



Initial Review: _____
Updated On: _____
Complete: _____
Official Use Only

Coastal Zone Management Act Federal Consistency Form

This document provides the Delaware Coastal Management Program (DCMP) with a Federal Consistency Determination or Certification for activities regulated under the Coastal Zone Management Act of 1972, as amended, and NOAA's Federal Consistency Regulations, 15 C.F.R. Part 930. Federal agencies and other applicants for federal consistency are not required to use this form; it is provided to applicants to facilitate the submission of a Consistency Determination or Consistency Certification. In addition, federal agencies and applicants are only required to provide the information required by NOAA's Federal Consistency Regulations.

Project/Activity Name: _____

I. Federal Agency or Non-Federal Applicant Contact Information:

Contact Name/Title: _____

Federal Agency Contractor Name (if applicable): _____

Federal Agency: _____
(either the federal agency proposing an action or the federal agency issuing a federal license/permit or financial assistance to a non-federal applicant)

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____ Telephone #: _____

II. Federal Consistency Category:

Federal Activity or Development Project
(15 C.F.R. Part 930, Subpart C)

Federal License or Permit Activity
(15 C.F.R. Part 930, Subpart D)

Outer Continental Shelf Activity
(15 C.F.R. Part 930, Subpart E)

Federal License or Permit Activity which occurs
wholly in another state (interstate consistency
activities identified in DCMP's Policy document)

Federal Financial Assistance
(15 C.F.R. Part 930, Subpart F)

III. Detailed Project Description (attach additional sheets if necessary):

IV. General Analysis of Coastal Effects (attach additional sheets if necessary):

V. Detailed Analysis of Consistency with DCMP Enforceable Policies (attach additional sheets if necessary):

Policy 5.1: Wetlands Management

Policy 5.2: Beach Management

Policy 5.3: Coastal Waters Management (includes wells, water supply, and stormwater management. Attach additional sheets if necessary)

Policy 5.4: Subaqueous Land and Coastal Strip Management

Policy 5.5: Public Lands Management

Policy 5.6: Natural Lands Management

Policy 5.7: Flood Hazard Areas Management

Policy 5.8: Port of Wilmington

Policy 5.9: Woodlands and Agricultural Lands Management

Policy 5.10: Historic and Cultural Areas Management

Policy 5.11: Living Resources

Policy 5.12 Mineral Resources Management

Policy 5.13: State Owned Coastal Recreation and Conservation

Policy 5.14: Public Trust Doctrine

Policy 5.15: Energy Facilities

Policy 5.16: Public Investment

Policy 5.17: Recreation and Tourism

Policy 5.18: National Defense and Aerospace Facilities

Policy 5.19: Transportation Facilities

Policy 5.20: Air Quality Management

Policy 5.21: Water Supply Management

Policy 5.22: Waste Disposal Management

Policy 5.23: Development

Policy 5.24: Pollution Prevention

Policy 5.25: Coastal Management Coordination

VI. JPP and RAS Review (Check all that apply):

Has the project been reviewed in a monthly Joint Permit Processing and/or Regulatory Advisory Service meeting?

- JPP RAS None

*If yes, provide the date of the meeting(s): _____

VII. Statement of Certification/Determination and Signature (Check one and sign below):

FEDERAL AGENCY CONSISTENCY DETERMINATION. Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Delaware Coastal Management Program.

OR

FEDERAL AGENCY NEGATIVE DETERMINATION. Based upon the information, data, and analysis included herein, the federal agency, or its contracted agent, listed in (I) above, finds that this proposed activity will not have any reasonably foreseeable effects on Delaware's coastal uses or resources (Negative Determination) and is therefore consistent with the enforceable policies of the Delaware Coastal Management Program.

OR

NON-FEDERAL APPLICANT'S CONSISTENCY CERTIFICATION. Based upon the information, data, and analysis included herein, the non-federal applicant for a federal license or permit, or state or local government agency applying for federal funding, listed in (I) above, finds that this proposed activity complies with the enforceable policies of the Delaware Coastal Management Program and will be conducted in a manner consistent with such program.

