assumed to detect primarily particle motion rather than pressure.

The level of a sound in water can be expressed in several different ways, but always in terms of dB relative to 1 micro-Pascal (µPa). Decibels are a logarithmic scale; each 10 dB increase is a tenfold increase in sound pressure. Accordingly, a 10 dB increase is a factor of 10 increase in sound pressure, and a 20 dB increase is a 100-fold increase in sound pressure.

The following are commonly used measures of sound:

- Peak sound pressure level (SPL): the maximum sound pressure level (highest level of sound) in a signal measured in dB re 1 µPa.
- Sound exposure level (SEL): the integral of the squared sound pressure over the duration of the pulse (e.g., a full pile driving strike.) SEL is the integration over time of the square of the acoustic pressure in the signal and is thus an indication of the total acoustic energy received by an organism from a particular source (such as pile strikes). Measured in dB re1µPa2-s.
- Single Strike SEL (ssSEL): the amount of energy in one strike of a pile.
- Cumulative SEL (cSEL): the energy accumulated over multiple strikes. cSEL indicates the full energy to which an animal is exposed during any kind of signal. The rapidity with which the cSEL accumulates depends on the level of the single strike SEL. The actual level of accumulated energy (cSEL) is the logarithmic sum of the total number of single strike SELs. Thus, cSEL (dB) = Single-strike SEL + 10log10(N); where N is the number of strikes.
- Root Mean Square (RMS): the average level of a sound signal over a specific period of time.

6.1.2 Approach to Assessing the Potential for Physiological Effects

There is limited data from other projects to demonstrate the circumstances under which immediate mortality of fish from exposure to pile driving is likely to occur: mortality appears to occur when fish are close (within 0.9 m to 9.1 m (3 ft to 30 ft)) to driving of relatively large diameter piles. Studies conducted by the California Department of Transportation (Caltrans) showed some mortality for several different species of wild fish exposed to the driving of steel pipe piles 2.4 m (8 ft) in diameter, whereas Ruggerone *et al*. (2008) found no mortality to caged yearling coho salmon (*Oncorhynchus kisutch*) placed as close as 0.6 m (2 ft) from a 0.5 m (1.5 ft) diameter pile and exposed to over 1,600 strikes. As noted above, the data indicates that species have different tolerances to noise and may exhibit different responses to the same noise source.

Potential physiological effects are highly diverse. Sound exposure that may result in mortality-inducing physiological effects could in one species result in physiological effects that would have no effect on fish survival in another. Potential effects range from very small ruptures of capillaries in fins (which are not likely to have any consequences on survival) to severe

hemorrhaging of major organ systems such as the liver, kidney, or brain (Stephenson *et al*., 2010). Other potential effects include rupture of the swim bladder (the bubble of air in the abdominal cavity of most fish species that is involved in maintenance of buoyancy). See (Halvorsen *et al*., 2011) for a review of potential injuries from pile driving.

Effects on body tissues may result from barotrauma or result from rapid oscillations of air bubbles. Barotrauma occurs when there is a rapid change in pressure that directly affects the body gasses. Gas in the swim bladder, blood, and tissue of fish can experience a change in state, expand and contract during rapid pressure changes, which can lead to tissue damage and organ failure (Stephenson *et al*., 2010).

Related to this are changes that result from very rapid and substantial excursions (oscillations) of the walls of air-filled chambers, such as the swim bladder, striking nearby structures. Under normal circumstances the walls of the swim bladder do not move very far during changes in depth or when exposed to normal sounds. However, very intense noise, and particularly those with very sharp onset (also called "rise time") will cause the swim bladder walls to move a much greater distance and thereby strike nearby tissues such as the kidney or liver. Rapid and frequent striking (as can occur during one or more sound exposures) may result in bruising, and ultimately in damage, to the nearby tissues.

The Fisheries Hydroacoustic Working Group (FHWG) was formed in 2004 and consists of biologists from NMFS, USFWS, FHWA California Department of Fish and Game, USACE, and the California, Washington, and Oregon DOTs, supported by national experts on sound propagation activities that affect fish and wildlife species of concern. In June 2008, the NMFS, USFWS, FHWA, and the state agencies signed an MOA documenting criteria for assessing physiological effects of pile driving on fish (Molnar *et al*., 2020). The criteria were developed for the acoustic levels at which physiological effects to fish could be expected. It should be noted that these are the onset of physiological effects (Molnar *et al.*, 2020), and not levels at which fish are necessarily mortally damaged. These criteria were developed to apply to all fish species, including listed green sturgeon, which are biologically similar to Atlantic sturgeon and for these purposes can be considered a surrogate. The interim criteria are:

- Peak SPL: 206 decibels relative to 1 micro-Pascal (dB re 1 µPa).
- cSEL: 187 decibels relative to 1 micro-Pascal-squared second (dB re 1µPa2-s) for fishes above 2 grams (0.07 ounces).

The FHWG developed the interim criteria because resource agencies needed immediate thresholds to guide the evaluation of the effects of pile driving in order to ensure protection of threatened and endangered fish. However, at the time when the FHWG developed the interim criteria, the FHWG recognized that more data and research was necessary to further consider and refine the thresholds. Studies of noise effects on fish do demonstrate that individual species possess different "tolerances" to varying noise sources and that for some species and in unique situations, fish can be exposed to noise levels greater than the FHWG criteria and exhibit little or no negative effects. For instance, recent research summarized in Popper *et al*. (2014) suggests that $SEL_{CUMULATIVE}$ thresholds for injury may be well above 200 dB. Molnar *et al*. (2020) noted

that "during the time that has passed since the interim injury thresholds were first established in 2008, there has not been a single documented (in the field or lab studies) instance of even minor injury to fish that have been exposed to sound pressure levels in excess of the $SEL_{CUMULATIVE}$ threshold." However, for different reasons, the FHWG discussions related to modifications of the interim thresholds, though warranted, have not proceeded and the 2008 criteria remain in place. Given this, we currently consider the FHWG criteria to represent the best available information on the thresholds at which physiological effects to sturgeon are likely to occur. Thus, for the purposes of this Opinion, we consider the potential for physiological effects upon exposure to 206dB re 1 µPa peak and 187 dB re 1 μPa^2-s cSEL. It is important to note that physiological effects may range from minor injuries that individuals are anticipated to completely recover from with no impact to overall fitness to significant injuries that will lead to death. The severity of injury is related to the distance from the pile being installed and the duration of exposure. The closer to the source and the greater the duration of the exposure, the higher likelihood of significant injury.

6.1.3 Approach to Assessing the Potential for Behavioral Effects

Empirical studies on the hearing of fishes, amphibians, birds, and mammals (including humans), in general, show that behavioral responses vary substantially. Even within a single species, depending on a wide range of factors (e.g., the motivation of an animal at a particular time, the nature of other activities that the animal is engaged in when it detects a new stimulus, the hearing capabilities of an animal or species) responses demonstrate variability (Brumm & Slabbekoorn, 2005). Thus, it may be difficult to assign a single criterion above which behavioral responses to noise would occur.

For purposes of assessing behavioral effects of pile driving on ESA listed fish, NMFS uses a 150dB re 1 µPa RMS SPL criterion[16]. Based on the best available information, for the purposes of this consultation, we will use 150 dB re 1 µPa RMS as an indicator of the noise level at which there is the potential for behavioral consequences. That is not to say that exposure to noise levels of 150 dB re 1 µPa RMS will always result in behavioral modifications or that any behavioral modifications will rise to the level of take (e.g., harassment) but that there is the potential, upon exposure to noise at this level, to experience some behavioral response. Behavioral responses could range from a temporary startle to avoidance of an ensonified area.

As hearing generalists, sturgeon rely primarily on particle motion to detect sounds (Lovell *et al.*, 2005), which does not propagate as far from the sound source as pressure. However, a clear threshold for particle motion was not provided in the Lovell study. In addition, flanking[17] of the sounds through the substrate may result in higher levels of particle motion at greater distances than would be expected from the non-flanking sounds. Unfortunately, data on particle motion from pile driving is not available at this time, and we must rely on sound pressure level criteria.

[16] https://www.fisheries.noaa.gov/s3/2025-09/ESA-AllSpeciesThresholdSummary-2025-508-OPR1-9.16.25-.pdf ; last accessed June 29, 2026

17 Flanking sound (or flanking noise) is sound that transmits between spaces indirectly, going over or around, rather than directly through the main separating element.

Although we agree that more research is needed, the studies noted above support the 150 dB re 1 µPa RMS criterion as an indication for when behavioral effects could be expected. With the exception of studies carried out during the Tappan Zee Pile Installation Demonstration Project in the Hudson River, NY, (Krebs *et al*., 2012, 2016), we are not aware of any studies that have considered the behavior of shortnose or Atlantic sturgeon in response to peak pile driving noise levels. Given this and the available information from studies on other fish species, we consider 150 dB re 1 µPa RMS to be a reasonable estimate of the noise level at which exposure may result in behavioral modifications.

6.1.4 Exposure of Sturgeon to Increased Underwater Pile Driving Noise

As described in the BA, FHWA and MDTA used the acoustic tool developed by our Office of Protected Resources (Multi-Species Pile Driving Calculator) that applies noise results from installation of proxy piles (i.e., piles that are most like the pile and conditions of the proposed action) to estimate the ensonified area for piles of different types and sizes, driven with different hammers, and with different attenuations[18]. This tool uses representative data from installation of similar pile types; many of the examples rely on data compiled for the California Department of Transportation from tests conducted by others under similar conditions (Molnar *et al.*, 2020).

The calculator incorporates a Practical Spreading Loss Model (PSLM) which requires an estimate of the number of strikes needed to install a pile (or the number of seconds with a vibratory hammer). For this Opinion, we use the Multi-Species Pile Driving Calculator and its use of the PSLM to estimate intensity and spatial extent of sound levels to analyze the effects of the proposed pile driving, in consideration of the thresholds identified above (summarized in the Tables below).

NMFS typically recommends using a default attenuation of 5 dB during impact pile driving with bubble curtains. However, in the BA FHWA indicates that for this project, calculations were completed with attenuation levels set at 10 dB for most pile types, based on the 15-20 dB of attenuation attained with pile driving associated with the Nice-Middleton Bridge Project. The calculations for the dolphin pier protection installation were completed with attenuation levels set at 5 dB based on the assumption that the bubble curtain would be less protective in this scenario. Studies indicate sound attenuation from unconfined bubble curtains can range from 5 to 10 dB in shallow waters (Molnar *et al*., 2020; WSDOT, 2020), and confined bubble curtains can reduce sound by 10 to 15 dB (Molnar *et al*., 2020). It is not uncommon to observe a 10 dB reduction in pile driving noise or more when bubble curtains are effectively deployed. Higher levels of sound attenuation can be achieved with confined air bubble curtains under low current situations. Based on our review of the available information, we agree that the approach to incorporating attenuation into the calculations presented in the BA is reasonable.

[18] The spreadsheet is available at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance

Table 17 and Table 18 provide the project's piling specifications and the estimated sound levels of those piles from proxy projects. Input data (source levels) for all pile types, sizes, and hammer types were not available in the pile driving calculator, and in these cases the next largest size pile was used as a proxy. For example, data were not available for 48-inch steel pipe piles for impact hammering so the next size steel pipe pile (60-inch) was used. Data for 48-inch steel pipe piles were also not available for vibratory hammering and proxy data for the next available size larger (72-inch) were used. No data were available for vibratory hammering of any size of concrete piles, and thus only impact hammering estimates are provided. In all of these cases we recognize that the estimated distances to the identified thresholds are likely larger than what will be experienced; however, they are the best, reasonable, estimates that are possible given the available information.

Table 17 provides metrics associated with the various pile types and installation methods and Table 18 provide estimated distances from the project piles to the identified injury and behavioral effect thresholds as determined from the Multi-Species Pile Driving Calculator.

Table 17. Proxy levels for underwater noise.

Type of Pile**	**Hammer Type**	**Proxy Type Used**	**Estimated Peak Noise Level (dB_{Peak})**	**Estimated Single Strike Sound Exposure Level (dB_{SELss})**	**Estimated Pressure Level (dB_{RMS})**
36" Square Concrete	Impact	30" Square (Type II)	200	166	176
36" Steel Pipe	Impact	36" Steel Pipe	210	183	193
	Vibratory	36" Steel Pipe	N/A	N/A	175
48" Steel Pipe	Impact	48" Steel Pipe	213	179	192
48" Steel Pipe (60" Steel Pipe Proxy)*	Impact	60" Steel Pipe	210	185	195
48" Steel Pipe (72" Steel Pipe Proxy)	Vibratory	72" Steel Pipe	N/A	N/A	180
	Impact	96" Steel Pipe	220	195	205

Type of Pile**	Hammer Type	Proxy Type Used	Estimated Peak Noise Level (dB_{Peak})	Estimated Single Strike Sound Exposure Level (dB_{SELss})	Estimated Pressure Level (dB_{RMS})
96” Steel Pipe	Vibratory	72” Steel Pipe	N/A	N/A	180
14” H-Pile	Impact	14” Steel H-Pile	208	177	187
	Vibratory	14” Steel H-Pile	N/A	N/A	150
AZ Sheet Pile	Impact	24” AZ Sheet Pile	205	180	190
	Vibratory	AZ Steel Sheet – Loudest	N/A	N/A	165

Table 18. Estimated distances to sturgeon injury and behavioral disturbance thresholds

Type of Pile	Hammer Type	Distance (ft) to 206 dB_{Peak}	Distance (ft) to Behavioral Disturbance Threshold (150 dB_{RMS})
36” Square Concrete	Impact	2.8	382.5
36” Steel Pipe	Impact	13.1	5,199.8
	Vibratory	N/A	328.1
48” Steel Pipe	Impact	20.7	4,459.8
	Vibratory	N/A	706.8**
48” Steel Pipe (60” Steel Pipe Proxy)*	Impact	13.1	7,068.4
	Vibratory	N/A	706.8**
96” Steel Pipe	Impact	60.6	32,808.4
	Vibratory	N/A	706.8**

Type of Pile	Hammer Type	Distance (ft) to 206 dB_{Peak}	Distance (ft) to Behavioral Disturbance Threshold (150 dB_{RMS})
14" H-Pile	Impact	20.7	4,459.8
	Vibratory	N/A	15.2
AZ Sheet Pile	Impact	13.1	7,068.4
	Vibratory	N/A	152.3

As outlined above, in order to be exposed to pile driving noise that could result in injury due to a single strike (i.e., the peak threshold), a sturgeon would need to be within 0.85 to 18.5 m (2.8 to 60.6 ft) of the pile being installed. The cSEL threshold accounts for multiple exposures. The cSEL is a measure of the accumulated energy over a specific period of time (e.g., the period of time it takes to install all piles in a given period, in this case 12 hours), rather than an instantaneous maximum noise threshold (Buehler *et al.* 2015). The greater the distance between the fish and the pile being driven, the greater the number of strikes it must be exposed to in order to be injurious. The threshold distance from the pile indicates that the fish is far enough away that, regardless of the number of strikes it is exposed to, the energy accumulated is not sufficient to cause injury. A fish located outside of this isopleth is considered to have no risk of auditory injury, regardless of the number of pile strikes. Considering the cumulative threshold, a sturgeon would need to remain within 82.4 to 7,068.4 m (270 to 23,190 ft) of the noise source for the duration of all pile driving during the 12-hour period that pile driving was conducted in a given day. Note that injury is not an expected outcome of exposure of sturgeon to vibratory pile driving noise, regardless of pile size.

6.1.5 Response of Sturgeon to Pile Driving Noise

Based on the best available information, as outlined herein, it is reasonable to assume that sturgeon, on hearing pile driving, will either not approach the source or will move to avoid it. Rare and transient sturgeon in the area are expected to leave the area when pile driving begins facilitated by the use of a "soft start" or system of "warning strikes" where the pile driving begins with an initial set of three single strikes by the hammer at 40 percent of its maximum energy. These "warning strikes" cause fish to leave the area before the pile driving begins at full energy.

Studies on sturgeon behavior towards noise from pile driving in relation to the construction of the Tappen Zee Bridge over Hudson River found that sturgeon avoid or move out of the ensonified area (NMFS, 2017b). Thus, we expect the sturgeon to avoid an ensonified area upon exposure to underwater noise levels of 150 dB RMS, if fish do not completely leave after the

warning strikes. Noise above the threshold where behavioral modification (avoidance) is expected at distances ranging from 4.6 to 10,000 m (15.2 to 32,808.4 ft) from the piles being driven, depending on pile type, size, and installation method.

Given the use of soft start, we do not expect any sturgeon to be exposed to noise above the peak injury threshold. Here, we explain why we also do not expect any sturgeon to be exposed to noise above the cumulative injury threshold.

As explained above, we expect that sturgeon will react to detection of noise above the 150 dB threshold by swimming away from the noise source. We expect that this response will result in sturgeon swimming away from the pile prior to accumulating enough energy to experience injury.

We have considered whether a sturgeon is likely to be able to swim far enough away from the pile being installed in time to avoid exposure to the full duration of pile installation. The furthest distances required for a sturgeon to swim are for the 96-inch steel pipe piles. A study by D. Deslauriers and James D. Kieffer (2012) measured sustained swimming speed (swimming against a current for 200 minutes) for young-of-the-year shortnose sturgeon at 18 cm/s (0.18 m/s). Further, shortnose sturgeon young-of-the-year could sustain swimming at velocities of 0.35 m/s for up to 30 to 50 minutes depending on water temperature (D. Deslauriers & J. D. Kieffer, 2012). We estimate that shortnose and Atlantic sturgeon have a prolonged swim speed of at least 35 cm/s (1.1 feet per second (fps)) and an escape or burst speed of at least 45 cm/s (1.4 fps). We also estimate that sturgeon could sustain their prolonged swim speed for up to 200 minutes without muscle fatigue (Webb 1986). Based on the estimated prolonged swim speed, a sturgeon could be expected to exit the maximum SEL_{cum} ensonified area (2,154 m (7,068.4 ft) from the pile driving location) within approximately 6,426 seconds, or 107 minutes, and would not reach or exceed the duration at which muscle fatigue would be expected. Based on this, we expect that any sturgeon in the action area would be able to move away from the sound source with sufficient time to avoid exposure to injurious levels of noise as the cumulative threshold calculations considered installation of multiple piles in a 12-hour period (720 minutes). We also note that the requirement to maintain a wide zone of passage at all times ensures that there is a path for sturgeon to use to avoid the noise and there is not a risk of sturgeon not being able to avoid the area with noise above the cumulative injury threshold. Therefore, we expect all sturgeon in the action area to be able to readily swim away from any ensonified area in time to avoid injury. As such, injury of any type due to exposure to pile driving noise is extremely unlikely to occur and effects are discountable. We consider the effects of avoidance below.

6.1.6 Effects of Behavioral Response to Pile Driving Noise

As noted above, available information suggests that behavioral responses (avoidance) may begin upon exposure to noise at levels of 150 dB re 1 µPa RMS. Depending on pile type and installation method, the 150 dB re 1 µPa RMS isopleth (radius) would extend from approximately 4.6 m (15.2 ft), during vibratory installation of 14-inch steel H-piles, to approximately 10,000 m (32,808 ft) during impact driving of 96-inch steel pipe piles. The isopleths associated with impact pile driving of the 96-inch steel pipe piles represent the project's

largest ensonified area and are used here to frame the analysis. Rather than relying exclusively on the spatial extent of the ensonified area that, at its maximum (10,000 m (32,808 ft, or 6.2 mi), in radius for impact driving of 96-inch steel pipe piles), exceeds the approximately 7.2 km (4.5 mi) width of the Bay at the Bay Bridge crossing - our conclusion that behavioral effects from pile driving are insignificant rests primarily on the limited duration and frequency of pile driving activity, combined with the mobile, non-aggregating use of the action area by Atlantic and shortnose sturgeon as described in the *Status of the Species* and *Environmental Baseline* sections of this Opinion. The action area is not known to support unique overwintering habitat, concentrated foraging areas, or other conditions that would cause sturgeon to remain in one location for an extended period; rather, sturgeon use the action area primarily while migrating through the Bay and opportunistically foraging. According to data received from the telemetry array, Atlantic sturgeon only spent one to four hours in the action area. Sturgeon that move away from the immediate vicinity of active pile driving are expected to continue these same behaviors (foraging, resting, or migrating) elsewhere within the tens of thousands of acres of comparable habitat available throughout the Chesapeake Bay, and no information indicates that temporary displacement to nearby habitat of similar quality would impose a measurable energetic or fitness cost on a transiting individual.

Most importantly, pile driving will not be a continuous, sustained operation across the full construction period. For the eastbound bridge, a total of approximately 120 days of pile driving is anticipated across construction years 1 through 5; for the westbound bridge, approximately 138 days across construction years 7 through 13. This means that for the eastbound construction period, pile driving is expected on approximately 6.5 percent of days (120/1825) and will occur for no more than 12-hours on each of those days; similarly, for the westbound construction, pile driving is expected on approximately 5.4 percent of days (138/2,555), also limited to 12 hours per day.

Sturgeon are likely to be foraging (where forage is present), resting, or migrating in the action area. Here, we consider two scenarios: (1) sturgeon near the pile being installed that must swim away from the pile to move out of the area where noise is greater than 150 dB re 1µPa RMS; and (2) sturgeon outside of the area where noise is greater than 150 dB re 1µPa RMS at the onset of pile driving that would need to avoid this area when pile driving is ongoing.

Sturgeon present within the 150 dB re 1 µPa RMS isopleth when pile driving commences are expected to move away from the sound source and exit the ensonified area. We estimate that Atlantic and shortnose sturgeon have a prolonged sustained swim speed of at least 35 cm/s (1.1 fps) and a burst or escape swim speed of at least 45 cm/s (1.4 fps), and that sturgeon can sustain their prolonged swim speed for up to 200 minutes without muscle fatigue (Castro-Santos *et al*. 2024, McLean *et al.* 2014). At the prolonged sustained swim speed of 35 cm/s (1.1 fps), a sturgeon located at the outermost boundary of the maximum 150 dB RMS behavioral isopleth (10,000 m (32,808 ft) from the pile during 96-inch pipe pile impact driving) would be expected to exit the ensonified area in approximately 107 minutes (approximately 6,426 seconds), well within the 200-minute fatigue threshold. At the more conservative minimum sustained swim speed of 0.18 m/s (0.6 fps), even a slow-moving individual at the outer boundary of this largest

isopleth would exit the ensonified area within two hours, which is the approximate time period needed to install a single 96-inch steel pipe pile.

In practice, sturgeon would not typically be located at the outermost boundary of the behavioral isopleth at the moment pile driving begins, nor would they need to complete the full swim-out distances calculated above, which, in order to avoid disruptive noise levels, assume a fish already at the isopleth's outer edge when the hammer reaches full power. Soft-start procedures, which commence pile driving at reduced energy before reaching full operational intensity, give animals time to detect increasing noise levels and move progressively away from the sound source before threshold levels are reached. The committed use of soft start as and avoidance and minimization measure, typically provides 20 minutes at reduced energy before reaching full power. Accordingly, the realistic duration of behavioral disruption in this scenario is on the order of 20 minutes - the length of the soft-start period - rather than the full swim-out times of up to 107 minutes (or, at the most conservative swim speed, approximately two hours) calculated above for a fish that begins at the outer edge of the isopleth once the hammer is already at full power, and considerably shorter than the approximately two-hour period needed to install a 96-inch steel pipe pile.

Sturgeon located outside the ensonified area at the onset of pile driving would need to avoid entering the 150 dB re 1 µPa RMS isopleth while pile driving is underway. This avoidance behavior would entail, at most, a temporary rerouting of migratory movement, a shift in foraging location, or a brief pause in movement until the end of the 12-hour pile driving period. Given the breadth of suitable habitat available throughout the Chesapeake Bay action area, sturgeon engaging in this avoidance behavior would have access to comparable foraging substrate elsewhere in the Bay outside of the daily ensonified area. No information is available to indicate that any particular portion of the Chesapeake Bay within the action area provides superior foraging, resting, or migratory conditions relative to any other, so this displacement is not expected to disadvantage an individual relative to the continued use of the location it otherwise would have occupied. We recognize, however, that at its maximum extent (10,000 meters (32,808 feet, or 6.2 miles)), in radius for impact driving of 96-inch steel pipe piles) the 150 dB isopleth exceeds the approximately 7.2 km (4.5 mi) width of the Bay at the project site. As a result, during periods when the largest pile types are installed at full power, the ensonified area could extend across the full width of the Bay at the bridge, and we cannot conclude that a fully unensonified, below-threshold corridor spanning this area would necessarily remain available at that specific time and location. In addition, where pile driving during the ZSFP window limited to pile types smaller than the 96-inch steel pipe piles, FHWA and MDTA's committed maintenance of a 2,133.6 m (7,000 ft)-wide ZSFP from January 15 through May 15 (the anadromous fish migratory period) would provide a corridor of below-threshold acoustic habitat during the period of greatest migratory sensitivity, encompassing both shallow and deep-water habitat types. This January 15–May 15 window reflects a seasonal habitat-protection commitment tied to the anadromous fish migratory period; it is not a separate time-of-year restriction on pile driving itself, and pile driving may occur during that window subject to maintenance of the ZSFP corridor. Outside of the January 15 through May 15 window, pile

driving may occur during other months when sturgeon opportunistically forage and make seasonal movements. Pile driving occurs on only approximately 5.4 to 6.5 percent of days within a given construction period (as described above) and is followed each day by a 12-hour quiet period. As a result, while an individual sturgeon may encounter active pile driving at some point over the multi-year construction schedule, the likelihood of exposing the same individual on consecutive days, or repeatedly within a short period, is low, because an overnight quiet period follows each exposure and, on most days, additional intervening quiet days pass before pile driving resumes.

A short-term behavioral disruption of foraging, resting, or migratory movement will not have any detectable effect to any individual sturgeon and therefore no effect on the overall health, condition, or fitness of individual Atlantic or shortnose sturgeon. Foraging activity resumes as soon as pile driving ceases or the individual exits the ensonified area and encounters suitable benthic invertebrate prey, which is broadly distributed throughout the action area. Migratory movement continues on a rerouted or briefly delayed basis, with no information available to suggest that a disruption in daily movements that lasts no more than a few hours would have a detectable effect on the individual. This would also be too short to have any impact on timing of movements for spawning or overwintering, or to experience any energetic deficit measurable against normal seasonal variation. Resting behavior also resumes as soon as the noise ends or the individual moves beyond the disturbing noise level.

6.1.7 Summary of Behavioral Effects

Because behavioral modification at the 150 dB RMS threshold is expected to occur at sustained swim speeds after, perhaps, an initial speed burst from a startle response, no increase in metabolic expenditure beyond normal activity levels is anticipated. Accordingly, no decrease in individual condition or body reserves is expected to result from avoidance behavior. Therefore, we do not anticipate any effects to growth, reproduction, immune function, or long-term survival of any individual sturgeon attributable to pile driving-related behavioral modification. This is consistent with the regulatory definition of insignificant effects – effects that could reasonably occur but that would never be expected to rise to a level that could result in take – because the behavioral modification described here does not reach a magnitude capable of causing injury and would not be expected to produce any measurable change in an individual's growth, reproduction, or survival.

Based on the analysis above, behavioral modification from pile driving noise will not preclude any sturgeon from completing essential behaviors - including foraging, resting, and migration - within the action area or within adjacent suitable habitat. Thus, effects are too small to be meaningfully measured, detected, or evaluated and, therefore, consequences are insignificant.

6.2 Dredging

As described above, all dredging will be carried out with a mechanical (bucket) dredge, targeting a depth of 9 feet below mean lower low water (MLLW) across a total footprint of approximately 50.2 acres (approximately 308,800 cubic yards). The estimated dredging duration is 14 days for

the eastbound bridge (construction years 1–2) and 7 days for the westbound bridge (construction years 7–8).

6.2.1 Interactions between Dredge Equipment and sturgeon

Mechanical dredging entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge. The bucket operates without suction or hydraulic intake, moves relatively slowly through the water column and affects only a small area of the aquatic bottom at any time. To be captured in a dredge bucket, an animal must be on the bottom directly below the dredge bucket as it contacts the substrate and remain stationary as the bucket closes. Species captured in dredge buckets can be injured or killed if entrapped in the bucket or buried in sediment during dredging and/or when sediment is deposited into the dredge scow. Species captured and emptied out of the bucket can suffer stress or injury, which can lead to mortality.

In addition to capture, a sturgeon could be struck by the dredge bucket, cable, or associated rigging without being captured or retained. Such a non-capture interaction could cause injury or mortality that would not be reflected in the incident records discussed below, since the animal would not be brought to the surface or observed by dredge monitors. However, we are not aware of documented non-capture strike records separate from the capture incidents described below; however, the absence of such records likely reflects the limited ability to detect an interaction that does not result in retrieval, rather than confirmation that the risk does not occur.

In 2012, the USACE provided us with a list of all documented interactions between dredges and sturgeon reported along the U.S. East Coast; reports dated as far back as 1990. The list includes five incidents of sturgeon captured in dredge buckets. We are not aware of any additional records that postdate this report. These five incidents include the capture of a decomposed Atlantic sturgeon in Wilmington Harbor in 2001. The condition of this fish indicated it was not killed during the dredging operation and was likely dead on the bottom or in the water column and merely scooped up by the dredge bucket. Another record was the reported lethal capture of an Atlantic sturgeon in Wilmington Harbor in 1998; however, this record was never verified. An Atlantic sturgeon was captured in a clamshell bucket, deposited in the dredge scow, and released apparently unharmed during dredging operations at Bath Iron Works (BIW) in 2001. On April 30, 2003, a shortnose sturgeon was captured in a clam-shell bucket dredge operating in the BIW sinking basin; the fish was nearly cut in half. This fish was killed during the last hour of a 24 hour a day dredging operation that had been ongoing for approximately six weeks. One shortnose sturgeon was captured in a clamshell bucket and detected in the dredge scow on June 1, 2009, during dredging operations at BIW. Observer coverage at dredging operations at the BIW facility has been 100 percent for approximately 20 years, with dredging occurring every one to two years.

Monitoring occurred at dredging projects associated with the Tappan Zee Bridge replacement project on the Hudson River. The first stage of dredging occurred in 2013. Two dredges were used between August 2 and October 30, 2013, and a total of 844,120 CY of material were removed using a bucket dredge. NMFS-approved observers were present to monitor 100 percent

of all dredging. All dredge observer forms were submitted to us on December 31, 2013. While fish and other biological materials were observed in 279 loads (out of approximately 1,500), no shortnose or Atlantic sturgeon were observed. Dredging occurred again in 2015 with approximately 150,000 CY of material removed; observer coverage was 100 percent and no shortnose or Atlantic sturgeon were observed. The area where dredging occurred is a high use area for shortnose and Atlantic sturgeon.

We expect the risk of interactions between sturgeon and mechanical dredges to be highest in areas where large numbers of sturgeon are known to aggregate. The behavior of sturgeon in the area may also affect the risk of capture. While foraging, sturgeon are at the bottom of the river interacting with the sediment. This behavior may increase the susceptibility of capture with a dredge bucket. We also expect the risk of capture to be higher in areas where sturgeon are overwintering in dense aggregations as overwintering sturgeon may be less responsive to stimuli which could reduce the potential for a sturgeon to avoid an oncoming dredge bucket. Telemetry data indicate that while sturgeon may forage opportunistically within the dredging footprint, individuals do not exhibit long-term residency in this area, and the area is not a known aggregation site for sturgeon. This transient pattern of use limits the duration over which any individual sturgeon would be present within the footprint at a given time, correspondingly reducing the cumulative probability of an interaction with dredge equipment. Given the slow rate of bucket descent and closure and the small area of bottom substrate affected during each pass, as described above, a mobile organism in the vicinity of a descending bucket would generally be expected to detect and move away from the disturbance before contact. For a bucket dredge to capture a sturgeon, the sturgeon has to be immediately below the bucket and remain stationary as the bucket jaw closes. The slow movement of the dredge bucket through the water column and the relatively small area of bottom impacted by each pass of the bucket makes the likelihood of interaction between a dredge bucket and an individual fish unlikely.

Considered together, the risk of a sturgeon being captured by a mechanical dredge bucket - which requires the animal to be positioned directly beneath the bucket and remain stationary as it closes - is extremely low given the slow rate of bucket descent and closure and the small area of bottom affected during each pass. The risk of a non-capture strike, while more difficult to characterize because such an interaction would not be reflected in observer or incident records, is likewise expected to be low: the same slow, localized nature of bucket operation that limits capture risk also limits the opportunity for a sturgeon to be struck without being captured, and mobile sturgeon in the vicinity of the descending bucket would generally be expected to move away from the disturbance before contact. Telemetry data further indicate that sturgeon use of the area is limited, which suggests they may use the area for opportunistic foraging rather, which reduces the duration of exposure and the corresponding cumulative probability of either type of interaction. Based on the available evidence regarding both capture and non-capture interaction pathways, we conclude that the risk of a mechanical dredge affecting Atlantic or shortnose sturgeon is extremely unlikely to occur, and any such effects are discountable.

6.3 Suspended Sediment/Turbidity

A number of project activities, including dredging, vessel operations, blasting, and pile driving result in temporary, localized increases in suspended sediment and turbidity due to disturbances of bottom sediments. Here, we address anticipated effects on shortnose and Atlantic sturgeon in the action area.

6.3.1 Thresholds for TSS and Turbidity Effects

Literature reviews of the effects of suspended sediment on fish show that effects vary greatly among species and suggest that concentrations of suspended solids can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993; Kjelland *et al*., 2015; Wilber & Clarke, 2001). Burton (1993) evaluated consequences of bucket dredging in the Delaware River and determined that lethal effects on fish due to turbid waters can occur at levels between 580 mg/L to 700,000 mg/L, depending on the species. The studies reviewed by Kjelland *et al*. (2015) found that, depending on species, reported mortality ranged from 10 to 100 percent when exposed to TSS levels ranging from 300 to 300,000 mg/L after exposure periods ranging from 24 to 48 hours. Wilber and Clarke (2001) found that for adult estuarine species, TSS effects ranged from "no effect" when exposed to 14,000 mg/L for a duration of three days for two species to the lowest observed concentration that caused mortality at 580 mg/L after one day of exposure for Atlantic silverside. The concentration of suspended sediment is not the only factor determining effects; also relevant is the duration at which a fish is exposed. For example, most studies report response after exposure ranging from 24 to 48 hours.

In general, sturgeon are adapted to living in turbid environments (Hastings 1983; ECORP Consulting 2009), and this can be taken into consideration when evaluating the effects of turbidity and suspended solids on sturgeon species. However, there have been no directed studies on the physiological consequences of TSS on Atlantic or shortnose sturgeon; *Kjelland et al.* (2015) noted that benthic species in general are more tolerant to suspended sediment than pelagic species. As such, Atlantic and shortnose sturgeon are assumed to be at least as tolerant to suspended sediment as other estuarine fish. Based on the study of other species, we regard sublethal and lethal consequences on Atlantic and shortnose sturgeon to occur when exposed to 24 hours of concentrations at or above 580 mg/L. This threshold is derived from Burton (1993) and Wilber and Clarke (2001) data for Atlantic silverside, the most sensitive adult estuarine species reviewed in that literature, and reflects an acute (24-hour) exposure endpoint. We use it here because it is the closest available analog to the short-duration TSS pulses generated by the proposed action's construction activities (see Extent and Intensity of Water Quality Changes, below).

High TSS levels can cause a reduction in dissolved oxygen (DO) levels. Atlantic and shortnose sturgeon may become stressed when dissolved oxygen falls below certain levels. Jenkins *et al*. (1993) observed that younger shortnose sturgeon experienced high levels of mortality at low dissolved oxygen levels while older individuals tolerated those reduced levels for short time periods. Tolerances may decline if chronic exposure to low dissolved oxygen levels occurs. Johnson (2018), following a comprehensive literature review, found no sturgeon-specific data

establishing a physiological or lethal effects threshold and instead recommends, as a conservative screening benchmark, that TSS concentrations not exceed 1,000 mg/L above ambient for longer than 14 days at a project site in order for effects to be considered insignificant and discountable. This 1,000 mg/L/14-day benchmark addresses a substantially longer, chronic exposure duration than either the acute 580 mg/L/24-hour threshold discussed above or the TSS durations expected from any of the project's construction activities, all of which are measured in minutes to hours rather than days (see Extent and Intensity of Water Quality Changes, below). The two threshold values are therefore not directly comparable and should not be read as points on a single graduated severity scale; each corresponds to a different exposure duration, and project-generated exposures fall well short of the duration basis for either one.

As is the case with physiological effects, behavioral response to increased turbidity and turbidity plumes varies among species and depends on their specific biology such as sensory capabilities and adaptive strategies. Studies of how fish respond to suspended sediment have detected behavioral effects of turbidity on feeding and vulnerability to predation (Kjelland *et al*., 2015; Wilber & Clarke, 2001). High turbidity may affect feeding efficiency for species using visual detection during foraging, which again can result in reduced growth, fecundity or increase stress and susceptibility to disease and parasites. However, turbidity, at least at TSS levels below what would cause physiological effects, is not likely to substantially affect Atlantic and shortnose sturgeon foraging. Sturgeon typically occur in turbid waters and sturgeon forage by rooting along the bottom with their snout in search for benthic prey that they grasp with their protuberant mouth (Kynard *et al*., 2016). During foraging, they use their barbels as sensory organs to detect prey (Hilton *et al*., 2016; Kynard *et al*., 2016). Atlantic sturgeon also actively forage during night (Dadswell *et al*., 1984). Based on foraging method, tolerance to high turbidity and foraging during night it is unlikely that visual detection of prey is of major importance for Atlantic and shortnose sturgeon foraging success. Elevated TSS levels resulting in physiological effects may elicit avoidance behavior and movement away from turbidity plumes. Studies on another anadromous species, striped bass, showed that pre-spawners did not avoid TSS concentrations of 954 mg/L to 1920 mg/L to reach spawning sites (Combs 1979 in Burton, 1993; Summerfelt & Mosier, 1976).

The BA estimates that the duration of levels above ambient TSS conditions is expected to be short (less than 30 minutes). Studies of the effects of turbid water on fish suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton 1993). Furthermore, the TSS levels expected are below those shown to have adverse effect on fish (typically up 1,000.0 mg/L; Wilber and Clarke 2001). Similarly, based on a comprehensive literature review, Johnson (2018) recommends that sturgeon should not be exposed to TSS levels of 1,000 mg/L above ambient for longer than 14 days at a time to avoid behavioral and physiological effects.

6.3.2 Extent and Intensity of Water Quality Changes

6.3.2.1 Mechanical Dredging

Dredging suspends sediment into the water column. Resuspension of sediment may increase Total Suspended Sediment (TSS) load and turbidity[19] above ambient baseline levels. Effects of dredging will vary based on site-specific conditions (Wilber and Clarke 2001). Site-specific conditions (e.g., bathymetry, currents) and material (e.g., sand versus silt) should be taken into consideration as it may influence turbidity and re-suspended sediment at a site. Assessing exposure of listed species to elevated levels of turbidity or TSS concentration requires an understanding of the sources (e.g., dredge type), factors that influence the duration and intensity of exposure (e.g., sediment type and/or current), as well as the individual species tolerance to the anticipated level of exposure at a given life stage. In our analysis, we consider information from earlier studies of sediment resuspension and turbidity to understand the intensity and extent of turbidity impacts. However, we also consider site-specific information to understand how local conditions influence turbidity and re-suspended sediment.

High concentration of suspended sediment or turbidity may affect fish through many pathways (Kjelland *et al*. 2015, Johnson 2018). Sediment and turbidity can affect fish directly by reducing the gill's ability to take up oxygen, causing acute toxic reactions, resulting in physiological stress, and reducing foraging efficiency and/or predator avoidance. Resuspension of fine sediment with high organic content can affect fish indirectly by reducing dissolved oxygen levels. For all fish species in which effects to early life stages have been measured, it is clear that eggs and larvae (which are not present in the action area) are the most sensitive to suspended sediments and sediment deposition.

TSS concentrations associated with mechanical clamshell bucket dredging operations have been shown to range from 105 mg/L in the middle of the water column to 445 mg/L near the bottom (210 mg/L, depth-averaged) (USACE 2001). Furthermore, a study by Burton (1993) measured TSS concentrations at distances of 152, 305, 610, and 1,006 m (500, 1,000, 2,000, and 3,300 ft) from dredge sites in the Delaware River and were able to detect concentrations between 15 mg/L and 191 mg/L up to 610 m (2,000 ft) from the dredge site. Independent of bucket type or size, plumes dissipated to background levels within 183 m (600 ft) of the source in the upper water column and 732 m (2,400 ft) in the lower water column. Based on these studies, elevated suspended sediment concentrations at several hundreds of mg/L above background may be present in the immediate vicinity of the bucket but would settle rapidly within a 732 m (2,400 ft) radius of the dredge location.

Applying the thresholds established above, the maximum TSS concentrations expected during mechanical dredging (445 mg/L near the bottom, 210 mg/L depth-averaged) do not reach the 580 mg/L threshold associated with sublethal and lethal effects, nor the 1,000 mg/L (above ambient)

[19] Turbidity relates to the optical quality of light transmission through a fluid containing sediment particles (most often measured as nephelometric turbidity units) and TSS concentration is the gravimetric measure of particles in suspension (generally measured as milligrams per liter).

threshold associated with behavioral effects. We therefore do not identify a lethal, sublethal, or behavioral zone of impact for dredging-related turbidity based on these thresholds. Elevated TSS levels are expected to remain within an approximately 732 m (2,400 ft) radius of the dredge location in the lower water column and 183 m (600 ft) in the upper water column, dissipating to background levels beyond these distances (Burton 1993).

6.3.2.2 Pile Driving

The installation of piles will disturb bottom sediments and may cause a temporary increase in suspended sediment in the action area. Using available information collected from a project in the Hudson River, we expect pile driving activities to produce TSS concentrations of approximately 5.0 to 10.0 mg/L above background levels within approximately 91 m (300 ft) of the pile being driven (FHWA, 2012). Using a vibratory hammer to extract piles allows sediment attached to the pile to move vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours.

Applying the thresholds established above, the TSS concentrations expected during pile driving (approximately 5.0 to 10.0 mg/L above background) fall far below both the 580 mg/L threshold for sublethal/lethal effects and the 1,000 mg/L (above ambient) threshold for behavioral effects. We therefore do not identify a lethal, sublethal, or behavioral zone of impact for pile-driving-related turbidity. Elevated TSS levels are expected to be limited to approximately 91 m (300 ft) of the pile being driven and to settle out of the water column within a few hours (FHWA 2012).

6.3.2.3 Vessel Operation

Hayes *et al*. (2010) estimated that tugs supporting dredging and construction activities can cause significant scour and resuspension of bottom sediments, potentially more than the dredging itself, because they often work in shallow water where the riverbed consists of fine, soft sediment. They modeled resuspension of highly erodible bottom sediment of indefinite depth from various types of vessels at various propeller clearance. They estimated that an 1,800 horsepower (HP) tug operating at 25 percent power and moving forward at 1.9 km/h (1 kts) could resuspend from 8,300 kilograms per second (kg/s) at 7.7 m (25.3 ft) propeller clearance to 14,000 kg/s at 1.7 m (5.6 ft) propeller clearance (Hayes *et al*., 2010). A small push boat with a 180 HP engine could potentially resuspend 1,000 to 5,000 kg/s at 1.4 m (4.6 ft) propeller clearance depending on power used. Even with a 3.4 m (11.2 ft) propeller clearance, the small push boat could resuspend up to 70 kg/s if operating at full power. Based on the model results, Hayes *et al*. (2010) concluded that resupension flux by support vessels (tugs) could exceed that of the dredging itself. Although the approximate size and type of vessel is currently unknown, we assume that the project-related vessels will have a draft of approximately up to 3.7 m (12 ft) and the dredge area currently has water depths 0.3 to 0.91 m (1 to 3 ft) that extend channelward approximately 244 to 290 m (800 to 950 ft) from the western shoreline, and approximately 1,200 to 1,300 feet from the eastern shoreline. Areas with depths from approximately 0.91to 3.7 m (3 feet to 12 ft) generally extend from about 640 to 671 m (2,100 to 2,200 ft) from the western shoreline and 1,189 to 1,433 m (3,900 to 4,700 ft) from the eastern shoreline. Based on bathymetric analysis, it is anticipated that dredging would be required to a depth of 2.7 m (9 ft) at

mean lower low water (MLLW). Vessels will not be restricted to the dredge footprint and we expect these to operate within the whole action area.

Similar to most of the sediment transport observations in open-channel flow, the maximum concentration from propeller disturbance of bottom sediment is located near the surface of the bottom with the suspended-sediment concentration gradually decreasing toward the water surface. Additionally, at any level in the water column, the concentration also decreases with time. Clarke *et al*. (2015) measured TSS concentrations after deep draft vessel passage in the Newark Bay, New Jersey, of 90 mg/l over broad areas following vessels maneuvers. TSS levels remained detectable against ambient levels at least 50 minutes where tidal currents could disperse plumes. Residual plumes (maximum 40 mg/l) in the lower two meters remained detectable at least 65 minutes after deep draft vessel passage. Field measurements of suspended sediment concentration behind a container vessel departing through a restricted fairway at a port in Hamburg, Germany, reached 550 mg/l (Stoschek *et al*., 2014). Concentrations at the focal point of propeller scour when a vessel with little clearance is maneuvering (e.g., at start of movement from a still position) can exceed 1,000 mg/l but the plume will quickly dilute as the vessel start moving and the plume disperses (PIANC, 2008; Stoschek *et al*., 2014). Since the vessels described above are larger with more powerful engines and have deeper draft than the tug vessels analyzed here, we expect the measured TSS levels above to be the maximum TSS levels generated by tugs operating in areas with little clearance.

The deep-draft vessels evaluated in these studies were substantially larger than the tugs and support vessels anticipated for project use. The eleven vessels measured by Clarke *et al*. (2015) in Newark Bay ranged from 190 to 294 m (623 to 965 ft) in length, with drafts of 9.2 to 13.5 m (30 to 44 ft) and gross tonnage of approximately 32,957 to 57,255 tons — compared to the maximum project vessel draft of approximately 12 ft (3.7 m) assumed here. The container vessel measurements in Stoschek *et al*. (2014) were likewise based on large containerships with propeller diameters on the order of 9 m (29.5 ft), far exceeding the propeller dimensions of the 1,800-HP tug and 180-HP push boat modeled by Hayes *et al*. (2010) for this project. Because propeller-induced sediment resuspension scales with vessel draft, propeller diameter, and engine power - and RPM in particular, which Stoschek *et al*. (2014) identified as the most sensitive parameter, with a 5 percent increase in RPM producing a 20 percent increase in resuspension - the substantially greater draft, propeller size, and power of the vessels evaluated in Clarke *et al*. (2015) and Stoschek *et al.* (2014) indicate that the TSS concentrations they measured represent a conservative upper bound for the smaller support vessels and tugs anticipated for this project.

Applying the thresholds established above, the TSS concentrations associated with project vessel operation - informed by the conservative upper-bound data from Clarke *et al*. (2015) and Stoschek *et al*. (2014) - do not approach the 580 mg/L / 24-hour threshold for sublethal/lethal effects or the 1,000 mg/L (above ambient) / 14-day threshold for behavioral effects, once duration is accounted for. Concentrations at the focal point of propeller scour during low-speed maneuvering can transiently exceed 1,000 mg/L (up to 1,500 mg/L per Stoschek *et al.* 2014), but such concentrations are localized to the immediate propeller wake and persist for at most several minutes as the vessel gets underway - several orders of magnitude shorter than the 14-day

duration associated with the behavioral threshold. Broader-area concentrations following vessel passage (up to 90 mg/L, with residual plumes detectable for 50 to 65 minutes; Clarke *et al*. 2015) fall far short of either threshold in both magnitude and duration. Based on these thresholds, we therefore do not identify a lethal, sublethal, or behavioral zone of impact for vessel-related turbidity.

6.3.2.4 Blasting

There is no available information on the TSS levels expected after a blast event. However, the BA estimates that the TSS levels following a blast event may be between 350 and 600 milligrams per liter, based on discussions with blast experts and water quality monitoring experts. While increased TSS may cause Atlantic and shortnose sturgeon to alter their normal movements, these minor movements will be too small to be meaningfully measured or detected. TSS is most likely to affect sturgeon if a plume causes a barrier to normal behaviors. However, we expect sturgeon to swim through the plume to avoid the area with no adverse effects.

Because the elevated TSS levels associated with blasting (350–600 mg/L) are expected to persist for less than 30 minutes - several orders of magnitude shorter than the 24-hour exposure duration associated with the lethal/sublethal threshold and the 14-day duration associated with the behavioral threshold established above - neither threshold is expected to be reached at any distance from the blast site. We therefore do not identify a lethal, sublethal, or behavioral zone of impact for blasting-related turbidity.

6.3.3 Response of Sturgeon to Exposure

Adult and subadult sturgeon are frequently found in turbid water and would be capable of avoiding any sediment plume by swimming higher in the water column. Laboratory studies (Niklitschek 2001, Secor and Niklitschek 2002) have demonstrated shortnose sturgeon are able to actively avoid areas with unfavorable water quality conditions and that they will seek out more favorable conditions when available. As discussed above, none of the project's turbidity-generating stressors are expected to produce TSS concentrations and durations sufficient to reach the sublethal/lethal or behavioral thresholds established in this section. Based on this, and the demonstrated capacity of sturgeon to actively avoid unfavorable water quality conditions, we expect effects to sturgeon exposed to project-related sediment plumes to be too small to be meaningfully measured, evaluated or detected and, therefore, insignificant.

TSS is most likely to affect sturgeon if a plume causes a barrier to normal behaviors. However, the increase in TSS levels expected are below those shown to have adverse effects on fish. Moreover, sturgeon are likely to avoid the sediment plume at the focal point where the propeller jet hits the bottom and suspended sediment concentrations are highest. Thus, we expect sturgeon to either swim through the plumes or make minor evasive movements to avoid them.

Even if sturgeon avoid the turbidity plume, this will not be a barrier to migration. Elevated suspended sediment levels at the Bridge site that may cause avoidance will be the sediment plumes generated by pile driving and mechanical dredging, with radii of 91 m (298.5 ft) and 732 m (2,400 ft), respectively. The sediment suspended during dredging will quickly decrease to low concentrations as the distance increases from the dredging area and the sediment falls out of the

water column. Any TSS levels that may cause avoidance will be closer to the dredging than the full extent of the sediment plume. Thus, any avoidance of the plume will not hinder upstream or downstream movements of sturgeon.

Energy expenditure to avoid turbidity plumes could reduce growth of sturgeon, delaying ocean migration and, eventually, expected lifetime fecundity. Sturgeon feed on a large range of prey and actively move over the bottom in search of prey when foraging. The evasive movements that would be necessary to avoid high TSS concentrations would be within their normal range of movement and we do not expect this to increase substantially normal energy use. Thus, any effects are likely to be so small that they cannot be meaningfully monitored, detected, or evaluated and are therefore insignificant.

6.4 Benthic Habitat Modification

The proposed project will remove and disturb the substrate through construction, demolition, dredging, and scour from the propeller jet of vessels. According to the BA, approximately 134.8 acres of tidal water bottom impacts are expected due to impacts associated with the proposed action (pile driving and removal, demolition and clearing debris, and dredging). This 134.8-acre figure describes the extent of direct physical habitat disturbance from construction activities. It is distinct from the approximately 1,200-acre zone discussed below under Blasting, which describes the outer extent of potential underwater noise detection during blasting rather than an area of direct habitat loss.

Soft substrate supports a variety of benthic invertebrates that are important prey for sturgeon. Therefore, removal and disturbance of the bottom sediment or conversion of the bottom from soft to hard substrate can eliminate or reduce forage for sturgeon.

In this section, we present background information on the existing habitat and the proposed project's impacts; the factors to consider when assessing habitat impact; an analysis of exposure; and a summary of available information on sturgeon habitat use and available information on sturgeon responses to loss of habitat and forage. We then consider the effects of exposure of individual sturgeon to habitat loss and degradation.

6.4.1 Intensity and Extent of Habitat Impacts

Bottom substrates within the action area, based on MDNR's Chesapeake Bay Bottom Survey data (Smith *et al*., 2001), are mapped in the Annapolis Shore, Kent Island True Bay, and Kent Island Shore 12-digit watersheds. Within the action area, substrates in the Lower Severn River, Annapolis Shore, and Kent Island True Bay MD 12-digit watersheds are dominated by mud and natural oyster rubble. The Northwest Lower Chesapeake Bay MD 12-digit watershed contains natural oyster rubble and sand substrates within the action area. The Grasonville South MD 12-digit watershed contains man-made oyster rubble, mud, natural oyster rubble, sand, and sandy mud substrate types within the resource review area. Mud, natural oyster rubble, sand, and sandy-mud substrate is present in the Chester River South MD 12-digit watershed. Finally, the Kent Island Shore MD 12-digit watershed contains only sand substrate, based on MDNR's Chesapeake Bay Bottom Survey data (Smith *et al*., 2001). Table 19 illustrates the predominance

of mud, sand, and natural oyster rubble within the action area. These substrates provide a soft bottom habitat supportive of diverse aquatic life, providing habitat for invertebrates as well as other species that rely on foraging and burrowing.

Table 19. Habitat types within the action area

Habitat Type	Lower Severn River	Annapolis Shore	Northwest Lower Chesapeake Bay	Kent Island True Bay	Kent Island Shore	Grasonville South	Chester River South
Man-Made Oyster Reef	0.68	---	---	---	---	---	---
Man-Made Oyster Rubble	3.31	---	---	---	---	17.02	4.32
Mud	340.43	333.10	---	8.20	---	39.15	44.79
Natural Oyster Rubble	198.62	125.09	88.26	396.49	---	25.12	81.37
Sand	2.03	58.87	46.89	590.97	1.26	6.97	46.47
Sandy Mud	---	---	---	---	---	35.29	56.60
Unclassified	14.07	---	---	---	---	---	3.44
Unspecified Construction Reef	2.54	---	---	---	---	---	---

6.4.1.1 Dredging

Dredging will temporarily remove all benthic invertebrates within the approximately 50.2 acre dredge footprint. We expect that this activity is more likely to disturb or displace non-mobile organisms that occur at the surface of the sediment and is less likely to impact mobile invertebrates (such as crabs) who can avoid the dredge. Dredging is likely to entrain and kill at least some of mobile invertebrates. Further, turbidity and suspended sediments from dredging activities may affect benthic resources in those areas. Some of the TSS levels expected for the proposed activities (up to 445 mg/L) exceed the levels shown to have adverse effects on benthic communities (390 mg/L (EPA 1986)).

Studies done by Wilber and Clarke (2001) demonstrate that benthic communities in temperate regions occupying shallow waters with substrate of sand, silt, or clay reported recovery times between one and 11 months after dredging. Therefore, if a dredge site remains undisturbed after dredging, the benthic invertebrate fauna within the dredged areas could recover to pre-project conditions within one year following completion of the initial dredging. Because sturgeon are

highly mobile and forage opportunistically across the action area rather than depending on a single fixed foraging location, individual sturgeon are not expected to depend on the 50.2-acre dredge footprint specifically for prey during the estimated 1- to 11-month benthic recovery period. Sturgeon encountering reduced prey density within the footprint during this period of time would be expected to forage in adjacent, unaffected areas of comparable habitat that remain available throughout the action area. We therefore do not expect the temporary reduction in benthic prey availability within the dredge footprint to measurably affect individual sturgeon growth, condition, or fitness. Given that maintenance dredging is not proposed and the dredged areas are expected to fill in over time, we expect that the area will recover to pre-dredge conditions over time with a similar composition and density of the invertebrate fauna. As such, effects of dredging on benthic communities in the action area are expected to be temporary and localized.

6.4.1.2 Blasting

Subaqueous explosive demolition impacts the benthic environment through three primary vectors: direct substrate displacement, localized sedimentation, and structural bathymetric alteration. As discussed above (see *Action Area* and the introduction to this section), the BA's reference to a 1,200-acre area of impact from blasting describes the extent of the area potentially ensonified during demolition (see Section 6.6.2 and Figures 9 and 10), not an area of direct habitat disturbance. In terms of habitat disturbance, direct physical disturbance to the bay bottom from blasting is limited to the immediate vicinity of each pier and the associated rubble-placement areas; the majority of the 1,200-acre zone is expected to experience, at most, transient increases in turbidity and sedimentation of the magnitude and duration addressed in the Suspended Sediment/Turbidity section above, rather than direct habitat loss.

The BA describes the proposal to implement confined blasting, which reduces the energy and shock wave released to the water column. Confined blasting ensures that the blast will radiate outward toward the outer edge of the pier so that most of the blast energy is focused on the pier and that the rubble produced from the blasts is controlled, and does not land far away from the blasting site. Therefore, we expect that the rubble will be in close proximity to the location that it will subsequently be moved to disposal sites or placed within scour holes. After demolition, if suitable for re-use, the clean concrete rubble from each existing pier will be mechanically pushed into the new pier's scour holes with large excavators attached with buckets, grapple, and clamshells operating from barges, which may kill at least some potential sturgeon forage items. In addition, the re-use of concrete rubble in these locations will raise the elevation of the bay floor from the bottom of the deep scour holes to an elevation close to the river bottom. Leaving space on top of each filled scour hole encourages the deposition of soft sediment over the concrete rubble, which will enable the recolonization of benthic organism. Keevin and Hempen (1997) assembled a literature review on the effects of blasting to aquatic invertebrates that observed the impacts to benthic organisms over distance gradients using "shots" with similar or greater force as proposed to demolish the five piers and fender nose for this project. Mortality of oysters, blue crabs, various crabs, snails, shrimp, clams, and worms was observed. Mortality was low overall and benthic invertebrate organisms were not highly sensitive to underwater blasting. This could be attributable to the fact that all the invertebrate species tested lack gas-

containing organs, which have been implicated in internal damage and mortality in vertebrates (Keevin and Hempen 1997). The impact on benthic species should not extend beyond the immediate blasting area as previous studies indicate that invertebrates are relatively insensitive to pressure related damage from underwater detonations (USACE 2000).

The width of the bay is 7.2 km (4.5 miles) and effects of blasting are expected to encompass up to a 640-meter area around each of the 15 eastbound and 15 westbound piers. Given the limited spatial extent of potential impacts and the available literature which indicates that benthic communities that serve as forage for sturgeon are expected to be resilient to blasting effects and the anticipated rapid recovery of any loss of benthic resources following blasting (Wilber and Clarke 2007), effects to the forage base are expected to be extremely small and limited in space and time. To contextualize this area, the Chesapeake Bay's total surface area is approximately 2.87 million acres (4,479 square miles). A 1,200-acre zone of potential blasting influence therefore represents approximately 0.04 percent of the Bay's total surface area. We do not rely on this percentage alone to support an insignificance finding. As discussed above, the 1,200-acre figure describes the outer extent of a zone within which underwater noise may potentially be detected, not an area of temporary turbidity, suspended sediments, or direct habitat loss; direct physical disturbance to the bay bottom is limited to the immediate vicinity of each of the 30 piers and the associated rubble-placement areas described above. It is the temporary, non-destructive nature of the effect across the great majority of the 1,200-acre zone - not its size relative to the Bay - that supports our conclusion below. Therefore, any effects of the blasting operations on sturgeon prey items within the action area will be too small to be meaningfully measured, evaluated, or detected, and therefore, insignificant.

6.4.2 Effects to Habitat Modification and Loss of Forage

When added to baseline bottom disturbances, the proposed project will affect a relatively small portion of bay bottom and reduce the availability of benthic invertebrate prey. This will affect sturgeon distribution and foraging within the Bridge area. However, the action area still provides ample available bottom habitat, and the temporary loss of benthic invertebrates within the dredge footprint is small relative to the amount of soft bottom habitat present in the action area and in the Chesapeake Bay. Therefore, we do not expect the proposed project to limit forage for Atlantic and shortnose sturgeon. We also expect that the action area will provide ample forage for Atlantic and shortnose sturgeon as they migrate. As such, we have determined that the effects to sturgeon habitat and forage from dredging and vessel activity is too small to be meaningfully measured, detected, or evaluated. Therefore, effects are insignificant.

6.5 Vessel Strike

In this section of the Opinion, we consider the effects of project vessels on shortnose and Atlantic sturgeon. Specifically, we consider if the increase in vessel traffic, when added to the baseline, is likely to result in effects to individual sturgeon and whether it will increase the risk of interactions between sturgeons and vessels in the action area.

Construction and demolition of the Bridge will cause an increase in vessels operating within the action area. Vessels supporting construction, demolition, and dredging, will operate within the

action area for approximately 15 years. The proposed project will result in the maneuvering and movement of vessels within the project site and the Federal Navigation Channel between the Port of Baltimore and the project site during the lifespan of the project.

To evaluate the potential risk of vessel interactions with Atlantic and shortnose sturgeon when exact details about project vessels are unknown, the effects analysis incorporates the approach established in Section 4.1.1.2. This proxy framework categorizes potential construction traffic into three operational tiers based on transit velocity, displacement, and draft. With respect to vessel trips, we assume a maximum of up to 44 round-trips (88 linear transits) per day during peak construction and demolition seasons, dominated by light-displacement / high-speed vessels.

6.5.1 Increase in Vessel Traffic from the Proposed Action

As explained in Section 3, the approximate size and type of vessel, travel routes, and number of trips is currently unknown. The approach we developed utilizes a surrogate project analysis - drawing from the construction and demolition of the Nice Bridge, the Governor Mario M. Cuomo Bridge, and the Hampton Roads Bridge-Tunnel Expansion projects to classify potential traffic into three distinct operational tiers based on vessel displacement and transit velocity. Spatial and temporal routing models assume low-displacement, high-speed vessels will frequently traverse the shoals flanking the bridge spans during peak summer foraging months (June–September). The draft of the vessels will range from 0.6 to 4.3 m (2 to 14 ft). As described in Section 3 of the Opinion, during all phases of the project, vessels will travel at speeds of up to 5.4 km/h (10 kts) with appropriate safety exemptions, as needed.

As explained in the *Environmental Baseline*, the area to be transited by project-related vessels has relatively high levels of vessel traffic. The best available information indicates there were approximately 34,302 vessel transits[20] during 2023 in the upper Chesapeake Bay and Baltimore approach channels (i.e., the general area that the majority of project vessels will transit to/from the Bridge) (Table 20).

Table 20. 2019-2023 upper Chesapeake Bay vessel traffic (USACE Waterborne Commerce Data 2023)

Calendar Year	Self-Propelled Trips (Ships, Tugs)	Non-Self-Propelled Trips (Barges, Scows)	Total Annual Commercial Trips
2019	24,115	11,407	**35,522**
2020	23,925	10,120	**34,045**
2021	24,082	9,325	**33,407**
2022	23,810	8,195	**32,005**

[20] The vessel traffic numbers from the USACE Waterborne Commerce data do not include most fishing vessels or any recreational vessels; therefore, it is just a portion of the total vessel traffic in the area.

Calendar Year	Self-Propelled Trips (Ships, Tugs)	Non-Self-Propelled Trips (Barges, Scows)	Total Annual Commercial Trips
2023	24,650	9,652	**34,302**
5-Year Median	**24,082**	**9,652**	**34,302**

6.5.2 Factors Relevant to Vessel Strike

A vessel can cause injury or death to a sturgeon when the hull or propeller strikes the sturgeon, or the sturgeon becomes entrained through the propeller. Examination of sturgeon carcasses in the Delaware River and the James River shows that the majority of carcasses found have damage consistent with vessel strike (Balazik *et al*. 2012d, Brown and Murphy 2010; also, see discussion in previous sections of this Opinion). Direct observations of vessel strikes killing sturgeon have also been reported (e.g., Park 2017, personal communication). Therefore, we anticipate that increasing the amount of vessel traffic in a geographic area generally increases the risk of vessel strike for sturgeon in the area.

The timing and location of vessel traffic in the action area may influence the risk of a vessel striking a sturgeon. A significant increase in vessel traffic during spawning periods could potentially increase the risk of vessel strike for migrating adult sturgeon (Fisher 2011, Hondorp *et al*. 2017). Similarly, narrow channels or passageways with restricted clearance may increase the probability that sturgeon will be struck and killed by a vessel (Balazik *et al*. 2012d). We note that neither of these risk factors are considerations for the proposed action as it does not overlap with pathways to known spawning rivers and also is not in a narrow channel or passageway.

For sturgeon to interact with vessels and their propellers, they must overlap spatially and temporally. First, a vessel's activity must occur in the same reach of the waterbody where sturgeon is present. Second, a sturgeon must occupy the same portion (lateral location) of the channel as the vessel (e.g., the maintained navigation channel versus the non-navigational portion of the channel or waterway). Lastly, the hull, propeller, and the hydrological forces around the vessel have to be at the same depth in the water column as the sturgeon. Factors relevant to determining the risk of vessel strikes include, but may not be limited to, the size and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the size and behavior of sturgeon in the area (e.g., foraging, migrating, etc.). Physical characteristics of the area where project vessels will operate (e.g., narrow channels, channel constrictions, etc.) may also be relevant risk factors.

For a vessel strike to occur, the sturgeon must either not respond to an approaching vessel (i.e., not moving away or trying to avoid interaction) or be unable to avoid the vessel. It is well documented that adult sturgeon are killed by interactions with propellers of vessels (Balazik, Reine, *et al.*, 2012; Brown & Murphy, 2010; Demetras *et al*., 2020; Killgore *et al*., 2011). The

available telemetry evidence indicates that sturgeon generally do not respond to an approaching vessel by moving out of its way, and that even when sturgeon do attempt to move, they may be unable to evade the propeller. A few studies have used VEMCO Positioning System (VPS) receiver arrays to study Atlantic sturgeon response to approaching vessels. Preliminary tracking studies in the James River indicate that Atlantic sturgeon seem to be oblivious to the threat of vessel propellers. In other words, they do not make any effort to leave the navigation channel or avoid approaching and passing deep draft vessels (Balazik, 2018; Balazik, Barber, *et al.*, 2017), and, occasionally, the researchers observed sturgeon move into the path of an approaching vessel (Balazik, Barber, *et al*., 2017). DiJohnson (2019) studied Atlantic sturgeon responses to approaching vessels in the Delaware River similarly using a VEMCO Positioning System to monitor fine-scale movements of telemetered adults and subadults as large vessels approached. The recently completed study found no evidence that Atlantic sturgeon altered their behavior in the presence of approaching commercial vessel traffic in the Delaware River (DiJohnson, 2019; DiJohnson *et al.*, 2015). Both Balazik, Barber, *et al.* (2017) and DiJohnson (2019) concluded that their findings suggest that either Atlantic sturgeon do not consider vessels a threat or they cannot detect a vessel until it is too late.

The hull itself may hit sturgeon that fails to avoid a vessel and cause injury or mortality. It seems likely that the chance of injury and death by impact increases with the vessel's speed and mass, but we do not know at what speed mortality would occur for different types of vessels or for different sizes of sturgeon. Fast vessels have been implicated in shortnose sturgeon vessel strikes but there is no information available to suggest a minimum speed necessary for a sturgeon to avoid an approaching vessel nor has a threshold speed at which a sturgeon is injured or killed by a vessel hull been defined. More often observed is evidence that vessel strike mortalities occur when a propeller hits a sturgeon. The propeller may hit a sturgeon that is directly in the path of a vessel or when the water sucked through a propeller entrains a sturgeon.

Entrainment of an organism occurs when a water current (in this case the current created by the propeller) carries the organism along at or near the velocity of the current without the organism being able to overcome or escape the current. Propeller engines work by creating a low-pressure area immediately in front of the propeller and a high pressure behind. In the process, the propeller moves water at high velocities (can exceed 6 m/s (19.7 ft/s)) through the propeller. Thus, as the boat propeller draws water through the propeller, it can also consequently entrain an organism in that water. Fish that cannot avoid a passing vessel, that are entrained by the propeller current, and who are unable to escape the low-pressure area in front of the propeller, will go through the propeller.

Entrainment can occur if a sturgeon is exposed to the water being sucked into the propeller and that individual is not able to escape the current velocity as water is drawn through the propeller. The zone of influence, the part of the water body entrained through the propeller, is the depth, width, and length in front of the propeller at which water is drawn through. Models of water entrained during maneuvering of tow vessels in the Mississippi River found the volume of water to be about twice the propeller area times the distance travelled (Wilcox, 1991). Larger propellers draw larger volumes of water, and we therefore expect the likelihood of a propeller

entraining a fish to increase with propeller size. Recreational vessels rarely have propellers exceeding 0.5 m (1.6 ft) in diameter, towboats and tugs commonly have propellers between 2-3 m (6.5-9.8 ft) in diameter, and tankers and bulk carrier vessels with a 12 m (40 ft) draft may have propellers that are 7-8 m (23-26 ft) in diameter. Typically, most vessel types have two propellers, but larger vessels may occasionally have three. Thus, we expect large tugboats, cargo vessels, and tankers to have a substantially larger zone of influence than recreational or smaller fishing vessels. Maynord (2000) showed that the inflow zone of a propeller surrounds the vessel in an area limited to roughly the size of the cross section of the vessel (i.e., similar to the width of the vessel). As an example, a tow with a draft of 2.7 m (8.9 ft) pushing three barges side by side (total width of 32 m (105 ft)) in 4.3 to 12 m (14 to 40 ft) deep water and a speed (relative to water) of 2 m/s (6.6 ft/s) had an inflow zone of about 25 m (82 ft) on either side of the center line. Thus, water within a 50 m (164 ft) wide zone could go through the propeller. Besides vessel specifications, the depth relative to draft determines the propeller's lateral zone of influence. In Maynord's calculations, bottom water at depths of 9.8 m (32.1 ft) or greater were not drawn into the 2.4 m (7.9 ft) diameter propeller (for a towboat with a 2.7 m (8.9 ft) draft) while water at depths of 5.6 m (18 ft) or less was drawn into the propeller, though not all flow within this zone would go through it. Therefore, a demersal sturgeon below a large vessel with a clearance of 6 m (19.7 ft) or less would be exposed to water drawn through the vessel's propeller(s). Further, while sturgeon are benthic feeders, they also use the upper water column during non-foraging movements and migrations and sometimes jump out of the water. Therefore, we consider all sturgeon in the path of a large vessel (the width of the path being equal to the width of the vessel) to be located in the water column where the moving vessel will expose them to the water drawn through its propellers.

Whether a fish can avoid entrainment depends on its location relative to the velocity of the water moved by the propeller and its swimming ability relative to that velocity. It is unclear what the response of a sturgeon will be when exposed to the hydrology around the hull and propeller of a moving or maneuvering vessel. For a vessel at cruising speed, the suction in front of the propeller is moderate, but it is more pronounced if the propeller diameter is relatively small – as it often is for ships designed for operation in rivers (e.g., tugboats) and other areas with draft limitations, or if the forward speed of the ship is slow (Steen, 2021). We do not have calculations of the approach velocity of water in front of the propellers of the delivery and installation vessels or the tugboats; therefore, we cannot evaluate a sturgeon's ability to escape entrainment through the propeller of these specific vessels. However, Steen theorizes that the propellers of large vessels can entrain even large sturgeon.

Not all fish entrained by a propeller will necessarily be injured or killed. Killgore *et al*. (2011) in a study of fish entrained in the propeller wash (two four-blade propellers that were 2.77 m (9.09 ft) in diameter) from a towboat in the Mississippi River found that 2.4 percent of all fish entrained and 30 percent of shovelnose sturgeon entrained showed direct sign of propeller impact (only estimated for specimens ≥12.5 cm (≥5 in) TL). The most common injury was a severed body, severed head, and lacerations. This is consistent with injuries reported for sturgeon

carcasses in the Delaware River and James River (Balazik, Barber, *et al*., 2017; Brown & Murphy, 2010).

Killgore *et al*. (2011) found that the probability of propeller-induced injury (i.e., propeller contact with entrained fish) depends on the propellers revolution per minute (RPM) and the length of the fish. Simply put, the faster the propeller revolves around its axis, the less time a fish has to move through the propeller without striking a blade. Similarly, the longer the fish is, the longer time it needs to move through the propeller, thereby increasing the chance that a blade hits it. The injury probability model developed by Killgore *et al*. (2011) showed a sigmoid (or "S" shaped) relationship between fish length and injury rate at a given RPM. The model estimates probability of injury at about 150 RPM for the towboat in their study increased from 1 percent for a 12.5 cm (5 in) fish to 5 percent for a 35 cm (13.8 in) long fish, and from 50 percent for a 72 cm (28.3 in) long fish to 80 percent for a 90 cm (35.4 in) long fish. However, Killgore *et al*. (2011) did not find that the number of fish entrained by the propeller was dependent on RPM even though the percentage of fish killed increased with increasing RPM.

Recreational and smaller commercial vessels (e.g., fishing boats or vessels used for shellfish husbandry) have smaller diameter propellers, entrain smaller volume of water, and have a shallow draft. Consequently, they are extremely unlikely to entrain a subadult or adult sturgeon. Large vessels have been typically implicated because of their deep draft relative to smaller vessels, which increases the probability of vessel collision with demersal fishes like sturgeon, even in deep water (Balazik, Reine, *et al.*, 2012; Brown & Murphy, 2010). Larger vessels also draw more water through their propellers given their large size and, therefore, may be more likely to entrain sturgeon in the vicinity.

Miranda and Killgore (2013) indicates that heavy large-towboat traffic on the Mississippi River (vessels with an average propeller diameter of 2.5 m (8.2 ft), a draft of up to 2.7 m (9 ft), and travel at approximately the same speed as tugboats (less than 18.5 km/h (10 kts)), kill a large number of fish by drawing them into the propellers. The study demonstrates that shovelnose sturgeon (*Scaphirhynchus platorynchus*), a small sturgeon (~50-85 cm (~19.7-33.5 in) in length) with a similar life history to shortnose sturgeon, were being killed at a rate of 0.02 individuals per kilometer traveled by the towboats. As the geomorphology and depth of the Mississippi River – including its reaches and navigation channel where the study was conducted - differ substantially from the action area, and as shovelnose sturgeon is a common species in the Mississippi River with densities that are likely not comparable to sturgeon populations in Chesapeake Bay waters, this estimate cannot directly be used for this analysis. We also cannot modify the rate for this analysis because the type of vessels traveling in the two areas differ and we do not know (a) the difference in density of shovelnose sturgeon and Atlantic and shortnose sturgeon and (b) if there are risk factors that increase or decrease the likelihood of strike in Chesapeake Bay waters. However, this information does suggest that high vessel traffic can be a major source of sturgeon mortality. A similarly sized tugboat moving about 20.4 km/h (11 kts)

was observed striking and killing an adult Atlantic sturgeon female in the Federal Navigation Channel of the Delaware River in 2016 (Park, 2017).

Other factors affect the probability of vessel interactions with sturgeon. For example, although not present within the action area, narrow channels can concentrate both sturgeon and vessels into a smaller areas and thus increase the risk of vessel strike. Balazik, Reine, *et al*. (2012) noted that there is an inverse relationship between channel width and vessel mortalities in the James River. Sturgeon are likely to typically use the navigation channels during spawning migrations as well as seasonal movements between summer and overwintering areas (Fisher, 2011; Hondorp *et al*., 2017). Because of these behaviors, a higher number of adult Atlantic sturgeon vessel mortalities occur in the Delaware River during spring months. Besides exposing adults and subadults to vessels during these months, it has also been suggested that sturgeon swimming higher in the water column during migration increases their exposure to vessels (Balazik, Barber, *et al.*, 2017; Brown & Murphy, 2010; Fisher, 2011).

6.5.3 Effects of Project Vessel Activity on Sturgeon

The BA does not include the exact parameters for the project's marine fleet (vessel types, sizes, routes, and trip frequencies); therefore, as we did in Section 4.1.1.2, to analyze the effects of project vessels on sturgeon, we used data from comparable projects along with standard marine construction operational assumptions as a proxy for the Bay Crossing Project. As established elsewhere in this Opinion, Atlantic and shortnose sturgeon are present within the action (described in Section 5) and are transient, not resident, within the area; there are no known aggregation or overwintering areas at the location of the Bridge or along the vessel transit route to and from the Bridge.

NMFS maintains records of sturgeon mortalities reported by the public, state agencies, and researchers in a "Sturgeon Salvage Database" (NMFS unpublished data). There are 11 records of salvaged Atlantic sturgeon received between 2022 and 2025 from Maryland. Among these, one report (SALV266) shows definitive signs of a vessel strike (a clean propeller-like cut), and one additional report (SALV137) shows potential signs of impact trauma (cracked bony plates on the head). The closest salvaged fish found north of the bridge - SALV269 (near Earleville) being the closest at 55 km (34.2 mi) away, followed by SALV266 (Elk Neck State Park) at 62.8 km (39.0 mi) away. Some carcasses were not examined and we do not have an estimate of the total number of vessel strikes in this area annually. There were no shortnose sturgeon salvages reported in Maryland during this time period.

While we are not able to use these reports to estimate the total number of sturgeon struck in the action area in any given year, the number of carcasses reported and detected in an area that has high volumes of vessel traffic, accessible and well populated shorelines and waterways, and an established reporting system (through the Sturgeon Salvage Program), indicates that risk of vessel strike in the action area may be considerably lower than in other geographic areas (e.g., the James River). This may be due to the deep depths of the waterways in this area, the rare transient nature of sturgeon in the upper Chesapeake Bay generally and the action area specifically (i.e., there are no documented spawning rivers in the upper Bay north of the Potomac

River), and the lack of constrictions that would increase the potential for co-occurrence of deep draft vessels and individual sturgeon which together are likely to reduce risk of vessel strike generally in the action area.

To evaluate risk in the absence of a finalized description of project vessels, based on our review of previous bridge construction and demolition project, we estimated up to 44 round-trips (88 linear transits) per day during peak construction and demolition periods. We assess the potential for these transits to result in sturgeon interactions across the three operational vessel tiers:

Tier 1: Heavy-Displacement / Slow-Moving Construction Vessels

Vessel Types: Derrick barges, material transport barges (45.7-91.4 m (150–300 ft)), and attendant coastal tugboats (18.3-30.5 m (60–100 ft)).

Risk Characterization: Tier 1 vessels present deep drafts (up to 3.7-4.6 m (12–15 ft) for loaded barges and tugs). However, their operational velocity is exceptionally low, typically ranging from 7.4 to 11.1 km/h (4 to 6 kts) during transit and remaining stationary or tethered during active pile installation. Tier 1 vessels' low speed and low-frequency acoustic signature are, in principle, within the detection range of a sturgeon's lateral line and rheotactic senses (Gibbs and Northcutt 2004, Johnston *et al*. 2017). We do not rely on that theoretical sensory capacity here, however: as discussed above (see Factors Relevant to Vessel Strike), field telemetry studies (Balazik *et al.* 2017a; DiJohnson 2019) found that Atlantic sturgeon generally do not alter their behavior in response to an approaching vessel and may be unable to evade one even when they attempt to move, regardless of vessel speed. We therefore do not expect the slow speed of Tier 1 vessels to meaningfully increase the likelihood that sturgeon detect and evade them. The reduced risk associated with Tier 1 vessels instead derives from their low operational frequency relative to Tier 2 and 3 vessels and, in the event of an encounter, the lower severity of a low-speed strike (see discussion below).

Tier 2: Medium-Displacement Support & Service Craft

Vessel Types: support vessels and supply tenders (12.2-24.4 m (40–80 ft)).

Risk Characterization: FHWA and MDTA have committed to the enforcement of reduced construction vessel speeds (e.g., below 18.5 km/h (10 kts)). However, these intermediate draft (4-8 feet) vessels can operate at moderate speeds of 15 to 22.2 km/h (8 to 12 kts). They navigate dynamically around the bridge bents and within the designated construction zones. While their paths are less predictable than Tier 1 vessels, their moderate speeds and mid-water drafts provide a sufficient reaction window for transiting sturgeon (Gibbs and Northcutt 2004, Johnston *et al*. 2017).

Tier 3: Light-Displacement / High-Speed Crew Transfer Vessels

Vessel Types: Rigid-hull inflatable boats (RHIBs), center-consoles, and small vessels (6.1-12.2 m (20–40 ft)).

Risk Characterization: FHWA and MDTA have committed to the enforcement of reduced construction vessel speeds (e.g., below 18.5 km/h (10 kts)). These vessels are capable of operating at high, planing velocities (>27.8-37 km/h (15–20 kts)), and represent the vast majority of the daily vessel trips (up to 30 round-trips per day). Their high speed significantly compresses the behavioral reaction time available to a surfacing or shallow-swimming animal. However, Tier 3 vessels feature shallow static and dynamic drafts (typically 0.6 to 1.2 m (2 to 4 ft)). The risk of a Tier 3 strike depends entirely on the vessel speed, vertical clearance buffer between the vessel drafts, and the seasonal depth distribution of the sturgeon.

As explained above, we consider the available information to indicate that the baseline risk of vessel strike in the action area is low. We expect the risk of a project-related vessel strike to Atlantic and shortnose sturgeon to be in part influenced by the potential for co-occurrence, which is seasonally variable and directly tied to water temperature and dissolved oxygen dynamics within the estuary (Secor and Niklitschek, 2001; Niklitschek and Secor, 2005). During the spring and fall, sturgeon occupancy of the shallow shoals (< 9.1 m (30 ft)) flanking the bridge is negligible; well-oxygenated bottom waters allow transiting and foraging individuals to remain within the deep navigation channel, thereby reducing vertical and spatial co-occurrence with shallow-draft surface vessels (Welch *et al*., 2013; Hager *et al*., 2014). However, during the summer months (June–August), deep-water benthic anoxia and hypoxia force sturgeon out of the deep navigation channel and onto the shallower, mesohaline flats (Secor and Gunderson, 1998; Niklitschek and Secor, 2005). This localized 'habitat squeeze' (Coutant, 1987) increases sturgeon density in the shallows, bringing individuals into close vertical proximity with vessel hulls and propellers. Consequently, the risk of a project-related vessel strike is expected to be concentrated almost exclusively during the summer months, presenting the highest risk when shallow-draft project vessels are operating outside the maintained, deep navigation channel (Brown and Murphy, 2010; Balazik *et al*., 2012).

While the potential co-occurrence of sturgeon and project-related vessels in the shallow waters during summer increases the risk of interactions, the dispersed nature of Atlantic and shortnose sturgeon in the upper Chesapeake Bay, the lack of known sturgeon use of the Patapsco River, the absence of spawning populations in the upper Bay, and the geography of the upper Bay, which does not restrict Atlantic sturgeon distribution in the way that narrow or constricted river reaches may, reduce many of the factors that are considered to increase risk of vessel strike of Atlantic sturgeon (Gomez and Sullivan Engineers, n.d.; Hondorp *et al*., 2017; Schoeman *et al*., 2020).

A dispersed, non-aggregated distribution reduces the probability that any given vessel transit will spatially and temporally coincide with an individual sturgeon at a specific location, and the transient, mobile nature of sturgeon movements through this reach further limits predictable overlap with vessel routes, as compared to areas of known aggregation such as spawning or overwintering habitat.

In addition, the potential for project-related vessel interactions with Atlantic and shortnose sturgeon during the critical summer hypoxia window is further minimized through the mandatory implementation of the 18.5 km/h (10 kts) speed restriction and the deployment of vessel-based

Protected Species Observers (PSOs) (Schoeman *et al*., 2020). While the telemetry evidence summarized above indicates that sturgeon are unlikely to detect or actively evade an approaching vessel regardless of speed, vessel speed remains relevant to the effects of an interaction. As discussed above (Killgore *et al*. 2011), the probability and severity of propeller-strike injury is a function of blade rotation rate, which scales with vessel speed; a vessel operating at or below 18.5 km/h (10 kts) strikes with substantially less force and lower propeller RPM than one operating at planing speeds of 27.8-37 km/h (15–20 kts). The 18.5 km/h (10 kts) restriction therefore reduces the severity of injury in the event of an encounter, rather than the probability that sturgeon detect and avoid the vessel.

We recognize that due to the benthic nature of sturgeon and the elevated turbidity characteristic of the mesohaline Chesapeake Bay water column, vessel-based PSOs are limited in their ability to visually detect and clear sturgeon directly ahead of a moving hull. However, PSOs maintain real-time oversight of vessel operations, ensuring strict compliance with the 18.5 km/h (10 kts) mandate. Consequently, when evaluated in tandem with the shallow drafts of the vessels, these conservation measures reduce the probability of a lethal vessel collision to an extremely remote and discountable scale.

Project vessels are expected to represent an approximate 5 percent temporary increase over the established baseline of 34,302 annual vessel transits in the upper Chesapeake Bay and Federal Navigation Channel. While not negligible, this temporary increase is distributed across an approximately 15-year construction and demolition program rather than concentrated in a single season, and - for the reasons discussed above regarding dispersed sturgeon distribution and reduced injury severity at restricted speeds - is not expected to appreciably change the baseline risk of vessel strike. Based on the anticipated size and type of vessel, travel routes, and number of trips as informed by relevant data from similar projects, the lack of surface-oriented behavior in sturgeon, and the maintenance of a vertical clearance even during periods of summer benthic hypoxia, the probability of a project-related vessel striking an Atlantic or shortnose sturgeon is extremely remote. Any marginal increase in collision risk relative to the baseline level of commercial and recreational traffic at the bridge span cannot be meaningfully measured or evaluated. Therefore, the potential effects of project-related vessel traffic on Atlantic sturgeon and shortnose sturgeon, are too small to be meaningfully measured, detected, or evaluated, and insignificant.

6.6 Blasting

As described above, demolition of the existing structures occurs in two phases. If required, any blasting will be limited to October 1 – December 15. During this time of year, the majority of adult shortnose sturgeon are located at overwintering areas outside of the action area. For example, shortnose sturgeon overwinter predominantly near the fresh/saltwater interface (SSSRT 2010, Kynard *et al.* 2009). During the winter, the action area lacks the necessary freshwater chemistry and low-velocity benthic habitat features required to support overwintering shortnose sturgeon; however, individual, transient fish may occur within the action area between December and February. Therefore, although unlikely, shortnose sturgeon adults may be present within the action area when blasting occurs.