Signature:	<i>Terry L. Deputy</i>		
Printed Name:		Date:	

Pursuant to 15 C.F.R. Part 930, the Delaware Coastal Management Program must provide its concurrence with or objection to this consistency determination or consistency certification in accordance with the deadlines listed below. Concurrence will be presumed if the state's response is not received within the allowable timeframe.

Federal Consistency Review Deadlines:

Federal Activity or Development Project (15 C.F.R. Part 930, Subpart C)	60 days with option to extend an additional 15 days or stay review (15 C.F.R. § 930.41)
Federal License or Permit (15 C.F.R. Part 930, Subpart D)	Six months, with a status letter at three months. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.63)
Outer Continental Shelf Activity (15 C.F.R. Part 930, Subpart E)	Six months, with a status letter at three months. If three month status letter not issued, then concurrence presumed. The six month review period can be stayed by mutual agreement. (15 C.F.R. § 930.78)
Federal Financial Assistance to State or Local Governments (15 C.F.R. Part 930, Subpart F)	State Clearinghouse schedule

OFFICIAL USE ONLY:

Reviewed By:	Fed Con ID:	Date Received:
Public notice dates: _____ to _____	Comments Received: <input type="checkbox"/> NO <input type="checkbox"/> YES <i>[attach comments]</i>	
Decision type: <small>(objections or conditions attach details)</small>	Decision Date: _____	

U.S. Army Corps of Engineers (USACE)
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

For use of this form, see 33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved -
OMB No. 0710-0003
Expires: 08-31-2023

The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: <http://dpcl.dod.mil/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx>

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
--------------------	----------------------	------------------	------------------------------

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME First - Terry Middle - Last - Deputy Company - DNREC Div. Watershed Stewardship E-mail Address - terry.deputy@delaware.gov			8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Lena Middle - Last - DeSantis Company - Anchor QEA, LLC E-mail Address - lmdesantis@anchorqea.com		
6. APPLICANT'S ADDRESS: Address- 285 Beiser Boulevard, Suite 102 City - Dover State - DE Zip - 19904 Country - USA			9. AGENT'S ADDRESS: Address- 123 Tice Blvd #205 City - Woodcliff Lake State - NJ Zip - 07677 Country - USA		
7. APPLICANT'S PHONE NOs. w/AREA CODE a. Residence b. Business c. Fax 302-739-9921 302-739-6724			10. AGENTS PHONE NOs. w/AREA CODE a. Residence b. Business c. Fax 267-751-4116		

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Anchor QEA, LLC to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Terry.Deputy@Delaware.Gov Digitally signed by Terry.Deputy@Delaware.Gov
Date: 2023.04.19 09:35:48 -0400 2023-04-19
SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) Assawoman Creek Dredging and Beneficial Use Project	
13. NAME OF WATERBODY, IF KNOWN (if applicable) Assawoman Canal, Sussex County, DE	14. PROJECT STREET ADDRESS (if applicable) Address N/A City - State - Zip-
15. LOCATION OF PROJECT Latitude: °N 38.522 Longitude: °W 75.075	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID 134-13.00-94.00 Municipality Section - Township - Range -	

17. DIRECTIONS TO THE SITE

Directions to Assawoman Canal: This waterway is accessible by White Creek and the Indian River Bay to the north, and Little Assawoman Bay to the south.

Directions to Muddy Neck Marsh Complex: The marsh can be accessed terrestrially through the Assawoman Wildlife Area. From Dover, Delaware take 113/Route 1 south for distance of approximately 53 miles. Turn right onto Garfield Parkway (0.1 miles), left onto Kent Ave (1.4 miles), left onto Double Bridges Rd (0.6 miles).

18. Nature of Activity (Description of project, include all features)

The project includes the following key components: 1) Dredge approximately 50,000 cubic yards of shoaled sediments from the Assawoman Canal, consistent with previous dredge design depths (-3 MLW, 35-foot-wide channel); 2) Transport the dredged material, via pipeline, to the beneficial use placement site at Muddy Neck Marsh Complex within the Assawoman Wildlife Area (Muddy Neck); 3) Employ thin layer placement as a beneficial use of the dredged material to enhance marsh elevations and restore the wetlands, which have been subject to expansive ponding and deterioration. The wetland restoration site, the Muddy Neck Marsh Complex, will be restored to improve coastal resiliency of the marsh (from future storm events). The use of thin layer placement will minimize marsh impacts and restore the marsh in a manner that promotes natural recolonization of vegetation. See Permit Supplement for site map and additional project overview.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of the Project is to improve navigability in the Assawoman Canal and restore an area of highly degraded coastal salt marsh using dredged material, thereby providing enhanced resiliency to coastal wetlands from the continued effects of sea level rise and other environmental stressors. See Permit Supplement for details.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

The proposed Project involves hydraulically dredging approximately 50,000 cubic yards (CY) of sediment and beneficial use of dredged material via thin layer placement in nearby marshes. The material will be used to restore a marsh complex which exhibits ponding and degradation, in a sediment-deficient system. See Permit Supplement for more information on the dredged material placement at Muddy Neck and the comprehensive evaluation of all other practicable material placement alternatives.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards
50,000 CY dredged sediments		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 122.91
or
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

Silt screens and other biodegradable controls will be placed in and along areas where dredging is to occur to control turbidity. Dredging during winter will turbidity impacts on migrating fish and aquatic species. By engineering with nature through use of the natural topographic changes, the thin layer placement operations will result in gradual, natural transitions of restoration material over the existing marsh as the placement thickness tapers out along the perimeter within the defined transition zones and the even distribution of material is promoted during periods of inundation.

24. Is Any Portion of the Work Already Complete? Yes No IF YES, DESCRIBE THE COMPLETED WORK

The most recent Assawoman Canal dredging project occurred between 2016 and 2018. Since then, no dredge work has occurred in the Assawoman Canal and consequently, shoaling has occurred and inhibited navigation. No beneficial use of sediments has occurred in Muddy Neck Marsh Complex, but the White Creek Dredging and Beneficial Use Project (USACE NAP-2022-00368-85, FC 2022.0039; Approved November 14, 2022) is currently underway, which includes thin-layer placement of dredged materials in the Muddy Neck Marsh Complex. See Permit Supplement for history of White Creek dredging.

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- **Adjoining property owner maps are provided as an appendix to the permit application**

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
DNREC	CWA Sec. 401	Appendix L		Pending	
DNREC	Sec. 401 Appendices	H, R, M		Pending	
DNREC	CZA Consistency			Pending	

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Terry.Deputy@Delaware.Gov Digitally signed by Terry.Deputy@Delaware.Gov
Date: 2023.04.19 09:36:33 -04'00' 2023-04-19 Lena DeSantis Digitally signed by Lena DeSantis
Date: 2023.04.17 09:45:03 -04'00' 2023-04-17
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

ENVIRONMENTAL QUESTIONNAIRE
FOR CORPS OF ENGINEERS PERMIT APPLICATIONS
Philadelphia District, Corps of Engineers
Philadelphia, Pennsylvania 19107
CENAP-OP-R

INTRODUCTION AND INSTRUCTIONS

The District Engineer is required by law to assess the initial, cumulative, and long-term effects of any proposed permit on all aspects of the environment.

To speed the analysis of the probable impact of the proposed work, each applicant is required to submit appropriate environmental data as part of a permit application. We ask that you provide a thorough description of your proposed project and answer each question as it applies to the work and the results of that work. Complete and accurate answers will prevent unnecessary delays in processing your permit application

Parts I and II will be filled out by all applicants. Part I is self-explanatory. In Part II, the Environmental Impact Checklist, you should indicate the impacts of your project on all aspects of the environment that are listed. Use the space under "Qualifying Remarks" to indicate the specific impacts that your project will have. This may include types of plants or animals affected, specific adverse, beneficial, or mitigative effects, changes to existing conditions, etc. Although space for answers has been provided, you may wish to supply additional information on attached pages. If you do not anticipate an impact on a certain item, simply place a check in the "No" column.