The majority of adult and subadult Atlantic sturgeon overwinter in estuaries, bays, sounds, and marine environments. For example, a Balazik (2023) telemetry study conducted of Atlantic sturgeon captured in the Potomac River between November 2020 and November 2022 confirmed the presence of seven subadult and one adult Atlantic sturgeon in the Potomac River as late as mid-December. Within the action area, telemetry detections at the bridge span drop off precipitously by mid-November, leaving only a negligible number of late-season stragglers transiting the area. During the core winter months, Atlantic sturgeon are rare in the mainstem Chesapeake Bay in the vicinity of the Bay Bridge (W. Cruz, NOAA, pers. comm. 2026). Although juvenile Atlantic sturgeon are more tolerant of saline waters, near-freezing water temperatures drastically reduce their osmoregulatory efficiency and exposure to the mesohaline waters (5–15+ ppt) at the Bay Bridge during winter would cause lethal osmotic shock. Therefore, we do not expect juvenile Atlantic sturgeon to be present in the action area during blasting activities. Instead, they remain clustered deep within the freshwater or low-salinity oligohaline nursery zones of their natal tidal tributaries (e.g., the James or York rivers). As such, during the blasting window we expect that few, transient Atlantic sturgeon may be present but that generally Atlantic sturgeon would be rare.

Demolition of the existing Bay Bridge eastbound and westbound spans will require subaqueous explosive demolition of deep-water concrete piers located in water depths exceeding 12.2 m (40 ft), where mechanical means of removal are not feasible. There are 15 deep-water piers in the existing eastbound span and 15 deep-water piers in the existing westbound span that will require subaqueous blasting, for a total of 30 blast-subject structures across the two demolition phases. The total length of bridge supported by deep-water piers is approximately 6,132 linear meters (20,117 linear feet), constituting approximately 48 percent of the total bridge length to be demolished.

Blasting is anticipated during 18 blast events occurring over construction years 6 through 7 (eastbound span demolition) and 16 blast events occurring over construction years 14 through 15 (westbound span demolition) for a total of 34 blast events. Blasting will occur concurrently with pile driving operations; if construction of the second new span begins while demolition of the first existing span is underway, all blasting activities will be paused during any concurrent pile driving.

The blast design for the existing Bay Bridge has not yet been finalized; final design will occur during the USACE permitting phase in coordination with us. For planning purposes, and consistent with our approach for this project, the approved blast design parameters from the Nice Bridge project are applied as a proxy, based on the structural and environmental similarities between the two projects. The general planning-level blast parameters assumed are: five decks of explosives per hole; a maximum of 13.6 kilograms (30 pounds) of explosives per delay; a minimum of 9 milliseconds (ms) delay between explosions; and a maximum of 17 ms delay between decks within the same hole. These parameters will be re-evaluated and refined during final design based on actual pier concrete conditions and updated best available science.

Blasting has the potential to cause physical injury or mortality to individual sturgeon and displace sturgeon from the area where blasting is occurring. The blasting may also affect sturgeon by modifying the habitat and benthic community within the reach as well as by reducing foraging opportunities. Here, we consider that risk to sturgeon in the action area.

As noted above, all blasting will occur between October 1 and December 15, when fish density is at its lowest. As described above, the proposed action incorporates the following measures to monitor and reduce the potential for fish mortality:

- Perform acoustic telemetry monitoring of previously tagged shortnose and Atlantic sturgeon in the action area to continue data collection on the presence of sturgeon and delay blasting until any detected sturgeon leaves the Exclusion Zone (640 m (2,100 ft) around each pier);
- Use of fish deterrent sonar (pulled behind a vessel) prior to blasting;
- Use of fisheries and telemetry observers to reduce the potential that sturgeon are within the project area during blasting;
- Use of fish scare charges[21] with blast cap detonations (each will contain 0.75 grams (0.03 ounces) of explosives to be suspended in the water column surrounding the structure) will be set off 30 seconds prior to blasting to drive fish away from the Exclusion Zone;
- Maintain a zone of fish passage in the bay during blasting (i.e., the area outside of the Exclusion Zone);
- Post-blasting surface monitoring for injured or dead sturgeon that will occur following each detonation;
- Blast parameters designed to minimize underwater disturbance including:
  - minimization of maximum charge weights (i.e., a blasting sequence from interior to exterior with lighter charges on the exterior),
  - a minimum of 9-millisecond charge delays,
  - stemming of drill holes,
  - utilization of blast mats placed over the exposed piers to minimize projectiles.

6.6.1 Acoustic Deterrence

The proposed action incorporates both (1) acoustic fish deterrent sonar (pulled behind a vessel) and (2) scare blasts prior to blasting. The applicant has not yet finalized a specific acoustic deterrent system design. However, consistent with our approach elsewhere in this consultation, of the Nice-Middleton Bridge project serves as an analog for blast design and monitoring parameters. For purposes of this analysis, we assume a system with characteristics and performance similar to the system used for the Nice Bridge project described in Section 3.5 of this Opinion. If the acoustic deterrent system incorporated into the final project plan is

[21] A scare charge is a small charge of explosives detonated immediately prior to a blast for the purpose of scaring aquatic organisms away from the location of an impending blast without producing so much pressure or noise that they could be injured or killed.

significantly different than this assumption and would result in effects to sturgeon not considered here, reinitiation of consultation may be required

The purpose of a fish deterrent sonar is to behaviorally deter sturgeon from entering or remaining in the blasting area, to minimize the potential for exposure to blasting effects. In July 2015, ERDC (2015) conducted a feasibility study to test an acoustic deterrent system for the Delaware Deepening project. Their analysis provided evidence that some sturgeon avoided the loudest portions of an experimental sound field and that sturgeon experienced no latent effects of the sound exposure. The study showed that sturgeon spent 4.55 hours less in the regions of interest when the sound was on than when the sound was off; however, the difference in time spent during test and control conditions was not statistically significant at the $\alpha = 5$ percent level. Regardless, there was some evidence of avoidance behavior, and the authors concluded that ensonifying the blast area would add a degree of protection for the sturgeon that cannot otherwise be accomplished.

The deterrent system for the Delaware Deepening project consisted of a sound source capable of producing impulsive sound of the appropriate amplitude and frequency range, and a generator to power the source, mounted on a self-propelled pontoon boat. The sound source was an Applied Acoustic Engineering Ltd. (AAE) "boomer" typically used for subsurface geophysical profiling (Moody and Van Reenan 1967). The boomer is an electromagnetically driven sound source consisting of a triggered capacitor bank that discharges through a flat coil. Eddy currents are induced in aluminum plates held against the coil by heavy springs or rubber bumpers. The plates are violently repelled when the capacitor fires, producing a cavitation volume in the water, which acts as a source of low-frequency sound (Edgerton and Hayward 1964).

The sound source was set to produce a sound level (as determined at 10 m (33 ft) from the source) of ≤204 dB re 1 μPa peak at a repetition rate of 20 per minute; it was also mounted 162 horizontally such that the sound is projected downward and laterally into the water column below the pontoon boat.

The sound source was moored as closely to the blasting location as safety and operational considerations allow, and operated continuously for at least five hours prior to each detonation. The sound source operated as close in time to the blast as safety allowed before moving away from the blasting site (approximately 30 minutes).

Blasting plans will also incorporate fish scare charges. The fish scare will be set off 30 seconds prior to the main detonation, followed by a 10-second count down will before detonating the blast. These fish scares will consist of a series of blasting caps, each containing 0.75 grams (0.03 ounces) of explosives, suspended in the water column surrounding the structure. The scare charges will likely be placed in very close proximity to the bridge and likely within the 640 m (2,100 ft) Exclusion Zone.

Research demonstrates that the use of scare charges with small blasting caps can be effective at deterring fish from the blast zone. They are most effective when deployed 30 to 60 seconds prior to the main blast detonation (FHWA 2019), similar to the deployment for this action, described

above. However, it is important to note that the use of higher charge weight scare charges can be more harmful than effective (McAnuff *et al.* 1994, Keevin *et al.* 1997). The effectiveness of acoustic deterrents varies because different species may respond differently to various acoustic frequencies and amplitudes (FHWA 2019). For example, a 10 Hz tone successfully deterred migrating Atlantic salmon smolt in a small river (Knudsen *et al.* 1992). Therefore, based on the available literature and the successful implementation of acoustic deterrent technology during the recent demolition of the Nice Bridge in 2023, the anticipated deterrent methods for this project are expected to effectively encourage sturgeon to leave the project area prior to blasting.

6.6.1.1 Effects of Noise Produced by Acoustic Deterrents

As noted above, the sound source for the fish deterrent sonar produces a sound level of ≤204 dB re 1 µPa peak at a repetition rate of 20 per minute for at least five hours prior to each detonation. Based on the results of the pilot study trials where the system operated at maximum energy (350 J), we expected peak noise to be 193 dB 1 µPa peak-to-peak (146 dB re 1 µPa single-pulse SEL) at a distance of 5.3 m (17.4 ft) from the sound source. This results in an ensonified area of approximately 0.4 square kilometers (0.15 square miles), and all Atlantic sturgeon behavioral responses were anticipated to occur within the ensonified area. Based on this, we expect that effects to shortnose and Atlantic sturgeon from exposure to the fish deterrent sonar would be limited to a 0.4 square kilometer (0.15 square miles) area centered around the blasting site.

As described in the pile driving analysis, we expect potential injury to Atlantic and shortnose sturgeon upon exposure to impulsive noises greater than 206 dB re 1µPa peak or 187 dB re 1uPa cSEL. Peak noise levels for the noise produced by fish deterrent sonar in the Delaware Deepening project did not exceed 193 dB re 1uPa2·s peak and, therefore, we expect fish deterrent sonar used for this project will not exceed the peak noise exposure threshold of 206 dB re 1µPa. Given the short duration of the blasting event, consideration of the cumulative noise threshold is not relevant for considering effects of exposure to the detonations; however, it is considered as we assess effects of the noise deterrent system.

As described above, the cSEL is not an instantaneous maximum noise level, but is a measure of the accumulated energy over a specific period of time (i.e., in this case, the duration of use of the fish deterrent sonar over the course of a single day). For the Delaware Deepening project, the impulsive noise was generated for five hours prior to each detonation (max of two detonations per day). The cSEL is calculated by incorporating both the noise level associated with a single impulse as well as the total number of noise events. In this instance, this would mean accounting for every impulse over the entire day (i.e., one impulse every two seconds for two five-hour periods, for a total of 18,000 impulses). Information from the Delaware project indicates that the distance to the 187 dB re 1uPa cSEL isopleth was less than five meters from the noise source[22]. That means that in order to accumulate enough energy to be injured, a sturgeon would need to stay within 5 meters of the noise source for the entire 10-hour period that the system is

[22] Using the NMFS pile driving calculator (available at: www.wsdot.wa.gov/) and using a peak noise level of 193 dB, SEL of 146, and RMS of 178 (calculated by subtracting 15 from the peak as recommended by the authors of the calculator), all measured at a distance of 5.3 m from the sound source as described in ERC (2015).

operational. We do not expect this to happen because sturgeon in the action are highly mobile and expected to be largely using the site for transiting between areas. Shortnose sturgeon do not overwinter in the mainstem of the Bay, but individuals may be migrating through the project area and Atlantic sturgeon are also not expected to overwinter in the action area and are expected to be transient (Balazik 2023). While some of the sturgeon tracked during the noise deterrent study did not avoid the ensonified area during the deterrent study, none of them were stationary for hours at a time. Therefore, it is not reasonable to anticipate that any sturgeon would stay within five meters of the sound deterrent system for 10 hours.

Based on this information, we do not expect any injury or mortality to result from exposure to the noise produced by fish deterrent sonar. This conclusion is supported by the findings of ERC (2015). All of the sturgeon that were exposed to sound during ERC's 2015 tests were detected by multiple receivers in the weeks following testing. All of them showed normal patterns of movement, indicating that exposure to sound had not injured or impaired them. Based on the best available information (discussed above), it is extremely unlikely that any sturgeon will be exposed to injurious levels of underwater noise created by the deterrent device.

Behavioral effects, ranging from a startle to avoidance or alteration of activities including foraging, are expected to occur in sturgeon exposed to noise above 150 dB RMS. The Nice Bridge project calculated that noise will exceed that threshold in a 1,920 m (6,299 ft) area around the blasting site. The width of the Bay is 7.2 km (4.5 miles); therefore, a 1,920 m (6,299 ft) area leaves at least an 816 m (2,677 ft) zone of passage where noise below this threshold is expected. We expect that sturgeon, upon detecting underwater noise levels at or above the 150 dB thresholds, would modify their behavior such that the fish redirects its course of movement away from the noise source. It is extremely unlikely that these movements would have a measurable or detectable effect on the use of the action area by sturgeon, as the Bay is sufficiently wide enough (approximately 7.2 km (4.5 miles) wide) to allow individuals to avoid the ensonified area while continuing to forage and migrate within the 816 m (2,677 ft) zone of passage. We also note that this increase in noise will be limited to less than 12 hours a day for no more than 34 days spread out over a 15-year period. Therefore, the effects of underwater noise produced by fish deterrent sonar on ESA species would be too small to be meaningfully measured, evaluated, or detected and are therefore, insignificant.

6.6.2 Available Information on Effects of Blasting on Fish

The BA relied on the demolition of the original (1940) Nice-Middleton Bridge (N-MB) performed in late 2023 as a proxy for the proposed demolition of the existing Bay Bridge to obtain a rough estimate for the magnitude of effects of explosive underwater demolition. The N-MB project team determined the most appropriate Mortality Zone and Danger Zone designations based on a review of existing published documents and studies, including the six reference projects/documents forwarded by NMFS for other demolition projects. These zones were then compared to the data from the fish surveys to determine anticipated impacts. The analysis in the BA applied a formula from Hempen *et al.* (2007) to calculate the blasting Mortality Zone (i.e., the distance from the detonation within which a fish would be expected to be seriously injured or killed). Hempen *et al.* (2007) studied rock-confined blasting to gain information on typical

pressure measures from the rock removal program relative to impacts on marine organisms as part of the ongoing Miami Harbor Channel Deepening for the Dodge Island Widening (and Turning Basin). The equation below for open-water pressures was manipulated using the Hubbs and Rechnitzer (1952) lower bound of lethal pressure value of 280 kilopascal (40 pounds per square inch). This equation was previously used by Hempen *et al.* (2005). The mortality radius for single, open water shots (MROW) is calculated as:

MROW (feet) = 260 wOW$^{1/3}$
where wOW = the maximum charge weight (in pounds) per delay[23] of a single, open-water blast

The mortality radius for confined shots may be resolved from the confined pressure of the equation and using the low lethal pressure of 40 pounds per square inch. The mortality radius for single, confined shots, MRC, is:

MRC (feet) = 56 wC$^{1/3}$
where wC = the maximum charge weight (in pounds) per delay of a single, confined blast

Considering a maximum amount of explosive per delay of 13.6 kilograms (30 pounds), this yields a Mortality Zone of 53 m (174 ft) around each of the piers to be blasted. To account for the physical dimensions of the piers - and to ensure that the Mortality Zone extends from the outer face of the largest pier rather than from its centerline - the MRC is increased by half the width of the largest pier to be blasted in each span: MRC (EB, adjusted) = 174 + 41 = 215 feet MRC (WB, adjusted) = 174 + 46 = 220 feet.

It is important to note that these calculations assume the full 13.6 kilogram (30 pound) maximum charge weight per delay throughout the pier. In practice, charges located closest to the exterior of the pier will likely be smaller than those in the interior, meaning this Mortality Zone estimate is conservative.

The formula in Hempen *et al.* (2005) was utilized to calculate the Exclusion Zone, which defines the area surrounding each blast event within which effects on fish - including injury, harassment, and potential mortality - are anticipated. The Exclusion Zone is also the operational boundary within which the presence of telemetry tagged individuals will be monitored and blasting will be delayed until any tagged individuals have left the area. The Exclusion Zone is calculated using the Hempen *et al*. (2005) formula for confined blasting, with an additional 152.4 m (500 ft) conservative buffer applied to account for the sensitivity of marine organisms, including vulnerable species:

R (feet) = [520 × W^(1/3)] + 500

[23] A blast delay is a simple and intuitive delay within the blast sequencer. Delay patterns allow for more efficient use of the explosive energy in the blast.

where R is the Exclusion Zone radius in feet and W is the maximum pounds of explosives per delay.

Applying a maximum charge weight of 30 pounds per delay:

R = [520 × (30)^(1/3)] + 500 = **2,100 feet (approximately 640 meters)**

As with the Mortality Zone, this is a conservative estimate; the actual zone of behavioral disturbance is expected to be smaller for each blast event given that maximum-weight charges are confined to the interior of the piers and lesser charges will likely be used nearest the pier exterior. Considering the inputs to the formula and the incorporation of the 152.4 m (500 ft) buffer, we expect that in order to experience any potential for injury a sturgeon would need to be within this exclusion zone during active detonation.

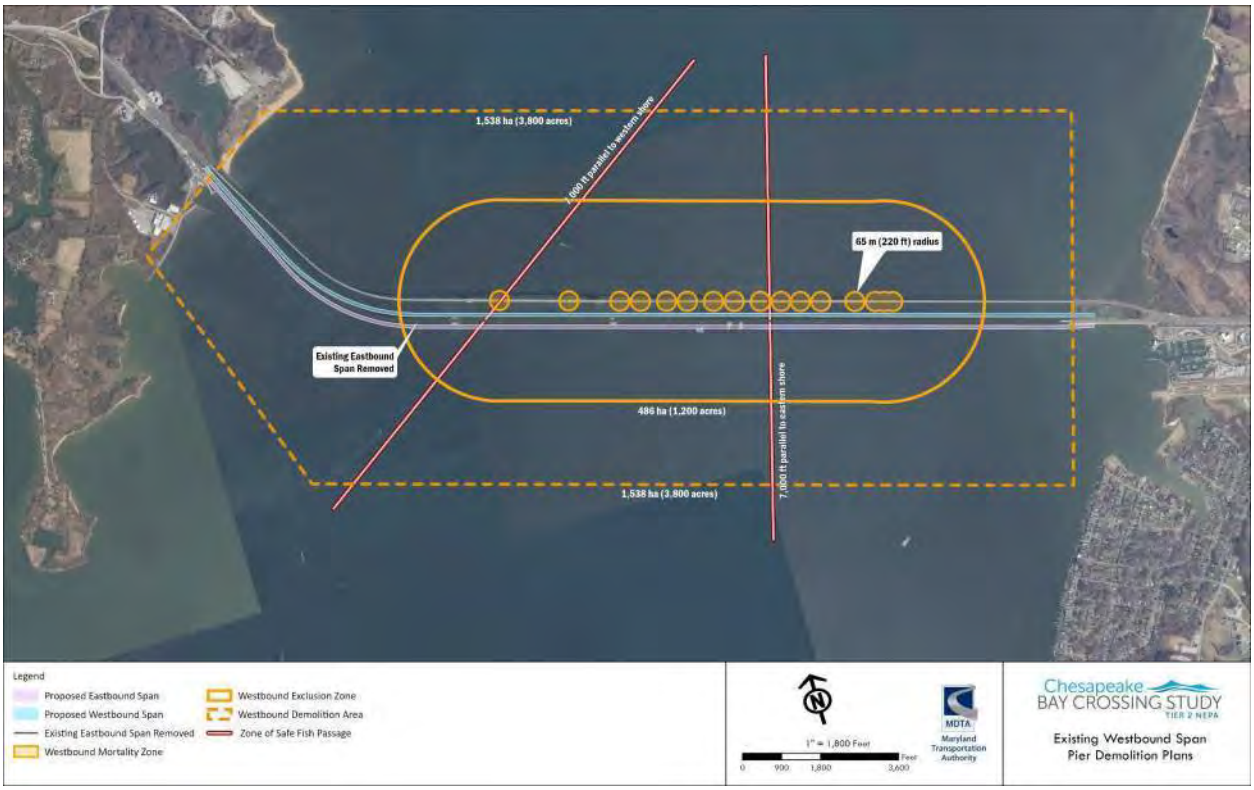
For context, the Exclusion Zone radius of 640 m (2,100 ft) substantially exceeds the Mortality Zone radius 65.5-67 m (215–220 ft) by approximately an order of magnitude. Fish within the Exclusion Zone, but outside the Mortality Zone, at the time of detonation may sustain sublethal injury - including barotrauma, internal hemorrhage not immediately fatal, and temporary or permanent hearing threshold shifts - and are subject to behavioral disturbance resulting from sudden intense acoustic and pressure exposure. The probability and severity of disturbance within the Exclusion Zone is expected to be greatest in the area immediately surrounding the Mortality Zone and diminishes with increasing distance from the blast source.

Previous section 7 consultations on bridge pier demolition projects used this formula and it is considered the best available information. Although this is the best available information, it may be considered conservative for the current project because the blast design requires that the 13.6 kilogram (30 pound) charges are located in the interior of the piers and the 8.2 kilogram (18 pound) charges are closest to the exterior of the piers (40 percent less charge weight than the maximum for the blast) and is expected to result in less energy release and resulting impact to the water column than predicted by the formula. The zones of influence described above are depicted in Figure 9 and Figure 10 and are consistent with the available information described below on the effects of blasting on fish.

Figure 9. Mortality Zone and Exclusion Zone for the existing eastbound span



Figure 10. Mortality Zone and Exclusion Zone for the existing westbound span



Numerous studies have assessed the direct impact of underwater blasting on fish. While not all of the studies have focused exclusively on shortnose or Atlantic sturgeon, the results demonstrate that blasting does have an adverse impact on fish. Teleki and Chamberlain (1978) found that several physical and biological variables were the principal components in determining the magnitude of the blasting effect on fish. Physical components include detonation velocity, density of material to be blasted, and charge weight, while the biological variables are fish shape, location of fish in the water column, and swim bladder development. Composition of the explosive, water depth, and bottom composition also interact to determine the characteristics of the explosion pressure wave and the extent of any resultant fish kill. Furthermore, the more rapid the detonation velocity, the more abrupt the resultant hydraulic pressure gradient, and the more difficulty fish appear to have adjusting to the pressure changes.

Underwater explosions may affect marine life by causing death, injury, temporary threshold shifts (TTS or recoverable loss of hearing sensitivity), or behavioral reactions, depending on the distance an animal is located from a blast. An underwater explosion is composed of an initial shock wave, followed by a succession of oscillating bubble pulses. A shock wave is a compression wave that expands radially out from the detonation point of an explosion. At a distance from a detonation, the propagation of the shock wave may be affected by several components including the direct shock wave, the surface-reflected wave, the bottom-reflected wave, and the bottom-transmitted wave. The direct shock wave results in the peak shock

pressure (compression) and the reflected wave at the air-water surface produces negative pressure (expansion). For an explosion with the same energy and at the same distance, an underwater blast is much more dangerous to animals than an air blast. The shock wave in air dissipates more rapidly and tends to be reflected at the body surface; in water, the blast wave travels through the body and may cause internal injury to gas-filled organs due to impedance differences at the gas-liquid interface. The soft sediments found in the action area may absorb shock waves and reduce the intensity of the bottom-reflected wave that may affect fish.

Fishes with swim bladders, including both species of sturgeon, are more likely to be killed or injured by blasting than fishes without swim bladders (Christian 1973). The primary cause of blast-related fish mortality is tissue damage to gas filled organs such as the intestinal tract and swim bladders. Internal injuries to other organ systems have resulted from the rapid expansion of the swim bladder because of exposure to negative pressures or "cavitation hat" from a shock wave. The magnitude of damage has been correlated with the mass of individuals, such that smaller size classes of fish would be expected to incur greater blast injury than larger size classes at the same exposure level (Yelverton *et al.* 1975, Goertner 1978, Wiley *et al.* 1981, O'Keefe 1984, Munday *et al.* 1986). This may be the reason some studies have reported that sturgeon exhibit less severe blast damage than other species tested (Moser, 1999a and 1999b). The larger size of sturgeon that may be present in the action area (juvenile through adult) may make sturgeon less susceptible to the adverse internal effects from blasting. However, sturgeon have been reported to be killed by underwater explosions, regardless of size, but other factors such as age, general health, water temperature, and reproductive condition may influence mortality (Keevin *et al.* 1997). External damage appears to be species specific and related to the magnitude of the pressure wave (e.g., charge size and distance from explosion (Keevin *et al.* 2002).

A blasting study conducted in Nanticoke, Lake Erie, found that fish were killed in radii ranging from 20 to 50 m (65.6 to 164 ft) for 22.7 kilogram (50 pounds) per charge and from 45 to 110 m (147.6 to 361 ft) for 272.4 kilograms (605 pounds) per charge (Teleki and Chamberlain 1978). Approximately 201 blasts were detonated in 4 to 8 m (13.1 to 26.2 ft) of water. Of the thirteen fish species studied, mortality differed by species at identical pressure. No shortnose sturgeon were tested. Common blast induced injuries included swim bladder rupturing and hemorrhaging in the coelomic and pericardial cavities.

The effects of blasting on thirteen species of fish were measured in deep water (46 m (151 ft)) explosion tests in the Chesapeake Bay opposite the mouth of the Patuxent River (Wiley *et al.* 1981). No shortnose or Atlantic sturgeon were tested. Fish were held in cages at varying depths during 16 midwater detonations with 32 kilograms (70.5 pounds) of explosives. For the 32 kilogram (70.5 pounds) charges, the pressure wave was propagated horizontally most strongly at the depth at which the explosion occurred. While the extent of the injury varied with species, the fish with swim bladders were far more vulnerable than those lacking swim bladders, and toadfish and catfish were the most resistant to damage of those species with a swim bladder.

Many fish exposed to blasting exhibit injuries to the kidney and swim bladder, thus affecting their fitness (Wiley *et al.* 1981). Efficient osmoregulation is very important in fishes; even slight bruises to the kidney could seriously affect this efficiency, causing at least a higher expenditure of energy. Burst swim bladders cause the fish to lose their ability to regulate the volume of their swim bladders (destroying buoyancy control) and probably increases their vulnerability to predators.

Wiley *et al.* (1981) found that the oscillatory response of the swim bladder was a likely cause of the fishes' injuries. Their analyses demonstrate that fish mortality is strongly dependent on the depth of the fish. For larger fish (like shortnose and Atlantic sturgeon) at shallower depths (approximately 7 to 11 m (23 to 36 ft)), the swim bladder does not have time to fully respond to the positive portion of the explosion wave. Thus, at shallow depths the larger fish are, in effect, protected from harm by their swim bladders, while at the resonance depth their swim bladders are otherwise burst.

Burton (1994) conducted experiments to estimate the effects of blasting to remove approximately 1,600 cubic yards of bedrock during construction of a natural gas pipeline in the Delaware River near Easton, Pennsylvania. American shad and smallmouth bass juveniles were exposed to charges of 112.5 and 957 kilograms (248 and 2,110 pounds) of explosives in depths ranging between 0.5 and 2 m (1.6 and 6.6 ft). The fish were caged at a range of distances from the blasts. Tests with American shad were inconclusive due to an unavoidable delay between the time when the chambers were stocked and the detonation of the explosives; however, successful tests with smallmouth bass suggested that the explosives created a maximum kill radius of 12 m (39.4 ft) (for both charge magnitudes). No fish were killed by the shock wave at the 24 m (78.7 ft) position and beyond.

Hubbs and Rechnitzer (1952) looked at the effects of blasting on the following caged fish: anchovies, jack mackerel, kingfish, sardine, queenfish, pompano, and grunion. The cages were placed anywhere from 3-28 m (10-92 ft) from the charge. They determined that the lethal threshold peak pressure for a variety of marine fish species exposed to dynamite blasts varied from 40 pounds per square inch (280 kilopaschals, kPa) to 70 pounds per square inch (480 kPa) (Hubbs and Rechnitzer 1952).

Keevin (1995) compared the mortality of bluegill exposed to three high-explosive types (T-100 Two Component, Pellite, and Apex 260) spanning the range of detonation velocities within commercially available explosives. Using equivalent weights of explosives, there was no significant difference in mortality curves based on distance from the explosive charge. An abrupt increase in internal damage (ruptured swim bladder, kidney, liver, and spleen damage) occurred at values above approximately 700 kPa peak pressure, and mortality abruptly increases at approximate values above 500 kPa peak pressure (Keevin 1995). According to the USACE (2004), Keevin (1995) found no mortality or internal organ damage to bluegill exposed to a high explosive at pressures at or below 400 kPa (60 pounds per square inch).

The preceding studies were not conducted on Atlantic or shortnose sturgeon, but the nature of the injuries and the optimal distance from the detonations could be applied to blasting activities and the two sturgeon species. The effects of blasting on shortnose sturgeon have been examined. Test blasting was conducted in the Wilmington Harbor, North Carolina, in December 1998 and January 1999, in order to adequately assess the impacts on shortnose sturgeon, the size of the LD1 area (the lethal distance from the blast where 1 percent of the fish died), and the efficiency of an air curtain for mitigating blast effects.

As explained in Moser (1999a), the test blasting consisted of 32-33 blasts, about 24 to 28 kilograms (53 to 62 pounds) of explosives per hole, and an approximate 25 m/s (82 ft/s) delay after each blast. During test blasting, 50 hatchery reared juvenile striped bass and shortnose sturgeon were placed in 0.64 centimeters (0.25 inches) plastic mesh cylinder cages (0.6 m (2 ft) in diameter by 0.9 m (3 ft) long) 0.9 m (3 ft) from the bottom (worst case scenario for blast pressure as confirmed by test blast pressure results) at 10.7, 21.3, 42.7, 85.3, and 170.7 m (35, 70, 140, 280, and 560 ft) upstream and downstream of the blast location. For each test, 200 caged shortnose sturgeon were held at a control location 0.8 km (0.5 mi) from the test blast area. The caged fish had a mean weight of 55 grams (0.12 pounds).

Several fish within 21.3 m (70 ft) of the drill holes (most within 10.7 m (35 ft)) were necropsied. These fish were in apparently normal condition when necropsied 24 hours after the blast. The fish were swimming normally in their cages and exhibited no outward signs of stress or physical discomfort (Moser 1999b). Of the 70 sturgeon necropsied, ten likely would not have survived the injuries sustained during blasting. While sturgeon had relatively little damage to their swim bladders, they more often had distended intestines with gas bubbles inside and hemorrhage to the body wall lining. In the fish caged 21.3 m (70 ft) away, there was no sign of hemorrhage or swim bladder damage but two of the fish exhibited distended intestines, which may have been caused by the blast. Moser (1999) speculated that sturgeon fared better than striped bass because their air bladder has a free connection to the esophagus, allowing gas to be expelled rapidly without damage to the swim bladder.

The numbers of injured, dead, and mortally injured sturgeon varied greatly between tests. Of the 500 fish tested during each blast, mortalities (dead or mortally injured) ranged from one to 89 fish. Mortality rates for shortnose sturgeon as compared to the other species tested were low, with the author of the report concluding that this was likely due to the larger size of shortnose sturgeon tested (approximately 30 centimeters (11.8 inches) average) as compared to the size of the other species (3 – 20 centimeters (1.2-7.9 inches)). Therefore, mortality for sturgeon 30 centimeters (11.8 inches) or larger may occur less frequently due to their size. However, some fish caged as far as 170.7 m (560 ft) away from the blast died or were injured/mortally injured within 24 hours of the blast. Given that some fish in the control study also died, and that none of the fish caged this far away were necropsied, it is impossible to know whether they died of causes unrelated to the blasting experiment.

The total number of blasts (n=33) used in the Moser (1999) study described above is nearly the same as maximum number of blasts proposed for this project (n=34). However, the maximum amount of explosives used in the Moser (1999) study (24 to 28 kilograms (53 to 62 pounds) of explosives) exceed the maximum amount of explosives for this project (13.6 kilograms (30 pounds) per delay). Therefore, we can conclude that the effects of blasting on fish may be less severe (less injury and mortality, particularly for fish that are 30 centimeters (11.8 inches) or larger) than described in the Moser (1999) study.

The monitoring program implemented for the Nice Bridge replacement project in 2023 examined the potential effects of subaqueous explosive pier demolition on aquatic biota, specifically ESA-listed shortnose and Atlantic sturgeon. In-situ blast pressure monitoring was conducted using underwater noise meters and hydrophones to record water-borne peak overpressures and attenuation from the confined pier blasts. Data was collected from actual blasts to evaluate real-world noise levels against the 206-decibel (dB) peak behavioral and acoustic mortality thresholds. Pressure data was collected across varying distances from the detonations to map acoustic dissipation and confirm the size of the danger zone. The blast pressures recorded at the 640 m (2,100 ft) edge of the designated Danger Zone (or, Exclusion Zone, as defined in the Bay Crossing BA) were noted to be quite low (181.8 dB to 191.3 dB peak) compared to the 206 dB mortality threshold, demonstrating that the established safety boundaries were highly conservative. Close-range hydrophone arrays tracked the rapid reduction of waterborne energy, showing peak pressures dropping from 209 dB at 66.4 m (218 ft) down to 200 dB at 157.3 m (516 ft).

The data inferred that the controlled, stemmed, and delayed confined charges used in the Nice Bridge Demolition Program successfully restricted extreme pressure waves, confining the dangerous 206 dB noise contour to a radius of approximately 123 m (400 ft) from the blast. The fish kill that did occur was highly localized and concentrated within the immediate vicinity of the structural columns. The actual limits of the mortality footprint were determined to tightly match the anticipated 52.4 m (172-ft) mortality zone based on immediate post-blast biological evaluations. Stunned and killed fish (totaling 1,110 individuals across two primary blast events) were recovered by project biologists using hand nets from the surface via specialized Fish Recovery Vessels. No Atlantic or shortnose sturgeon were documented. A real-world assessment of the blast events monitored during this study demonstrated that utilizing minimized charge weights and a 9-millisecond minimum delay sequence appeared to successfully prevent any incidental take of sturgeon.

In addition to the Nice-Middleton Bridge monitoring data discussed above, we also considered empirical blasting-mortality data from a second, independent analog project: the USACE's deepening of the Philadelphia to the Sea Federal Navigation Channel, a project distinct from the Nice-Middleton Bridge demolition. Since 2008, the USACE have been working with us to consider effects of the deepening of the Philadelphia to the Sea Federal Navigation Channel from -12 to -13.7 m (-40 to -45 ft) (with 0.6 m (2 ft) over-dredge) MLLW. The biological opinions issued between 2012 and 2019 considered the effects of blasting on Atlantic and shortnose sturgeon. Over the first four blasting seasons, 506 detonation blasts (shots) occurred (Season 1:

117; Season 2: 211; Season 3: 150; Season 4: 28). Methods to clear sturgeon from the blast zone (500-foot radius), as well as monitoring whether they have entered it, have shown to be very effective. On multiple occasions, active acoustic monitoring (for acoustically tagged sturgeon) detected sturgeon. In all of these instances, scare charges were used (as many as five) until the fish left the blast zone. In all, we have attributed nine takes to blasting activities (8 lethal, 1 non-lethal). Post-blast visual surveys continued at least 305 m (1,000 ft) downcurrent of the blast site. The observers did not recover any injured sturgeon outside of the blast zone (more than 152.4 m (500 ft) from the blast) post-blast.

- 2/6/2016: a stunned Atlantic sturgeon was observed on the surface after a blast, but it swam away when observers attempted to capture it with a dip net.
- 3/12/2016: during relocation trawling, an Atlantic sturgeon carcass was incidentally recovered (i.e., it was previously dead). A necropsy report completed August 9, 2016 concluded that the fish might have died from blast related injuries.
- 2/1/2017: two shortnose sturgeon floated to the surface after a blast. One was killed instantly; the other's condition continued to deteriorate and the biologist euthanized it the following morning after determining that it would not survive.
- 3/1/2017: a shortnose sturgeon floated to the surface after a blast (the sturgeon died that night in a holding tank)
- 12/12/17: An injured shortnose sturgeon, gilling occasionally, but not able to maintain equilibrium, was collected after a blast. The biologist tried to revive the sturgeon but it died approximately 1.25 hours after being collected.
- 01/02/2018: An injured Atlantic sturgeon gilling occasionally but not able to maintain equilibrium was collected after a blast. The biologist tried to revive the sturgeon but it died in the holding tank 22 hours after being collected.
- 01/14/2018: An injured shortnose sturgeon was collected after a blast. The sturgeon gilled a few times but died within a few minutes after being collected
- 01/15/2018: An injured shortnose sturgeon with weak gill movements was collected after a blast. The sturgeon died a few minutes after being collected.

Based on the results of the post-blast surface monitoring from the Delaware Deepening Project, these blasts resulted in the mortality of two juvenile Atlantic sturgeon and six adult shortnose sturgeon, and the injury (stunning) of one juvenile Atlantic sturgeon. We note that the area where blasting occurred is a high use area of the Delaware River where sturgeon of both species are known to aggregate.

The maximum pounds of explosive per delay for the proposed Bridge project is 13.6 kilograms (30 pounds), is equal to the those used in the Nice Bridge (2023) study. However, several variables impact the magnitude of the blasting effects on fish (Teleki and Chamberlain 1978), including detonation velocity, density of material to be blasted, and charge weight of the blast and biological variables including fish shape, location of fish in the water column, size of the fish (Moser 1999), and swim bladder development. In addition, water depth and bottom composition also interact to determine the characteristics of the explosion pressure wave effects on fish (Teleki and Chamberlain 1978, Moser 1999). Given all variables that may influence the effects of blasting on fish, although the area is greater than that calculated in the above study, the

Exclusion Zone of 640 m (2,100 ft) around each pier calculated above represents the most accurate impact estimate based on the best available information. Therefore, compared to the studies discussed above, the zones of influence for blasting (i.e., Mortality Zone and Exclusion Zone) are consistent with the available information on the effects of blasting on fish and are expected to encompass all the underwater areas where the effects of blasting may be experienced.

6.6.3 Effects of Proposed Blasting on Shortnose and Atlantic Sturgeon

During the winter months, transient adult shortnose sturgeon may occur within the project area when blasting will occur. Telemetry detections of Atlantic sturgeon at the bridge span drop off precipitously by mid-November, leaving only a negligible number of late-season stragglers transiting the action area. Therefore, we expect a limited number of subadult and adult Atlantic sturgeon may migrate through the blasting component of the action area until early December (NOAA 2026) and may be within the action area during blasting.

Sturgeon appear to be able to withstand some degree of exposure to blasting at a certain distance from the detonation, but it is apparent from the study results outlined above that if sturgeon are close enough to a detonation, the exposure to blasting may injure the species internally and/or externally. Given the discussion of past blasting studies, the impact zone calculations, and considering the multiple variables that may influence the effects of blasting on fish described above, we conclude that the Exclusion Zone of 640 m (2,100 ft) around each pier represents the most accurate impact estimate based on the best available information. Therefore, any sturgeon within 640 m (2,100 ft) of the target pier during a given blasting event could experience injury or mortality.

The blast severity of the impact on fish is dependent on several biological and physical variables. Results from previous blasting studies conducted on thirteen species of fish other than shortnose and Atlantic sturgeon, revealed that swim bladder rupture and hemorrhaging in the pericardial and ceolomic cavities were common injuries that resulted from exposure to blasting. While studies on shortnose sturgeon revealed that they also suffer from swim bladder ruptures, more common blast induced injuries that resulted were distended intestines with gas bubbles inside and hemorrhage to the body wall lining (Moser 1999a, b). Overall, however, it is difficult to determine the extent of internal injury because many fish did not exhibit external stress or physical discomfort despite extensive internal damage. Approximately 10 percent of fish that appeared to have suffered no injury, actually sustained injuries from the blasting and it is speculated this would have led to their eventual death. Recovery of stunned sturgeon following blasting in the Delaware River supports this as several individuals died within hours of collection.

Based on the information presented above, shortnose and Atlantic sturgeon within 640 m (2,100 ft) of a detonation would be exposed to noise and pressure levels that could result in behavioral avoidance, temporary stunning, external or internal injury with full recovery, injury with delayed mortality, or injury sufficient to cause immediate mortality. Based on the best available

information, it is also likely that the smaller the fish is and the closer it is to the blast, the more significant the injuries would be (Moser 1999).

6.6.3.1 Estimating Sturgeon Exposure to Blasting Noise

Blasting is anticipated during 18 blast events occurring over construction years 6 through 7 (eastbound span demolition) and 16 blast events occurring over construction years 14 through 15 (westbound span demolition). Measures will be used to minimize the potential for take of sturgeon resulting from blasting. This includes using acoustic telemetry monitoring to determine if tagged sturgeon are within the Exclusion Zone of the blast site (total of 640 m (2,100 ft) from each pier). If a sturgeon is detected or observed, the project will delay the blast until the sturgeon has moved safely out of the Exclusion Zone. As explained above, we estimate that in order to be injured or killed, a sturgeon would need to be within 640 m (2,100 ft) of the bridge (i.e., Exclusion Zone) during the one-second duration of the detonation.

Telemetry data collected by NOAA's Chesapeake Bay Interpretive Buoy System from 2021 to 2024 indicated the presence of Atlantic sturgeon in the Chesapeake Bay North array (located just south of the Bay Bridge), with detections of tagged Atlantic sturgeon occurring mainly during the warmer months (May through July), with additional detections in October through December. The fish were within the vicinity of the Bridge from one to four hours each day (Figure 11). Therefore, by early December, most subadults and adults are likely outside of the action area, either north of the Bridge near the salt front or below the Bridge in the Chesapeake Bay. Although there were no detections of tagged individuals, adult shortnose sturgeon may occur within the action area, and may move throughout the Bay and pass through the action area (SSSRT 2010) but are not expected to overwinter within the project area during this time.

Figure 11. Chesapeake Bay North hourly detections (2021-2024)



Based on the available information, we expect that some shortnose sturgeon and Atlantic sturgeon may be transient in the blasting area during the blasting period. At the blast site, active acoustic monitoring will provide notice of the presence of any tagged sturgeon in the area. In addition, the fish deterrent sonar, described above, may act as a behavioral deterrent to at least some sturgeon and reduce the number of sturgeon passing within 640 m (2,100 ft) of the bridge (Exclusion Zone) at the detonation site. We are unable to estimate the number of sturgeon that would be in the Exclusion Zone at the time of blasting because we do not have information regarding the number of shortnose or Atlantic sturgeon in Chesapeake Bay. However, we expect the majority of sturgeon in the Bay will be well above or below the Exclusion Zone at the time of blasting and are most likely to be within rivers with spawning populations outside of the action area. Based on information from the telemetry receiver, we expect that a small number of sturgeon in the Bay could be moving through the action area in October and November. Due to the very short amount of time we expect sturgeon to linger in the area (a few hours to a few days), the relatively small number of blasts (18 blast events during demolition of the first bridge span, to occur during years 6 to 7 of construction, and 16 blast events during demolition of the second bridge span, to occur during years 14 to 15 of

construction), and the use of deterrents and observers (telemetry and visual), we expect that the majority of the already small proportion of sturgeon in the Bay will be effectively outside of the Exclusion Zone. However, despite the implementation of avoidance and minimization measures, there is still the potential for a very small number of sturgeon to be in the Exclusion Zone at the time of blasting.

The ERC (2015) study described above concluded that, although some avoidance behavior was observed, the difference in time sturgeon spent in an area during fish deterrent sonar tests when compared to control conditions was not statistically significant (α = 5 percent). Therefore, although there was some evidence of avoidance behavior, we cannot assume that sturgeon will completely avoid the area solely based on the fact that fish deterrent sonar will be used.

Rather than assuming a fixed rate of one mortality per blast event as was evaluated in the BA, we base our take estimate on empirical monitoring data from comparable confined-shot bridge and channel demolition projects. Monitoring during the Delaware River Main Channel Deepening Project documented 9 sturgeon takes from 506 blasting events (ERC 2015, 2016, 2017), an incident rate of approximately 0.018 per blast. Monitoring conducted during the 2023 Nice-Middleton Bridge demolition program, which used a comparable confined-shot design with the same maximum charge weight (13.6 kilograms (30 pounds) per delay) and comparable BMPs (fish deterrent sonar, scare charges, telemetry and visual observers, TOYR), documented zero Atlantic or shortnose sturgeon among the recovered fish kill across the blasts conducted during that program. As noted above, the Delaware River blasting occurred in a high use area where sturgeon aggregate; thus, the interaction risk is expected to be greater than it would be in the action area for this project.

Applying the Delaware Deepening incidence rate to the 34 total blast events anticipated for this project (18 EB, 16 WB) yields an expected value of approximately 0.6 sturgeon interactions over the life of the project. We round this up to one (1) and as we cannot reasonably predict whether this interaction is likely to be a shortnose or Atlantic sturgeon, and we expect that the proposed action could result in the mortality of up to one Atlantic sturgeon and one shortnose sturgeon over the life of the project.

Outside of the 640 m (2,100 ft) Exclusion Zone, we do not expect any adverse effects to sturgeon from blasting. Levels of noise from the blast may exceed the behavioral threshold for sturgeon (150 dB RMS) beyond 640 m (2,100 m) and increased turbidity and total suspended solids may also extend beyond this area, as discussed above. Behavioral effects, such as avoidance or disruption of foraging activities due to noise, may also occur in sturgeon exposed to noise above 150 dB RMS. However, given that noise from blasting will last only one second at a time, any behavioral response is expected to be extremely short and likely not more than a startle. As such, effects are likely to be so small that they cannot be meaningfully measured, detected, or evaluated and will be insignificant.

6.7 Non-Blasting Demolition Activities

In addition to subaqueous blasting (Section 6.6), demolition of the existing Bay Bridge piers and pile bents will involve mechanical demolition methods not otherwise addressed in this Opinion. These include: mechanical removal of the 156 shallow-water pile bents (67 EB, 89 WB) and 50 moderate-depth piers (39 EB, 11 WB) that will not be blasted; mechanical demolition of the above-water portion of each deep-water pier prior to blast-hole preparation; mechanical removal of deck slabs and girders; and extraction of piles by vibratory or other mechanical means.

Physical strike and debris

Demolition rubble from mechanical removal of piers and pile bents will drop to the Bay bottom in the immediate vicinity of each structure. Unlike blasting, mechanical demolition does not involve a discrete high-energy explosion with a defined injury radius, but the falling debris itself presents a physical strike hazard to any sturgeon in very close proximity to an active demolition structure at the moment material is dropped. Given that sturgeon are not expected to aggregate at or remain beneath an active demolition structure (consistent with the transient, non-aggregating use of the action area described elsewhere in this Opinion), and given that protected species observers already committed to for blasting and pile driving activities could reasonably be extended to cover mechanical demolition, we anticipate the likelihood of a sturgeon being struck by falling debris to be extremely unlikely, and therefore discountable.

Turbidity

Mechanical demolition of piers and pile bents, and mechanical pile extraction, will generate localized turbidity, addressed in the context of the project's overall turbidity effects in Section 6.3. The BMPs committed to for pile removal (preferring vibratory extraction over direct pull, jetting, or clamshell methods, per the Pier Demolition Report) are the same measures already credited in that turbidity analysis for new pile installation and are expected to have a comparable turbidity-reducing effect during demolition.

Vessel traffic

Mechanical demolition will require barges and support vessels at each of the 206 mechanically demolished structures over the life of the demolition program. This vessel activity is encompassed within the overall project vessel traffic analysis in Section 6.5 and does not represent an additional, unanalyzed source of vessel-strike risk beyond what is already quantified there.

6.8 Geotechincal Investigations

Underwater noise

Geotechnical drilling and sampling equipment generate continuous, non-impulsive underwater noise, of the same general category as noise from vessels, dredging, or vibratory pile driving (ANSI, 1995; NIOSH, 1998; see Section 6.1.1). The source levels of drill rigs and sampling equipment used for geotechnical borings are substantially lower than the pile driving equipment analyzed in Sections 6.1 and 6.6.2 and are not expected to approach the injury thresholds developed in this Opinion for impact pile driving or blasting. Any noise generated is expected to

remain below the 150 dB re 1 µPa RMS behavioral threshold used throughout this Opinion (Section 6.1.2) beyond a limited radius of the sampling vessel. Because each boring is conducted at a discrete location for a limited duration, any sturgeon in the vicinity would be exposed only briefly and would be expected to move through or away from the area without difficulty, consistent with the swim-speed and avoidance analysis applied to other continuous noise sources in this Opinion (Section 6.1.5).

Vessel traffic

The vessel(s) used for geotechnical sampling would be stationary or slow-moving while on station at each boring location, rather than transiting at speed, consistent with the vessel-strike analysis in Section 6.5, which found project vessel operations - given their limited speed, shallow draft, and observer protocols - extremely unlikely to result in the strike of a sturgeon.

Physical disturbance and turbidity

Individual boreholes are small in diameter (typically on the order of a few inches) and would affect a negligible area of substrate at each sampling location relative to the area affected by pier construction, dredging, or blasting. Any turbidity generated during drilling or grouting would be minor, localized to the immediate vicinity of the borehole, and of shorter duration and lower magnitude than the turbidity from dredging and pile driving already addressed in Section 6.3. Given the low source levels and short, localized noise exposure, the small physical footprint of individual borings, the stationary or slow-moving nature of the sampling vessel, and the brief duration of activity at any one location, effects to Atlantic sturgeon and shortnose sturgeon from geotechnical investigations are extremely unlikely to occur and are discountable. To the extent any effect does occur (e.g., minor turbidity or a brief startle response), it would be too minor to be measured, evaluated, or detected, and is insignificant.

6.9 Temporary Moorings

Installation noise

To the extent mooring piles (rather than mooring ball anchors) are used, based on the pile size, purpose, and substrate, we assume vibratory installation of small-diameter, temporary piles, rather than the impact driving used for the permanent bridge piles addressed in Sections 6.1 and 6.6. This is expected to produce continuous, non-impulsive noise at or below the lowest vibratory source levels already evaluated in this Opinion (e.g., the 14-inch steel H-pile vibratory installation), for which the 150 dB RMS behavioral threshold extends only a short distance from the pile.

Benthic disturbance

The footprint of individual mooring piles or anchors is far smaller than that of permanent pier construction, and FHWA and MDTA's commitment to avoid oyster beds and SAV further limits any effect on sensitive benthic habitat features relevant to these species. Swing of anchor chains with tide and current could disturb a limited additional area of bottom around each mooring;

because moorings will not be sited in oyster beds or SAV, this incidental disturbance is expected to affect only soft-bottom or previously disturbed sediment.

Vessel traffic
Vessels on station at a mooring are stationary rather than transiting, and consistent with the Section 6.5 vessel-strike analysis, present minimal or no strike risk while moored; the observer and speed-restriction protocols established for project vessels in Section 6.5 apply while vessels transit to and from mooring locations.

Turbidity
Installation of mooring piles or anchors would generate minor, temporary turbidity, similar in kind to but smaller in magnitude than turbidity generated during installation and removal of the bridge's permanent piles (Section 6.3).

Given the small footprint, avoidance of oyster beds and SAV, low noise levels relative to production pile driving, and the stationary nature of moored vessels, effects to Atlantic sturgeon and shortnose sturgeon from temporary mooring installation and use are extremely unlikely to occur and are discountable, or, to the extent any minor effect occurs, insignificant.

6.10 Summary of Effect Determinations

Table 21. Species effect determinations by stressor

Species	Federal Status	Distinct Population Segment (DPS) Potentially Occurring in the Action Area	Stressor	Stressor Effect	Species Determination
Atlantic sturgeon (*Acipenser oxyrinchus*)	Endangered	Chesapeake Bay	Pile driving	NLAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	Range-wide	Pile driving	NLAA	LAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	LAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	
	Threatened	Northwest Atlantic	Pile driving	NLAA	NLAA

Species	Federal Status	Distinct Population Segment (DPS) Potentially Occurring in the Action Area	Stressor	Stressor Effect	Species Determination
Loggerhead sea turtle (*Caretta caretta*)			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	NLAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Range-wide	Pile driving	NLAA	NLAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	NLAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	
Green sea turtle (*Chelonia mydas*)	Threatened	North Atlantic	Pile driving	NLAA	NLAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	NLAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Range-wide	Pile driving	NLAA	NLAA
			Dredging	NLAA	
			Turbidity and habitat modification	NLAA	
			Increased vessel traffic	NLAA	
			Blasting	NLAA	
			Non-blast demo	NLAA	
			Geo borings	NLAA	
			Moorings	NLAA	

7 CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR § 402.02). This section does not consider future Federal actions that are unrelated to the proposed action because they require separate consultation pursuant to section 7

of the ESA. It is important to note that the definition of "cumulative effects" in the Section 7 regulations is not the same as the NEPA definition of cumulative effects[24].

During this consultation, we searched for information on future state, tribal, local, or private (non-federal) actions reasonably certain to occur in the action area that would have effects on species considered in this Opinion. We did not find any information about non-federal actions other than what has already been described in the *Environmental Baseline*. The primary non-federal activities that will continue to occur in the action area are recreational fisheries, fisheries authorized by the states, use of the action area by private vessels, discharge of wastewater and associated pollutants, and coastal development authorized by state and local governments. We do not have any information to indicate that effects of these activities over the life of the proposed action will have different effects than those considered in the *Status of the Species* and *Environmental Baseline* sections of this Opinion.

8 INTEGRATION AND SYNTHESIS OF EFFECTS

In the *Effects of the Action* section, we considered potential effects from construction and demolition activities at the Bridge. We also considered the potential for interactions between ESA-listed species from project vessels, impacts to their habitats and prey, active acoustic sources used as deterrents, and changes in water quality on these species.

We have estimated that the Bridge project will result in injury and/or morality of up to one shortnose sturgeon and one Atlantic sturgeon over the life of the project that will occur during years 6 to 7 of construction, and years 14 to 15 of construction. These interactions are expected to result in serious injury or mortality. As explained in the *Effects of the Action* section, all other effects to shortnose and Atlantic sturgeon from the project activities, including effects to their prey and habitat, from project-related vessels, and from water quality will be insignificant and/or extremely unlikely to occur.

In the discussion below, we consider whether the effects of the proposed action reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the listed species in the wild by reducing the reproduction, numbers, or distribution of the listed species that will be adversely affected by the action. The purpose of this analysis is to determine whether the proposed action, in the context established by the status of the species, environmental baseline, and cumulative effects, would jeopardize the continued existence of any listed species.

In the U.S. FWS/NMFS Section 7 Handbook (U.S. FWS and NMFS 1998), for the purposes of determining jeopardy, survival is defined as, "the species' persistence as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow for the potential recovery from endangerment. Said in another way, survival is the condition in which a

[24] Cumulative effects are defined for NEPA as "the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

species continues to exist into the future while retaining the potential for recovery. This condition is characterized by a species with a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter."

The ESA defines recovery as, "Improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4(a)(1) of the Act." We summarize below the status of the species and consider whether the proposed action will result in reductions in reproduction, numbers, or distribution of these species and then consider whether any reductions in reproduction, numbers, or distribution resulting from the proposed action would reduce appreciably the likelihood of both the survival and recovery of these species, as those terms are defined for purposes of the ESA.

8.1 Atlantic sturgeon

As explained below, the proposed action is likely to result in the incidental take of up to one Atlantic sturgeon during blasting activities associated with the Bridge project. Because individual Atlantic sturgeon from the five DPSs cannot be reliably distinguished in the field (see Determination of DPS Composition, below), we do not know in advance to which DPS a taken individual would belong. For this reason, our analysis treats the take of this single individual as though it could originate from any of the five DPSs, and separately evaluates the consequences of that loss for each DPS in turn below. This analysis anticipates the take of one Atlantic sturgeon in total - not one take per DPS. We expect that the Atlantic sturgeon killed could be a subadult or adult. No take of eggs, larvae (yolk sac or post-yolk sac), young-of-year, or juvenile Atlantic sturgeon are anticipated, because these life stages do not occur in the action area. All other effects to Atlantic sturgeon, including effects to habitat and prey will be insignificant or extremely unlikely to occur.

8.1.1 Determination of DPS Composition

While the action area lies within the geographic range of the Chesapeake Bay DPS, it is located in the mesohaline mainstem of the Chesapeake Bay rather than in riverine spawning or nursery habitat. Outside of the natal rivers, we expect there to be a mixing of the five Atlantic sturgeon DPSs. Satellite tagging, acoustic telemetry, and genetic mixed-stock studies conducted throughout the species' range demonstrate that subadult and adult Atlantic sturgeon do not remain confined to their natal estuaries after outmigration; individuals from all five DPSs undertake extensive coastal migrations and regularly transit between river systems and DPS boundaries (Dunton *et al*. 2010, 2012; Erickson *et al.* 2011; Wirgin *et al.* 2015a; Kazyak *et al.* 2021a).

Telemetry data collected specifically in Mid-Atlantic waters off Maryland confirm that this mixing extends into the Chesapeake Bay region. For example, Rothermel *et al*. (2020) documented seasonal inshore and offshore movements of acoustically tagged Atlantic sturgeon across the continental shelf off Maryland, and mixed-stock and bycatch studies elsewhere in the

Mid-Atlantic Bight have repeatedly recovered individuals from DPSs other than the one nearest the sampling location (Waldman *et al*. 2013; Wirgin *et al*. 2015b; Kazyak *et al*. 2021a). However, no mixed-stock analysis has been conducted for the action area itself or a comparably situated segment of the upper Chesapeake Bay, so this Opinion does not assign relative proportions to any DPS's contribution here because it is the co-occurrence of multiple DPSs in Mid-Atlantic waters generally, not any specific ranking among them, that is supported by the best available science at this time.

Individuals from the five DPSs cannot be reliably distinguished by external morphology; DPS of origin can only be determined through genetic analysis of a tissue sample, which is why the ITS requires a fin clip from any sturgeon over 75 cm total length (RPM 3, T&C 5). Because sturgeon from any of the five DPSs may be present in the action area at the time of a given blast event, any individual affected by blasting is, therefore, equally likely to belong to any of the five DPSs. The DPS of individuals cannot be determined until the collection and analysis of a tissue sample. Therefore, this Opinion does not attribute the single anticipated Atlantic sturgeon mortality to the Chesapeake Bay DPS and considers that this individual could originate from any of the five DPSs.

8.1.2 Jeopardy Determination by DPS

8.1.2.1 Chesapeake Bay DPS

The Chesapeake Bay DPS is listed as endangered and Atlantic sturgeon occur in and may potentially spawn in several rivers connected to the Chesapeake Bay. There is evidence of spawning in the James River (confirmed); Pamunkey River, a tributary of the York River; and Nanticoke River and its tributary Marshyhope Creek (section 5.2.2.8). In addition, detections of acoustically-tagged adult Atlantic sturgeon in the Mattaponi and Rappahannock Rivers during the spawning window have occurred. Historical evidence for these rivers as well as the Potomac River supports the likelihood that Atlantic sturgeon spawning populations are present in the Mattaponi, Rappahannock, and Potomac Rivers (NMFS 2017). However, information for these populations is limited and the research is ongoing.

Chesapeake Bay origin Atlantic sturgeon are affected by numerous sources of human induced mortality and habitat disturbance throughout the riverine and marine portions of their range. There is currently no census nor enough information to establish a trend, for any life stage, for the James River spawning population, or for the DPS as a whole. However, the NEAMAP data indicates that the estimated ocean population of Chesapeake Bay DPS Atlantic sturgeon is, at a minimum, 10,332 sub-adult and adult individuals. The updated estimated annual adult male population for the fall cohort is approximately 3,707 individuals and the estimated annual adult female spawning population is 1,250 individuals (Balazik 2019 pers. comms.) In river estimates include, 75 adult Atlantic sturgeon spawned in the Pamunkey River in 2013 (Kahn *et al*. 2014) and 222 adults from 2013 to 2018, with yearly variability likely due to spawning periodicity (Kahn 2019). Research in the Nanticoke River system suggests a small adult population based on a small total number of captures (i.e., 26 sturgeon) (Secor *et al.* 2022). In the James River, 373 different adult-sized Atlantic sturgeon (*i.e*., total count does not include recaptures of the same fish) were captured in the from 2009 through spring 2014 (Balazik and Musick

2015). Coleman *et al.* (2024) estimated that 32 (95% confidence interval [CRI] = 23-47) and 70 (95% CRI = 49-105) Atlantic sturgeon used the Marshyhope Creek-Nanticoke River system in 2020 and 2021, respectively. The ASMFC (2024) stock assessment update determined that abundance of the Chesapeake Bay DPS is "depleted" relative to historical levels. The stock assessment update, while noting significant uncertainty in trend data, also determined that there is a relatively low probability (27 percent) that abundance of the Chesapeake Bay DPS has increased since the implementation of the 1998 fishing moratorium, and a 14 percent probability that mortality for the Chesapeake Bay DPS exceeds the mortality threshold used for the assessment (ASMFC, 2024).

As described in the 5-Year Review for the Chesapeake Bay DPS (NMFS 2022), the demographic risk for the DPS is "High" because of its low productivity (e.g., relatively few adults compared to historical levels and irregular spawning success), low abundance (e.g., only three known spawning populations and low DPS abundance, overall), and limited spatial distribution (e.g., limited spawning habitat within each of the few known rivers that support spawning). There is also new information indicating genetic bottlenecks as well as low levels of inbreeding. However, the recovery potential is considered high.

The effects of the action are in addition to ongoing threats in the action area, which include incidental capture in state and federal fisheries, boat strikes, coastal development, habitat loss, contaminants, and changing environmental conditions. As noted in the Cumulative Effects section of this Opinion, we have not identified any cumulative effects different from those considered in the Status of the Species and Environmental Baseline sections of this Opinion

We anticipate the mortality of up to one adult or subadult Chesapeake Bay DPS Atlantic sturgeon as a result of blasting during the demolition of the existing bridges. Thus, here, we consider the effects of the loss of up to one Atlantic sturgeon from the Chesapeake Bay DPS over the lifespan of the project. The reproductive potential of the Chesapeake Bay DPS will not be affected in any way other than through a reduction in number of one individual. The loss of up to one individual will have the effect of reducing the amount of reproduction potential as any dead Chesapeake Bay DPS Atlantic sturgeon has no potential for future reproduction. However, this small reduction in potential future spawners is expected to result in an extremely small reduction in the number of eggs laid or larvae produced in future years and similarly, extremely small effects on the strength of subsequent year classes. Even considering the potential future spawners that would be produced by one Chesapeake Bay DPS Atlantic sturgeon that could be killed as a result of the proposed action, any effect to future year classes is anticipated to be extremely small and would not change the status of this species. The proposed action will also not affect the spawning grounds within the rivers where Chesapeake Bay DPS fish spawn, as they are outside of the action area. The action will also not create any barrier to pre-spawning sturgeon accessing the overwintering sites or the spawning grounds used by Chesapeake Bay DPS fish for the same reasons.

Because we do not have a population estimate for the Chesapeake Bay DPS, it is difficult to evaluate the effects of the mortality caused by this action on the species. However, because the

proposed action will result in the loss of an individual over the life of the project, it is unlikely that this death will have a detectable effect on the abundance and population trend of the Chesapeake Bay DPS.

The proposed action is not likely to reduce distribution of the Chesapeake Bay DPS because the action will not impede Atlantic sturgeon from accessing any seasonal concentration areas, including foraging areas within the action area that Chesapeake Bay DPS subadults or adults use. Further, the action is not expected to reduce the river-by-river distribution of Atlantic sturgeon. Any effects to distribution will be minor and temporary and limited to the temporary avoidance of the area where impacts of the action.

Based on the information provided above, the death of one Chesapeake Bay DPS Atlantic sturgeon will not appreciably reduce the likelihood of survival of the Chesapeake Bay DPS (i.e., it will not decrease the likelihood that the species will continue to persist into the future with sufficient resilience to allow for the potential recovery from endangerment). The action will not affect Chesapeake Bay DPS Atlantic sturgeon in a way that prevents the species from having a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring. It will also not result in effects to the environment which would prevent Atlantic sturgeon from completing their entire life cycle, including reproduction, sustenance, and shelter. This is the case because: (1) the death of up to one Chesapeake Bay DPS Atlantic sturgeon will not change the status or trends of the species as a whole; (2) the loss of one Chesapeake Bay DPS Atlantic sturgeon is not likely to have effects on the levels of genetic heterogeneity in the population; (3) the action will have only a minor and temporary effect on the distribution of Chesapeake Bay DPS Atlantic sturgeon in the action area and no effect on the distribution of the species throughout its range; and (4) the action will have no effect on the ability of Chesapeake Bay DPS Atlantic sturgeon to shelter and only an insignificant effect on any foraging Chesapeake Bay DPS Atlantic sturgeon.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might appreciably reduce its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed action will not appreciably reduce the likelihood that the Chesapeake Bay DPS will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. Thus, we have considered whether the proposed action will affect the likelihood that the Chesapeake Bay DPS can rebuild to a point where listing is no longer appropriate. No Recovery Plan for the Chesapeake Bay DPS has been published at this time. As defined, the Recovery Plan will outline the steps necessary for recovery and the demographic criteria that, once attained, would allow the species to be delisted. In January 2018, we published a Recovery Outline for the five DPSs of Atlantic sturgeon (NMFS 2018). This outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, until a full recovery plan is developed and approved. The outline provides a preliminary strategy for recovery of the species. We know that, in general, to recover, a listed species must have a sustained positive trend of increasing population over time. To allow that to happen for sturgeon, individuals must have

access to enough habitat in suitable condition for foraging, resting, migrating and spawning. Conditions must be suitable for the successful development of early life stages. Mortality rates must be low enough to allow for recruitment to all age classes so that successful spawning can continue over time and over generations. There must be enough suitable habitat for spawning, foraging, resting, and migrations of all individuals. For Chesapeake Bay DPS Atlantic sturgeon, habitat conditions must be suitable both in the natal river and in other rivers and estuaries where foraging by subadults and adults will occur and, in the ocean, where subadults and adults migrate, overwinter and forage. Habitat connectivity must also be maintained so that individuals can migrate between important habitats without delays that impact their fitness. As described in the vision statement in the Recovery Outline, subpopulations of all five Atlantic sturgeon DPSs must be present across the historical range. These subpopulations must be of sufficient size and genetic diversity to support successful reproduction and recovery from mortality events. The recruitment of juveniles to the sub-adult and adult life stages must also increase and that increased recruitment must be maintained over many years. Recovery of these DPSs will require conservation of the riverine and marine habitats used for spawning, development, foraging, and growth by abating threats to ensure a high probability of survival into the future. Next, we consider whether this proposed action will reduce the Chesapeake Bay DPS likelihood of recovery.

This action will not change the status or trend of the Chesapeake Bay DPS and will only result in an extremely small reduction in the number of Chesapeake Bay DPS Atlantic sturgeon and will not affect their overall distribution. Any effects to habitat will be insignificant and will not affect the ability of Atlantic sturgeon to carry out any necessary behaviors or functions. Any impacts to available forage will also be insignificant. The proposed action will result in an extremely small amount of mortality and a subsequent small reduction in future reproductive output. For these reasons, we do not expect the actions to affect the persistence of the Chesapeake Bay DPS of Atlantic sturgeon. This action will not change the status or trend of the Chesapeake Bay DPS of Atlantic sturgeon. The very small reduction in numbers and future reproduction resulting from the proposed action will not reduce the likelihood of improvement in the status of the Chesapeake Bay DPS of Atlantic sturgeon. The effects of the proposed action will not delay the recovery timeline or otherwise decrease the likelihood of recovery. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it is recovered and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood that the Chesapeake Bay DPS of Atlantic sturgeon can be brought to the point at which they are no longer listed as endangered or threatened. Based on the analysis presented herein, the proposed action is not likely to appreciably reduce the survival and recovery of this species.

Despite the threats faced by individual Chesapeake Bay DPS Atlantic sturgeon inside and outside of the action area, the proposed action will not increase the vulnerability of individual sturgeon to these additional threats and exposure to ongoing threats will not increase susceptibility to effects related to the proposed action. We have considered the effects of the proposed action in light of cumulative effects explained above, and have concluded that, even in

light of the ongoing impacts of these activities and conditions, the conclusions reached above do not change. Based on the analysis presented herein, the proposed action, resulting in the mortality of one Chesapeake Bay DPS Atlantic sturgeon, is not likely to appreciably reduce the survival and recovery of this species.

8.1.2.2 Gulf of Maine DPS

The Gulf of Maine DPS is listed as threatened, and while Atlantic sturgeon occur in several rivers of the Gulf of Maine region, recent spawning has only been physically documented in the Kennebec River. That said, spawning is suspected to occur in the Androscoggin, Piscataqua, and Merrimack Rivers, although not confirmed. Currently we do not have an estimate of the number of Atlantic sturgeon in any river nor is any currently available for the entire DPS; however, NEAMAP data indicates that the estimated ocean population of Gulf of Maine DPS Atlantic sturgeon subadults and adults is, at a minimum, 727 individuals. As discussed in the *Status of the Species* section, this is likely a significant underestimate since (1) the NEAMAP surveys do not extend into the Gulf of Maine and (2) Gulf of Maine DPS fish do not often stray beyond the Gulf of Maine like other DPSs do from their general geographic area (as evidenced by genetic sampling). For in-river estimates, the ASSRT (2007) status review estimated that the number of spawning adults in the Gulf of Maine DPS was less than 300 per year and Wippelhauser and Squiers (2015) reviewed the results of studies conducted in the Kennebec River System from 1977-2001 and 371 Atlantic sturgeon were captured, but the abundance of adult Atlantic sturgeon in the Kennebec spawning population could not be estimated because too few tagged fish were recaptured (i.e., 9 of 249 sturgeon).

Gulf of Maine origin Atlantic sturgeon are subject to numerous sources of human induced mortality and habitat disturbance throughout the riverine and marine portions of their range. There is currently not enough information to establish a trend for any life stage or for the DPS as a whole. The ASMFC (2024) stock assessment update concluded that the abundance of the Gulf of Maine DPS is "depleted" relative to historical levels. The Commission also noted that the Gulf of Maine is particularly data poor among all five DPSs. The assessment concluded that there is a 45 percent probability that the abundance of the Gulf of Maine DPS has increased since implementation of the 1998 fishing moratorium. The Commission also concluded that there is a relatively high likelihood (55.5 percent probability) that mortality for the Gulf of Maine DPS exceeds the mortality threshold used for the assessment ASMFC (2017); (ASMFC, 2024). However, the Commission noted that there was considerable uncertainty related to these numbers, particularly concerning trends data for the Gulf of Maine DPS. For example, the stock assessment notes that it was not clear if: (1) the percent probability for the trend in abundance for the Gulf of Maine DPS is a reflection of the actual trend in abundance or of the underlying data quality for the DPS; and, (2) the percent probability that the Gulf of Maine DPS exceeds the mortality threshold actually reflects lower survival or was due to increased tagging model uncertainty owing to low sample sizes and potential emigration.

As described in the 5-Year Review for the Gulf of Maine DPS (NMFS 2022), the demographic risk for the DPS is "moderate"[25] because of its low productivity (i.e., relatively few adults compared to historical levels), low abundance (i.e., only one known spawning population and low DPS abundance, overall), and limited spatial distribution (i.e., limited spawning habitat within the one river known to support spawning). There is also new information indicating genetic bottlenecks as well as low levels of inbreeding. However, the recovery potential is considered high.

Here, we consider the effects of the loss one Atlantic sturgeon from the Gulf of Maine DPS in addition to ongoing threats (e.g., capture in fisheries, coastal development, habitat loss, contaminants, etc.) in the action area. The reproductive potential of the Gulf of Maine DPS will not be affected in any way other than through a reduction in numbers of individuals. The loss one individual will have the effect of reducing reproduction potential within the DPS because any dead Gulf of Maine DPS Atlantic sturgeon has no potential for future reproduction. However, this small reduction in potential future spawners is expected to result in an extremely small reduction in the number of eggs laid or larvae produced in future years and similarly, an extremely small effect on the strength of subsequent year classes. Even considering the potential future spawners that would be produced by the individual that will be killed as a result of the proposed action, any effect to future year classes is anticipated to be extremely small and would not change the status of this species. The proposed action will also not affect the spawning grounds within the rivers where Gulf of Maine DPS fish spawn, because it will occur outside of those identified areas. Additionally, the action will not create any barrier to pre-spawning sturgeon accessing the overwintering sites or the spawning grounds used by Gulf of Maine DPS fish for the same reasons.

Because we do not have a population estimate for the Gulf of Maine DPS, it is difficult to evaluate the effects of mortality on this species caused by this action. However, because the proposed action will result in the loss of one individual over 34 blasting events, or an average of 0.03 mortalities each event, it is unlikely that this death will have detectable effects on the numbers and population trend of the Gulf of Maine DPS.

The proposed action is not likely to reduce distribution because the action will not impede Atlantic sturgeon from accessing any seasonal concentration areas, including foraging areas within the action area that may be used by Gulf of Maine DPS subadults or adults. Further, the action is not expected to reduce the river-by-river distribution of Atlantic sturgeon. Any effects to distribution will be minor and temporary, and limited to the avoidance of the area where the impacts occur because of the action.

Based on the information provided above, the death of one Gulf of Maine DPS Atlantic sturgeon will not appreciably reduce the likelihood of survival of the Gulf of Maine DPS (i.e., it will not decrease the likelihood that the species will continue to persist into the future with sufficient resilience to allow for the potential recovery from endangerment). The action will not affect

[25] 84 FR 18243; April 30, 2019 - Listing and Recovery Priority Guidelines.

Gulf of Maine DPS Atlantic sturgeon in a way that prevents the species from maintaining a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring. Additionally, it will not result in effects to the environment which prevent Atlantic sturgeon from completing their entire life cycle, including reproducing, sustenance, and shelter. This is the case because: (1) the death of one Gulf of Maine DPS Atlantic sturgeon will not change the status or trends of the species as a whole; (2) the loss of one Gulf of Maine DPS Atlantic sturgeon as a result of this action is not likely to have effects on the levels of genetic heterogeneity in the population; (3) the action will have only a minor and temporary effects on the distribution of Gulf of Maine DPS Atlantic sturgeon in the action area and no effect on the distribution of the species throughout its range; and, (4) the action will have no effect on the ability of Gulf of Maine DPS Atlantic sturgeon to shelter with only an insignificant effect on any foraging Gulf of Maine DPS Atlantic sturgeon.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might affect its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed action will not appreciably reduce the likelihood that the Gulf of Maine DPS will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. Thus, we have considered whether the proposed action will affect the likelihood that the Gulf of Maine DPS can rebuild to a point where listing is no longer appropriate. No Recovery Plan for the Gulf of Maine DPS has been published at this time. As defined, a Recovery Plan will outline the steps necessary for recovery and the demographic criteria, which once attained would allow the species to be delisted. In January 2018, we published a Recovery Outline for the five DPSs of Atlantic sturgeon (NMFS 2018[26]). This outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, until a full recovery plan is developed and approved. The outline provides a preliminary strategy for recovery of the species. We know that in general, to recover, a species must have a sustained positive increasing population trend over time and an increase in population size. To allow that to happen for sturgeon, individuals must have access to enough habitat in suitable condition for foraging, resting and spawning.

Conditions must be suitable for the successful development of early life stages. Mortality rates must be low enough to allow for recruitment to all age classes so that successful spawning can continue over time and over generations. There must be enough suitable habitat for spawning, foraging, resting, and migrations of all individuals. For Gulf of Maine DPS Atlantic sturgeon, habitat conditions must be suitable both in the natal river and in other rivers and estuaries where foraging by subadults and adults will occur and, in the ocean, where subadults and adults migrate, overwinter and forage. Habitat connectivity must also be maintained so that individuals can migrate between important habitats without delays that impact their fitness. As described in the vision statement in the Recovery Outline, subpopulations of all five Atlantic sturgeon DPSs must be present across the historical range. These subpopulations must be of sufficient size and

[26] Available online at: https://media.fisheries.noaa.gov/dam-migration/ats_recovery_outline.pdf

genetic diversity to support successful reproduction and recovery from mortality events. The recruitment of juveniles to the sub-adult and adult life stages must also increase and that increased recruitment must be maintained over many years. Recovery of these DPSs will require conservation of the riverine and marine habitats used for spawning, development, foraging, and growth by abating threats to ensure a high probability of survival into the future. Here, we consider whether this proposed action will reduce the Gulf of Maine DPS likelihood of recovery.

We do not expect the proposed action to modify, curtail or destroy the range of the species, or to change the status or trend of the Gulf of Maine DPS, since it will result in an extremely small reduction in the number and overall distribution. Any effects to habitat will be insignificant and will not affect the ability of Atlantic sturgeon to carry out any necessary behaviors or functions. Any impacts to available forage will also be insignificant. The proposed action will result in an extremely small amount of mortality over the lifespan of the project (one individual) and a subsequent small reduction in future reproductive output. For these reasons, we do not expect the action to affect the persistence of the Gulf of Maine DPS of Atlantic sturgeon. The action will not change the status or trend of the Gulf of Maine DPS of Atlantic sturgeon, nor will a very small reduction in numbers and future reproduction resulting from the proposed action reduce the likelihood of improvement in the status. The effects of the proposed action will not delay the recovery timeline or otherwise decrease the likelihood of recovery. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it is recovered and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood that the Gulf of Maine DPS of Atlantic sturgeon can be brought to the point at which listing as threatened is no longer necessary. Based on the analysis presented herein, the proposed action is not likely to appreciably reduce the survival and recovery of this species.

Despite the threats faced by individual Gulf of Maine DPS Atlantic sturgeon inside and outside of the action area, the proposed action will not increase the vulnerability of individual sturgeon to additional threats and exposure to ongoing threats will not increase susceptibility to effects related to the proposed action. We have considered the effects of the proposed action in light of cumulative effects explained above and have concluded that, even in light of the ongoing impacts of these activities and conditions, the conclusions reached above do not change. Based on the analysis presented herein, the proposed action, resulting in the mortality one Gulf of Maine DPS Atlantic sturgeon, is not likely to appreciably reduce the survival and recovery of the species.

8.1.2.3 New York Bight DPS

The New York Bight DPS is listed as endangered and includes the following: all anadromous Atlantic sturgeon spawned in the watersheds that drain into coastal waters (including bays and sounds) from Chatham, MA to the Delaware-Maryland border on Fenwick Island. Our recent status review concluded that the status of the DPS has likely neither improved nor declined from what it was when we listed the DPS in 2012, that the DPS's demographic risk is "High," and that no changes to the listing status and listing recovery priority number are needed (NMFS 2022c). As noted in the 5-year review, low productivity (e.g., relatively few adults compared to historical levels and irregular spawning success), low abundance (e.g., only a few known spawning

populations and low DPS abundance, overall), and limited spatial distribution (e.g., limited spawning habitat within each of the few known rivers that support spawning) puts the New York Bight DPS at risk of extinction. There is also new information indicating genetic bottlenecks as well as low levels of inbreeding in the Hudson and Delaware spawning populations.

Within the New York Bight DPS range, Atlantic sturgeon historically spawned in the Connecticut, Delaware, Hudson, and Housatonic Rivers (ASSRT 2007, Murawski and Pacheco 1977, Secor *et al.* 2002). While Atlantic sturgeon occur in several rivers in the New York Bight, recent spawning has only been physically documented in the Hudson and Delaware Rivers. The essential physical features necessary to support spawning and recruitment are present in all the New York Bight DPS rivers (82 FR 39160, August 17, 2017). However, currently, there is no evidence that spawning is occurring nor are studies underway to investigate spawning occurrence in the Connecticut and Housatonic Rivers; except one recent study where young of year fish were captured in the Connecticut River (Savoy *et al.* 2017). Genetic analysis suggests that the young of year fish belonged to the South Atlantic DPS and at this time we do not know if these fish were the result of a single spawning event due to unique straying of the adults from the South Atlantic DPS's spawning rivers.

New York Bight DPS origin Atlantic sturgeon are subject to numerous sources of human induced mortality and habitat disturbance throughout the riverine and marine portions of their range. The largest single source of mortality appears to be capture as bycatch in commercial fisheries operating in the marine environment. Because early life stages and juveniles do not leave the river, they are not impacted by fisheries occurring in federal waters. Bycatch and mortality also occur in state fisheries; however, the primary fishery that impacted juvenile sturgeon (the shad fishery) has now been closed and there is no indication that it will reopen soon. New York Bight DPS Atlantic sturgeon are killed as a result of other anthropogenic activities in the Hudson, Delaware, and other rivers within the New York Bight as well; sources of potential mortality include vessel strikes, entrainment in dredges, effects from contaminants, habitat loss, and effects of changing environmental conditions.

Small populations are susceptible to threats such as inbreeding, genetic drift (allele frequencies of a population changing over generations due to chance), demographic stochasticity (chance independent events of individual mortality and reproduction, causing random fluctuations in population growth rate), and Allee effect (individual fitness in a population increases/decreases with increasing/decreasing population size because of undercrowding). These factors have substantial influence on the growth of small populations and therefore their extinction risk. The specific biology and life history of a species influence the population size needed to remain viable, but as a rule of thumb, an effective population size, N_e, of 50 breeding individuals are needed for a short-term minimum viable population (MVP) and a N_e size of 500 breeding individuals for retaining evolutionary potential (and long-term MVP) (Franklin 1980). The effective population "rule of thumb" for an N_e of 50 takes into account inbreeding while the latter considers genetic drift.

As noted in the *Status of the Species* section, both the Delaware River and the Hudson River current abundance is believed to be a fraction of historic levels (also see Secor (2002) and Kahnle *et al*. (2007)). An estimated 3,656 age-1 individuals used the Delaware Estuary as a

nursery in 2014 (since oceanward migration begins at age two or older, these juveniles would be of Delaware River origin). An estimate of the mean annual number of mature adults (863 total; 596 males and 267 females) was calculated for the Hudson River riverine population based on fishery-dependent data collected from 1985-1995 (Kahnle *et al*. 2007). In a more recent study, Kazyak *et al*. (2020a) estimated the 2014 Hudson River spawning run size to be 466 sturgeon (95% CRI = 310-745). In our analysis below, we use a Delaware River spawner abundance of between 125 and 250 adults and a Hudson River spawner abundance of between 400 and 500 adults. However, it should be noted that this estimate of Delaware River spawners does not include individuals that failed to spawn (e.g., male to male competition), spawners that did not have offspring surviving to the young of year age stage, and spawners who offspring remained outside of the sampling area. Thus, we expect the actual total number of spawners to be higher. Using the NEAMAP study, we concluded that the DPS consists of, at a minimum, approximately 24,963 adults and subadults. Therefore, we expect the loss of one adult or subadults over the life of the project to be too small to increase variation in abundances over time to such an extent that it can be meaningfully measured or evaluated.

Based on genetic analyses of two different life stages, subadults and natal juveniles, N_e for the Delaware River population has been estimated to be 108.7 (95% CI=74.7-186.1) (O'Leary *et al.* 2014) and 40 (95% CI=34.7-46.2) (Waldman *et al*. 2019), respectively. Estimates for the Hudson River spawning population from the same studies are 198 (95% CI=171.7-230.7; (O'Leary *et al*. 2014)) and 156 (95% CI=138.3-176.1) (Waldman *et al*. 2019), respectively. Given the low N_e, genetic drift poses a threat to future genetic diversity of these populations. O'Leary *et al*. (2014) concluded that the populations likely would retain 95 percent of their alleles over the next century under current conditions. However, a decrease in longevity of mature adults would result in severe loss of genetic diversity (O'Leary *et al.* 2014).

We estimated that demolition of the existing bridges will add one subadult or adult Atlantic sturgeon mortality incidental to blasting from the New York Bight DPS to the baseline mortality rate over the lifespan of the project. Using the best available information, we expect that the Delaware River spawning runs consist of between 125 and 250 individuals and the Hudson River runs consist of approximately 400 to 500 individuals. Based on the above, the demolition of the bridges will remove up to one subadult or adult Delaware River or Hudson River fish due to blasting. We anticipate that this reduction in numbers from either river is too small to affect genetic drift or inbreeding in a way that can be meaningfully evaluated. This is because of variation in the biological characteristics (number of progenies, male contribution, sex ratio, and population size) that affects the N_e and it is not possible to evaluate the contribution of one individual or the effect of losing one individual.

We also expect the reduction of a single fish from either the adult Delaware River population or the Hudson River population over the life of the project to be too small to increase the populations' vulnerability to demographic stochasticity, Allee effect, or other small population impacts on population genetics in a way that we can meaningfully measure or determine for either river or for the DPS as a whole. We expect that any vulnerability to catastrophic events will mostly depend on spatial structure of the populations and life history of the species. Current information from both the Delaware and Hudson River indicates that both rivers have multiple spawning sites. The loss of up to one Delaware River fish or Hudson River fish over the life of

the project is unlikely to measurably increase the vulnerability during an in-river catastrophic event. This is because we expect the effects of a catastrophic event (e.g., oil spill, pollutant release, etc.) to be more related to the concentration of spawners within a particular area than to the total number of spawners, and it is not possible to evaluate how a loss of these spawners spread out over the life of the project will increase the vulnerability from a catastrophic event. Since Atlantic sturgeon adults do not spawn every year, it is unlikely that the lost adults would have participated in the same spawning runs and migrating adults will buffer against catastrophic loss of a spawning population by reintroducing spawning individuals in following years. However, even if there was a catastrophic event affecting Atlantic sturgeon spawning areas, we do not expect that the loss of one fish from either the Delaware River or Hudson River populations over the life of the project would significantly affect the outcome and effects of a catastrophic event in either river considering the number of expected spawners in both the Delaware River and Hudson River together with the fecundity of adult female sturgeon and multiple rearing sites. Also, in the case of a catastrophic event, we do not have enough information to determine if the loss of spawners may affect the vulnerability of young of year fish at the rearing site.

The Commission's 2024 benchmark stock assessment update concluded that there was a relatively high probability (59 percent) that the abundance of the New York Bight DPS has increased since the implementation of the 1998 fishing moratorium (ASMFC 2024). However, there was considerable uncertainty expressed in the stock assessment and in its peer review report. New information suggests that the conclusion about the New York Bight DPS primarily reflects the status and trend of only the DPS's Hudson River spawning population (NMFS 2022c). Annual surveys for Atlantic sturgeon juveniles in the Hudson River conducted by the New York State Department of Environmental Conservation (NYDEC) since 2004 suggests that the catch rate of juvenile Atlantic sturgeon has increased, with double the average catch rate for the period from 2012-2019 compared to the previous eight years, from 2004-2011 (Pendleton and Adams 2021). However, recent research by Stich *et al*. (2025) demonstrated that the juvenile population does not show an increasing trend. We do not have enough information to discern the Hudson River population's growth rate, but recent research seems to indicate that it is trending downward (Stich *et al.* 2025). For a population to recover, population growth rate must be positive and a species remains prone to extinction as long as the population remains small and, thus, the rate of population growth, even if positive, will influence survival and recovery. For Atlantic sturgeon, ASMFC (2007) concluded that a 5 percent bycatch mortality of adults was not sustainable. Brown and Murphy (2010) similarly concluded that the loss of 2.5 percent of females per year from vessel strikes would hamper recovery of the Delaware River Atlantic sturgeon population. Variations in mortality, fecundity, and generation time can result in variations in abundance over time, which affects extinction risk. No data exists that can be used to determine productivity for the Delaware River since the time the New York Bight DPS was listed. While DO conditions in the river have improved over past decades, significant vessel traffic, industrial activity, and contaminated bottom substrate in these reaches exposes sturgeon to multiple threats, as discussed in the Environmental Baseline.

Here, we consider how one mortality will affect productivity when added to other anthropogenic mortalities of females from the two river populations. Bycatch in federal fisheries account for one of the largest known numbers of anthropogenic mortalities. Bycatch and mortality also

occur in state fisheries; however, the primary fishery that impacted juvenile sturgeon (the shad fishery) has now been closed in the Hudson River and there is no indication that it will reopen. New York Bight DPS Atlantic sturgeon are killed as a result of other anthropogenic activities in the Hudson, Delaware, and other rivers within the DPS as well, including vessel strikes, entrainment in dredges, and entrainment in cooling water intakes at power stations. We do not have an estimate of the total number of anthropogenic mortalities per year; we do not expect that the additional mortality of adult females from this proposed action will change the status of either river population or the DPS as a whole. This is because they contribute a very small number of mortalities relative to the total populations and these mortalities will occur over time. As previously discussed, individual females do not spawn every year, thus allowing time for new spawning events to occur after mortalities occur over time. Based on the above considerations, we do not expect the proposed project to affect productivity of either the Delaware River or Hudson River populations or the DPS as a whole. In conclusion, even considering the potential future female spawners that would be produced by an individual that would be killed as a result of the proposed action, any effects to future year classes of both riverine populations and the New York Bight as a whole is anticipated to be small and would not change the status of this species.

The proposed action is not likely to reduce distribution because the action will not impede New York Bight DPS Atlantic sturgeon from accessing any seasonal concentration areas, including foraging, spawning or overwintering grounds in the Delaware River or elsewhere. Any effects to distribution will be minor and temporary and limited to the temporary avoidance of areas near in-water construction activities.

Last, we have considered if changing environmental conditions will affect our above conclusions with regard to the effects to survival and recovery of the New York Bight DPS. As described above, over the long term, global environmental changes may affect New York Bight DPS Atlantic sturgeon by affecting the location of the salt wedge, distribution of prey, water temperature and water quality. Any activities occurring within and outside the action area that contribute to changes in environmental conditions are also expected to affect New York Bight DPS Atlantic sturgeon in the action area. However, there is significant uncertainty, due to a lack of specific scientific data, on the degree to which these effects may be experienced and the degree to which New York Bight DPS Atlantic sturgeon will be able to successfully adapt to any such changes. While we can make some predictions on the likely effects of environmental changes on these species and critical habitat, without modeling and additional scientific data, these predictions remain speculative, and we have concluded that changes in environmental conditions will not change our determinations.

Numerous sources of human induced mortality and habitat disturbance affect New York Bight DPS origin Atlantic sturgeon throughout the riverine and marine portions of their range. However, since the proposed action is unlikely to affect the viability of the Delaware River or Hudson River populations, we do not expect the estimated loss of one adult or subadult to diminish the DPS' numbers, reproduction, or distribution so that the likelihood of survival is appreciably reduced.

Based on the above, we have determined that the action will not affect New York Bight DPS Atlantic sturgeon in a way that will change the status of the DPS or prevent the species from achieving a sufficient population represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring. It also will not result in effects to the environment which would prevent Atlantic sturgeon from completing their entire life cycle, including reproduction, sustenance, and shelter. This is the case because: (1) the death of one New York Bight DPS Atlantic sturgeon as a result of this action over the life of the project will not reduce the current status of the Delaware River and Hudson River populations; (2) the death of one New York Bight DPS Atlantic sturgeon will not change the status or trends of the species as a whole; (3) the loss of one New York Bight DPS Atlantic sturgeon is not likely to have effects on the levels of genetic heterogeneity in the species; (4) the loss of one New York Bight DPS Atlantic sturgeon is likely to have such small effects on reproductive output that the loss of one individual will not change the status or trends of the species; (5) the action will have only a minor and temporary effect on the distribution of New York Bight DPS Atlantic sturgeon in the action area and no effect on the distribution of the species throughout its range; and (6) the action will have no effect on the ability of New York Bight DPS Atlantic sturgeon to shelter with only an insignificant effect on individual foraging New York Bight DPS Atlantic sturgeon when considering that the footprint of the dredging site is small relative to available forage within the action area and the mid-to-upper estuary.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might affect its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed action will not appreciably reduce the likelihood that the New York Bight DPS will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. Thus, we have considered whether the proposed action will affect the likelihood that the New York Bight DPS can rebuild to a point where listing is no longer appropriate. No Recovery Plan for the New York Bight DPS has been published, at this time. As defined, the Recovery Plan will outline the steps necessary for recovery and the demographic criteria, which once attained, will allow the species to be delisted. In January 2018, we published a Recovery Outline for the five DPSs of Atlantic sturgeon (NMFS 2018). This outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, until a full recovery plan is developed and approved. The outline provides a preliminary strategy for recovery of the species. We know that in general, to recover, a listed species must have a sustained positive trend of increasing population over time. To allow that to happen for sturgeon, individuals must have access to enough habitat in suitable condition for foraging, resting, migration and spawning. Conditions must be suitable for the successful development of early life stages. Mortality rates must be low enough to allow for recruitment to all age classes so that successful spawning can continue over time and over generations. There must be enough suitable habitat for spawning, foraging, resting, and migrations of all individuals. For New York Bight DPS Atlantic sturgeon, habitat conditions must be suitable both in the natal river and in other rivers and estuaries where foraging by subadults and adults will occur and, in the ocean, where subadults and adults migrate, overwinter and forage. Habitat connectivity must also be maintained so that individuals can migrate between important habitats without delays that impact their fitness. As described in the vision statement in the Recovery Outline, subpopulations of all five Atlantic sturgeon DPSs

must be present across the historical range. These subpopulations must be of sufficient size and genetic diversity to support successful reproduction and recovery from mortality events. The recruitment of juveniles to the sub-adult and adult life stages must also increase and that increased recruitment must be maintained over many years. Recovery of these DPSs will require conservation of the riverine and marine habitats used for spawning, development, foraging, and growth by abating threats to ensure a high probability of survival into the future. Here, we consider whether this proposed action will reduce the New York Bight DPS likelihood of recovery.

We do not expect the proposed action to modify, curtail or destroy the range of the species, or to change the status or trend of the New York Bight DPS, since it will result in an extremely small reduction in the number and overall distribution. Any effect to habitat will be insignificant and will not affect the ability of Atlantic sturgeon to carry out any necessary behaviors or functions. Any impacts to available forage will also not limit forage to the species as ample forage exists to support the Atlantic sturgeon using the Chesapeake Bay estuary. The proposed action will result in a small amount of mortality (no more than one individual over the life of the project) and a subsequent small reduction in future reproductive output. For these reasons, the action is not expected to affect the persistence of the New York Bight DPS of Atlantic sturgeon. Additionally, the action will not change the status or population trend of the New York Bight DPS of Atlantic sturgeon. The very small reduction in numbers and future reproduction resulting from the proposed action will not reduce the likelihood of improvement in the status of the New York Bight DPS of Atlantic sturgeon. The effects of the proposed action will not delay the recovery timeline or otherwise decrease the likelihood of recovery. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it is recovered and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood that the New York Bight DPS of Atlantic sturgeon can be brought to the point at which they are no longer listed as endangered or threatened. Based on the analysis presented herein, the proposed action is not likely to appreciably reduce the survival and recovery of this species.

Despite the threats faced by individual New York Bight DPS Atlantic sturgeon inside and outside of the action area, the proposed action will not increase the vulnerability of individual sturgeon to these additional threats and exposure to ongoing threats will not increase susceptibility to effects related to the proposed action. We have considered the effects of the proposed action in light of cumulative effects explained above, including environmental changes and have concluded that even in light of the ongoing impacts of these activities and conditions; the conclusions reached above do not change. Based on the analysis presented herein, the proposed action, resulting in the mortality of one New York Bight DPS Atlantic sturgeon over a the life of the project, is not likely to appreciably reduce the survival and recovery of this species.

8.1.2.4 Carolina DPS

The Carolina DPS is listed as endangered. Atlantic sturgeon from the Carolina DPS spawn in the rivers of North Carolina south to the Cooper River, South Carolina. There are currently seven spawning subpopulations within the Carolina DPS: Roanoke River, Tar-Pamlico River,

Neuse River, Northeast Cape Fear and Cape Fear Rivers, Waccamaw and Great Pee Dee Rivers, Black River, Santee and Cooper Rivers. We estimated adult and subadult abundance of the Carolina DPS based on available information for the genetic composition and the estimated abundance of Atlantic sturgeon in marine waters and concluded that subadult and adult abundance of the Carolina DPS was 1,356 sturgeon (339 adults and 1,017 subadults) (NMFS 2013). This number encompasses many age classes since, across all DPSs, subadults can be as young as two years old when they first enter the marine environment, and adults can live as long as 64 years (Balazik *et al*. 2012; Hilton *et al*. 2016).

Very few data sets are available that cover the full potential life span of an Atlantic sturgeon. The ASMFC concluded for the Stock Assessment that it could not estimate abundance of the Carolina DPS or otherwise quantify the trend in abundance because of the limited available information. However, the Stock Assessment was a comprehensive review of the available information and used multiple methods and analyses to assess the status of the Carolina DPS and the coast wide stock of Atlantic sturgeon. For example, the Stock Assessment Subcommittee defined a benchmark, the mortality threshold, against which mortality for the coast wide stock of Atlantic sturgeon as well as for each DPS were compared[27] to assess whether the current mortality experienced by the coast wide stock and each DPS is greater than what it can sustain. This information informs the current trend of the Carolina DPS.

In the Stock Assessment, the ASMFC concluded that abundance of the Carolina DPS is "depleted" relative to historical levels and there is a relatively low probability (36 percent) that abundance of the Carolina DPS has increased since the implementation of the 1998 fishing moratorium. The ASMFC also concluded that there is a relatively low likelihood (25 percent probability) that mortality for the Carolina DPS does not exceed the mortality threshold used for the Stock Assessment (ASMFC 2017).

Here, we consider the effects of the loss of one Atlantic sturgeon from the Carolina DPS. The reproductive potential of the Carolina DPS will not be affected in any way other than through a reduction in numbers of individuals. The loss of one individual will have the effect of reducing reproduction potential within the DPS because any dead Carolina DPS Atlantic sturgeon has no potential for future reproduction. However, this small reduction in potential future spawners is expected to result in an extremely small reduction in the number of eggs laid or larvae produced in future years and similarly, an extremely small effect on the strength of subsequent year classes. Even considering the potential future spawners that would be produced by the individual that will be killed because of the proposed action, any effect to future year classes is anticipated to be extremely small and would not change the status of this species. The proposed action will also not affect the spawning grounds within the rivers where Carolina DPS fish spawn, because it will occur outside of those identified areas. Additionally, the action will not

[27] The analysis considered both a coast wide mortality threshold and a region-specific mortality threshold to evaluate the sensitivity of the model to differences in life history parameters among the different DPSs (e.g., Atlantic sturgeon in the northern region are slower growing, longer lived; Atlantic sturgeon in the southern region are faster growing, shorter lived).

create any barrier to pre-spawning sturgeon accessing the overwintering sites or the spawning grounds used by Carolina DPS fish for the same reasons.

Because we do not have a population estimate for the Carolina DPS, it is difficult to evaluate the effects of mortality on this species caused by this action. However, because the proposed action will result in the loss of one individual, it is unlikely that this death will have detectable effects on the numbers and population trend of the Carolina DPS.

The proposed action is not likely to reduce distribution because the action will not impede Atlantic sturgeon from accessing any seasonal concentration areas, including foraging areas within the action area that may be used by Carolina DPS subadults or adults. Further, the action is not expected to reduce the river-by-river distribution of Atlantic sturgeon. Any effects to distribution will be minor and temporary, and limited to the avoidance of the area where the impacts occur.

Based on the information provided above, the death of one Carolina DPS Atlantic sturgeon will not appreciably reduce the likelihood of survival of the Carolina DPS (i.e., it will not decrease the likelihood that the species will continue to persist into the future with sufficient resilience to allow for the potential recovery from endangerment). The action will not affect Carolina DPS Atlantic sturgeon in a way that prevents the species from maintaining a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring. Additionally, it will not result in effects to the environment that prevent Atlantic sturgeon from completing their entire life cycle, including reproducing, sustenance, and shelter. This is the case because: (1) the death of one Carolina DPS Atlantic sturgeon as a result of this action in any year will not change the status or trends of the species as a whole; (2) the loss of one Carolina DPS Atlantic sturgeon as a result of this action is not likely to have effects on the levels of genetic heterogeneity in the population; (3) the action will have only a minor and temporary effects on the distribution of Carolina DPS Atlantic sturgeon in the action area and no effect on the distribution of the species throughout its range; and (4) the action will have no effect on the ability of Carolina DPS Atlantic sturgeon to shelter with only an insignificant effect on any foraging Carolina DPS Atlantic sturgeon.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might affect its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed action will not appreciably reduce the likelihood that the Carolina DPS will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. Thus, we have considered whether the proposed action will affect the likelihood that the Carolina DPS can rebuild to a point where listing is no longer appropriate. No Recovery Plan for the Carolina DPS has been published at this time. As defined, a Recovery Plan will outline the steps necessary for recovery and the demographic criteria, which once attained would allow delisting of the species. We know that in general, to recover, a species must have a sustained positive increasing population trend over time and an increase in population size. To allow those things to happen, a species

must have enough habitat in suitable condition that allows all normal life functions to occur (i.e., spawning, foraging, resting) and must have access to enough food. Next, we consider whether the proposed action will affect the population size and/or trend in a way that would affect the likelihood of recovery.

We do not expect the proposed action to modify, curtail, or destroy the range of the species since it will result in an extremely small reduction in the number and overall distribution of Carolina DPS Atlantic sturgeon. Any effects to habitat will be insignificant and will not affect the ability of Atlantic sturgeon to carry out any necessary behaviors or functions. Any impacts to available forage will also be insignificant. The proposed action will result in an extremely small amount of mortality over the lifespan of the project (one individual) and a subsequent small reduction in future reproductive output. For these reasons, we do not expect the action to affect the persistence of the Carolina DPS of Atlantic sturgeon. The action will not change the status or trend of the Carolina DPS of Atlantic sturgeon, nor will a very small reduction in numbers and future reproduction resulting from the proposed action reduce the likelihood of improvement in the status. The effects of the proposed action will not delay the recovery timeline or otherwise decrease the likelihood of recovery. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it recovers and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood of bringing the Carolina DPS of Atlantic sturgeon to the point at which listing as threatened is no longer necessary. Based on the analysis presented herein, the proposed action is not likely to reduce appreciably the survival and recovery of this species.

Despite the threats faced by individual Carolina DPS Atlantic sturgeon inside and outside of the action area, the proposed action will not increase the vulnerability of individual sturgeon to these additional threats and exposure to ongoing threats will not increase susceptibility to effects related to the proposed action. We have considered the effects of the proposed action in light of cumulative effects explained above and have concluded that, even in light of the ongoing impacts of these activities and conditions, the conclusions reached above do not change. Based on the analysis presented herein, the proposed action, resulting in the mortality one Carolina DPS Atlantic sturgeon, is not likely to reduce appreciably the survival and recovery of the species.

8.1.2.5 South Atlantic DPS

The South Atlantic DPS is listed as endangered and Atlantic sturgeon originate from at least six rivers where spawning potentially still occurs. Secor *et al*. (2002) estimates that 8,000 adult females were present in South Carolina prior to 1890. In Georgia, prior to the collapse of the fishery in the late 1800s, the sturgeon fishery was the third largest fishery. Secor *et al*. (2002) estimated from U.S. Fish Commission landing reports that approximately 11,000 spawning females were likely present in Georgia prior to 1890. At the time of listing, only six spawning subpopulations existed in the South Atlantic DPS: Combahee River, Edisto River, Savannah River, Ogeechee River, Altamaha River (including the Oconee and Ocmulgee tributaries), and the Satilla River. Three of the spawning subpopulations in the South Atlantic DPS are relatively robust and are considered the second (Altamaha River) and third (Combahee/Edisto River) largest spawning subpopulations across all five DPSs. Peterson *et al*. (2008) estimated the

number of spawning adults in the Altamaha River was 324 (95% CI: 143-667) in 2004 and 386 (95% CI: 216-787) in 2005. Bahr and Peterson (2016) estimated the age-1 juvenile abundance in the Savannah River from 2013-2015 at 528 in 2013, 589 in 2014, and 597 in 2015. No census of the number of Atlantic sturgeon in any of the other spawning rivers or for the DPS as a whole is available. However, the most up to date NEAMAP data indicates that the estimated ocean population of South Atlantic DPS Atlantic sturgeon sub-adults and adults is, at a minimum, 6,154 individuals.

The 2024 ASMFC stock assessment determined that abundance of the South Atlantic DPS is "depleted" relative to historical levels (ASMFC, 2024). While noting significant uncertainty in trend data, the stock assessment update also determined that there is a relatively low probability (31 percent) that abundance of the South Atlantic DPS has increased since the implementation of the 1998 fishing moratorium. However, it was estimated that there is a 26.5 percent probability that mortality for the South Atlantic DPS exceeds the mortality threshold used for the assessment (ASMFC, 2024). We note that the Commission expressed significant uncertainty in relation to the trends data.

The effects of the action are in addition to ongoing threats in the action area, which include incidental capture in state and federal fisheries, boat strikes, coastal development, habitat loss, contaminants and changing environmental conditions. As noted in the *Cumulative Effects* section of this Opinion, we have not identified any cumulative effects different from those considered in the *Status of the Species* and *Environmental Baseline* sections of this Opinion.

We anticipate the mortality of one South Atlantic DPS adult or sub-adult Atlantic sturgeon as a result of the proposed project. Take of South Atlantic DPS Atlantic sturgeon is only anticipated during the 34 blasting events expected to complete the demolition of the existing bridges. Thus, here, we consider the effects of the loss of one South Atlantic DPS Atlantic sturgeon. The reproductive potential of the South Atlantic DPS will not be affected in any way other than through a reduction in numbers of individuals. The loss of one individual sturgeon would have the effect of reducing the amount of reproduction potential, as dead South Atlantic DPS Atlantic sturgeon have no potential for future reproduction. However, this small reduction in potential future spawners expects to result in an extremely small reduction in the number of eggs laid or larvae produced in future years and similarly, an extremely small effect on the strength of subsequent year classes. Even considering the potential future spawners produced by any individuals killed as a result of the proposed action, any effect to future year classes is anticipated to be extremely small and will not change the status of this species. The proposed action will also not affect the spawning grounds within the rivers where South Atlantic DPS fish spawn because they are outside of the action area. The action will also not create any barrier to pre-spawning sturgeon accessing the overwintering sites or the spawning grounds used by South Atlantic DPS fish for the same reasons.

Because we do not have a population estimate for the South Atlantic DPS, it is difficult to evaluate the effects of the mortality caused by this action on the species. However, because the

proposed action will result in the loss of one individual, it is unlikely that this death will have a detectable effect on the numbers and population trend of the South Atlantic DPS.

The proposed action is not likely to reduce distribution because it will not impede Atlantic sturgeon from accessing any seasonal concentration areas, including foraging areas within the action area used by South Atlantic DPS subadults or adults. Further, the action is not expected to reduce the river-by-river distribution of Atlantic sturgeon. Any effects to distribution will be minor and temporary and limited to the avoidance of the action area where impacts occur.

Based on the information provided above, the death of one South Atlantic DPS Atlantic sturgeon will not appreciably reduce the likelihood of survival of the South Atlantic DPS (i.e., it will not decrease the likelihood that the species will continue to persist into the future with sufficient resilience to allow for the potential recovery from endangerment). The action will not affect South Atlantic DPS Atlantic sturgeon in a way that prevents the species from maintaining a sufficient population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, and it will not result in effects to the environment which would prevent South Atlantic DPS Atlantic sturgeon from completing their entire life cycle, including reproduction, sustenance, and shelter. This is the case because: (1) the death of one South Atlantic DPS Atlantic sturgeon will not change the status or trends of the species as a whole; (2) the loss of one South Atlantic DPS Atlantic sturgeon is not likely to have effects on the levels of genetic heterogeneity in the population; (3) the loss of one South Atlantic DPS Atlantic sturgeon is likely to have such a small effect on reproductive output that the loss of these individuals will not change the status or trends of the species; (4) the action will have only a minor and temporary effect on the distribution of South Atlantic DPS Atlantic sturgeon in the action area and no effect on the distribution of the species throughout its range; and (5) the action will have no effect on the ability of South Atlantic DPS Atlantic sturgeon to shelter with only an insignificant effect on any foraging South Atlantic DPS Atlantic sturgeon.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might affect its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed action will not appreciably reduce the likelihood that the South Atlantic DPS of Atlantic sturgeon will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. No Recovery Plan for the South Atlantic DPS has been published at this time. As defined, the Recovery Plan will outline the steps necessary for recovery and the demographic criteria, which once attained, would allow the species to be delisted. In January 2018, we published a Recovery Outline for the five DPSs of Atlantic sturgeon (NMFS 2018). This outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, until a full recovery plan is developed and approved. The outline provides a preliminary strategy for recovery of the species. We know that in general, to recover, a listed species must have a sustained positive trend of increasing population over time. To allow that to happen for sturgeon, individuals must have access to enough habitat in suitable condition for foraging, resting, migration and spawning. Conditions must be suitable for the successful development of

early life stages. Mortality rates must be low enough to allow for recruitment to all age classes so that successful spawning can continue over time and over generations. There must be enough suitable habitat for spawning, foraging, resting, and migrations of all individuals. For South Atlantic DPS Atlantic sturgeon, habitat conditions must be suitable both in the natal river and in other rivers and estuaries where foraging by subadults and adults will occur and, in the ocean, where subadults and adults migrate, overwinter and forage. Habitat connectivity must also be maintained so that individuals can migrate between important habitats without delays that impact their fitness. As described in Recovery Outline's vision statement, subpopulations of all five Atlantic sturgeon DPSs must be present across the historical range. These subpopulations must be of sufficient size and genetic diversity to support successful reproduction and recovery from mortality events. The recruitment of juveniles to the sub-adult and adult life stages must also increase and that increased recruitment must be maintained over many years. Recovery of these DPSs will require conservation of the riverine and marine habitats used for spawning, development, foraging, and growth by abating threats to ensure a high probability of survival into the future. Here, we consider whether this proposed action will reduce the South Atlantic DPS likelihood of recovery.

This action will not change the status or trend of the South Atlantic DPS and will only result in an extremely small reduction in the number of South Atlantic DPS Atlantic sturgeon and will not affect their overall distribution. Any effects to habitat will be insignificant and will not affect the ability of Atlantic sturgeon to carry out any necessary behaviors or functions. Any impacts to available forage will also be insignificant. The proposed action will result in an extremely small amount of mortality (one individual) and a subsequent small reduction in future reproductive output. For these reasons, we do not expect the action to affect the persistence of the South Atlantic DPS of Atlantic sturgeon. This action will not change the status or trend of the South Atlantic DPS of Atlantic sturgeon. The very small reduction in numbers and future reproduction resulting from the proposed action will not reduce the likelihood of improvement in the status of the South Atlantic DPS of Atlantic sturgeon. The effects of the proposed action will not delay the recovery timeline or otherwise decrease the likelihood of recovery. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it is recovered and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood of bringing the South Atlantic DPS of Atlantic sturgeon to the point at which they are no longer listed as threatened or endangered. Based on the analysis presented herein, the proposed action is not likely to appreciably reduce the survival and recovery of this species.

Despite the threats faced by individual South Atlantic DPS Atlantic sturgeon inside and outside of the action area, the proposed action will not increase the vulnerability of individual sturgeon to these additional threats and exposure to ongoing threats will not increase susceptibility to effects related to the proposed action. We have considered the effects of the proposed action in light of cumulative effects explained above, and have concluded that, even in light of the ongoing impacts of these activities and conditions, the conclusions reached above do not change. Based on the analysis presented herein, the proposed action, resulting in the mortality of one

South Atlantic DPS Atlantic sturgeon, is not likely to appreciably reduce the survival and recovery of this species.

8.2 Shortnose sturgeon

Historically, shortnose sturgeon are believed to have inhabited nearly all major rivers and estuaries along nearly the entire east coast of North America. Today, only 19 populations remain. The present range of shortnose sturgeon is disjunct, with northern populations separated from southern populations by a distance of about 400 km (248.5 mi). Population sizes range from under 100 adults in the Cape Fear and Merrimack Rivers to tens of thousands in the St. John and Hudson Rivers. As indicated in Kynard *et al.* (2016), adult abundance is less than the minimum estimated viable population abundance of 1,000 adults for five of 11 surveyed northern populations and all natural southern populations. The only river systems likely supporting populations close to expected abundance are the St John, Hudson and possibly the Delaware and the Kennebec (Kynard *et al.* 2016), making the continued success of shortnose sturgeon in these rivers critical to the species as a whole.

The Delaware River population of shortnose sturgeon is the second largest in the United States. Historical estimates of the size of the population are not available as historic records of sturgeon in the river did not discriminate between Atlantic and shortnose sturgeon. The most recent population estimate for the Delaware River is 12,047 (95% CI= 10,757-13,580) and is based on mark recapture data collected from January 1999 through March 2003 (ERC Inc. 2006). Comparisons between the population estimate by ERC Inc. and the earlier estimate by Hastings *et al.* (1987) of 12,796 (95% CI=10,228-16,367) suggests that the population is stable but not increasing.

In Chesapeake Bay, shortnose sturgeon occur in the Maryland waters of the mainstem bay and tidal tributaries such as the Susquehanna, Potomac, and Rappahannock Rivers (Kynard *et al.* 2016, SSSRT 2010). Spells (1998), Skjeveland *et al.* (2000), and Welsh *et al.* (2002) all reported one capture each of adult shortnose sturgeon in the Rappahannock River. Documented use of Virginia waters within the Chesapeake Bay is currently limited to two individual shortnose sturgeon: one captured in 2016 (Balazik 2017) and a second sturgeon (a confirmed gravid female) caught in 2018 in the James River (Balazik, pers. comm. 2018).

Spawning has not been documented in any tributary to the Chesapeake Bay although suitable spawning habitat and two pre-spawning females with late-stage eggs have been documented in the Potomac River (Kynard *et al.* 2009). Current information indicates that shortnose sturgeon are present year-round in the Chesapeake Bay with foraging and overwintering taking place (Kynard *et al.* 2009). Shortnose sturgeon captured in the Chesapeake Bay are not genetically distinct from the Delaware River population.

Based on the number of adults in population for which estimates are available, there are at least 104,662 adult shortnose sturgeon, including 18,000 in the Saint John River in Canada. The lack of information on the status of some populations, such as that in the Chesapeake Bay, adds uncertainty to any determination on the status of this species as a whole. Based on the best

available information (SSSRT 2010), trends in abundance for shortnose sturgeon in Northeast rivers demonstrate the majority of populations are stable (i.e., Delaware, Hudson, Connecticut, Merrimack). The Kennebec River Complex is the only population in the Northeast that shows an increasing trend in abundance. In the Southeast abundance trends for many riverine populations are unknown due to lack of data (i.e., Chowan, Tar Pamlico, Neuse, New, North, Santee, S-C Reservoir system, Satilla, St. Mary's, and St. John's). The Winyah Bay Complex, Cooper, Savannah, Ogeechee, and Altamaha Rivers show stable trends in abundance. The only riverine population in the Southeast demonstrating increasing trends in abundance is the Ashepoo-Combahee-Edisto (ACE) Basin. Based on the best available information, we consider the status of shortnose sturgeon throughout their range to be stable.

As described in the *Status of the Species*, *Environmental Baseline*, and *Cumulative Effects* sections above, the Shortnose Sturgeon Status Review Team's Biological Assessment of shortnose sturgeon (2010) identify habitat degradation or loss and direct mortality as principal threats to the species' survival. Shortnose sturgeon are also affected by impingement at water intakes, habitat alteration, dredging, bycatch in commercial and recreational fisheries, research activities, water quality, in-water construction activities, and vessel traffic. Shifts in seasonal temperature regimes and changes in the location of the salt wedge in rivers may impact shortnose sturgeon in the future. It is difficult to quantify the total number of shortnose sturgeon killed in the Chesapeake Bay system each year due to anthropogenic sources.

As explained above, the proposed action is likely to result in the incidental take of one adult shortnose sturgeon due to blasting. While it is possible that the fish could survive the blast, we assume here that this fish will be killed.

Here, we consider the effects of the loss of one shortnose sturgeon over the life of the project. The reproductive potential of shortnose sturgeon will not be affected in any way other than through a reduction in numbers of individuals. The loss of one individual would have the effect of reducing the amount of potential reproduction as any dead shortnose sturgeon would have no potential for future reproduction. However, this small reduction in potential future spawners is expected to result in an extremely small reduction in the number of eggs laid or larvae produced in future years and similarly, an extremely small effect on the strength of subsequent year classes. Even considering the potential future spawners produced by the individual that would be killed as a result of the proposed action, any effect to future year classes is anticipated to be extremely small and would not change the status of this species. The proposed action will also not affect the spawning grounds within the rivers where shortnose sturgeon fish spawn. The action will also not create any barrier to pre-spawning sturgeon accessing the overwintering sites or the spawning grounds.

Based on the information provided above, the death of one shortnose sturgeon as a result of the proposed actions will not appreciably reduce the likelihood of survival (i.e., it will not increase the risk of extinction faced by this species) for this species given that: (1) the death of one shortnose sturgeon represents a small percentage of the species as a whole; (2) the loss of one shortnose sturgeon will not change the status or trends of the species as a whole; (3) the loss of

one shortnose sturgeon is likely to have an undetectable effect on reproductive output of the species as a whole; and (4) the action will have no effect on the distribution of shortnose sturgeon in the action area or throughout its range.

The proposed action is not likely to reduce distribution because the actions will not impede shortnose sturgeon from accessing any seasonal concentration areas, including foraging areas within the action area used by adults. Further, the action is not expected to reduce the river-by-river distribution of shortnose sturgeon. Any effects to distribution will be minor and temporary and limited to the temporary avoidance of the area where the project activities and its impacts occur.

In certain instances, an action that does not appreciably reduce the likelihood of a species' survival might affect its likelihood of recovery or the rate at which recovery is expected to occur. As explained above, we have determined that the proposed actions will not appreciably reduce the likelihood that shortnose sturgeon will survive in the wild. Here, we consider the potential for the action to reduce the likelihood of recovery. As noted above, recovery is defined as the improvement in status such that listing is no longer appropriate. section 4(a)(l) of the ESA requires listing of a species if it is in danger of extinction throughout all or a significant portion of its range (i.e., "endangered"), or likely to become in danger of extinction throughout all or a significant portion of its range in the foreseeable future (i.e., "threatened") because of any of the following five ESA listing factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation;(4) the inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors affecting its continued existence.

The proposed action is not expected to modify, curtail, or destroy the range of the species since it will result in only a slight reduction in the number of shortnose sturgeon and since it will not affect the overall distribution of shortnose sturgeon other than to cause minor temporary adjustments in movements within the action area. The proposed action will not utilize shortnose sturgeon for recreational or commercial purposes or affect the adequacy of existing regulatory mechanisms to protect this species. The proposed action is likely to result in one mortality, a slight reduction in future reproductive output; therefore, the proposed action is not expected to affect the persistence of shortnose sturgeon range-wide. There will be no change in the status or trend of shortnose sturgeon. As there will be only a slight reduction in numbers or future reproduction, the action will not cause any reduction in the likelihood of improvement in the status of shortnose sturgeon. The effects of the proposed action will not hasten the extinction timeline or otherwise increase the danger of extinction since the actions will not cause any significant reduction of overall reproductive fitness for the species. The effects of the proposed action will also not reduce the likelihood that the status of the species can improve to the point where it is recovered and could be delisted. Therefore, the proposed action will not appreciably reduce the likelihood of bringing shortnose sturgeon to the point at which they are no longer listed as endangered. Based on the analysis presented

herein, the proposed action is not likely to appreciably reduce the survival and recovery of this species.

9 CONCLUSION

After reviewing the current status of the species, the environmental baseline and the cumulative effects in the action area, and the effects of the Bay Crossing project, it is our biological opinion that the proposed action may adversely affect, but is not likely to jeopardize the continued existence of the New York Bight, Chesapeake Bay, Gulf of Maine, Carolina, and South Atlantic DPS of Atlantic sturgeon or shortnose sturgeon. It is also our biological opinion that the proposed action is not likely to adversely affect leatherback, Kemp's ridley, the Northwest Atlantic DPS of loggerhead, and the North Atlantic DPS green sea turtles.

10 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species of fish and wildlife. "Fish and wildlife" is defined in the ESA "as any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, non-migratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof" (16 U.S.C. § 1532(8)). "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. "Otherwise lawful activities" are those actions that meet all State and Federal legal requirements except for the prohibition against taking in ESA section 9 (51 FR 19936, June 3, 1986), which would include any state endangered species laws or regulations. Section 9(g) makes it unlawful for any person "to attempt to commit, solicit another to commit, or cause to be committed, any offense defined [in the ESA]." (16 U.S.C. 1538(g)). A "person" is defined in part as any entity subject to the jurisdiction of the U.S., including an individual, corporation, officer, employee, department, or instrument of the Federal government (see 16 U.S.C. § 1532(13)). Under the terms of ESA section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not the purpose of carrying out an otherwise lawful activity is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this ITS. In issuing ITSs, NMFS takes no position on whether an action is an "otherwise lawful activity."

The measures described below are non-discretionary, and must be undertaken by the FHWA so that they become binding conditions for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this ITS. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require any contractors and personnel to adhere to the terms and conditions of the ITS through enforceable terms that are added to contracts or other documents as appropriate, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA must report on the progress of the action and its impact on ESA-listed species to NMFS GARFO PRD as specified

in the ITS [50 CFR §402.14(i)(3)] (See U.S. FWS and NMFS's Joint Endangered Species Act Section 7 Consultation Handbook (1998) at 4-49).

10.1 Anticipated Amount or Extent of Incidental Take

The proposed action has the potential to result in the mortality or injury of one shortnose sturgeon and one Atlantic sturgeon due to blasting. The Atlantic sturgeon could originate from any of the five DPSs. This level of take is expected to occur during the demolition phase of the project (e.g., years 6 to 7 of construction (EB) and years 14 to 15 of construction (WB)), and is not likely to jeopardize the continued existence of shortnose sturgeon or any DPS of Atlantic sturgeon.

This ITS exempts the following incidental take during the blasting phase of the project:

Table 22. Summary of incidental take

Species	Lethal Take
New York Bight, Chesapeake Bay, Gulf of Maine, Carolina, or South Atlantic DPS Atlantic sturgeon	1 subadult or adult from any of the 5 DPSs (blasting)
Atlantic Sturgeon Total	1
Shortnose sturgeon	1 adult (blasting)
Shortnose Sturgeon Total	1

In the event that the identified number of shortnose sturgeon or Atlantic sturgeon takes provided in this Incidental Take Statement is exceeded, reinitiation of this consultation is required.

10.2 Reasonable and Prudent Measures, Terms and Conditions, and Justifications

NMFS has determined that the following Reasonable and Prudent Measures (RPMs) and associated Terms and Conditions (T&Cs) are necessary and appropriate to minimize and monitor impacts of the incidental take on shortnose sturgeon and Atlantic sturgeon resulting from the proposed action. In order to be exempt from prohibitions of section 9 of the ESA and regulations issued pursuant to section 4(d), FHWA and MDTA must comply with the following T&Cs, which implement the RPMs and outline required reporting/monitoring requirements. These T&Cs are non-discretionary; that is, any incidental take that is in compliance with the T&Cs specified in this ITS shall not be considered a prohibited take of the species concerned (ESA section 7(o)(2)). FHWA and MDTA should ensure that the project proponent and their contractors comply with these RPMs and T&Cs.

The RPMs, with their implementing TCs, minimize and monitor the impact of the incidental take resulting from the proposed actions. The third column below explains why each of these RPMs and T&Cs are necessary and appropriate to minimize or monitor the level of incidental take

associated with the proposed action and how they represent only a minor change to the proposed action.

In order to effectively monitor the effects of the proposed actions, it is necessary to monitor the impacts of the actions to document the amount of incidental take (i.e., the number of shortnose sturgeon and Atlantic sturgeon captured, stunned, injured, or killed) and to assess any sturgeon captured during monitoring. Monitoring provides information on the characteristics of sturgeon encountered and may provide data which will help develop more effective measures to avoid future interactions with ESA-listed species. We do not anticipate any additional injury or mortality by handling, assessing, and ultimately releasing sturgeon as required in the RPMs listed below.

Reasonable and Prudent Measures (RPMs)	Terms and Conditions (T&Cs)	Justifications for RPMs & T&Cs
RPMs Applicable for All Activities		
1. All sturgeon captures, injuries, or mortalities in the immediate activity area must be reported to NMFS within 24 hours.	1. In the event of any injury of sturgeon (lethal or non-lethal), FHWA and MDTA must follow the Sturgeon Take Standard Operating Procedures (SOPs) that can be downloaded from our website at: https://www.fisheries.noaa.gov/s3/2026-05/sturgeon_take_sops_external_08142024.pdf FHWA or MDTA must submit a completed Take Report Form for ESA-Listed Species within 24 hours of any take. The form can be downloaded from our website: https://www.fisheries.noaa.gov/s3/2026-04/take-report-form-04272026_0.pdf. The completed Take Report Forms, together with any supporting photos or videos must be submitted to nmfs.gar.incidental-take@noaa.gov with "Take Report Form" in the subject line. 2. In the event of any lethal takes of sturgeon, any dead specimens or body parts must be photographed, measured, and preserved (refrigerate, not frozen) until disposal procedures are discussed with us.	These RPMs and T&Cs are necessary and appropriate to ensure the documentation of any interactions with sturgeon, as well as requiring that these interactions are reported to us in a timely manner with all of the necessary information. In some cases, when the cause of death is uncertain, a necropsy may be necessary to aid in the determination of whether or not a mortality should count toward the ITS. This is essential for monitoring the level of incidental take associated with the proposed action. These
2. Any dead sturgeon must be held until	3. In the event you collect or capture a dead sturgeon (e.g., dead sturgeon collected during	

Reasonable and Prudent Measures (RPMs)	Terms and Conditions (T&Cs)	Justifications for RPMs & T&Cs
proper disposal procedures can be discussed with us. The fish should be held in cold storage.	blasting operations) and you request concurrence that this take should not be attributed to the Incidental Take Statement, but we do not concur, or if it cannot be determined whether a proposed activity was the cause of death, then the dead sturgeon must be transferred to an appropriately permitted research facility identified by us so that a necropsy can be undertaken to attempt to determine the cause of death. 4. NMFS will have the mortality assigned to the Incidental Take Statement if the necropsy determines that the death was due to injuries sustained from exposure to blasting. NMFS shall have the final say in determining if the take should count towards the Incidental Take Statement.	RPMs and T&Cs represent only a minor change as compliance will not delay the project or decrease the efficiency of blasting operations.
3. All sturgeon over 75 cm total length that are captured must have a fin clip taken for genetic analysis. This sample must be transferred to a NMFS-approved laboratory capable of performing the genetic analysis.	5. FHWA and MDTA must ensure that fin clips from any Atlantic sturgeon captured or collected are taken according to the procedure outlined in the "Procedure for Obtaining Sturgeon Fin Clips" found on our website. The fin clips shall be sent to a NMFS approved laboratory capable of performing genetic analysis. Fin clips must be taken prior to preservation of other fish parts or whole bodies.	These RPMs and T&Cs are necessary and appropriate to ensure the proper handling and documentation of any interactions with sturgeon, as well as requiring that these interactions are reported to us in a timely manner with all of the necessary information. This is essential for monitoring the level of incidental take associated with the proposed action.

Reasonable and Prudent Measures (RPMs)	Terms and Conditions (T&Cs)	Justifications for RPMs & T&Cs
		Genetic analysis must be conducted on sturgeon samples to determine the appropriate DPS of origin, when applicable, and accurately record take of sturgeon. These RPMs and T&Cs represent only a minor change as compliance will not result in delay of the project or decrease in the efficiency of the blasting operations.
RPMs Related to Blasting		
4. Acoustic measurement of the first three detonations must be conducted to confirm your estimated underwater pressure levels. If pressure levels exceed those estimates, you must contact us within 24 hours of the recorded measurement.	6. Acoustic measurement of the first three detonations must be conducted to confirm your estimated underwater pressure levels (i.e., noise levels below 206dB (or the psi equivalent) beyond 640 meters from the bridge). Results of this monitoring must be reported to us prior to any subsequent blasting. This acoustic monitoring must be repeated for a representative sample of all blasts (occurring on at least one day per month during the blasting season). If monitoring indicates that underwater noise levels of 206dB are being exceeded outside of the 640-meter Mortality Zone, blasting must stop and you must contact us to discuss whether sturgeon protection measures may be expanded to include a radius that encompasses all areas where noise/pressure levels are expected to exceed 206dB.	These RPMs and T&Cs are necessary and appropriate to minimize the potential for blasting activities to take place when sturgeon are within 640 meters of the detonation site. These conditions are also designed to verify that the sound and pressure levels presented by you, and that we rely on in estimating take, are valid and that a 640 meter exclusion zone is sufficient. This acoustic monitoring plan represents only a minor change, as the

Reasonable and Prudent Measures (RPMs)	Terms and Conditions (T&Cs)	Justifications for RPMs & T&Cs
		plan will be designed by you in cooperation with us and is not anticipated to result in any delays of the project or decreased efficiency of blasting operations. Any increased cost will be very small in comparison to the total costs of the project. Further, the plan will not alter the time of year or location of detonation sites.
5. You must submit a final blasting plan prior to demolition that contains final parameters for blasting, outline the final mitigation measures, details of the deterrent system, the noise and fish monitoring plan and require NMFS approval of the plan before it is executed and ensure that any sturgeon killed during blasting are recorded.	7. At least six months prior to the commencement of blasting for demolition of any bridge pier, FHWA and MDTA shall submit a final blasting plan to NMFS for review. The plan shall include, at a minimum: a. Final blast design parameters, including charge weight per delay, number and sequence of charges per pier, and confirmation that these parameters do not exceed the maximum charge weight (30 lb/delay) and resulting Mortality Zone and Exclusion Zone distances analyzed in this Opinion; b. Final mitigation measures to be implemented, including the acoustic/fish deterrent protocol (sequence, duration, and source level of pre-blast sonar sweeps and fish	These RPMs and T&Cs are necessary and appropriate as they serve to ensure that sturgeon have a minimized risk of injury or mortality from blasting activities. The implementation of the mitigation measures represent only a minor change as the measures were designed by you and previously approved by us. Implementation

Reasonable and Prudent Measures (RPMs)	Terms and Conditions (T&Cs)	Justifications for RPMs & T&Cs
	scare charges), and any additional avoidance measures; c. Final details of the deterrent system, including equipment specifications, deployment method, and confirmation that source levels will not exceed those analyzed in this Opinion (≤204 dB re 1 µPa peak); and d. A combined noise and fish monitoring plan describing hydroacoustic monitoring methods, the acoustic telemetry protocol for detecting tagged sturgeon within the Exclusion Zone, observer qualifications and deployment, and the post-blast fish search and recovery protocol (search area, duration, and personnel). 8. FHWA and MDTA shall not commence blasting until NMFS has reviewed and approved the final blasting plan in writing. If NMFS identifies deficiencies, FHWA and MDTA shall revise and resubmit the plan for approval prior to any blasting activity. NMFS will provide comments or approval within [30 days] of receipt of a complete submission. 9. If the final blasting plan proposes any parameters, mitigation measures, or monitoring protocols that are less protective than those analyzed in this Opinion (e.g., larger charge weights, shorter time-of-year restrictions, reduced monitoring effort), FHWA and MDTA shall request reinitiation of consultation prior to plan approval. 10. FHWA and MDTA shall record and report to NMFS, within 24 hours, any sturgeon (Atlantic or shortnose) found injured or killed as a result of blasting, estimated size/life stage, location, and date/time relative to the blast event, consistent with the reporting procedures in the Incidental Take Statement.	of the mitigation measures will not result in any significant delays to blasting and is not anticipated to result in any increased cost, delays of the project, or decreased efficiency of blasting operations.

11 CONSERVATION RECOMMENDATIONS

In addition to section 7(a)(2), which requires agencies to ensure that proposed projects will not jeopardize the continued existence of listed species, section 7(a)(1) of the ESA places a responsibility on all federal agencies to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species." Conservation Recommendations are discretionary activities designed to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The BA includes a list of Avoidance and Minimization Measures that are incorporated by reference as Conservation Recommendations. The following additional measures are recommended regarding incidental take and conservation of Atlantic and shortnose sturgeon:

1. The FHWA and MDTA should continue acoustic telemetry monitoring of shortnose and Atlantic sturgeon in the action area to improve data collection on the presence of sturgeon in the Chesapeake Bay.

2. The FHWA and MDTA should continue to support studies of potential Atlantic and shortnose sturgeon spawning and overwintering locations in the Chesapeake Bay.

3. The FHWA and MDTA should support ongoing and/or future research to determine the abundance and distribution of Atlantic sturgeon and shortnose sturgeon in Maryland waters.

4. The FHWA and MDTA should support studies to assist in gathering the necessary information to develop a population estimate for the Atlantic sturgeon Chesapeake Bay DPS.

5. The FHWA and MDTA should measure and report in-situ blasting noise measurements to NMFS.

6. The FHWA and MDTA should fund or support a Chesapeake Bay sea turtle telemetry/home-range study.

7. The FHWA and MDTA should support derelict gear/marine debris removal in the action area, consistent with recognized sea turtle threats (entanglement, ingestion).

12 REINITIATION OF CONSULTATION

This concludes formal consultation on the Bridge project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes a consequence to listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

In the event that the amount or extent of incidental take exempted in this Opinion is exceeded, the FHWA must immediately request reinitiation of formal consultation.

13 REFERENCES

ASMFC. (1998a). *Amendment 1 to the interstate fishery management plan for Atlantic sturgeon* (Fishery Management Report No. 31, Issue. http://www.asmfc.org/species/atlantic-sturgeon

ASMFC. (1998b). *Atlantic sturgeon stock assessment peer review report*.

ASMFC. (2007). *Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic* [Report](Special Report to the ASMFC Atlantic Sturgeon Management Board, Issue. http://www.asmfc.org/species/atlantic-sturgeon

ASMFC. (2017). *Atlantic sturgeon benchmark stock assessment and peer review report* [Report]. https://www.asmfc.org/species/atlantic-sturgeon#stock

ASMFC. (2024). *2024 Atlantic sturgeon stock assessment update*.

ASPRT, (Atlantic Sturgeon Plan Review Team). (2019). *Review of the Atlantic States Marine Fisheries Commission fishery management plan for Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 2017 fishing year* [Report]. http://www.asmfc.org/species/atlantic-sturgeon#stock

ASSRT. (2007). *Status review of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus)* [Final Report]. https://www.fisheries.noaa.gov/resource/document/status-review-atlantic-sturgeon-acipenser-oxyrinchus-oxyrinchus

Bahr, D. L., & Peterson, D. L. (2016). Recruitment of juvenile Atlantic sturgeon in the Savannah River, Georgia. *Transactions of the American Fisheries Society*, *145*(6), 1171-1178. https://doi.org/10.1080/00028487.2016.1209557

Bain, M. B. (1997). Atlantic and shortnose sturgeons of the Hudson River: Common and divergent life history attributes [journal article]. *Environmental Biology of Fishes*, *48*(1), 347-358. https://doi.org/10.1023/a:1007325814893

Bain, M. B., Haley, N., Peterson, D., Waldman, J. R., & Arend, K. (2000). Harvest and habitats of Atlantic sturgeon *Acipenser oxyrinchus* Mitchill, 1815 in the Hudson River estuary: Lessons for sturgeon conservation. *Boletin Instituto Espanol de Oceanografia*, *16*(1-4), 43-53.

Balazik, M. T. (2018). Preliminary results of studies to determine sturgeon vessel strike risk and behavioral response to approaching vessels. In NMFS, Greater Atlantic Regional Fisheries Office (Ed.), (Verbal ed.). Vicksburg, Mississippi: USACE, Engineer Research and Development.

Balazik, M. T., Barber, M. R., & Garman, G. C. (2017). *Vessel related threats to reproductively active Atlantic sturgeon in a large coastal river system Spring-2017 NOAA Grant NA16NMF4720358 - Final Report* [Report].

Balazik, M. T., Farrae, D. J., Darden, T. L., & Garman, G. C. (2017). Genetic differentiation of spring-spawning and fall-spawning male Atlantic sturgeon in the James River, Virginia [eScientific Journal]. *PLoS ONE*, *12*(7), e0179661. https://doi.org/10.1371/journal.pone.0179661

Balazik, M. T., Garman, G. C., Fine, M. L., Hager, C. H., & McIninch, S. P. (2010). Changes in age composition and growth characteristics of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) over 400 years. *Biology Letters*, *6*(5), 708-710. https://doi.org/10.1098/rsbl.2010.0144

Balazik, M. T., Garman, G. C., Van Eenennaam, J. P., Mohler, J., & Woods, L. C. (2012). Empirical evidence of fall spawning by Atlantic sturgeon in the James River, Virginia [Scientific Journal]. *Transactions of the American Fisheries Society*, *141*(6), 1465-1471. https://doi.org/10.1371/journal.pone.0128234

Balazik, M. T., McIninch, S. P., Garman, G. C., & Latour, R. J. (2012). Age and growth of Atlantic sturgeon in the James River, Virginia, 1997–2011. *Transactions of the American Fisheries Society*, *141*(4), 1074-1080. https://doi.org/10.1080/00028487.2012.676590

Balazik, M. T., & Musick, J. A. (2015). Dual annual spawning races in Atlantic sturgeon [Scientific Journal]. *PLoS ONE*, *10*(5), e0128234. https://doi.org/10.1371/journal.pone.0128234

Balazik, M. T., Reine, K. J., Spells, A. J., Fredrickson, C. A., Fine, M. L., Garman, G. C., & McIninch, S. P. (2012). The potential for vessel interactions with adult Atlantic sturgeon in the James River, Virginia. *North American Journal of Fisheries Management*, *32*(6), 1062-1069. https://doi.org/https://doi.org/10.1080/02755947.2012.716016

Bath, D. W., O'Connor, J. M., Alber, J. B., & Arvidson, L. G. (1981). Development and identification of larval Atlantic sturgeon (*Acipenser oxyrinchus*) and shortnose sturgeon (*A. brevirostrum*) from the Hudson River estuary, New York. *Copeia*, *3*, 711-717. http://www.jstor.org (Not in File)

Beardsall, J., Stokesbury, M., Logan-Chesney, L., & Dadswell, M. (2016). Atlantic sturgeon *Acipenser oxyrinchus* Mitchill, 1815 seasonal marine depth and temperature occupancy and movement in the Bay of Fundy. *Journal of Applied Ichthyology*, *32*(5), 809-819.

Boucher, J. M. (2025). Updated population estimates of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) derived from the Northeast Area Monitoring Assessment Program (NEAMAP) Survey. In (Vol. 25-02, pp. 9). Woods Hole, Massachusetts: Northeast Fisheries Science Center.

Breece, M., Higgs, A., & Fox, D. (2021). Spawning intervals, timing, and riverine habitat use of adult Atlantic sturgeon in the Hudson River. *Transactions of the American Fisheries Society*, *150*(4), 528-537.

Breece, M. W., Fox, D. A., Dunton, K. J., Frisk, M. G., Jordaan, A., & Oliver, M. J. (2016). Dynamic seascapes predict the marine occurrence of an endangered species: Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus* [Scientific Journal]. *Methods in Ecology and Evolution*, *7*(6), 725-733. https://doi.org/10.1111/2041-210X.12532

Breece, M. W., Oliver, M. J., Cimino, M. A., & Fox, D. A. (2013). Shifting distributions of adult Atlantic sturgeon amidst post-industrialization and future impacts in the Delaware River: A maximum entropy approach. *PLoS ONE*, *8*(11), e81321. https://doi.org/10.1371/journal.pone.0081321

Brown, J. J., & Murphy, G. W. (2010). Atlantic sturgeon vessel-strike mortalities in the Delaware estuary. *Fisheries*, *35*(2), 72-83. https://doi.org/10.1577/1548-8446-35.2.72

Brumm, H., & Slabbekoorn, H. (2005). Acoustic communication in noise. *Advances in the Study of Behavior*, *35*, 151-209.

Brundage, H. M. (2018). *Monitoring of acoustically-tagged shortnose sturgeon in the vicinity of the Scudder Falls Bridge replacement project* [Report]. I. ACT Engineers.

Burton, W. H. (1993). *Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources* [Report](Prepared for Delaware Basin Fish and Wildlife Management Cooperative, Issue. I. Versar.

Bushnoe, T. M., Musick, J. A., & Ha, D. S. (2005). *Essential Spawning and Nursery Habitat of Atlantic Sturgeon (Acipenser oxyrinchus) in Virginia* [Report](Essential fish habitat of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the southern Chesapeake Bay, Issue.

Calvo, L., Brundage, H. M., Haidvogel, D., Kreeger, D., Thomas, R., O'Herron, J. C., II, & Powell, E. N. (2010). *Effects of flow dynamics, salinity, and water quality on the Atlantic sturgeon, the shortnose sturgeon and the eastern oyster in the oligohaline zone of the Delaware Estuary. Final report project year 2008-2009.* [Final Report](151265). (Prepared for the U.S. Army Corps of Engineers, Philadelphia District, Issue.

Caron, F., Hatin, D., & Fortin, R. (2002). Biological characteristics of adult Atlantic sturgeon (*Acipenser oxyrinchus*) in the St. Lawrence River estuary and the effectiveness of management rules. *Journal of Applied Ichthyology*, *18*(4-6), 580-585. https://doi.org/10.1046/j.1439-0426.2002.00416.x

Chesapeake Bay Foundation. (2022). *State of the bay 2022*.

Clarke, D., Reine, K. J., Dickerson, C., Alcoba, C., Gallo, J., Wisemiller, B., & Zappala, S. (2015). *Sediment resuspension by ship traffic in Newark Bay, New Jersey* [Report](ERDC/EL TR-15-1).

Clarke, S. H., Lawrence, E. R., Matte, J.-M., Gallagher, B. K., Salisbury, S. J., Michaelides, S. N., Koumrouyan, R., Ruzzante, D. E., Grant, J. W. A., & Fraser, D. J. (2024). Global assessment of effective population sizes: consistent taxonomic differences in meeting the 50/500 rule [Preprint]. *Molecular Ecology*, *00*, e17353. https://onlinelibrary.wiley.com/doi/10.1111/mec.17353

Coleman, N., Fox, D., Horne, A., Hostetter, N. J., Madsen, J., O'Brien, M., Park, I., Stence, C., & Secor, D. (2024). Spawning run estimates and phenology for an extremely small population of Atlantic Sturgeon in the Marshyhope Creek–Nanticoke River system, Chesapeake Bay. *Marine and Coastal Fisheries*, *16*(3), e10292. https://doi.org/https://doi.org/10.1002/mcf2.10292

Collins, M. R., Rogers, S. G., Smith, T. I. J., & Moser, M. L. (2000). Primary factors affecting sturgeon populations in the southeastern United States: Fishing mortality and degradation of essential habitats [Journal article; conference]. *Bulletin of Marine Science*, *66*(3), 917-928.

Collins, M. R., Smith, T. I. J., Post, W. C., & Pashuk, O. (2000). Habitat utilization and biological characteristics of adult Atlantic sturgeon in two South Carolina rivers. *Transactions of the American Fisheries Society*, *129*(4), 982-988. https://doi.org/10.1577/1548-8659(2000)129<0982:HUABCO>2.3.CO;2

Crance, J. H. (1987). Habitat suitability index curves for anadromous fishes. Common Strategies of Anadromous and Catadromous Fishes. Symposium 1, Bethesda, Maryland.

Dadswell, M., Wehrell, S., Spares, A., Mclean, M., Beardsall, J., Logan-Chesney, L., Nau, G., Ceapa, C., Redden, A., & Stokesbury, M. (2016). The annual marine feeding aggregation of Atlantic Sturgeon *Acipenser oxyrinchus* in the inner Bay of Fundy: population characteristics and movement. *Journal of Fish Biology*, *89*(4), 2107-2132.

Dadswell, M. J. (2006). A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. *Fisheries*, *31*(5), 218-229. https://doi.org/10.1577/1548-8446(2006)31[218:AROTSO]2.0.CO;2

Dadswell, M. J., Taubert, B. D., Squiers, T. S., Marchette, D., & Buckley, J. (1984). *Synopsis of biological data on shortnose sturgeon, Acipenser brevirostrum LeSueur 1818*

[Report](NOAA Technical Report NMFS, Issue. N. S. P. Office. http://spo.nmfs.noaa.gov/trseries.htm

Demetras, N. J., Helwig, B. A., & Mchuron, A. S. (2020). Reported vessel strike as a source of mortality of White Sturgeon in San Francisco Bay [Scientific Journal]. *California Fish and Wildlife*, *106*(1), 59-65.

Denison, C. D., Cottrell, A., Farmer, T. M., Fox, D. A., Hood, D. M., Post, W. C., Sorg, G., Waldrop, E., & Peoples, B. K. (2023). Seasonal migration cues differ for dual-spawning Atlantic Sturgeon in the Great Pee Dee River. *Transactions of the American Fisheries Society*, *152*(5), 694-708. https://doi.org/10.1002/tafs.10431

Deslauriers, D., & Kieffer, J. D. (2012). The effects of temperature on swimming performance of juvenile shortnose sturgeon (*Acipenser brevirostrum*) [Scientific Journal]. *Journal of Applied Ichthyology*, *28*(2), 176-181. https://doi.org/10.1111/j.1439-0426.2012.01932.x

Deslauriers, D., & Kieffer, J. D. (2012). Swimming performance and behaviour of young-of-the-year shortnose sturgeon (*Acipenser brevirostrum*) under fixed and increased velocity swimming tests [Scientic Journal]. *Canadian Journal of Zoology*, *90*(3), 345-351. https://doi.org/10.1139/z2012-004

DiJohnson, A. M. (2019). *Atlantic sturgeon (Acipencer oxyrinchus oxyrinchus) behavioral response to vessel traffic and habitat use in the Delaware River, USA* [Writen, Delaware State University]. Dover, Delaware.

DiJohnson, A. M., Brown, L. M., Fisher, M. T., & Fox, D. A. (2015, October 20-22, 2015). *Behavioral response of adult Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus) to commercial shipping in the Delaware River* [Abstract]. Annual meeting of North American Sturgeon and Paddlefish Society, Oshkosh, WI. http://www.nasps-sturgeon.org/news/news.aspx

Dovel, W. L., & Berggren, T. J. (1983). Atlantic sturgeon of the Hudson estuary, New York [Scientific Journal]. *New York Fish and Game Journal*, *30*(2), 140-172.

Dunton, K. J., Chapman, D., Jordaan, A., Feldheim, K., O'Leary, S. J., McKown, K. A., & Frisk, M. G. (2012). Genetic mixed-stock analysis of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus* in a heavily exploited marine habitat indicates the need for routine genetic monitoring. *J Fish Biol*, *80*(1), 207-217. https://doi.org/10.1111/j.1095-8649.2011.03151.x

Dunton, K. J., Jordaan, A., Conover, D. O., McKown, K. A., Bonacci, L. A., & Frisk, M. G. (2015). Marine distribution and habitat use of Atlantic sturgeon in New York lead to fisheries interactions and bycatch [Scientific Journal]. *Marine and Coastal Fisheries*, *7*(1), 18-32. https://doi.org/10.1080/19425120.2014.986348

EPA. (2008). *National coastal condition report III* (EPA/842-R-08-002).

Farrae, D. J., Post, W. C., & Darden, T. L. (2017). Genetic characterization of Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*, in the Edisto River, South Carolina and identification of genetically discrete fall and spring spawning. *Conservation Genetics*, 1-11. https://doi.org/10.1007/s10592-017-0929-7

Fernandes, S. J., Zydlewski, G. B., Zydlewski, J. D., Wippelhauser, G. S., & Kinnison, M. T. (2010). Seasonal distribution and movements of shortnose sturgeon and Atlantic sturgeon in the Penobscot River Estuary, Maine [Scientic Journal]. *Transactions of the American Fisheries Society*, *139*, 1436-1449. https://doi.org/10.1577/T09-122.1

FHWA. (2012). *Tappan Zee Hudson River crossing project: final environmental impact statement*.

Fisher, M. (2011). *Atlantic Sturgeon Final Report. Period October 1, 2006 to October 15, 2010* [Report](T-4-1).

Fox, A. G., Peterson, D., Wirgin, I., & Cummins, A. (2019). *Quantifying Annual Recruitment and Nursery Habitats of Atlantic Sturgeon in Georgia* [Grant].

Fox, D. A., Hale, E. A., & Sweka, J. A. (2020). *Examination of Atlantic sturgeon vessel strikes in the Delaware River Estuary. Final Report*.

Frankham, R., Bradshaw, C. J. A., & Brook, B. W. (2014). Genetics in conservation management: Revised recommendations for the 50/500 rules, Red List criteria and population viability analyses. *Biological Conservation*, *170*, 56-63. https://doi.org/https://doi.org/10.1016/j.biocon.2013.12.036

Franklin, I. R. (1980). Evolutionary change in small populations. In *Conservation biology: an evolutionary-ecological perspective* (pp. 135-149). Sinauer Associates, U.S.A.

Gilbert, C. R. (1989). *Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic Bight)--Atlantic and shortnose sturgeons.* (USACE TR EL-82-4). (U.S. Fish and Wildlife Service Biological Report, Issue.

Greene, K. E., Zimmerman, J. L., Laney, R. W., & Thomas-Blate, J. C. (2009). Atlantic coast diadromous fish habitat: A review of utilization, threats, recommendations for conservation, and research needs. In. Washington, D.C.: ASMFC.

Greenlee, R., Balazik M., Bunch A., Fisher M.T., Garman G.C., Hilton E.J., McGrath P., McIninch S., & K.C., W. (2019). *Assessment of critical habitats for recovering the Chesapeake Bay Atlantic sturgeon distinct population segment—Phase II: A collaborative approach in support of management. Virginia Department of Game and Inland Fisheries Final Report* (NA16NMF4720067) [Grant].

Hager, C., Kahn, J., Watterson, C., Russo, J., & Hartman, K. (2014). Evidence of Atlantic Sturgeon spawning in the York river system. *Transactions of the American Fisheries Society*, *143*(5), 1217-1219.

Hale, E. A., Park, I. A., Fisher, M. T., Wong, R. A., Stangl, M. J., & Clark, J. H. (2016). Abundance estimate for and habitat use by early juvenile Atlantic Sturgeon within the Delaware River Estuary. *Transactions of the American Fisheries Society*, *145*(6), 1193-1201. https://doi.org/10.1080/00028487.2016.1214177

Halvorsen, M. B., Casper, B. M., Woodley, C. M., & Popper, A. N. (2011). *Predicting and mitigating hydroacoustic impacts on fish from pile installations* [Report](NCHRP Research Results Digest, Issue. http://nap.edu/14596

Hatin, D., Fortin, R., & Caron, F. (2002). Movements and aggregation areas of adult Atlantic sturgeon (*Acipenser oxyrinchus*) in the St Lawrence River estuary, Québec, Canada. *Journal of Applied Ichthyology*, *18*(4-6), 586-594. https://doi.org/10.1046/j.1439-0426.2002.00395.x

Hatin, D., Munro, J., Caron, F., & Simons, R. D. (2007). Movements, home range size, and habitat use and selection of early juvenile Atlantic Sturgeon in the St. Lawrence Estuarine Transition Zone. In J. Munro, D. Hatin, J. E. Hightower, K. A. McKown, K. J. Sulak, A. W. Kahnle, & F. Caron (Eds.), *Anadromous Sturgeons: Habitats, Threats, and Management* (Vol. 56, pp. 129-155). Bethesda, Maryland: American Fisheries Society.

Hayes, D. F., Chintamaneni, R., Bommareddy, P., & Cherukuri, B. (2010, June 7-9). Propwash impacts on water quality around dredging and other marine construction activities. Western Dredging Association, Forty-first Texas A&M Dredging Seminar, San Juan, Puerto Rico.

Heidt, A. R., & Gilbert, R. J. (1978, August 3-4). The shortnose sturgeon in the Altamaha River drainage, Georgia.*Technical Bulletin - Georgia Department of Natural Resources, Game and Fish Division* Proceedings of the Rare and Endangered Wildlife Symposium, Athens, Georgia.

Hildebrand, S. F., & Schroeder, W. C. (1928). Fishes of Chesapeake Bay. 376.

Hilton, E. J., Kynard, B., Balazik, M. T., Horodysky, A. Z., & Dillman, C. B. (2016). Review of the biology, fisheries, and conservation status of the Atlantic sturgeon, (*Acipenser oxyrinchus oxyrinchus* Mitchill, 1815). *Journal of Applied Ichthyology*, *32*(S1), 30-66. https://doi.org/10.1111/jai.13242

Hoban, S., Bruford, M., D'Urban Jackson, J., Lopes-Fernandes, M., Heuertz, M., Hohenlohe, P. A., Paz-Vinas, I., Sjögren-Gulve, P., Segelbacher, G., Vernesi, C., Aitken, S., Bertola, L. D., Bloomer, P., Breed, M., Rodríguez-Correa, H., Funk, W. C., Grueber, C. E., Hunter, M. E., Jaffe, R.,…Laikre, L. (2020). Genetic diversity targets and indicators in the CBD post-2020 Global Biodiversity Framework must be improved. *Biological Conservation*, *248*, 108654. Retrieved 2020/08/01/, from https://www.sciencedirect.com/science/article/pii/S0006320720307126

Hocking, D. J. (2025). *Discard estimates for Atlantic sturgeon by federal vessels*.

Holland, B. F., Jr., & Yelverton, G. F. (1973). *Distribution and biological studies of anadromous fishes offshore North Carolina* [Report](24). https://www.gpo.gov/

Holton, J. W., & Walsh, J. B. (1995). *Long-term dredged material management plan for the upper James River, Virginia*. United States Army Corps of Engineers Norfolk District.

Hondorp, D. W., Bennion, D. H., Roseman, E. F., Holbrook, C. M., Boase, J. C., Chiotti, J. A., Thomas, M. V., Wills, T. C., Drouin, R. G., Kessel, S. T., & Krueger, C. C. (2017). Use of navigation channels by Lake Sturgeon: Does channelization increase vulnerability of fish to ship strikes? [Scientific Journal]. *PLoS ONE*, *12*(7), e0179791. Retrieved 07/05

02/04/received

06/05/accepted, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5497965/

Hylton, S. N., Weissman, A. M., Wippelhauser, G. S., & Sulikowski, J. A. (2018). Identification of potential wintering habitat for threatened Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus* in Saco Bay, Maine, USA. *Endangered Species Research*, *37*, 249-254.

Ingram, E. C., Cerrato, R. M., Dunton, K. J., & Frisk, M. G. (2019). Endangered Atlantic sturgeon in the New York Wind Energy Area: implications of future development in an offshore wind energy site. *Scientific reports*, *9*(1), 1-13.

Jamieson, I. G., & Allendorf, F. W. (2012). How does the 50/500 rule apply to MVPs? *Trends in Ecology & Evolution*, *27*(10), 578-584. https://doi.org/10.1016/j.tree.2012.07.001

Jenkins, W. E., Smith, T. I. J., Heyward, L. D., & Knott, D. M. (1993). Tolerance of shortnose sturgeon, *Acipenser brevirostrum*, juveniles to different salinity and dissolved oxygen concentrations [Conference Proceedings]. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies*, *47*, 476-484. (Annual Conference of the Southeastern Association of Fish and Wildlife Agencies: Fisheries Session)

Kahn, J. E. (2019). *Adult Atlantic sturgeon population dynamics in the York River, Virginia* West Virginia University].

Kazyak, D. C., Lubinski, B. A., Johnson, R., & Eackles, M. (2020). *Draft stock composition of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus) encountered in marine and estuarine environments on the U.S. Atlantic coast* (Unpublished Report, Issue.

Kazyak, D. C., White, S. L., Lubinski, B. A., Johnson, R., & Eackles, M. (2021). Stock composition of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) encountered in marine and estuarine environments on the U.S. Atlantic Coast. *Conservation Genetics*. https://doi.org/10.1007/s10592-021-01361-2

Killgore, K. J., Miranda, L. E., Murphy, C. E., Wolff, D. M., Hoover, J. J., Keevin, T. M., Maynord, S. T., & Cornish, M. A. (2011). Fish entrainment rates through towboat propellers in the upper Mississippi and Illinois Rivers [Scientific Journal]. *Transactions of the American Fisheries Society*, *140*(3), 570-581. https://doi.org/10.1080/00028487.2011.581977

Kjelland, M. E., Woodley, C. M., Swannack, T. M., & Smith, D. L. (2015). A review of the potential effects of suspended sediment on fishes: potential dredging-related physiological, behavioral, and transgenerational implications. *Environment Systems and Decisions*, *35*(3), 334-350. https://doi.org/10.1007/s10669-015-9557-2

Krebs, J., Jacobs, F., & Popper, A. N. (2012). *Presence of acoustic-tagged Atlantic sturgeon and potential avoidance of pile-driving activities during the pile installation demonstration project (PIDP) for the Tappan Zee Hudson River Crossing Project* [Report].

Krebs, J., Jacobs, F., & Popper, A. N. (2016). Avoidance of pile-driving noise by Hudson River sturgeon during construction of the new NY Bridge at Tappan Zee. In A. N. Popper & A. Hawkins (Eds.), *The Effects of Noise on Aquatic Life II* (pp. 555-563). Springer New York. https://doi.org/10.1007/978-1-4939-2981-8_67

Kynard, B., Bolden, S., Kieffer, M., Collins, M., Brundage, H., Hilton, E. J., Litvak, M., Kinnison, M. T., King, T., & Peterson, D. (2016). Life history and status of shortnose sturgeon (*Acipenser brevirostrum* LeSueur, 1818) [Scientific Jurnal]. *Journal of Applied Ichthyology*, *32*(Suppl. 1), 208-248. https://doi.org/10.1111/jai.13244

Kynard, B., & Horgan, M. (2002). Ontogenetic behavior and migration of Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*, and shortnose sturgeon, *A. brevirostrum*, with notes on social behavior. *Environmental Biology of Fishes*, *63*(2), 137-150. https://doi.org/10.1023/A:1014270129729

Leland, J. G. (1968). *A survey of the sturgeon fishery of South Carolina* (Contributions from Bears Bluff Laboratories, Issue.

Little, C. (2013). *Assessing the habitat use, diet, and sex ratios of Atlantic (Acipenser oxyrinchus) and Shortnose sturgeon (Acipenser brevirostrum) in the Saco River, ME* University of New England].

Lovell, J. M., Findlay, M. M., Moate, R. M., Nedwell, J. R., & Pegg, M. A. (2005). The inner ear morphology and hearing abilities of the Paddlefish (*Polyodon spathula*) and the Lake Sturgeon (*Acipenser fulvescens*). *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology*, *142*(3), 286-296. https://doi.org/https://doi.org/10.1016/j.cbpa.2005.07.018

Maynord, S. T. (2000). *Inflow zone and discharge through propeller jets* [Report](ENV Report, Issue. https://erdc-library.erdc.dren.mil/xmlui/handle/11681/22865

McCord, J. W., Collins, M. R., Post, W. C., & Smith, T. I. J. (2007). Attempts to develop an index of abundance for age-1 Atlantic sturgeon in South Carolina, USA. In J. Munro, D. Hatin, J. E. Hightower, K. A. McKown, K. J. Sulak, A. W. Kahnle, & F. Caron (Eds.),

Anadromous Sturgeons: Habitats, Threats, and Management (Vol. 56, pp. 397-404). Bethesda, Maryland: American Fisheries Society.

Miranda, L. E., & Killgore, K. J. (2013). Entrainment of shovelnose sturgeon by towboat navigation in the Upper Mississippi River [Scientific Journal]. *Journal of Applied Ichthyology*, *29*(2), 316-322. https://doi.org/10.1111/jai.12132

Mohler, J. W. (2003). *Culture manual for the Atlantic sturgeon Acipenser oxyrinchus oxyrinchus*.

Molnar, M., Buehler, D., Oestman, R., Reyff, J., Pommerenck, K., & Mitchell, B. (2020). *Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Prepared for California Department of Transportation (Updated)* [Report](CTHWANP-RT-20-365.01.04). https://dot.ca.gov/programs/environmental-analysis/biology/hydroacoustics

Murawski, S. A., & Pacheco, A. L. (1977). *Biological and fisheries data on Atlantic sturgeon, Acipenser oxyrhynchus (Mitchill)* [Technical Series Report](Technical Series Report, Issue. N. F. S. C. National Marine Fisheries Service, Sandy Hook Laboratory.

Niklitschek, E. J., & Secor, D. H. (2005). Modeling spatial and temporal variation of suitable nursery habitats for Atlantic sturgeon in the Chesapeake Bay [Scientific Journal]. *Estuarine, Coastal and Shelf Science*, *64*(1), 135-148. https://doi.org/https://doi.org/10.1016/j.ecss.2005.02.012

Niklitschek, E. J., & Secor, D. H. (2010). Experimental and field evidence of behavioural habitat selection by juvenile Atlantic Acipenser oxyrinchus oxyrinchus and shortnose Acipenser brevirostrum sturgeons [Scientific Journal]. *Journal of Fish Biology*, *77*(6), 1293-1308. https://doi.org/10.1111/j.1095-8649.2010.02748.x

NMFS. (2017a). *Designation of critical habitat for the Gulf of Maine, New York Bight, and Chesapeake Bay Distinct Population Segments of Atlantic sturgeon : ESA Section 4(b)(2) Impact Analysis and Biological Source Document with the Economic Analysis and Final Regulatory Flexibility Analysis Finalized June 3, 2017* [Miscellaneous]. https://repository.library.noaa.gov/view/noaa/18671

NMFS. (2017b). *Endangered Species Act - Section 7 Consultation on the Tappan Zee Bridge Replacement NER-2017-14375* [Government Document](Biological Opinion, Issue. https://www.fisheries.noaa.gov/resource/tool-app/environmental-consultation-organizer-eco

NMFS. (2022a). *Chesapeake Bay Distinct Population Segment of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 5-Year Review: Summary and Evaluation* [Report]. https://media.fisheries.noaa.gov/2022-02/Atlantic%20sturgeon%20GOM%205-year%20review_FINAL%20SIGNED.pdf

NMFS. (2022b). *Gulf of Maine Bight Distinct Population Segment of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 5-Year Review: Summary and Evaluation* [Report]. https://media.fisheries.noaa.gov/2022-02/Atlantic%20sturgeon%20GOM%205-year%20review_FINAL%20SIGNED.pdf

NMFS. (2022c). *New York Bight Distinct Population Segment of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 5-Year Review: Summary and Evaluation* [Report]. https://www.fisheries.noaa.gov/resource/document/new-york-bight-distinct-population-segment-atlantic-sturgeon-5-year-review

NMFS. (2023a). *Carolina Distinct Population Segment of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 5-Year Review: Summary and Evaluation* [Report].

NMFS. (2023b). *South Atlantic Distinct Population Segment of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). 5-Year Review: Summary and Evaluation* [Report].
NMFS, (National Marine Fisheries Service),. (2017). Endangered and Threatened Species; designation of critical habitat for the endangered New York Bight, Chesapeake Bay, Carolina and South Atlantic Distinct Population Segments of Atlantic sturgeon and the threatened Gulf of Maine Distinct Population Segment of Atlantic sturgeon [Government Document]. *Federal Register*, *82*(158), 39160-39274. https://www.fisheries.noaa.gov/find-species
NMFS, (National Marine Fisheries Service), , & U.S. FWS, (U. S. Fish and Wildlife Service). (2023). *Loggerhead sea turtle (Caretta caretta) Northwest Atlantic Ocean DPS 5-year review: Summary and evaluation*.
NMFS (National Marine Fisheries Service). (2017). *Designation of critical habitat for the Gulf of Maine, New York Bight, and Chesapeake Bay Distinct Population Segments of Atlantic sturgeon : ESA Section 4(b)(2) Impact Analysis and Biological Source Document with the Economic Analysis and Final Regulatory Flexibility Analysis Finalized June 3, 2017* [Miscellaneous]. https://repository.library.noaa.gov/view/noaa/18671
NMFS (National Marine Fisheries Service), & U.S. FWS (U. S. Fish Wildlife Service). (1991). *Recovery plan for U.S. population of Atlantic green turtle (Chelonia mydas)*. https://www.fisheries.noaa.gov/resource/document/recovery-plan-us-population-atlantic-green-turtle-chelonia-mydas
NMFS (National Marine Fisheries Service), & U.S. FWS (U.S. Fish and Wildlife Service). (1992). *Recovery plan for leatherback turtles (Dermochelys coriacea) in the U.S. Caribbean, Atlantic and Gulf of Mexico* [Report]. https://www.fisheries.noaa.gov/resource/document/recovery-plan-leatherback-turtles-us-caribbean-atlantic-and-gulf-mexico
NMFS (National Marine Fisheries Service), & U.S. FWS (U.S. Fish and Wildlife Service). (2008). *Recovery plan for the Northwest Atlantic population of the loggerhead sea turtle (Caretta caretta), Second revision* [Government Document]. O. o. P. R. National Marine Fisheries Service. https://www.fisheries.noaa.gov/resource/document/recovery-plan-northwest-atlantic-population-loggerhead-sea-turtle-caretta-caretta
NMFS (National Marine Fisheries Service), U.S. FWS (United States Fish and Wildlife Service), & SEMARNAT (Secretariat of Environment and Natural Resources). (2011). *Bi-National recovery plan for the Kemp's ridley sea turtle (Lepidochelys kempii), Second Revision*. https://www.fisheries.noaa.gov/resource/document/bi-national-recovery-plan-kemps-ridley-sea-turtle-2nd-revision
Novak, A. J., Carlson, A. E., Wheeler, C. R., Wippelhauser, G. S., & Sulikowski, J. A. (2017). Critical foraging habitat of Atlantic sturgeon based on feeding habits, prey distribution, and movement patterns in the Saco River estuary, Maine. *Transactions of the American Fisheries Society*, *146*(2), 308-317.
Park, I. A. (2017). Sturgeon salvage in the Delaware River and Bay. In NMFS, Greater Atlantic Regional Fisheries Office (Ed.), (email ed.). Smyrna, Delaware: Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife.
Parker, E. L. (2007). *Ontogeny and life history of shortnose sturgeon (Acipenser brevirostrum Lesueur 1818): Effects of latitudinal variation and water temperature* University of Massachusetts]. Amherst, Massachusetts.

Pérez-Pereira, N., Wang, J., Quesada, H., & Caballero, A. (2022). Prediction of the minimum effective size of a population viable in the long term. *Biodiversity and Conservation*, *31*(11), 2763-2780. https://doi.org/10.1007/s10531-022-02456-z

Peterson, D. L., Schueller, P., DeVries, R., Fleming, J., Grunwald, C., & Wirgin, I. (2008). Annual run size and genetic characteristics of Atlantic sturgeon in the Altamaha River, Georgia. *Transactions of the American Fisheries Society*, *137*(2), 393-401.

PIANC. (2008). *Considerations to reduce environmental impacts of vessels* (99-2008). http://www.pianc.org/publications.php

Popper, A. N., Fewtrell, J., Smith, M. E., & McCauley, R. D. (2003). Anthropogenic sound: effects on the behavior and physiology of fishes. *Marine Technology Society Journal*, *37*(4), 35-40.

Popper, A. N., Hawkins, A. D., Fay, R. R., Mann, D. A., Bartol, S. M., Carlson, T. J., Coombs, S., Ellison, W. T., Gentry, R. L., Halvorsen, M. B., Løkkebork, S., Rogers, P. H., Southall, B. L., Zeddies, D. G., & Tavolga, W. N. (2014). *Sound exposure guidelines for fishes and sea turtles: A technical report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI* [Book]. Springer International Publishing and ASA Press.

Pyzik, L., Caddick, J., & Marx, P. (2004). *Chesapeake Bay: Introduction to an ecosystem (Update)* [Report](CBP/TRS 232/00).

Richardson, B., & Secor, D. (2016). *Assessment of critical habitat for recovering the Chesapeake Bay Atlantic sturgeon distinct population segment* (NA13NMF4720042) [Grant].

Ruggerone, G., Goodman, S., & Miner, R. (2008). Behavioral response and survival of juvenile coho salmon to pile driving sounds. *Seattle, WA: Natural Resources Consultants, Inc. for Port of Washington.*

Savoy, T., & Pacileo, D. (2003). Movements and important habitats of subadult Atlantic sturgeon in Connecticut waters. *Transactions of the American Fisheries Society*, *132*, 1-8.

Schueller, P., & Peterson, D. L. (2010). Abundance and recruitment of juvenile Atlantic sturgeon in the Altamaha River, Georgia [Scientific Journal]. *Transactions of the American Fisheries Society*, *139*(5), 1526-1535. https://doi.org/10.1577/T09-127.1

Scott, W. B., & Crossman, E. J. (1973). Freshwater fishes of Canada. *Fisheries Research Board of Canada Bulletin*, *184*.

Secor, D., O'Brien, M., Coleman, N., Horne, A., Park, I., Kazyak, D. C., Bruce, D., & Stence, C. (2022). Atlantic sturgeon status and movement ecology in an extremely small spawning habitat: The Nanticoke River-Marshyhope Creek, Chesapeake Bay. *Reviews in Fisheries Science & Aquaculture*, *30*(2), 195-214.

Secor, D. H. (2002). Atlantic sturgeon fisheries and stock abundances during the late nineteenth century. In W. Van Winkle, PhD, P. Anders, D. H. Secor, PhD, & D. Dixon, PhD (Eds.), *Biology, Management, and Protection of North American Sturgeon* (Vol. 28, pp. 89-98). Bethesda, Maryland: American Fisheries Society.

Secor, D. H., Anders, P. J., Van Winkle, W., & Dixon, D. A. (2002). Can we study sturgeons to extinction? What we do and don't know about the conservation of North American sturgeons. In W. Van Winkle, PhD, P. J. Andres, D. H. Secor, PhD, & D. A. Dixon, PhD (Eds.), *Biology, Management, and Protection of North American Sturgeon* (Vol. 28). Bethesda, Maryland: American Fisheries Society.

Secor, D. H., Niklitschek, E. J., Stevenson, J. T., Gunderson, T. E., Minkkinen, S. P., Richardson, B., Florence, B., Mangold, M., Skjeveland, J., & Henderson-Arzapalo, A. (2000). Dispersal and growth of yearling Atlantic sturgeon, *Acipenser oxyrinchus*, released into Chesapeake Bay. *Fishery Bulletin*, *98*(4), 800-800.

Secor, D. H., O'Brien, M., Coleman, N., Horne, A., Park, I., Kazyak, D., Bruce, D., & Stence, C. (2021). Atlantic sturgeon status and movement ecology in an extremely small spawning habitat: The Nanticoke River-Marshyhope Creek, Chesapeake Bay. *Reviews in Fisheries Science & Aquaculture*, 1-20.

Smith, T. I. J. (1985). The fishery, biology, and management of Atlantic sturgeon, *Acipenser oxyrhynchus*, in North America [Scientific Journal]. *Environmental Biology of Fishes*, *14*(1), 61-72. https://doi.org/10.1007/BF00001577

Smith, T. I. J., & Clugston, J. P. (1997). Status and management of Atlantic sturgeon, *Acipenser oxyrinchus*, in North America [Scientific Journal]. *Environmental Biology of Fishes*, *48*(1), 335-346. https://doi.org/10.1023/A:1007307507468

Smith, T. I. J., Dingley, E. K., & Marchette, D. E. (1980). Induced spawning and culture of Atlantic sturgeon [Scientific Journal]. *The Progressive Fish-Culturist*, *42*(3), 147-151. https://doi.org/10.1577/1548-8659(1980)42[147:ISACOA]2.0.CO;2

Smith, T. I. J., Marchette, D. E., & Smiley, R. A. (1982). *Life history, ecology, culture and management of Atlantic sturgeon, Acipenser oxyrhynchus oxyrhynchus, Mitchill, in South Carolina. South Carolina Wildlife Marine Resources. Resources Department, Final Report to U.S. Fish and Wildlife Service* (AFS-9).

SSSRT. (2010). *A biological assessment of shortnose sturgeon (Acipenser brevirostrum)* [Government Document](Report to National Marine Fisheries Service, Northeast Regional Office, Issue.

SSSRT (Shortnose Sturgeon Status Review Team). (2010). *A biological assessment of shortnose sturgeon (Acipenser brevirostrum)* [Government Document](Report to National Marine Fisheries Service, Northeast Regional Office, Issue.

Steen, S. (2021). Vessel hydrology and impacts to fish. In P. B. Johnsen (Ed.), (email ed.). Norway: Norwegian University of Science and Technology (NTNU).