Part III will be filled out by all applicants applying for a permit to perform dredging.

Part IV will be filled out by all applicants applying for a permit to perform filling operations. This includes activities such as filling behind bulkheads.

Refer any questions you may have concerning this supplemental form to the Regulatory Branch at (215) 656-6728.

PART I

I. PROJECT DESCRIPTION:

- A. General Site Location: Accurately locate the project site with respect to State, county, or other subdivision, and in relation to streams and rivers.

Assawoman Canal is located in Sussex Co., DE. Assawoman Canal extends from White Creek to the north 5 miles south to Little Assawoman Bay. The Muddy Neck Marsh Complex (Muddy Neck) is located in the Assawoman Wildlife Area in Little Assawoman Bay, Sussex Co., DE.

- B. Specific Site Locations: Completely locate the project site with respect to cove, creek, property owner, plot number, etc.

The proposed Project would occur in the Assawoman Canal in Sussex County, Delaware. The Muddy Neck restoration area is located west of the southern end of Assawoman Canal. Construction plans showing site locations and property owner information are included as supporting information in the permit application.

- C. Description of Proposed Action: Carefully describe the action proposed, including the method of construction, equipment, and materials to be used. Details in your description are important. Attach additional sheets if necessary.

The project includes the following key components: 1) Dredge approximately 50,000 cubic yards of shoaled sediments from the Assawoman Canal, consistent with previous dredge design depths (-3 MLW, 35-foot-wide channel); 2) Transport the dredged material, via pipeline, to the beneficial use placement site at Muddy Neck Marsh Complex within the Assawoman Wildlife Area (Muddy Neck); 3) Employ thin layer placement as a beneficial use of the dredged material to enhance marsh elevations and restore the wetlands, which have been subject to expansive ponding and deterioration. The wetland restoration site, the Muddy Neck Marsh Complex, will be restored to improve coastal resiliency of the marsh (from future storm events). The use of thin layer placement will minimize marsh impacts and restore the marsh in a manner that promotes natural recolonization of vegetation. See Permit Supplement for site map and additional project overview.

- D. Purpose of Proposed Action: Define the purpose of the proposed structure or work. For example, the purpose of bulkheading may be to stabilize an eroding bank; whereas, the purpose for a pier may be for the mooring of a private boat, for access to a public or private facility, for a marina, or for another purpose.

The purpose of the Project is to improve navigability in the Assawoman Canal and restore an area of highly degraded coastal salt marsh using dredged material, thereby providing enhanced resiliency to coastal wetlands from the continued effects of sea level rise and other environmental stressors. See Permit Supplement for details.

- E. Submit color photographs of the site, with explanations of the views shown (prints only). Photographs help us to better understand your project. The more photographs you provide, the easier it is to understand and process your application.

See supporting appendices of the permit application for site plans, photographs, and characterization reports.

PART II – ENVIRONMENTAL IMPACT CHECKLIST

ENVIRONMENTAL IMPACT	YES	NO	QUALIFYING REMARKS
A. Physical			
1. Topography	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sediment placement will restore marsh to elevations conducive to low and high marsh species, including nearer term sea level rise considerations.
2. Geological Elements and Leaching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Air	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4. Transportation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. Handling of Hazardous Materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Spoil Disposal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The proposed project involves beneficial use of dredged materials as an ecological resource.
7. Sewage and Solid Wastes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. Water Resources			
a. Water Quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temporary sediment disturbance at dredging and placement site will be controlled with best management practices (see Section 2 of Permit Supplement for details)
b. Hydrography, Circulation, Littoral Drift.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Placement of dredged materials in low-lying marsh and expanding pond areas will restore previously existing low and high marsh elevations and provide flooding and drainage patterns present in healthy, natural marsh systems
c. Ground Water	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B. Biological			
1. Vegetation			
a. Terrestrial	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Upland and aquatic vegetation will be planted as part of restoration plans at Muddy Neck. No SAV exists in the dredging area.
b. Aquatic	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Fish and Wildlife			
a. Mammals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Construction may cause short term impacts to area fish and wildlife. However, they may avoid the area during construction. No long term impacts are expected.
b. Birds	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project will restore wetland habitat to support coastal species.
c. Amphibians	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Permit Supplement for characterization of temporary impacts on species, including those of special status. There would be no impact to rare or endangered species
d. Reptiles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
e. Fish	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
f. Shellfish	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
g. Invertebrates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Rare or Endangered Species	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