Stein, A. B., Friedland, K. D., & Sutherland, M. (2004). Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States [Scientific Journal]. *North American Journal of Fisheries Management*, *24*(1), 171-183. https://doi.org/10.1577/M02-123

Stephenson, J. K., Gingerich, A., & Brown, R. S. (2010). Assessing barotrauma in neutrally and negatively buoyant juvenile salmonids exposed to simulated hydro-turbine passage using a mobile aquatic barotrauma laboratory [Scientific Journal]. *Fisheries Research*, *106*(2010), 271-278. https://doi.org/10.1016/j.fishres.2010.08.00 (Not in File)

Stevenson, J. T., & Secor, D. H. (1999). Age determination and growth of Hudson River Atlantic sturgeon, Acipenser oxyrinchus [Scientific Journal]. *Fishery Bulletin*, *98*(1), 153-166.

Stewart, N., Cormier, Y., Logan-Chesney, L., Gibson, G., Wirgin, I., Dadswell, M., & Stokesbury, M. (2017). Natural stranding of Atlantic sturgeon (*Acipenser oxyrinchus* Mitchill, 1815) in Scot's Bay, Bay of Fundy, Nova Scotia, from populations of concern in the United States and Canada. *Journal of Applied Ichthyology*, *33*(3), 317-322.

Stoschek, O., Precht, E., Larsen, O., Jain, M., Yde, L., Ohle, N., & Strotmann, T. (2014). *Sediment resuspension and seabed scour induced by ship-propeller wash* PIANC World Congress, San Fransisco, California.

Sulak, K., & Randall, M. (2002). Understanding sturgeon life history: enigmas, myths, and insights from scientific studies. *Journal of Applied Ichthyology*, *18*(4-6), 519-528.
Summerfelt, R., & Mosier, D. (1976). Evaluation of ultrasonic telemetry to track striped bass to their spawning grounds. *Final Report, Dingell-Johnson Project F-29-R, Segment*, *7*.
USACE (U.S. Army Corps of Engineers). (2001). *Monitoring of Boston Harbor confined aquatic disposal cells*.
Van Den Avyle, M. J. (1984). *Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Atlantic): Atlantic sturgeon*.
Van Eenennaam, J. P., & Doroshov, S. I. (1998). Effects of age and body size on gonadal development of Atlantic sturgeon [Scientific Journal]. *Journal of Fish Biology*, *53*(3), 624-637. https://doi.org/10.1111/j.1095-8649.1998.tb01006.x
Van Eenennaam, J. P., Doroshov, S. I., Moberg, G. P., Watson, J. G., Moore, D. S., & Linares, J. (1996). Reproductive conditions of the Atlantic sturgeon (*Acipenser oxyrinchus*) in the Hudson River [Scientific Journal]. *Estuaries*, *19*(4), 769-777. https://doi.org/10.2307/1352296
Vladykov, V. D., & Greeley, J. R. (1963). Order *Acipenseroidei*. In H. B. Bigelow (Ed.), *Fishes of the Western North Atlantic, Part 3* (Vol. I, pp. 630). New Haven, Connecticut: Yale University.
Waldman, J., Alter, S. E., Peterson, D., Maceda, L., Roy, N., & Wirgin, I. J. C. G. (2019). Contemporary and historical effective population sizes of Atlantic sturgeon *Acipenser oxyrinchus oxyrinchus* [Scientific Journal]. *20*(2), 167-184. https://doi.org/https://doi.org/10.1007/s1059
Waldman, J., Alter, S. E., Peterson, D., Maceda, L., Roy, N. K., & Wirgin, I. (2018). Contemporary and historical effective population sizes of Atlantic sturgeon Acipenser oxyrinchus oxyrinchus [journal article]. *Conservation Genetics*. https://doi.org/10.1007/s10592-018-1121-4
Waldman, J. R., Hart, J. T., & Wirgin, I. I. (1996). Stock composition of the New York Bight Atlantic sturgeon fishery based on analysis of mitochondrial DNA [Scientific Journal]. *Transactions of the American Fisheries Society*, *125*(3), 364-371. https://doi.org/10.1577/1548-8659(1996)125<0364:SCOTNY>2.3.CO;2
Wang, J., Santiago, E., & Caballero, A. (2016). Prediction and estimation of effective population size. *Heredity*, *117*(4), 193-206. https://doi.org/10.1038/hdy.2016.43
White, S. L., Kazyak, D., Darden, T. L., Farrae, D. J., Lubinski, B. A., Johnson, R., Eackles, M., Balazik, M., Brundage, H., Fox, A. G., Fox, D. A., Hager, C. H., Kahn, J. E., & Wirgin, I. I. (2021). Establishment of a microsatellite genetic baseline for North American Atlantic sturgeon (*Acipenser o. oxyrhinchus*) and range-wide analysis of population genetics. *Conservation Genetics*, *22*(6), 977-992. https://doi.org/10.1007/s10592-021-01390-x
White, S. L., Kazyak, D. C., Darden, T. L., Farrae, D. J., Lubinski, B. A., Johnson, R. L., Eackles, M. S., Balazik, M. T., Brundage, H. M., Fox, A. G., Fox, D. A., Hager, C. H., Kahn, J. E., & Wirgin, I. I. (2021). Establishment of a microsatellite genetic baseline for North American Atlantic sturgeon (Acipenser o. oxyrhinchus) and range-wide analysis of population genetics. *Conservation Genetics*. https://doi.org/10.1007/s10592-021-01390-x
White, S. L., Sard, N. M., Brundage III, H. M., Johnson, R. L., Lubinski, B. A., Eackles, M. S., Park, I. A., Fox, D. A., & Kazyak, D. C. (2022). Evaluating sources of bias in pedigree-based estimates of breeding population size. *Ecological Applications*, *32*(5), e2602. https://doi.org/https://doi.org/10.1002/eap.2602

Wilber, D. H., & Clarke, D. G. (2001). Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management*, *21*(4), 855-875. https://doi.org/10.1577/1548-8675(2001)021<0855:BEOSSA>2.0.CO;2

Wilcox, D. B. (1991). Models for predicting impacts of vessel passage on young of year fish and fish populations. In A. C. Miller & B. S. Payne (Eds.), *An investigation of methods to measure and predict biological and physical effects of commercial navigation traffic: Workshop II* (Vol. EL-91-12, pp. 22-27). Vicksburg, Mississippi: USACE, Engineer Waterways Experiment Station.

Wippelhauser, G. S., Sulikowski, J., Zydlewski, G. B., Altenritter, M. A., Kieffer, M., & Kinnison, M. T. (2017). Movements of Atlantic sturgeon of the Gulf of Maine inside and outside of the geographically defined Distinct Population Segment [Scientific Journal]. *Marine and Coastal Fisheries*, *9*(1), 93-107. https://doi.org/10.1080/19425120.2016.1271845

Wirgin, I., Breece, M. W., Fox, D. A., Maceda, L., Wark, K. W., & King, T. (2015). Origin of Atlantic Sturgeon collected off the Delaware coast during spring months [Scientific Journal]. *North American Journal of Fisheries Management*, *35*(1), 20-30. https://doi.org/10.1080/02755947.2014.963751

Wirgin, I., Maceda, L., Waldman, J. R., Wehrell, S., Dadswell, M., & King, T. (2012). Stock origin of migratory Atlantic Sturgeon in Minas Basin, Inner Bay of Fundy, Canada, determined by microsatellite and mitochondrial DNA analyses [Scientific Journal]. *Transactions of the American Fisheries Society*, *141*(5), 1389-1398. https://doi.org/10.1080/00028487.2012.700899

Wirgin, I., Roy, N. K., Maceda, L., & Mattson, M. T. (2018). DPS and population origin of subadult Atlantic sturgeon in the Hudson River [Scientific Journal]. *Fisheries Research*, *207*, 165-170. https://doi.org/https://doi.org/10.1016/j.fishres.2018.06.004

Wright, S. (1969). *Evolution and the genetics of populations. 2. The theory of gene frequencies*. University of Chicago Press. https://books.google.com/books?id=HemscDlWXCQC&printsec=copyright#v=onepage&q&f=false

WSDOT. (2020). Ch. 7 Noise Impact Assessment. In *Biological Assessment Preparation for Transportation Projects - Advanced Training Manual* (pp. 95). Olympia, Washington: Washington State Department of Transportation.

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: National Park Service

X **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: Mark D. Eberle Date: 5/9/23

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. Gay Vietzke
Regional Director, Northeast Region
National Park Service
Northeast Region
U.S. Custom House
200 Chestnut Street, 5th Floor Philadelphia, PA 19106-2912

Dear Ms. Vietzke:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to Section 6(f) of the Land and Water Conservation Program. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

JEANETTE J MAR

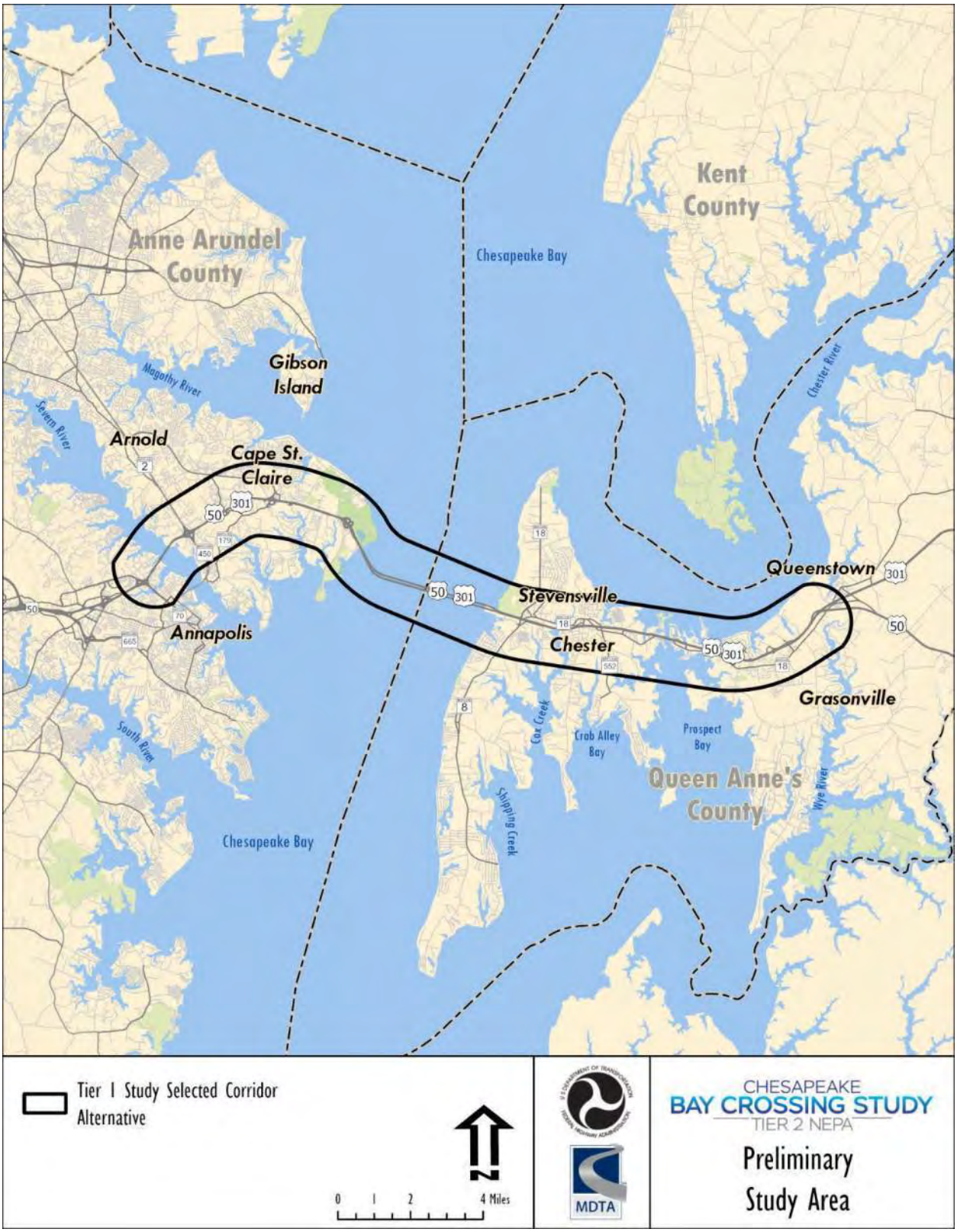
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:32:44 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Ms. Wendy O'Sullivan, NPS, Superintendent - NPS Chesapeake Office
Mr. Mark Eberle, NPS, External Review Coordinator/Resource Planning Specialist
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: National Park Service

Signature: GAY VIETZKE Digitally signed by GAY VIETZKE Date: 2023.06.22 17:37:53 -04'00' Date: _____

Print Name: Gay Vietzke

Title: Regional Director - Interior Region 1, North Atlantic-Appalachian

United States Department of the Interior

NATIONAL PARK SERVICE
Interior Region 1
North Atlantic-Appalachian
1234 Market Street, 20th Floor
Philadelphia, PA 19107

IN REPLY REFER TO:

1.A.2 (IR1-RSS)

August 31, 2023

Melissa Williams, Director of Planning and Program Development
The Maryland Transportation Authority
2310 Broening Highway, Baltimore, MD 21224

Subject: Section 106 Consulting Party Invitation for the Tier 2 Draft Environmental Impact Statement for the Chesapeake Bay Crossing Study

Dear Ms. Williams:

Thank you for inviting the National Park Service (NPS) to be a consulting party under Section 106 of the National Historic Preservation Act on the Tier 2 Draft Environmental Impact Statement for the Chesapeake Bay Crossing Study (Study) in Maryland. The Study intends to assess the potential environmental impacts of addressing congestion at the Chesapeake Bay Bridge, which could result in added capacity at the existing bridge or at a new location across the Chesapeake Bay. As the NPS manages The Chesapeake Bay Program and the Captain John Smith Chesapeake National Historic Trail, we have an interest in the potential effects of this undertaking, so we accept your invitation to consult.

We understand that the Section 106 process is resuming in the Tier 2 Study with the continued identification of historic properties within the Tier 1 Selected Corridor Alternative (Corridor 7). We also understand that the Maryland Transportation Authority will complete a Gap Analysis of archaeological and architectural resources within this area and provide specific recommendations for additional investigations required to identify historic properties, in accordance with 36 CFR 800.4(a). The Gap Analysis will also include recommendations for archaeological and architectural surveys. The NPS has reviewed your planned Section 106 process for the Tier 2 study and do not have comments.

Thank you for contacting the NPS. We look forward to consulting with you on this proposed project. If you have questions, please contact Mark Eberle, External Review Coordinator, at 267-315-1631 or mark_eberle@nps.gov.

Sincerely,

JONATHAN MEADE

Digitally signed by JONATHAN MEADE
Date: 2023.09.05 13:36:34 -04'00'

Jonathan Meade, Associate Regional Director
Resource Science and Stewardship

cc:
Elizabeth Hughes, Maryland Historical Trust
Wendy O'Sullivan, Superintendent, Chesapeake Bay Program
Jerri Marr, Superintendent, Colonial National Historical Park

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Cultural Resources Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Cultural Resources Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Cultural Resources, the following agency (by signing this form): **Agency: National Park Service**
____ **Concures** with the **Cultural Resources Methodology (without comments)** __**X**__ **Agrees** with the **Cultural Resources Methodology (with minor comments)*** ____ **Does not agree** with the **Cultural Resources Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: The last line on page 3 refers to "potential" consulting parties, including state agencies and state-recognized tribes. We would like those entities to be included, rather than be considered potential parties.
Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2023.11.20 11:33:53 -05'00' Date:

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency: The National Park Service**
_X___ **Concurs** with the **Natural Environmental Methodology (without comments)** **____ Agrees** with the **Natural Environmental Methodology (with minor comments)*** **____ Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2024.02.02 09:09:43 -05'00' Date: _____

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:____National Park Service_____**
__X__ **Concurs** with the **Socioeconomics & Land Use Methodology (without comments)** **____ Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** **____ Does not agree** with the **Socioeconomics & Land Use Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2024.02.28 10:36:12 -05'00' Date: _____

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency: National Park Service**
____ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **_X__ Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **Pg. 49: Please add the following National Park Service resources to the text: Captain John Smith Chesapeake National Historic Trail and Star-Spangled Banner National Historic Trail to the list of "community resources within the Study Area," since both water trails go under the existing bridges.**
Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2024.08.06 16:15:29 -04'00' Date:_____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Noise Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Noise Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Noise Methodology, the following agency (by signing this form): **Agency: National Park Service**
____ **Concurs** with the **Noise Methodology (without comments)** **_X_ Agrees** with the **Noise Methodology (with minor comments)*** **____ Does not agree** with the **Noise Methodology*** ****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **The NPS agrees to the noise methodology in principle, but continues to have the same concerns expressed in our previously submitted Noise Methodology form dated 1/26/24, and also discussed at the meeting held 8/2/24 with FHWA and others. We acknowledge and appreciate the changes to the methodology document as a result of the 8/2/24 meeting.** **We still disagree with the FHWA's Noise Abatement Criteria (NAC) [Hourly A-Weighted Sound Level in Decibels dB(A)] for Category A, and its narrow interpretation of lands that should be included in that criteria. We find that by lumping parks, trails, open space areas, and campgrounds with active sport areas, amphitheaters, daycare centers, hospitals, playgrounds, schools, and other uses, this does not properly evaluate noise impacts in the human environment. By using this criteria level, NPS believes the project's potential noise impacts will be underestimated by at least a factor of two since the impact threshold level criteria will be set at 67 dBA (Category C) instead of 57 dBA (Category A). Also, as a reminder, Holly Beach Farm, a key NPS resource in the area, was preserved by a grant from the NPS in 2001 with the intent to be "maintained in the public trust for preservation/recreational use in perpetuity." In addition, the most important aspect of the property is the concept of increasing its quiet park-like accessibility to others while avoiding adverse impacts of crowding, traffic, or neighborhood disruption. This further supports the reasoning that Holly Beach Farm would be a better fit in Category A.** **As applicable to NPS lands, we prefer that the project use the relevant standard ASA/ANSI SC1.100-2014, *"Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residental Areas"*. As stated in the standard, "the main purpose... is to develop procedures to estimate the residual sound levels in an area where these levels are used to evaluate the effects of a noise source, with two examples being wind turbine noise in quiet rural areas and transportation noise in U.S. National Parks". Use of the standard would offer the credibility of scientific consensus from a broadly representative group of stakeholders, including the U.S. Department of Transportation.** **Also, as discussed in our previous comments, the 500'- 1000' noise analysis limits for the area of potential effect does not seem large enough for a project of this scale to adequately capture noise impacts. If a new bridge is the selected alternative, especially if it will be substantially taller than the existing bridge, impacts from noise associated with this new structure could be far reaching. We recommend that the noise analysis**

consider all resources within 1.5 miles of the bridge since this distance would allow for the inclusion of Holly Beach Farm in the project area. This updated distance is based on the expected existing median daytime summer sound level at Holly Beach Farm (Mennitt et al. 2013), which is about 44 dB. Given the original 500' buffer corresponds to an impact level of 67 dB, a more appropriate buffer for an impact level of 44 dB is >7000' or 1.3 miles (Barber et al. 2010, Box 2, *detection distance ratio*). Since Holly Beach Farm and other important resources are located across the water from any proposed new bridge alternative, we recommend that the noise analysis discuss how sound will travel across wetlands and water, as well as across land. Please let us know if you need us to provide the references discussed above.

In addition, noise impacts on wildlife are very well documented in published research; however, there is no specific discussion of noise impacts to wildlife in the updated draft noise methodology. We recommend that those impacts also be incorporated and addressed in the noise analysis in the NEPA document.

Finally, if these suggested changes and comments are not addressed in the draft Environmental Impact Statement (EIS), then the NPS will likely have similar concerns and comments on the noise analysis in the draft EIS when it is circulated for agency review.

Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2024.09.17 09:33:47 -04'00' Date: _____

vx

United States Department of the Interior

NATIONAL PARK SERVICE
Interior Region 1
North Atlantic-Appalachian
1234 Market Street – 20th Floor
Philadelphia, Pennsylvania 19107

IN REPLY REFER TO:
A.1. 2 (RSS-IR1)

Maryland Transportation Authority
Attn: Heather Lowe, Project Manager
Division of Planning & Program Development, Bay Crossing Study,
2310 Broening Highway
Baltimore, Maryland 21224

RE: Chesapeake Bay Crossing Study – Notice of Intent – November 2024

Dear Ms. Lowe:

The National Park Service (NPS) has reviewed the Notice of Intent (NOI) that was issued from the Federal Highway Administration (FHWA), in coordination with the Maryland Transportation Authority (MDTA), to solicit comments and advise the public, agencies, and stakeholders that an environmental impact statement (EIS) will be prepared for the Chesapeake Bay Crossing Study. We understand that the Tier 2 NEPA is to address existing and future transportation issues at the William Preston Lane, Jr. Memorial (Bay) Bridge and its approaches along U.S. 50/301, from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore, in Maryland.

After reviewing the NOI and associated documents the NPS offers the following comments and recommendations:

1. Tunnel Dismissed too Early – We believe MDTA/FHWA are dismissing the other structure types too early in the NEPA process and recommend carrying over a full bridge or bridge/tunnel alternative into the draft EIS for analysis. We also that believe that MDTA/FHWA haven't considered the potential positive benefits of the ventilation islands, reduction in environmental noise/light pollution with a tunnel, and the long-term benefit of not having to replace a new bridge structure at the end of its lifespan. A few outstanding questions on the analysis include: What is a bridge lifespan versus a tunnel lifespan? From a cost perspective, was the lifespan equal of a tunnel vs. bridge when comparing the different cost options? In addition, the Purpose and Need statement discusses how current truck traffic volume slows and clogs traffic adding to congestion. Having a bridge and a tunnel could mean that trucks move into a specific bridge lane approaching the crossing, which could help alleviate congestion for cars going through a tunnel. Finally, a tunnel alternative avoids issues with high wind warnings that already occur on the bridge and eliminates the conflict between large container ships and potential future height clearance issues.

2. Holding Tunnel Alternative to a Higher Standard than New Bridge – A number of issues brought up in dismissing the tunnel options were similar to a higher bridge. The document mentions that a steep grade going into and out of a tunnel will slow truck traffic, but this is an issue that you reference is already happening with the height of the existing bridge and will only get worse as the bridge gets taller and steeper. In addition, the impacts to the bay bottom through dredging or tunneling are discussed, but there is not much discussion or comparison to the impact on the bay bottom from all the new, much larger bridge footers and associated large pile driving equipment that will be needed during installation of a new bridge structure. Overall, the tunnel options appear to be held to a higher standard (cost/traffic/environmental) than the new bridge alternatives.

3. Tunnel Restrictions Need Clarification – The NOI makes the statement that hazardous materials cannot be transported via a tunnel and would have to make a large detour to avoid the tunnel. After research into both federal and state regulations, it's unclear exactly what types of vehicles and materials would be excluded by a tunnel. Please clarify which state and federal regulations would apply here, including what type of materials being carried (i.e. gasoline) and what percentage of vehicles and trucks on the roadway would be impacted. Would it be 10% of vehicles using the current bridge or closer to 50% of the vehicles using the current bridge that would have to make the detour? As stated above, an alternative with one bridge and one tunnel could accommodate the need to transport hazardous materials across the Bay while helping to alleviate congestion for cars going through a tunnel.

4. Considering Other Bridge Heights – The bridge option has alternatives for the number of lanes, but we recommend you also carry over and analyze three different proposed heights of a new bridge and evaluate the impacts and benefits of each. As you discussed in the Purpose and Need there are still many other bridges with height restrictions in the regional shipping area (specifically the C&D Canal), which further highlights the question, of what should be the appropriate height for any new Chesapeake Bay Bridge. There is a large cost (both economically and environmentally) for raising the bridge to meet the requested height proposed by the Maryland Port Authority. The higher height proposed is following the lead of international shipbuilding companies that have decided to make bigger ships to increase efficiency and profit. Will the height of this larger bridge be obsolete in 20-years, if shipbuilders decide to build even bigger ships?

5. Range of Reasonable Alternatives – It is important for the public and agencies to have an opportunity to review and comment on the structure type chosen here, as well as the height of any bridge option being proposed, since those key decisions determine the scale and extent of impacts on both natural and cultural resources in the area.

6. Dismissing Alternatives – To save on the number of alternatives being carried forward, you could consider eliminating one of the lane alternatives and replacing with the above discussed alternatives.

7. Shared Used Path (SUP) - Section 4.8 from page 4-49 to 4-52 and including Table 4-11 on Shared Use Path (for pedestrians and bikes). There is no mention of parking facilities for visitors who may arrive at the Bay Crossing for the single purpose of recreating on foot or on bicycle to enjoy the SUP. Parking facilities and locations should be considered in the draft EIS. Please note that recreational visitors attracted to this use will likely bring additional traffic to the area and add to the congested

traffic conditions. MDTA/FWHA could consider these effects in conjunction with Section 4.7.2.3 under Transportation Systems Management / Transportation Demand Management, Park-and-Ride facilities.

8. Signage - If an SUP is included in any new bridge, the NPS would like to work closely with MDTA/FHWA to discuss the option of installing interpretive signage for visitors who will have a wide view of the Chesapeake Bay from the vantage point afforded by the SUP. This view would include a Captain John Smith voyage stop, and the location of multiple 17th century Native American town sites.

Thank you for your continued coordination with the NPS on this project, and if you have questions on this letter, please contact Mark Eberle, Region 1 External Review Coordinator, at mark_eberle@nps.gov or 215-597-1258.

Sincerely,

JONATHAN MEADE

Digitally signed by JONATHAN MEADE
Date: 2025.01.13 09:51:05 -05'00'

Jonathan Meade
Associate Regional Director
Resource Science and Stewardship

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency: National Park Service**
_X_ Concurs with the **Draft ARDS (without comments)** **____ Agrees** with the **Draft ARDS (with minor comments)*** **____ Does not agree** with the **Draft ARDS*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2025.03.11 10:13:08 -04'00' Date:

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: National Park Service

X **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)**

____ **Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree** with the **Preferred Alternative & Conceptual Mitigation***

****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: MARK EBERLE Digitally signed by MARK EBERLE Date: 2026.05.04 14:02:15 -04'00' Date: _____

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency:__USDA-NRCS_____**
_X___ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:N/A
Signature: PHILLIP KING Digitally signed by PHILLIP KING Date: 2023.05.16 09:25:03 -04'00' Date: _____

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. Steve Strano
State Resource Conservationist
U.S. Department of Agricuture
Natural Resources Conservation Service
John Hanson Business Center
339 Busch's Frontage Road
Annapolis, MD 21409-5543

Dear Mr. Strano:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include

the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

JEANETTE J MAR

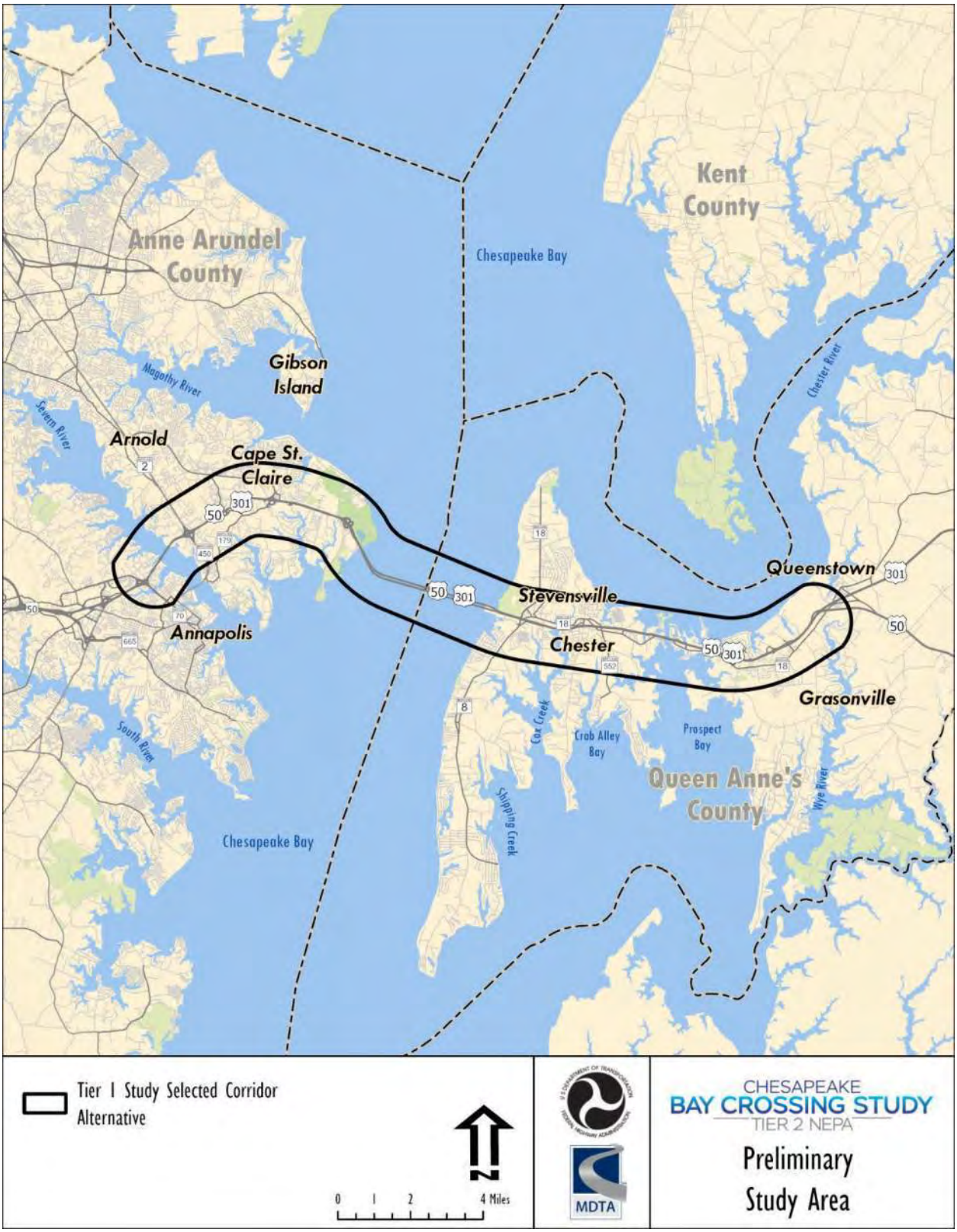
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:35:33 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Mr. Phillip King, USDA NRCS, State Soil Scientist
Mr. J'Que Jones, USDA NRCS, Assistant State Conservation Engineer
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☒ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☒ Other (please provide): NRCS will respond to the 1026 FPPA request when summitted.

Agency: ____USDA-NRCS_____

Signature: PHILLIP KING Digitally signed by PHILLIP KING Date: 2023.09.11 13:41:29 -04'00' _____ Date: _____

Print Name: __Phillip S. King _____

Title: __State Soil Scientist_____

From:	Megan Bolcar
To:	King, Phillip - FPAC-NRCS, DE
Cc:	RossiGill, Ann - FPAC-NRCS, MD; Witkowski, Tyler - FPAC-NRCS, MD; Clements, Philip - FPAC-NRCS, MD; Sarah Williamson; Emma Beck; Heather Lowe; Eric Almquist
Subject:	FPPA Consultation - Bay Crossing Study: Tier 2 NEPA
Date:	Tuesday, May 26, 2026 2:03:44 PM
Attachments:	image001.png

Good afternoon, Phil,

Coastal Resources, Inc. is submitting this request on behalf of the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA) for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) in Anne Arundel and Queen Anne's Counties, Maryland. The Tier 2 Study is a National Environmental Policy Act (NEPA) Environmental Impact Statement that has analyzed alternatives to provide congestion relief and improve travel reliability, mobility, and roadway deficiencies across the Chesapeake Bay. Through the NEPA process, the MDTA and FHWA have identified a Preferred Alternative for the project.

With this correspondence, we are submitting the Farmland Conversion Impact Rating for Corridor Type Projects (NRCS-CPA-106) form to the Natural Resources Conservation Service (NRCS) with Parts I and III complete. Please review the form and confirm whether the corridor contains prime, unique statewide or local important farmland, and if so, complete parts II, IV, and V of the form.

At the link below, please find the NRCS-CPA-106 form, as well as a map showing the Preferred Alternative location and limits of disturbance, and mapped farmland soils. Please let me know if you have any questions or need additional information.

NRCS - FPPA

Thank you,

Megan Bolcar | *Environmental Scientist*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 137) | Direct 443-837-2151 | Cell 443-900-1992



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From:	Clements, Philip - FPAC-NRCS, MD
To:	Megan Bolcar
Cc:	Sarah Williamson; Emma Beck; Heather Lowe; Eric Almquist; King, Phillip - FPAC-NRCS, DE
Subject:	RE: [External Email]RE: FPPA Consultation - Bay Crossing Study: Tier 2 NEPA
Date:	Monday, June 8, 2026 4:55:02 PM
Attachments:	image003.png Chesapeake Bay Crossing FPPA Letter.pdf CPA-106_BCST2_20260526.pdf

Megan,

After reviewing the project, the FPPA does not apply to this project. Any prime farmland soils are of small enough acreage or exist entirely within developed land. I'm returning the CPA-106 form with the appropriate information and a letter explaining the exemption. Contact me if you have any questions.

Thanks,
Phil Clements

Philip Clements
Resource Soil Scientist
NRCS Maryland | Soils - Western Region

USDA U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
Norman A. Berg Plant Materials Center
8791 Beaver Dam Road, Beltsville, MD 20705
c: (443) 758 6307

From: Megan Bolcar <meganb@cri.biz>
Sent: Monday, June 8, 2026 12:00 PM
To: Clements, Philip - FPAC-NRCS, MD <Philip.Clements@usda.gov>; King, Phillip - FPAC-NRCS, DE <phillip.king@usda.gov>
Cc: RossiGill, Ann - FPAC-NRCS, MD <Ann.RossiGill@usda.gov>; Witkowski, Tyler - FPAC-NRCS, MD <tyler.j.witkowski@usda.gov>; Sarah Williamson <sarahw@cri.biz>; Emma Beck <emmab@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>; Eric Almquist <ealmquist@rkk.com>
Subject: RE: [External Email]RE: FPPA Consultation - Bay Crossing Study: Tier 2 NEPA

Great, thank you so much!

Megan Bolcar | *Environmental Scientist*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 137) | Direct 443-837-2151 | Cell 443-900-1992



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From: Clements, Philip - FPAC-NRCS, MD <Philip.Clements@usda.gov>
Sent: Monday, June 8, 2026 11:55 AM
To: Megan Bolcar <meganb@cri.biz>; King, Phillip - FPAC-NRCS, DE <phillip.king@usda.gov>
Cc: RossiGill, Ann - FPAC-NRCS, MD <Ann.RossiGill@usda.gov>; Witkowski, Tyler - FPAC-NRCS, MD <tyler.j.witkowski@usda.gov>; Sarah Williamson <sarahw@cri.biz>; Emma Beck <emmab@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>; Eric Almquist <ealmquist@rkk.com>
Subject: RE: [External Email]RE: FPPA Consultation - Bay Crossing Study: Tier 2 NEPA

Hi Megan, I actually just started looking at this this morning and should have it back to you soon.

-Phil Clements

Philip Clements
Resource Soil Scientist
NRCS Maryland | Soils - Western Region

USDA U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service
Norman A. Berg Plant Materials Center
8791 Beaver Dam Road, Beltsville, MD 20705
c: (443) 758 6307

From: Megan Bolcar <meganb@cri.biz>
Sent: Monday, June 8, 2026 11:53 AM
To: King, Phillip - FPAC-NRCS, DE <phillip.king@usda.gov>
Cc: RossiGill, Ann - FPAC-NRCS, MD <Ann.RossiGill@usda.gov>; Witkowski, Tyler - FPAC-NRCS, MD <tyler.j.witkowski@usda.gov>; Clements, Philip - FPAC-NRCS, MD <Philip.Clements@usda.gov>; Sarah Williamson <sarahw@cri.biz>; Emma Beck <emmab@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>; Eric Almquist <ealmquist@rkk.com>
Subject: [External Email]RE: FPPA Consultation - Bay Crossing Study: Tier 2 NEPA

Some people who received this message don't often get email from meganb@cri.biz. Learn why this is important

[External Email]
If this message comes from an **unexpected sender** or references a **vague/unexpected topic;**
Use caution before clicking links or opening attachments.
Please send any concerns or suspicious messages to: Spam.Abuse@usda.gov

Hi Phil,

Just following up to confirm receipt of the below submittal. Can you also please let me know when the anticipated response date will be? Thank you!

Megan Bolcar | *Environmental Scientist*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 137) | Direct 443-837-2151 | Cell 443-900-1992



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From: Megan Bolcar
Sent: Tuesday, May 26, 2026 2:04 PM
To: King, Phillip - FPAC-NRCS, DE <phillip.king@usda.gov>
Cc: RossiGill, Ann - FPAC-NRCS, MD <Ann.RossiGill@usda.gov>; Witkowski, Tyler - FPAC-NRCS, MD <tyler.j.witkowski@usda.gov>; Clements, Philip - FPAC-NRCS, MD <Philip.Clements@usda.gov>; Sarah Williamson <sarahw@cri.biz>; Emma Beck <emmab@cri.biz>; Heather Lowe <hlowe@mdta.state.md.us>; Eric Almquist <ealmquist@rkk.com>
Subject: FPPA Consultation - Bay Crossing Study: Tier 2 NEPA

Good afternoon, Phil,

Coastal Resources, Inc. is submitting this request on behalf of the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA) for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) in Anne Arundel and Queen Anne's Counties, Maryland. The Tier 2 Study is a National Environmental Policy Act (NEPA) Environmental Impact Statement that has analyzed alternatives to provide congestion relief and improve travel reliability, mobility, and roadway deficiencies across the Chesapeake Bay. Through the NEPA process, the MDTA and FHWA have identified a Preferred Alternative for the project.

With this correspondence, we are submitting the Farmland Conversion Impact Rating for Corridor Type Projects (NRCS-CPA-106) form to the Natural Resources Conservation Service (NRCS) with Parts I and III complete. Please review the form and confirm whether the corridor

contains prime, unique statewide or local important farmland, and if so, complete parts II, IV, and V of the form.

At the link below, please find the NRCS-CPA-106 form, as well as a map showing the Preferred Alternative location and limits of disturbance, and mapped farmland soils. Please let me know if you have any questions or need additional information.

NRCS - FPPA

Thank you,

Megan Bolcar | *Environmental Scientist*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 137) | Direct 443-837-2151 | Cell 443-900-1992



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USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Norman A. Berg Plant Materials Center
8791 Beaver Dam Rd
Beltsville, MD 20705

Megan Bolcar
Coastal Resources Inc.
25 Old Solomons Island Rd
Annapolis, MD 21401

RE: Chesapeake Bay Crossing Study Tier 2

June 8, 2026

Dear Ms. Bolcar,

On 5/26/2026 we received your request for a farmland impact determination on the project listed above. This request was completed per the Farmland Protection Policy Act (FPPA – Public Law 97-98, 7 U.S.C. 4201) for accordance with the National Environmental Policy Act. The purpose is to evaluate impacts of irreversible farmland conversion to nonagricultural use (directly or indirectly) when implemented or assisted by a federal agency.

According to the information submitted, soil survey information, U.S. Census data, and aerial photography it is determined that FPPA ***does not apply***. This area is entirely within the U.S. Census urbanized area map (UA), within an existing "footprint" of "developed" land, or other land that is defined as "farmland" under the FPPA. "Farmland" does not include land already in or committed to urban development or water storage (Title 7, Subtitle B, Chapter VI, Subchapter F, Part 658.2).

Attached is the AD-1006 form that contains the determination information from the Natural Resources Conservation Service (NRCS). Only Part II of the AD-1006 is completed as the site only contains "Prime, Unique, Statewide or Local Important Farmland" of small acreage and around existing infrastructure. If there are any questions, comments, or concerns with the documents provided feel free to contact me with the contact information provided in this letter.

Sincerely,

Philip Clements
Resource Soil Scientist
philip.clements@usda.gov
c: 443-758-6307

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request **5/26/26**	4. Sheet 1 of **1**
1. Name of Project **Chesapeake Bay Crossing Study Tier 2 NEPA**	5. Federal Agency Involved **Federal Highway Administration**	
2. Type of Project **Bridge replacement & approach widening**	6. County and State **Anne Arundel and Queen Anne's, Maryland**	

PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS **5/26/26**	2. Person Completing Form **Philip Clements**
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☐ NO ☑		4. Acres Irrigated **217** / Average Farm Size **79**
5. Major Crop(s) **Soybeans, wheat, sorghum**	6. Farmable Land in Government Jurisdiction Acres: **36003** % **12.41**	7. Amount of Farmland As Defined in FPPA Acres: **94822** % **32.6**
8. Name Of Land Evaluation System Used **National Commodity Crop Production Inde:**	9. Name of Local Site Assessment System **Maryland**	10. Date Land Evaluation Returned by NRCS **6/8/26**

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment ____ Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	**20.5**			
B. Total Acres To Be Converted Indirectly, Or To Receive Services	**0**			
C. Total Acres In Corridor	**20.5**			
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*				

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points	Corridor A	Corridor B	Corridor C	Corridor D
1. Area in Nonurban Use	15				
2. Perimeter in Nonurban Use	10				
3. Percent Of Corridor Being Farmed	20				
4. Protection Provided By State And Local Government	20				
5. Size of Present Farm Unit Compared To Average	10				
6. Creation Of Nonfarmable Farmland	25				
7. Availablility Of Farm Support Services	5				
8. On-Farm Investments	20				
9. Effects Of Conversion On Farm Support Services	25				
10. Compatibility With Existing Agricultural Use	10				
TOTAL CORRIDOR ASSESSMENT POINTS	160	**0**	**0**	**0**	**0**
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	**0**	**0**	**0**	**0**
Total Corridor Assessment (From Part VI above or a local site assessment)	160	**0**	**0**	**0**	**0**
TOTAL POINTS *(Total of above 2 lines)*	260	**0**	**0**	**0**	**0**

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: | DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

Clear Form

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY
TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency: Queen Anne's County**
____ **Agrees** with the **Study Schedule (without comments)** __X__ **Agrees** with the **Study Schedule (with minor comments)*** ____ **Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **Addressing congestion related to the Bay Bridge and in the Bay Bridge corridor is a top priority for Queen Anne's County. This priority is listed in the annual priority letter every year. The Tier II NEPA study is a major step forward in addressing the lack of capacity crossing the Bay and associated congestion.** **Please consider any opportunities to complete the project ahead of schedule or to accelerate the process if possible.** **Thank you for the opportunity to participate and comment in the NEPA process.**
Signature: Steve Cohoon Steve Cohoon, Public Facilities Planner_ Date: _5/31/2023

In Reply Refer To:
Chesapeake Bay Crossing
Study: Tier 2 NEPA;
Invitation to Serve as a
Participating Agency

June 2, 2023

Amy Moredock
Director, Planning and Zoning
Queen Anne's County
110 Vincit Street
Suite 104
Centerville, MD 21617

Dear Amy Moredock:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the US 50/US 301 split in Queen Anne's County (see **Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, MDTA and FHWA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.

3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to me at hlowe@mdta.state.md.us. If you are not the correct point of contact, please forward this email to the correct person and copy me and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **July 3, 2023**. If you have any questions or need additional information, please contact me via email or phone at (410) 537-5665.

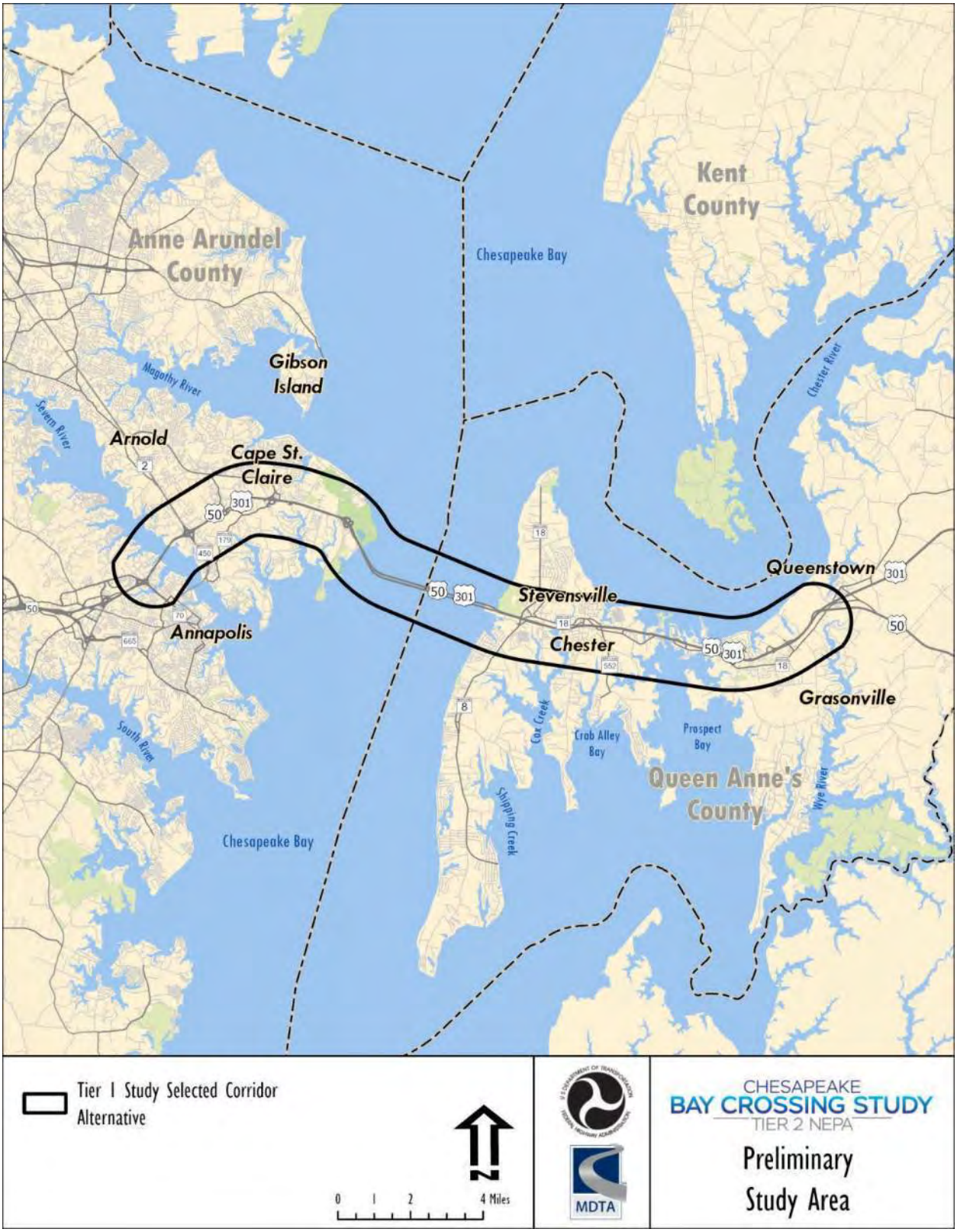


Heather Lowe

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Todd Mohn, Queen Anne's County, Director - Department of Public Works
Steve Cohoon, Queen Anne's County, Public Facilities Planner
Rob Gunter, Queen Anne's County, Principal Planner
Jeanette Mar, FHWA, Environmental Manager
Melissa Williams, MDTA, Director – Division of Planning and Program Development

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

From:	Amy Moredock
To:	Emma Beck
Cc:	Todd Mohn; Steve Cohoon; Robert Gunter; jeanette.mar@dot.gov; mwilliams9@mdta.state.md.us; Heather Lowe; Sarah Williamson; Eric Almquist
Subject:	RE: Bay Crossing Study Tier 2 NEPA - Agency Invitation
Date:	Monday, June 5, 2023 8:27:50 AM
Attachments:	image002.png image003.png BCST2_QACounty_ParticipatingResponse_AGM5June23.pdf

Good morning, Emma.
Thank you for extending this invitation to participate in the Tier 2 NEPA study. Attached please find the Department's acceptance of the invitation. We look forward to continuing this process with you.
Best,
Amy

Amy G. Moredock, CFM
Director
Queen Anne's County Planning and Zoning
110 Vincit Street, Suite 104
Centreville, MD 21617
Phone: 410-758-1255
www.qac.org

From: Emma Beck <emmab@cri.biz>
Sent: Friday, June 2, 2023 3:09 PM
To: Amy Moredock <AMoredock@qac.org>
Cc: Todd Mohn <TMohn@qac.org>; Steve Cohoon <SCohoon@qac.org>; Robert Gunter <RGunter@qac.org>; jeanette.mar@dot.gov; mwilliams9@mdta.state.md.us; Heather Lowe <hlowe@mdta.state.md.us>; Sarah Williamson <sarahw@cri.biz>; Eric Almquist <ealmquist@rkk.com>
Subject: [EXTERNAL] Bay Crossing Study Tier 2 NEPA - Agency Invitation

CAUTION: This email originated from an external source. DO NOT CLICK any links,open attachments or forward unless you recognize the sender and know the content is safe.

This Message originated outside your organization.

Good afternoon, Amy,

My apologies for misidentifying the planning director for Queen Anne's County. Please see the below email and updated letter attached for the Bay Crossing Study.

Again, my apologies for the mix up. Hope you have a good weekend.

Emma C. Beck | *Bay Crossing Study – Agency Coordination*
Coastal Resources, Inc. | Facebook | LinkedIn
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 116) | Direct 443-837-2156 | Cell 717-433-3519

From: Emma Beck
Sent: Friday, June 2, 2023 2:55 PM
To: mwisnosky@qac.org
Cc: tmohn@qac.org; scohoon@qac.org; amoredock@qac.org; rgunter@qac.org; jeanette.mar@dot.gov; mwilliams9@mdta.state.md.us; Heather Lowe <hlowe@mdta.state.md.us>; Sarah Williamson <sarahw@cri.biz>; Eric Almquist <ealmquist@rkk.com>
Subject: Bay Crossing Study Tier 2 NEPA - Agency Invitation

Good afternoon, Michael,

On behalf of Heather Lowe (MDTA) and Sarah Williamson (Bay Crossing Study Team), please see the attached Participating Agency invitation for the Chesapeake Bay Crossing Study Tier 2 NEPA. Please return letter **Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Agency Response Form** to Sarah Williamson (sarahw@cri.biz) and copy Heather Lowe (hlowe@mdta.state.md.us) and me (emmab@cri.biz) by **July 3, 2023**. Please reach out if you have any questions. We look forward to working with you on this Tier 2 Study.

Best,

Emma C. Beck | *Bay Crossing Study – Agency Coordination*
Coastal Resources, Inc. | Facebook | LinkedIn
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 116) | Direct 443-837-2156 | Cell 717-433-3519

Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: Queen Anne's County Planning and Zoning

Signature:  Date: 5 June 2023

Print Name: Amy G. Moredock

Title: Planning Director

NOISE METHODOLOGY

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) requests any final comments on the **NOISE METHODOLOGY** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the NOISE METHODOLOGY, the following agency (by signing this form):

Agency: Queen Anne's County Government

_X_ Provides Comments (below)

____ Has No Comments

Comments (Noise Methodology Memo):

- Page 2: Land uses within 500 feet of existing US 50/301 were determined during the BCS Tier 1 study based upon socioeconomic zoning data available, but the noise analysis area will be extended if impacts are found beyond 500 feet.
  - Please also analyize noise impacts measured from roads that see increased traffic patterns based on diversion from US 50/301.
- Page 3: Noise level predictions will be based on loudest-hour traffic conditions which correspond to the highest traffic volumes and percentages of trucks traveling at free flowing speeds at or near level of service C conditions. The loudest-hour traffic noise impact may not coincide with peak traffic due to reduced speeds during heavy congestion.
  - Please also contemplate noise level predictions measured from roads that see increased traffic patterns based on diversion from US 50/301.

Signature: _____ Date: 25 January 2024

Queen Anne's County

DEPARTMENT OF PUBLIC WORKS
312 Safety Drive
Centreville, MD 21617

Telephone: (410) 758-0925
Fax: (410) 758-3441
www.qac.org

County Commissioners:
James J. Moran, At Large
Jack N. Wilson, Jr., District 1
J. Patrick McLaughlin, District 2
Philip L. Dumenil, District 3
Christopher M. Corchiarino, District 4

MEMORANDUM

Date: March 9, 2026
To: Heather Lowe, Planning & Community Relations Manager
Maryland Transportation Authority

From: Steve Cohoon, Public Facilities Planner

Re: Bay Crossing Study Draft Environmental Impact Statement (DEIS)
Tier 2 National Environmental Policy Act (NEPA)

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Bay Crossing Study.

Queen Anne's County offers the following comments.

1. The County Commissioners have documented their support for adding capacity to the Bay Crossing to relieve congestion and improve mobility in and through Queen Anne's County.
2. The proposed alternatives evaluated in the DEIS, except for the no build alternative, are generally consistent with the goals and objectives of the 2022 Queen Annes County Comprehensive Plan.
3. The preferred alternative proposes widening of 2.25 miles of the US 50/301 corridor in Queen Anne's County and not the entire 10 miles in the study area. Planning should continue for future widening of US 50/301 from Cox Creek to Queenstown.
4. The preferred alternative proposes a new merge condition near Cox Creek (eastbound) and Oceanic Drive (westbound).
    a. Please provide information on the potential for new congestion at the new merger locations as traffic volumes increase.
    b. Please provide information on the anticipated trip diversion onto local roads as a result of this new merge condition.
5. Queen Annes County appreciates the continued opportunity to review and comment on the proposed property impacts, road improvements and multimodal improvements as additional detailed information becomes available during engineering and design.

Additional information elaborating on each of these points is listed below.

The County Commissioners have documented their support for adding capacity to the Bay Crossing to relieve congestion and improve mobility in and through Queen Anne's County.

For many years the Annual MDOT Priority letter from the Queen Annes County Commissioners to the Secretary of Transportation has identified the top transportation priority for the County is to address congestion at the Bay Bridge and in the Bay Bridge Corridor. The priority letter fully supports construction of two new replacement bridges to add the needed capacity to reduce congestion and improve mobility. The May 13, 2025 priority letter encourages quick completion of the National Environmental Protection Act (NEPA) Tier 2 study process so design, engineering and construction of replacement bridges can begin. The letter also asks that locally planned improvements be incorporated into the project as it moves forward. The May 13, 2025 letter states:

> *"It is vital to the safety and mobility of Queen Anne's County Citizens that continued steps be taken to quickly complete the Bay Crossing Study Tier II NEPA process and move directly into design and engineering for the corridor improvements. It is essential to establish funding and a schedule for the design and engineering of the preferred alternative to begin immediately following the NEPA process."*
>
> *"As the Tier II NEPA study moves towards selecting a preferred alternative for corridor improvements please continue to review and include transportation improvements identified in the locally adopted public policy documents such as the Queen Anne's County Comprehensive Plan, Kent Island Transportation Plan and the Queen Anne's County Pedestrian and Bicycle Master Plan."*

The DEIS is an essential first step in selecting a preferred alternative and establishing the limits of disturbance. A significant amount of information related to appearance, design, engineering, construction and impacts to property will be forthcoming as the project moves forward. Queen Anne's County would like to participate in the review, comment and where appropriate, decision making as the information becomes available to ensure continued consistency with local plans.

The proposed alternatives evaluated in the DEIS, except for the no build alternative, are generally consistent with the goals and objectives of the 2022 Queen Annes County Comprehensive Plan.

The DEIS evaluates alternatives for a new bay crossing to add capacity and to relieve congestion at the Chesapeake Bay Bridge consistent with the requirements of NEPA. The purpose and need identifies that the NEPA Tier 2 study is to evaluate viable alternatives that will address and improve:

- Adequate capacity and reliable travel times,
- Mobility,
- Roadway Deficiencies,
- Existing and future maintenance needs, and
- Navigation

While considering

- Environmental Responsibility, and
- Cost and Financial Responsibility

In general, the thousands of pages of documentation that make up the DEIS (chapters, appendix and supporting technical reports) provide an extensive study that has gathered and fully evaluates all aspects of potential impacts related to a new bay crossing and included a significant public process. The DEIS provides for a comprehensive inventory of environmental, cultural, land use, noise, socioeconomic and transportation related factors in the 2 mile wide, 20 mile long study area in Anne Arundel and Queen Anne's County.

The purpose and need identified in the DEIS as well as the supporting information related to alternatives works to move forward goals and objectives in the Queen Anne's County Comprehensive Plan.

In general, all options evaluated in the DEIS other than the "no build alternative" are generally consistent with the Comprehensive Plan because they work to:

- Improve safety, mobility, accessibility, and resiliency in the transportation network (Chapter 6, Goal 6-1)
- Strongly support resolutions to traffic problems caused by through traffic that impedes local traffic and citizen movements. (Chapter 6, Goal 6-1, Strategy 1)
- Support implementation of priority transportation improvement projects through partnerships with the State, adjacent counties, and key stakeholders. (Chapter 6, Goal 6-1, Strategy 1.2)
- Create safe and adequate infrastructure available to all modes of travel, in part by Working with MDOT SHA to reduce crashes, and improve local traffic mobility. (Chapter 6, Goal 1-2, Strategy 2.2)
- Protect neighborhood streets from through traffic and decrease congestion delays (Chapter 6, Goal 6-1, Strategy 4)
- Develop transportation studies that identify capital projects consistent with PlanQAC and its Future Land Use Plan. (Chapter 6, Goal 6-1, Strategy 5)
- Identify capital projects that are consistent with PlanQAC and annually prioritize projects in the County Transportation Priority Letter to MDOT SHA. (Chapter 6, Goal 6-1, Strategy 5)
- Continue to provide opportunities for public involvement in the planning, design, and construction of transportation improvements. (Chapter 6, Goal 6-1, Strategy 5)
- Enhance the transportation network for all users. (Chapter 6, Goal 6-2)
- Plan, design, improve, manage, maintain, and expand transportation infrastructure to meet the needs of residents and businesses. (Chapter 6, Goal 6-1, Strategy 1)
- Provide commuters a reliable route to other metropolitan areas while ensuring delivery access to the Eastern Shore, major airports, and warehouse facilities and other markets. (Chapter 6, Goal 6-1, Strategy 1.7)
- Promote safe and convenient bicycle and pedestrian access throughout the transportation system and programs. (Applicable to the SUP Option) (Chapter 6, Goal 6-1, Strategy 2)
  Minimize the loss of historic and archeological sites. (Chapter 7, Goal 7-4)
- Enhance County information maintained on historic sites, landmarks, cemeteries, archaeological sites, and scenic byways. (Chapter 7, Goal 7-4 Strategy 1)

The preferred alternative proposes widening of 2.25 miles of the US 50/301 corridor in Queen Anne's County and not the entire 10 miles in the study area. Planning should continue for future widening of US 50/301 from Cox Creek to Queenstown.

The alternatives that propose more improvements, relieve congestion for longer periods of time and accommodate higher traffic volumes resulting in less diversion trips onto local roads, go farther to comply and implement the goals of the comprehensive plan.

When considering the 3 alternatives,

> The **6-8-6 alternative** proposes widening bridge capacity from 5 lanes to 8 lanes and widening approximately 2.25 miles of US 50/301 in Queen Anne's County
>
> The **8-8-8 alternative** proposes widening bridge capacity from 5 lanes to 8 lanes and widening approximately 10 miles of US 50/301 in Queen Anne's County
>
> The **8-10-8 alternative** proposes widening bridge capacity from 5 lanes to 10 lanes and widening approximately 10 miles of US 50/301 in Queen Anne's County

Building two new bridges for the replacement of the aging structures and comprehensive widening a 20 mile long corridor is a monumental undertaking as proposed in the 8-8-8 and 8-10-8 alternatives. Selection of the 6-8-6 alternative has the least amount of environmental impact and cost because it results in the least amount of construction in the near term. It is also understood that the study shows that the 6-8-6 option significantly reduces congestion at the Bay Bridge in the target year of 2045, when the bridges are just opening. However, it is important to consider that with the construction of new bridges with an anticipated life cycle of 100 years or more, additional highway widening will be needed to support this corridor in the future. Planning improvements based on projected traffic in the year 2045 only considers conditions at the very beginning of the life cycle of the new bridges. If widening is not considered or at least planned as part of this process, then State Highway Administration will need to take years to begin and complete another planning process for highway widening, interchange replacement and exit ramp improvements. Please consider how MDTA and SHA can plan to implement the widening of the US 50/301 corridor as part of this project or as a companion project that coincides with construction of the Bay Bridges. Planning the entire 10-mile corridor now for potential highway widening and related improvements would help avoid the need for additional studies in the future. By addressing the needs of the full corridor upfront, MDOT, the State Highway Administration, the County, and residents could significantly streamline and accelerate the later planning, design, funding, and implementation of any required improvements. This is consistent with Comp Plan Goal 6-1, Strategy 4.3 "Work with MDOT SHA and the MDTA to develop a US 50/301 Corridor Plan to help move traffic through the County."

Widening of US 50/301 not addressed by MDTA as part of the Bay Crossing Study should be included in all appropriate Federal and State Transportation Planning Documents such as the Long Range

Transportation Plan(LRTP), Maryland Transportation Plan, Highway Needs Inventory and Consolidated Transportation Plan.

The preferred alternative proposes a new merge condition near Cox Creek (eastbound) and Oceanic Drive (westbound).

> **Please provide information on the potential for new congestion at the new merger locations as traffic volumes increase.**
>
> **Please provide information on the anticipated trip diversion onto local roads as a result of this new merge condition.**

For many years we have seen how the existing merge condition going from six highway lanes to five lanes on the bridge has operated as a bottleneck slowing traffic and creating backups. The proposed 6-8-6 alternative removes this condition and improves traffic flow onto the bridges. However, it creates new merge conditions as the highway will transition from 4 lanes in each direction to 3 lanes near Oceanic Drive (westbound) and Cox Creek (eastbound). We are concerned that the merger from 4 lanes to 3 lanes will become a future bottleneck as traffic volumes increase.

Because this new merge point would be located in central Kent Island, Queen Anne's County is concerned that as eastbound traffic on the US 50/301 corridor slows due to the merge, drivers may divert onto local roads to bypass the congestion. This could create new traffic and congestion problems in areas that do not currently experience them, such as Postal Road and Maryland 18, neither of which have the capacity to manage diversion trips coming off the US 50/301. Even short backups at this location could impact local roads by trip diversion onto MD 8 to access MD 18 in an effort to avoid congestion on US50/301. Likewise, the westbound merger could result in diversion trips onto local side roads. Has this future condition been evaluated? Is there a projection on when (what year) this merge condition may begin slowing traffic and generating congestion? Will future mitigating improvements be implemented on MD 18 as proposed in the MDOT MD 18 Planning and Environmental Linkages (PEL)? The County would like to fully understand the potential and anticipated timing of this congestion in relation to the comprehensive plan goals below.

- Improve safety, mobility, accessibility, and resiliency in the transportation network (Chapter 6, Goal 6-1)
- Strongly support resolutions to traffic problems caused by through traffic that impedes local traffic and citizen movements. (Chapter 6, Goal 6-1, Strategy 1)

Widening and improvements to MD 18 to address anticipated diversion trips should be included in all appropriate Federal and State Transportation Planning Documents such as the Long Range Transportation Plan(LRTP), Maryland Transportation Plan, Highway Needs Inventory and Consolidated Transportation Plan.

Queen Annes County appreciates the continued opportunity to review and comment on the proposed property impacts, road improvements and multimodal improvements as additional detailed information becomes available during engineering and design.

MD 8 Interchange

Comprehensive Plan Goal 6-1, Strategy 5, identifies that the County should "With assistance from the State, implement improvements to MD 8 and its interchange with US 50/301."

The MD 8 overpass, that is within the Limit of Disturbance (LOD) of the preferred alternative, is aging and has limited capacity for northbound left turns onto US 50/301. As more information becomes available on the condition of the existing overpass and any proposed new traffic pattern (at time of construction of the 1st and 2nd bridges) Queen Anne's County would like the opportunity to review and provide input on any proposed improvements.

Improvements could consider adding a double left turn onto US 50/301 to improve traffic flow. Also, if the aging overpass is in need of replacement, then could a divergent diamond configuration be considered as recommended in the Kent Island Transportation Plan?

Continued Support and Implementation of US 50/301 Summer Ramp Management

The summer weekend ramp management project has been successful in reducing diversion trips from US 50/301 onto MD 8. Acknowledging that the proposed preferred alternative does not eliminate westbound congestion in the corridor on summer weekends it will be necessary to continue to implement the Summer Ramp Management Partnership between MDOT and Queen Anne's County. As design for highway improvements continues, please consider including alternative ways to implement ramp management including gates, signage and markings.

The continuation of the ramp management partnership implements the Comprehensive Plan goal to "Protect neighborhood streets from through traffic and decrease congestion delays" by "Work with MDOT SHA and the MDTA to develop a US 50/301 Corridor Plan to help move traffic through the County." (Comprehensive Plan Goal 6-1, Strategy 4 & 4.3)

Bicycle and Pedestrian Improvements

If the Shared Use Path (SUP) proposed as an option in the preferred alternative continues to move forward, please review Comprehensive Plan Goal 6-2, Strategy 2 that "Promotes safe and convenient bicycle and pedestrian access throughout the transportation system and programs".

If the SUP advances to design, it should connect to the existing Cross Island Trail and/or South Island Trail for continuity of the users. Also, information will need to be provided on the anticipated number of users so supporting infrastructure such as parking and restroom facilities can be planned. MDOT and the County will need to coordinate on the planning of operations and maintenance as well.

US 50/301 Pedestrian Overpass

Queen Anne's County will be working directly with MDOT to plan and design a pedestrian overpass west of MD 8 connecting Pier One Road to Terrapin Park over US 50/301. Highway widening is proposed in this area, therefore, continued coordination will be essential to ensure that design and engineering of each project fully consider the impacts and progress of both projects.

Consider Complete Streets Implementation on Service Roads & MD 8 in the LOD

Complete streets policies to improve multimodal transportation on the service roads within the LOD (Thompson Creek, Sherman Drive, Shopping Center Drive) should be addressed as the project moves forward. Specifically, the consideration of improvements for multimodal users.

This supports Comprehensive Plan Goal 6-3, Strategy 1.1. "Apply a complete streets philosophy to identify multimodal transportation solutions for both rural roads and those in Growth Areas and making connections to and from residential neighborhoods to employment and commercial centers"

Public Property Impacts

A number of public properties (parks, schools, pump station, utilities, county roads) are impacted by the LOD for the preferred alternative. The LOD shown does not provide information on the nature of the impact and if it is temporary or permanent. Queen Anne's County will work with MDOT to fully review, discuss and comment on any impact to public property as information becomes available and the project continues.

Thank you for the opportunity to offer comments on the DEIS. Queen Anne's County appreciates the involvement in the planning process for the new bay crossing. We look forward to continuing to work with MDOT as the project moves forward.

Any comments or questions related to the comment above can be directed to:

Steve Cohoon - scohoon@qac.org
Public Facilities Planner
Department of Public Works
312 Safety Drive
Centreville, MD 21617
410-758-0920 Ext. 4131

Queen Anne's County

County Commissioners:
James J. Moran, At Large
Jack N. Wilson, Jr., District 1
J. Patrick McLaughlin, District 2
Philip L. Dumenil, District 3
Christopher M. Corchiarino, District 4

THE COUNTY COMMISSIONERS OF QUEEN ANNE'S COUNTY
The Liberty Building
107 North Liberty Street
Centreville, MD 21617

e-mail: QACCommissioners&Administrator@qac.org

County Administrator: Todd R. Mohn, PE
Executive Assistant to County Commissioners: Stephanie Jarrell
County Attorney: Patrick Thompson, Esquire

Public Hearing Comments Presented by County Commissioner Jim Moran

During Tier 2 NEPA HEARING on February 12, 2026 at Kent Island High School

Thank you for the opportunity to Speak.

It is great to see the Tier 2 NEPA process get to this point of selecting a preferred alternative with the hope of quickly moving forward to design and construction.

For many years the top transportation priority for Queen Annes County has been addressing congestion at the Bay Bridge and in the Bay Bridge corridor. The replacement bridges studied in the NEPA process will help remove the congestion and delays we experience every day and improve summer weekend traffic.

The replacement bridges are needed now and we ask that MDTA move quickly to complete the NEPA process and begin design and construction of the two new replacement bridges as quickly as possible.

The start of the NEPA process was announced on August 30, 2016. For almost 10 years MDTA has studied corridors to locate a new crossing and construction alternatives to relieve congestion. Throughout that process, the NEPA study considered a 20 mile long corridor (Corridor 7) that went from the Severn River to Queenstown. The Tier 2 NEPA studied multiple options for bridge and highway improvements throughout that 20 mile long corridor.

The selected preferred alternative is focused on only widening 8.5 miles of the 20 mile corridor.

While the preferred alternative addresses congestion at the Bay Bridge by going from 5 lanes to 8 lanes crossing the bay, it does not address the long term needed improvements in the corridor to manage traffic moving through Queen Anne's County.

After the new bridges open in the 2030's or 2040's they are anticipated to last for the next 100 years. Therefore, we ought to consider at least some of the needed highway improvements over the life of the bridge as part of this project. If widening the highway is not addressed as part of this project, then it will need to be addressed by SHA shortly after the first bridge opens.

The exhibits show traffic conditions projected in 2045 which is just the beginning of the life of the new bridges. We know based on the historical trends that traffic will continue to increase past 2045. We need to consider traffic conditions in 2065, 2085, 2100. It is highly likely that 8 lanes from Queenstown to Kent Island will be needed to address the future traffic volumes.

We believe that planning for additional highway improvement in the corridor is needed as part of this project. Other alternatives propose widening US 50/301 to 8 lanes which appear to better address the long term needs of the corridor. If alternatives D, E, F & G are not being advanced, can additional highway widening and improvements be added to alternative C?

Almost 10 years has been spent on the NEPA process. Everyone has been very patient throughout this process year after year as we endure the ongoing congestion at the bridge. We need a new Bridge Now. We need to move quickly to construction so Queen Anne's County Residents can get some relief.

Queen Anne's County strongly supports the replacement of the two existing bridges with 2 new bridges totaling at least 8 lanes.

Queen Anne's County strongly supports MDTA quickly moving to design and construction of the bridges.

Queen Anne's County believes additional highway improvements will be needed to support the new bridges and should be considered as part of this project.

Thank you for your time and consideration.

Respectfully,

County Commissioner Jim Moran

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency: United States Army Corps of Engineers**
____ Agrees with the **Study Schedule (without comments)** **_X_ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **The "Preferred Alternative and Conceptual Mitgation" coordination point indicates that MDTA will request concurrence from cooperating agencies on the preferred alternative and conceptual mitigation plan. At this point, the Corps will not have completed our public process, and therefore, will likely not be able to provide concurrence on the preferred alternative and conceptual mitigation plan.**
Signature: April Spakman Date: 5/11/2023

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. Joseph DaVia
Chief, Maryland Section North
U.S. Army Corps of Engineers
Regulatory Branch (CENAB-OPR)
2 Hopkins Plaza
Baltimore, MD 21201

Dear Mr. DaVia:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Clean Water Act, Rivers and Harbors Act, and other laws and regulations. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

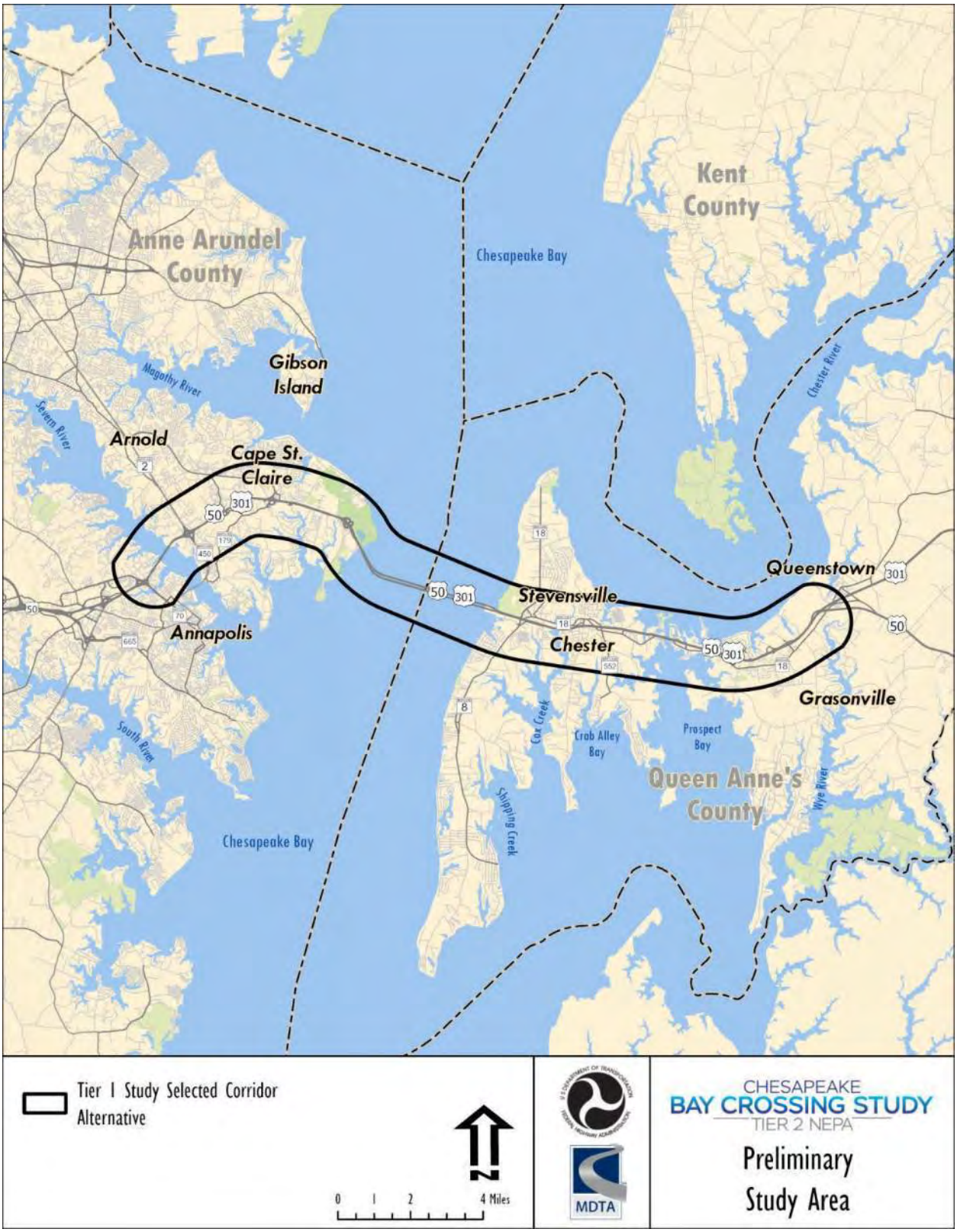
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:38:08 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Ms. April Sparkman, USACE, Biologist, Maryland Section North
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Cooperating and Participating Agency.

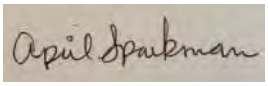
☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: United States Army Corps of Engineers, Baltimore District

Signature:  Date: 16 JUN 2023

Print Name: April Sparkman

Title: Biologist, Maryland North Section

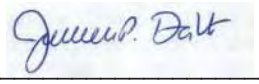
Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency: U.S. Army Corps of Engineers , Baltimore District**
_X__ Concures with the **Indirect & Cumulative Effects Methodology (without comments)** **____ Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)*** **____ Does not agree** with the **Indirect & Cumulative Effects Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: April Spakman Date: 11/22/2023

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency: United States Army Corps of Engineers, Baltimore District**
_X_ **Concurs** with the **Natural Environmental Methodology (without comments)** **____ Agrees** with the **Natural Environmental Methodology (with minor comments)*** **____ Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: April Spakman Date: 2/16/2024

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): US Army Corps of Engineers, Baltimore District **Agency:**_____
___XX_ **Concurs** with the **Draft Purpose and Need Summary (without comments) See typo below** **____ Agrees** with the **Draft Purpose and Need Summary (with <u>minor</u> comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: Typo on page 2: Additional Objectives, Environmental Responsibility Paragraph, First Sentence: Should be "..meet…"
Signature:  Date:__July 26, 2024_____

DEPARTMENT OF THE ARMY
U. S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
ATTN: REGULATORY BRANCH
2 HOPKINS PLAZA
BALTIMORE, MARYLAND 21201-2930

January 13, 2025

Operations Division

Ms. Heather Lowe
Maryland Transportation Authority
Division of Planning & Program Development
2310 Broening Highway
Baltimore, Maryland 21224

Dear Ms. Lowe:

This is in response to the Federal Highway Administration (FHWA), U.S. Department of Transportation (USDOT) Notice of Intent (NOI) to prepare an environmental impact statement (EIS) for Tier 2 of the Bay Crossing Study that was published in the Federal Register on November 15, 2024. The EIS will be prepared to address existing and future transportation issues at the William Preston Lane, Jr. Memorial (Bay) Bridge and its approaches along U.S. 50/301, from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore, in Maryland. FHWA, in coordination with the Maryland Transportation Authority (MDTA) is requesting scoping comments from all interested parties and agencies to ensure that all potential alternatives, important issues, or significant environmental effects and analyses relevant to the proposed action are considered in preparation of a National Environmental Policy Act (NEPA) document.

The Corps has been designated as a Cooperating agency in the preparation of the EIS for the Chesapeake Bay Crossing Study: Tier 2 NEPA. In this regard, we look forward to working with your agency as the NEPA document is developed to ensure that the information presented is adequate to fulfill Corps requirements. In general, the EIS should thoroughly evaluate project alternatives, permanent and temporary impacts to waters of the U.S., including jurisdictional streams and wetlands, impacts to Corps Civil Works projects, and the Corps public interest factors described below. This includes an analysis of impacts resulting from all project elements such as: in-water piers or structures, pier protection measures (e.g., riprap, island fills, dolphins, etc.), road crossings and/or filling of streams and wetlands, dredging, grading, permanent and temporary access roads, construction matting, staging areas, building pads, storm water management, stream diversions, disposal of any excess fill or dredged material, utility line impacts and/or relocations, mitigation proposals, demolition of existing bridge spans, and all other construction/operation related impacts.

We understand that the project will result in discharges of dredged or fill material into waters of the U.S., including jurisdictional wetlands; and work is expected to occur in

navigable waters of the U.S., therefore, the project will require Department of the Army authorization under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. The alternatives analysis and methods to avoid/minimize impacts to waters of the U.S. are the centerpieces of the Corps-permit review process. Accordingly, to ensure that the information presented in the EIS is adequate to fulfill the requirements of the Corps regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the Corps public interest review process, we request that the following topics be scoped and comprehensively evaluated in the EIS:

1. Purpose and need for the project: The EIS should clearly and comprehensively describe the purpose and need for the project.

2. Alternatives Analysis/Avoidance and minimization: A fundamental precept of the Clean Water Act Section 404 Regulatory Program is that impacts to wetlands and other waters of the United States will be avoided and minimized, where it is practicable to do so. An evaluation of alternatives is required under the Section 404(b)(1) Guidelines for projects that include the discharge of dredged or fill material to waters of the United States. NEPA requires discussion of a reasonable range of alternatives, including the no action alternative, and the effects of those alternatives. Under the Section 404(b)(1) Guidelines, practicability of alternatives is taken into consideration and no alternative may be permitted if there is a less environmentally damaging practicable alternative. Note that an alternative is practicable if it is available and capable of being done after taking into consideration cost, logistics, and existing technology in light of the overall project purpose. The MDTA has identified seven alternatives for the proposed action, including the no-build alternative and six build alternatives. At a minimum, the NEPA document must evaluate the practicability of the identified bridge alternatives, while considering the following avoidance and minimization techniques:

    a. Evaluation of alternative alignments within the study corridor and shifts in alignment to avoid impacts to waters of the U.S., including jurisdictional wetlands.
    b. Longer Bay Bridge span lengths to minimize in-water piers
    c. Bridges to span stream/wetland crossings
    d. Alternative measures for Chesapeake Bay bridge pier protection (e.g., rock island fill, dolphins, fender system, etc.)
    e. Retaining walls along additional approach lanes
    f. Steep side slopes
    g. Stormwater management alternatives, i.e. placing stormwater in uplands
    h. Stream relocation as opposed to filling and/or piping streams,
    i. Implementation of best management practices
    j. Use of timber mats in wetland/stream areas for temporary equipment access.

k. Use of temporary construction road access bridges to span streams and wetlands.
l. Construction material/equipment staging areas should be located outside of stream and wetland boundaries,
m. Shorten and/or narrow construction widths through waters of the U.S., including jurisdictional wetlands.
n. Adherence to time of year restrictions in waters of the U.S.
o. Impacts and alternatives for placement of any dredged material or excess fill material (e.g., uplands, existing dredge material containment facilities, beneficial/innovative reuse, etc.)

3. Corps public interest review factors: The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest as stated at 33 CFR 320.4(a). The benefits which reasonably may be expected to accrue from the proposal are balanced against its reasonably foreseeable detriments. Among the factors that must be evaluated as part of the Corps public interest review include: conservation, economics, aesthetics, general environmental concerns, wetlands and streams, historic and cultural resources, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, energy needs, safety, food and fiber production, mineral needs, water quality, considerations of property ownership, air and noise impacts, and, in general, the needs and welfare of the people. These Corps public interest factors must be comprehensively evaluated in the EIS.

4. Delineation: All waters of the U.S., including jurisdictional wetlands, must be delineated within the project area in accordance with the 1987 CORPS Wetland Delineation Manual and appropriate Regional Supplement.

5. Impacts: Temporary and permanent impacts to all waters of the U.S, including jurisdictional wetlands, shall be quantified for each project alternative. For streams and rivers (both temporary and permanent), include the stream classification (e.g., perennial, intermittent; rivers, lakes, ponds, etc.) and both the linear feet of the stream/river impacts (as measured along the centerline of the stream/river channel) and square feet of impact. For jurisdictional wetland impacts (both temporary and permanent), identify the wetland classification (e.g., palustrine or lacustrine system; forested, scrub-shrub, or emergent wetlands) to be impacted, quantify each classification of wetlands to be impacted in square feet, differentiate between temporary or permanent impacts, and quantify any

change in wetland classification in square feet (e.g., palustrine forested to palustrine emergent, etc.). Impacts associated with dredging shall also be quantified.

6. Cumulative Impacts: Cumulative, secondary, and indirect impacts resulting from the project along with historical impacts and existing land use must be analyzed with the watershed that contains the project.

7. Dredging and Dredge Material Disposal Sites: Describe the anticipated dredging for the project, methods (e.g., mechanical, hydraulic), cubic yards, physical/chemical analysis, dredge material disposal options, and proposed locations for any excess fill and/or dredged material resulting from project construction. Describe impacts and alternatives for placement of any dredged material or excess fill material (e.g., uplands, existing dredge material containment facilities, beneficial/innovative reuse, etc.).

8. Compensatory Mitigation: A comprehensive compensatory mitigation plan must be described to offset the loss of waters of the U.S. The plan must describe the final mitigation amount required to offset loss of waters of the United States and must provide supporting information regarding the identification and quantification of those amounts. Information should also be provided regarding the ratio or function, or condition assessment or other suitable mitigation metric used to make this determination, if applicable. The mitigation plan shall be developed in accordance with the 2008 mitigation rule at 33 CFR 332.3.

9. Effects on Corps Civil Works Projects (33 USC 408): The EIS should comprehensively evaluate the potential for effects on Corps Civil Works project (Section 408) and the project should be designed to avoid and minimize these effects to the maximum extent practicable. Please be advised that the project will require the submittal of a Section 408 request in accordance with Engineer Circular 1165-2-220, Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects pursuant to Section 14 of the Rivers and Harbors Act 33 U.S.C. 408, dated September 10, 2018, for any proposed work that could impact the federal navigation channel. Information on the Section 408 process can be found at this link: https://www.nab.usace.army.mil/Missions/Regulatory/Section-408-Requests/. A Section 408 Request Form has also been provided as an enclosure with this letter (Enclosure 1).

10. Compliance with Existing Acts: Analysis of the project's compliance with Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, Section 401 of the Clean Water Act, and the Magnuson-

Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 04-267) [essential fish habitat]. The EIS should also analyze air quality impacts (i.e., Section 176(c) of the Clean Air Act General Conformity Rule Review) and the effects of the project on greenhouse gas emissions and climate change.

11. Executive Orders: Evaluation of compliance with Executive Orders on floodplains and environmental justice.

12. List of all Federal, State, County, Municipal, and Local permits required for the project.

13. Project review schedule, and NEPA document preparation schedule. Other important milestones (e.g., public hearings, etc.) should also be listed in the NEPA document.

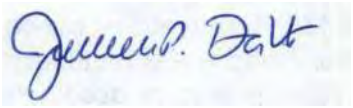
14. A comprehensive description of anticipated impacts, avoidance/minimization measures, and construction means and methods for removing the two existing Chesapeake Bay bridge spans.

15. Sequence of construction for new bridges and removal of old bridges.

16. Describe if a temporary construction trestle is needed for bridge construction, including associated impacts.

Again, thank you for inviting the Corps participation as a Cooperating agency in the NEPA process and the opportunity to provide scoping comments on the project. We look forward to working with your agency as the EIS is prepared and the review of the project proceeds. If you have any questions concerning this letter, please contact Mrs. April E. Sparkman of my staff at (410) 962-0148 or April.E.Sparkman@usace.army.mil.

Sincerely,



Joseph P. DaVia
Chief, Maryland North Section
Regulatory Branch

Enclosure

To identify how we can better serve you, we need your help. Please take the time to fill out our customer service survey at: https://regulatory.ops.usace.army.mil/customer-service-survey/

Enclosure #1: Section 408 Request Form

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

INFORMATION REQUIRED TO PROCESS SECTION 408 REQUESTS
by private, public, tribal, or other federal entities to make alterations to, or temporarily or permanently occupy or use, any US Army Corps of Engineers federally authorized civil works projects pursuant to 33 USC 408

1. Purpose. The purpose of this document is to provide guidance for private, public, tribal, or other federal entities regarding the information the US Army Corps of Engineers (USACE) Baltimore District needs to complete a review pursuant to 33 USC 408 (Section 408). This review is necessary to obtain permission from the USACE Baltimore District for proposed alterations to any USACE federally authorized civil works project, referred to as a "USACE project" within this document.