ENVIRONMENTAL IMPACT	YES	NO	QUALIFYING REMARKS
C. Cultural			
1. Land Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Population Density and Trends	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Regional Development	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4. Historic Places	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. Archaeological Sites	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Aesthetics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Temporary construction equipment-related aesthetic impacts along Assawoman Canal will be minimized by use of hydraulic rather than mechanical dredging methodologies.
7. Utilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. Transportation Systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9. Recreation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Recreational watercraft use will benefit from restored navigability in the Assawoman Canal. Restoration of previously existing marsh habitat will provide improved wildlife viewing and recreational hunting opportunities at Muddy Neck.
10. Public Health	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
D. Other Factors			
1. Secondary Effects	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Controversiality	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Is significant dredging involved?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	This is a maintenance dredging project which will restore navigability to the previously dredged waterways. New dredging is not proposed.
4. Is significant filling involved?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Thin-layer placement will restore marsh elevations to within the narrow functional habitat elevation for low and high marsh plant species and not significantly fill the marsh area relative to preexisting conditions

Part III

Considerations of a Dredging Proposal:

- A. Describe characteristics and locations of the proposed dredged material disposal site. Provide photographs.

The dredged material will be transported via pipeline for thin-layer placement (TLP) at Muddy Neck. See supporting appendices of the permit application for site plans and photographs.

- B. Is there a comprehensive plan for disposal sites that takes into account the accumulative effect over time and the decreasing amount of suitable sites for disposal?

Yes, the "Sediment Management Plan" for Rehoboth Bay, Sussex County, Delaware, prepared for DNREC (Moffatt & Nichol, 2007) details the scarcity of dredged material disposal sites for the Canal and other waterways in Delaware's Inland Bays. This plan also proposes a variety of sustainable beneficial use opportunities and/or overall strategies for sediment management.

- C. Describe the present land use of the disposal site.

Muddy Neck is part of the Assawoman Wildlife Area. It is comprised of an expansive tidal marsh system and adjacent, largely forested upland areas. The marsh system is used for recreational hunting and wildlife viewing.

- D. Describe characteristics of the material to be disposed, including:

1. Physical source of material (i.e. sand, silt, clay, etc.) Give percentages of the various fractions if available.

The material is well-graded providing a wide spread of grain sizes from medium sand through clays. This range of grain size is optimal for TLP placement. See Permit Supplement for details, including grain size fractions.

2. Chemical composition of material: Many areas, especially marinas, highly industrialized areas, etc., have sediments with high concentrations of pollutants (chemicals, organic material, etc.). These materials may be re-suspended or reintroduced into the water and result in serious environmental damage. If your proposed dredging is in an area such as described above, a chemical analysis of the material to be dredged should be provided.

A comprehensive evaluation and risk-screening of the chemical composition of the sediments targeted for dredging and subsequent ecological restoration has been completed. See Permit Supplement and "Analysis of Chemical Constituents Report" provided as an appendix to the permit application for detailed analysis.

3. Dewatering properties of the material to be disposed.

No active dewatering is proposed. Following placement the dredged materials will passively dewater following multiple weeks of drainage and flooding during normal tide cycles. Perimeter drainage controls will remain in place following construction and be maintained as needed until material has sufficiently stabilized (as documented in monitoring reports).

4. Compactability of material and settling rates of material to be disposed.

See Permit Supplement and "Analysis of Chemical Constituents Report" for information related to physical properties of the dredged materials.