2. Applicability. This guidance applies to alterations proposed within the lands and real property interests identified and acquired for the USACE project and to lands available for USACE projects under the navigational servitude. In the Baltimore District, USACE projects typically include: local protection projects consisting of levees, floodwalls, channel improvement, and interior drainage features; Federal navigation channels; and flood risk management projects consisting of earthen or concrete dams, outlet works, spillways, abutments, support facilities, and reservoir pool. Routine operations and maintenance activities specified in the O&M manual and performed by the non-federal sponsor or USACE do not require permission from USACE under Section 408.

3. References. Engineering Circular 1165-2-216, *Policy and Procedural Guidance for Processing Requests to Alter USACE Civil Works Projects pursuant to 33 USC 408*

4. Authority. The authority for the US Army Corps of Engineers to grant permission for temporary or permanent alterations to federally authorized civil works projects is contained in Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 USC 408, which states that *"the Secretary [of the Army] may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any [work built by the United States] when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work."* It is otherwise unlawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct, or in any manner whatever impair the usefulness of any work built by the United States.

5. Exclusions. Per Engineering Circular 1165-2-216, the following activities do not require permission from USACE under Section 408:
    a. Routine operations and maintenance activities specified in the O&M manual and performed by the non-federal sponsor or USACE
    b. Activities contained in 36 CFR 327, including the implementation of an approved USACE Project Master Plan, Shoreline Management Plan, or Operational Management Plan

6. Requester. A request for Section 408 permission can originate from a non-federal sponsor or an independent requester. For USACE projects with a non-federal sponsor, the requester must either be the non-federal sponsor or have the endorsement of the non-federal sponsor prior to a written request being submitted to USACE.

7. Request. The Requester must submit the information that follows for all requests to alter USACE projects within the Baltimore District. Requests must be in writing, signed, and submitted to the USACE Baltimore District Regulatory Point of Contact. Requests may be sent by regular mail or electronic mail for attachments under 10MB. Attachment A contains a comprehensive list of additional information that may be requested to facilitate the Section 408 review process. Attachment B provides an example of the local sponsor statement of no objection.

Points of Contact:

GOVERNMENT:

Name: Michael Danko
Organization: USACE Baltimore District
Title: Regulatory Point of Contact
Address: 401 East Louther Street, Suite 205
Carlisle, Pennsylvania
Phone: (717) 249-8730
E-mail: Mike.Danko@usace.army.mil

REQUESTER:

Name: _____
Organization: _____
Title: _____
Address: _____
Phone: _____
E-mail: _____

LOCAL SPONSOR: (if not the Requester)

Name: _____
Organization: _____
Title: _____
Address: _____
Phone: _____
E-mail: _____

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

Project Description

USACE Project being altered, used or impacted: _____

City and State: _____

Stream, River or Water Body: _____

Proposed Project Name: _____

Latitude, Longitude: _____

USACE Project Type

_____ Local Protection Project** _____ Navigation _____ Flood Risk Management

****Have you obtained a Statement of No Objection from the Non-Federal Local Sponsor of the Local Protection Project? If no, please explain.**

_____

Note: Requests will not accepted as complete without this statement. See Attachment B for an example.

Brief description of the proposed work and how the USACE project will be altered
Note: Indicate if the proposed alteration is to a previously-modified feature (e.g., re-aligning a pipe through the embankment that had been installed as a modification to the project).

_____

_____

_____

Description of project alternatives (if any) that avoid impacts to the USACE project

_____

_____

_____

List of all real property interests
Note: Include maps clearly depicting both existing real estate rights and additional real estate required.

_____

_____

_____

_____

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

Approximate schedule for work (list activities by Month/Year)

_____

_____

_____

Describe operations and maintenance that will be required as a result of this alteration
Note: Requester is responsible for performing all operations and maintenance required as a result of the alteration, as well as for all associated costs. For local protection projects, the non-federal local sponsor is required to ensure that all required operations and maintenance associated with the alteration are adequately performed.

_____

_____

_____

Documents included with the alteration request
Note: USACE may request additional information as part of the review process.

General Project: Report _____ Plans _____ Specs _____ Drawings _____

Hydrology & Hydraulics: Report _____ Models _____

Geotechnical: Report _____ Drilling Plan _____

Other (describe): _____

Questions: **(Yes/No)**

1. Will the proposed project require the use of federal property? _____
2. Will the proposed project require the use of property owned by the non-federal sponsor? _____
3. Have any Environmental Reports been completed for this Project? If yes list below. _____
4. Are you required to pursue authorization pursuant to Sections 10/404/103? If yes, list date or anticipated date of application/pre-construction notification submittal. _____
5. Is this proposed project identified as a priority project in an established in-place funding agreement? If yes, provide documentation of the funding agreement and point of contact. _____
6. Are you seeking credit under Section 221 of the Flood Control Act of 1970 or other laws such as approval under Section 204 (f) of WRDA 1986? _____

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

Signature Block

Request is hereby made for permission to alter the USACE project as described in this form and supporting documentation. I certify that the information provided in this request is complete and accurate to the best of my knowledge. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the requesting organization and/or non-federal local sponsor.

REQUESTER:

_____
Name

_____
Organization

_____
Title

_____
Signature

_____
Date

LOCAL SPONSOR: (If not the requester, for local protection projects)

_____
Name

_____
Organization

_____
Title

_____
Signature

_____
Date

TO BE COMPLETED BY USACE

Date Received: _____
USACE Project Name: _____
Resource Manager or Local Sponsor: _____
Regulatory Permit Number: _____

8. USACE Review Criteria. USACE will review the alteration request for potential adverse impacts to the project based on the following criteria (as applicable):
   a. Reliability of the project to function as designed.
   b. Local sponsor and/or USACE ability to adequately inspect the project during normal conditions.
   c. Local sponsor and/or USACE ability to adequately inspect the project during potential or actual emergency conditions.
   d. Local sponsor and/or Requester ability to adequately operate and maintain the project.
   e. Local sponsor and/or Requester legal rights to enter and/or have contractors enter all properties affected, either through fee deed(s) or easement deed(s), which should be attached to this request.
   f. Local sponsor ability to conduct flood fighting operations and temporary repairs during an emergency.
   g. Alteration impacts to the structural or geotechnical integrity of project components (including embankment, floodwall, or retaining wall strength; slope stability; stone protection; crest elevation; miscellaneous structures, etc.).
   h. Alteration impacts on the hydraulic functioning of the project.
   i. Alteration impacts to a floodplain or floodway (flood risk management projects only).
   j. Alteration impacts on the interior drainage system or drainage facilities (i.e. outfalls, gate wells, storm sewer lines, pump stations, drainage ditches, etc.).
   k. Alteration impacts on environmental aspects of the project, including compliance with National Environment Policy Act (NEPA) requirements.
   l. Alteration impacts on safety aspects of the project.
   m. Alteration impacts to the real estate easement requirements, including project access.
   n. USACE Section 10/404 Regulatory permit requirements.
   o. Impacts to the public and other stakeholders.
   p. Other criteria as available.

9. USACE Review and Decision. Work or usage shall not begin until written approval from the USACE Baltimore District Commander, or his designee, is obtained. Upon completion of review of the request, the Baltimore District will send a letter from the District Commander, or his designee, either granting or denying the request for permission to alter the USACE project. If granted, the Requester's signature may be required on an Alteration Conditions Form to confirm acceptance of any special conditions required. If denied, reasons for not granting permission will be provided.

   If applicable, an Emergency Action Plan (EAP) must also be provided as a prerequisite to approval. Requestor must provide information about emergency response in the event of a flood during construction. This should include at a minimum: notification tree, stockpiled materials, how flooding will be anticipated, and specific activities at each phase of construction to restore flood risk reduction.

   USACE reserves the right to require construction inspections or meetings with the Local Sponsor, Requester, and other interested parties.

10. Special Conditions. The following are examples of special conditions, which may be included in the permission to alter, use, or impact a USACE project. Additional special conditions may be included depending on the nature of the work:
    a. Requester shall obtain all appropriate local, state, and Federal permits (or waivers from these permits) before performing the proposed alteration. USACE approval of the proposed alteration does not negate the need to obtain the aforementioned permits.
    b. Requester must notify the USACE Baltimore District at least fifteen (15) days before work/usage is started and receive approval to proceed from the designated Baltimore District point of contact. Time may vary depending on project.
    c. Requester shall provide copies of pertinent design, construction, and/or usage submittals/documents. Photographic documentation of the alteration work and the impacted project area may be requested to be taken before, during, and after construction.
    d. Requester must develop a safety plan prior to commencing the alteration and ensure that all officers, agents, employees, or others who may be present on the premises at their invitation are thoroughly familiar with the plan and follow it.
    e. No equipment or materials may be stored or stockpiled within 15 feet of the levee toe, floodwall, or any other flood protection project features without prior consent from the Corps.
    f. The Requester may be required to perform an inspection of the USACE project with the Baltimore District prior to the Requester's use of the project to document existing conditions.
    g. Alterations approved in this request shall be progressed in such a manner to avoid interference with the inspection, operation, and maintenance of the USACE project.
    h. Requester must schedule a final inspection with the Baltimore District within fifteen (15) days after completion of the alteration. Time may vary depending on project.
    i. Requester shall submit a copy of as-built drawings within 30 days of completion of work showing the new work as it relates to identifiable features of the USACE project.
    j. Requester shall remove all structures constructed on or within the USACE project upon completion of usefulness of such structures, if they no longer serve the purposes originally intended, or upon expiration of the agreement with USACE Baltimore District. The Requester shall restore the USACE project to its original condition after removal of these structures. Permanent alterations approved by USACE are excluded from this requirement, however must be maintained in good condition.
    k. Field work shall be coordinated with the designated USACE Baltimore District point of contact, to be determined prior to the start of work.
    l. Underground utility lines of any type that cross the levee shall have markers placed on the surface to indicate location, type, and usage of the line.

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

ATTACHMENT A
Section 408 Request Supplemental Information

The following list is designed to assist you in providing a complete review package when submitting a Section 408 request to the USACE Baltimore District. The intent is to provide a comprehensive list of information our technical staff may need to complete the review process. The list below is not all inclusive and may not apply to every situation; our technical staff may request additional documentation. Please provide the information in this list to the extent possible and submit with your request.

A. General Documentation. Please provide at minimum the following items:
    1) Project Location Map (at least 8.5"x11") including:
        a) Aerial image with proposed project features
        b) City, county, and state
        c) Latitude and longitude
        d) Name of Stream, River or Body of Water
        e) River mile (if applicable)
    2) Project Description. Please provide a detailed and complete project description, including all areas of disturbance to the USACE project. Include areas to be used for ingress, egress, or staging of materials or equipment. Fully describe construction techniques to be used on the USACE project alteration. Include quantities and types of materials used as fill or removed from the site. Accurately describe any ground disturbing activity that will occur and provide acreage or lineal area of impact. Include maps, pictures, and figures as necessary to fully explain the proposed work.
    3) Right-of-Way Maps from agency responsible for operating and maintaining the facility
    4) Pre-final project plans and specifications
    5) Project schedule
    6) Photographs of current conditions at the site
    7) Written Statement of No Objection by the Local Sponsor

B. Real Estate
    1) List of all real property interests required to support the proposed alteration, including those in federally managed lands and those owned by the Requester.
    2) Maps clearly depicting both existing real estate rights and the additional real estate required.
    3) GIS shapefiles of the full project extents.
    4) Deed or other real estate instruments
    5) Agreements between the United States of America and Proponent
    6) Office of the Assessor Property Information Report
    7) Assessor's Parcel Number (APN)

C. Environmental Compliance
    1) List of any State or Federal Threatened or Endangered Species
    2) List of any noise sensitive receptors and provide description of the receptor and its distance from the source
    3) List and describe all Hazardous Toxic and Radioactive waste (HTRW) present at the site

4) List all recreation amenities that would be impacted due to this alteration
5) List all public services that would be disrupted due to this alteration
6) Indicate whether public transportation will be impacted due to this alteration
7) Section 401 Certification
8) Air Quality Analysis
9) All cultural surveys conducted in the last five years
10) Tribal Contact List

D. Technical Analysis

1) Civil. Each submittal should clearly identify the existing condition of the dam and/or appurtenant structures to include plan, profile and design details of the proposed alteration in relation to the existing USACE project. Below are examples of information necessary to understand the existing and proposed conditions.
    a) Alteration location (Vicinity map and specific alteration location)
    b) Applicable datum
    c) Real estate interests, existing and to be acquired, needed for the proposed alteration
    d) Grading plans
    e) Layout plan, profiles, and cross-sections of the proposed alternation
    f) Previous inspection reports to assist in identifying existing deficiencies and their proximity to the proposed alteration
    g) Sections and details
    h) Temporary measures required during construction (bypasses, cofferdams, etc.)
2) Geotechnical. The following is a list of analyses or information that may be necessary to consider in evaluating geotechnical impacts if proposed alterations alter the dam embankment or penetrate the natural blanket or foundation.
    a) Erosion control (changes in erosive forces on a slope)
    b) Liquefaction susceptibility
    c) Material usage/borrow/waste/transport/hauling
    d) Placement of stockpiles, heavy equipment, or other surcharges
    e) Drilling plan
    f) Results of subsurface investigation – boring logs, test pit logs, laboratory test results, etc.
    g) Seepage analysis
    h) Settlement analysis
    i) Stability analysis
    j) Vegetation
3) Structural. The following is a list of analysis or information that may be necessary to evaluate the impacts of proposed alterations to concrete, sheet-piling, or drainage structures.
    a) Bridges and related abutments
    b) Design analysis for retaining walls and excavation support system
    c) Design of shallow or deep foundations, including bearing capacity and settlement analysis if the construction is located within the line of protection or right-of-way and creates potential seepage problems

   d) Design recommendations for foundations on expansive soils
   e) Diaphragm walls
   f) Gates or other operable features
   g) Other structural components integral to the project
   h) Pier penetrations of levee embankments
   i) Stability analysis including sliding, overturning, bearing, flotation, uplift and any seismic load effects for any alteration to the channel walls and/or flood walls
   j) Structural drainage control methods
   k) Water stops and contraction/expansion joints

4) Hydrology and Hydraulics. The following factors may be considered when evaluating the hydrologic and hydraulic (H&H) impacts to a USACE project. Please provide an Executive Summary detailing how each of the below items is addressed and how your project impacts the USACE project. H&H models may be requested for review.
   a) Changes in inflow
   b) Changes in velocity
   c) Changes in water surface profiles and flow distribution
   d) Consideration of impacts to energy dissipation measures; hydropower generation; sedimentation; or navigation
   e) Scour Analysis
   f) Sediment transport analysis
   g) Upstream and downstream impacts of the proposed alterations
5) Operations, Maintenance and Flood Fighting. Alterations may change operation, maintenance or require special flood fighting procedures.
   a) Effects on existing maintenance access
   b) Effects on maintenance practices
   c) Flood contingency plan during construction, measures proposed to protect area under construction, monitoring of river level, river stage at which plan will be activated, materials and equipment to be used to activate plan, and personnel contact and telephone number to activate plan.
   d) Flood fighting requirements and practices
   e) Special inspection requirements
6) Potential Failure Mode Analysis. Depending on the proposed alteration, the requester may be required by the district to provide a potential failure mode analysis with the proposed alteration in place.
7) Review Plan. If the alteration will either 1) temporarily impair the purpose and function of the existing Federally-constructed project or 2) be a major repair, rehabilitation, relocation, replacement or modification of the existing Federally-constructed project, please provide the following:
   a) Independent External Peer Review (IEPR) Plan (Reference EC 1165-2-217)
   b) Design Quality Control Plan

DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Baltimore District – Section 408 Request

ATTACHMENT B
Local Sponsor Statement of No Objection

SUBJECT: Request to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408

TO: USACE Baltimore District Regulatory 408 POC

The **<*Name of Non-Federal Local Sponsor*>** (Sponsor) is the Non-Federal Local Sponsor to the U.S. Army Corps of Engineers Baltimore District for the **<*Name of USACE Project*>** Local Protection Project (USACE Project).

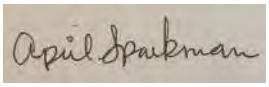
The Sponsor is aware of the Section 408 Request by **<*Name of Requester*>** to alter the USACE Project in order to complete the proposed **<*Description of work to be performed and impacts to the local protection project*>**.

The Sponsor does not object to the Section 408 Request nor its review by the U.S. Army Corps of Engineers. The Sponsor acknowledges continued responsibility for the operation and maintenance of the USACE Project at no cost to the government and will hold and save the government free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project.

_____
Printed Name

_____ _____
Signed Name Date

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:** United States Army of Corps of Engineers
_X_ **Concurs** with the **Draft ARDS (without comments)** ____ **Agrees** with the **Draft ARDS (with <u>minor</u> comments)*** ____ **Does not agree** with the **Draft ARDS*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature:  Date: 4/7/2025

DEPARTMENT OF THE ARMY
U. S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
ATTN: REGULATORY DIVISION
2 HOPKINS PLAZA
BALTIMORE, MARYLAND 21201-2930

March 9, 2026

Regulatory Division

Ms. Heather Lowe
Maryland Transportation Authority
Division of Planning & Program Development
2310 Broening Highway
Baltimore, Maryland 21224

Dear Ms. Lowe:

This is in response to the Federal Highway Administration (FHWA), U.S. Department of Transportation (USDOT) Draft Environmental Impact Statement (DEIS) for Tier 2 of the Bay Crossing Study that has been completed, with the Notice of Availability published in the Federal Register on January 23, 2026. The DEIS has been prepared to address existing and future transportation issues at the William Preston Lane, Jr. Memorial (Bay) Bridge and its approaches along U.S. 50/301, from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore, in Maryland. FHWA, in coordination with the Maryland Transportation Authority (MDTA) is requesting comments from all interested parties and agencies to ensure that all potential alternatives; including MDTA’s Recommended Preferred Alternative (RPA) (8-6-8 South); important issues, or significant environmental effects and analyses relevant to the proposed action are considered in preparation of the Final EIS.

The Corps has been designated as a Cooperating agency in the preparation of the EIS for the Chesapeake Bay Crossing Study: Tier 2 NEPA. In this regard, we look forward to working with your agency as the NEPA document is further developed to ensure that the information presented is adequate to fulfill Corps requirements. In general, the EIS should thoroughly evaluate project alternatives, permanent and temporary impacts to waters of the U.S., including jurisdictional streams and wetlands, impacts to Corps Civil Works projects, and the Corps public interest factors described below. This includes an analysis of impacts resulting from all project elements such as: in-water piers or structures, pier protection measures (e.g., riprap, island fills, dolphins, etc.), road crossings and/or filling of streams and wetlands, dredging, grading, permanent and temporary access roads, construction matting, staging areas, building pads, storm water management, stream diversions, disposal of any excess fill or dredged material, utility line impacts and/or relocations, mitigation proposals, demolition of existing bridge spans, and all other construction/operation related impacts.

We understand that the project will result in discharges of dredged or fill material into waters of the U.S., including jurisdictional wetlands; and work is expected to occur in navigable waters of the U.S., therefore, the project will require Department of the Army authorization under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 189, and Section 14 of the Rivers and Harbors Act (Section 408). The alternatives analysis and methods to avoid/minimize impacts to waters of the U.S. are the centerpieces of the Corps-permit review process. Accordingly, to ensure that the information presented in the EIS is adequate to fulfill the requirements of the Corps regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the Corps public interest review process, we request that the following topics be scoped and comprehensively evaluated in the EIS:

1. Alternatives Analysis/Avoidance and minimization: A fundamental precept of the Clean Water Act Section 404 Regulatory Program is that impacts to wetlands and other waters of the United States will be avoided and minimized, where it is practicable to do so. An evaluation of alternatives is required under the Section 404(b)(1) Guidelines for projects that include the discharge of dredged or fill material to waters of the United States. NEPA requires discussion of a reasonable range of alternatives, including the no action alternative, and the effects of those alternatives. Under the Section 404(b)(1) Guidelines, practicability of alternatives is taken into consideration, and no alternative may be permitted if there is a less environmentally damaging practicable alternative. Note that an alternative is practicable if it is available and capable of being done after taking into consideration cost, logistics, and existing technology in light of the overall project purpose. The MDTA has identified seven alternatives for the proposed action, including the no-build alternative and six build alternatives. The DEIS also identifies a RPA (8-6-8 South).

   The Corps would like to commend MDTA and FHWA for the level of rigor and detail that has been provided in the alternatives analysis.

   At a minimum, the NEPA document must evaluate the practicability of the identified bridge alternatives, while considering the following avoidance and minimization techniques:

   a. Evaluation of alternative alignments within the study corridor and shifts in alignment to avoid impacts to waters of the U.S., including jurisdictional wetlands.
   b. Longer Bay Bridge span lengths to minimize in-water piers
   c. Bridges to span stream/wetland crossings
   d. Alternative measures for bridge pier protection (e.g., rock island fill, dolphins, fender system, etc.)
   e. Retaining walls along additional approach lanes
   f. Steep side slopes
   g. Stormwater management alternatives, i.e. placing stormwater in uplands

h. Stream relocation as opposed to filling and/or piping streams,
i. Implementation of best management practices
j. Use of timber mats in wetland/stream areas for temporary equipment access.
k. Use of temporary construction road access bridges to span streams and wetlands.
l. Construction material/equipment staging areas should be located outside of stream and wetland boundaries,
m. Shorten and/or narrow construction widths through waters of the U.S., including jurisdictional wetlands.
n. Adherence to time of year restrictions in waters of the U.S.
o. Impacts and alternatives for placement of any dredged material or excess fill material (e.g., uplands, existing dredge material containment facilities, beneficial/innovative reuse, etc.)

2. Collision Protection System/Pier Protection: The Corps understands that the main piers near the navigation channels would have a collision protection system and recommends that you evaluate alternatives for pier protection. The Corps is currently reviewing a MDTA permit application which proposes pier protection at the existing Bay Bridge spans and that these structures may need to be removed when the old bridge spans are demolished. Therefore, the Corps recommends that demolition of these pier protection structures be included as an element of the LOD and that you quantify impacts to Waters of the U.S. associated with demolition and restoration. However, to the extent practicable, to minimize aquatic impacts and reduce project cost, MDTA should evaluate whether any or all of the proposed pier protection structures at the existing spans can be incorporated into the pier protection for the new Chesapeake Bay bridge spans. This information/analysis should be included in the Final EIS.

3. Jurisdiction and Delineation: The Corps recommends that MDTA and FHWA closely monitor any potential changes to the definition of waters of the U.S. Further, the final jurisdictional status of resources will be determined during permitting. All waters of the U.S., including jurisdictional wetlands, must be delineated within the project area in accordance with the 1987 Corps Wetland Delineation Manual and appropriate Regional Supplement.

4. Impacts: Temporary and permanent impacts to all waters of the U.S, including jurisdictional wetlands, shall be quantified for each project alternative. For streams and rivers (both temporary and permanent), include the stream classification (e.g., perennial, intermittent; rivers, lakes, ponds, etc.) and both the linear feet of the stream/river impacts (as measured along the centerline of the stream/river channel) and square feet of impact. For jurisdictional wetland impacts (both temporary and permanent), identify the wetland classification (e.g., palustrine or lacustrine system; forested, scrub-shrub, or emergent wetlands) to

be impacted, quantify each classification of wetlands to be impacted in square feet, differentiate between temporary or permanent impacts, and quantify any change in wetland classification in square feet (e.g., palustrine forested to palustrine emergent, etc.). Impacts associated with dredging shall also be quantified.

5. Cumulative Impacts: Cumulative, secondary, and indirect impacts resulting from the project along with historical impacts and existing land use must be analyzed with the watershed that contains the project.

6. Dredging and Dredge Material Disposal Sites: Describe the anticipated dredging for the project, methods (e.g., mechanical, hydraulic), cubic yards, physical/chemical analysis, dredge material disposal options, and proposed locations for any excess fill and/or dredged material resulting from project construction. Describe impacts and alternatives for placement of any dredged material or excess fill material (e.g., uplands, existing dredge material containment facilities, beneficial/innovative reuse, etc.).

7. Compensatory Mitigation: The Corps will require compensatory mitigation for all unavoidable adverse impacts to Waters of the U.S. A comprehensive compensatory mitigation plan must be described to offset the loss of waters of the U.S. The plan must describe the final mitigation amount required to offset loss of waters of the United States and must provide supporting information regarding the identification and quantification of those amounts. Information should also be provided regarding the ratio or function, or condition assessment or other suitable mitigation metric used to make this determination, if applicable. The mitigation plan shall be developed in accordance with the 2008 mitigation rule at 33 CFR 332.3. The Corps recognizes that there are no approved wetland or stream mitigation banks and/or ILF programs that have a service area within the resource review area; however, mitigation banks may become available during final design and/or permitting. The following additional mitigation opportunities have been identified in the DEIS: nature-based shoreline stabilization; SAV restoration/enhancement, oyster reef seeding, funding, and/or oyster reef creation; fish reef enhancement and/or creation; common reed eradication; fish passage restoration; and/or stream restoration. The Corps recommends that MDTA continue to coordinate with the Corps and the Maryland Department of Environment to evaluate potential compensatory mitigation options. The Corps cannot issue a permit for the proposed work until a final compensatory mitigation plan has been submitted and approved.

8. Effects on Corps Civil Works Projects (33 USC 408): The EIS should comprehensively evaluate the potential for effects on Corps Civil Works project (Section 408) and the project should be designed to avoid and minimize these effects to the maximum extent practicable. Please be advised that the project will require the submittal of a Section 408 request in accordance with Engineer

Circular 1165-2-220, Policy and Procedural Guidance for Processing Requests to Alter US Army Corps of Engineers Civil Works Projects pursuant to Section 14 of the Rivers and Harbors Act 33 U.S.C. 408, dated September 10, 2018, for any proposed work that could impact the federal navigation channel. Information on the Section 408 process can be found at this link: https://www.nab.usace.army.mil/Missions/Regulatory/Section-408-Requests/. A Section 408 Request Form has also been provided as an enclosure with this letter (Enclosure 1).

9. A comprehensive description of anticipated impacts, avoidance/minimization measures, and construction means and methods for removing the two existing Chesapeake Bay bridge spans.

10. Optional Shared Use Path (SUP): The Corps attended two public hearings that were held for the Chesapeake Bay Crossing Study and was provided an opportunity to listen to those that offered testimony. During the public hearings the Corps heard extensive comments related and/or in favor of the optional SUP. The Corps strongly recommends that MDTA and FHWA take these comments under advisement during your evaluation of the optional SUP and in light of your project purpose. The project purpose and need focuses on five identified needs, one of which is mobility. The DEIS further identifies that there is lack of mobility and connectivity at the Bay Bridge for bicycle and pedestrian users.

Again, thank you for inviting the Corps participation as a Cooperating agency in the NEPA process and the opportunity to provide comments on the DEIS. We look forward to working with your agency as the Final EIS is prepared and the review of the project proceeds. If you have any questions concerning this letter, please contact me at (410) 962-0148 or April.E.Sparkman@usace.army.mil.

Sincerely,

April E. Sparkman
Biologist, Maryland North Branch

Enclosure

To identify how we can better serve you, we need your help. Please take the time to fill out our customer service survey at: https://regulatory.ops.usace.army.mil/customer-service-survey/

INFORMATION REQUIRED TO PROCESS SECTION 408 REQUESTS
by private, public, tribal, or other federal entities to make alterations to, or temporarily or permanently occupy or use, any US Army Corps of Engineers federally authorized civil works projects pursuant to 33 USC 408

1. Purpose. The purpose of this document is to provide guidance for private, public, tribal, or other federal entities regarding the information the US Army Corps of Engineers (USACE) Baltimore District needs to complete a review pursuant to 33 USC 408 (Section 408). This review is necessary to obtain permission from the USACE Baltimore District for proposed alterations to any USACE federally authorized civil works project, referred to as a "USACE project" within this document.

2. Applicability. This guidance applies to alterations proposed within the lands and real property interests identified and acquired for the USACE project and to lands available for USACE projects under the navigational servitude. In the Baltimore District, USACE projects typically include: local protection projects consisting of levees, floodwalls, channel improvement, and interior drainage features; Federal navigation channels; and flood risk management projects consisting of earthen or concrete dams, outlet works, spillways, abutments, support facilities, and reservoir pool. Routine operations and maintenance activities specified in the O&M manual and performed by the non-federal sponsor or USACE do not require permission from USACE under Section 408.

3. References. Engineering Circular 1165-2-216, *Policy and Procedural Guidance for Processing Requests to Alter USACE Civil Works Projects pursuant to 33 USC 408*

4. Authority. The authority for the US Army Corps of Engineers to grant permission for temporary or permanent alterations to federally authorized civil works projects is contained in Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 USC 408, which states that *"the Secretary [of the Army] may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any [work built by the United States] when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work."* It is otherwise unlawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct, or in any manner whatever impair the usefulness of any work built by the United States.

5. Exclusions. Per Engineering Circular 1165-2-216, the following activities do not require permission from USACE under Section 408:
    a. Routine operations and maintenance activities specified in the O&M manual and performed by the non-federal sponsor or USACE
    b. Activities contained in 36 CFR 327, including the implementation of an approved USACE Project Master Plan, Shoreline Management Plan, or Operational Management Plan

6. Requester. A request for Section 408 permission can originate from a non-federal sponsor or an independent requester. For USACE projects with a non-federal sponsor, the requester must either be the non-federal sponsor or have the endorsement of the non-federal sponsor prior to a written request being submitted to USACE.

7. Request. The Requester must submit the information that follows for all requests to alter USACE projects within the Baltimore District. Requests must be in writing, signed, and submitted to the USACE Baltimore District Regulatory Point of Contact. Requests may be sent by regular mail or electronic mail for attachments under 10MB. Attachment A contains a comprehensive list of additional information that may be requested to facilitate the Section 408 review process. Attachment B provides an example of the local sponsor statement of no objection.

Points of Contact:

GOVERNMENT:

Name: Michael Danko
Organization: USACE Baltimore District
Title: Regulatory Point of Contact
Address: 401 East Louther Street, Suite 205
Carlisle, Pennsylvania 17013
Phone: (717) 249-8730
E-mail: mike.danko@usace.army.mil

REQUESTER:

Name: _____

Organization: _____

Title: _____

Address: _____

Phone: _____

E-mail: _____

LOCAL SPONSOR: (if not the Requester)

Name: _____

Organization: _____

Title: _____

Address: _____

Phone: _____

E-mail: _____

Project Description

USACE Project being altered, used or impacted: _____

City and State: _____

Stream, River or Water Body: _____

Proposed Project Name: _____

Latitude, Longitude: _____

USACE Project Type

_____ Local Protection Project** _____ Navigation _____ Flood Risk Management

****Have you obtained a Statement of No Objection from the Non-Federal Local Sponsor of the Local Protection Project? If no, please explain.**

_____

Note: Requests will not accepted as complete without this statement. See Attachment B for an example.

Brief description of the proposed work and how the USACE project will be altered
Note: Indicate if the proposed alteration is to a previously-modified feature (e.g., re-aligning a pipe through the embankment that had been installed as a modification to the project).

_____

_____

_____

Description of project alternatives (if any) that avoid impacts to the USACE project

_____

_____

_____

List of all real property interests
Note: Include maps clearly depicting both existing real estate rights and additional real estate required.

_____

_____

_____

_____

Approximate schedule for work (list activities by Month/Year)

_____

_____

_____

Describe operations and maintenance that will be required as a result of this alteration
Note: Requester is responsible for performing all operations and maintenance required as a result of the alteration, as well as for all associated costs. For local protection projects, the non-federal local sponsor is required to ensure that all required operations and maintenance associated with the alteration are adequately performed.

_____

_____

_____

Documents included with the alteration request
Note: USACE may request additional information as part of the review process.

General Project: Report _____ Plans _____ Specs _____ Drawings _____

Hydrology & Hydraulics: Report _____ Models _____

Geotechnical: Report _____ Drilling Plan _____

Other (describe): _____

Questions: **(Yes/No)**

1. Will the proposed project require the use of federal property? _____
2. Will the proposed project require the use of property owned by the non-federal sponsor? _____
3. Have any Environmental Reports been completed for this Project? If yes list below. _____
4. Are you required to pursue authorization pursuant to Sections 10/404/103? If yes, list date or anticipated date of application/pre-construction notification submittal. _____
5. Is this proposed project identified as a priority project in an established in-place funding agreement? If yes, provide documentation of the funding agreement and point of contact. _____
6. Are you seeking credit under Section 221 of the Flood Control Act of 1970 or other laws such as approval under Section 204 (f) of WRDA 1986? _____

Signature Block

Request is hereby made for permission to alter the USACE project as described in this form and supporting documentation. I certify that the information provided in this request is complete and accurate to the best of my knowledge. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the requesting organization and/or non-federal local sponsor.

REQUESTER:

_____
Name

_____
Organization

_____
Title

_____
Signature

_____
Date

LOCAL SPONSOR: (If not the requester, for local protection projects)

_____
Name

_____
Organization

_____
Title

_____
Signature

_____
Date

TO BE COMPLETED BY USACE

Date Received: _____
USACE Project Name: _____
Resource Manager or Local Sponsor: _____
Regulatory Permit Number: _____

8. USACE Review Criteria. USACE will review the alteration request for potential adverse impacts to the project based on the following criteria (as applicable):
   a. Reliability of the project to function as designed.
   b. Local sponsor and/or USACE ability to adequately inspect the project during normal conditions.
   c. Local sponsor and/or USACE ability to adequately inspect the project during potential or actual emergency conditions.
   d. Local sponsor and/or Requester ability to adequately operate and maintain the project.
   e. Local sponsor and/or Requester legal rights to enter and/or have contractors enter all properties affected, either through fee deed(s) or easement deed(s), which should be attached to this request.
   f. Local sponsor ability to conduct flood fighting operations and temporary repairs during an emergency.
   g. Alteration impacts to the structural or geotechnical integrity of project components (including embankment, floodwall, or retaining wall strength; slope stability; stone protection; crest elevation; miscellaneous structures, etc.).
   h. Alteration impacts on the hydraulic functioning of the project.
   i. Alteration impacts to a floodplain or floodway (flood risk management projects only).
   j. Alteration impacts on the interior drainage system or drainage facilities (i.e. outfalls, gate wells, storm sewer lines, pump stations, drainage ditches, etc.).
   k. Alteration impacts on environmental aspects of the project, including compliance with National Environment Policy Act (NEPA) requirements.
   l. Alteration impacts on safety aspects of the project.
   m. Alteration impacts to the real estate easement requirements, including project access.
   n. USACE Section 10/404 Regulatory permit requirements.
   o. Impacts to the public and other stakeholders.
   p. Other criteria as available.

9. USACE Review and Decision. Work or usage shall not begin until written approval from the USACE Baltimore District Commander, or his designee, is obtained. Upon completion of review of the request, the Baltimore District will send a letter from the District Commander, or his designee, either granting or denying the request for permission to alter the USACE project. If granted, the Requester's signature may be required on an Alteration Conditions Form to confirm acceptance of any special conditions required. If denied, reasons for not granting permission will be provided.

   If applicable, an Emergency Action Plan (EAP) must also be provided as a prerequisite to approval. Requestor must provide information about emergency response in the event of a flood during construction. This should include at a minimum: notification tree, stockpiled materials, how flooding will be anticipated, and specific activities at each phase of construction to restore flood risk reduction.

   USACE reserves the right to require construction inspections or meetings with the Local Sponsor, Requester, and other interested parties.

10. Special Conditions. The following are examples of special conditions, which may be included in the permission to alter, use, or impact a USACE project. Additional special conditions may be included depending on the nature of the work:
    a. Requester shall obtain all appropriate local, state, and Federal permits (or waivers from these permits) before performing the proposed alteration. USACE approval of the proposed alteration does not negate the need to obtain the aforementioned permits.
    b. Requester must notify the USACE Baltimore District at least fifteen (15) days before work/usage is started and receive approval to proceed from the designated Baltimore District point of contact. Time may vary depending on project.
    c. Requester shall provide copies of pertinent design, construction, and/or usage submittals/documents. Photographic documentation of the alteration work and the impacted project area may be requested to be taken before, during, and after construction.
    d. Requester must develop a safety plan prior to commencing the alteration and ensure that all officers, agents, employees, or others who may be present on the premises at their invitation are thoroughly familiar with the plan and follow it.
    e. No equipment or materials may be stored or stockpiled within 15 feet of the levee toe, floodwall, or any other flood protection project features without prior consent from the Corps.
    f. The Requester may be required to perform an inspection of the USACE project with the Baltimore District prior to the Requester's use of the project to document existing conditions.
    g. Alterations approved in this request shall be progressed in such a manner to avoid interference with the inspection, operation, and maintenance of the USACE project.
    h. Requester must schedule a final inspection with the Baltimore District within fifteen (15) days after completion of the alteration. Time may vary depending on project.
    i. Requester shall submit a copy of as-built drawings within 30 days of completion of work showing the new work as it relates to identifiable features of the USACE project.
    j. Requester shall remove all structures constructed on or within the USACE project upon completion of usefulness of such structures, if they no longer serve the purposes originally intended, or upon expiration of the agreement with USACE Baltimore District. The Requester shall restore the USACE project to its original condition after removal of these structures. Permanent alterations approved by USACE are excluded from this requirement, however must be maintained in good condition.
    k. Field work shall be coordinated with the designated USACE Baltimore District point of contact, to be determined prior to the start of work.
    l. Underground utility lines of any type that cross the levee shall have markers placed on the surface to indicate location, type, and usage of the line.

ATTACHMENT A
Section 408 Request Supplemental Information

The following list is designed to assist you in providing a complete review package when submitting a Section 408 request to the USACE Baltimore District. The intent is to provide a comprehensive list of information our technical staff may need to complete the review process. The list below is not all inclusive and may not apply to every situation; our technical staff may request additional documentation. Please provide the information in this list to the extent possible and submit with your request.

A. General Documentation. Please provide at minimum the following items:
    1) Project Location Map (at least 8.5"x11") including:
        a) Aerial image with proposed project features
        b) City, county, and state
        c) Latitude and longitude
        d) Name of Stream, River or Body of Water
        e) River mile (if applicable)
    2) Project Description. Please provide a detailed and complete project description, including all areas of disturbance to the USACE project. Include areas to be used for ingress, egress, or staging of materials or equipment. Fully describe construction techniques to be used on the USACE project alteration. Include quantities and types of materials used as fill or removed from the site. Accurately describe any ground disturbing activity that will occur and provide acreage or lineal area of impact. Include maps, pictures, and figures as necessary to fully explain the proposed work.
    3) Right-of-Way Maps from agency responsible for operating and maintaining the facility
    4) Pre-final project plans and specifications
    5) Project schedule
    6) Photographs of current conditions at the site
    7) Written Statement of No Objection by the Local Sponsor

B. Real Estate
    1) List of all real property interests required to support the proposed alteration, including those in federally managed lands and those owned by the Requester.
    2) Maps clearly depicting both existing real estate rights and the additional real estate required.
    3) GIS shapefiles of the full project extents.
    4) Deed or other real estate instruments
    5) Agreements between the United States of America and Proponent
    6) Office of the Assessor Property Information Report
    7) Assessor's Parcel Number (APN)

C. Environmental Compliance
    1) List of any State or Federal Threatened or Endangered Species
    2) List of any noise sensitive receptors and provide description of the receptor and its distance from the source
    3) List and describe all Hazardous Toxic and Radioactive waste (HTRW) present at the site

4) List all recreation amenities that would be impacted due to this alteration
5) List all public services that would be disrupted due to this alteration
6) Indicate whether public transportation will be impacted due to this alteration
7) Section 401 Certification
8) Air Quality Analysis
9) All cultural surveys conducted in the last five years
10) Tribal Contact List

D. Technical Analysis
    1) Civil. Each submittal should clearly identify the existing condition of the dam and/or appurtenant structures to include plan, profile and design details of the proposed alteration in relation to the existing USACE project. Below are examples of information necessary to understand the existing and proposed conditions.
        a) Alteration location (Vicinity map and specific alteration location)
        b) Applicable datum
        c) Real estate interests, existing and to be acquired, needed for the proposed alteration
        d) Grading plans
        e) Layout plan, profiles, and cross-sections of the proposed alternation
        f) Previous inspection reports to assist in identifying existing deficiencies and their proximity to the proposed alteration
        g) Sections and details
        h) Temporary measures required during construction (bypasses, cofferdams, etc.)
    2) Geotechnical. The following is a list of analyses or information that may be necessary to consider in evaluating geotechnical impacts if proposed alterations alter the dam embankment or penetrate the natural blanket or foundation.
        a) Erosion control (changes in erosive forces on a slope)
        b) Liquefaction susceptibility
        c) Material usage/borrow/waste/transport/hauling
        d) Placement of stockpiles, heavy equipment, or other surcharges
        e) Drilling plan
        f) Results of subsurface investigation – boring logs, test pit logs, laboratory test results, etc.
        g) Seepage analysis
        h) Settlement analysis
        i) Stability analysis
        j) Vegetation
    3) Structural. The following is a list of analysis or information that may be necessary to evaluate the impacts of proposed alterations to concrete, sheet-piling, or drainage structures.
        a) Bridges and related abutments
        b) Design analysis for retaining walls and excavation support system
        c) Design of shallow or deep foundations, including bearing capacity and settlement analysis if the construction is located within the line of protection or right-of-way and creates potential seepage problems

d) Design recommendations for foundations on expansive soils
e) Diaphragm walls
f) Gates or other operable features
g) Other structural components integral to the project
h) Pier penetrations of levee embankments
i) Stability analysis including sliding, overturning, bearing, flotation, uplift and any seismic load effects for any alteration to the channel walls and/or flood walls
j) Structural drainage control methods
k) Water stops and contraction/expansion joints

4) Hydrology and Hydraulics. The following factors may be considered when evaluating the hydrologic and hydraulic (H&H) impacts to a USACE project. Please provide an Executive Summary detailing how each of the below items is addressed and how your project impacts the USACE project. H&H models may be requested for review.
    a) Changes in inflow
    b) Changes in velocity
    c) Changes in water surface profiles and flow distribution
    d) Consideration of impacts to energy dissipation measures; hydropower generation; sedimentation; or navigation
    e) Scour Analysis
    f) Sediment transport analysis
    g) Upstream and downstream impacts of the proposed alterations
5) Operations, Maintenance and Flood Fighting. Alterations may change operation, maintenance or require special flood fighting procedures.
    a) Effects on existing maintenance access
    b) Effects on maintenance practices
    c) Flood contingency plan during construction, measures proposed to protect area under construction, monitoring of river level, river stage at which plan will be activated, materials and equipment to be used to activate plan, and personnel contact and telephone number to activate plan.
    d) Flood fighting requirements and practices
    e) Special inspection requirements
6) Potential Failure Mode Analysis. Depending on the proposed alteration, the requester may be required by the district to provide a potential failure mode analysis with the proposed alteration in place.
7) Review Plan. If the alteration will either 1) temporarily impair the purpose and function of the existing Federally-constructed project or 2) be a major repair, rehabilitation, relocation, replacement or modification of the existing Federally-constructed project, please provide the following:
    a) Independent External Peer Review (IEPR) Plan (Reference EC 1165-2-217)
    b) Design Quality Control Plan

ATTACHMENT B
Local Sponsor Statement of No Objection

SUBJECT: Request to Alter US Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408

TO: USACE Baltimore District Regulatory 408 POC

The **<*Name of Non-Federal Local Sponsor*>** (Sponsor) is the Non-Federal Local Sponsor to the U.S. Army Corps of Engineers Baltimore District for the **<*Name of USACE Project*>** Local Protection Project (USACE Project).

The Sponsor is aware of the Section 408 Request by **<*Name of Requester*>** to alter the USACE Project in order to complete the proposed **<*Description of work to be performed and impacts to the local protection project*>**.

The Sponsor does not object to the Section 408 Request nor its review by the U.S. Army Corps of Engineers. The Sponsor acknowledges continued responsibility for the operation and maintenance of the USACE Project at no cost to the government and will hold and save the government free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project.

_____
Printed Name

_____ _____
Signed Name Date

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: United States Army Corps of Engineers, Baltimore District, Regulatory Division

__X__ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)**

____ **Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree** with the **Preferred Alternative & Conceptual Mitigation***

****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Please see attached letter.

Signature: April Sparkman Date: 13 May 2026

Enclosure 1

DEPARTMENT OF THE ARMY
U. S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
ATTN: REGULATORY DIVISION
2 HOPKINS PLAZA
BALTIMORE, MARYLAND 21201-2930

May 13, 2026

Regulatory Division

Ms. Heather Lowe
Maryland Transportation Authority
Division of Planning & Program Development
2310 Broening Highway
Baltimore, Maryland 21224

Dear Ms. Lowe:

This is in response to the Maryland Transportation Authority (MDTA) request for concurrence on the Draft Preferred Alternative and Conceptual Mitigation (PACM) that was prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. The PACM presented rationale for MDTA's Preferred Alternative and the MDTA's proposed conceptual mitigation measures for resources affected by the Preferred Alternative. Based on a comparison and evaluation of the Alternatives Retained for Detailed Study (ARDS) presented in the Draft Environmental Impact Statement (EIS), as well as based on agency and public comments during the Federal Highway Administration public comment period, Alternative C: 6-8-6 South, has been identified as MDTA's Preferred Alternative. The PACM indicates that Alternative C adequately meets the project purpose and appears to be the Least Environmentally Damaging Practicable Alternative (LEDPA). The US Army Corps of Engineers, Baltimore District (Corps) appreciates the opportunity to review the PACM package.

We understand that additional information will be presented in the Final EIS. Based on the information currently available, the Corps concurs with the PACM package (Enclosure 1) and your initial determination that Alternative C appears to be the LEDPA. However, this concurrence does not constitute a final LEDPA determination, nor is it a Section 404 or Section 10 permit decision by the Corps. Any request for Corps permit authorization will require a comprehensive review through the joint permit process, including the Clean Water Act Section 404(b)(1) Guidelines analysis, Corps public interest review, and issuance of a Corps public notice to request formal public and agency comments. If plans change or new information is discovered during the permit review (including during the public comment period), MDTA may be required to provide additional information. Finally, as project development continues, MDTA will also need to explore all practicable methods for avoiding and minimizing impacts to waters of the U.S., as well as practicable compensation measures.

A copy of this letter is being furnished to Mr. Alexander Bienko, Federal Highway Administration.

We look forward to working with your agency on the next phases of this project. Again, thank you for inviting the Corps participation as a Cooperating agency in the NEPA process. If you have any questions concerning this letter, please contact me at (410) 962-0148 or April.E.Sparkman@usace.army.mil.

Sincerely,

April E. Sparkman
Biologist, Maryland North Branch

Enclosure

To identify how we can better serve you, we need your help. Please take the time to fill out our customer service survey at: https://regulatory.ops.usace.army.mil/customer-service-survey/

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency:_____USCG District 5 Bridge Branch_____

_X__ **Agrees** with the **Study Schedule (without comments)**

____ **Agrees** with the **Study Schedule (with minor comments)***

____ **Does not agree** with the **Study Schedule***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: SANDERS.MICKEY.D.1234326968 Digitally signed by SANDERS.MICKEY.D.1234326968 Date: 2023.05.16 16:27:55 -04'00' Date: 5/16/2023

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Mr. Hal Pitts
Chief, Bridge Branch, Fifth Coast Guard District
U.S. Coast Guard
Federal Building
431 Crawford Street
Portsmouth, VA 23704-5004

Dear Mr. Pitts:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Rivers and Harbors Act and other laws and regulations. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

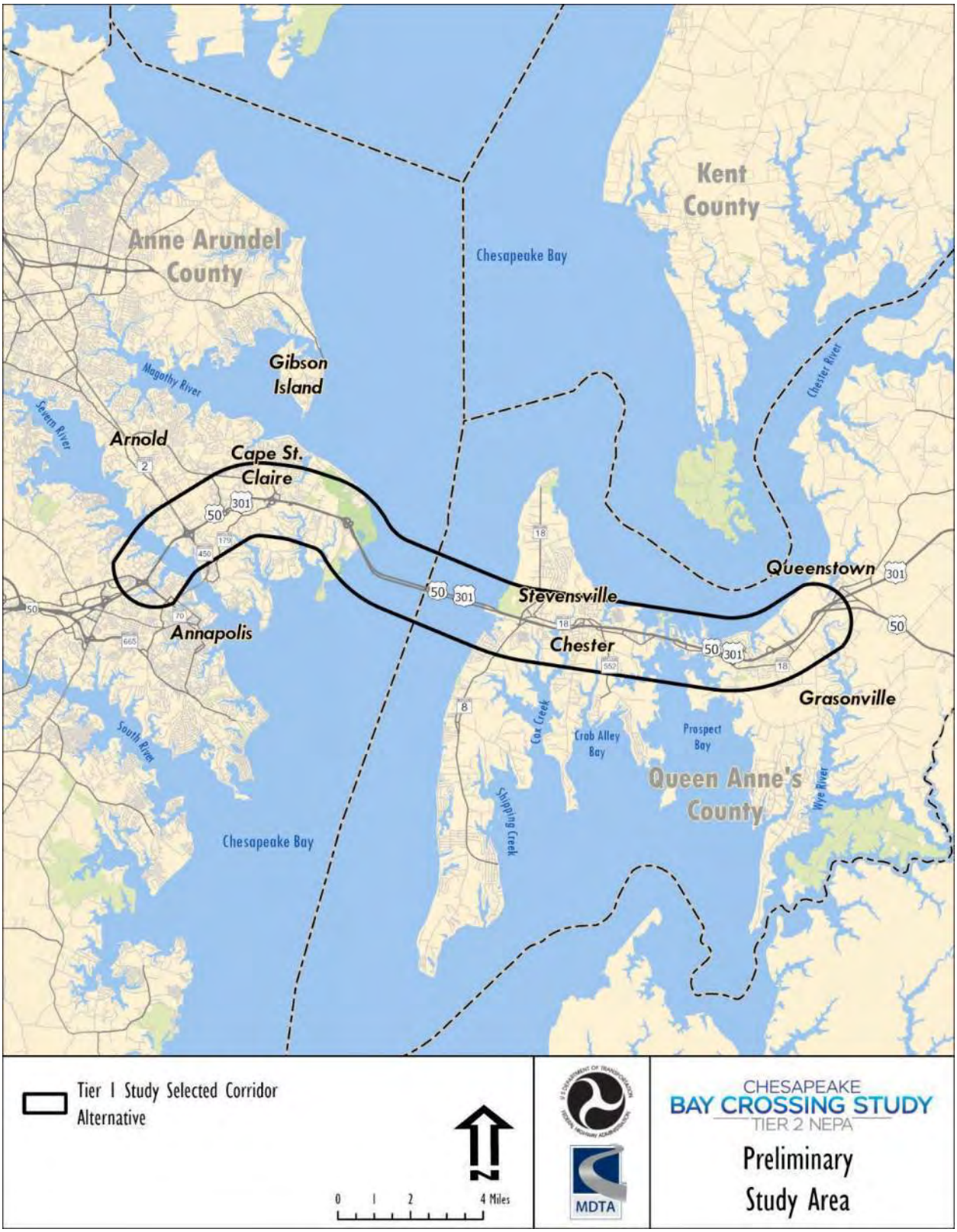
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:40:45 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Mr. Mickey Sanders, USCG, Bridge Administration Branch, Fifth District
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street
Portsmouth, VA 23704-5004
Staff Symbol: dpb
Phone: (757) 398-6222
Fax: (757) 398-6334
Email: Hal.R.Pitts@uscg.mil or
CGDFiveBridges@uscg.mil

16591
8 NOV 2023

Mr. Alexander Bienko
Federal Highway Administration
Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

Dear Mr. Bienko:

The Coast Guard has established a bridge permitting project for the notional highway fixed bridge over Chesapeake Bay, as described within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County.

The Coast Guard hereby accepts Cooperating Agency/Consulting Party status with the Federal Highway Administration (FHWA) Maryland Division as the Lead Federal Agency (LFA) for the above Federal undertaking as requested in your letter dated June 1, 2023. This designation applies to compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321, et seq), National Historic Preservation Act (NHPA) of 1966 (54 U.S.C. § 306108, et seq) (if applicable), and all other applicable environmental control laws.

If the NHPA has application in this project, the Coast Guard does not intend to serve as signatory to the MOA, unless assigned responsibilities to carry out functions within the Memorandum of Agreement (MOA) (beyond issuance of a Coast Guard Bridge Permit).

The Coast Guard Bridge Permit Application Guide (BPAG), Commandant Publication P16591.3D, and BPAG Applicant Template are enclosed to provide information concerning the environmental documentation requirements related to Coast Guard bridge permitting.

Please contact Mr. Hal R. Pitts, project officer, at the above telephone number or email address if you have any questions. Please maintain frequent and regular contact with the project officer to ensure efficient and effective project administration.

Sincerely,

PITTS.HAL.R.1121267272 Digitally signed by PITTS.HAL.R.1121267272 Date: 2023.11.08 15:02:23 -05'00'

HAL R. PITTS
Bridge Program Manager
By direction

Encl: Bridge Permit Application Guide, COMDTPUB P16195.3D and BPAG Applicant Template located at (https://go.usa.gov/xRFk2)

Copy: CG Sector Maryland-National Capital Region, Waterways Management
U. S. Army Corps of Engineers, Baltimore District
Federal Highways Administration, Baltimore, MD

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:____USCG_____**
__X_ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **____ Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: PITTS.HAL.R.1121267272 Digitally signed by PITTS.HAL.R.1121267272 Date: 2024.08.01 13:02:36 -04'00' Date: _____

From:	Eric Almquist
To:	Cassie Greenhawk; Emma Beck; Sarah Williamson; Katie Gibson
Subject:	FW: BCST2 Project Initiation Request
Date:	Wednesday, June 25, 2025 5:00:40 PM
Attachments:	Outlook-Company na.png Outlook-nrkqfvgi.png Outlook-A picture .png Outlook-Shape Des.png Outlook-fxghif3n.png Outlook-Flickr log.png USCG Project Initiation Request BCST2 20241216.pdf Attach 1_Tier 2 study area.pdf Attach 2_Navigation Map with Study Limits.pdf Attach 3_USCG 20210924 No Objection.pdf

---

From: Heather Lowe <hlowe@mdta.state.md.us>
Sent: Monday, December 16, 2024 2:45 PM
To: Pitts, Hal R CIV USCG D5 (USA) <hal.r.pitts@uscg.mil>
Cc: Pavona, Jamie (FHWA) <Jamie.Pavona@dot.gov>; Chris (FHWA) <Chris.Millington@dot.gov>; Bienko, Alexander (FHWA) <alexander.bienko@dot.gov>; Shreeve, Rob <robert.shreeve@aecom.com>; Eric Almquist <ealmquist@rkk.com>; Mel Williams <mwilliams9@mdta.state.md.us>
Subject: BCST2 Project Initiation Request

EXTERNAL EMAIL: Do not click links or open attachments unless you trust the 'Sender' and know the content is safe.

Good afternoon, Mr. Pitts,

I have attached the Chesapeake Bay Crossing Study: Tier 2 NEPA Project Initiation Request.

Please let me know if you have any questions.

Thank you,

Heather

Heather Lowe
Planning & Community Relations Manager
Maryland Transportation Authority
Division of Planning and Program Development

Point Breeze
2310 Broening Highway

Baltimore, MD 21224



410.537.5665 (direct)

hlowe@mdta.state.md.us
http://www.mdta.maryland.gov

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Maryland Transportation Authority

Wes Moore, Governor
Aruna Miller, Lt. Governor
Paul J. Wiedefeld, Chairman

Board Members:
Dontae Carroll — Cynthia D. Penny-Ardinger
William H. Cox, Jr. — Jeffrey S. Rosen
W. Lee Gaines, Jr. — Samuel D. Snead, MCP, MA
Mario J. Gangemi, P.E. — John F. von Paris

Bruce Gartner, Executive Director

December 16, 2024

Mr. Hal Pitts
US Coast Guard
5th District
431 Crawford Street
Portsmouth, VA 23704-5004

RE: Bridge Project Initiation Request
Chesapeake Bay Crossing Study: Tier 2 NEPA
William Preston Lane, Jr. Memorial Bridge (Bay Bridge): US 50/301 across the Chesapeake Bay
Kent Narrows Bridge: US 50/301 across Kent Narrows
Anne Arundel County and Queen Anne's County, Maryland

Dear Mr. Pitts,

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA) Maryland Division, is submitting this Project Initiation Request (PIR) for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) for your review. The FHWA published a Notice of Intent (NOI) to prepare an Environmental Impact Statement for this project in the Federal Register on November15, 2024 (https://www.federalregister.gov/documents/2024/11/15/2024-26545/notice-of-intent-to-prepare-an-environmental-impact-statement-for-the-chesapeake-bay-crossing-study).

Study Background and Status

The FHWA approved the Chesapeake Bay Crossing Study: Tier 1 NEPA Environment Impact Statement (EIS) and issued a Record of Decision (https://baycrossingstudy.com/tier-2-study-process/tier-1-study-completed/tier1-feis-rod) on April 14, 2022. The US Coast Guard (USCG) was a Cooperating Agency for the Tier 1 Study and issued a "No Objection" determination to the selection of Corridor 7 as the Selected Corridor Alternate (SCA) on September 24, 2021 (Attachment 3). The Tier 2 Study was launched in June 2022. Public meetings for the Tier 2 Study have been held in September 2022 (2022 Open House Survey Summary) and September 2023 (2023 Open House Survey Summary). Public meetings for the scoping period are being held in December 2024. Interagency coordination meetings are on-going and include cooperating and participating agencies. The USCG is a cooperating agency for the Tier 2 Study.

Location

The Tier 1 Selected Corridor Alternative (Corridor 7) traverses parts of Anne Arundel County and Queen Anne's County, Maryland. The FHWA Tier 1 Record of Decision (ROD) describes Corridor 7 as:

> *"A two-mile wide corridor that follows the existing Bay Bridge road network along US 50/301 from west of the Severn River on the Western Shore to the US 50/301 split on the Eastern Shore. Corridor 7 includes the location of the existing Bay Bridge."*

During the period between the Tier 1 Record of Decision and the Tier 2 NOI, the MDTA and the FHWA refined the study limits to be the area adjacent to, and along, the existing US 50/301 corridor from east of Severn River to east of the US 50/301 split, including the existing Bay Bridge and the existing Kent Narrows Bridge.

Purpose and Need

The purpose of the Tier 2 Study is to address existing and future transportation capacity needs and access across the Chesapeake Bay and at the Chesapeake Bay Bridge approaches along the US 50/301 corridor. The Tier 2 Study is evaluating measures to reduce congestion, improve travel times and reliability, mobility, roadway deficiencies, and accommodate maintenance activities and navigation, while minimizing impacts to local communities and the environment.

The MDTA has identified five needs for the Tier 2 Study:

- Adequate capacity and reliable travel times,
- Mobility,
- Roadway deficiencies,
- Existing and future maintenance needs, and
- Navigation.

In addition to these needs, the MDTA has also identified two objectives for consideration:

- Environmental responsibility, and
- Cost and financial responsibility.

Scope

The Tier 2 Study will evaluate a No-Build alternative and six proposed build alternatives:

- Alternative A – No-Build: retains the existing Chesapeake Bay Bridge, the US 50/301 alignment, and the existing number of lanes;
- Alternative B - 6-8-6 North: 6 lanes along US 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, and 6 lanes along US 50/301 on the Eastern Shore;
- Alternative C - 6-8-6 South: 6 lanes along US 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, and 6 lanes along US 50/301 on the Eastern Shore;
- Alternative D - 8-8-8 North: 8 lanes along US 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, 8 lanes along US 50/301 on the Eastern Shore;
- Alternative E - 8-8-8 South: 8 lanes along US 50/301 on the Western Shore, 8 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, 8 lanes along US 50/301 on the Eastern Shore;
- Alternative F - 8-10-8 North: 8 lanes along US 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge to the north of the existing bridge, 8 lanes along US 50/301 on the Eastern Shore and
- Alternative G - 8-10-8 South: 8 lanes along US 50/301 on the Western Shore, 10 lanes across the Chesapeake Bay on a new bridge to the south of the existing bridge, 8 lanes along US 50/301 on the Eastern Shore.

All build alternatives (Alternatives B through G) would include full replacement of the existing Bay Bridge with two new bridge structures ("spans"). The existing eastbound and westbound Bay Bridge spans would be removed. The MDTA and the FHWA considered additional alternatives regarding the new Bay Bridge structure type, number of lanes, new Bay Bridge bridge location, travel mode (e.g., transit, ferry), and Transportation Systems Management (TSM)/Transportation Demand Management (TDM) strategies. The additional structure type options considered for a new Chesapeake Bay crossing include a full-length tunnel, bridge-tunnel, and double decker bridge. Additional information on the alternatives deemed reasonable by the MDTA and the FHWA, and therefore proposed to be retained for detailed study in the EIS, is provided in the NOI and NOI supplemental materials (https://www.baycrossingstudy.com/study-process/tier-2-study/scoping-noi).

The existing Kent Narrows Bridge may be affected by Alternatives D, E, F, and G; however, further analysis of potential improvements or replacement of this bridge have not yet been determined.

The Tier 2 Study will conclude with identification of a Selected Alternative, including engineering and environmental impact analyses that will be conducted with robust public, State, and Federal regulatory agency involvement. Public engagement activities for the Tier 2 Study were initiated shortly after the Tier 2 Study launch in June 2022. The MDTA has held three sets of Public Open Houses (one virtual Open House and two in-person Open Houses) in September 2022, September 2023, and December 2024. The MDTA has conducted a Transit and Bicycle/Pedestrian Listening Meeting and has attended numerous community engagement events.

The Tier 2 Study will identify mitigation measures for unavoidable environmental impacts, including wetlands, waterways, forests, and noise.

Project Status and Schedule

The lead federal agency for the Tier 2 Study is the FHWA, and the co-lead agency for the NEPA study is the MDTA. The NEPA phase of the Study is formally underway with the release of the NOI on November 15, 2024. Regulatory coordination has been underway since 2022 with interagency coordination meetings (ICMs) being held monthly with the resource agencies including USCG.

A Navigation Impact Report will be developed and coordinated with USCG in early 2025 to obtain a Preliminary Navigational Clearance Determination. The NIR will address needs at both the Bay Bridge and Kent Narrows Bridge.

The anticipated overall Tier 2 Study schedule, as presented in the NOI, is as follows:

- Public Open Houses/Scoping Meetings (December 2024)
- End of Scoping Comment Period (January 2025)
- Evaluation of Alternatives Retained for Detailed Study (February 2025-June 2025)
- MDTA's Recommended Preferred Alternative (July 2025)
- Tier 2 Study DEIS Notice of Availability (NOA) (November 2025)
- Tier 2 Study DEIS Comment Period and Public Hearings (December 2025)
- Tier 2 Study Final EIS/ROD (November 2026)
- Procurement for Final Design (Fall 2026-Spring 2028)
- Commence Final Design (Spring 2028)
- Permit Applications/Authorization Requests Submitted (Spring 2030)
- All Permit Decisions and Authorizations Issued (Spring 2031)
- Commence Construction (Summer 2032)

Permitting

The MDTA will not apply for permits and approvals that require design-level detail during the NEPA environmental review process or immediately following completion of NEPA. The development and review of applications for permits, and other approvals, will be completed as more detailed design and construction engineering progresses beyond the Tier 2 Study. The NEPA study will be coordinated with the federal and state regulatory agencies based on their role as Cooperating and Participating Agencies.

Permits and approvals that will be applied for as detailed design is completed are identified in Table 1. Table 1 is not an exhaustive list, and all appropriate Federal, State, and Local agencies will be coordinated with as the project moves through the NEPA process to identify future permitting requirements.

Table 1: Permits and Regulatory Approvals

Permit/Approval	Authority	Agency	Schedule
Smart Growth Areas Act	State	MDP	November 2026 – Authorization with ROD
LWCF Act	Federal	NPS	November 2026 – Authorization with ROD
Farmland Protection Policy Act	Federal	USDA NRCS	November 2026 – Authorization with ROD
Section 4(f) of the USDOT Act	Federal	FHWA	November 2026 – Authorization with ROD
Migratory Bird Treaty Act	Federal	USFWS	November 2026 – Authorization with ROD
Nongame and Endangered Species Conservation Act	State	DNR	November 2026 – Authorization with ROD
			November 2026
MHT Act and National Historic Preservation Act, Section 106	State / Federal	MHT, ACHP, FHWA	November 2026 – Authorization with ROD (Programmatic Agreement)
Fish and Wildlife Coordination Act	Federal	USFWS, NMFS, DNR	November 2026 – Authorization with ROD
EO 11990: Protection of Wetlands	Federal	FHWA	November 2026 – Authorization with ROD
EO 11998: Floodplain Management	Federal	FHWA	November 2026 – Authorization with ROD
Endangered Species Act and Marine Mammal Act	Federal	USFWS and NOAA Fisheries	November 2026 – Authorization (Biological Opinion) with ROD
CWA, Section 401 (Water Quality Certification)	Federal	MDE	Spring 2030 – Joint Permit Application Spring 2031 – Permits
CWA, Section 404/River and Harbors Act – Section 10	Federal	USACE	
Nontidal Wetlands Protection Act & Program	State	MDE	

Permit/Approval	Authority	Agency	Schedule
Tidal Wetlands Act & Program	State	BPW	
Waterways Construction Statute	State	MDE	
Coastal Zone Consistency & Coastal Zone Management Program	Federal	DNR	
Civil Works Projects, CWA Section 408 / River and Harbors Act – Section 14	Federal	USACE	Spring 2030 – Permit Application Spring 2031 – Permit
Bald and Golden Eagle Protection Act	Federal	USFWS	November 2026 – Authorization with ROD
Essential Fish Habitat – Magnuson-Stevens Fishery and Management Act	Federal	NOAA Fisheries	November 2026 – Authorization with ROD
General Bridge Act/River and Harbors Act – Section 9	Federal	USCG	Spring 2030 – Bridge Permit Application Spring 2031 – Permit
National Flood Insurance Program	Federal	FEMA	Spring 2030 – Authorization
Obstruction Evaluation / Airport Airspace Analysis 14 CFR 77	Federal	FAA	Spring 2031 – Authorization
Obstruction Evaluation / Airport Airspace Analysis COMAR 11.03.05	State	MAA	Spring 2031 – Authorization
Chesapeake Bay Critical Area Law	State	DNR Critical Area Commission	Spring 2030 – Authorization
Forest Conservation Act, Reforestation / Roadside Tree Laws	State	DNR	Spring 2030 – Applications Spring 2031 – Permits
Sediment & Erosion Control Program	State	MDE	Spring 2030 – Application Spring 2031 – Permit
Stormwater Management Act	State	MDE	Spring 2030 – Application Spring 2031 – Permit

Thank you for your continued support to the MDTA as we seek to deliver this transportation improvement project for Maryland.

If you have questions or comments about this matter, please feel free to contact me at 410-802-9684 or mwilliams9@mdta.state.md.us.

Sincerely,

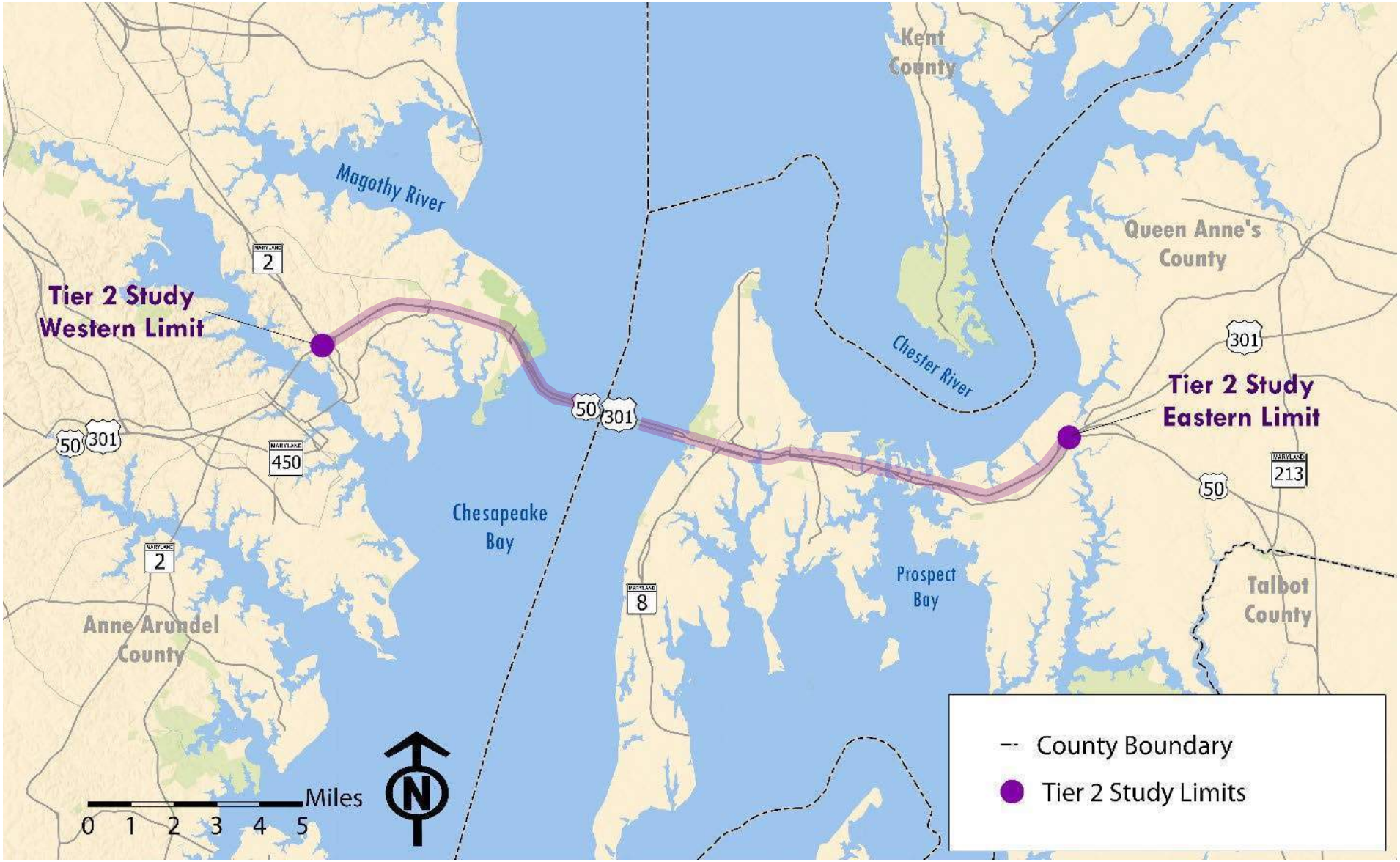
Mellissa Williams, Director
MDTA Planning and Program Development

Attachments:

Attachment 1 – Project Location Map from Tier 2 NOI
Attachment 2 – Corridor on NOAA Navigation Charts 12270 and 12278
Attachment 3 – USCG Letter (12-14-2021)

cc: Heather Lowe (MDTA Project Manager)
Sarah Williamson (BCST2 Team)
Eric Almquist (BCST2 Team)
Rob Shreeve (BCST2 Team)

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Limits




Navigation Map 12273
Navigation Map 12278
Bay Bridge
Kent Narrows Bridge
Study Limits
US 50/301 Corridor
0 1/2 1 Miles
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Tier 2 Study Limits
Attachment 2

U.S. Department of Homeland Security

United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street
Portsmouth, VA 23704-5004
Staff Symbol: dpb
Phone: (757) 398-6587
Fax: (757) 398-6334
Email: Mickey.D.Sanders2@uscg.mil
or CGDFiveBridges@uscg.mil

16591
24 SEP 2021

Ms. Jeanette Mar
Environmental Program Manager
FHWA – Maryland Division
George H. Fallon Federal Building
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

Dear Ms. Mar:

The Coast Guard has reviewed the Chesapeake Bay Crossing Study (Preferred Corridor Alternative Report) document of July 2020.

The Coast Guard has no objection to the decision to select corridor seven as the preferred corridor alternative.

The Coast Guard will continue to participate in the Chesapeake Bay Crossing Study NEPA process and will provide letters to document the Coast Guard's review of NEPA documents, in lieu of signing the agreement documents. The Coast Guard will either provide a "statement of no objection" or "statement of objection", inclusive of a detailed rationale for the objection.

If you have any questions, please contact Mr. Mickey Sanders at the above listed address, email or telephone number.

Sincerely,

HAL R. PITTS
Bridge Program Manager
By direction

Copy: CG Sector Maryland-National Capital Region, Waterways Management

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street
Portsmouth, VA 23704-5004
Staff Symbol: dpb
Phone: (571) 607-8298
Fax: (757) 398-6334
Email: Hal.R.Pitts@uscg.mil

16591
02 APR 2025

Ms. Melissa Williams
Director, Planning and Program Development
Maryland Transportation Authority (MDTA)
2310 Broening Highway
Baltimore, MD 21224

Dear Ms. Williams:

Coast Guard review of your bridge Project Initiation Request (PIR), as provided in your letter dated December 16, 2024, is complete.

Based on the documentation provided and our research, the Coast Guard has updated a bridge permitting project for the proposed highway fixed bridge – William Preston Lane, Jr. Memorial Bridge (Bay Bridge) (US 50/301) across Chesapeake Bay, mile 138.0, between Sandy Point and Kent Island, MD. In addition, the Coast Guard acknowledges that this project may result in modification or replacement of the Kent Narrows Bridge (US 50/301) across Kent Narrows, mile 1.0, at Narrows, MD.

The Bridge Permit Application Guide (BPAG) should be used in preparing a Navigation Impact Report (NIR) and Coast Guard Bridge Permit Application (CGBPA) as described below:

a. Navigation Impact Report (NIR): A Navigation Impact Report (NIR), as outlined in appendix A in the BPAG, should be submitted early in the project scoping and planning phase in order for the Coast Guard to provide a preliminary navigation clearance determination (PNCD). A PNCD provides the preliminary navigational clearances (vertical and horizontal) to be used in the development of alternatives within the project planning and environmental review processes. A PNCD is not binding, does not constitute an approval or final agency action, and normally expires three (3) years from the date of the correspondence in which the determination is provided.

b. Coast Guard Bridge Permit Application (CGBPA): A complete Coast Guard Bridge Permit Application (CGBPA) should be submitted at least 120 days prior to the date in which a Coast Guard Bridge Permit or Permit Amendment is needed. The enclosed BPAG Applicant Template may be completed and attached to a cover letter, or incorporated into a letterhead, and submitted along with all required bridge permit application documents, as outlined in the BPAG.

Mr. Hal R. Pitts, at the above listed address and telephone number, has been assigned as the Coast Guard's Bridge Permit project officer. Please maintain frequent and regular contact with the project officer to ensure efficient and effective project administration.

Sincerely,

PITTS.HAL.R.1121267272 Digitally signed by PITTS.HAL.R.1121267272 Date: 2025.04.02 10:39:12 -04'00'

HAL R. PITTS
Bridge Program Manager
By direction

Encl: Bridge Permit Application Guide, COMDTPUB P16195.3D and BPAG Applicant Template located at (https://go.usa.gov/xRFk2)

Copy: CG Sector Maryland-National Capital Region, Waterways Management
U. S. Army Corps of Engineers, Baltimore District
Federal Highways Administration, Baltimore, MD

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street
Portsmouth, VA 23704-5004
Staff Symbol: dpb
Phone: (571) 607-8298
Fax: (757) 398-6334
Email: Hal.R.Pitts@uscg.mil

16591
03 APR 2025

Ms. Melissa Williams
Director, Planning and Program Development
Maryland Transportation Authority (MDTA)
2310 Broening Highway
Baltimore, MD 21224

Dear Ms. Williams:

Coast Guard review of the Chesapeake Bay Crossing Study Tier 2 NEPA, Draft Alternatives Retained for Detailed Study (ARDS) documents, as provided via link in an email dated April 2, 2025, from Ms. Sarah Williamson with Coastal Resources, Inc., is complete.

The Coast Guard established a bridge permitting project via letter 16591 on January 24, 2024, for the proposed highway fixed bridge – William Preston Lane, Jr. Memorial Bridge (Bay Bridge) (US 50/301) across Chesapeake Bay, mile 138.0, between Sandy Point and Kent Island, MD. The Coast Guard accepted MDTA's Project Initiation Request (PIR) dated December 16, 2024, and updated the project plan via letter 16591 on April 2, 2025.

The Coast Guard hereby provides our concurrence of the Draft Alternatives Retained for Detailed Study (ARDS), under the condition that all build alternatives meet the minimum vertical and horizontal clearances as contained in the Coast Guard Preliminary Navigation Clearance Determination (PNCD), when issued.

It is noted that MDTA intends to submit a Navigation Impact Report (NIR), along with proposed minimum vertical and horizontal clearances, the week ending April 11, 2025. Upon receipt of the NIR, the Coast Guard will conduct a navigation evaluation, publish a preliminary public notice (PPN) for navigation (with a 30-day comment period), and issue the PNCD.

Mr. Hal R. Pitts, at the above listed address and telephone number, has been assigned as the Coast Guard's Bridge Permit project officer. Please maintain frequent and regular contact with the project officer to ensure efficient and effective project administration.

Sincerely,

PITTS.HAL.R.1121267272 Digitally signed by PITTS.HAL.R.1121267272 Date: 2025.04.03 12:40:41 -04'00'

HAL R. PITTS
Bridge Program Manager
By direction

Encl: Bridge Permit Application Guide, COMDTPUB P16195.3D and BPAG Applicant Template located at (https://go.usa.gov/xRFk2)

Copy: Ms. Sarah Williamson, Coastal Resources, Inc
CG Sector Maryland-National Capital Region, Waterways Management
U. S. Army Corps of Engineers, Baltimore District
Federal Highways Administration, Baltimore, MD

From:	Sarah Williamson
To:	Pitts, Hal R CIV USCG D5 (USA)
Cc:	Heather Lowe (hlowe@mdta.state.md.us); Parikh, Jitesh (FHWA); alexander.bienko@dot.gov; Pavona, Jamie (FHWA); Millington, Chris (FHWA); ealmquist@rkk.com; Shreeve, Rob; Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA); Melissa Williams; Emma Beck
Subject:	BCST2 - NIR Submittal to USCG for review
Date:	Wednesday, April 9, 2025 8:50:43 AM
Attachments:	BCST2 NIR Transmittal.pdf image001.png

Good Morning, Mr. Pitts,
As we discussed last week, the MDTA is submitting the BCST2 Navigation Impact Report (NIR) for your review. MDTA's transmittal letter is attached, and the NIR, NIR Exhibits, and transmittal are available for you to download at the link below:
USCG - Navigation Impact Report

Please confirm that you received this email and were able to download the documents.

Thank you,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

April 8, 2025

US Coast Guard
5th District
431 Crawford Street
Portsmouth, VA 23704-5004

Attn: Mr. Hal Pitts

RE: Bridge Navigation Impact Report
Chesapeake Bay Crossing Study: Tier 2 NEPA
William Preston Lane, Jr. Memorial Bridge (Bay Bridge): US 50/301 across the Chesapeake Bay
Anne Arundel County and Queen Anne's County, Maryland

Dear Mr. Pitts,

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA) Maryland Division, is submitting the Navigation Impact Report (NIR) for the Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) for your review. The FHWA published a Notice of Intent (NOI) to prepare an Environmental Impact Statement for this project in the Federal Register on November15, 2024 (https://www.federalregister.gov/documents/2024/11/15/2024-26545/notice-of-intent-to-prepare-an-environmental-impact-statement-for-the-chesapeake-bay-crossing-study).

The FHWA approved the Chesapeake Bay Crossing Study: Tier 1 NEPA Environment Impact Statement (EIS) and issued a Record of Decision (https://baycrossingstudy.com/tier-2-study-process/tier-1-study-completed/tier1-feis-rod) on April 14, 2022. The US Coast Guard (USCG) was a Cooperating Agency for the Tier 1 Study and issued a "No Objection" determination to the selection of Corridor 7 as the Selected Corridor Alternate (SCA) on September 24, 2021 (Attachment 3). The Tier 2 Study is currently in the scoping phase of developing an Environmental Impact Statement.

Interagency coordination meetings are on-going and include cooperating and participating agencies. The USCG is a cooperating agency for the Tier 2 Study. The USCG's Preliminary Navigation Clearance Determination is needed for scoping. The MDTA submitted the Project

Information Request to the USCG on December 16, 2024. The USCG requested the attached NIR to aid its decision making.

Thank you for your continued support to the MDTA as we seek to deliver this transportation improvement project for Maryland.

If you have questions or comments about this matter, please feel free to contact me at 410-802-9684 or mwilliams9@mdta.state.md.us.

Sincerely,

Mellissa Williams, Director
MDTA Planning and Program Development

Attachments: Navigation Impact Report

cc: Heather Lowe (MDTA Project/Environmental Manager)
Sarah Williamson (BCST2 Team)
Eric Almquist (BCST2 Team)
Rob Shreeve (BCST2 Team)

From: Pitts, Hal R CIV USCG D5 (USA)
Sent: Wednesday, April 16, 2025 8:12 AM
To: Sarah Williamson
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA)
Subject: RE: BCST2 - NIR Submittal to USCG for review

Received.

Very Respectfully,

Mr. Hal R. Pitts, MBA
Captain (retired), U. S. Coast Guard
Master, Any Gross Tons
Chief, Bridge Branch (dpb)
Fifth Coast Guard District
(571) 607-8298 (TEAMS) / (757) 848-7750 (Mobile)

From: Sarah Williamson <sarahw@cri.biz>
Sent: Thursday, April 10, 2025 1:52 PM
To: Pitts, Hal R CIV USCG D5 (USA) <Hal.R.Pitts@uscg.mil>
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.D.Bullock@uscg.mil>
Subject: [Non-DoD Source] RE: BCST2 - NIR Submittal to USCG for review

Hi Mr. Pitts,
Just checking that you received my email (below) with the link and were able to download the BCST2 NIR.
Thanks,

Sarah Williamson

From: Sarah Williamson
Sent: Wednesday, April 9, 2025 8:51 AM
To: Pitts, Hal R CIV USCG D5 (USA) <hal.r.pitts@uscg.mil>
Cc: Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>; Parikh, Jitesh (FHWA) <Jitesh.Parikh@dot.gov>; alexander.bienko@dot.gov; Pavona, Jamie (FHWA) <jamie.pavona@dot.gov>; Millington, Chris (FHWA) <chris.millington@dot.gov>; ealmquist@rkk.com; Shreeve, Rob <robert.shreeve@aecom.com>; Bullock, Charles D Jr CIV USCG

SEC MD/NCR (USA) <Charles.d.bullock@uscg.mil>; Melissa Williams <mwilliams9@mdta.state.md.us>; Emma Beck <emmab@cri.biz>
Subject: BCST2 - NIR Submittal to USCG for review

Good Morning, Mr. Pitts,
As we discussed last week, the MDTA is submitting the BCST2 Navigation Impact Report (NIR) for your review. MDTA's transmittal letter is attached, and the NIR, NIR Exhibits, and transmittal are available for you to download at the link below:
USCG - Navigation Impact Report

Please confirm that you received this email and were able to download the documents.

Thank you,
Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From:	Sarah Williamson
To:	Eric Almquist; Shreeve, Rob
Cc:	Emma Beck; Heather Lowe (hlowe@mdta.state.md.us)
Subject:	FW: BCST2 - NIR Submittal to USCG for review
Date:	Tuesday, May 20, 2025 10:19:06 AM
Attachments:	image002.png image003.png
Importance:	High

From: Pitts, Hal R CIV USCG D5 (USA) <Hal.R.Pitts@uscg.mil>
Sent: Tuesday, May 20, 2025 9:48 AM
To: Sarah Williamson <sarahw@cri.biz>
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.D.Bullock@uscg.mil>; Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>
Subject: RE: BCST2 - NIR Submittal to USCG for review
Importance: High

Ms. Williamson,

1. Please excuse the delay in response. I've reviewed the NIR and found it is complete and sufficient. I intend to publish a Preliminary Public Notice (PPN) for navigation that will be open for 30 days (from June 2, 2025). I'll send you a letter for distribution and the PPN via .pdf email attachment by the middle of next week

2. Please contact me with any questions.

Very Respectfully,

Mr. Hal R. Pitts, MBA
Captain (retired), U. S. Coast Guard
Master, Any Gross Tons
Chief, Bridge Branch (dpb)
Fifth Coast Guard District
(571) 607-8298 (TEAMS) / (757) 848-7750 (Mobile)

From: Sarah Williamson <sarahw@cri.biz>

Sent: Thursday, May 15, 2025 1:53 PM
To: Pitts, Hal R CIV USCG D5 (USA) <Hal.R.Pitts@uscg.mil>
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.D.Bullock@uscg.mil>; Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>
Subject: [Non-DoD Source] RE: BCST2 - NIR Submittal to USCG for review

Good Afternoon, Mr. Pitts,
I am checking in on the status of your review of the BCST2 NIR we sent to you on April 10th. When do you think we will receive the Preliminary Navigational Clearance Determination (PNCD)? If there is anything else you need from the Team, please let me know.
Sincerely,

Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131



WE'RE HIRING! – CLICK HERE

From: Pitts, Hal R CIV USCG D5 (USA) <Hal.R.Pitts@uscg.mil>
Sent: Wednesday, April 16, 2025 8:13 AM
To: Sarah Williamson <sarahw@cri.biz>
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.D.Bullock@uscg.mil>
Subject: RE: BCST2 - NIR Submittal to USCG for review
Importance: High

Received.

Very Respectfully,

Mr. Hal R. Pitts, MBA
Captain (retired), U. S. Coast Guard
Master, Any Gross Tons
Chief, Bridge Branch (dpb)
Fifth Coast Guard District
(571) 607-8298 (TEAMS) / (757) 848-7750 (Mobile)

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To: Pitts, Hal R CIV USCG D5 (USA) <Hal.R.Pitts@uscg.mil>
Cc: Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.D.Bullock@uscg.mil>
Subject: [Non-DoD Source] RE: BCST2 - NIR Submittal to USCG for review

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Thanks,
Sarah Williamson

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Sent: Wednesday, April 9, 2025 8:51 AM
To: Pitts, Hal R CIV USCG D5 (USA) <hal.r.pitts@uscg.mil>
Cc: Heather Lowe (hlowe@mdta.state.md.us) <hlowe@mdta.state.md.us>; Parikh, Jitesh (FHWA) <Jitesh.Parikh@dot.gov>; alexander.bienko@dot.gov; Pavona, Jamie (FHWA) <jamie.pavona@dot.gov>; Millington, Chris (FHWA) <chris.millington@dot.gov>; ealmquist@rkk.com; Shreeve, Rob <robert.shreeve@aecom.com>; Bullock, Charles D Jr CIV USCG SEC MD/NCR (USA) <Charles.d.bullock@uscg.mil>; Melissa Williams <mwilliams9@mdta.state.md.us>; Emma Beck <emmab@cri.biz>
Subject: BCST2 - NIR Submittal to USCG for review

Good Morning, Mr. Pitts,
As we discussed last week, the MDTA is submitting the BCST2 Navigation Impact Report (NIR) for your review. MDTA's transmittal letter is attached, and the NIR, NIR Exhibits, and transmittal are available for you to download at the link below:
USCG - Navigation Impact Report

Please confirm that you received this email and were able to download the documents.

Thank you,
Sarah Williamson | *Bay Crossing Study Team*
Coastal Resources, Inc. | Facebook | LinkedIn | Instagram
25 Old Solomons Island Road, Annapolis, MD 21401
Main 410-956-9000 (ext. 113) | Direct 443-837-2155 | Cell 443-995-4131

Maryland Transportation Authority

Wes Moore, Governor
Aruna Miller, Lt. Governor
Samantha J. Biddle, Chair

Board Members:
Dontae Carroll
Maricela Cordova
William H. Cox, Jr.
Mario J. Gangemi, P.E.
Cynthia D. Penny-Ardinger
Jeffrey S. Rosen
Samuel D. Snead, MCP, MA
John F. von Paris

Bruce Gartner, Executive Director

September 29, 2025

Mr. Hal R. Pitts
US Coast Guard
5th District
431 Crawford Street
Portsmouth, VA 23704-5004

RE: Preliminary Public Notice D05PPN-08-2025 Certification
Preliminary Navigation Clearance Determination
Chesapeake Bay Crossing Study: Tier 2 NEPA
William Preston Lane, Jr. Memorial Bridge (Bay Bridge): US 50/301 across the Chesapeake Bay
Anne Arundel County and Queen Anne's County, Maryland

Dear Mr. Pitts:

The Maryland Transportation Authority (MDTA) is providing certification that the Preliminary Public Notice D05PPN-08-2025, dated 9/29/2025, has been distributed as follows:

Interested Parties PPN 16591, Bay Crossing Project, US 50/301 across the Chesapeake Bay Anne Arundel County and Queen Anne's County, Maryland		
Mariners Utilizing the Waterway	Notification Method	Date
Maryland Port Administration	Email	9/26/2025
MPA Vessel Operations Email List (Ship Lines, Operators, Stakeholders)	Email	9/26/2025
Adjacent Property Owners	Notification Method	Date
DNR Sandy Point State Park	Email	9/26/2025
QA County Terrapin Nature Park	Email	9/26/2025
Bay Bridge Marina	USPS	9/26/2025
Marine Related Facilities within 3 Miles	Notification Method	Date
Sandy Point State Park boat ramp	Email	9/26/2025
Queen Anne's County Kent Narrows Landing	Email	9/26/2025
Queen Anne's County Thompson Creek Landing	Email	9/26/2025
Bay Bridge Marina	USPS	9/26/2025
Queen Anne's County Matapeake Fishing Pier and Ramp	Email	9/26/2025
Safe Harbor Podickory Point	USPS	9/26/2025
Whitehall Marina & Yacht Yard	USPS	9/26/2025

2310 Broening Highway • Baltimore, MD 21224 • mdta@mdta.maryland.gov • 410.537.1000 • 711 (MD Relay) • mdta.maryland.gov • DriveEzMD.com

Interested Parties PPN 16591, Bay Crossing Project, US 50/301 across the Chesapeake Bay Anne Arundel County and Queen Anne's County, Maryland		
Naval Support Activity Annapolis, Mill Creek Marina	USPS	9/26/2025
U.S. Naval Academy, Waterfront Readiness Center	USPS	9/26/2025
Newspapers Serving the Area	Notification Method	Date
Baltimore Sun/Capital Gazette	Delivered (9/29 Posting)	9/26/2025
Star Democrat	Delivered (10/1 Posting)	9/26/2025
Libraries within 3 Miles	Notification Method	Date
Anne Arundel County Public Library - Broadneck	Delivered/Posted	9/27/2025
Queen Anne's County Public Library - Kent Island	Email/Posted	9/29/2025

If any comments are received that require further action before the Coast Guard can make a PNCD, please feel free to provide the comments to us so that we may assist the Coast Guard's review and response, as needed.

If you have any other questions or concerns, please feel free to contact me at 410.802.9684 or mwilliams9@mdta.state.md.us.

Sincerely,

Melissa Williams, Director
Maryland Transportation Authority
Planning & Program Development

U.S. Department of Homeland Security
United States Coast Guard

Commander
United States Coast Guard
Coast Guard East District

431 Crawford Street
Portsmouth, VA 23704-5004
Staff Symbol: dpb
Phone: (571) 607-8298
Fax: (757) 398-6334
Email: Hal.R.Pitts@uscg.mil

16591
28 NOV 2025

Ms. Melissa Williams
Director, Planning and Program Development
Maryland Transportation Authority (MDTA)
2310 Broening Highway
Baltimore, MD 21224

Dear Ms. Williams:

The Coast Guard has reviewed the Navigation Impact Report (NIR) dated April 8, 2025, for Chesapeake Bay (including Kent Narrows and Mezick Pond), between Sandy Point, and Kent Island, MD and at Kent Narrows, MD, respectively. Based on a preliminary review of this study and the information available as of the date of this letter, the Coast Guard does not foresee anything that would prevent a bridge permit from being issued. The Preliminary Navigation Clearance Determination (s) (PNCD (s)) and information below are provided to assist the MDTA in preparing and submitting bridge permit application (s).

The Coast Guard has made PNCD (s) that fixed bridge (s) that carry US50/301 from Sandy Point to Kent Island, MD across the Chesapeake Bay, at mile 138.0; over Kent Narrows, at mile 1.0; and may cross over the entrance to Mezick Pond Channel [1], will provide for the current and prospective reasonable needs of navigation.

The proposed fixed bridge (s) would replace the existing fixed bridge (s) immediately adjacent to the existing bridge (s), on an alignment either to the south or north of the present location. The existing fixed bridge over the western channel has a vertical clearance of 185 feet (north structure) and 182 feet (south structure) above mean high water and 1,500 (north structure) and 1,533 (south structure) feet of horizontal clearance through the main navigation span of the bridge (s). The existing fixed bridge (s) over the eastern channel have a vertical clearance of 58.0 feet above mean high water and 690 feet of horizontal clearance through the main navigation span of the bridge (S). The existing fixed bridge over Kent Narrows has a vertical clearance of 65 feet above mean high water and 75 feet of horizontal clearance centered on the axis of the channel.

The proposed fixed bridge over the western channel (both structures) should provide at least 230 feet of vertical clearance above mean high water and at least 1,500 feet of horizontal clearance through the main navigation span of the bridge. The proposed fixed bridge over the eastern channel (both structures) should provide at least 58.0 feet of vertical clearance above mean high water and at least 690 feet of horizontal clearance through the main navigation span of the bridge. The proposed fixed bridge over Kent Narrows should provide at least 65.0 feet of vertical clearance above mean high water and at least 75 feet of horizontal clearance through the main navigation span of the bridge.

If the Northern alignment alternative for the structures over Chesapeake Bay is selected, the proposed fixed bridge structure (s) over Mezick Pond Channel should provide at least 31.5 feet of vertical clearance above mean high water and at least 75 feet of horizontal clearance centered on the axis of the channel. It must be noted that the veracity of this finding is limited due to the following factors.

[1] Note qualification of PNCD concerning Mezick Pond Channel below.

a. The NIR dated April 8, 2025, provides insufficient data or information to determine the dimensions of the largest vessels that currently transit Mezick Pond Channel.

b. The Maryland Department of Natural Resources (MDDNR) submitted comments in response to the preliminary public notice (attached as enclosures (1) and (2)) related to the Northern alignment alternative.

c. The Coast Guard received only two comments, both from the MDDNR as noted above, in response to the preliminary public notice (PPN). The time of year (outside recreational boating season) in which the Coast Guard PPN was published may have limited comment by recreational mariners.

d. Given the foregoing concerning the Northern alignment alternative, it may be prudent to conduct further analysis and obtain comment from mariners and maritime stakeholders, specifically recreational mariners. The Coast Guard is amenable to issuing a targeted supplemental preliminary public notice (PPN) or email in support of the effort.

Please note that this PNCD is not binding, does not constitute an approval or final agency action, and **expires three (3) years from the date of this correspondence**. A final determination can only be made in accordance with regulation and after Maryland Transportation Authority submits a complete bridge permit application to the Coast Guard. If a complete bridge permit application is not submitted within three (3) years from the date of this correspondence, an updated Navigation Impact Report as described in appendix A of the Coast Guard's Bridge Permit Application Guide, COMDTPUB P16591.3E, should be prepared and submitted in order to obtain a new PNCD.

Mr. Hal R. Pitts, at the above listed address or telephone number, has been assigned as the Coast Guard's Bridge Permit project officer. Please maintain frequent and regular contact with the project officer to ensure efficient and effective project administration.

Sincerely,

HAL R. PITTS
Bridge Program Manager
By direction

Encl: (1) MDDNR letter dated August 6, 2025
(2) MDDNR letter dated October 8, 2025
(3) Bridge Permit Application Guide, COMDTPUB P16591.3E and BPAG Applicant Template located at (https://go.usa.gov/xRFk2)

Copy: Coast Guard Sector Maryland-National Capital Region, Waterways Management
Federal Highways Administration, Baltimore Division Office
U. S. Army Corps of Engineers, Baltimore District Office
Maryland Department of Natural Resources

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form): **Agency:_Coast Guard East District (dpb)_____**
_X__ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)** **____ Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)*** **____ Does not agree** with the **Preferred Alternative & Conceptual Mitigation*** ****If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: **Page 4-1 (paragraph above 4.1 Alternative C Description, last sentence)** **"Alternatives D, E, F, and G would cost at least $2.6 billion more than Alternative C, but the additional benefit they would provide and increased environmental impact from these alternatives would not outweigh the additional cost."** **I find this sentence confusing and recommend the following:** **"Alternatives D, E, F, and G would cost at least $2.6 billion more than Alternative C. The additional transportation benefit they would provide would not outweigh the combination of the additional cost and increased environmental impact from these alternatives."** **Page 4-6 (paragraph 3) - I concur with the proposed LEDPA and remind the project planning team of the conditional Preliminary Navigation Clearance Determination (PNCD) for the new Mezick Pond Channel bridge for the north build alternatives, including Alternative B, in CG East District (dpb) letter dated November 28, 2025.**
Signature: _____Hal R. Pitts, District Bridge Manager Date: 5/15/2026_____

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1234 Market Street. 20th Floor
Philadelphia, Pennsylvania 19107

March 9, 2026

4111
ER26/0047

Alexander Bienko

RE: DEIS, Chesapeake Bay Crossing Study Tier 2, Anne Arundel and Queen Anne's Counties, MD, DOT-FHWA

The U.S. Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Chesapeake Bay Crossing Study Tier 2 in Anne Arundel and Queen Anne's Counties, Maryland.

The DEIS evaluates current and future transportation issues for the Chesapeake Bay Bridge. The proposed project covers a two-mile-wide and 22-mile-long area that includes the bridge and approaches along U.S. 50/301. As Maryland's only crossing of the Chesapeake Bay, the Bay Bridge plays a vital role in facilitating transportation, commerce, and tourism in the region. A no-action alternative and six build alternatives are evaluated in the DEIS. Each build alternative would replace the two existing bridge spans with two new, higher-clearance spans. The National Park Service served as a cooperating agency on this project.

The NPS supports the selection of Alternative C (6-8-6 South) as Maryland Transportation Authority's (MDTA) recommended preferred alternative, and the reduced environmental footprint of that alternative over the larger lane alternatives.

Upon reviewing the DEIS, the Department offers the following comments and recommendations:

Natural Resources

As displayed in Table 4-47, the preferred alternative is expected to impact approximately 27. 4 acres of forested land; however, the mitigation discussion on these impacts on page 4-120 only references mitigation for this loss in generalized terms such as: "For unavoidable impacts, mitigation strategies would focus on controlling the spread of invasive species and restoring the affected areas. These include removing invasive species mechanically or chemically prior to the start of construction activities and replanting with native vegetation. The native vegetation would help to restore biodiversity." Additional details on specifics of replanting plans and the type of native vegetation being replanted should be included in the Final Environmental Impact Statement (FEIS). As the designs for the bridge become further developed, we recommend that tree clearing be avoided to the extent practicable, and any trees impacted be quantified, and replanting sites be identified.

Noise

The Federal Highway Administration's (FHWA) Noise Abatement Criteria (NAC) [Hourly A-Weighted Sound Level in Decibels dB(A)] for Category A, and its narrow interpretation of lands that should be included in that criteria is very limited and the NPS finds that by lumping parks, trails, open space areas, and campgrounds with active sport areas, amphitheaters, daycare centers, hospitals, playgrounds, schools, and other uses, this does not properly evaluate noise impacts in the human environment. By using this criteria level, NPS believes the project's potential noise impacts are underestimated by at least a factor of two since the impact threshold level criteria will be set at 67 dBA (Category C) instead of 57 dBA (Category A).

a. Holly Beach Farm was preserved by a grant from the NPS in 2001 with the intent to be "maintained in the public trust for preservation/recreational use in perpetuity." In addition, the most important aspect of the property is the concept of increasing its quiet park-like accessibility to others while avoiding adverse impacts of crowding, traffic, or neighborhood disruption. This further supports the rationale that Holly Beach Farm would be a better fit in Category A.
b. As applicable to NPS lands, the Department prefers that the project use the relevant standard ASA/ANSI SC1.100-2014, "Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas". As stated in the standard, "the main purpose... is to develop procedures to estimate the residual sound levels in an area where these levels are used to evaluate the effects of a noise source, with two examples being wind turbine noise in quiet rural areas and transportation noise in U.S. National Parks". Use of the standard would offer the credibility of scientific consensus from a broadly representative group of stakeholders, including the U.S. Department of Transportation.
c. The Department recommends that Holly Beach Farm be included in the noise study for this project. As discussed at previous meetings coordination meetings with NPS, the 500'-1000' noise analysis limits for the area of potential effect are not large enough for a project of this scale to adequately capture noise impacts. The preferred alternative with the southern alignment and increase in bridge height will have further reaching noise impacts to areas to the south than that of the original bridge. The Department recommends that the noise analysis consider all resources within 1.5 miles of the bridge since this distance would allow for the inclusion of Holly Beach Farm in the project area.
d. Since Holly Beach Farm and other important resources are located across the water from the preferred bridge alternative (Alternative C), we recommend that the noise analysis discuss how sound will travel across wetlands and water, as well as across land. This new south alignment will be closer to Holly Beach Farm and have an increased level of noise impact on that property. There is no discussion of these types of impacts in the DEIS, and we recommend that analysis be added to the FEIS.

e. Noise impacts on wildlife are very well documented in published research; however, there is no specific discussion in the DEIS of noise impacts to wildlife that is found in the open space areas found in the project area. We recommend that analysis also be added to the FEIS.
f. Page 4-149, Sandy Point State Park, - Impact Determination is that noise abatement is not reasonable. The justification for not using noise abatement here is based on residential use: "based on highway noise guidelines, the linear frontage of the usage area and the applied use-time percentage adjustment, the equivalent residences that are impacted at this location (2.8) is fewer than three; therefore, noise abatement is not reasonable, and further analysis is not required." With this analysis and comparison to residential areas, open space areas are being prematurely dismissed, and not appropriately assessed and mitigated for noise impacts. Open spaces such as Sandy Point State Park should also receive appropriate noise abatement for recreational users of the park and fauna that use the park. Recommend contacting Sandy Point State Park Officials to determine appropriate noise abatement here.
g. Page 4-151, Terrapin Nature Park, - Impact Determination is that noise abatement is not reasonable. The justification for not using noise abatement discussed in the DEIS is based on residential use: "based on highway noise guidelines, the linear frontage of the usage area and the applied use-time percentage adjustment, the equivalent residences that are impacted at this location (2.8) is fewer than three; therefore, noise abatement is not reasonable, and further analysis is not required." With this analysis and comparison to residential areas, open space areas are being prematurely dismissed, and not appropriately assessed and mitigated for noise impacts. Open spaces such as Terrapin Nature Park should also receive appropriate noise abatement for recreational users of the Park and fauna that use the Park. Recommend contacting Terrapin Nature Park Managers to determine appropriate noise abatement here.
h. Section 4.8.2 – the noise impact analysis focuses only on the approach roads, and does not discuss impacts from vehicles traveling across the main span of the bridges. We recommend adding a discussion on that type of noise impact and potential associated mitigation (i.e., quiet pavement, expansion joint, noise barriers) for those; or, further explain how those issues may be addressed during the design phase of the bridges.

<u>Lighting</u>

a. On page 4-31, the MDTA commits to developing a lighting plan for a new bridge during final design. Final elements related to the lighting plan would depend on structure type of the new bridge and whether the optional SUP is included in the project.
b. The Department recommends that the bridge and its approaches use shielded, Dark Sky-compliant lighting fixtures that incorporate LED

fixtures with a color warmth of no more than 2200 Kelvin (a "warm" color that may be less intrusive than bright white lighting).

c. The NPS maintains a Night Skies website with night sky lighting best practices to mitigate impacts to the night sky and demonstrate the benefits of sustainable outdoor lighting. It is recommended that the Bay Crossing study team use these resources to address potential indirect impacts to the night skies to the surrounding communities and adjacent Section 4(f) resources. Please see the links: Sustainable Outdoor Lighting Principles - Night Skies (U.S.National Park Service) (nps.gov) for more information.
d. We also recommend that FHWA use the ANSI/IES RP-43-25 standard guide (https://webstore.ansi.org/standards/iesna/ANSIIESRP4723) when designing lighting associated with any SUP. There are numerous recommendations in the guide on the best ways to light pedestrian areas for safety and to also minimize unnecessary light trespass on night skies.
e. We also recommend considering the height of the light pole and using only the highest pole needed to accommodate large vehicles. Standard light poles are approximately 30 feet, and the MDTA regulates vehicle height to ensure safety on the roads. The height limits are as follows:
    i. General Height Limit: 13 feet 6 inches for most vehicles.
    ii. Extended Height Limit: 16 feet for vehicle combinations transporting farm equipment.
        1. Consider having light poles on the bridge that are lower in height (i.e., 25 ft) to provide proper safety clearance and ensuring that the spill of light from the fixtures more directly falls onto the surface below.

Signage

If a Shared Use Path (SUP) is included in any new bridge, the NPS would like to work closely with MDTA/Federal Highway Administration (FHWA) to discuss the option of installing interpretive signage for visitors who will have a wide view of the Chesapeake Bay from the vantage point afforded by the SUP. This view would include a Captain John Smith voyage stop, and the location of multiple 17th century Native American town sites.

Groundwell Water

The U.S. Geological Survey (USGS) operates groundwater wells throughout the U.S. to collect water quantity and quality data for a variety of purposes. These wells are permanent infrastructure and are vulnerable to disruption from nearby construction activities and/or surface/subsurface contamination. In addition, the data they provide may be affected. The USGS maintains the following active wells within the area affected by the proposed project.

Station Number	Station Name	Site Type	Data Collected
385852076195202	QA Eb 157	well	water level, water quality

385852076195201	QA Eb 156	well	water level, water quality
385756076105301	QA Ec 1	well	water level
390121076253301	AA Cf 152	well	water level

The Maryland-Delaware-DC Water Science Center operates these USGS stations and should be contacted and given sufficient advance notice before construction occurs near them. Efforts should be made to both preserve these stations and minimize impacts to data collected at them.

Section 4(f) and Section 6(f) Properties - Page 5-4, Table 5-1

a. We recommend that MDTA and FHWA continue to coordinate with the NPS as the bridge design moves forward on potential impacts to Section 4(f) and 6(f) properties.
b. Impacts to Sandy Beach State Park and Holly Beach Farm could result in a conversion under Section 6(f), and, if they do, as a reminder Section 6(f) of the Land and Water Conservation Fund (LWCF) Act (now codified at 54 U.S.C. §200305(f)(3)) provides, in part, that:
…no property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as they deem necessary to assure the substitution of other recreation properties of at least equal fair market value and reasonable equivalent usefulness and location.
c. The Section 6(f) review process is in the preliminary stages, and we recommend that the Bay Crossing Study team continue coordination with the Maryland Department of Natural Resources, Land Acquisition and Planning Unit, and NPS on this issue.
d. We recommend a baseline study of current noise levels at Holly Beach Farm, Sandy Point State Park, and Terrapin Nature Park be completed, and then compared to expected noise levels after project completion. This will also assist FHWA to determine the difference between the existing and as-built conditions, and determine if, and what noise mitigation efforts may be needed for the project. Table 4-2, of the Appendix E – Section 4(f) Evaluation summarizes potential uses to Section 4(f) properties. As per 23 CFR 774.17, a *de minimis* impact determination subsumes the requirement for all possible planning to minimize harm because impacts have already been reduced to a *de minimis* level. In the case of noise impacts for Holly Beach Farm, Sandy Point State Park, and Terrapin Nature Park, the Department encourages additional planning to be undertaken to minimize harm to these properties.
e. When evaluating and mitigating noise impacts on Section 4(f) and 6(f) properties, keep in mind that noise impacts, if not properly mitigated,

could result in a constructive use of a resource. The types of impacts that may qualify as constructive use, such as increased noise levels that would substantially interfere with the use of a noise sensitive feature are addressed in 23 CFR 774.15: *The Administration has reviewed the following situations and determined that a constructive use occurs when:*

f. (1) The projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a property protected by Section 4(f), such as:

(i) Hearing the performances at an outdoor amphitheater;
(ii) Sleeping in the sleeping area of a campground;
(iii) Enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance;
(iv) Enjoyment of an urban park where serenity and quiet are significant attributes; or
(v) Viewing wildlife in an area of a wildlife and waterfowl refuge intended for such viewing.

2. Mitigation
   a. If mitigation is needed to offset impacts to Section 4(f) or 6(f) resources, the NPS recommends that FHWA consider Weedon Farm (1741 Holly Beach Farm Rd) as a potential property acquisition. It is an important historic property that is privately owned at the north end of Holly Beach Farm directly on the Bay with a protected cove and dock. It was for sale earlier in early 2026, and is a critical missing piece to open the site to appropriate public access.

Thank you for the opportunity to review and comment on this proposed project. If you have any questions concerning our comments on groundwell water, please contact Alison Gordon (agordon@usgs.gov) and Frederick Spitz (fspitz@usgs.gov); for questions on lighting, noise, signage, and 4(f) and 6(f) resources, please contact Mark Eberle (Mark_Eberle@nps.gov).

Sincerely,

John Nelson
Regional Environmental Officer

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form):

Agency: U.S. Environmental Protection Agency

__X__ **Agrees** with the **Study Schedule (without comments)**

____ Agrees with the **Study Schedule (with minor comments)***

____ Does not agree with the **Study Schedule***

If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: TIMOTHY WITMAN Digitally signed by TIMOTHY WITMAN Date: 2023.05.11 17:07:03 -04'00' Date: _____

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. Samantha Beers
Director
Office of Communities, Tribes & Environmental Assessment
U.S. Environmental Protection Agency
EPA Region III (3RA12)
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Ms. Beers:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Clean Water Act and expertise in the environmental effects analyses. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any

issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

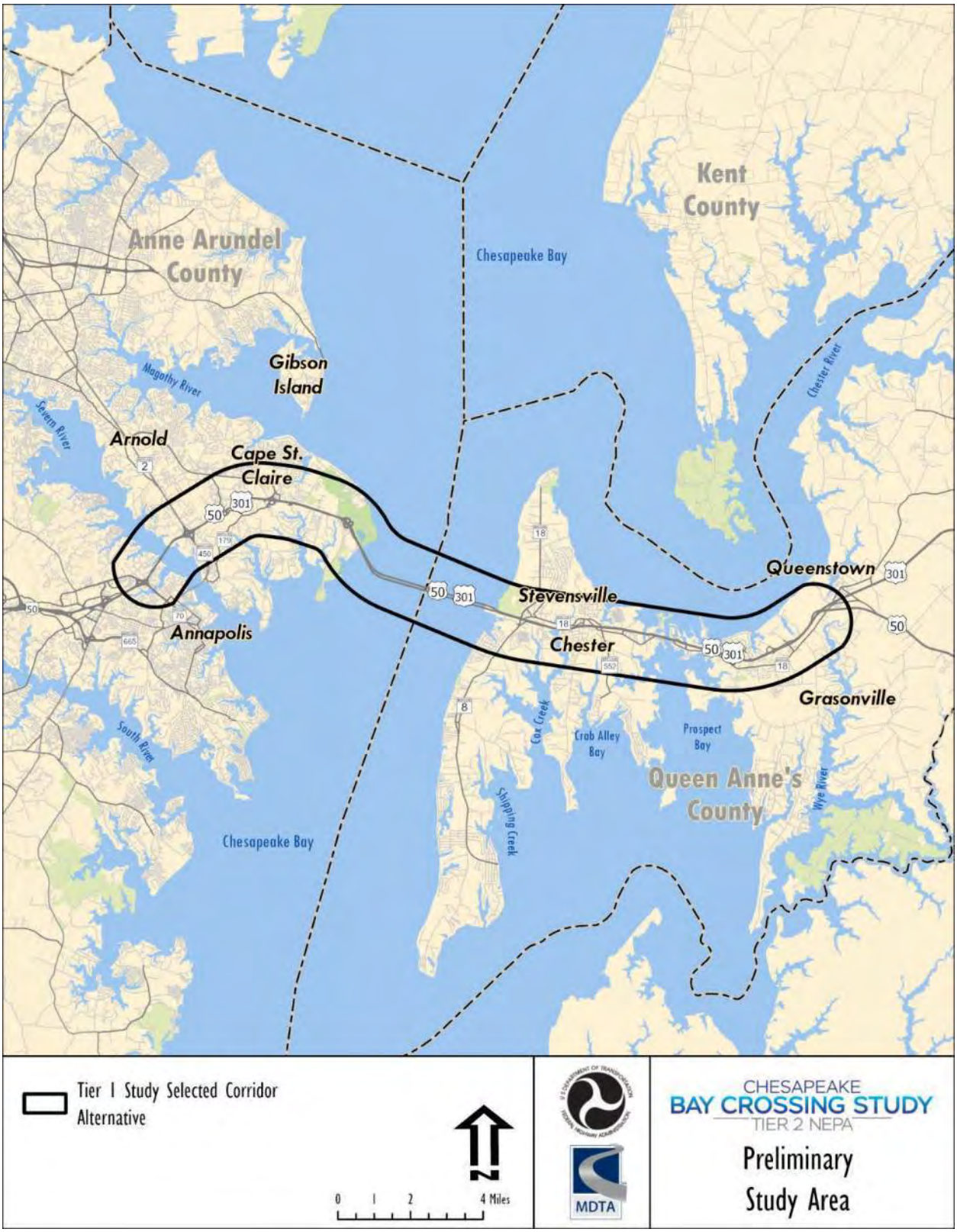
JEANETTE J MAR Digitally signed by JEANETTE J MAR
Date: 2023.06.01 16:43:00 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Mr. Tim Witman, USEPA, NEPA Reviewer & Transportation Liasion
Ms. Rebecca Souto-Glyn, USEPA NEPA Reviewer
Ms. Megan Fitzgerald, USEPA, Water Division RSC Representative
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Four Penn Center
1600 John F. Kennedy Boulevard
Philadelphia, Pennsylvania 19103-2852

June 29, 2023

VIA ELECTRONIC MAIL

Jeanette Mar
Federal Highway Administration
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201
Jeanette.Mar@dot.gov

RE: EPA Acceptance of Invitation to Serve as Cooperating Agency for the Chesapeake Bay Crossing Study: Tier 2 NEPA Study

Dear Ms. Mar:

The U.S. Environmental Protection Agency (EPA) accepts the invitation extended by the Federal Highway Administration (FHWA), as lead federal agency, to participate as a Cooperating Agency in the National Environmental Policy Act (NEPA) review of the Chesapeake Bay Crossing Study: Tier 2, between Arundel County and Queen Anne's County, Maryland. Please see enclosed our completed "Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form."

The Tier 2 Study focuses on potential environmental impacts of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the U.S. 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County.

As noted in Council of Environmental Quality (CEQ) Regulations for Implementing NEPA (40 C.F.R. §1501.8), a Cooperating Agency is responsible for assisting the lead agency with early involvement in the NEPA process. This participation includes engaging in the scoping process, assisting with identification of potential environmental issues and impacts, focusing on areas where the Cooperating Agency has special technical expertise, and making staff available to support and enhance the lead agency's interdisciplinary capabilities. As a Cooperating Agency for the Study's NEPA analysis, we will support the Study's development by providing comments on general NEPA compliance, Clean Water Act (CWA) Section 404 and Clean Air Act (CAA) compliance, climate change, and environmental justice.

Given reasonable timeframes, we would be pleased to review forthcoming environmental documents for the Study. CEQ guidance recognizes that the lead agency has overall responsibility for the content of the NEPA documents and status as a Cooperating Agency should not be construed as expressing agreement with the lead agency on the conclusions drawn from the NEPA documents or selection of the preferred alternative. In addition, EPA has independent responsibilities related to the

Study, including our responsibilities pursuant to Section 309 of the Clean Air Act (CAA), Sections 402(d) and 404(b), (c), and (q) of the CWA.

Thank you for the opportunity to engage as a Cooperating Agency. As you prepare your NEPA documents, please feel free to contact the Region 3 staff contact for this project, Rebecca Glyn, at (215) 814-2795 or glyn.rebecca@epa.gov. We look forward to working with you to ensure that a robust study is developed. If you have any questions, feel free to contact me at (215) 814-2775.

Sincerely,

TIMOTHY WITMAN Digitally signed by TIMOTHY WITMAN
Date: 2023.06.29 12:51:43 -04'00'

Timothy R. Witman
Acting Environmental Assessment Branch Chief
Office of Communities, Tribes & Environmental Assessment

Enclosure: "Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form"

Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: US Environmental Protection Agency Region 3

Signature: TIMOTHY WITMAN Digitally signed by TIMOTHY WITMAN Date: 2023.06.29 11:40:55 -04'00' Date: _____

Print Name: Timothy Witman

Title: Acting Chief, Environmental Assessment Branch

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Cultural Resources Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Cultural Resources Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Cultural Resources, the following agency (by signing this form): **Agency:_____USEPA_____**
__X__ **Concures** with the **Cultural Resources Methodology (without comments)** **____ Agrees** with the **Cultural Resources Methodology (with <u>minor</u> comments)*** **____ Does not agree** with the **Cultural Resources Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.**
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2023.11.16 17:47:50 -05'00' _____ Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form):

Agency:_____US EPA_____

____ **Concures** with the **Indirect & Cumulative Effects Methodology (without comments)**

__X__ **Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)***

____ **Does not agree** with the **Indirect & Cumulative Effects Methodology***

****If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

EPA has reviewed the Draft Indirect & Cumulative Effects (ICE) Methodology, as provided for pre-publication review to Cooperating Agencies on October 16, 2023. We provide the following comments at this time to further enhance the methodology for assessing indirect and cumulative effects (ICE) in the forthcoming EIS:

- While the draft ICE methodology generally describes the main components of the ICE analysis, it is not clear how the data collected will be used to inform project decisions. EPA recommends describing the process that will be used to identify potential adverse environmental impacts and human health stressors, in terms of degree of impact and level of concern, and how these findings will be used to inform the alternatives analysis and proposed mitigation measures. We recommend, in addition to a narrative description, providing clear graphics, such as a pathway diagram or decision flowchart, that illustrate the causal connections between potential adverse impacts and project outcomes.
- We recommend identifying how the analysis will determine the furthest potentially impacted geographic area, appropriate to the potential means and type of impact, for example with regard to community air quality impacts.
- Given the overlap with the draft Socioeconomic and Land Use Analysis Methodology, EPA references our comments provided to the BCST2 on that Memorandum on October 26, 2023 (attached).

Thank you for considering these comments and please reach out with any questions.

Signature: REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2023.11.16 17:44:44 -05'00' Date: _16 November 2023___

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Air Quality Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Air Quality Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Air Quality, the following agency (by signing this form): **Agency:_____US EPA_____**
__X__ Concurs with the **Air Quality Methodology (without comments)** **___ Agrees** with the **Air Quality Methodology (with <u>minor</u> comments)*** **____ Does not agree** with the **Air Quality Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: Thank you for providing the revised methodology document for review. EPA concurs and has no comments at this time.
Signature: REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2023.12.12 17:04:36 -05'00' Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Noise Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Noise Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Noise Methodology, the following agency (by signing this form): **Agency:_____US EPA_____**
____ **Concurs** with the **Noise Methodology (without comments)** **__X_ Agrees** with the **Noise Methodology (with <u>minor</u> comments)*** **____ Does not agree** with the **Noise Methodology*** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: Thanks for the opportunity to review the draft methodology. We concur with the following comments: - The Noise methodology appears to only provide for a qualitative assessment of construction noise impacts in the NEPA document. EPA recommends the Noise analysis provide additional information on potential noise impacts associated with constructing the proposed action (once determined) as appropriate, including a description of the approximate construction timeframe and schedule, expected noise-generating activities and equipment use, the potential for certain blasting activities to cause higher levels of noise and vibration, as well as the feasibility of applying a quantitative assessment methodology to more accurately predict and mitigate noise impacts from construction. - EPA recommends providing clear map graphics in the NEPA document Noise analysis to illustrate estimated noise levels associated with the proposed action's construction and operation, as well as factors affecting noise levels and the feasibility of abatement measures.
Signature: REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2024.01.24 15:57:45 -05'00' Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:_____US EPA_____**
____ **Concures** with the **Natural Environmental Methodology (without comments)** **__X__ Agrees** with the **Natural Environmental Methodology (with minor comments)*** **____ Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments: EPA provides concurrence on the BCST2 draft Natural Resources Methodology with the following comments: • For **G. Surface Water Resources, Stream Channels and Geomorphic Assessments Methods** (pg. 6), we recommend including the MD stream calculator and Function Based Rapid Stream Assessment (FBRSA) updates: o USACE Public Notice of the final MD Stream Mitigation Framework (MSMF) - https://www.nab.usace.army.mil/Missions/Regulatory/Public-Notices/Public-Notice-View/Article/3527064/spn-23-37-announcing-the-maryland-stream-mitigation-framework-version-1-final/ o 2015 - FBRSA – we note that updates are expected in 2024 - https://stream-mechanics.com/wp-content/uploads/2012/01/Rapid-Assessment-Methodology.pdf • For **H. Waters of the U.S. and State Including Wetlands, Tidal and Non-tidal Streams and Wetlands Methods** (p. 9), the USACE Baltimore District will be publishing a draft rapid wetland condition assessment (MDWAM) in 2024 for public comment. We recommend the use of MDWAM when it's finalized. • On page 10, the reference to FACM should be FCAM (functional condition assessment method) and should be defined the first time it's used. • Regarding the reference to using the New England Method for assessing wetland functions (p. 9 and in response to the MDE comment in the errata), it's unclear if there's a reason to not use the MidAtlantic Tidal Rapid Assessment Method (MidTRAM) for tidal resources. We provide this link to it here, as it would appear more relevant than the New England Method (but feel free to disregard if there's more context or if this was resolved elsewhere) - https://dnrec.delaware.gov/watershed-stewardship/wetlands/monitoring-assessment/#:~:text=The%20MidAtlantic%20Tidal%20Rapid%20Assessment,bird%20community%20and%20biomass%20levels. • Regarding the reference to VIMS surveys in **L. Aquatic Habitat and Biota, Methodology** and the NMFS comment cited in the errata, EPA clarifies that, while VIMS surveys do categorize earlier species (such as *Zannichellia palustris* – Horned pondweed) when detected in the surveys, VIMS surveys may occur too late in the growing season to reliably capture or map the extent of earlier emerging species, like Zapa. Therefore, to

ensure the most accurate description of SAV presence, it may still be appropriate to recommend ground truthing surveys to occur in areas where Zapa or similarly early SAV species occur.

- For **O. Climate Change, Methods** (p. 20), we recommend including MD's critical area mapping, NOAA's Sea-Level Rise (SLR) viewer, and EPA's climate change page:
    - Critical Area mapper - https://webmaps.esrgc.org/cbca/#instruction
    - NOAA SLR viewer (unless the information here is redundant) - https://coast.noaa.gov/slr/
    - EPA's climate change page for the mid-atlantic region - https://www.epa.gov/climate-adaptation/climate-change-epa-mid-atlantic-region

Signature: TIMOTHY WITMAN Digitally signed by TIMOTHY WITMAN Date: 2024.02.02 15:02:56 -05'00' Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Socioeconomics & Land Use Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Socioeconomics & Land Use Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Socioeconomics & Land Use, the following agency (by signing this form): **Agency:_____US EPA_____**
_X__ **Concurs** with the **Socioeconomics & Land Use Methodology (without comments)** **____ Agrees** with the **Socioeconomics & Land Use Methodology (with minor comments)*** **____ Does not agree** with the **Socioeconomics & Land Use Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2024.02.12 16:36:12 -05'00' Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:_____U.S. Environmental Protection Agency, Region 3_____**
____ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **_X__ Agrees** with the **Draft Purpose and Need Summary (with <u>minor</u> comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with <u>minor</u> comments" of "does not agree," written comments <u>must</u> be provided below or as an attachment to this agreement form.***
Note: Do <u>not</u> provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with <u>minor</u> comments") or do not agree until revisions are made or additional information is provided.
Comments: EPA appreciates the BCST2 NEPA team's consideration of our previous comments on the draft purpose and need for the project. We provide the following additional minor comments with our concurrence on the June 2024 Draft Purpose and Need Summary and Report: • <u>Needs, Navigation</u>: We recommend the NEPA document discuss coordination efforts with the Francis Scott Key Bridge reconstruction project to accommodate existing and future ship navigation and commercial traffic in the Chesapeake Bay, Port of Baltimore, and commerce in Maryland, including coordinated measures to increase shipping channel width and vertical clearance for proposed Bay crossing structures. • We also recommend discussing how sea-level rise projections will be factored into the design of the proposed crossing to ensure its resilience in accommodating ship navigation needs in the study area over time. • <u>Needs, Mobility</u>: In assessing the capacity of park and ride facilities to accommodate carpool and transit mobility, we recommend also exploring potential needs and opportunities to accommodate rest areas for commercial truck drivers, given the corridor's significance as part of FHWA's Primary Highway Freight System, its ranking as the first and second least reliable corridors for truck travel in the State of Maryland, and projected increases in truck volumes and trucks as percentages of traffic in the corridor. • We also recommend coordinating with State programs implementing various initiatives under the Infrastructure Investment and Jobs Act, such as the National Electric Vehicle Infrastructure (NEVI) Formula Program, which identifies the study area as an Alternative Fuel Corridor, in line with FHWA's designation under 23 USC 151. • <u>Needs, Reliability</u>: If not already considered, we recommend forecasted truck volumes and percentages summarized in Table 7 account for projected increased operations at the Port of Baltimore.
REBECCA SOUTO-GLYN Digitally signed by REBECCA SOUTO-GLYN Date: 2024.07.29 16:37:44 -04'00' Signature: _____ Date:_____

From:	Glyn, Rebecca
To:	Bienko, Alexander (FHWA); Heather Lowe; Sarah Williamson
Cc:	Witman, Timothy; Joe DaVia ; Mazzarella, Christine; Blair, AaronM
Subject:	RE: Maryland Bay Crossing Tier 2 NOI Publication
Date:	Monday, January 13, 2025 5:02:22 PM
Attachments:	20250113_BCST2-NOI_EPAComments Signed.pdf

Hello Alex, Heather, and Sarah,

Please find attached EPA's comments on the BCST2 NEPA NOI and NOI Additional Project Information Document.

Thanks for considering our comments and please reach out with any questions. We look forward to working with you in preparing the Draft EIS.

Thanks and happy new year!
Rebecca

Rebecca Souto-Glyn
National Environmental Policy Act (NEPA) Reviewer
U.S. Environmental Protection Agency
Mid-Atlantic Region 3 Philadelphia, Pennsylvania
(215) 814-2795 glyn.rebecca@epa.gov
Submit NEPA environmental review documents to R3NEPA@epa.gov

From: Bienko, Alexander (FHWA) <alexander.bienko@dot.gov>
Sent: Monday, November 18, 2024 4:16 PM
To: joseph.davia@nab02.usace.army.mil; nicole.m.voelker@usace.army.mil; Li, Ray <ray_li@fws.gov>; Pitts, Hal R CIV <Hal.R.Pitts@uscg.mil>; jonathan.watson <Jonathan.Watson@noaa.gov>; james.m.moore2@uscg.mil; Eberle, Mark D <Mark_Eberle@nps.gov>; Glyn, Rebecca <GLYN.REBECCA@EPA.GOV>; Brian D Hopper - NOAA Federal <brian.d.hopper@noaa.gov>
Subject: Maryland Bay Crossing Tier 2 NOI Publication

Caution: This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Good Evening Cooperating Agencies!

I would like to mention to everyone that the NOI for the Bay Crossing Tier 2 EIS has officially been published on the federal register last Friday, November 15th. The link below is for the exact publication:
https://www.federalregister.gov/documents/2024/11/15/2024-26545/notice-of-intent-to-prepare-an-environmental-impact-statement-for-the-chesapeake-bay-crossing-study

In addition, all supporting documents related to the publication can be found on regulations.gov in

the link below:
https://www.regulations.gov/docket/FHWA-2024-0073/document

The public comment period for the NOI ends January 13th.

If you have any questions, please let me know!

Best,

Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA – Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201
(410) 779-7148

REGION 3
PHILADELPHIA, PA 19103

January 13, 2025

VIA ELECTRONIC MAIL ONLY

Alexander Bienko, Environmental Protection Specialist
Federal Highway Administration, Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
alexander.bienko@dot.gov

Heather Lowe, Project Manager
Maryland Transportation Authority
Division of Planning & Program Development
2310 Broening Highway
Baltimore, Maryland 21224
hlowe@mdta.state.md.us

RE: EPA Comments on the Notice of Intent (NOI) for the Chesapeake Bay Crossing Study Tier 2 National Environmental Policy Act (NEPA), November 2024 (ID No. EISX—XMD-1729253019)

Dear Mr. Bienko and Ms. Lowe:

The U.S. Environmental Protection Agency (EPA) has reviewed the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Chesapeake Bay Crossing Study: Tier 2 (BCST2) National Environmental Policy Act (NEPA), issued by the Federal Highway Administration (FHWA) in cooperation with the Maryland Transportation Authority (MDTA). We provide FHWA and MDTA with our enclosed comments on the NOI and NOI Additional Project Information Document (APID) in accordance with NEPA, as modified by the Fiscal Responsibility Act (42 USC § 4321 - 4336e)) and Section 309 of the Clean Air Act (CAA) (42 USC 7609).

The Tier 2 NEPA Study addresses existing and future transportation capacity needs and access across the Chesapeake Bay at the William Preston Lane, Jr. Memorial (Chesapeake Bay) Bridge and its approaches within the U.S. 50/301 corridor from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore in Maryland.

As a Cooperating Agency for the project pursuant to 23 USC 139 and 42 USC 4336a, EPA participated in regular agency coordination meetings and site visits and provided early review and comments on the project's draft NEPA documents. These include providing written comments on the project's

preliminary Purpose and Need (July 2023, January 2024), Alternatives Analysis (June 2024), and Technical Methodologies for Air Quality (June 2023), Natural Resources (June, October 2023), Greenhouse Gas Emissions & Climate Change (October 2023), Indirect & Cumulative effects (June, November 2023), Noise (June 2023, January 2024), Socioeconomics & Land Use (October 2023), and Environmental Justice & Equity (November 2023, February 2024).

We appreciate MDTA and FHWA's ongoing efforts to coordinate with EPA and address our previous comments. We look forward to continuing our coordination with you in preparing the Draft EIS. Please reach out with any questions to me or the lead NEPA reviewer for the project, Rebecca Souto-Glyn at glyn.rebecca@epa.gov.

Sincerely,

TIMOTHY WITMAN

Digitally signed by TIMOTHY WITMAN
Date: 2025.01.13 16:52:49 -05'00'

Timothy Witman
Manager, NEPA & Technical Assistance Branch
US EPA Region 3
witman.timothy@epa.gov

Encl. EPA Comments on the November 2024 NOI to Prepare an EIS for the Chesapeake Bay Crossing Study Tier 2 NEPA

Cc: Joseph DaVia, U.S. Army Corps of Engineers, Baltimore District, Regulatory
joseph.davia@usace.army.mil

EPA Comments on the November 2024 NOI to Prepare an EIS for the Chesapeake Bay Crossing Study
Tier 2 NEPA and NOI Additional Project Information Document (APID)
Submitted to FHWA and MDTA on January 13, 2025

The U.S. Environmental Protection Agency (EPA) provides the following comments and recommendations on the NOI and NOI APID for your consideration in preparing the EIS:

2 Purpose and Need, 2.3 Roadway Deficiencies. We recommend the project team consider framing the need element of "roadway deficiencies" in terms of "roadway safety and integrity." This may better encompass the suite of needs related to providing modern safety standards for lane and shoulder widths and safer access for emergency and maintenance personnel, emergency evacuations, suicide deterrence, as well as ensuring the future structure is protected from vessel collisions, flooding, and extreme weather events (APID p. 2-1, 2-3).

2 Purpose and Need, 2.4 Existing and Future Maintenance Needs. EPA recommends the EIS identify design factors and considerations for the new bridge structure to minimize and improve upon the long-term maintenance issues present with the existing bridge, beyond the proposed wider shoulders noted in Table 5-2 that would give maintenance workers greater access without the need for lane closures (APID pp. 2-3; 2-4; 5-15).

2 Purpose and Need, 2.6 Environmental Responsibility. For this objective, EPA reiterates our previous recommendation to prioritize the proposed bridge's resilience to changing environmental conditions. We recommend the EIS include analysis regarding past and potential future effects of flooding, sea level rise, coastal storm surges, and extreme weather events on mobility and travel reliability in the corridor (APID p. 2-5).

4 Screening Process and Results, 4.7 Transit/TSM/TDM, 4.7.1.1 Ferry. We recommend the EIS provide any available updates or findings from Visit Annapolis & AAC's ongoing study exploring the viability of passenger ferry service in the project area (APID p. 4-32). We recommend the ARDS consider alignments that would not preclude optimal siting of future ferry service and its potential role in improving bridge congestion, recreation access, and mobility and emergency evacuation options in the project area.

4 Screening Process and Results, 4.7 Transit/TSM/TDM, 4.7.2.3 Park-and-Ride Facilities. We recommend the EIS identify the criteria that will be used to evaluate the adequacy of existing park and ride facilities to meet existing and future demand, as well as the optimal siting, capacity needs, and amenities for proposed new park and ride facilities or improvements to existing facilities (APID p. 4-40).

To reiterate from our previous comment, we recommend that plans for park and ride facilities consider input from local and regional organizations and the general public and prioritize locations that combine high demand with ease of access for various modes of travel, including vehicular, transit, and bicycle/pedestrian. We further recommend consideration of accessory uses for park and ride facilities, such as for truck rest areas, electric vehicle charging, and intermodal access to recreation facilities.

4 Screening Process and Results, 4.8 Pedestrian and Bicycle Shared Use Path (SUP). We recommend the EIS show how a proposed SUP would connect with existing and proposed bicycle and pedestrian

networks in the project area and how the proposed SUP would incorporate safety features as recommended in relevant guidance documents and 23 USC 217 (g)(2), such as audible traffic signals and enhanced lighting and signage. We recommend identifying which safety features would be necessary to support two-way 24-hour access to the SUP (APID p. 4-50).

5 Proposed Action and Build Alternatives Retained for Detailed Study (ARDS). We recommend throughout the EIS that references to the No-Build Alternative identify the existing number of lanes on the existing approach roads and Bay Bridge, to match the nomenclature of the proposed build alternatives, i.e. "6-5-6 No-Build."

We recommend Figure 5.2 Alternatives B and C Typical Sections show stormwater facilities and swales similar to those shown in Figures 5.3 and 5.4 for Alternatives D through G. For all build alternative plans and cross-sections provided in the EIS, we recommend showing the anticipated stormwater features as accurately as possible (APID pp. 5-8 to 5-10).

6 Existing Environmental Conditions and Expected Effects, Minority and Low-Income Populations. We recommend clarifying that Executive Order (EO) 14096 directs agencies to evaluate and address a proposed action's potential "disproportionate and adverse" human health and environmental effects. This amended EO 12898 language that refers to "disproportionately high and adverse" effects (APID p. 6-3).

The EIS should identify the thresholds used to identify block groups as minority and/or low-income populations subject to the EO 14096 directive to propose measures that avoid, minimize, or mitigate disproportionate and adverse effects to communities with environmental justice concerns to the maximum extent practicable, and to account for the cumulative effects on these communities from past federal activities (APID pp. 6-3, 6-4, Table 6-3 p. 6-10).

6 Existing Environmental Conditions and Expected Effects, Other Resources/Preservation Areas. The EIS should identify the Green Infrastructure resources listed in Table 6-3 as potentially impacted by the proposed ARDS.

7 Anticipated Permits and Other Authorizations. We recommend the EIS identify for Maryland Department of Environment Sediment & Erosion Control Program and/or Stormwater Management Act permits the relevant delegated authority under the federal Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) program (Table 7-1, p. 7-3).

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency:___U.S. Environmental Protection Agency_____**
____ Concurs with the **Draft ARDS (without comments)** **__X_ Agrees** with the **Draft ARDS (with minor comments)*** **____ Does not agree** with the **Draft ARDS*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.***
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
EPA concurs with the Draft ARDS with the following minor comments: • In Section 3, Overview of Alternatives Screening Process (p. 3-1), 42 USC Section 4332(2)(C)(iii) is the correct citation to the NEPA requirement to analyze a reasonable range of alternatives (not 42 USC 4331 Sec. 102). • Appendix A, Table 4.2 (p. 4-15) states that proposed build alternatives would substantially reduce existing and future maintenance needs by virtue of the new bridge being newly constructed. We recommend the EIS evaluate additional criteria, such as design factors, material and finish selections, and construction practices, that would ensure greater durability of the proposed new bridge over time and improve upon the long-term maintenance issues present with the current structure. • Vertical clearance is identified as the primary criterion for build alternatives to better meet navigation needs over the no-action alternative. We recommend considering additional criteria to meet this need, such as alignment and spacing of new bridge piers around shipping lanes and incorporating navigation aids and pier protection in line with standard industry guidance and similar measures being developed for the Francis Scott Key Bridge reconstruction. • Preliminary lengths of build alternatives vary significantly, with Appendix A, Figure 4.1 showing 8-8-8 Alternatives D & E and 8-10-8 Alternatives F & G extending 10 miles longer overall than 6-8-6 Alternatives B & C (pp. 4-2 to 4-4). We recommend identifying major differences in total length among build alternatives and adding a graphic scale to maps illustrating this. • It would also be helpful to identify which interchanges and major water crossings would be reconstructed for each build alternative. While Background Section 2 (p. 2-1) and Appendix A, Section 3.4 (p. 3-18) identify three major water crossings between the Bay Bridge and U.S. 50/301 split (at Cox Creek, Piney Creek, and the Kent Narrows Bridge), these do not appear fully considered in the purpose and need screening, cost, or impact analyses.
Signature: _____ Digitally signed by TIMOTHY WITMAN Date: 2025.03.26 16:11:37 -04'00' Date: _____

March 9, 2026

Alexander Bienko
Environmental Specialist
Federal Highway Administration
George H. Fallon Building
31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
alexander.bienko@dot.gov

Heather Lowe
Planning & Community Relations Manager
Maryland Transportation Authority
Division of Planning and Program Development
2310 Broening Highway
Baltimore, Maryland 21224
hlowe@mdta.state.md.us

RE: EPA Comments on the Draft Environmental Impact Statement for the Chesapeake Bay Crossing Study: Tier 2 NEPA, Anne Arundel and Queen Anne's County, Maryland, CEQ No. 20250190

Dear Mr. Bienko and Ms. Lowe:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced Tier 2 Study Draft Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) and our NEPA review authority under Section 309 of the Clean Air Act (CAA). The CAA Section 309 role is unique to EPA. It requires the EPA to review and comment on the environmental impact of proposed federal actions subject to NEPA's EIS requirements and to make its comments public.

The Tier 2 Study Draft EIS evaluates measures to address transportation capacity needs and access across the Chesapeake Bay at the William Preston Lane, Jr. Memorial Bridge and its approaches within the U.S. 50/301 corridor. Based on the Tier 2 Study Draft EIS analysis of six build alternatives, the Study's lead agencies, the Federal Highway Administration (FHWA) and Maryland Transportation Authority (MDTA), have determined that Alternative C is the Recommended Preferred Alternative.

The EPA has served as a Cooperating Agency since December 2017 for the Tier 1 Study and since June 2023 for the Tier 2 Study. (23 U.S.C. 139(d); 42 U.S.C. 4336a(a)(3)). The EPA attended numerous interagency meetings and site visits and reviewed draft documents to support the project's efficient environmental review under 23 U.S.C 139(d)(9) (Efficient Environmental Reviews for Project Decision Making and One Federal Decision) and 42 U.S.C. 4336a (NEPA). Recent participation includes the agency's review of the Draft EIS Notice of Intent (January 2025), Draft Analysis Methodologies and Technical Reports (July 2023 through July 2025), and the Administrative Draft EIS (September 2025). We thank the FHWA and MDTA for addressing many of our comments and appreciate this opportunity to review and comment on the Draft EIS.

We provide the following recommendations on the Draft EIS.

Water Resources

In accordance with 23 U.S.C. 139 and 42 U.S.C. 4336a, the combined Final EIS and Record of Decision (ROD) should serve as a single environmental document that provides sufficient information and analysis to inform concurrent agency reviews and timely project authorizations. The EPA recommends the combined Final EIS and ROD include the most current information to assist the EPA in the review of the U.S. Army Corps of Engineers' authorization for the project under the Clean Water Act Section 404 and Rivers and Harbors Act Section 10. The combined Final EIS and ROD would benefit from information to support a determination on whether the Preferred Alternative is the least environmentally damaging practicable alternative and the mitigation necessary to compensate for its unavoidable impacts, per the Clean Water Act Section 404(b)(1) Guidelines (40 C.F.R. 230).

We recommend information about the proposed type and water resource impacts of pier protections for the Tier 2 Study should be documented consistently throughout the combined Final EIS and ROD. We also recommend the combined Final EIS and ROD clarify, as appropriate, how MDTA's recently initiated pier protection project at the existing bridge will be coordinated with the Tier 2 Study Preferred Alternative, with respect to the discharge of dredged and fill material requiring Section 404/Section 10 permit authorization and 401 Water Quality Certification.

The EPA appreciates this opportunity to review the Draft EIS and continue supporting the Tier 2 Study's efficient environmental review. Looking ahead, we will ensure our timely response to MDTA's upcoming request for Cooperating Agency concurrence on Alternative C as the Preferred Alternative, as well as timely review of the combined Final EIS and ROD in November 2026.

If you have any questions or would like to discuss these recommendations, please contact me at witman.timothy@epa.gov or (215) 814-2775 or Rebecca Souto-Glyn at glyn.rebecca@epa.gov or (215) 814-2795.

Sincerely,

Timothy Witman
Manager, NEPA and Technical Assistance Branch
U.S. EPA Mid-Atlantic Region 3

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: U.S. Environmental Protection Agency Region 3

__X__ Concurs with the Preferred Alternative & Conceptual Mitigation (without comments)

____ Agrees with the Preferred Alternative & Conceptual Mitigation (with minor comments)*

____ Does not agree with the Preferred Alternative & Conceptual Mitigation*

**If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.*

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: Timothy Whitman Digitally signed by TIMOTHY WITMAN Date: 2026.05.07 15:32:21 -04'00' Date: _____

Maryland Transportation Authority

CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA

STUDY SCHEDLULE (AS PROVIDED IN THE COORDINATION PLAN)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests comments/agreement on the Study Schedule (as provided in the Coordination Plan)** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Study Schedule (April 2023), the following agency (by signing this form): **Agency: U.S. Fish and Wildlife Service**
__X__ **Agrees** with the **Study Schedule (without comments)** **____ Agrees** with the **Study Schedule (with minor comments)*** **____ Does not agree** with the **Study Schedule*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2023.05.11 07:50:45 -04'00' Date:

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. Genevieve LaRouche
Supervisor
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Dear Ms. LaRouche:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that has jurisdiction over resources within the Tier 2 study area pursuant to the Endangered Species Act and other laws and regulations. As Lead Agencies, FHWA and MDTA invite your agency to be a Cooperating and Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS) in accordance with 40 C.F.R. §1501.8(a).

In addition to the responsibilities associated with being a Participating Agency, responsibilities associated with accepting the Cooperating Agency invitation are described in §1501.8(b). They include:

1. Participate in the NEPA process at the earliest practicable time.
2. Participate in the scoping process (described in §1501.9).
3. On request of the Lead Agency, assume responsibility for developing information and preparing environmental analyses, including portions of the environmental impact statement or environmental assessment in which the Cooperating Agency has special expertise.
4. On request of the Lead Agency, make available staff support to enhance the Lead Agency's interdisciplinary capability.
5. Consult with the Lead Agency in developing the schedule (§1501.7(i)), meet the schedule, and elevate, as soon as practicable, to the senior agency official of the Lead Agency any issues relating to purpose and need, alternatives, or other issues that may affect any agencies' ability to meet the schedule.

6. Meet the Lead Agency's schedule for providing comments and limit its comments to those matters for which it has jurisdiction by law or special expertise with respect to any environmental issue consistent with §1503.2.
7. To the maximum extent practicable, jointly issue environmental documents with the lead agency.

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identify, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Provide data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participate in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agree on the schedule contained in the Coordination Plan as required by 23 U.S.C. §139(g) and the Study's Guiding Principles.
5. Review and comment on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency declines the invitation to be a Cooperating Agency, your agency is still invited to be a Participating Agency. If your agency elects to decline either or both invitations, please include the reason for declining with your agency's response. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Cooperating and Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

JEANETTE J MAR

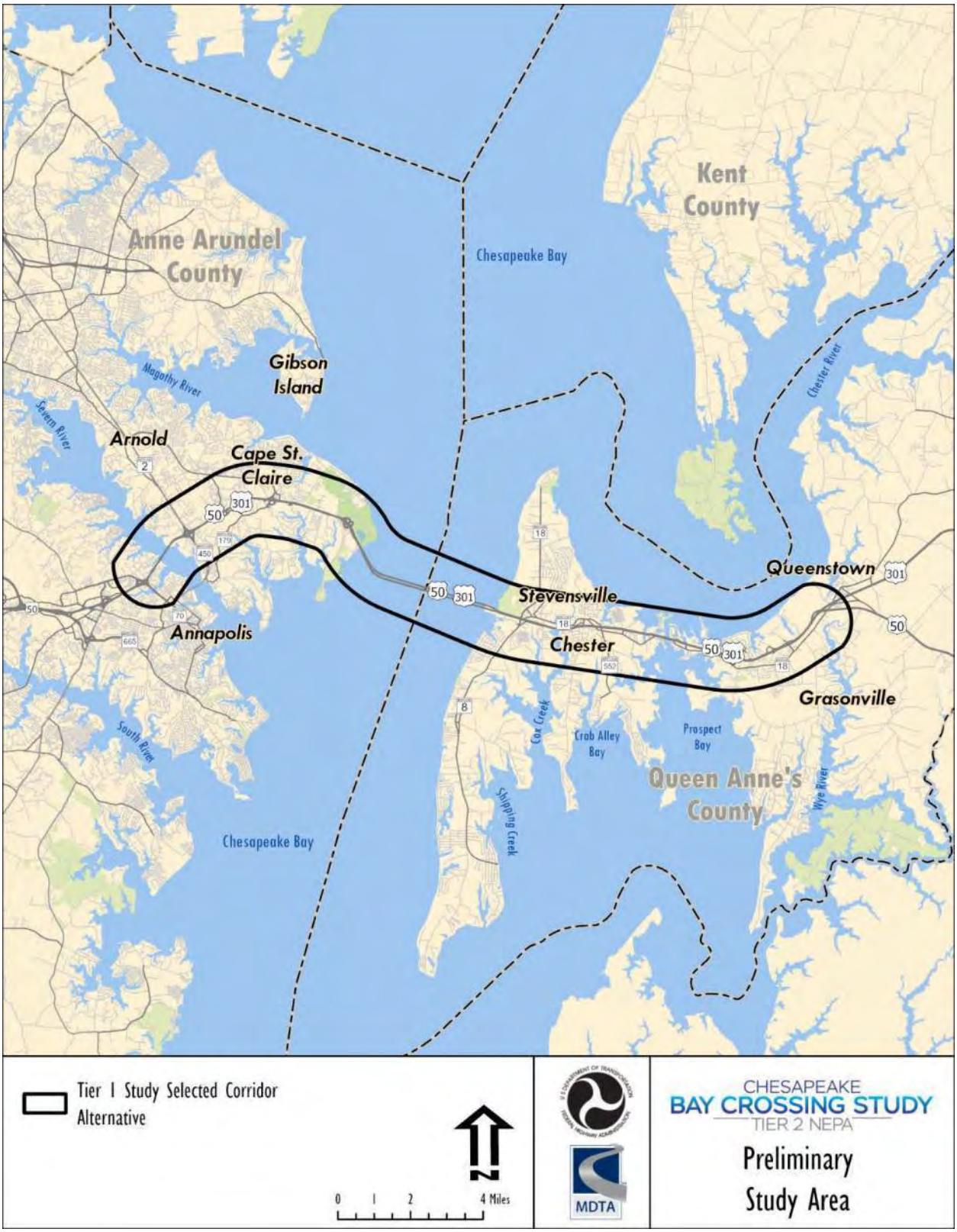
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:43:53 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

cc: Mr. Ray Li, USFWS, Transportation Liasion
Mr. Trevor Clark, USFWS, Biologist/Transportation Liasion
Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Attachment 2: Chesapeake Bay Crossing Study: Tier 2 NEPA Cooperating and Participating Agency Invitation Response Form

☒ Elect to accept the invitation to be a Cooperating and Participating Agency.

☐ Elect to decline the invitation to be a Cooperating Agency, but accept to be a Participating Agency, because:

- ☐ my agency is not a permitting agency but does have information and expertise with respect to the project.
- ☐ Other (please provide):

☐ Elect to decline the invitation to be a Cooperating or Participating Agency because:

- ☐ my agency has no jurisdiction or authority with respect to the project;
- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: U.S. Fish and Wildlife Service

Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2023.07.11 14:56:03 -04'00' Date: _____

Print Name: Raymond Li

Title: Transportation Liaison

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Indirect & Cumulative Effects Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Indirect & Cumulative Effects Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Indirect & Cumulative Effects, the following agency (by signing this form): **Agency:___US Fish and Wildlife Service_____**
__X_ **Concures** with the **Indirect & Cumulative Effects Methodology (without comments)** **____ Agrees** with the **Indirect & Cumulative Effects Methodology (with minor comments)*** **____ Does not agree** with the **Indirect & Cumulative Effects Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2023.11.15 14:59:43 -05'00' _____ Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Natural Environmental Methodology

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Natural Environmental Methodology** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Natural Environmental Methodology, the following agency (by signing this form): **Agency:_____U.S. Fish and Wildlife Service_____**
__X__ **Concures** with the **Natural Environmental Methodology (without comments)** **____ Agrees** with the **Natural Environmental Methodology (with minor comments)*** **____ Does not agree** with the **Natural Environmental Methodology*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2024.02.05 09:14:04 -05'00' Date: _____

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Purpose and Need Summary

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft Purpose and Need Summary** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft Purpose and Need Summary, the following agency (by signing this form): **Agency:** U.S. Fish and Wildlife Service
__X__ **Concurs** with the **Draft Purpose and Need Summary (without comments)** **____ Agrees** with the **Draft Purpose and Need Summary (with minor comments)*** **____ Does not agree** with the **Draft Purpose and Need Summary *** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("agrees without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2024.07.29 14:43:30 -04'00' Date:_____

From:	Li, Ray
To:	Sarah Williamson; Heather Lowe; alexander.bienko@dot.gov
Cc:	ERs, FWS HQ
Subject:	Re: [EXTERNAL] RE: BCST2 - Reminder of Scoping Comment Deadline - 1/13/25
Date:	Monday, January 13, 2025 3:11:46 PM
Attachments:	image001.png

Hi Heather, Sarah, and Alex -

The U.S. Fish and Wildlife Service (FWS) has reviewed the Notice of Intent (NOI) to Prepare an Environmental Impact Statement for the Chesapeake Bay Crossing Study: Tier 2, Maryland and the Additional Project Information Document dated November 2024, and offer the following comments:

- The Coastal Barrier Resources Act (CBRA) restricts Federal expenditures and financial assistance that have the effect of encouraging development in Coastal Barrier Resource System designated units. Two designated units are located along the northern boundary of the study corridor in Stevensville, MD (MD-32: Stevensville Unit; MD-33: Wesley Church Unit), and mapping boundaries for both were revised with the Bolstering Ecosystems Against Coastal Harm Act (BEACH Act, Pub. L.118-117) which was enacted on November 25, 2024. Considering broad Federal funding prohibitions and proximity of units to the corridor, FWS recommends CBRA be added to list of environmental resources and Permits and Regulatory Approvals being considered by the study.
- The preliminary Purpose and Need touches on sea-level rise considerations for navigational clearance requirements for ships traveling to the Port of Baltimore. How will the study consider projected sea-level rise scenarios and strategies to improve climate resilience of roadway infrastructure through the expected life-span of replacement bridges and its approaches?

Appreciate the opportunity to provide comments, and look forward to continued coordination throughout the study.

DRAFT ALTERNATIVES RETAINED FOR DETAILED STUDY (ARDS)

Chesapeake Bay Crossing Study Tier 2 NEPA
The Maryland Transportation Authority (MDTA) **requests concurrence on the Draft ARDS** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Having reviewed the Draft ARDS, the following agency (by signing this form): **Agency: U.S. Fish and Wildlife Service**
_X__ Concurs with the **Draft ARDS (without comments)** **____ Agrees** with the **Draft ARDS (with minor comments)*** **____ Does not agree** with the **Draft ARDS*** ***If choosing "agrees with minor comments" of "does not agree," written comments must be provided below or as an attachment to this agreement form.**
Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agree with minor comments") or do not agree until revisions are made or additional information is provided.
Comments:
RAYMOND LI Digitally signed by RAYMOND LI Date: 2025.03.31 13:44:40 -04'00' Signature: _____ Date: _____

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

November 26, 2025

In Reply Refer To:
HDA-MD

Genevieve Pullis LaRouche
Field Office Supervisor
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401

Subject: Chesapeake Bay Crossing Study Tier 2 Environmental Impact Statement
Anne Arundel and Queen Anne Counties, Maryland
Initiation of Formal Section 7 Endangered Species Act Consultation

Dear Genevieve LaRouche:

The Federal Highway Administration (FHWA) is the lead federal agency for the Maryland Transportation Authority (MDTA) preparation of a Tier 2 Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) for the Chesapeake Bay Crossing Study (CBCS). This letter is to initiate Section 7 Formal Consultation (50 CFR §402.14) under the Endangered Species Act (ESA) for the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) in Anne Arundel and Queen Anne Counties, Maryland.

The Bay Bridge is a two span bridge each 4.3-miles in length over the Chesapeake Bay on U.S. 50/301 connecting Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The original span opened in 1952 with the second span opening in 1973. The proposed action involves constructing two new spans and demolishing the two existing spans with a proposed sequencing of build first new span, demolish first original span, build second new span, demolish second original span.

On-land work associated with the construction of new spans, removal of the original spans, and construction activities on the roadway approaches and interchanges along U.S. 50/301 may affect listed species under the ESA. A review of the Information for Planning and Consultation (IPaC) tool indicated that the federally listed northern long-eared bat (*Myotis septentrionalis*) (NLEB) range is within the Tier 2 EIS area. The project also lies within the range of the tricolored bat (*Perimyotis subflavus*) (TCB), which is federally proposed for listing as endangered and will likely become listed during the project timelines. Critical habitat has not been designated for NLEB and TCB.

In accordance with Section 7 of the ESA, a Biological Assessment (BA) to analyze the potential affects on bat species listed or eligible for listing under the ESA has been prepared and is transmitted with this letter.

FHWA in coordination with MDTA has determined that the action may affect but is not likely to adversely affect the NLEB and TCB.

Thank you in advance for working with the FHWA and for your continued support with this Tier 2 EIS. If you have any questions or concerns, please contact Alexander Bienko, FHWA Maryland Division Environmental Specialist, at alexander.bienko@dot.gov.

Sincerely,

Valeriya Remezova
Division Administrator

cc:
Julie Thompson-Slacum, U.S. FWS
Ray Li, U.S. FWS
Trevor Clark, U.S. FWS
Melissa Williams, MDTA

March 4, 2026

Alex Bienko
Federal Highway Administration, Maryland Division
31 Hopkins Plaza, Suite 1520
Baltimore, MD 21201

RE: Chesapeake Bay Crossing Tier 2 NEPA Study, Draft Biological Assessment for Alternative C, Anne Arundel and Queen Anne's Counties, Maryland

Dear Mr. Bienko:

This letter responds to Federal Highway Administration's (FHWA) Draft Biological Assessment for Alternative C of the Chesapeake Bay Crossing Tier 2 NEPA Study received on February 23, 2026, and request for concurrence that the alternative may affect, but is not likely to adversely affect the Federal listed endangered northern long-eared (NLEB; *Myotis septentrionalis*) and proposed endangered tricolored bat (TCB; *Perimyotis subflavus*). The U.S. Fish and Wildlife Service (Service) has been a cooperating agency since the start of the NEPA study to identify and collaboratively address fish and wildlife issues early, including species listed or proposed under the Endangered Species Act.

Project Description:
Alternative C is the Maryland Transportation Authority's Recommended Preferred Alternative and would replace the Governor William Preston Lane Junior Memorial Bridge with two new bridge spans. Spans would consist of a total of eight bridge lanes, six lanes along US 50/301 on the Western Shore, and six lanes along US 50/301 on the Eastern Shore. Bridge spans would include one span to the south and one span in between the location of the existing bridge spans. Approach roadways would remain along the existing alignment, except where necessary to connect to the new bridge spans. A bicycle/pedestrian shared use path is being considered along one of the new bridge spans to connect between existing and proposed trails and recreation facilities on the Eastern and Western Shores and is included in the Biological Assessment's analysis of effects to listed and proposed species.

Species and Habitat Considerations:
NLEB and TCB roost in forests and human-made structures including bridges, culverts and buildings during the active season, and hibernate in caves and abandoned mines with high humidity, no strong currents, and relatively constant and cooler temperatures during the winter. In areas where caves and mines are not present, bats have also been observed to overwinter in

other types of habitat including man-made structures with similar conditions. Alternative C includes realigning sections of roadway and constructing new stormwater management facilities and therefore will require clearing of approximately 27.6 acres of forest habitat. Sixteen culverts and bridges including the Governor William Preston Lane Junior Memorial Bridge and three building structures along the corridor may be suitable habitat for bats during the active and/or overwinter seasons and may be impacted by the alternative.

Determination:
Based on the information provided in the Biological Assessment, the Service concurs with FHWA's determination that Alternative C is not likely to adversely affect NLEB and TCB. This concurrence is based on the following:

- Tree clearing is primarily limited to areas within 100 feet of existing roads that are heavily disturbed by traffic-related noise and vibrations and are outside of documented habitat. These areas are contiguous to high quality forest-interior that will remain protected (e.g., Sandy Point State Park, Holly Beach Farm, and Terrapin Nature Park). As a result, tree clearing is not expected to negatively impact roosting and foraging habitats or commuting corridors that would result in adverse effects.
- FHWA is committing to avoid tree clearing activities during the summer occupancy season which is between April 1 through September 30 to avoid direct effects to roosting bats.
- September-October 2025 surveys of culverts (≥ 36" wide), bridges, and buildings determined probable absence of bats in structures within the limits of disturbance. Presence / absence surveys are generally valid for two years, and FHWA has committed to re-survey structures to confirm probable absence of bats prior to construction.
- Temporary construction and permanent lighting will be directed away from suitable forest habitat, and backlight and uplight will be minimized to not substantially increase beyond current conditions.

FHWA has determined the project is not likely to jeopardize the continued existence of the Federal proposed threatened monarch butterfly (*Danaus Plexippus*) and will not destroy or result in adverse modification of proposed designated critical habitat. Therefore, conferencing for the species is not required under Section 7 of the Endangered Species Act.

This concludes informal consultation pursuant to section 7(a)(2) of the Endangered Species Act. If project plans change, new species become listed, or listed species are found in the action area that were not considered, reinitiation of consultation may be required.

We appreciate your efforts to conserve listed species. If you have questions, please contact Ray Li at ray_li@fws.gov or 410-573-4522.

Sincerely,

Genevieve LaRouche
Field Supervisor

cc: H. Lowe (MDTA)
G. Gibson (DNR)
D. Limpert (DNR)

Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Draft Preferred Alternative & Conceptual Mitigation (PACM)

Chesapeake Bay Crossing Study Tier 2 NEPA

The Maryland Transportation Authority (MDTA) **requests concurrence on the draft Preferred Alternative & Conceptual Mitigation** prepared for the Chesapeake Bay Crossing Study Tier 2 NEPA. Concurrence with the MDTA's PACM indicates that the MDTA may confidently proceed to the Final EIS and that alternatives to be eliminated from consideration are not necessary for compliance with NEPA or any other Federal law per 23 U.S.C. 139(f)(4)(E)(ii)((VI). Having reviewed the Preferred Alternative & Conceptual Mitigation package, the following agency (by signing this form):

Agency: U.S. Fish and Wildlife Service

__x__ **Concurs** with the **Preferred Alternative & Conceptual Mitigation (without comments)**

____ **Agrees** with the **Preferred Alternative & Conceptual Mitigation (with minor comments)***

____ **Does not agree** with the **Preferred Alternative & Conceptual Mitigation***

**If choosing "agrees with minor comments" or "does not agree," written comments must be provided below or as an attachment to this form.*

Note: Do not provide "conditional" agreement. Either agree with the information as provided ("concurs without comments" or "agrees with minor comments") or do not agree until revisions are made or additional information is provided.

Comments:

Signature: RAYMOND LI Digitally signed by RAYMOND LI Date: 2026.05.13 08:36:30 -04'00' **Date:** _____

Bienko, Alexander <alexander.bienko@dot.gov>

BCST2 Updated BA submittal

Li, Ray <ray_li@fws.gov> Tue, May 19, 2026 at 8:21 AM
To: "Bienko, Alexander" <alexander.bienko@dot.gov>
Cc: "Millington, Chris (FHWA)" <chris.millington@dot.gov>, "Toni, Melissa (FHWA)" <melissa.toni@dot.gov>, "Yanchik, Brian (FHWA)" <brian.yanchik@dot.gov>

Got both emails and will review this week. Thanks!

From: Bienko, Alexander <alexander.bienko@dot.gov>
Sent: Monday, May 18, 2026 2:06 PM
To: Li, Ray <ray_li@fws.gov>
Cc: Millington, Chris (FHWA) <chris.millington@dot.gov>; Toni, Melissa (FHWA) <melissa.toni@dot.gov>; Yanchik, Brian (FHWA) <brian.yanchik@dot.gov>
Subject: [EXTERNAL] Re: BCST2 Updated BA submittal

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Email with the remaining attachments. The updated BA in the first email was split into two documents due to file size as well.

Best,
Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
alexander.bienko@dot.gov

On Mon, May 18, 2026 at 2:04 PM Bienko, Alexander <alexander.bienko@dot.gov> wrote:

> Good Afternoon Ray!
> As discussed in our last coordination call with MDTA and the project team, please find attached the updated BA and forest impacts. Due to file sizes, this email is part 1 of 2 for submittals.
>
> Upon review, if USFWS requires a reinitiating letter or change in consultation, please let us know. However, if the past concurrence letter that was submitted on March 4th is still valid upon this update, please let us know as well.
>
> Thanks!
> Alex Bienko

Alexander Bienko
Environmental Specialist
FHWA - Maryland Division
U.S. Department of Transportation
(410) 779-7148
alexander.bienko@dot.gov

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

BIOLOGICAL ASSESSMENT
NORTHERN LONG-EARED AND TRICOLORED BAT

Maryland Transportation Authority
MDTA

MAY 2026

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ABBREVIATIONS AND ACRONYMS

ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADT	Average Daily Traffic
AET	All Electronic Tolling
APE	Area of Potential Effects
ARDS	Alternatives Retained for Detailed Study
BA	Biological Assessment
BCS	Bay Crossing Study
BMP	Best Management Practices
CAV	Connected and Automated Vehicle
CBCAA	Chesapeake Bay Critical Area Act
CWA	Clean Water Act
DBH	Diameter at breast height

DEIS	Draft Environmental Impact Statement
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESC	Erosion and Sediment Control
EV	Electric Vehicle
FAST (Act)	Fixing America's Surface Transportation
FCA	Forest Conservation Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GGRA	Greenhouse Gas Emissions Reduction Act
GHG	Greenhouse Gas
ICE	Indirect and Cumulative Effects
ICM	Interagency Coordination Meetings
JPA	Joint Permit Application
LOD	Limits of Disturbance
LOS	Level of Service
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
MDTA	Maryland Transportation Authority
MHT	Maryland Historical Trust
MTA	Maryland Transit Administration
NEPA	National Environmental Policy Act
NETR	Natural Environment Technical Report
NLEB	Northern long-eared bat
NOI	Notice of Intent
OSHA	Occupational Safety and Health Administration
RCP	Reinforced concrete pipe
ROD	Record of Decision
RPU	Representation Units
SAV	Submerged Aquatic Vegetation
SSPRAs	Sensitive Species Project Review Areas
SWM	Stormwater management
TCB	Tricolored bat
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day
WNS	White-nose syndrome
WOTUS	Waters of the U.S.
WOC	Water Quality Certification
ZEV	Zero Emission Vehicle

1 INTRODUCTION

The Chesapeake Bay Crossing Study (Bay Crossing Study) is a two-tiered engineering and environmental study being advanced by the Maryland Transportation Authority (MDTA) and Federal Highway Administration (FHWA). The Bay Crossing Study is addressing existing and future transportation issues at the William Preston Lane, Jr. Memorial Bridge (Bay Bridge) and its approaches along U.S. 50/301. Each tier of the Bay Crossing Study involves development of an Environmental Impact Statement (EIS), in compliance with the National Environmental Policy Act (NEPA), to describe potential significant environmental effects and inform the evaluation of alternatives. Tier 1 of the Bay Crossing Study (Tier 1 Study) was completed in April 2022. At that time, FHWA issued a combined Final Environmental Impact Statement/Record of Decision (FEIS/ROD) identifying Corridor 7, the corridor that includes the Bay Bridge and its approaches, as the Selected Corridor Alternative for further evaluation. Tier 2 of the Bay Crossing Study (Tier 2 Study) was launched in June 2022 to focus on a project-level (site-specific) analysis within the Tier 1 Selected Corridor Alternative (Corridor 7).

The Tier 2 NEPA process was initiated formally with the publication of a Notice of Intent (NOI) to prepare an EIS in the Federal Register on November 15, 2024. The MDTA identified the Alternatives Retained for Detailed Study (ARDS), which are the NEPA range of reasonable alternatives for evaluation in the Tier 2 Study EIS. Since then, the MDTA Recommended Preferred Alternative (RPA) was identified as Alternative C, a build alternative that includes construction of two new spans as well as demolition of the existing bridge spans. A Natural Environment Technical Report (NETR) and Draft EIS (DEIS) were prepared by the MDTA and FHWA and made available for the public in January 2026. After reviewing public and agency input on the DEIS and the MDTA RPA, the MDTA requested cooperating agency concurrence on Alternative C as the Preferred Alternative. Concurrence from all cooperating agencies on the Preferred Alternative was received as of May 2026.

This Biological Assessment (BA) evaluates the potential effects of the Preferred Alternative on bat species that are federally listed or proposed for listing under the Endangered Species Act (ESA). Specific project design elements will be developed, as the project progresses, that avoid or minimize adverse effects to listed or proposed species. The project area lies within the range of one federally endangered species, the northern long-eared bat (*Myotis septentrionalis*) (NLEB). The project also lies within the range of the tricolored bat (*Perimyotis subflavus*) (TCB), which is federally proposed for listing as endangered. Critical habitat has not been designated for NLEB and TCB; therefore, it is not discussed further in this BA.

The monarch butterfly (*Danaus plexippus*) is federally proposed for listing as threatened and could occur within the project area. FHWA, in coordination with the U.S. Fish and Wildlife Service (USFWS), has determined that this project is not likely to jeopardize the continued existence of the monarch butterfly. The determination is based on the limited magnitude of the potential effect on monarch butterflies and their wide-ranging distribution. If the monarch butterfly is listed, FHWA will consult with USFWS.

The Preferred Alternative is in the early stages of design. As the design progresses through NEPA and into final design, the MDTA, in coordination with FHWA, will continue to consult with USFWS to develop a bridge design and construction means and methods that avoid and minimize impacts and ensure the protection of listed species.

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 United States Code [USC] 1531 *et seq.*), the MDTA has prepared this BA to analyze the potential effects on bat species listed or proposed for listing under the ESA.

2 CONSULTATION HISTORY

- In November 2023, an official species list was generated using the USFWS Information for Planning and Consultation (IPaC) website. This official species list has been regenerated multiple times to ensure relevance and was last generated April 6, 2026.

- In November 2024, USFWS reviewed and provided comments on the Notice of Intent (NOI) for FHWA to prepare an EIS for the Tier 2 Study (proposed project). Copies of the correspondence are provided in **Appendix A**. Additional coordination and agency meetings occurred through the DEIS phase of the project. USFWS provided comments on the NETR and DEIS.

- On August 11, 2025, a draft of the DEIS was provided to the cooperating and participating Agencies, including USFWS, for review.

- On September 19, 2025, the MDTA began species surveys coordinated with USFWS, which will continue to be conducted, as needed, during final design to provide the most accurate and representative information as well as coordination with the Maryland Department of Natural Resources (MDNR). USFWS reviewed the bat forest habitat assessment and indicated that the project may be outside the scope of the *Programmatic Biological Opinion/Conference Opinion for Transportation Projects in the Range of the Indiana Bat, Northern Long-eared Bat, and Tricolored Bat* (PBO/PCO) due to forest clearing acreages.

- On October 9, 2025, USFWS individually reviewed the project and determined that the project may affect but is not likely to adversely affect NLEB and TCB.
- On November 28, 2025, a draft of the Northern Long-Eared and Tricolored Bat Biological Assessment was provided to USFWS for review.
- On December 11, 2025, USFWS provided comments on the draft of the Northern Long-Eared and Tricolored Bat Biological Assessment.
- On February 23, 2026, the revised Northern Long-Eared and Tricolored Bat Biological Assessment was provided to USFWS.
- On March 4, 2026, USFWS reviewed and concurred with the not likely to adversely affect determination of the Northern Long-Eared and Tricolored Bat Biological Assessment.
- On May 13, 2026, consultation was reinitiated with an updated draft of the Northern Long-Eared and Tricolored Bat Biological Assessment provided to USFWS due to refinements of the Preferred Alternative and updated natural resource impacts.

3 PROPOSED ACTION

The Bay Bridge is a two-span structure that crosses the Chesapeake Bay from Anne Arundel County on the Western Shore to Queen Anne's County on the Eastern Shore. The original span opened in 1952, and the second span opened in 1973. Today, the two-lane original span typically carries eastbound traffic, and the three-lane second span typically carries westbound traffic. However, lanes on the bridge can be reversed to accommodate periods of heavy traffic. The approaches along U.S. 50/301 on each shore have six lanes (three lanes for each travel direction).

A wide range of engineering and environmental considerations were evaluated for one no-build alternative and six build alternatives as detailed in the DEIS. Alternative A (no-build) is not the Preferred Alternative because it would not meet the Tier 2 Study purpose and need. Alternative A (no-build) would not increase roadway capacity or mobility, correct roadway deficiencies, or provide the navigational clearance established by the U.S. Coast Guard. Alternative A (no-build) would also require substantial maintenance and related lane closures that would worsen congestion over time and compound existing traffic congestion, mobility, and roadway deficiency issues.

Each of the six build alternatives meet the Tier 2 Study's purpose and need and would therefore be reasonable to implement. However, the build alternatives differ in the degree of transportation benefit they would provide as well as likely environmental impacts and cost.

The Preferred Alternative, has the least impact to most natural, cultural, and socioeconomic resources compared to the other build alternatives. The Preferred Alternative would result in the least impact to forests, bridges, overpasses, culverts, buildings, historic properties, and park properties. The anticipated impacts from the build alternatives are discussed in detail in the NETR and DEIS.

The Preferred Alternative (**Figure 3-1**) would replace the existing Bay Bridge spans with two new bridge spans and would consist of six lanes along U.S. 50/301 on the Western Shore (three per direction), eight lanes on a new bridge (four per direction), and six lanes along U.S. 50/301 on the Eastern Shore (three per direction). The two new bridge spans would include one span to the south and one span in between the location of the existing bridge spans. The approach roadways would remain on the existing roadway alignment, except where necessary to connect to the new bridge spans. Thus, the five existing bridge lanes would be increased to eight bridge lanes; however, the number of lanes on the Western Shore and Eastern Shore would not change and would remain at six total travel lanes beyond the immediate tie-ins to the new bridge spans. The Preferred Alternative could include a bicycle/pedestrian shared use path (SUP) along a new bridge. The MDTA has identified SUP connections to existing and proposed trails and recreational facilities on the Eastern Shore and Western Shore.