5. Dredging and disposal schedule to insure that operations do not degrade water quality during times of anadromous fish migration.

Operations are planned for October 2023 through March 2024.

- E. When the project involves land disposal, discuss the following:

1. Method of disposal to be utilized, i.e., pipeline discharge, barge, hopper (underway or stationary).

The beneficial reuse sediment will be transported by pipeline and then applied in a wetland environment via thin layer placement (TLP) methodologies. See Permit Supplement for additional details.

2. Describe method of dredged material containment (i.e. embankment, behind bulkhead, etc.)

Material containment will be achieved through operational controls such as the use of perimeter transition zones between active placement areas and adjacent marsh/waterway areas. Engineering controls such as coir logs and turbidity curtains will also be positioned to protect key marsh features such as tidal creeks, channels, and shoreline areas near placement cells. See Permit Supplement for details.

3. What type of leachates will be produced from the spoil material and what is planned for protection of the groundwater?
See Permit Supplement and "Analysis of Chemical Constituents Report" provided as an appendix to the permit application for detailed analysis of sediment chemistry. The chemical composition of the sediments indicate that associated leachates will not negatively impact the environment.
4. Methods to insure that spoil water does not adversely affect water quality, both during construction and after completion of the project.
See Permit Supplement and "Analysis of Chemical Constituents Report" provided as an appendix to the permit application for detailed analysis of sediment chemistry.
5. Provisions for monitoring during discharge: water quality, sediment transport, and precautions to prevent "short-circuiting" dumping.

Project specifications will require the contractor to ensure TLP material is placed uniformly. Perimeter controls will be inspected daily during TLP operations. Water quality will be visually monitored by construction oversight personnel and if required, turbidity measurements will be taken in the field to assess if field operations need to be modified.

F. Consider and discuss the following for water disposal:

1. Describe methods to be used for water disposal, including volumes and site selection.

N/A

2. Describe the existing water characteristics at the site, including chemical analysis for water quality.

N/A

G. Discuss the frequency and amount of maintenance dredging which will be required; discuss the resulting impacts.

Maintenance dredging may be required within 10 years of the work based on the observed shoaling that has occurred since the prior maintenance dredging event. Additional maintenance dredging would require additional thin layer placement within Muddy Neck in areas that have not previously received material.

H. Alternatives.

1. Discuss all alternatives to the project, including the "no action" alternative.

Alternatives included: other locations for TLP in marshes, CDF, beach placement, and "no action".
See Permit Supplement and Analysis of Alternatives provided with the permit application for details.

2. Discuss alternative types and methods of dredging and disposal, such as pipeline discharge, barging, or hopper method.

See Section 2 of Permit Supplement and Analysis of Alternatives provided with the permit application for details.

3. Discuss alternatives to dredging.

If no dredging occurs, navigational hazards in Assawoman Canal and continued degradation of Muddy Neck will persist. See Permit Supplement and Analysis of Alternatives provided with the permit application for details.

4. Discuss alternative areas of sites for spoil disposal.

See Section 2 of Permit Supplement and Analysis of Alternatives provided with the permit application for details.

5. Discuss impact of port docking patterns upon the demand for dredging. Can alternative patterns reduce the amount of dredging required to support port operations?

N/A

6. Support alternative means of construction that would prevent or minimize water quality degradation using EPA standards for guidance.

See Section 2 of Permit Supplement and Analysis of Alternatives provided with the permit application for details.

7. State in detail impacts resulting in alternative locations for the proposed project.

A complete evaluation of potential alternative locations for beneficial use was conducted resulting in the finding of no practicable alternatives to the Muddy Neck location. See Permit Supplement and Analysis of Alternatives provided with the permit application for details.

Part IV

CONSIDERATIONS OF A FILLING PROPOSAL:

- A. Describe in detail the existing characteristics of the area proposed for filling (i.e. aquatic area, marsh, mudflat, swamp, etc.). In your description, be sure to include the types of vegetation present and the types of animals that use the area. Provide photographs.