The Tier 2 Study is currently in preliminary engineering; therefore, construction means and methods have not been developed. It is anticipated that construction of the new bridge spans would occur in multiple phases. Phasing of the Preferred Alternative may involve building one span at a time: the first new bridge span may be built, then one existing bridge span could be demolished, and the new bridge span would be in use while the second new bridge span is built. Once both new bridge spans are complete, the second span of the existing bridge could be demolished. The exact order and timing of construction have yet to be determined; however, a preliminary construction sequence is found in **Table 3-1**.

Table 3-1: Preliminary Construction Sequence

Construction Activity	Construction Years
Construction of Bridge 1 (eastbound) – Occurring during years 1 through 5	
Start Construction, Bridge 1	1
Construct landings (work completed on land)	1-4
Constructing approaches and main span	1-5
Trestles and water access construction	1
Dredging for eastbound bridge	1-2
Transport and disposal of dredge	1-2
Substructure/pier protection construction	1-3
Superstructure construction	2-5
Complete construction, Bridge 1	5
Demolition of existing eastbound bridge – Occurring during years 6 through 7	
Start demolition, existing eastbound bridge	6
Blasting (total of 18 blast events)	6-7
Superstructure Truss Units	
Cantilever Deck Truss Spans (12 spans, 4 events)	
Through Truss Spans (4 simple spans, 1 event)	
250’ Simple Deck Truss Spans (4 simple spans, 1 event)	
300’ Simple Deck Truss Spans (6 simple spans, 2 events)	
Suspension Spans (3 suspension spans, 1 event)	
Substructure Piers in Deep Water	
4 Column Piers (4 piers, 4 events)	
2 Column Piers (7 piers, 3 events)	
Solid Shaft Piers Under Suspension Span (4 piers, 2 events)	
Dismantling	6-7
Complete demolition, existing eastbound bridge	7
Construction of Bridge 2 (westbound) – Occurring during years 7 through 13	
Start construction, Bridge 2	7
Construct landings (work completed on land)	7-13
Constructing approaches and main span	7-13
Trestles and water access construction	7
Dredging for westbound bridge	7-8
Transport and disposal of dredge	7-8

Substructure/pier protection construction	7-12
Superstructure construction	8-13
Complete construction, Bridge 2	13
Demolition of existing westbound bridge – Occurring during years 14 through 15	
Start demolition, existing westbound bridge	14
Blasting (16 total events)	14-15
Superstructure Truss Units	
Cantilever Deck Truss Spans (12 spans, 4 events)	
Through Truss Spans (3 spans, 1 event)	
Suspension Spans (3 suspension spans, 1 event)	
Substructure Piers in Deep Water	
4 Column Piers (8 piers, 8 events)	
2 Column Piers (6 piers, 3 events)	
Dismantling	14-15
Complete demolition, existing westbound bridge	15

3.1 Land-based Activities

The Tier 2 Study is in preliminary engineering for the Preferred Alternative. The Preferred Alternative extends along U.S. 50/301 for approximately 8.3 miles from west of Oceanic Drive to east of Cox Creek. The limits of disturbance (LOD) include all proposed construction, erosion and sediment control (ESC), stormwater management (SWM), and right-of-way offsets. Impacts to bat habitat within the LOD relate to the acreage of forest clearing, the number of bridges, overpasses, and culverts impacted, construction techniques, construction access and duration, and the success of implemented ESC and SWM Best Management Practices (BMPs).

Forests and other linear wooded features containing live trees and snags, especially those with exfoliating bark, crevices, cavities, or leaf clusters provide suitable habitat for NLEB and TCB. Forest clearing impacts have been determined to be 57.7 acres, or 59.1 acres if an SUP is constructed. Streams and wetlands may provide NLEB and TCB with forage, water, and cover from predators. The Preferred Alternative will impact 670 linear feet of nontidal waterways, or 700 linear feet if an SUP is constructed. For wetlands, the Preferred Alternative will impact 5.6 acres, or 6.3 acres if an SUP is constructed.

Expansion joints and other crevices on bridges can provide habitat for roosting bats by mimicking cave-like conditions. Bridges impacted by the Preferred Alternative include the Bay Bridge and Cox Creek bridge. The Bay Bridge will be demolished and replaced. The eastbound span of the Cox Creek bridge will be widened. Work is not proposed directly to the Oceanic Drive overpass; however, coordination with USFWS indicated concerns of this overpass as suitable bat habitat. Impacting the road surface underneath the overpass may impact bats; therefore, it is included in this assessment.

Cracks and crevices within 36-inches or wider culverts may also mimic cave-like environments and provide suitable habitat for NLEB and TCB. The Preferred Alternative will impact thirteen (13) 36-inch or wider culverts. Buildings can act as potential roosting locations for bats and vary in

quality depending on the building materials and the amount of noise and light surrounding them. Following refinements to the Preferred Alternative, no impacts to existing buildings are anticipated.

These land-based activities have the potential to impact existing bat habitat including forests, streams and wetlands, bridges, and culverts. A more extensive examination of these impacts is discussed in **Section 6 Effects Determination**.

Figure 3-1: Vicinity Map



4 ACTION AREA

The action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR §402.02). The action area of a project includes the project area and any area where stressors may affect any listed species, terrestrial and marine. This BA focuses on impacts to NLEB and TCB; however, the action area includes any area where there may be impacts to all listed or proposed species in accordance with 50 CFR 402.02. The action area spans 1267.8 acres across land and water, currently determined by the land-based construction area and the potential in-water construction, sedimentation, and turbidity impacts associated with the Preferred Alternative. A map of the action area is presented in **Appendix B**.

Within the action area, direct impacts to NLEB and TCB will likely be contained within the identified LOD for the Preferred Alternative. The action area for the Preferred Alternative includes all areas affected by temporary and permanent disturbances associated with the proposed project, including construction of the new bridge spans (pile driving), approach roadway widening (tree/vegetation removal), demolition of the existing bridge spans (cutting and/or blasting, temporary access, and all land-based construction activities.

4.1 Existing Conditions within the Action Area

The action area lies within the Severn River (02131002), Magothy River (02131001), Lower Chesapeake Bay (02139998), Kent Island Bay (02130511), Eastern Bay (02130501), Kent Narrows (02130504), Wye River (02130503), and Lower Chester River (02130505) 8-digit federal HUC watersheds. Land use within the vicinity of the action area on either side of the Chesapeake Bay consists of low-density residential, medium-density residential, commercial, transportation, institutional, and water.

The action area is in the Atlantic Coastal Plain physiographic province, specifically within the Western Shore Lowlands Region and Delmarva Peninsula Region. The Western Shore Lowlands Region borders the Western Shore Uplands Regions of the Atlantic Coastal Plain physiographic province and is characterized as a region with flat-lying sedimentary beds. Elevation in the Western Shore Lowlands Region ranges from 0 to 65 feet. The Delmarva Peninsula Region is also characterized by flat sedimentary beds, some of which are bioturbated. This region features low salt marshes and islands with a maximum elevation of 80 feet.

The action area contains forests, tree clusters, wetlands, and streams, which provide NLEB and TCB with habitat, forage, water, and protection from predation. Throughout the action area, 144 wetland systems have been identified, including 36 palustrine emergent wetlands, 58 palustrine forested wetlands, six (6) palustrine scrub/shrub wetlands, nine (9) palustrine unconsolidated bottom wetlands, 31 estuarine emergent wetlands, and four (4) estuarine scrub/shrub or forested wetlands. Fifty-eight (58) waterways have been identified within the action area, including 16 nontidal perennial waterways, 23 nontidal intermittent waterways, and 19 tidal waterways. Prevalent forest communities in the action area include pine-oak heath forests, bottomland hardwood forest, and tidal hardwood swamp. Common tree species within these forests include oaks, gums, hickories, pines, and maples.

Noise may negatively impact bats in the action area by altering behavior, reducing foraging efficiency, and increasing susceptibility to disease. A noise monitoring study completed in 2023 and discussed in the *Bay Crossing Study Noise Technical Report,* included 136 measurements used to validate the computer model that would be used to predict future noise conditions of the proposed action. Short-term noise monitoring was conducted in the form of 15-minute spot measurements. These 15-minute measurements were then multiplied by four to develop hourly volumes. This noise monitoring study measured sound level weighted to the sensitivity of human hearing using the A-weighted sound level (dBA) via the equivalent sound level (L_{eq}), which is the constant sound level over a given period and situation. Short-term noise monitoring revealed that the highest noise levels, measured in dBA, originated from two monitoring sites along U.S. 50/301 on the Western Shore at a L_{eq} value of 75 between 1200 and 1500 hours. The lowest noise level, measured in dBA, was recorded, on the same day, at a different monitoring site, also on the Western Shore along U.S. 50/301, at a L_{eq} value of 47 between 1300 and 1500 hours. The study also predicts that lands within 100 feet of proposed construction activity may experience noise levels between 78 to 83 dBA.

4.2 USFWS Listed Species in the Action Area

There is one federally endangered bat species and one federally proposed endangered bat species that have the potential to occur in the action area and may be affected by the proposed action. ESA-listed and proposed bat species include:

- Northern long-eared bat (*Myotis septentrionalis*) – endangered
- Tricolored bat (*Perimyots subflavus*) – proposed endangered

Northern Long-Eared Bat (NLEB)

The NLEB is a medium-sized insectivorous bat that typically hibernates within caves or abandoned mines and may use man-made structures when typical habitats are limited (USFWS/ECOS, 2015). On October 2, 2013, USFWS issued a proposed rule to list the NLEB as endangered, with a final listing of the species as threatened on April 2, 2015 (80 FR 17974). On November 30, 2022, the NLEB was uplisted to endangered; this reclassification went into effect March 31, 2023 (88 FR 4908; 87 FR 73488). The NLEB is found across much of the eastern and northcentral United States (range includes 37 states) and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. Populations tend to be patchy across its range and are typically composed of small numbers. More than 1,100 winter hibernacula have been identified in the United States, most of which contain only a few (1 to 3) individuals. USFWS recognizes four United States populations of NLEB. NLEBs inhabiting Maryland are considered part of the Eastern population, which has historically been the most abundant population and consists of individuals inhabiting Maine south to Virginia and west to West Virginia (USFWS/ECOS, 2015).

The primary factor, as cited in the ESA listing, for the decline of NLEB populations is white-nose syndrome (WNS), a lethal fungal disease spread while the species inhabits caves and mines during winter hibernation. The NLEB has experienced a sharp decline in the northeastern part of its range, as evidenced by a combination of hibernacula surveys and summer capture trends. Although the disease has not yet spread throughout the species' entire range (WNS is currently found throughout approximately 80% of the NLEB range) it continues to spread. Other factors contributing to the decline in populations include collisions with wind turbines, human disturbance

of hibernacula, nonstationary climate, and loss of summer habitat due to forest conversion and forest management (USFWS/ECOS, 2015).

NLEBs primarily overwinter in hibernacula of various sizes including caves and abandoned mines. Hibernacula have relatively constant, cool temperatures with very high humidity and no air currents. Less commonly, NLEBs have been observed overwintering in abandoned railroad tunnels, storm sewers, aqueducts, attics, and other non-cave or mine hibernacula with temperature, humidity, and air flow conditions resembling suitable caves and mines (USFWS/ECOS, 2015).

Spring staging is the time between winter hibernation and spring migration to summer habitat when bats begin to gradually emerge from hibernation. Individuals will exit the hibernacula to feed but re-enter the same or alternative hibernacula to resume periods of physical inactivity. The staging period, in Maryland, is believed to be short for the NLEB and may last from April through mid-May with variations in timing and duration based on latitude and weather (USFWS, 2011).

NLEBs typically roost during summer underneath bark or in cavities or crevices of both live trees and snags individually or in colonies. Males and nonreproductive females may also roost in cooler locations, including caves and mines. Individuals have also been observed roosting in colonies in buildings, barns, on utility poles, and in other man-made structures. The species has been documented to roost in many species of trees, including black oak (*Quercus velutina*), northern red oak (*Quercus rubra*), silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), sourwood (*Oxydendrum arboreum*), and shortleaf pine *(Pinus echinata*) (Foster and Kurta, 1999).

Fall swarming is the time between the summer and winter seasons and includes behaviors such as copulation, introduction of juveniles to hibernacula, and stop-overs at sites between summer and winter regions. Both males and females are present together at swarming sites, and other bat species are often present as well. For NLEBs, the swarming period, in Maryland, may occur between mid-August and mid-November. NLEBs may use caves and mines during swarming. Little is known about roost tree selection during this period, but some studies suggest that a wider variation in tree selection may occur during swarming than during the summer (USFWS/ECOS, 2015).

Tricolored Bat (TCB)

The TCB is a small insectivorous bat that typically hibernates within caves or abandoned mines (USFWS, 2021). On September 14, 2022, USFWS issued a proposed rule to list the TCB as endangered (87 FR 56381). The bat is found across much of the eastern and central United States (range includes 39 states), Washington D.C., and in four Canadian provinces, from southern Ontario to Nova Scotia (USFWS, 2021). The species is experiencing a westward expansion due to the increase in riparian trees as well as man-made structures for roosting. Most TCB roosts are composed of one individual and range upwards from roosting pairs to small groups. USFWS recognizes three United States Representation Units (RPU), each different due to genetic and behavioral diversity. TCBs inhabiting northern and western Maryland are considered part of the Eastern RPU, while the rest of Maryland is within the Southern RPU. The Eastern RPU extends from southeastern Virginia and continues up the Atlantic coast to Nova Scotia, containing the lowest abundance of TCB (11%) and known winter hibernacula (11%). The

Southern RPU, containing the action area, begins as far north as central Maryland and continues south through Honduras (USFWS, 2021).

The primary factor, as cited in the ESA-listing proposed rule, for the decline of TCB populations is WNS. The TCB has experienced a sharp decline across the majority of its range as evidenced by a combination of hibernacula surveys and predictive modeling. Recent estimations from data of 27 states and two North American provinces show declines of up to 100% over 59% of TCB range. TCB of the Southern RPU that hibernate in roadside culverts have experienced a far more severe effect of WNS compared to TCB hibernating in caves across all RPU. Although the disease has not yet spread throughout the species' entire range (WNS is currently found in 36 of 39 States where the TCB occurs), it continues to spread. Other factors contributing to the decline in populations include collisions with wind turbines, loss of deciduous forest and emergent wetland habitat, and a nonstationary climate (USFWS, 2021).

TCBs overwinter primarily in hibernacula of various sizes including caves, abandoned mines, and culverts in the Southern RPU. TCB require hibernacula to have relatively constant and higher temperature requirements than other cave-roosting species, with very high humidity and no air currents. TCBs may also overwinter in tree cavities, abandoned wells, and other human-made structures with the narrow temperature, humidity, and air flow conditions resembling suitable caves and mines (USFWS, 2021).

Spring staging is the time between winter hibernation and spring migration to summer habitat when bats begin to gradually emerge from hibernation. Individuals will exit the hibernacula to feed but re-enter the same or alternative hibernacula to resume periods of physical inactivity. During this time, bats are preparing for spring migration to summer habitat. The staging period in Maryland is believed to be short for the TCB and may last from April through mid-May, with variations in timing and duration based on latitude and weather (USFWS 2024).

TCBs typically roost during summer within leaf clusters of living or newly dead deciduous trees and may also roost in pine needles and eastern redcedar (*Juniperus virginiana*). TCB will roost in the mid to upper canopy of a variety of tree species, showing some degree of preference for larger oaks (*Quercus spp*.). In some sections of the species' range, TCB will roost within Spanish moss (*Tillandisa usneoides*) and bony bear lichen (*Usnea trichodea)*. Bridges, barns, and concrete surfaces may also provide artificial summer roosting habitat for TCB. Female TCB are known to return to the same roost each year and form maternity colonies with other females. Male TCB are known to roost as individuals (USFWS, 2021).

Fall swarming is the time between the summer and winter seasons and includes behaviors such as copulation, introduction of juveniles to hibernacula, and stop-overs at sites between summer and winter regions. For TCBs in Maryland, the swarming period may occur between mid-August and mid-November. TCB are known to begin hibernation earlier following the fall swarming period compared to other cave-hibernating species (USFWS, 2021 and Tate, 2020). Previous studies have shown that TCB, during this time, will roost in leaf clusters of living trees and that proximity to hibernaculum is important (Tate 2020).

5 BAT HABITAT SURVEYS

A bat habitat suitability field assessment was conducted within the action area in fall 2025. The results of this initial assessment are included in **Appendix C**; however, it should be noted that the LOD has been refined since the field assessment. The following discussion of bat habitat reflects these refinements to the LOD. Forest is the largest land use category in the Anne Arundel County portion of the action area and is more scattered in the Queen Anne's County portion due to higher levels of development and more tidal emergent wetlands and waterways.

The *Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines* (USFWS, 2024) were followed during the bat habitat assessment. A total of 32 individual suitable bat habitat areas were identified. Within the LOD, 72.4 acres (20%) are classified as suitable habitat for NLEB and TCB; and 284.8 acres (80%) are classified as unsuitable bat habitat.

In general, wooded areas within the action area follow a linear path and are typified by a moderate to heavy vine load, including oriental bittersweet and English ivy, as well as being dominated by trees not typically favored by NLEB or TCB, such as Callery pear and sweetgum. Canopy is the least dense forest layer, never exceeding 50% density, which may expose bats roosting in these stands to predation. Midstory and understory layers vary throughout the action area and are occupied, to some extent, by denser shrubs and trees such as Callery pear and autumn olive. Many of the wooded areas are adjacent to the highway, creating tracts of forest edge, which may be beneficial to TCB. Unsuitable areas of bat habitat include roadways, trees with a diameter at breast height (DBH) of three inches or less, and areas with only shrubby vegetation. The complete suitable habitat assessment is presented in **Appendix C**.

On September 19, October 7 and 16, 2025, systematic visual assessments were conducted on two (2) bridges, one (1) overpass, 13 culverts, and three (3) buildings throughout the action area for evidence of roosting bats. Since completion of these visual surveys, the LOD of the Preferred Alternative has been refined and the three (3) buildings surveyed will no longer be impacted. Per USFWS coordination, the assessment of the Bay Bridge was conducted using MDTA biennial inspection reports. The Oceanic Drive overpass as well as three buildings were assessed using only publicly available imagery. The visual assessments of the Cox Creek bridge and all culverts were completed, in the field, following Appendix K of the *Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* and included the use of a borescope with a 20-foot reach, an infrared camera, binoculars, and spotlights (USFWS, 2024, Appendix K).

The visual assessment of all 19 structures yielded no evidence of roosting bats. Despite suitable cracks, crevices, and concrete surfaces along the exterior as well as interior structures, no evidence of roosting bats was detected within the Bay Bridge. The Cox Creek bridge and Oceanic Drive overpass did not yield evidence of roosting bats, despite also containing concrete elements. Bats within the LOD may be avoiding roosting in bridges due to increased noise and light of heavy vehicular traffic, especially considering that suitable forested habitat exists within 1,000 feet of these bridges (Zurcher et al., 2010). Similarly, the three buildings assessed yielded no evidence of roosting bats, which may be due to increased lighting and noise from commercial buildings and the highway as well as proximity to, likely, higher quality habitat in forested areas. Finally, none of the culverts assessed contained evidence of roosting bats; however, most of the culverts were blocked to bats via debris or other obstructions, heavily limiting the ability of bats to utilize them. The complete bridge and culvert survey report is in **Appendix D**.

6 EFFECTS ANALYSIS

Habitat Modification

Potential direct effects to NLEB and TCB include habitat loss, degradation, disturbance, and fragmentation. NLEB and TCB habitat in the action area may be distributed amongst 72.4 acres of suitable forest habitat of varied quality as well as 16 potential roosting locations in bridges, overpasses, and culverts.

The Tier 2 Study Preferred Alternative will require the removal of 57.7 acres of forest. Forest impacts in the Anne Arundel County portion of the action area will largely occur surrounding Mezick Pond and adjacent to a Habitat Protection Area north of Mezick Pond. In Queen Anne's County, forest impacts would primarily occur in a previously disturbed area between the eastern shoreline of the Chesapeake Bay and MD 8. Potential impacts to forest within the action area, would occur primarily within forest edge and fragmented forests, due to disturbance typical of a linear transportation corridor. A more detailed view of these forested areas is shown in **Appendix C**. Forest fragments and edge is the preferred forest habitat of TCB, allowing for efficient foraging to facilitate their fast metabolism (USFWS, 2024). Other preferred habitat elements for this species includes deciduous trees, especially oaks, providing live or dead leaf clusters for roosting. NLEB are more likely to be found in forests containing trees with exfoliating or shaggy bark, cracks, crevices, or cavities. This species shows preference for intact forests of various size and is less commonly seen along fragmented forest or forest edge (USFWS, 2024). The assessment of bat habitat within the LOD indicates that the majority of forested resources are within 100 feet of the highway and generally composed of invasive vegetation, providing low-quality bat habitat for NLEB and TCB.

Proposed forest impacts would comply with the Forest Conservation Act (FCA) and Chesapeake Bay Critical Area Act (CBCAA) where required. Maryland Reforestation Law requires 1:1 replacement of impacted forest acreage. Where possible, the MDTA will replace trees on-site; however, it is expected that all required reforestation and/or afforestation would not be possible on site, potentially requiring some off-site replacement. The MDTA will prioritize off-site planting areas that expand existing forest habitats where practicable. Mitigation would be required for forest impacts within the Critical Area at a ratio ranging from 1:1 to 3:1 depending on the percent of forest acreage cleared, designated land use classification, and whether impacts fall within the identified Critical Area Buffer. During final design, the MDTA would look to replace affected trees and forest. The MDTA will work with the MDNR Critical Area Commission to identify additional land within the Critical Area outside the LOD, and within the Critical Area Buffer, as appropriate, to fully address mitigation requirements. These laws limit clearing and require specific mitigation through reforestation and tree planting, potentially benefitting NLEB and TCB. Tree clearing will be prohibited during the active season (April 1 to September 30) to avoid and minimize potential direct effects to NLEB and TCB in the action area. There are no known NLEB roosts or hibernacula in the action area and it is unknown whether TCB are roosting or hibernating in the action area.

The Preferred Alternative will permanently impact 5.6 acres of tidal and nontidal wetlands as well as 670 linear feet of nontidal waterways. Wetlands and streams may provide NLEB and TCB with forage, water, and cover from predators. A compensatory mitigation plan for unavoidable wetland impacts will be coordinated with state and Federal regulatory agencies during final design. Mitigation for wetland impacts would focus on qualitative measures, such as the replacement of wetland function, as well as quantitative measures, such as specified acreage of wetland loss and/or construction activities.

The Preferred Alternative would result in impacts to two bridges in the action area. Impacts to bridges include the replacement and demolition of the existing Bay Bridge spans and the widening of the eastbound span of the Cox Creek bridge, in Stevensville, shown in **Figure 6-1**. The removal of the existing Bay Bridge spans would remove potential NLEB and TCB habitat; however, the October 2025 visual assessment did not reveal evidence of bat use. Further coordination with USFWS would be required if roosting bats are detected in a bridge span and may result in time of year restriction(s) for construction activity on the bridges. However, the Preferred Alternative proposes a wider Bay Bridge structure that would provide a net increase in potential bat roosting habitat. The widening of the Cox Creek eastbound span would also provide a slight increase in potential bat roosting habitat. This roadway widening project will result in an increase in impervious surface, meaning the project must comply with the Maryland Department of the Environment's (MDE) Stormwater Design Manual.

Modification or replacement is anticipated for most culverts in the action area due to concerns of projected hydrologic conditions and headwater elevations that overtop the roadway. Culvert modifications will also be required to accommodate roadway widening. In the action area, an assessment of 36-inch or wider diameter culverts determined that the 36-inch reinforced concrete pipe conveying Meredith Creek beneath U.S. 50/301 does not currently meet the criteria of the MDOT Highway Drainage Manual (MDOT, 2023). The methods to increase capacity at Meredith Creek may include a full replacement with a larger pipe or the addition of three (3) 36-inch RCPs. The assessment identified two (2) additional RCPs that are undersized, shown in **Figure 6-1**, one on the Eastern Shore conveying Thompson Creek and one on the Western Shore, just east of the Meredith Creek RCP. To address these concerns, while maintaining MDOT SHA Drainage Manual standards (MDOT, 2023), culvert capacity increases may be completed by replacing the culvert, either in sections or entirely, or by adding pipes adjacent to the existing pipe. Another option that may be employed to address the excessive headwater elevation would be to improve the headwalls of some culverts. The method used to increase capacity and improve these identified culverts will be determined in final design. The proposed action would impact 1,330 linear feet of culverted waterways in the action area. Additional culverts that need increased capacity may be identified during final design; however, if the culverts are smaller than 36 inches in diameter, they are currently unsuitable for use by NLEB and TCB (USFWS, 2024). Culverts that are blocked by debris would also be highly unlikely to support NLEB and TCB (USFWS, 2024). There are no known roosts of NLEB or TCB occurring in culverts within the action area. Bat usage was not observed during the October 2025 visual assessments of the three (3) culverts that require modification, and 10 other 36-inch or greater culverts whose modification requirements are unknown at this time.

Figure 6-1: Impacts to Bridges and Culverts



Bats utilize day and night roosts, each serving unique purposes. Day roosts protect bats while resting or tending to young, while night roosts are needed for bats to digest food while feeding (Keeley and Tuttle, 1999). Due to the requirements of day roosts, human-made structures along busy highways are less likely to be suitable habitat. Structures composed of concrete with crevices 0.5 to 1.25 inches wide and 12 inches or greater in depth are of high priority for bats. Quiet roosts are also of some priority, as bats within them will be with young or resting (Keeley and Tuttle, 1999). The Chesapeake Bay Bridge is a mostly steel structure, containing some concrete portions, that experiences high traffic volumes of cars and trucks, as well as vessel traffic underneath the spans. The Cox Creek bridge is a much smaller bridge, with proportionally greater concrete surface when compared to the Bay Bridge. The Cox Creek bridge is positioned closer to the water, meaning that vessel traffic is not a concern for bats; however, heavy vehicular traffic would still impact bats potentially roosting in this bridge. Bats are more likely to seek bridges at night as they retain heat, reducing the energetic cost of thermoregulation (Keeley and Tuttle, 1999). Bats show preference for bridges as night roosts that are fully exposed to sun and with space between beams of the deck (Keeley and Tuttle, 1999). Evidence of bats was not detected during the October 2025 visual assessments; however, these bridge structures may provide bats with suitable habitat in the form of poor-quality night roosts. Most culverts in the LOD were blocked to some extent and are unlikely to support NLEB and TCB during the day or night (USFWS, 2024).

The LOD is not located within a karst area and does not contain documented habitat for NLEB and TCB. The suitable habitat available within the LOD is typical of a transportation corridor, being heavily fragmented, exposed to heavy vehicular traffic, and moderately developed in some areas. Furthermore, the MDTA and FHWA will ensure no tree clearing will occur from April 1 to September 30 of any year, which will avoid direct injury or mortality to NLEB and TCB from tree clearing. Large areas of high-quality forest adjacent to the LOD will remain for use by NLEB and TCB. For these reasons, impacts to forest resources may affect but are not likely to adversely affect NLEB and TCB. The impacts of the Preferred Alternative to bridges and culverts in the action area may affect but are not likely to adversely affect NLEB and TCB. The proposed wider/larger structures will increase the potential suitable habitat for NLEB and TCB, which could benefit these species.

Noise

Noise impacts may originate from pile driving, bridge demolition, tree/vegetation clearing, and the operation of equipment associated with construction activities. As pile driving and bridge demolition, either cutting or blasting, would impact the subaqueous environment, it would not impact suitable bat habitat. Construction activities that may produce noise within or adjacent to suitable bat habitat include, but are not limited to, tree/vegetation clearing, structure takes, construction access, and equipment mobilization. Ambient noise monitoring in the action area revealed noise levels ranging from 47 dBA to 75 dBA. The noise study was completed to validate a computer model that would be used to predict the noise increase in the action area during the construction of the Preferred Alternative. The model predicts that lands within 100 feet of construction may experience noise levels up to 83 dBA. The model also predicts that there would not be substantial increases in noise levels in Noise Sensitive Areas (NSA), which include single and multiple family structures, following the completion of the Preferred Alternative. While dBA is not typically used in studies pertaining to noise impacts on bats, there is evidence to show that bats may experience decreased foraging efficiency under the effects of noise at 56 dBA to 88 dBA as well as changes

to call frequency and amplitude of echolocation at 88 dBA (Bunkley and Barber, 2015). Additionally, bats foraging near highways, especially those with high traffic volumes, may experience decreased foraging efficiency up to 60 meters from road surface (Siemers and Schaub, 2011). Over time, bats may adjust to low noise levels or louder noise levels at greater distances. However, high noise levels at close proximity, accompanied by vibration, may force bats away from roosting areas and induce evasive responses (USFWS, 2015). In proximity to highways, bats are more likely to engage in evasive actions and are less likely to cross roadways, posing a barrier to foraging habitat when traffic volumes are higher (Zurcher et al., 2010). Evasive actions and alterations to call frequency and echolocation incur energetic costs to bats, which are intensified by decreased forage efficiency and restricted access to forage areas associated with high noise levels. Along with increased energy costs, chronic exposure to excess noise may induce stress responses and increase the incidence of disease (Song et al., 2018; Davy et al., 2017). WNS is a disease of concern as it has resulted in heavy declines of North American bat populations (Bektas et al., 2021; Powell et al., 2021). As pile driving and bridge demolition would occur within the water, the impacts to NLEB, TCB, and suitable habitat are negligible. Bats that may be roosting within the action area are likely adjusted to heightened noise levels and would likely shift roosting locations or temporarily abandon the roost during construction activities. As a result, noise impacts from the Preferred Alternative may affect but are not likely to adversely affect NLEB and TCB.

Lighting

Artificial light, especially at night, may negatively affect bats by entombing them in their roost, forcing them to abandon roosts, or disrupting behaviors such as foraging or avoiding predators (Zeale et al., 2016). Temporary lighting may encourage insect-gleaning species, such as the NLEB and TCB, to forage; however, the effects are relative to individuals (Voigt et al., 2021). Some studies have shown that members of the *Myotis* genus forage less within areas lit by streetlamps and forage more in darker areas (Rydell, 1992). However, artificial light may disturb the forage base for bats, as congregating insects will be preyed upon by multiple predators (Van Grunsven et al., 2020). Finally, bats may be at greater risk of predation as they take less optimal paths to avoid artificial light (Voigt and Kingston, 2016).

The Preferred Alternative may include temporary artificial light to support extended day and overnight construction activities. Nighttime construction is most likely to occur on the Bay Bridge spans; however, it is unknown if nighttime work will be required at this time. If temporary artificial light is used, it will comply with applicable Occupational Safety and Health Administration (OSHA) standards. This utilization of temporary lighting would be an increase from existing conditions in the action area. As the temporary lighting would be focused on the Bay Bridge spans and any required access roads or access trestles, it is unlikely that it would impact suitable bat forest habitat. This would minimize exposure of suitable bat habitat, and any bats that may be within it, to artificial light.

Currently, any changes to the existing permanent lighting regime of the action area are unknown. Assessments of the lighting in the action area indicate that minor increases in permanent lighting may be needed to meet the exact requirements for interchange lighting outlined in the *MDTA and SHA Lighting Guidelines* (MDTA, 2019). On the Bay Bridge, at minimum, safety lighting for air traffic on bridge towers, U.S. Coast Guard required navigational channel lighting, as well as functional roadway lighting would be anticipated. The design of the bridge's lighting system will

be based on DarkSky International's Five Principles for Responsible Outdoor Lighting: Useful, Targeted, Low Level, Controlled, and Warm-Colored. By integrating these principles, the project can minimize light pollution, protect wildlife habitats, reduce energy costs, and comply with *MDTA and SHA Lighting Guidelines* (MDTA, 2019). Specific details of this safety lighting, as well as any continuous or aesthetic lighting on the bridge deck, would be determined in final design. Currently, the Bay Bridge is unlit, except for overhead gantry systems and necessary lighting for roadway safety, vessel navigation, and aviation. Any additional permanent lighting would be an increase from existing conditions. Any changes to the continuous or aesthetic lighting regime would include measures to ensure safety and navigational compliance, and minimize impacts on species and the environment, particularly within the ecologically sensitive Chesapeake Bay region. These considerations may include the use of energy-efficient lighting systems installed along the main span, approaches, and support piers to provide uniform illumination for vehicular traffic, maintenance operations, and emergency access. Navigational lighting, as required by the U.S. Coast Guard, would be implemented on the bridge's substructure to ensure safe passage for maritime vessels, utilizing shielded, downward-directed fixtures to reduce glare and light trespass into the Chesapeake Bay's sensitive aquatic and avian habitats. Aesthetic lighting may be considered for the bridge towers, with the option of employing programmable low-intensity lighting to adhere to DarkSky principles to minimize impacts on migratory birds and the scenic viewsheds of the Chesapeake Bay.

If utilized, temporary nighttime lighting would be directed on the Bay Bridge and accompanied by elevated noise originating from construction. It is likely that NLEB and TCB would avoid this area or not remain for extended periods of time. Currently, temporary nighttime light is only anticipated on the Bay Bridge spans; therefore, it is unlikely that bats occupying forest habitat within the action area would be impacted by temporary nighttime lighting. For these reasons, if nighttime work were to be conducted, it <u>may affect but is not likely to adversely affect</u> NLEB and TCB.

Currently, increases in the permanent lighting along U.S. 50/301 or other roadways are expected to be minor. If permanent lighting increases are determined during final design, they would comply with the *MDTA and SHA Lighting Guidelines* (MDTA, 2019). Considerations for potential environmental impacts include the installation of full-cutoff fixtures with warm-toned wavelengths (below 3000 Kelvin) or house side shields to reduce skyglow and light trespass into NLEB and TCB suitable habitat. Additionally, adaptive controls can dim lights during low-traffic periods to minimize energy consumption and ecological disturbance. Changes to permanent lighting along U.S. 50/301 or other roadways would likely have less impact on the NLEB and TCB on the Eastern Shore, as that area is highly lit by commercial buildings and parking lots compared to the forest habitat of the Western Shore. Although any increase in permanent light on the Bay Bridge would be an increase compared to the existing condition, it is unlikely that there will be much impact from this light source to bats due to distance to forest habitat and potential disturbance from vehicular and vessel traffic at the Bay Bridge spans. Currently, temporary and permanent lighting in the action area is not expected to increase substantially beyond current conditions; therefore, it is anticipated that impacts of the proposed project from lighting <u>may affect but are not likely to adversely affect</u> NLEB and TCB. Determinations on lighting will be made during final design; therefore, anticipated impacts to bats may change.

Indirect Effects

Throughout the action area, land-based construction activities such as clearing and grading have the potential to deposit sediment in NLEB and TCB habitat, such as streams and wetlands. Sediment deposition may be detrimental to NLEB and TCB as streams and wetlands may provide bats with forage, water, and cover. An ESC plan, in accordance with MDE guidelines, will be prepared during final design, ensuring that appropriate BMPs are implemented at each area of construction. The LOD of the Preferred Alternative has been developed to accommodate all aspects of the ESC plan. The project will increase the amount of impervious surface in the action area. This may result in indirect effects to bats via groundwater impacts to wetlands and streams, as well as pollutant runoff into these resources. As a result, this project must comply with the MDE Stormwater Design Manual. The MDTA's approach to design and development will aim to incorporate ESD to meet (and exceed where feasible) surface and protection requirements along the roadway and the Bay Bridge. The MDTA would adhere to the developed ESD and required BMPs, ESC, and SWM practices to treat runoff from new impervious surfaces and manage stormwater quality and quantity. Similar to the ESC plan, the LOD will accommodate all elements of the SWM plan, but details will not be determined until final design. For these reasons, it is anticipated that, at this time, indirect impacts of the Preferred Alternative may affect but are not likely to adversely affect NLEB and TCB in the action area.

7 CONCLUSION AND EFFECTS DETERMINATION

This Biological Assessment evaluated the potential effects of the proposed Chesapeake Bay Crossing project on the NLEB and the TCB. The proposed action is the Preferred Alternative. Based on currently available Tier 2 Study information, FHWA, in coordination with the MDTA, has made a determination that the Preferred Alternative may affect but is not likely to adversely affect the NLEB and TCB. Effects to NLEB and TCB are expected to be discountable because: 1) bat surveys did not detect NLEB or TCB on or within any of existing bridge or culverts within the LOD, 2) tree clearing will be prohibited during the bat active season (April 1 to September 30), 3) vegetation removal is limited to 57.8 acres primarily within forest edge and fragmented forests found within 100 feet of the roadway, and 4) Visual assessments of all bridges, culverts, and buildings identified for take will occur every two years and before and structure takes to maintain probable absence of NLEB and TCB. Further evaluation of potential impacts will be conducted during final design, and the effects determination will be re-assessed as more detailed construction means and methods are made available. FHWA, in coordination with the MDTA, will continue to coordinate with USFWS through final design to ensure implementation of appropriate avoidance, minimization, and mitigative protection measures so that there are no adverse effects to listed or proposed bat species.

8 LITERATURE CITED

Bektas, B., J. Blanchong, K. Freeseman, and A. Albughdadi 2021. *Use of Innovative Technology to Deter Bat Bridge Use Prior to and During Construction* (No. MN 2020-26). Minnesota Department of Transportation, Office of Research & Innovation.

Bunkley, J.P. and J.R. Barber 2015. Noise reduces foraging efficiency in pallid bats (Antrozous pallidus). *Ethology*, *121*(11), pp.1116-1121.

Caltrans 2016. TECHNICAL GUIDANCE FOR THE ASSESSMENT AND MITIGATION OF THE EFFECTS OF TRAFFIC NOISE AND ROAD CONSTRUCTION NOISE ON BATS https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/noise-effects-on-bats-jul2016-a11y.pdf

Davy, C.M., G.F. Mastromonaco, J.L. Riley, J.H. Baxter-Gilbert, H. Mayberry, and C.K. Willis. "Conservation implications of physiological carry-over effects in bats recovering from white-nose syndrome." *Conservation Biology* 31, no. 3 (2017): 615-624.

Gilmour, L. R. 2020. Evaluating methods to deter bats (Doctoral dissertation, University of Bristol).

Jerem, P., and F. Mathews 2021. Passing rail traffic reduces bat activity. *Scientific Reports*, *11*(1), 20671.

Keeley, B.W. and M.D. Tuttle. 1999. *Bats in American bridges* (No. Resource Publication No. 4). Bat Conservation International Incorporated.

Maryland Department of Transportation Sate Highway Administration (MDOT SHA). 2023. Highway Drainage Manual. https://roads.maryland.gov/ohd2/MDOT%20SHA%20Drainage%20Manual%20-%20September%202023.pdf

Maryland Transportation Authority (MDTA). 2019. https://mdta.maryland.gov/sites/default/files/Files/Business/2019-05-16_MDTA_Lighting_Guidelines_Signed.pdf

Powell, D., P. L. Droppelman, and T. Mullins. 2021. Efficacy of acoustic deterrence for bat occupancy of highway structures. ICF Jones & Stokes, Inc

Rydell, J. 1992. Exploitation of insects around streetlamps by bats in Sweden. *Functional Ecology*, pp.744-750.

Song, S., A. Lin, T. Jiang, X. Zhao, W. Metzner, and J. Feng 2018. Bats adjust temporal features of echolocation calls but not those of communication calls in response to traffic noise. *bioRxiv*, 354845.

Tate, M. E. 2020. Investigating the ecology and behavior of the Indiana bat and tri-colored bat during fall swarming and spring staging.

United States Fish and Wildlife Service (USFWS) 2022. Species Status Report (SSA) Report for the Northern Long-eared Bat (*Myotis septentrionalis)*. https://www.fws.gov/sites/default/files/documents/Species%20Status%20Assessment%20Report%20for%20the%20Northern%20long-eared%20bat-%20Version%201.1%20%282%29.pdf

United States Fish and Wildlife Service (USFWS) 2021. Species Status Report (SSA) Report for the Tricolored Bat (*Perimyotis subflavus)*. https://ecos.fws.gov/ServCat/DownloadFile/221212

United States Fish and Wildlife Service (USFWS) 2024. Range-wide Indiana Bat & Northern Long-eared Bat Survey Guideline. https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines

van Grunsven, R.H., J.R. van Deijk, M. Donners, F. Berendse, M.E. Visser, E. Veenendaal, and K. Spoelstra 2020. Experimental light at night has a negative long-term impact on macro-moth populations. *Current Biology*, *30*(12), pp.R694-R695.

Voigt, C.C. and T. Kingston 2016. *Bats in the Anthropocene* (pp. 1-9). Springer International Publishing.

Voigt, C.C., J. Dekker, M. Fritze, S. Gazaryan, F. Hölker, G. Jones, D. Lewanzik, H.J. Limpens, F. Mathews, J. Rydell and K. Spoelstra, 2021. The impact of light pollution on bats varies according to foraging guild and habitat context. *BioScience*, *71*(10), pp.1103-1109.

Zeale, M.R., E. Bennitt, S.E. Newson, C. Packman, W.J. Browne, S. Harris, G. Jones, and E. Stone 2016. Mitigating the impact of bats in historic churches: the response of Natterer's bats Myotis nattereri to artificial roosts and deterrence. *PLoS One*, *11*(1), p.e0146782

APPENDIX A

AGENCY COORESPONDENCE

PROJECT SUMMARY

Project Code: 2024-0014247

Project Name: Bay Crossing Study Tier 2

Project Type: Road/Hwy - New Construction

Project Description: The Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) is a National Environmental Policy Act (NEPA) study that will analyze alternatives to provide congestion relief and improve travel reliability, mobility and safety across the Chesapeake Bay. The Tier 2 Study is focusing on the Selected Corridor Alternative (Corridor 7) that was identified at the conclusion of the Tier 1 Study. Alternatives will include a No Build Alternative and a range of build alternatives involving various alignments, crossing types and modal and operational alternatives (e.g. transit, pedestrian, bicycle, etc.). Corridor 7 is two miles wide and runs 22 miles from the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.9956717,-76.3745195263001,14z



Counties: Anne Arundel and Queen Anne's counties, Maryland

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

SYSTEM UNIT (SU)

Most new Federal expenditures and financial assistance, including Federal flood insurance, are prohibited within System Units. ***Federally-funded projects within System Units require consultation with the Service.*** *Consultation is not required for projects using private, state, or local funds.*

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
MD-32	Stevensville	SU	11/16/1990	11/16/1990
MD-32	Stevensville	SU	11/25/2024	11/25/2025

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1Fx
- PFO1Cx
- PSS1S
- PSS4C
- PFO4/SS1S
- PSS1B
- PFO4/1R
- PFO4/EM1R
- PSS1/EM1F
- PSS1/FO4B
- PSS1Ah
- PSS1A
- PSS1Bh
- PFO1D
- PFO4/1B
- PSS3/4R
- PFO1E

- PSS1Ex
- PFO1/SS1S
- PFO1Ch
- PSS1R
- PSS1Cx
- PFO1A
- PSS1/EM1Cx
- PFO1/2F
- PFO1/EM1A
- PFO1F
- PSS1Ch
- PFO1Fb
- PFO4S
- PFO1/SS1A
- PSS1C
- PFO4/1S
- PFO1/4B
- PSS1/EM1C
- PFO1Ex
- PFO1Db
- PFO1/2C
- PFO4/1C
- PFO1C
- PFO1B
- PFO1/4C
- PFO1Fh
- PFO1T
- PFO4D
- PFO1/4A
- PFO1R
- PSS4A
- PFO1/2E
- PFO4B
- PFO1/4S
- PSS1/EM1D
- PFO1Ad

- PFO/SS1A
- PFO1/EM1R
- PSS1E
- PSS1/EM1A
- PSS1D
- PFO1S
- PFO4R
- PFO4C
- PFO1/SS1R
- PFO1/SS1C

FRESHWATER POND

- PUSA
- PUSCx
- PUBF
- PUBH
- PUBHx
- PABHx
- PAB1Hx
- PUBFx
- PUBHh
- PUBVh
- PUBKx

RIVERINE

- R4SBCx
- R5UBH
- R4SBC

FRESHWATER EMERGENT WETLAND

- PEM1Dx
- PEM1Ch
- PEM1Ah
- PEM1B
- PEM5A
- PEM1F
- PEM1Dh
- PEM1D
- PEM1/SS1C

- PEM1A
- PEM1Ex
- PEM1Rh
- PEM1/SS1Fx
- PEM1/SS1Ch
- PEM1/SS1Cx
- PEM1R
- PEM1/SS1D
- PEM1Fx
- PEM1/SS1R
- PEM5C
- PEM1Fb
- PEM1C
- PEM1Fh
- PEM5Eh
- PEM1E
- PEM1Cx

ESTUARINE AND MARINE WETLAND

- E2USP
- E2EM1/SS1P
- E2EM1Pd
- E2SS1P
- E2SS1/EM1P
- E2EM1/SS4P
- E2US/SS1P
- E2US2P
- E2SS3/4P
- E2SS1Pd
- E2USN
- E2SS1/EM5P
- E2USM
- E2SS4P
- E2EM2N
- E2EM1N
- E2EM5P
- E2FO4P

- E2EM1P
- E2SS1/3P

OTHER

- Pf

ESTUARINE AND MARINE DEEPWATER

- E1UBLx
- E1UBLh
- E1ABLh
- E1UBL

IPAC USER CONTACT INFORMATION

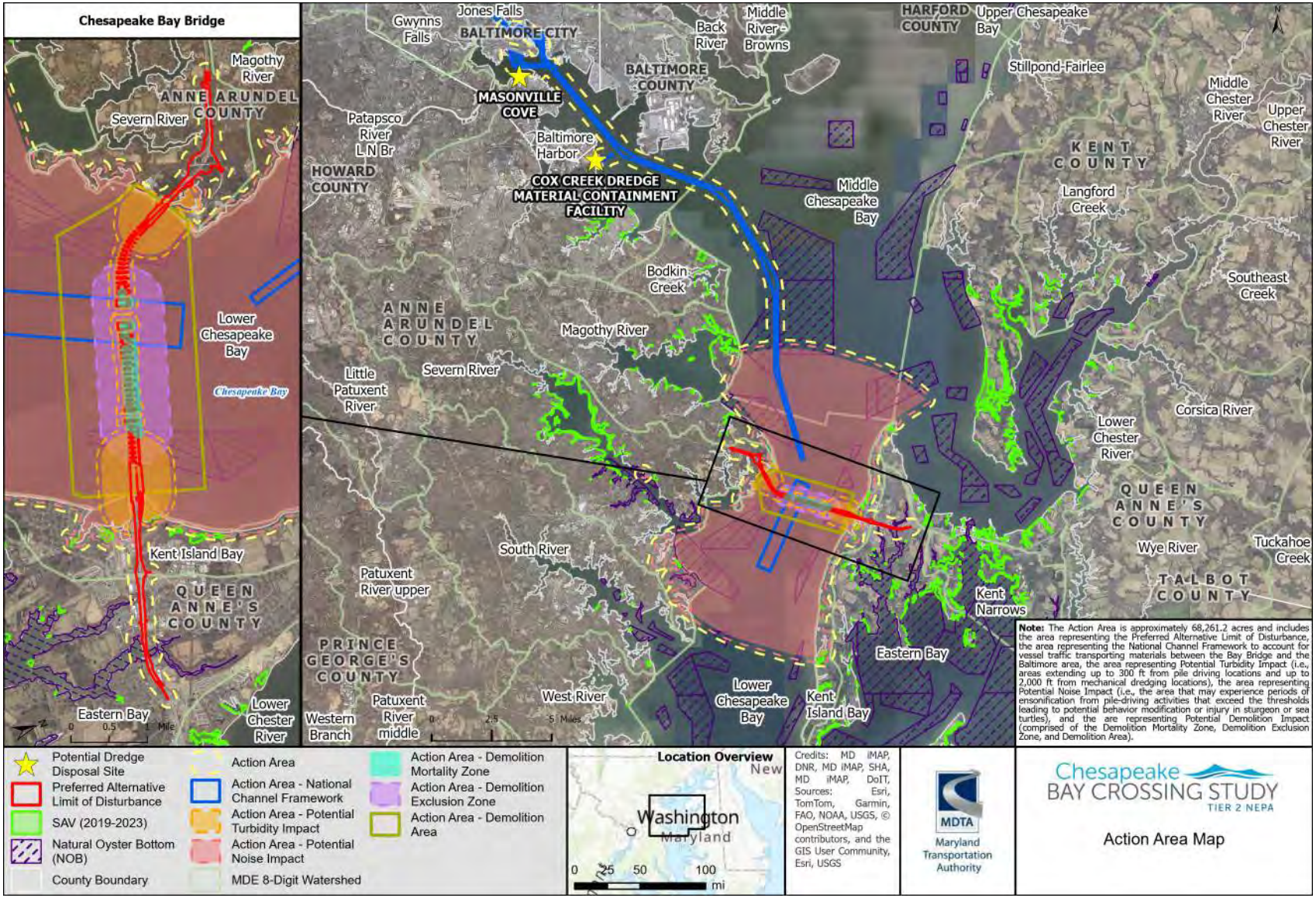
Agency: Private Entity
Name: Gavin Studds
Address: 25 Old Solomons Island Road
City: Annapolis
State: MD
Zip: 20401
Email gavins@cri.biz
Phone: 4104746559

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration
Name: Heather Lowe
Email: hlowe@mdta.state.md.us
Phone: 4105375665

APPENDIX B

ACTION AREA MAP


Chesapeake Bay Bridge
Magothy River
ANNE ARUNDEL COUNTY
Severn River
Lower Chesapeake Bay
Chesapeake Bay
Kent Island Bay
QUEEN ANNE'S COUNTY
Eastern Bay
Lower Chester River
0 0.5 1 Mile
Gwynns Falls
Jones Falls
BALTIMORE CITY
Back River
Middle River - Browns
HARFORD COUNTY
Upper Chesapeake Bay
Stillpond-Fairlee
BALTIMORE COUNTY
MASONVILLE COVE
Middle Chester River
Upper Chester River
Patapsco River LN Br
Baltimore Harbor
KENT COUNTY
HOWARD COUNTY
COX CREEK DREDGE MATERIAL CONTAINMENT FACILITY
Middle Chesapeake Bay
Langford Creek
Bodkin Creek
Southeast Creek
ANNE ARUNDEL COUNTY
Magothy River
Severn River
Little Patuxent River
Corsica River
Lower Chester River
QUEEN ANNE'S COUNTY
South River
Wye River
Tuckahoe Creek
Patuxent River upper
TALBOT COUNTY
Kent Narrows
PRINCE GEORGE'S COUNTY
Eastern Bay
Patuxent River middle
West River
Lower Chesapeake Bay
Kent Island Bay
Western Branch
0 2.5 5 Miles
Note: The Action Area is approximately 68,261.2 acres and includes the area representing the Preferred Alternative Limit of Disturbance, the area representing the National Channel Framework to account for vessel traffic transporting materials between the Bay Bridge and the Baltimore area, the area representing Potential Turbidity Impact (i.e., areas extending up to 300 ft from pile driving locations and up to 2,000 ft from mechanical dredging locations), the area representing Potential Noise Impact (i.e., the area that may experience periods of ensonification from pile-driving activities that exceed the thresholds leading to potential behavior modification or injury in sturgeon or sea turtles), and the are representing Potential Demolition Impact (comprised of the Demolition Mortality Zone, Demolition Exclusion Zone, and Demolition Area).
Potential Dredge Disposal Site
Preferred Alternative Limit of Disturbance
SAV (2019-2023)
Natural Oyster Bottom (NOB)
County Boundary
Action Area
Action Area - National Channel Framework
Action Area - Potential Turbidity Impact
Action Area - Potential Noise Impact
MDE 8-Digit Watershed
Action Area - Demolition Mortality Zone
Action Area - Demolition Exclusion Zone
Action Area - Demolition Area
Location Overview
New
Washington
Maryland
0 25 50 100 mi
Credits: MD iMAP, DNR, MD iMAP, SHA, MD iMAP, DoIT, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Action Area Map

APPENDIX C

BAT HABITAT ASSESSMENT

DRAFT BAT HABITAT ASSESSMENT

BAY CROSSING TIER 2 STUDY

ANNE ARUNDEL & QUEEN ANNE'S COUNTY(S), MARYLAND





OCTOBER 2025

Prepared For:

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

MDTA Maryland Transportation Authority

Prepared By:

COASTAL RESOURCES INC.

25 Old Solomons Island Road, Annapolis, Maryland 21401

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3.0 Methodology 1
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APPENDIX B: FEDERAL AGENCY COORDINATION
APPENDIX C: BAT HABITAT CHARACTERIZATION DATASHEETS
APPENDIX D: SITE PHOTOGRAPHS
APPENDIX E: BAT HABITAT SUITABILITY DATA

1.0 Introduction

Coastal Resources, Inc. (CRI), sub-consultant to Rummel, Klepper, & Kahl, LLP (RKK), under contract with Maryland Transportation Authority (MDTA), has completed a bat habitat assessment for the Northern long-eared bat (*Myotis lucifugus*, NLEB) and the tricolored bat (*Perimyotis subflavus*, TCB) in support of the Chesapeake Bay Crossing Study Tier 2 NEPA Project, in Anne Arundel and Queen Anne's Counties, Maryland.

2.0 Study Area

The study area is comprised of approximately eight miles of MDTA right of way spanning across the Chesapeake Bay from west of Oceanic Drive in Annapolis to east of Cox Creek in Chester (**Figure 1 – Vicinity Map**). Land use classifications within and adjacent to the study areas include transportation, commercial, low density residential, and other land. The Bay Crossing Study Tier 2 NEPA project occurs within the Severn River (02131002), Lower Chesapeake Bay (02139998), Kent Island Bay (02130511), and Chester River (02130501) MDE 8-digit watersheds and lies within the Coastal Plain physiographic province.

3.0 Methodology

Prior to conducting the bat habitat assessment, CRI began the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) review process. The IPaC review was conducted on June 28, 2025, and indicated the federally endangered NLEB and proposed endangered TCB may occur within the project area. IPaC documentation is included in **Appendix B**.

Prior to the bat habitat assessment, CRI researched existing literature on the habitat types associated with each of the bat species of concern (**Table 1**)**.** During the field assessment, potential bat habitat identified using the definitions of suitable NLEB and TCB habitat as defined in the 2024 USFWS *Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines* (USFWS 2024). Areas of potential bat habitat were created using the ArcGIS Field Maps application on an iOS device. These areas were field verified and adjusted using the cruise method. Inaccessible areas are assumed to be comprised of suitable bat habitat.

Figure 1: Vicinity Map



Table 1. Summary of RTE Habitat Assessment Results for Northern Long-eared Bat and Tricolored Bat

Common Name	Species	RTE Status[1]	Habitat Preference[2]	Suitable Habitat Present (Yes/No)
Northern Long-eared Bat	*Myotis septentrionalis*	FE, SE	Mixed-type wooded areas with potential roost trees and variable amounts of canopy closure and small gaps. May roost in human-made structures. [2]	Yes
Tri-colored Bat	*Perimyotis subflavus*	FPE, HSR	Wooded areas and adjacent non-forested habitat that includes emergent wetlands, shrublands, grasslands, and forested edges of fields and pastures. Will roost in human-made structures. [2]	Yes

[1]FT = Federally Endangered; FPE = Federally Proposed Endangered; SE = State Endangered; HSR = Highly State Rare
[2]Habitat associations obtained from 2024 USFWS Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines

4.0 Results and Discussion

The results of the bat habitat assessment are summarized below. Maps depicting the locations of bat habitat are included in **Appendix A**. Bat habitat characterization datasheets are included in **Appendix C**.

Representative site photographs of forest stands and tree clusters are included in **Appendix D** and bat habitat suitability data are included in **Appendix E**.

Both species of bats are insectivores. Because insects are so closely associated with water resources, streams and wetlands within suitable portions of the study area may provide important food sources and water for these species. These bats will typically forage over or along the edges of ponds, wetlands, and streams. During the waters of the U.S. (including wetlands) delineation, 38 wetland systems were identified within the LOD, including seven palustrine emergent wetlands, eight estuarine emergent wetlands, 21 palustrine forested wetlands, one palustrine scrub-shrub wetlands, one estuarine scrub-shrub wetland. Fifteen watercourses were identified within the study area, including 10 perennial streams and five intermittent streams.

Within the LOD, approximately 72.41 acres (20.58%) are classified as suitable bat habitat for the NLEB and TCB; and 279.41 acres (79.42%) are classified as unsuitable bat habitat. Much of the wooded areas in the project corridor provide suitable habitat, 10.23 acres (13.91%) of which is classified as good habitat for NLEB, 42.57 acres (59.43%) which is classified as moderate habitat for NLEB, and 19.6 acres (26.66%) which is classified as moderate-to-good habitat for NLEB. Within the LOD, 13.3 acres (18.41%) of suitable bat habitat is classified as good quality for TCB, 38.19 acres (53.43%) is classified as moderate quality for TCB, and 20.7 acres (28.16%) is classified as moderate-to-good habitat for TCB. In general, wooded areas along the project corridor follow a linear structure and are typified by a moderate to heavy vine load, including oriental bittersweet and English ivy, as well as being dominated by trees not typically favored by NLEB or TCB, such as Callery pear and sweetgum. Canopy was also the least dense forest layer, never exceeding 50% density, which may expose bats roosting in these stands to predation. Midstory and understory layers varied throughout the study area and were occupied, to some extent, by denser shrubs and trees such as Callery pear and autumn olive. Many of the wooded areas abutted the highway, creating tracts of forest edge, which may be beneficial to TCB. Unsuitable areas of bat habitat included roadways, trees with a DBH of three inches or less, and areas with only shrubby vegetation. The forest stands and tree clusters are depicted on the Bat Habitat Assessment Maps, included as **Appendix A**.

5.0 Conclusions

A habitat assessment was conducted for the Chesapeake Bay Crossing Tier 2 NEPA project to determine the potential for federally listed bat species to occur within the study area. Based on the results of the assessment, suitable roosting, traveling, and foraging bat habitat is present within the study area. Time of year restrictions and minimization measures will continue to be coordinated with USFWS as the project design progresses.

6.0 Literature Cited

U.S. Army Corps of Engineers (USACE). 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0, ed. J. F. Berkowitz, J. S. Wakeley, R. W. Lichvar, C. V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service (USWFS). 2024. Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines. U.S. Fish and Wildlife Service, Region 3, Bloomington, MN. 95 pp.

APPENDIX A: BAT HABITAT MAP

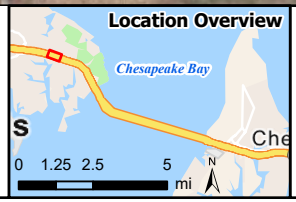


MDTA RPA Limit of Disturbance

Map Sheet

Bat Forest Habitat

Location Overview



0 0.01 0.03 0.05 mi

1 inch = 0.05 mile

N

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

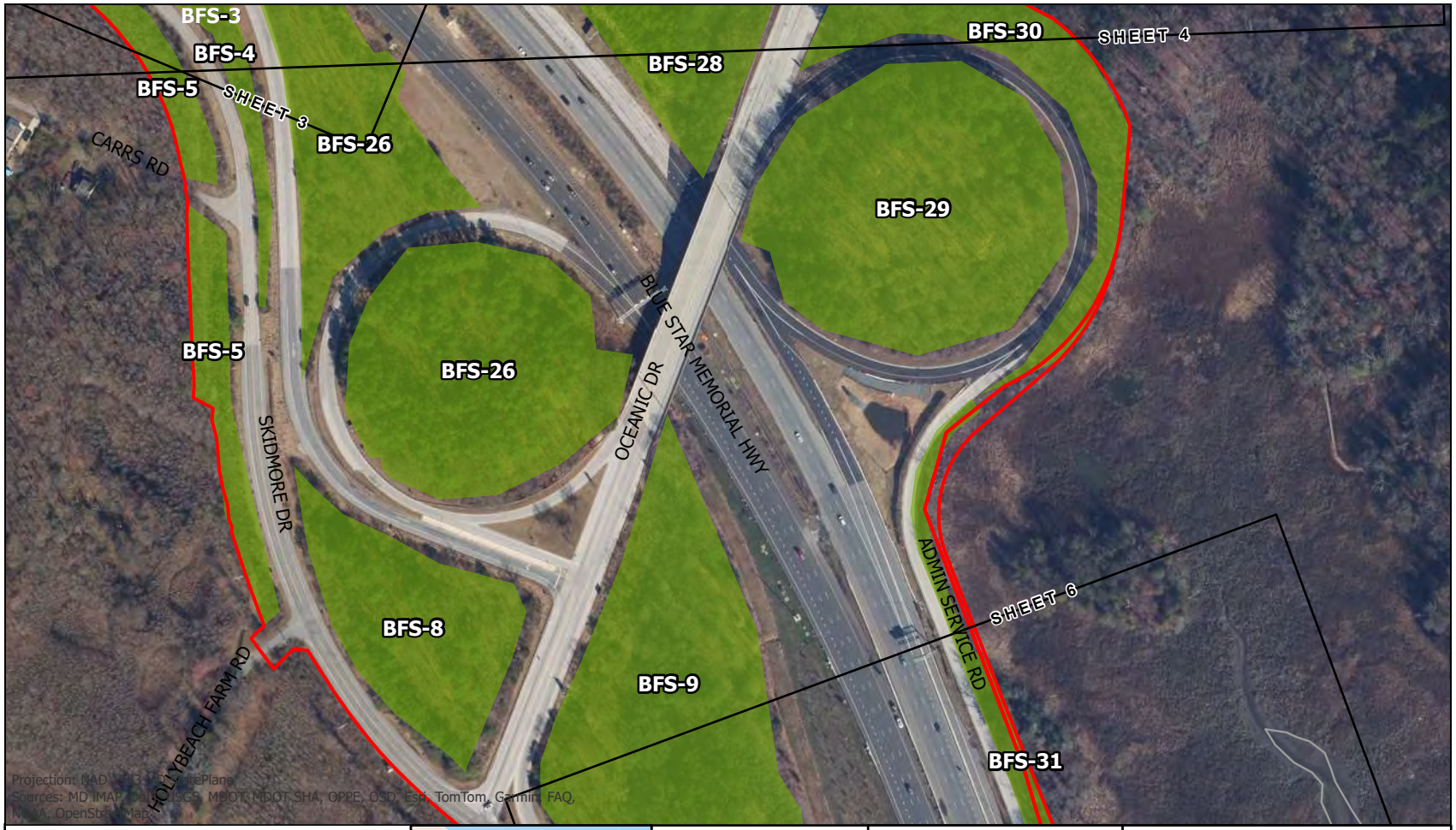
Bat Habitat Assessment Maps

Sheet 1 of 14


CONGRESS CT
YORKTOWN MANOR CT
YORKTOWN RD
SHEET 1
SHEET 3
Meredith Creek
BFS-14
BFS-13
BFS-12
EAST COLLEGE PKWY
BLUE STAR MEMORIAL HWY
SKIDMORE DR
BFS-2
WHITEHALL RD
COLBERT RD
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, OPPE, OSM, Esri, TomTom, Garmin, FAO, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 2 of 14


SHEET 2
LOG INN RD
SHEET 4
BFS-12
BFS-13
BFS-10
BFS-11
EAST COLLEGE PKWY
BFS-27
BLUE STAR MEMORIAL HWY
Meredith Creek
BFS-2
SKIDMORE DR
BFS-3
BFS-7
BFS-6
Meredith Creek
COL MAR LA
BFS-26
SHEET 5
BFS-5
BFS-4
SHEET 4
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, DPPE, OSD, Esri, TomTom, Garmin, FAO, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 3 of 14


Meredith Creek
SHEET 3
OCEANIC DR
BFS-10
BFS-10
BFS-10
EAST COLLEGE PKWY
BFS-11
BFS-27
SOUTH BEACH RD
BLUE STAR MEMORIAL HWY
BFS-27
BFS-3
BFS-28
SKIDMORE DR
BFS-5
SHEET 3
BFS-26
BFS-4
BFS-30
SHEET 5
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT SHA, HERE, OSD, Esri, TomTom, Garmin, FAQ, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Specimen Tree
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
N
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 4 of 14


BFS-3
BFS-4
BFS-5
SHEET 3
BFS-26
CARRS RD
BFS-30
SHEET 4
BFS-28
BFS-29
BFS-5
BFS-26
BLUE STAR MEMORIAL HWY
OCEANIC DR
SKIDMORE DR
BFS-8
BFS-9
HOLLYBEACH FARM RD
ADMIN SERVICE RD
SHEET 6
BFS-31
Projection: NAD 1983 StatePlane
Sources: MD iMAP, USGS, MDOT, MDOT SHA, OPPE, OSD, Esri, TomTom, Garmin, FAQ, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
N
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 5 of 14


BFS-31
SHEET 6
SHEET 7
ADMIN SERVICE RD
BFS-31
BFS-32
BFS-32
BLUE STAR MEMORIAL HWY
ENT TO WESTINGHOUSE
BFS-9
ENT TO WESTINGHOUSE
SHADY DR
Westinghouse Bay
Projection: NAD 1983 MD StatePlane
Sources: DoD iMAP, Esri, USGS, MDOT, MDOT SHA, OPPE, OSD, Esri, TomTom, Garmin, FAO, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 6 of 14


CHESAPEAKE BAY
BLUE STAR MEMORIAL HWY
BFS-32
BFS-32
SHEET 6
ENT TO WESTINGHOUSE
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, ESRI, OSD, Esri, TomTom, Garmin, FAO,
and the GIS User Community
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5
mi
0 0.01 0.03 0.05
mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 7 of 14


BFS-25
BFS-25
BFS-25
BFS-25
BFS-17
BLUE STAR MEMORIAL HWY
SHEET 9
PIER ONE RD
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, OPBE, OSD, Esri, TomTom, Garmin, FAQ, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 8 of 14



MDTA RPA Limit of Disturbance

Map Sheet

Bat Forest Habitat

Location Overview

Chesapeake Bay

0 1.25 2.5 5 mi

0 0.01 0.03 0.05 mi

1 inch = 0.05 mile

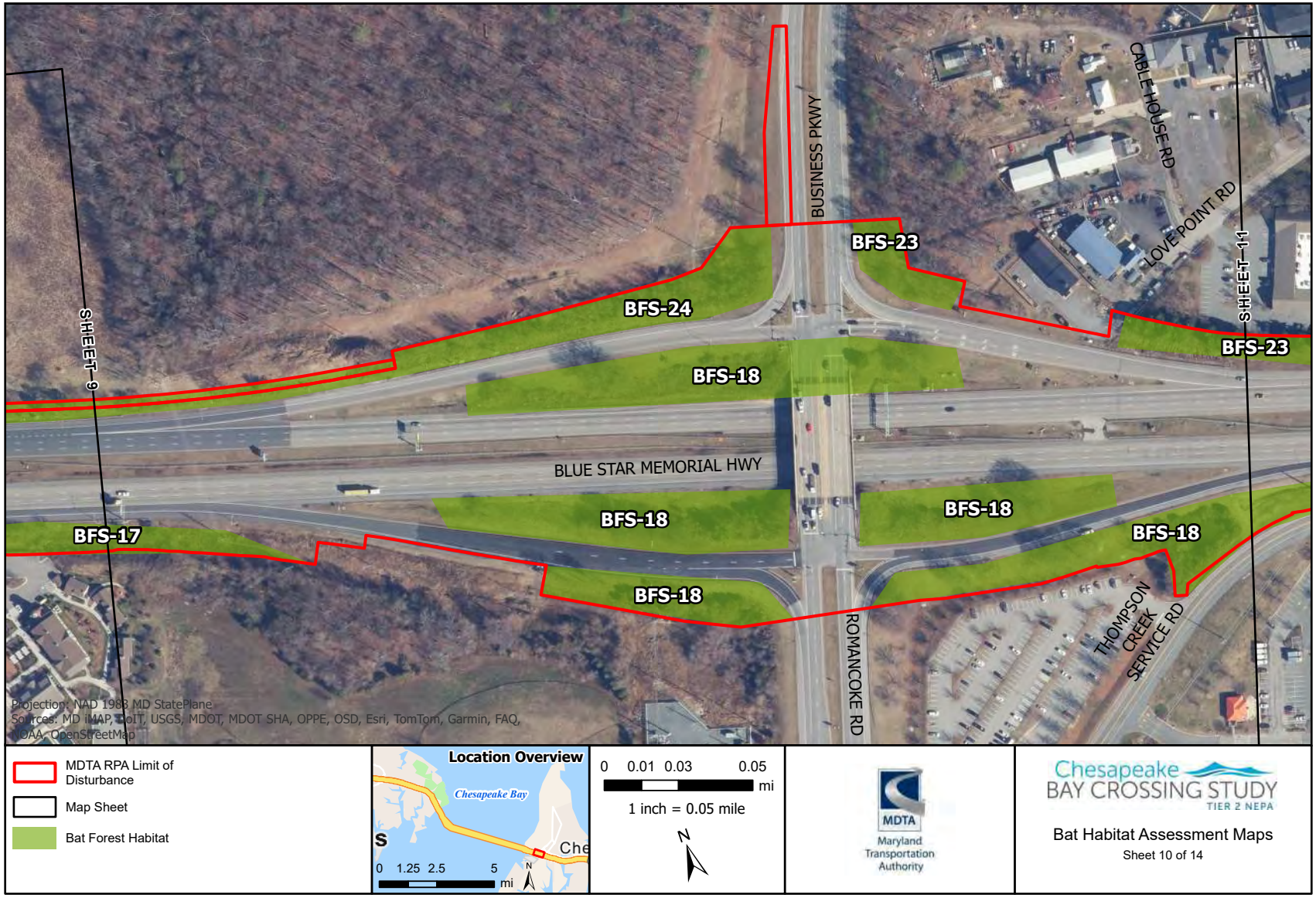
N

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Bat Habitat Assessment Maps

Sheet 9 of 14

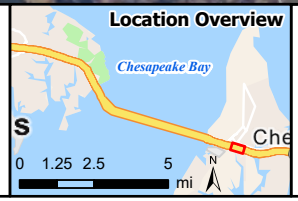

BUSINESS PKWY
CABLE HOUSE RD
LOVE POINT RD
SHEET 11
SHEET 9
BFS-23
BFS-24
BFS-18
BLUE STAR MEMORIAL HWY
BFS-18
BFS-18
BFS-17
BFS-18
BFS-18
ROMANCOKE RD
THOMPSON CREEK SERVICE RD
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, OPPE, OSD, Esri, TomTom, Garmin, FAQ, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 10 of 14



MDTA RPA Limit of Disturbance

Map Sheet

Bat Forest Habitat



0 0.01 0.03 0.05 mi

1 inch = 0.05 mile

N

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Bat Habitat Assessment Maps

Sheet 11 of 14


MAIN ST
SHEET 11
DUKE ST
SHEET 13
BFS-22
THOMPSON CREEK SERVICE RD
BLUE STAR MEMORIAL HWY
BFS-19
THOMPSON CREEK RD
Cox Creek
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, OPPE, OSD, Esri, TomTom, Garmin, FAQ, NOAA, OpenStreetMap
MDTA RPA Limit of Disturbance
Map Sheet
Bat Forest Habitat
Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
N
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 12 of 14


MAIN ST
SHOPPING CENTER RD
SHEET 12
SHEET 14
Cox Creek
BFS-21
BFS-19
BLUE STAR MEMORIAL HWY
BFS-20
SHERMAN DR
ANCHORAGE DR
Projection: NAD 1983 MD StatePlane
Sources: MD iMAP, DoIT, USGS, MDOT, MDOT SHA, OPPE, OSD, Esri, TomTom, Garmin, FAO, NOAA, OpenStreetMap
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Location Overview
Chesapeake Bay
0 1.25 2.5 5 mi
0 0.01 0.03 0.05 mi
1 inch = 0.05 mile
N
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Bat Habitat Assessment Maps
Sheet 13 of 14

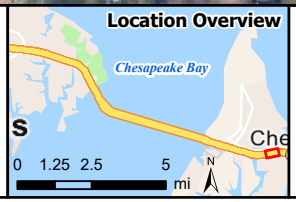


MDTA RPA Limit of Disturbance

Map Sheet

Bat Forest Habitat

Location Overview



0 0.01 0.03 0.05 mi

1 inch = 0.05 mile

N

MDTA Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY TIER 2 NEPA

Bat Habitat Assessment Maps

Sheet 14 of 14

APPENDIX B: FEDERAL AGENCY COORDINATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

In Reply Refer To: 07/28/2025 18:48:35 UTC
Project Code: 2024-0014247
Project Name: Bay Crossing Study Tier 2

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Coastal Barriers
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

PROJECT SUMMARY

Project Code: 2024-0014247
Project Name: Bay Crossing Study Tier 2
Project Type: Road/Hwy - New Construction
Project Description: The Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) is a National Environmental Policy Act (NEPA) study that will analyze alternatives to provide congestion relief and improve travel reliability, mobility and safety across the Chesapeake Bay. The Tier 2 Study is focusing on the Selected Corridor Alternative (Corridor 7) that was identified at the conclusion of the Tier 1 Study. Alternatives will include a No Build Alternative and a range of build alternatives involving various alignments, crossing types and modal and operational alternatives (e.g. transit, pedestrian, bicycle, etc.). Corridor 7 is two miles wide and runs 22 miles from the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.9956717,-76.3745195263001,14z



Counties: Anne Arundel and Queen Anne's counties, Maryland

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

SYSTEM UNIT (SU)

Most new Federal expenditures and financial assistance, including Federal flood insurance, are prohibited within System Units. ***Federally-funded projects within System Units require consultation with the Service.*** *Consultation is not required for projects using private, state, or local funds.*

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
MD-32	Stevensville	SU	11/16/1990	11/16/1990
MD-32	Stevensville	SU	11/25/2024	11/25/2025

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1Fx
- PFO1Cx
- PSS1S
- PSS4C
- PFO4/SS1S
- PSS1B
- PFO4/1R
- PFO4/EM1R
- PSS1/EM1F
- PSS1/FO4B
- PSS1Ah
- PSS1A
- PSS1Bh
- PFO1D
- PFO4/1B
- PSS3/4R
- PFO1E

- PSS1Ex
- PFO1/SS1S
- PFO1Ch
- PSS1R
- PSS1Cx
- PFO1A
- PSS1/EM1Cx
- PFO1/2F
- PFO1/EM1A
- PFO1F
- PSS1Ch
- PFO1Fb
- PFO4S
- PFO1/SS1A
- PSS1C
- PFO4/1S
- PFO1/4B
- PSS1/EM1C
- PFO1Ex
- PFO1Db
- PFO1/2C
- PFO4/1C
- PFO1C
- PFO1B
- PFO1/4C
- PFO1Fh
- PFO1T
- PFO4D
- PFO1/4A
- PFO1R
- PSS4A
- PFO1/2E
- PFO4B
- PFO1/4S
- PSS1/EM1D
- PFO1Ad

- PFO/SS1A
- PFO1/EM1R
- PSS1E
- PSS1/EM1A
- PSS1D
- PFO1S
- PFO4R
- PFO4C
- PFO1/SS1R
- PFO1/SS1C

FRESHWATER POND

- PUSA
- PUSCx
- PUBF
- PUBH
- PUBHx
- PABHx
- PAB1Hx
- PUBFx
- PUBHh
- PUBVh
- PUBKx

RIVERINE

- R4SBCx
- R5UBH
- R4SBC

FRESHWATER EMERGENT WETLAND

- PEM1Dx
- PEM1Ch
- PEM1Ah
- PEM1B
- PEM5A
- PEM1F
- PEM1Dh
- PEM1D
- PEM1/SS1C

- PEM1A
- PEM1Ex
- PEM1Rh
- PEM1/SS1Fx
- PEM1/SS1Ch
- PEM1/SS1Cx
- PEM1R
- PEM1/SS1D
- PEM1Fx
- PEM1/SS1R
- PEM5C
- PEM1Fb
- PEM1C
- PEM1Fh
- PEM5Eh
- PEM1E
- PEM1Cx

ESTUARINE AND MARINE WETLAND

- E2USP
- E2EM1/SS1P
- E2EM1Pd
- E2SS1P
- E2SS1/EM1P
- E2EM1/SS4P
- E2US/SS1P
- E2US2P
- E2SS3/4P
- E2SS1Pd
- E2USN
- E2SS1/EM5P
- E2USM
- E2SS4P
- E2EM2N
- E2EM1N
- E2EM5P
- E2FO4P

- E2EM1P
- E2SS1/3P

OTHER

- Pf

ESTUARINE AND MARINE DEEPWATER

- E1UBLx
- E1UBLh
- E1ABLh
- E1UBL

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Gavin Studds
Address: 25 Old Solomons Island Road
City: Annapolis
State: MD
Zip: 20401
Email gavins@cri.biz
Phone: 4104746559

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration
Name: Heather Lowe
Email: hlowe@mdta.state.md.us
Phone: 4105375665

APPENDIX C: BAT HABITAT CHARACTERIZATION DATASHEETS

Sample Site No.(s): BFS-1

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	40	50	35
Dominant Species of Mature Trees	PRAV, MOAL, Elm sp., JUNI		
% Trees w Exfoliating Bark	0	5	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	60	35	5
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ → Mod/Good

Tricolored Bats? ✓ → Mod

Additional Comments

Western extend of stand is likely out of LOD behind of fence line, aside from drip line
Heavy vine load of QUPA 2, HEHE, LOMA, + porcelainberry
Moving east, forest bumps out to a deeper stand (mostly 9-15" JUNI), decreased vines, increased forest structure

Sample Site No.(s): BFS-2

Water Resources at Sample Site						
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**	40ft
Pools/Ponds (# and size)		**Open and accessible to bats?**	✓			
Wetlands (approx. ac.)	**Permanent**	**Seasonal**				

Describe existing condition of water resources: Meredith Creek

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	90	45	15
Dominant Species of Mature Trees	LIST, ACSA2, JUVI, ROPS		
% Trees w Exfoliating Bark	2	0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	15	70	15
No. of Suitable Snags	2		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ → Mod

Tricolored Bats? ✓ Mod/Good

Additional Comments

Heavy vine load, esp @ Colbert Rd
Evidence of pruning @ powerline
Mostly smaller trees along Skidmore Dr, opens to sapling/shrub section (<3" DBH) abutting a WL/RIC
↳ Dense cluster of SANI, MOAL
Stand, moving east, returns to heavy vines + pruned JUVI, LIST
Western extent = better NLEB hab, East = better TCB hab

Sample Site No.(s): BFS-3

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	220ft	Meredith Creek
Pools/Ponds			**Open and accessible to bats?**				
(# and size)			✓				
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	30	40	15
Dominant Species of Mature Trees	LIST, JUNI, NYSY, ACSA2		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	25	65	10
No. of Suitable Snags	5		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ → Good

Tricolored Bats? ✓ → Mod

Additional Comments

Moving E, few canopy openings, tree size + vine load increases
Fairly open understory
Transitions to wetland, includes Meredith Creek, phragmites stand dominates understory
Small flowing WC abutting US50
Eastern extent → increases understory clutter + midstory clutter, + young/smaller trees
↳ Then again transitions to more open understory

Sample Site No.(s): BFS-4

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	10	30
Dominant Species of Mature Trees	DIVI, LIST, JUVI		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	90	10	0
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Dense understory of autumn olive, JUVI, HEHE

Sample Site No.(s): BFS-5

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds		**Open and accessible to bats?**					
(# and size)							
Wetlands	**Permanent**	**Seasonal**					
(approx. ac.)							

Forest Resources at Sample Site				
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**	1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%
	50	35	20	
Dominant Species of Mature Trees	LIST, PITA, ACRU, ACSA2			
% Trees w Exfoliating Bark	0	0	0	
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**	
Live Trees (%)	50	40	10	
No. of Suitable Snags	3			

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Good

Tricolored Bats? ✓ Mod

Additional Comments

Dense canopy → understory, evidence of pruning @ powerline
20ft of old growth field before forest edge
Forest opens over Carrs Rd, connected by midstory
West of Carrs Rd, understory is very open, low vines
Forest opening for powerline

Sample Site No.(s): BFS-6

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	10	85	15
Dominant Species of Mature Trees	LIST, Unknown ornamental		
% Trees w Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	50	45	5
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Small strip of yard trees - connecting BFS-5 + BFS-7

Heavy vine load + dense midstory clutter of white pine + ornamental sp

Sample Site No.(s): BFS-7

Water Resources at Sample Site							
Stream Type (# and length)	Ephemeral		Intermittent		Perennial	30ft	Describe existing condition of water resources: Meredith Creek
Pools/Ponds (# and size)			Open and accessible to bats?				
Wetlands (approx. ac.)	Permanent		Seasonal				

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	40	30	35
Dominant Species of Mature Trees	LIST, QUAL		
% Trees w Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	Small (3-8")	Med (9-15")	Large(>15")
	80	70	10
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ → Moo/Good

Tricolored Bats? ✓ → Good

Additional Comments

Linear forested feature abutting WL/WL
Heavy vine load in the mid/understory
From Skidmore Dr: 20ft of field growth (sapling JUNI + RUPS) before forest edge
↳ Cleared for powerline

Sample Site No.(s): BFS-8

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	25	30	20
Dominant Species of Mature Trees	QUAC 80, PIKA 80, PITA, LIST 2		
% Trees w Exfoliating Bark	20	0	2
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	50	40	10
No. of Suitable Snags	6		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ mod

Tricolored Bats? ✓ mod

Additional Comments

Ditch between US50 + forest, currently dry

Moving E, understory = more cluttered, low vine load, small saplings (JUVI), tall shrubs (autumnolive, hawthorn sp)

Sample Site No.(s): BFS-9

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	15	45	25
Dominant Species of Mature Trees	ACRU, QUPA2, QUPH, ILOP		
% Trees w Exfoliating Bark	0	5	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	30	40	30
No. of Suitable Snags	4		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Moderately open understory, low-mod vine load
Mixed oak + maple, typically large
Currently dry ditch surrounds forest island as it approaches road surface, phrag + other clutter in the understory - more present @ forest edge, smilax density increases @ edge
Moving E - forest breaks over access path, then returns to forest w/ heavy vines

Sample Site No.(s): BFS-10

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	50ft	Meredith Creek
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	35	60	60
Dominant Species of Mature Trees	PYCA80, LIST, ROPS		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	65	30	5
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Dense vine load + understory clutter of PYCA80
↳ HEHE + grape sp
Opens to stand of phragmites, likely depressed wetland (Heading west)
Heading east, more dense/cluttered understory 3-10" PYCA80
Heavier vine load @ forest edge within LOD. Beyond LOD, vine load decreases
↳ (PAQU)
Forest opens @ NRP Building over a maintained lawn

Sample Site No.(s): B FS-11

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site				
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**	1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%
	20	15	30	
Dominant Species of Mature Trees	PYCA80, QURU, MOAL, QUPH, QUAC80			
% Trees w Exfoliating Bark	0	0	0	
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**	
Live Trees (%)	65	30	5	
No. of Suitable Snags				

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Uphill small forested island between US50 + College Pkwy
Understory moderately cluttered w/ vines (PAQU2, TORA2) + PYCA80
Mixed oak assemblage, moderately sized

Sample Site No.(s): BFS-12

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	10	30	60
Dominant Species of Mature Trees	ACRU, LITU, QUAC80		
% Trees w Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	10	80	10
No. of Suitable Snags			

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? V

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Linear forest edge feature

Moderately dense understory w <20' JUVI + vines (grape sp, QUPA2)

↳ Moving west, vine load increases to heavy, very dense

Sample Site No.(s): BFS-13

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	40ft	Meredith Creek
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	5	35
Dominant Species of Mature Trees	PLOC, LIST2, JUVI		
% Trees w Exfoliating Bark	5	5	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	80	20	0
No. of Suitable Snags	2		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod / Good

Tricolored Bats? ✓ Good

Additional Comments

Better TCB habitat → Linear feature of small residential trees that opens over a wetland w/ standing water. Understory cluttered w/ vines

At the western most extent, understory thrayh canopy density increases

Sample Site No.(s): BFS-14

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	35	50	45
Dominant Species of Mature Trees	LIST2, QURU, PRSE2		
% Trees w Exfoliating Bark	0	2	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	40	55	5
No. of Suitable Snags	10		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Forest edge → heavy vine load (HEHE, PAQU2) in understory + midstory
Few standing snags, overtaken by vines

Sample Site No.(s): BFS -15

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	30	50
Dominant Species of Mature Trees	LITU, PYCA80, ACRS		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	40	60	0
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Forest island between US50 + Bike path, 450ft West = 30" + QUPU

Understory moderately cluttered by PYCA80 + vines

Forest edge has standing water, moving east = many plantings of shrubs + saplings

↳ Likely favors TCB ↳ canopy + midstory not present

Sample Site No.(s): BFS-17

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	45	80
Dominant Species of Mature Trees	Japanese Zelkova, PITA, Callery e, Southern Oak, Crape Myrtle		
% Trees w Exfoliating Bark	0	40	
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	10	65	20
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Good/Mod

Additional Comments

Linear feature of street trees, continuous phragmites stand, some areas of standing water.
Better TCB habitat - more openings, no canopy
Moving east, stand incorporates singular new sp. adding to the midstory - mixed make use taller deciduous like crape-myrtle + rawthorn sp., Further east, = more standing water
Vine load very low, few heavy spots moving east

Sample Site No.(s): BFS-18

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds		**Open and accessible to bats?**					
(# and size)							
Wetlands	**Permanent**	**Seasonal**					
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	5	20	30
Dominant Species of Mature Trees	QUPH, Sawtooth Oak, QURU		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	5	55	40
No. of Suitable Snags	6		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? _____

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod/Poor

Additional Comments

Mixed oak corridor, divided by roadsurface
Better TCB habitat due to linear feature, open on most sides + species comp
Vine load low, except for few trees at corner, mod

Sample Site No.(s): BFS-19

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	30ft	Cox Creek
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	10	40
Dominant Species of Mature Trees	Honey Locust, ELST2		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	65	35	0
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ~

Northern Long-eared Bats? ~ Marginal

Tricolored Bats? ~ Good

Additional Comments

Linear street tree feature parallel to US 50 + going over Cox Creek
Better for TCB due to openness + proximity to water
Western bank of Cox Creek has heavier vine load
Vines also present on east bank

Sample Site No.(s): BFS-20

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	0	3	40
Dominant Species of Mature Trees	JUVI, Caller PE OA		
% Trees w Exfoliating Bark			0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	55	40	5
No. of Suitable Snags	1		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? Mod

Tricolored Bats? Mod/Good

Additional Comments

Moderate vine load (grape & Dense understory due to JUVI branching, pear, + pin oak
Western most end abuts Cox Creek
Vines consistent throughout, includes Amur honeysuckle + VA creeper
Better for TCB due to oak assemblage + openness. Easternmost extent = heavily dense understory due to JUVI

Sample Site No.(s): BFS-21

Water Resources at Sample Site							
Stream Type (# and length)	Ephemeral		Intermittent		Perennial		Describe existing condition of water resources:
Pools/Ponds (# and size)			Open and accessible to bats?				
Wetlands (approx. ac.)	Permanent		Seasonal				

Forest Resources at Sample Site			
Closure/Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	0	10	10
Dominant Species of Mature Trees	PLOC		
% Trees w Exfoliating Bark	0	100	0
Size Composition of Live Trees (%)	Small (3-8")	Med (9-15")	Large(>15")
	0	100	0
No. of Suitable Snags	6		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments
2 PLOC within 100ft of FS-20

Sample Site No.(s): BFS-22

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	5	10	60
Dominant Species of Mature Trees	V. QUPH, ACO, Callery Pear		
% Trees w Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	70	25	5
No. of Suitable Snags	11		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod/Good

Additional Comments

Linear forest feature abutting US30, mixed assemblage, esp ashes (QUPH, QUAL)
Some portions w/ standing water
Understory dense w/ shrubs like Staghorn Sumac, sapling callery pear
Vine load heavy (VA Creeper, poison ivy, grape sp. multiflora rose)
Better for TCB due to assemblage, water, - Openness

Sample Site No.(s): PFS-23

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	30ft	Thompson Creek
Pools/Ponds		**Open and accessible to bats?**					
(# and size)							
Wetlands	**Permanent**	**Seasonal**					
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	10	20	15
Dominant Species of Mature Trees	JUNI, ACRU, JUNI, LIST, Pin oak		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	35	60	5
No. of Suitable Snags	2		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod/hard

Tricolored Bats? ✓ Mod/hard

Additional Comments

Lineal forested feature along USSD that crosses Thompson Creek
Between USSD + PFS-23 is a drainage ditch, w/ standing water
Moderate vine load
Likely better for TCB due to water, open linear feature, + mixed oaks/QUAL (pin oak, swamp white oak)

Sample Site No.(s): BFS-24

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	5	30	60
Dominant Species of Mature Trees	LIST: PITA ACRU, Mixed oak, Evergreens		
% Trees w Exfoliating Bark	0	0	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	30	60	10
No. of Suitable Snags			

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? V

Northern Long-eared Bats? V Mod

Tricolored Bats? V Mod/Hi

Additional Comments

Easternmost portion includes sloped forest

Includes phrag stand likely wetland, which has width w/in canopy opening

Moving west, stand becomes more [illegible]

Likely better TCB hab due to oak [illegible]

↳ Very open canopy - dense understory

Sample Site No.(s): BFS-25

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	5	20	25
Dominant Species of Mature Trees	PYCA80		
% Trees w Exfoliating Bark	0	0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	60	35	5
No. of Suitable Snags	0		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Small strips of woody veg abutting the Bay Bridge
↳ Includes staghorn sumac

Sample Site No.(s): BFS-26

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	15	30	15
Dominant Species of Mature Trees	White Oak Callery Pear, PITA		
% Trees w Exfoliating Bark		0	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	45	45	10
No. of Suitable Snags	HH III		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod/Good

Tricolored Bats? ✓ Mod

Additional Comments

Forest edge dominated by larger trees, mostly scattered oak - PITA - Callery pear, tall autumn olive
↳ Interior dominated by smaller trees, also including LIST + JUVI + mixed oak
Vine load low - moderate, not restrictive on the whole
Currently wet drainage ditch sits between US50 + forest interior
Moving east to the portion within the ramp, forest interior dominated by larger trees, mostly PITA, resulting in a more dense stand, phragmites stand where edge meets US50

Sample Site No.(s): BFS-22

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)							
Pools/Ponds			**Open and accessible to bats?**				
(# and size)							
Wetlands	**Permanent**		**Seasonal**				
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	10	15	30
Dominant Species of Mature Trees	Japanese zelkova, LITU, QUPH		
% Trees w Exfoliating Bark	5		
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	60	30	10
No. of Suitable Snags	III		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ✓ Mod

Additional Comments

Vine load moderate (HEHE, HOMU, greenbriar, CEOR)
Understory dense w/ fallen woody debris over/tangly vines
Standing water + wetland veg seen at forest edge along E College Pkwy

Sample Site No.(s): BFS-28

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	40	50	15
Dominant Species of Mature Trees	PITA, Sawtooth Oak, P.m oak, QUPH		
% Trees w Exfoliating Bark	5	5	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	20	30	50
No. of Suitable Snags	1		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? J

Northern Long-eared Bats? J (Good)

Tricolored Bats? J Good

Additional Comments

Forest includes extensive wetland w/ standing water wetland trees, mostly a variety of large oaks + PITA

Understory fairly open, sapling Callery pear or honeysuckle

Sample Site No.(s): BFS-29

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	20	5	50
Dominant Species of Mature Trees	A S 25		
% Trees w Exfoliating Bark	10	10	0
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	15	60	25
No. of Suitable Snags	IIII		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? ✓ Mod

Tricolored Bats? ~ Mod

Additional Comments

Vine load mod - heavy, mostly TOFA

Southern extent is almost exclusively Southern oak
↳ North extent - more PITA

Depression @ the eastern extent of Ring Levee

Sample Site No.(s): BFS-30

Water Resources at Sample Site							
Stream Type	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
(# and length)					1	170ft	
Pools/Ponds		**Open and accessible to bats?**					
(# and size)		✓					
Wetlands	**Permanent**	**Seasonal**					
(approx. ac.)							

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	20	40	30
Dominant Species of Mature Trees	ACRU, LITU		
% Trees w Exfoliating Bark	15	5	0
Size Composition of	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
Live Trees (%)	25	60	15
No. of Suitable Snags	IIII		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? ✓

Northern Long-eared Bats? – Mod

Tricolored Bats? – Mod/Good

Additional Comments

Forested wetland, little standing water @ time of survey at the western opening
From the ramp, there is a steep slope down into the forest
Looking NE vine load is low (TOAA, HEHE, ROMU)
Abuts Mezick Pond wetland, edge likely better habitat for TCB

Sample Site No.(s): BFS-31

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	15	30	10
Dominant Species of Mature Trees	LIST: Honeylocust, Callery Pear, PIVI, PRSE2		
% Trees w Exfoliating Bark	5	10	5
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	20	60	20
No. of Suitable Snags	IIII		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? V

Northern Long-eared Bats? V Moderate Good

Tricolored Bats? V

Additional Comments

Riparian edge habitat @ Mezick Ponds, dense phragmites bayond fence line (~3ft before opens to pond)
Understory most maintained, ~~so~~ open Moving east, large open field
Heavy vine cover on fence, ~~6ft~~ of dense vine
Some large, mixed oaks at pond perimeter
Fair better TCB habitat due to wide riparian, [illegible] wetlands

Sample Site No.(s): BFS-32

Water Resources at Sample Site							
Stream Type (# and length)	**Ephemeral**		**Intermittent**		**Perennial**		**Describe existing condition of water resources:**
Pools/Ponds (# and size)			**Open and accessible to bats?**				
Wetlands (approx. ac.)	**Permanent**		**Seasonal**				

Forest Resources at Sample Site			
Closure/Density	**Canopy (>50')**	**Midstory (20-50')**	**Understory (<20')**
	10	35	40
Dominant Species of Mature Trees	QUPH, PITA		
% Trees w Exfoliating Bark	0	5	5
Size Composition of Live Trees (%)	**Small (3-8")**	**Med (9-15")**	**Large(>15")**
	20	70	10
No. of Suitable Snags	11		

1 = 1-10%; 2 = 11-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Is the habitat suitable f Indiana Bats? V

Northern Long-eared Bats? V Mod

Tricolored Bats? ~ Mod

Additional Comments

Vine load heavy throughout midstory

APPENDIX D: SITE PHOTOGRAPHS

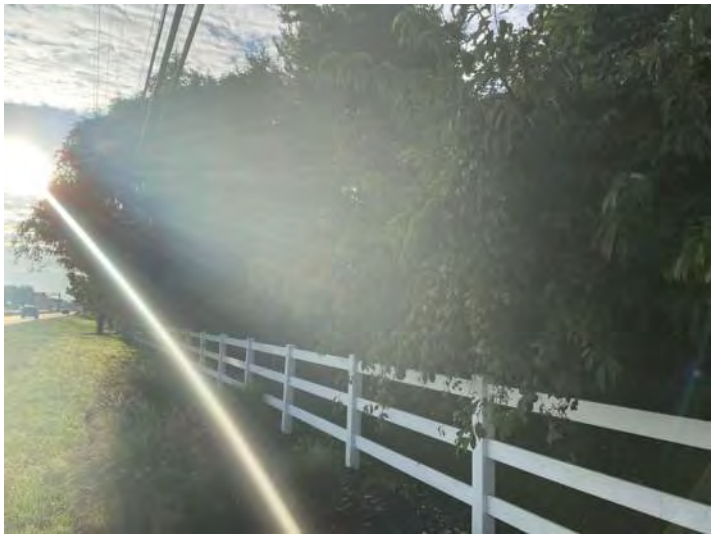


Photo 1. Representative photo of suitable bat habitat in a sweet cherry and white mulberry fencerow forest (BFS-1)



Photo 2. Representative photo, farther east, of suitable bat habitat in a sweet cherry, black walnut, and white mulberry fencerow forest (BFS-1).



Photo 3. Representative photo of suitable bat habitat in a row of sweetgum, silver maple, eastern redcedar, black locust (BFS-2).



Photo 4. Representative photo of suitable bat habitat in a row of sweetgum, silver maple, eastern redcedar, black locust (BFS-2).



Photo 5. Representative photo of suitable bat habitat in a sweetgum, black walnut, black gum, silver maple forest (BFS-3).



Photo 6. Representative photo of suitable bat habitat in a sweetgum, black walnut, black gum, silver maple forest (BFS-3).



Photo 7. Representative photo of suitable bat habitat in a sweetgum, black walnut, black gum, silver maple forest (BFS-3).



Photo 8. Representative photo of suitable bat habitat in a common persimmon, sweetgum, and eastern redcedar cluster (BFS-4).



Photo 9. Representative photo of suitable bat habitat in a common persimmon, sweetgum, and eastern redcedar cluster (BFS-4).

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Photo 11. Representative photo of suitable bat habitat in a sweetgum, loblolly pine, red maple, and silver maple forest (BFS-5).



Photo 10. Representative photo of suitable bat habitat in a sweetgum, loblolly pine, red maple, and silver maple forest (BFS-5).



Photo 12. Representative photo of suitable bat habitat in a sweetgum, loblolly pine, red maple, and silver maple forest (BFS-5).



Photo 13. Representative photo of suitable bat habitat in a cluster of sweetgum and unknown ornamental trees (BFS-6).



Photo 14. Representative photo of suitable bat habitat in a sweetgum and white oak forest (BFS-7).



Photo 15. Representative photo of suitable bat habitat in a sweetgum and white oak forest (BFS-7).



Photo 16. Representative photo of suitable bat habitat in a sawtooth oak, Callery pear, loblolly pine, and sweetgum forest (BFS-8).



Photo 17. Representative photo of suitable bat habitat in a red maple, pin oak, willow oak, and American holly (BFS-9).



Photo 18. Representative photo of suitable bat habitat in a red maple, pin oak, willow oak, and American holly (BFS-9).



Photo 19. Representative photo of suitable bat habitat in a Callery pear, sweetgum, and black locust forest (BFS-10).



Photo 20. Representative photo of suitable bat habitat in a Callery pear, sweetgum, and black locust forest (BFS-10).



Photo 21. Representative photo of suitable bat habitat in a Callery pear, sweetgum, and black locust forest (BFS-10).



Photo 22. Representative photo of suitable bat habitat in a Callery pear, white mulberry, and mixed oak forest (BFS-11).



Photo 23. Representative photo of suitable bat habitat in a Callery pear, white mulberry, and mixed oak forest (BFS-11).



Photo 24. Representative photo of suitable bat habitat in a red maple, sweetgum, sawtooth oak, and tuliptree forest (BFS-12).



Photo 25. Representative photo of suitable bat habitat in an American sycamore, sweetgum, and eastern redcedar forest (BFS-13).



Photo 26. Representative photo of suitable bat habitat in an American sycamore, sweetgum, and eastern redcedar forest (BFS-13).



Photo 27. Representative photo of suitable bat habitat in a sweetgum, northern red oak, and black cherry forest (BFS-14).



Photo 28. Representative photo of suitable bat habitat in a sweetgum, northern red oak, and black cherry forest (BFS-14).



Photo 29. Representative photo of suitable bat habitat in a tuliptree, Callery pear, and black locust forest (BFS-15).



Photo 30. Representative photo of suitable bat habitat in a mixed deciduous forest (BFS-16).



Photo 31. Representative photo of suitable bat habitat in a planted mixed deciduous forest (BFS-17).



Photo 32. Representative photo of suitable bat habitat in a mixed oak cluster (BFS-18).



Photo 33. Representative photo of suitable bat habitat in a honey locust and sweetgum forest (BFS-19).



Photo 34. Representative photo of suitable bat habitat in a eastern redcedar, Callery pear, and pin oak forest (BFS-20).



Photo 35. Representative photo of suitable bat habitat in a small cluster of American sycamore (BFS-21).



Photo 36. Representative photo of suitable bat habitat in a eastern redcedar, willow oak, Callery pear, and bitternut hickory forest (BFS-22).



Photo 37. Representative photo of suitable bat habitat in a mixed deciduous forest (BFS-23).



Photo 38. Representative photo of suitable bat habitat in a sweetgum, loblolly pine, red maple, and mixed oak forest (BFS-24).



Photo 39. Representative photo of suitable bat habitat in a Callery pear, loblolly pine, and sawtooth oak forest (BFS-26).



Photo 40. Representative photo of suitable bat habitat in a Callery pear, loblolly pine, and sawtooth oak forest (BFS-26).



Photo 41. Representative photo of suitable bat habitat in a sweetgum, willow oak, and Japanese zelkova forest (BFS-27).



Photo 42. Representative photo of suitable bat habitat in a sweetgum, willow oak, and Japanese zelkova forest (BFS-27).



Photo 43. Representative photo of suitable bat habitat in a mixed oak and loblolly pine forest (BFS-28).



Photo 44. Representative photo of suitable bat habitat in a mixed oak and loblolly pine forest (BFS-28).



Photo 45. Representative photo of suitable bat habitat in a loblolly pine, sweetgum, and sawtooth oak forest (BFS-29).



Photo 46. Representative photo of suitable bat habitat in a red maple and sweetgum forest (BFS-30).



Photo 47. Representative photo of suitable bat habitat in a mixed deciduous forest (BFS-31).



Photo 48. Representative photo of suitable bat habitat in a willow oak and loblolly pine cluster (BFS-32).

APPENDIX E: BAT HABITAT SUITABILITY DATA

Bat Habitat Data

			Quality				Canopy Density (%)			Size Composition (%)			Acres
Stand Code	**NLEB**	**TCB**	**NLEB**	**TCB**	**Forest Type**	**Dominatnt Tree Species**	**Understory**	**Midstory**	**Canopy**	**Small**	**Medium**	**Large**	
BFS-1	Yes	Yes	Mod/Good	Moderate	Deciduous	Sweet Cherry, White Mulberry, Black Walnut, Elm sp.	35	50	40	60	35	5	2.55
BFS-2	Yes	Yes	Moderate	Mod/Good	Mixed	Sweetgum, Silver Maple, Eastern Redcedar, Black Locust	15	45	50	15	70	15	0.86
BFS-3	Yes	Yes	Good	Moderate	Deciduous	Sweetgum, Black Walnut, Black Gum, Silver Maple	15	40	30	25	65	10	4.29
BFS-4	Yes	Yes	Moderate	Moderate	Mixed	Common Persimmon, Sweetgum, Eastern Redcedar	30	10	0	90	10	0	0.28
BFS-5	Yes	Yes	Good	Moderate	Mixed	Sweetgum, Loblolly Pine, Red Maple, Silver Maple	20	55	50	50	40	10	1.36
BFS-6	Yes	Yes	Moderate	Moderate	Deciduous	Sweetgum, Unknown Ornamental	15	85	10	50	45	5	0.06
BFS-7	Yes	Yes	Mod/Good	Good	Deciduous	Sweetgum, White Oak	35	50	40	20	70	10	0.34
BFS-8	Yes	Yes	Moderate	Moderate	Mixed	Sawtooth Oak, Callery Pear, Loblolly Pine, Sweetgum	20	30	25	50	40	10	1.92
BFS-9	Yes	Yes	Moderate	Moderate	Deciduous	Red Maple, Pin Oak, Willow Oak, American Holly	25	45	15	30	40	30	4.96
BFS-10	Yes	Yes	Moderate	Moderate	Deciduous	Callery Pear, Sweetgum, Black Locust	60	60	35	65	30	5	2.24
BFS-11	Yes	Yes	Moderate	Moderate	Deciduous	Callery Pear, Northern Red Oak, White Mulberry, Willow Oak, Sawtooth Oak	30	15	20	65	30	5	0.48
BFS-12	Yes	Yes	Moderate	Moderate	Deciduous	Red Maple, Tuliptree, Sawtooth Oak	60	30	10	10	80	10	0.95
BFS-13	Yes	Yes	Mod/Good	Good	Mixed	American Sycamore, Sweetgum, Eastern Redcedar	35	5	0	80	20	0	0.47
BFS-14	Yes	Yes	Moderate	Moderate	Deciduous	Sweetgtum, Northern Red Oak, Black Cherry	45	50	35	40	55	5	1.54
BFS-15	Yes	Yes	Moderate	Moderate	Deciduous	Tuliptree, Callery Pear, Black Locust	50	30	0	40	60	0	0.36
BFS-16	Yes	Yes	Moderate	Moderate	Deciduous	Red Maple, Tuliptree, Sweetgum, Black Cherry, American Holly	65	30	20	30	60	10	1.12
BFS-17	Yes	Yes	Moderate	Mod/Good	Mixed	Japanese Zelkova, Loblolly Pine, Callery Pear, Black Willow, Sawtooth Oak, Crape-Myrtle	20	45	0	10	65	20	4.74
BFS-18	Yes	Yes	Moderate	Mod/Good	Deciduous	Willow Oak, Sawtooth Oak, Northern Red Oak	30	20	5	5	55	40	6.59
BFS-19	Yes	Yes	Mod/Good	Good	Deciduous	Honey Locust, Sweetgum	40	10	0	65	35	0	3.2
BFS-20	Yes	Yes	Good	Mod/Good	Deciduous	Eastern Redcedar. Callery Pear, Pin Oak	40	30	0	55	40	5	2.49
BFS-21	Yes	Yes	Moderate	Moderate	Deciduous	American Sycamore	10	10	0	0	100	0	0.09
BFS-22	Yes	Yes	Moderate	Moderate	Mixed	Eastern Redcedar, Willow Oak, Bitternut Hickory, Callery Pear	60	10	5	70	25	5	0.66
BFS-23	Yes	Yes	Mod/Good	Mod/Good	Mixed	Black Walnut, Red Maple, Eastern Redcedar, Sweetgum, Pin Oak	15	20	10	35	60	5	2.54
BFS-24	Yes	Yes	Moderate	Mod/Good	Mixed	Sweetgum, Loblolly Pine, Red Maple, Crape-Myrtle, Mixed Oaks	60	30	5	30	60	10	3.11
BFS-25	Yes	Yes	Moderate	Moderate	Deciduous	Callery Pear	25	20	5	60	35	5	3.86
BFS-26	Yes	Yes	Mod/Good	Moderate	Mixed	Sawtooth Oak, Callery Pear, Loblolly Pine	15	40	15	45	45	10	5.49
BFS-27	Yes	Yes	Moderate	Moderate	Deciduous	Japanese Zelkova, Sweetgum, Willow Oak	30	15	10	60	30	10	2.7
BFS-28	Yes	Yes	Good	Good	Mixed	Loblolly Pine, Sawtooth Oak, Pin Oak, Willow Oak	15	50	40	20	30	50	4.58
BFS-29	Yes	Yes	Moderate	Moderate	Mixed	Loblolly Pine, Sweetgum, Sawtooth Oak	50	55	20	15	60	25	2.2
BFS-30	Yes	Yes	Moderate	Mod/Good	Deciduous	Red Maple, Sweetgum	20	40	30	25	60	15	4.19
BFS-31	Yes	Yes	Mod/Good	Good	Mixed	Sweetgum, Honey Locust, Callery Pear, Virginia Pine, Black Cherry	10	30	15	20	60	20	2.46
BFS-32	Yes	Yes	Moderate	Moderate	Mixed	Willow Oak, Loblolly Pine	40	35	10	20	70	10	0.87

APPENDIX D

BAT BRIDGE AND CULVERT ASSESSMENT

MEMORANDUM

DATE: OCTOBER 16, 2025

TO: RAY LI, USFWS

FROM: GAVIN STUDDS, COASTAL RESOURCES, INC.

SUBJECT: CHESAPEAKE BAY CROSSING STUDY TIER 2 NEPA PROJECT BRIDGE AND CULVERT BAT SURVEY

1.0 Introduction

Coastal Resources, Inc. (CRI), sub-consultant to Rummel, Klepper, & Kahl, LLP (RKK), under contract with Maryland Transportation Authority (MDTA), conducted a bridge and culvert bat survey for the Chesapeake Bay Crossing Study Tier 2 NEPA Project, in Anne Arundel and Queen Anne's Counties, Maryland (**Figure 1 – Vicinity Map)**. The study area is comprised of approximately eight miles of MDTA right of way spanning across the Chesapeake Bay from west of Oceanic Drive in Annapolis to east of Cox Creek in Chester. As part of coordination with U.S. Fish and Wildlife Service (USFWS), CRI conducted bridge and culvert surveys for evidence of roosting bats during the fall of 2025. Three bridges, thirteen (13) culverts, and three buildings were surveyed on September 19, October 7, and October 16, 2025, for evidence of roosting bats. Due to safety concerns, culverts less than three feet in diameter or that were otherwise inaccessible were not entered. Due to access constraints for private property, the three buildings were assessed using publicly available photographs. Coordinated with USFWS, the overpass of Oceanic Drive was also surveyed using publicly available imagery. Finally, due to its large size and primarily steel design, the Bay Bridge was assessed for viable roosting habitat using MDTA inspection reports. No bats were observed in any of the surveyed bridges, culverts, or buildings during the bridge and culvert survey.

Figure 1: Vicinity Map


ANNE ARUNDEL COUNTY
Revell Hwy E
Sandy Point State Park
Love Point
Chester River
Chesapeake Bay
Bridge View
Stevensville
QUEEN ANNE'S COUNTY
50
William Preston Lane Jr Memorial Brg
Main St
Chesapeake Bay
Kangaroo Beach
MDTA RPA Limit of Disturbance
County Boundary
0 0.5 1 2 mi
1 inch = 1 mile
N
MDTA
Maryland Transportation Authority
Chesapeake BAY CROSSING STUDY
TIER 2 NEPA
Vicinity Map

2.0 Methodology

Nineteen (19) structures were surveyed in the fall of 2025 for presence of day- roosting bats or evidence (e.g., guano or urine staining) of night roosting bats. Characteristics such as approximate length, height, and material were recorded for each of the structures assessed in the field on a datasheet provided by USFWS and are included in **Appendix B**.

Field maps on an aerial base image were prepared that highlighted each of the 19 selected bridges, culverts, and buildings to be surveyed (**Appendix A**). Equipment used in the visual assessments and for safety included an infrared camera, a borescope, high powered spotlights, binoculars, hardhats, high visibility vests, and iPads connected to a Global Positioning System (GPS) to record survey data and take photographs. Surveyors also carried guano collection kits and decontamination equipment, if bats were observed or evidence of roosting was detected.

Systematic visual surveys of bridges, culverts, and structures were conducted during daylight hours on September 19, October 7, and October 16, 2025. Each bridge, culvert and structure survey was carried out by two surveyors, at least one of which was certified to conduct bridge and culvert assessments for bats in Maryland. Surfaces beneath the bridges were assessed across their entire span from the junction of each abutment with the bridge deck. Inspections included visual surveys of all abutments, decks, piers, and other structures associated with each bridge. Suitable roosting habitat for bats on bridge structures includes cracks or crevices formed from spalling concrete, junctions of the bridge abutment with the bridge deck, expansion joints, and other cave-like areas associated with bridges. Surveys for the presence of day roosting bats typically began at each abutment with surveyors shining bright spotlights into dark spaces across the entire width of each bridge. The assessment focused its greatest attention on spaces generally less than two inches in width. Following the investigation using a spotlight, a borescope, attached to a 20- foot pole, was then used to more closely assess these areas, especially spaces smaller than two inches in width and four or more inches in depth. After using the borescope, an infrared camera was used to assess each of these areas of interest for heat signatures associated with roosting bats. In addition to looking for the visual presence of day roosting bats, evidence of bats was also assessed by listening for high pitched squeaking sounds of day roosting bats and searching for guano or urine staining or odor that may indicate use by day or night roosting bats. This same protocol was followed to sample all culverts as well, with the exception that culverts smaller than three feet in diameter or that had covered entrances, such as grates or debris, were not to be entered and had to be assessed from the outside. Based on coordination with USFWS, it was decided that the Bay Bridge will be visually assessed by inspection reports for evidence of bat use. Assessments were conducted using inspection reports due to constraints operating drones in the area. Three buildings and the Oceanic Drive overpass were assessed for evidence of bats using publicly available imagery.

As noted above, USFWS Bridge/Culvert Assessment Forms (USFWS, 2024, Appendix K) were completed for each bridge, culvert, and structure surveyed in the field. Data collected included associated date and time of assessment, location, facility carried, structure height and length, structure type and material, crossings traversed, surrounding habitat, names of inspectors, and any documented evidence of the presence of bats. The forms also provide a checklist of types of potential bat roosting habitat present for each structure, including:

- All vertical crevices sealed at the top that are 0.5-1.25” wide and ≥4” deep
- Concrete surfaces
- Spaces between concrete end walls and the bridge deck
- Crack between concrete railings on top of the bridge deck
- Vertical surfaces on concrete I-beams
- Spaces between walls, ceiling joists
- Weep holes, scupper drains, and inlets/pipes
- All guiderails
- All expansion joints

Completed data forms are included in **Appendix B**. Photographs were also taken of each assessed bridge and culvert; representative of the potential habitat checklist provided in the datasheets. These are included in a photographic log in **Appendix C**. Other representative photographs were taken using the borescope camera and infrared camera as appropriate.

3.0 Results

During the visual assessments of the bridges, culverts, and buildings, none were found to have evidence of bat use, including visual confirmation of bats, guano, or staining. Of the 13 culverts to be surveyed, 11 of them were not entered, due to steel grates or being mostly filled with water or sediment, so were surveyed from the outside. Of these, Culvert 50 was not surveyed as it was fully submerged.

The Bay Bridge was surveyed using MDTA inspection reports, which included detailed photographs of cracks and crevices. Viewing these reports yielded no evidence of bats, including visible staining or guano. Of the three buildings surveyed using publicly available imagery, none showed obvious evidence of bats from the exterior.

4.0 Discussion and Conclusions

During the visual assessments of bridges, culverts, and buildings from September 19, October 7, and October 16, 2025, no evidence of bat roosting was found and there were no observations of roosting bats.

Of the three bridges surveyed, Cox Creek bridge, the Oceanic Drive overpass, and the Bay Bridge, neither were found to contain evidence of roosting bats. The Bay Bridge, being mostly composed of steel, lacked plentiful quality roosting habitat. Of the available concrete surface, most cracks and crevices were less than four inches deep, and those that exceed four inches in depth were not sufficiently sealed to provide a cave-like environment. The concrete railings present along the Bridge are also reinforced with steel, reducing the viability of these features as bat summer roosting habitat. Similarly, the Oceanic Drive overpass is also primarily steel design with some concrete elements. However, assessment of these elements shows that they are mostly pristine,

with no evidence of guano or staining. The Cox Creek bridge, despite a greater percentage of concrete surface, contained metal I-beams and also lacked deep, sealed concrete crevices. The lack of these concrete crevices reduces protection from the elements and predators and does not allow for a stable thermal regime. These bridges may also be lower quality bat habitat due to the high volume of vehicular traffic and distance from forested resources. The Cox Creek bridge and portions of the Bay Bridge are within 1000 feet of suitable forested bat habitat, indicating that the lack of bats detected in the bridges may be due to higher quality habitat nearby.

Within the LOD, 13 culverts with a minimum width of three feet were targeted for survey. Culverts greater than three feet are the minimum size for tricolored bat occupancy, four feet for Indiana bat, and four and a half feet for northern long-eared bat (USFWS, 2024, Appendix K). Despite meeting the minimum size preference for bat use and primarily composed of concrete, more than half of the culverts were blocked to bats via grating or debris, heavily reducing available roosting habitat from these structures. Furthermore, five of the targeted culverts were also drains within or adjacent to the shoulder of the highway, meaning that bats seeking to roost within them would be exposed to greatly increased noise, light, and collision risk associated with highway traffic.

Each of the buildings surveyed using publicly available images are commercial buildings, which draw pedestrian and vehicular traffic. This increased noise may be a deterrent for bats looking to roost within human structures. These buildings are also well lit, providing a risk of potential roost entombment to bats within, which acts as another potential deterrent. All buildings proposed for take are also in close proximity to the highway and forested habitat patches. Again, proximity to the highway would increase the exposure of bats to high levels of noise, light from vehicles, as well as risk of collision. This, in conjunction with proximity to forested resources, may mean that bats in the area have better habitat alternatives than the four structures proposed for take.

As no bats were observed, nor was any evidence of bats detected at any of the bridges, culverts, and structures surveyed, another summer visual assessment will not need to be completed for two years.

5.0 Literature Cited

United States Fish and Wildlife Service (USFWS) 2022. Species Status Report (SSA) Report for the Northern Long-eared Bat (Myotis septentrionalis). https://www.fws.gov/sites/default/files/documents/Species%20Status%20Assessment%20Report%20for%20the%20Northern%20long-eared%20bat-%20Version%201.1%20%282%29.pdf

United States Fish and Wildlife Service (USFWS) 2021. Species Status Report (SSA) Report for the Tricolored Bat (Perimyotis subflavus). https://ecos.fws.gov/ServCat/DownloadFile/221212

United States Fish and Wildlife Service (USFWS) 2024. Range-wide Indiana Bat & Northern Long-eared Bat Survey Guideline. https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines

APPENDIX A: SURVEY MAP



MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

October 2025

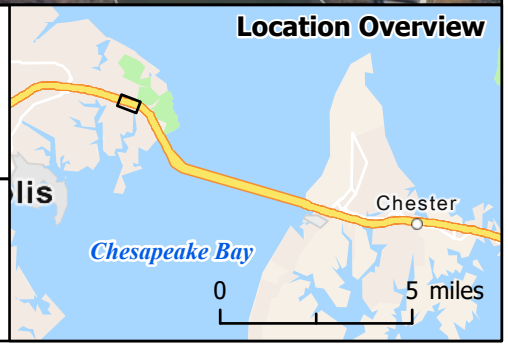
Sheet 1 of 6

- Impacted Building
- MDTA RPA Limit of Disturbance
- Impacted 36-Inch Culvurt
- Mapped Stream
- County Boundary
- Map Sheet

N E S W

0 0.03 0.05
mile

Location Overview





MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

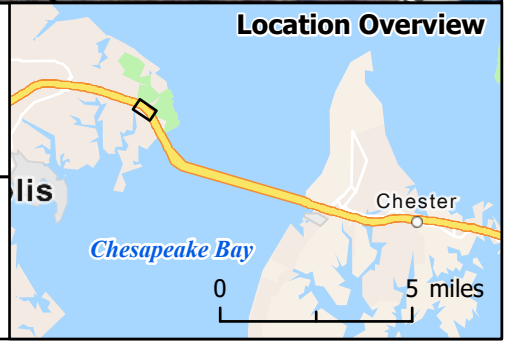
October 2025

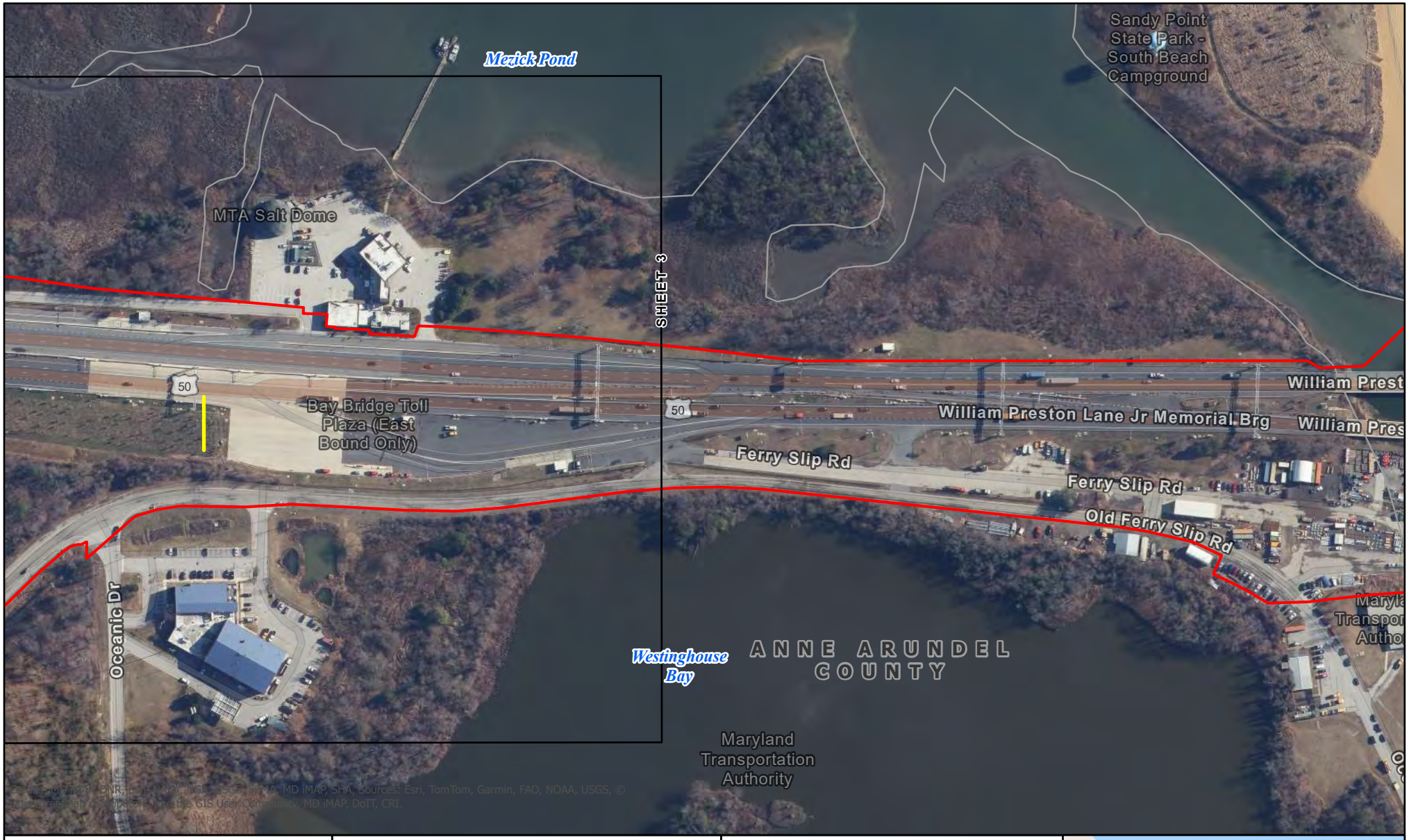
Sheet 2 of 6

- MDTA RPA Limit of Disturbance
- Impacted 36-Inch Culvurt
- Mapped Stream
- County Boundary
- Map Sheet

0 0.03 0.05
mile

Location Overview





MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

October 2025

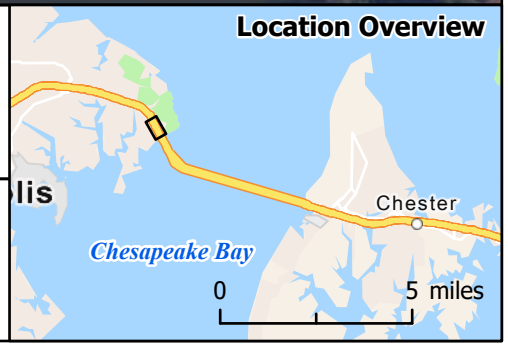
Sheet 3 of 6

MDTA RPA Limit of Disturbance
Impacted 36-Inch Culvurt
County Boundary
Map Sheet

N E S W

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mile

Location Overview





MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

October 2025

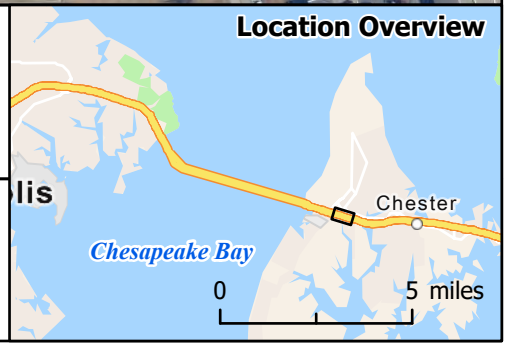
Sheet 4 of 6

- MDTA RPA Limit of Disturbance
- Impacted 36-Inch Culvurt
- County Boundary
- Map Sheet

N E S W

0 0.03 0.05
mile

Location Overview





MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

October 2025

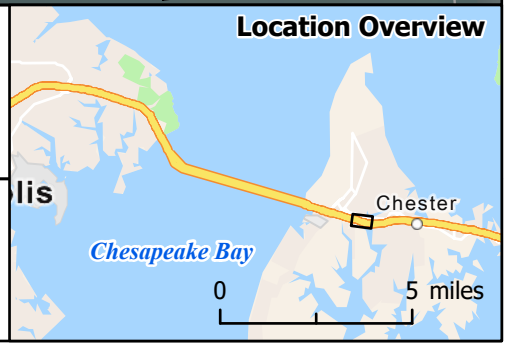
Sheet 5 of 6

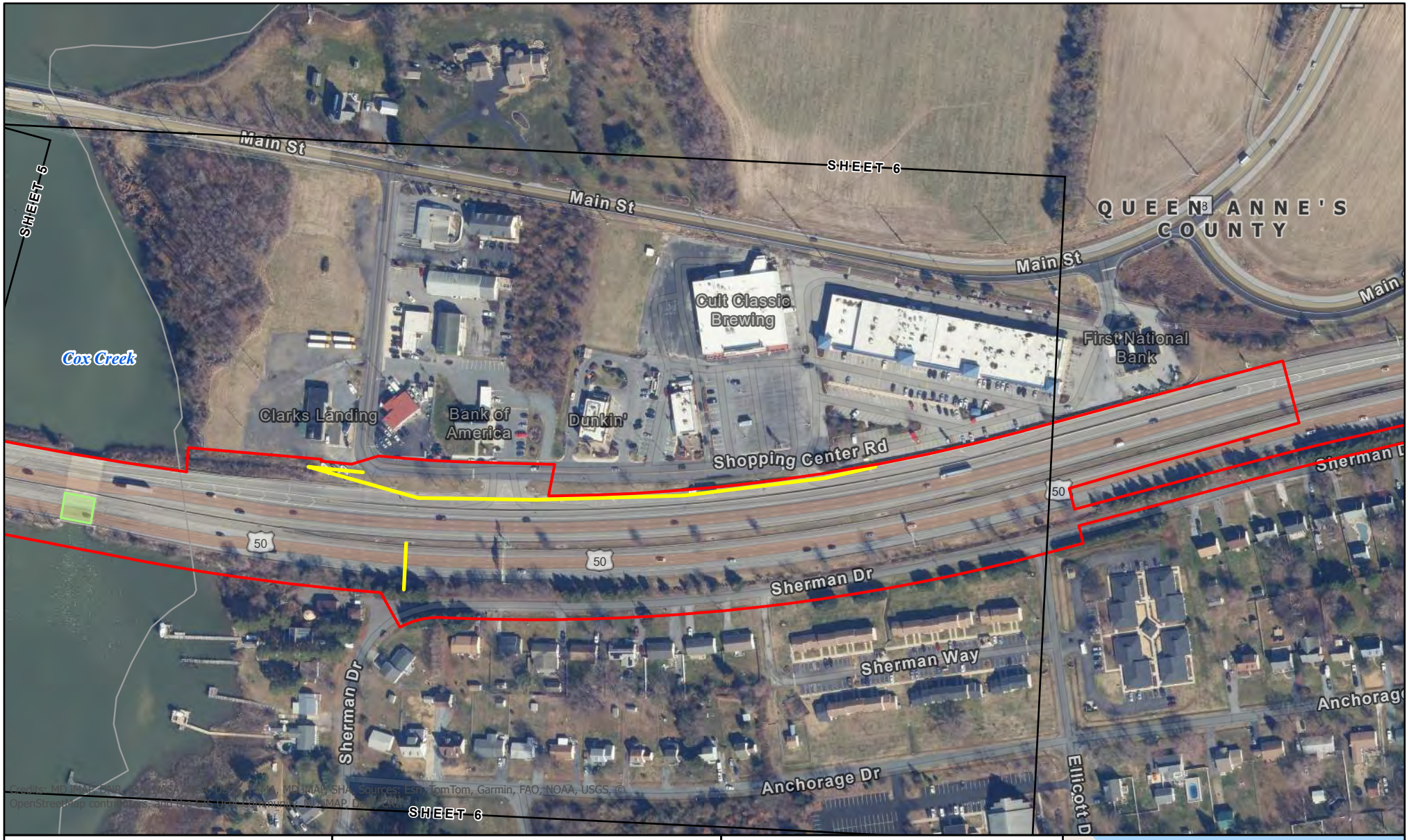
- Impacted Bridge
- MDTA RPA Limit of Disturbance
- Impacted 36-Inch Culvurt
- County Boundary
- Map Sheet

N W E S

0 0.03 0.05
mile

Location Overview





Basemap: MD iMAP, DNR, ESRI, NASA, NGA, USGS, FEMA, MD iMAP, SHA; Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, MD iMAP, DNR, SHA

MDTA
Maryland Transportation Authority

Chesapeake BAY CROSSING STUDY
TIER 2 NEPA

Chesapeake Bay Crossing Study

Bridge and Culvert Survey Maps

Anne Arundel and Queen Anne's Counties, MD

October 2025

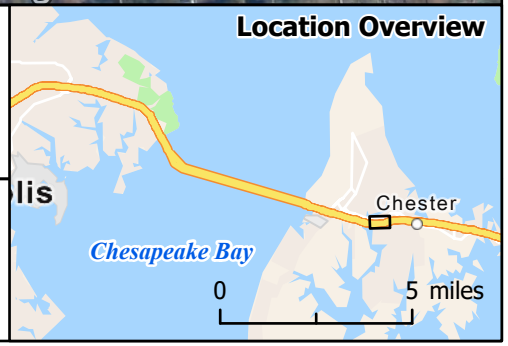
Sheet 6 of 6

- Impacted Bridge
- MDTA RPA Limit of Disturbance
- Impacted 36-Inch Culvurt
- County Boundary
- Map Sheet

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mile

Location Overview



APPENDIX B: COMPLETED DATASHEETS

Sherman Dr.

Bridge/Culvert Bat Assessment Form

Culv D

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
9/19/25 9:24	2024-0014247	US50	Queen Anne's
Federal Structure ID	**Structure Coordinates (latitude and longitude)**	**Structure Height (approximate)**	**Structure Length**
N/A	38.9743863 -76.3008927	36"	77"

Structure Type (check one)

Bridge Construction Style

- [ ] Cast-in-place
- [ ] Pre-stressed Girder
- [ ] Flat Slab/Box
- [ ] Steel I-beam
- [ ] Truss (Side View)
- [ ] Covered
- [ ] Parallel Box Beam
- [ ] Other

Culvert Type

- [ ] Box
- [x] Pipe/round
- [ ] Other

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other
Other	Other	

Creosote Evidence: Yes / No / Unknown

Culvert Material: Metal; Concrete; Plastic; Stone/masonry; Other

Notes:

Crossings Traversed (check all that apply)

- [x] Bare ground
- [ ] Rip-rap
- [ ] Flowing water
- [ ] Standing water
- [ ] Seasonal water
- [ ] Open vegetation
- [ ] Closed vegetation
- [ ] Railroad
- [ ] Road/trail - Type:
- [ ] Other:

Surrounding Habitat (check all that apply)

- [ ] Agricultural
- [ ] Commercial
- [x] Residential-urban
- [ ] Residential-rural
- [x] Woodland/forested
- [ ] Grassland
- [ ] Ranching
- [ ] Riparian/wetland
- [ ] Mixed use
- [ ] Other

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
[x] All crevices and cracks **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	[ ] Not present Pipe filled w/ sediment not covered. Assessed w/ IR and spotlight	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[x] Concrete surfaces (open roosting on concrete)	[ ] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] Spaces between concrete end walls and the bridge deck	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] Crack between concrete railings on top of the bridge deck (Gap / Railing)	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] Vertical surfaces on concrete I-beams	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] Spaces between walls, ceiling joists	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[x] Weep holes, scupper drains, and inlets/pipes	[ ] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] All guiderails	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species
[ ] All expansion joints	[x] Not present	Visual - live # dead #; Guano; Staining; [ ] Audible [ ] Odor [ ] Photos [ ] Species

Name: Gavin Stubbs **Signature:** Gavin Stubbs

Bridge/Culvert Bat Assessment Form

Culv 1

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
9/19/25 10 AM	2024-0014247	US50	Gilpin Ames
Federal Structure ID	**Structure Coordinates (latitude and longitude)**	**Structure Height (approximate)**	**Structure Length**
N/A	38.9748389 -76.2993161	48	235

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss (Side View)		Covered
	Parallel Box Beam		Other:

Culvert Type	*Other Structure*
	box
✓	pipe/culvert
	Other:

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Creosote Evidence: Yes / No / Unknown

Culvert Material: Metal; ✓ Concrete; Plastic; Stone/masonry; Other:

NOTES: Pipe 5ft below grade Concrete

Crossings Traversed (check all that apply)

Bare ground	Open vegetation	
Rip-rap	Closed vegetation	
Flowing water	Railroad	
Standing water	Road/trail - Type:	
Seasonal water	Other:	

Surrounding Habitat (check all that apply)

Agricultural	Grassland	
Commercial	Ranching	
Residential-urban	Riparian/wetland	
Residential-rural	Mixed use	
Woodland/forested	Other:	

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☐ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present: Cracks throughout abutments	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Concrete surfaces (open roosting on concrete)	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☐ Not present:	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Stubbs **Signature:**

Bridge/Culvert Bat Assessment Form

Culv 2

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
9/18/25 9:55	2024-0014247	US50	Queen Anne's
Federal Structure ID	**Structure Coordinates (latitude and longitude)**	**Structure Height (approximate)**	**Structure Length**
N/A		48	294

Structure Type (check one)

Bridge Construction Style

☐	Cast-in-place	☐	Pre-stressed Girder
☐	Flat Slab/Box	☐	Steel I-beam
☐	Truss (Side View)	☐	Covered
☐	Parallel Box Beam	☐	Other:

Culvert Type

☐	Box
☐	Pipe/round
☐	Other:

Other Structure

☐	

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
☐ Metal	☐ None	☐ Concrete
☐ Concrete	☐ Concrete	☐ Timber
☐ Timber	☐ Steel	☐ Stone/Masonry
☐ Open grid	☐ Timber	☐ Other:
☐ Other:	☐ Other:	

Culvert Material

☐	Metal
☐	Concrete
☐	Plastic
☐	Stone/Masonry
☐	Other:

Creosote Evidence

☐	Yes
☐	No
☐	Unknown

Notes: Pipe SF? below grade Inaccessible

Crossings Traversed (check all that apply)

☐	Bare ground	☐	Open vegetation
☐	Rip-rap	☐	Closed vegetation
☐	Flowing water	☐	Railroad
☐	Standing water	☐	Road/trail - Type:
☐	Seasonal water	☐	Other:

Surrounding Habitat (check all that apply)

☐	Agricultural	☐	Grassland
☐	Commercial	☐	Ranching
☐	Residential-urban	☐	Riparian/wetland
☐	Residential-rural	☐	Mixed use
☐	Woodland/forested	☐	Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present: Assessed w/ borescope + IR	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Studeny **Signature:** Gavin Studeny

Bridge/Culvert Bat Assessment Form

Culv 3

Date & Time of Assessment: 6/19/25 10:10	DOT Project Number or IPaC Code: 2024-0014247	Route/Facility Carried: US50	County: Queen Anne's
Federal Structure ID: N/A	Structure Coordinates (latitude and longitude): 38.9748317, -76.3001376	Structure Height (approximate): 42	Structure Length: 215

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss (Side View)		Covered
	Parallel Box Beam		Other:

Culvert Type

	Box		
✓	Pipe/Round		
	Other:		

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other
Other:	Other:	

Creosote Evidence: Yes / No / Unknown

Culvert Material

	Metal
✓	Concrete
	Plastic
	Stone/Masonry
	Other

NOTES: Pipe 5ft below grade Inaccessible

Crossings Traversed (check all that apply)

	Bare ground		Open vegetation
	Rip-rap		Closed vegetation
	Flowing water		Railroad
	Standing water		Road/trail - Type:
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban		Riparian/wetland
	Residential-rural		Mixed use
	Woodland/forested		Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☐ All crevices and cracks: **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	☐ Not present: Assessed with borescope	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Concrete surfaces (open roosting on concrete)	☐ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☐ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	✓ Not present:	☐ Visual - live # ☐ dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Studds

Signature: Gavin Studds

Culv 4

Bridge/Culvert Bat Assessment Form

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
10:15	2024-0014247	US50	Queen Anne's
Federal Structure ID	**Structure Coordinates (latitude and longitude)**	**Structure Height (approximate)**	**Structure Length**
N/A	38.9746750 -76.3006922	12	130

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss		Covered
	Parallel Box Beam		Other:

Culvert Type	*Other Structure*
✓ Box	
Pipe/Round	
Other:	

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Creosote Evidence: Yes / No / Unknown

Culvert Material
Metal
✓ Concrete
Plastic
Stone/Masonry
Other:

Notes: Filled over 1/2 with water, did not enter

Crossings Traversed (check all that apply)

Bare ground	Open vegetation
Rip-rap	Closed vegetation
Flowing water	Railroad
Standing water	Road/trail - Type:
Seasonal water	Other:

Surrounding Habitat (check all that apply)

Agricultural	Grassland
Commercial	Ranching
Residential-urban	Riparian/wetland
Residential-rural	Mixed use
Woodland/forested	Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	Not present: Assessed w/ IR camera + borescope	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ ✓ Concrete surfaces (open roosting on concrete)	Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Spaces between concrete end walls and the bridge deck	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Vertical surfaces on concrete I-beams	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Spaces between walls, ceiling joists	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Weep holes, scupper drains, and inlets/pipes	Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ All guiderails	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ All expansion joints	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species

Name: Gavin Shields **Signature:** Gavin Shields

Bridge/Culvert Bat Assessment Form

Culv 5

Date & Time of Assessment	DOT Project Number or IPaC Code	Route/Facility Carried	County
9:30 Culv 5	2024-0014217	US50	Queen Anne's
Federal Structure ID	**Structure Coordinates (latitude and longitude)**	**Structure Height (approximate)**	**Structure Length**
N/A	38.9749062 -76.3933296	42'	330'

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss		Covered
	Parallel Box Beam		Other:

Culvert Type

	pipe
✓	Pipe/round
	Other:

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Culvert Material

	Metal
✓	Concrete
	Plastic
	Stone/masonry
	Other:

Creosote Evidence

	Yes
	No
	Unknown

Notes: Pipe 5ft next to grate

Crossings Traversed (check all that apply)

	Bare ground		Open vegetation
	Rip-rap		Closed vegetation
	Flowing water		Railroad
	Standing water	✓	Road/trail - Type:
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban		Riparian/wetland
	Residential-rural		Mixed use
	Woodland/forested		Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present: Pipe inaccessible assessed w/ borescope	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☐ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	✓ Not present:	Visual - live # dead # Guano Staining; ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Scholes

Signature:

Culv 6

Bridge/Culvert Bat Assessment Form

Date & Time of Assessment: 9/19/25 9:15	DOT Project Number or IPaC Code: 2024-0014247	Route/Facility Carried: US 50	County: Queen Anne's
Federal Structure ID: N/A	Structure Coordinates (latitude and longitude): 39.9750671 -76.2959617	Structure Height (approximate): 48"	Structure Length: 95"

Structure Type (check one)

Bridge Construction Style

☐ Cast-in-place		☐ Pre-stressed Girder	
☐ Flat Slab/Box		☐ Steel I-beam	
☐ Truss	Side View	☐ Covered	
☐ Parallel Box Beam		☐ Other:	

Culvert Type

☐ Box	
☑ Pipe/round	
☐ Other:	

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
☐ Metal	☐ None	☐ Concrete
☐ Concrete	☐ Concrete	☐ Timber
☐ Timber	☐ Steel	☐ Stone/Masonry
☐ Open grid	☐ Timber	☐ Other:
☐ Other:	☐ Other:	

Culvert Material

☐ Metal
☐ Concrete
☐ Plastic
☐ Stone/Masonry
☑ Other: CMP

Creosote Evidence

☐ Yes	☐ No
☐ Unknown	

Notes: Pipe 2ft below grade inaccessible

Crossings Traversed (check all that apply)

☐ Bare ground	☐ Open vegetation
☐ Rip-rap	☐ Closed vegetation
☐ Flowing water	☐ Railroad
☐ Standing water	☐ Road/trail - Type:
☐ Seasonal water	☐ Other:

Surrounding Habitat (check all that apply)

☐ Agricultural	☐ Grassland
☐ Commercial	☐ Ranching
☐ Residential-urban	☐ Riparian/wetland
☐ Residential-rural	☐ Mixed use
☐ Woodland/forested	☐ Other

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	☐ Not present Pipe not accessible Possible with borescope	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Concrete surfaces (open roosting on concrete)	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Logan Studds	Signature:

Bridge/Culvert Bat Assessment Form

Culvert 45

Date Time of Assessment 10/7/25	ject Number IPaC Code 2024-0014207	ute/Facility Carried Cox Creek	ty Queen Anne's
tructure ID	Structure Coordinates (latitude and longitude) 38.9753473 -76.3074356	Structure Height (approximate)	Structure Length 80ft

tructu y (ch k ne

ndge ction tyle

Cast-in-pl ce		Pre-stre Gir	
at Slab/Bo		Stee beam	
russ	Side View	Covere	
Parallel Box Beam		Othe	

Structure Material ch a at p

Deck Material	Beam M	d/Ba W Ma
Metal	None	Co te
Concrete	Concrete	imber
imber	Stee	Stone/Mason
Open grid	Timber	Other
Other	Other	

Creosote Evidence

es | No | Unknown

Culvert Material

Metal; ✓ Concrete; Plastic; Stone/Masonry; Other

Culvert Type

Box; ✓ Pipe/round; Other

Other Structure

Notes

Crossings Traversed (check all that apply)

Bare ground		Open vegetation	
Rip-rap		Closed vegetation	
Flowing water		Railroad	
✓ tanding wate		Road/trail Type	
Seasonal water		Other:	

Surrounding Habitat (check all that apply)

Agricultural		Grassland	
Commercial		anch	
Residential		Riparian/wetland	
Residential-rural		Mixed use	
Woodland/forested		Other:	

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☒ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	☒ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☒ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Spaces between walls, ceiling joists	☐ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Weep holes, scupper drains and inlets/pipes	☐ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☒ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☒ Not present	Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Studds **Signature:** Gavin Studds

Bridge/Structure Bat Assessment Form C

Date & Time of Assessment: 9/19/25 12:00	DOT Project Number: 2024004 47	Route/Facility Carried:	County: Anne Arundel
Federal Structure ID: 4	Structure Coordinates (latitude and longitude): 39.020667 -76.4185329	Structure Height (approximate): 36	Structure Length: 264

Structure Type (check one)

Bridge Construction Style

- ○ Cast-in-place
- ○ Flat Slab/Box
- ○ Truss (Side View)
- ○ Parallel Box Beam
- ○ Pre-stressed Girder
- ○ Steel I-beam
- ○ Covered
- ○ Other:

Culvert Type

- ○ Box
- ⊘ Pipe/Round
- ○ Other:

Other Structure

- ○

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
☐ Metal	☐ None	☐ Concrete
☐ Concrete	☐ Concrete	☐ Timber
☐ Timber	☐ Steel	☐ Stone/Masonry
☐ Open grid	☐ Timber	☐ Other:
☐ Other:	☐ Other:	

Creosote Evidence

- ○ Yes ○ No ○ Unknown

Culvert Material

- ☐ Metal
- ☑ Concrete
- ☐ Plastic
- ☐ Stone/Masonry
- ☐ Other:

Notes: entrance cracked + falling / full of water

Crossings Traversed (check all that apply)

☐ Bare ground	☐ Open vegetation
☐ Rip-rap	☐ Closed vegetation
☐ Flowing water	☐ Railroad
☑ Standing water	☐ Road/trail - Type:
☐ Seasonal water	☐ Other:

Surrounding Habitat (check all that apply)

☐ Agricultural	☐ Grassland
☐ Commercial	☐ Ranching
☐ Residential-urban	☑ Riparian/wetland
☐ Residential-rural	☐ Mixed use
☑ Woodland/forested	☐ Other: Highway

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Weep holes, scupper drains, and inlets/pipes	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Studds

Signature: Gavin Studds

Bridge/Structure Bat Assessment Form

Date & Time of Assessment 9/2	DOT Project Number 2 1424	Route/Facility Carried US50	County re Arunde
Federal Structure ID	Structure Coordinates (latitude and longitude)	Structure Height (approximate) 6	Structure Length 2

Structure Type (check one)

Bridge Construction Style

- ○ Cast-in-place
- ○ Flat Slab/Box
- ○ Truss (Side View)
- ○ Parallel Box Beam
- ○ Pre-stressed Girder
- ○ Steel I-beam
- ○ Covered
- ○ Other:

Culvert Type

- ○ Box
- ○ Pipe/Round
- ○ Other:

Other Structure

- ○

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
☐ Metal	☐ None	☐ Concrete
☐ Concrete	☐ Concrete	☐ Timber
☐ Timber	☐ Steel	☐ Stone/Masonry
☐ Open grid	☐ Timber	☐ Other:
☐ Other:	☐ Other:	

Creosote Evidence

- ○ Yes ⊗ No
- ○ Unknown

Culvert Material

- ☐ Metal
- ☑ Concrete
- ☐ Plastic
- ☐ Stone/Masonry
- ☐ Other:

Notes:

Crossings Traversed (check all that apply)

☐ Bare ground	☐ Open vegetation
☐ Rip-rap	☐ Closed vegetation
☐ Flowing water	☐ Railroad
☑ Standing water	☐ Road/trail - Type:
☐ Seasonal water	☐ Other:

Surrounding Habitat (check all that apply)

☐ Agricultural	☐ Grassland
☐ Commercial	☐ Ranching
☐ Residential-urban	☑ Riparian/wetland
☐ Residential-rural	☐ Mixed use
☑ Woodland/forested	☐ Other: Hig

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☐ All crevices and cracks: **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap, Railing)	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Weep holes, scupper drains, and inlets/pipes	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	☑ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Stuebe

Signature: Gavin Stuebe

Bridge/Culvert Bat Assessment Form

Culv 87

Date & Time of Assessment: 9/19/25 11:00	DOT Project Number or IPaC Code: 2024-0014247	Route/Facility Carried: US50	County: Anne Arundel
Federal Structure ID: N/A	Structure Coordinates (latitude and longitude): 38.9138176 -76.4079589	Structure Height (approximate): 36"	Structure Length: 105"

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss (Side View)		Covered
	Parallel Box Beam		Other:

Culvert Type

	Box
✓	Pipe/round
	Other

Other Structure

Structure Material (check all that apply)

Deck Material		*Beam Material*		*End/Back Wall Material*	
	Metal		None		Concrete
	Concrete		Concrete		Timber
	Timber		Steel		Stone/Masonry
	Open grid		Timber		Other:
	Other:		Other:	*Creosote Evidence*	

Culvert Material			
	Metal	Yes	No
✓	Concrete	Unknown	
	Plastic		
	Stone/Masonry		
	Other:		

NOTES: Pipe not located, seemingly buried.

Crossings Traversed (check all that apply)

✓	Bare ground	✓	Open vegetation
	Rip-rap		Closed vegetation
	Flowing water		Railroad
	Standing water	✓	Road/trail - Type: Paved
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban		Riparian/wetland
	Residential-rural		Mixed use
	Woodland/forested		Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☐ All crevices and cracks **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Concrete surfaces (open roosting on concrete)	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Spaces between concrete end walls and the bridge deck	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Vertical surfaces on concrete I-beams	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Spaces between walls, ceiling joists	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ Weep holes, scupper drains, and inlets/pipes	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ All guiderails	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining
☐ All expansion joints	✓ Not present	Visual - live # dead # ☐ Audible ☐ Species ☐ Odor ☐ Photos ☐ Staining

Name: Gavin Stubbs

Signature: Gavin Stubbs

Bridge/Culvert Bat Assessment Form

CuLv 89

Date & Time of Assessment: 9/19/25 12:20	DOT Project Number or IPaC Code: 0534-0014247	Route/Facility Carried: Skidmore Dr	County: Anne Arundel
Federal Structure ID: N/A	Structure Coordinates (latitude and longitude): 39.019273, -76.415055	Structure Height (approximate): 36"	Structure Length: 745"

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss (Side View)		Covered
	Parallel Box Beam		Other:

Culvert Type

	Box
✓	Pipe/Round
	Other:

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	Concrete
Concrete	Concrete	Timber
Timber	Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Creosote Evidence

Yes	X No
Unknown	

Culvert Material

	Metal
✓	Concrete
	Plastic
	Stone/Masonry
	Other:

NOTES: Culvert 1/3 filled with water. Piped cracked & separated

Crossings Traversed (check all that apply)

	Bare ground	✓	Open vegetation
	Rip-rap		Closed vegetation
	Flowing water		Railroad
✓	Standing water		Road/trail - Type:
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban	✓	Riparian/wetland
	Residential-rural		Mixed use
✓	Woodland/forested		Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Concrete surfaces (open roosting on concrete)	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between concrete end walls and the bridge deck	✓ ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	X ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	X ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Spaces between walls, ceiling joists	X ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☑ Weep holes, scupper drains, and inlets/pipes	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All guiderails	✓ ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ All expansion joints	✓ ☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Gavin Studds **Signature:** Gavin Studds

Bridge/Culvert Bat Assessment Form

Cox Creek Bridge

Date & Time of Assessment: 9/19/25 10:45	DOT Project Number or IPaC Code: 2024-0014247	Route/Facility Carried: US 50	County: Queen Anne's
Federal Structure ID: N/A	Structure Coordinates (latitude and longitude): 38.974719 -76.302504	Structure Height (approximate): 10ft	Structure Length: 65ft

Structure Type (check one)

Bridge Construction Style

✓	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box		Steel I-beam
	Truss (Side View)		Covered
	Parallel Box Beam		Other:

Culvert Type

	Box		
	Pipe/Round		
	Other:		

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
Metal	None	✓ Concrete
✓ Concrete	Concrete	Timber
Timber	✓ Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Creosote Evidence: Yes | X No | Unknown

Culvert Material: Metal; Concrete; Plastic; Stone/Masonry; Other:

NOTES:

Crossings Traversed (check all that apply)

	Bare ground	✓	Open vegetation
	Rip-rap		Closed vegetation
✓	Flowing water		Railroad
	Standing water		Road/trail - Type:
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban		Riparian/wetland
	Residential-rural		Mixed use
	Woodland/Forested	✓	Other: Road/Water

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts**: rough surfaces or imperfections in concrete **Other structures**: soffits, rafters, attic areas	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☑ Concrete surfaces (open roosting on concrete)	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☐ Spaces between concrete end walls and the bridge deck	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☐ Crack between concrete railings on top of the bridge deck (Gap / Railing)	X Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☐ Vertical surfaces on concrete I-beams	X Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☐ Spaces between walls, ceiling joists	X Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☑ Weep holes, scupper drains, and inlets/pipes	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☑ All guiderails	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species
☑ All expansion joints	Not present	Visual - live # dead # Guano Staining; Audible Odor Photos; Species

Name: Gavin Stubbs

Signature: Gavin Stubbs

Bridge/Culvert Bat Assessment Form

Date & Time of Assessment: 10/16/25 13:35	DOT Project Number or IPaC Code: 2024-0014207	Route/Facility Carried: Oceanic Dr	County: AnneArundel
Federal Structure ID:	Structure Coordinates (latitude and longitude):	Structure Height (approximate): 35ft	Structure Length: 350ft

Structure Type (check one)

Bridge Construction Style

	Cast-in-place		Pre-stressed Girder
	Flat Slab/Box	✓	Steel I-beam
	Truss		Covered
	Parallel Box Beam		Other:

Culvert Type

	Box:		
	Pipe/Round:		
	Other*:		

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
✓ Metal	None	✓ Concrete
Concrete	Concrete	Timber
Timber	✓ Steel	Stone/Masonry
Open grid	Timber	Other:
Other:	Other:	

Culvert Material

	Metal
	Concrete
	Plastic
	Stone/Masonry
	Other:

Creosote Evidence

	Yes	X	No
	Unknown		

Notes:

Crossings Traversed (check all that apply)

	Bare ground		Open vegetation
	Rip-rap		Closed vegetation
	Flowing water		Railroad
	Standing water	✓	Road/trail - Type: US 50
	Seasonal water		Other:

Surrounding Habitat (check all that apply)

	Agricultural		Grassland
	Commercial		Ranching
	Residential-urban		Riparian/Wetland
	Residential-rural		Mixed use
	Woodland/forested	✓	Other: Transportation

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	Assessment Notes	Evidence of Bats (include photos if present)
☑ All crevices and cracks: **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☑ Concrete surfaces (open roosting on concrete)	Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☑ Spaces between concrete end walls and the bridge deck	Not present: Viewed as best as possible in street view	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☑ Crack between concrete railings on top of the bridge deck (Gap / Railing)	Not present: "	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Vertical surfaces on concrete I-beams	✓ Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Spaces between walls, ceiling joists	X Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☐ Weep holes, scupper drains, and inlets/pipes	X Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☑ All guiderails	Not present:	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species
☑ All expansion joints	Not present: "	Visual - live # dead #; Guano; Staining; Audible; Odor; Photos; Species

Name: Gavin Studds

Signature: Gavin Studds

APPENDIX C: PHOTOGRAPH LOG



Photo 1. Looking at the outside of Culvert 0.



Photo 2. Looking inside of Culvert 0.



Photo 3. Looking at the steel grate covering Culvert 1.

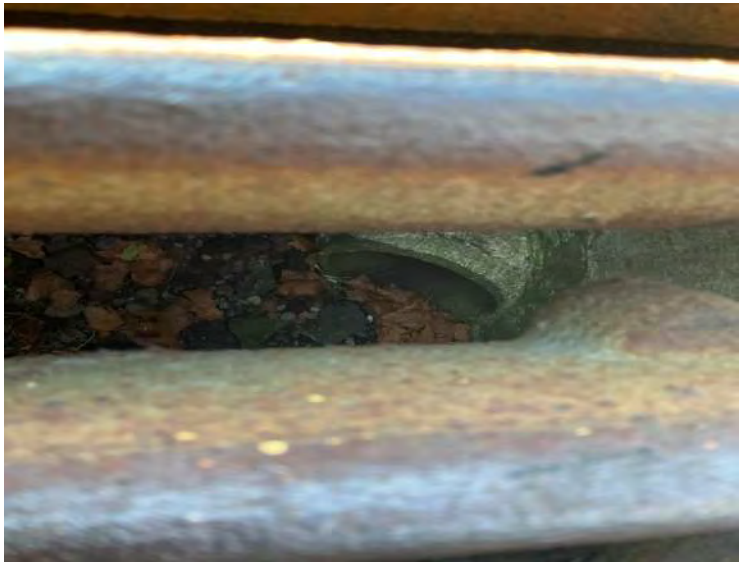


Photo 4. Looking through the steel grate to Culvert 1.



Photo 5. Looking down at the steel grate covering Culvert 2.



Photo 6. Looking down at the steel grate covering Culvert 3.



Photo 7. Looking through the steel grate to Culvert 3.



Photo 8. Looking at the headwall of Culvert 4.



Photo 9. Looking inside of Culvert 4.

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Photo 10. Looking at the steel grate covering Culvert 5.



Photo 11. Looking through the steel grate at the concrete surface surrounding Culvert 5.



Photo 12. Looking at the steel grate covering Culvert 6.



Photo 13. Looking through the steel grate to Culvert 6 below.



Photo 14. Looking at the headwall of Culvert 45.



Photo 15. Looking north at the headwall of Culvert 62.



Photo 16. Looking inside of Culvert 62.



Photo 17. Looking at a representative crack inside of Culvert 62.



Photo 18. Looking south at the headwall of Culvert 62.



Photo 19. Looking at the exterior of Culvert 82.



Photo 20. Looking at the interior of Culvert 82.



Photo 21. Looking through steel grate at Culvert 87.



Photo 22. Looking at cracked exterior of Culvert 89.



Photo 23. Looking at the interior of Culvert 89.



Photo 24. Looking at steel I-beams, decking, and piers of the Oceanic Drive overpass.



Photo 25. Looking at the south abutment of the Oceanic Drive overpass.



Photo 26. Looking west at the concrete parapet and fencing of the Oceanic Drive overpass.



Photo 27. Looking northeast at the eastbound span of the Cox Creek bridge.



Photo 28. Looking east at the deck, I beams and drains approaching the Cox Creek Bridge abutment.

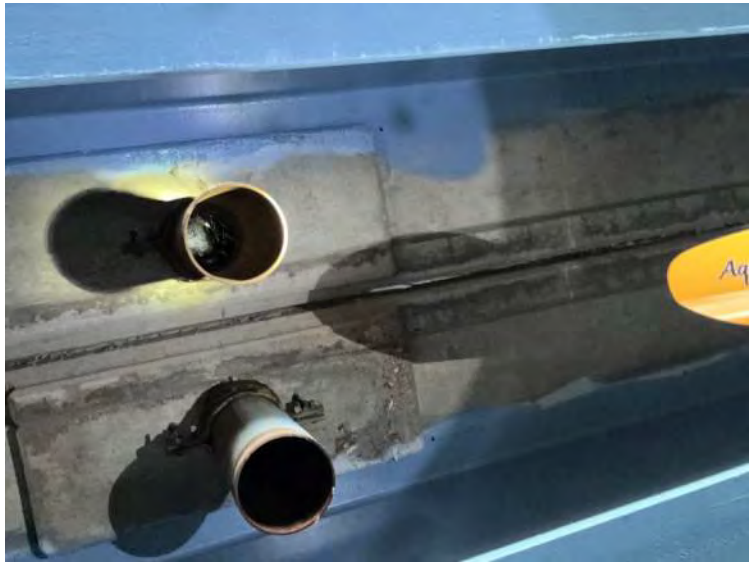


Photo 29. Looking into a drain under the eastbound span of the Cox Creek Bridge.



Photo 30. Looking northwest at the exterior of 1046 E College Parkway, a building proposed for take.



Photo 31. Looking southwest at the exterior of 1001 Skidmore Dr, a building proposed for take.



Photo 32. Looking south at the side and front of 1598 Whitehall Rd, a building proposed for partial take.

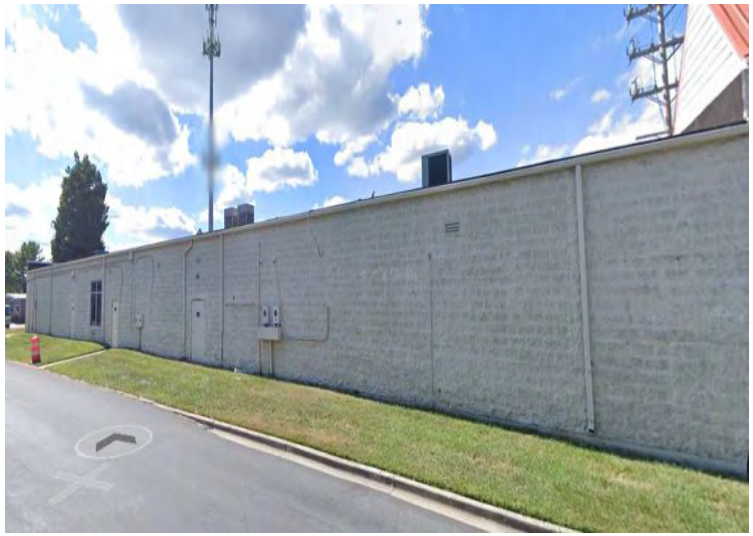


Photo 33. Looking west at the rear of 1598 Whitehall Rd, a building proposed for partial take.

Bienko, Alexander <alexander.bienko@dot.gov>

BCST2 Updated BA submittal

Li, Ray <ray_li@fws.gov> Tue, Jun 2, 2026 at 12:42 PM
To: "Bienko, Alexander" <alexander.bienko@dot.gov>
Cc: "Millington, Chris (FHWA)" <chris.millington@dot.gov>, "Toni, Melissa (FHWA)" <melissa.toni@dot.gov>, "Yanchik, Brian (FHWA)" <brian.yanchik@dot.gov>, Sarah Williamson <sarahw@cri.biz>

Hi Alex -
CRI shared updated maps that reflect refinements from the MDTA Recommended Preferred Alternative to the FHWA Preferred Alternative (attached) and walked me through these changes on a Teams call last week. While anticipated forest impacts have increased, this change is mainly due to recently completed field delineations and not expansion of the limits of disturbance. Impacts to suitable bat habitat (trees ≥ 3" diameter at breast height) will actually decrease from 73.52 to 72.4 acres, so there are no changes to the effects analysis and not likely to adversely affect determinations for northern long-eared bat and tricolored bat. Therefore, no Section 7 reinitiation is required based on these updates.
Thanks!
Ray

From: Li, Ray <ray_li@fws.gov>
Sent: Wednesday, May 20, 2026 3:04 PM
[Quoted text hidden]

[Quoted text hidden]

2 attachments

20251009 BCS2 NLAA NLEB TCB.pdf
1225K

BCS_LOD_Comparison_BatHabitat_20260529_Compressed.pdf
1983K

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127

In Reply Refer To: 09/17/2026 12:58:27 UTC
Project Code: 2024-0014247
Project Name: Bay Crossing Study Tier 2

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Coastal Barriers
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

PROJECT SUMMARY

Project Code: 2024-0014247
Project Name: Bay Crossing Study Tier 2
Project Type: Road/Hwy - New Construction
Project Description: The Chesapeake Bay Crossing Study: Tier 2 NEPA (Tier 2 Study) is a National Environmental Policy Act (NEPA) study that will analyze alternatives to provide congestion relief and improve travel reliability, mobility and safety across the Chesapeake Bay. The Tier 2 Study is focusing on the Selected Corridor Alternative (Corridor 7) that was identified at the conclusion of the Tier 1 Study. Alternatives will include a No Build Alternative and a range of build alternatives involving various alignments, crossing types and modal and operational alternatives (e.g. transit, pedestrian, bicycle, etc.). Corridor 7 is two miles wide and runs 22 miles from the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.99580985,-76.37480726099929,14z



Counties: Anne Arundel and Queen Anne's counties, Maryland

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-Eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

SYSTEM UNIT (SU)

Most new Federal expenditures and financial assistance, including Federal flood insurance, are prohibited within System Units. ***Federally-funded projects within System Units require consultation with the Service.*** *Consultation is not required for projects using private, state, or local funds.*

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
MD-32	Stevensville	SU	11/16/1990	11/16/1990
MD-32	Stevensville	SU	11/25/2024	11/25/2025

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit https://www.fws.gov/wetlands/data/mapper.HTML

FRESHWATER FORESTED/SHRUB WETLAND

- PFO4C
- PFO1/SS1C
- PFO1D
- PFO4/1B
- PSS3/4R
- PFO1E
- PSS1Ex
- PFO1/SS1S
- PFO1Ch
- PSS1R
- PSS1Cx
- PFO1A
- PSS1/EM1Cx
- PFO1/2F

- PFO1F
- PSS1Ch
- PFO1Fb
- PFO4S
- PFO1/SS1A
- PSS1C
- PFO4/1S
- PFO1/4B
- PSS1/EM1C
- PFO1Ex
- PFO1Db
- PFO1/2C
- PFO4/1C
- PFO1C
- PFO1B
- PFO1/4C
- PFO1Fh
- PFO1T
- PFO4D
- PFO1/4A
- PFO1R
- PSS4A
- PFO1/2E
- PFO4B
- PFO1/4S
- PSS1/EM1D
- PFO1Ad
- PFO/SS1A
- PSS1E
- PSS1/EM1A
- PSS1D
- PFO1S
- PFO4R

FRESHWATER EMERGENT WETLAND

- PEM1Cx
- PEM1Dx

- PEM1Ch
- PEM1Ah
- PEM1B
- PEM5A
- PEM1F
- PEM1Dh
- PEM1D
- PEM1/SS1C
- PEM1A
- PEM1Ex
- PEM1Rh
- PEM1/SS1Fx
- PEM1/SS1Ch
- PEM1/SS1Cx
- PEM1R
- PEM1/SS1D
- PEM1Fx
- PEM1/SS1R
- PEM5C
- PEM1Fb
- PEM1C
- PEM1Fh
- PEM5Eh
- PEM1E

ESTUARINE AND MARINE WETLAND

- E2USP
- E2EM1/SS1P
- E2EM1Pd
- E2SS1P
- E2SS1/EM1P
- E2EM1/SS4P
- E2US/SS1P
- E2US2P
- E2SS3/4P
- E2SS1Pd
- E2USN

- E2USM
- E2SS4P
- E2EM2N
- E2EM1N
- E2EM5P
- E2FO4P
- E2EM1P
- E2SS1/3P

FRESHWATER POND

- PUBH
- PUBHx
- PABHx
- PAB1Hx
- PUBFx
- PUBHh
- PUBVh
- PUBKx

OTHER

- Pf

ESTUARINE AND MARINE DEEPWATER

- E1UBLx
- E1UBLh
- E1ABLh
- E1UBL

RIVERINE

- R5UBH
- R4SBC

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Gavin Studds
Address: 25 Old Solomons Island Road
City: Annapolis
State: MD
Zip: 20401
Email gavins@cri.biz
Phone: 4104746559

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration
Name: Heather Lowe
Email: hlowe@mdta.state.md.us
Phone: 4105375665

U.S. Department of Transportation
Federal Highway Administration

Maryland Division

31 Hopkins Plaza, Suite 1520
Baltimore, Maryland 21201
(410) 962-4440
(410) 962-4054

June 1, 2023

In Reply Refer To:
HDA-MD

Ms. Gail E. Kenson
Community Planning and Liaison Officer
Commander, Naval Installations Command
Naval District Washington
1314 Harwood Street, SE
Washington Navy Yard, DC 20374-5018

Dear Ms. Kenson:

The Maryland Transportation Authority (MDTA), in coordination with the Federal Highway Administration (FHWA), has initiated the Chesapeake Bay Crossing Study: Tier 2 National Environmental Policy Act (NEPA) (Tier 2 Study). The Tier 2 Study focuses on potential impacts to resources as a result of a range of project alternatives within the Tier 1 Study Selected Corridor Alternative, which extends along the US 50/US 301 corridor from approximately the Severn River Bridge in Anne Arundel County to the U.S. 50/U.S. 301 split in Queen Anne's County (**Attachment 1**).

Your agency has been identified as one that may have an interest in the project; therefore, in accordance with 23 U.S.C. §139(d), as Lead Agencies, FHWA and MDTA invite your agency to become a Participating Agency in the environmental review process and preparation of the Tier 2 Environmental Impact Statement (EIS).

Responsibilities associated with accepting the Participating Agency invitation per 23 U.S.C. §139 include:

1. Identifying, as early as practicable, any issues of concern regarding potential impacts on the natural, cultural, or human environment.
2. Providing data, comments, responses, studies, or methodologies on those areas of special expertise or jurisdiction of your agency within established timeframes.
3. Participating in coordination meetings and field reviews with other environmental resource agencies as appropriate.
4. Agreement on the schedule contained in the Coordination Plan and the Study's Guiding Principles.
5. Reviewing and commenting on provided materials within established deadlines.

Your agency may elect to accept or decline the invitation by checking the appropriate response in the attached form (**Attachment 2**). If your agency elects to decline the invitation, please include the reason for declining with your agency's response. Your agency will still receive project

announcements and information concurrent with the public as a Notified Agency. Your agency's response may be transmitted electronically to the Environmental Program Manager, Ms. Jeanette Mar, at jeanette.mar@dot.gov. If you are not the correct point of contact, please forward this email to the correct person and copy Ms. Mar, Heather Lowe (hlowe@mdta.state.md.us), and Sarah Williamson (sarahw@cri.biz) so that we are aware of the change.

We look forward to receiving your agency's response to our invitation to serve as a Participating Agency. Please respond to this invitation no later than **June 30, 2023**. If you have any questions or need additional information, please contact Ms. Mar via email or via phone at (410) 779-7152.

Sincerely,

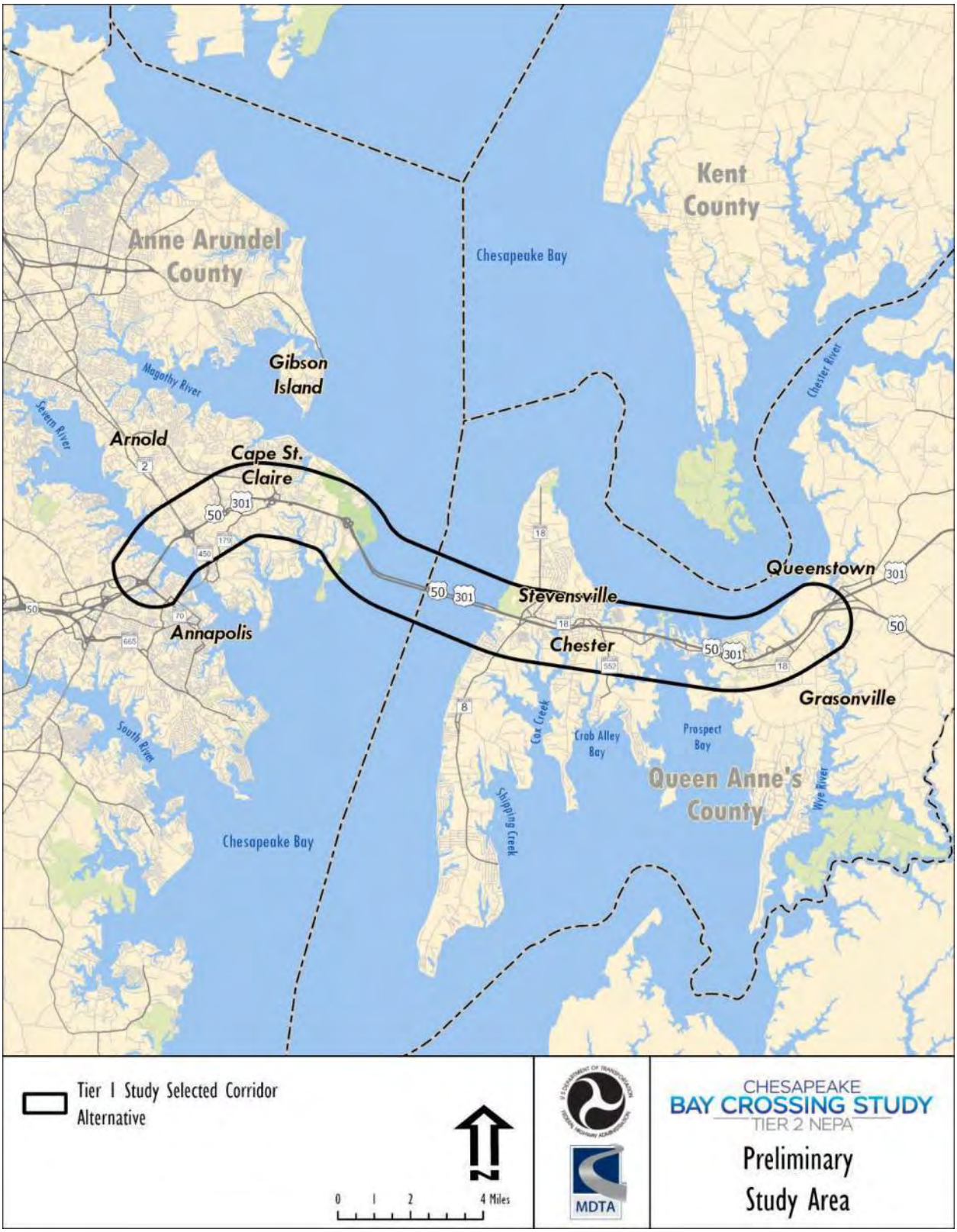
JEANETTE J MAR
Digitally signed by JEANETTE J MAR
Date: 2023.06.01 17:46:58 -04'00'

for Valeriya Remezova
Division Administrator

Attachment 1: Chesapeake Bay Crossing Study: Tier 2 NEPA Study Area
Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

cc: Ms. Heather Lowe, MDTA, Project Manager

Attachment 1: Chesapeake Bay Crossing Study Tier 2 NEPA Study Area



Attachment 2: Chesapeake Bay Crossing Study Tier 2 NEPA Participating Agency Invitation Response Form

☐ Elect to accept the invitation to be a Participating Agency.

☐ Elect to decline the invitation to be a Participating Agency because:

- ☐ my agency has no information or expertise relevant to the project; and/or
- ☐ my agency does not intend to submit comments on the project.
- ☐ Other (please provide):

Agency: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____