This project involves thin-layer placement (TLP) of dredged materials within a degraded wetland environment. This placement approach will retain elevations within the functional range for low and high marsh plant species survival. See photographs and site investigation results provided as appendices to this permit application for details.

- B. Give the following information in regard to the project size:

1. Total area to be filled.

No new area of fill. TLP will restore wetlands.
See discussion (right) and Project Supplement.

TLP will mimic natural deposition by adding 6-9 inches of sediment (and up to 18 inches in the most degraded areas devoid of vegetation), not to exceed elevations of state-regulated wetlands or the local line of mean higher high water. Using the unconfined placement approach (relying on existing site topography to contain sediment dispersion throughout the area) and biodegradable physical barriers (e.g., coir logs), TLP will be applied in 3-inch increments with designated settlement and consolidation periods; at any time, TLP will not exceed 6 inches above target elevation to avoid damaging existing vegetation. An adaptive management approach will guide implementation to account for any variation in bulking, settlement, and consolidation of the material.

2. Size of underwater area to be filled.

N/A

3. Area of intertidal zone to be filled.

N/A

4. Area of wetlands to be filled.

No Fill of wetlands; material will be deposited using TLP to enhance degraded wetlands system.

5. Proposed height of fill.

See above, TLP will not exceed 6 inches above target elevation to avoid damaging existing vegetation

6. Volume of material that will be used in filling.

50,000 CY

- C. Describe in detail the material to be used as fill including as follows:

1. Type of fill to be used (sand, stone, rubble, etc.). If the material is a composite (i.e., rubble), list the types of materials it will contain.

See Permit Supplement for physical and chemical characteristics of sediment within the Assawoman Canal.

2. Give the specific location of the source of this material.

Assawoman Canal

3. What types of leachates will be produced from the fill material and what is planned for protection of surface and groundwater?

N/A

- D. Carefully describe the method of fill, including the following:

1. Method of fill placement, including equipment used in deposition and grading.

See Permit Supplement for description of thin-layer placement.

2. Method of stabilization of banks from erosion, sloughing, wave action, boat wakes, etc.

N/A

3. Method of stabilization of the surface of the fill.

N/A

4. Length of time needed for completion of the project. State if filling will be continuous, intermittent, etc.
The entire Project will take place October 2023 through March 2024. Filling will be continuous during this period.
5. Method of controlling turbidity when filling an underwater area.

N/A

E. Purpose of the Project:

1. What is the intended use of the filled area?
No use - restoration of degraded wetlands
2. What structures, if any, will be constructed on the fill?

N/A

3. What benefits would you gain from the proposed fill?
TLP will result in a more stable and resilient marsh. This project will enhance elevations within Muddy Neck marshes and restore vegetated low and high marsh areas within the thin layer placement cells. The overall function of the restored wetlands will increase coastal resiliency and enhance the habitat value for wildlife species.

F. Alternatives

1. Discuss the “no action” alternative and how this would affect your present and future plans for the development of the area.
No dredging in Assawoman Canal will result in loss of navigability of a critical waterway.
2. Discuss alternative locations for the proposed fill.
Refer to Alternatives Analysis Report provided with permit application.
3. Discuss the use of elevated structures (i.e. causeways, elevated platforms, etc.) in place of the proposed fill.

N/A

4. Discuss any other alternatives you have considered prior to formulating the presently submitted proposal.

Refer to Alternatives Analysis Report provided with permit application.

**NOAA Fisheries Greater Atlantic Regional Fisheries Office
Essential Fish Habitat (EFH) Assessment & Fish and Wildlife
Coordination Act (FWCA) Consultation Worksheet
August 2021 rev.**

Authorities

The Magnuson Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NOAA Fisheries on any action or proposed action authorized, funded, or undertaken by such agency that may adversely affect essential fish habitat (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.

The Fish and Wildlife Coordination Act (FWCA) requires that all federal agencies consult with NOAA Fisheries when proposed actions might result in modifications to a natural stream or body of water. The FWCA also requires that federal agencies consider the effects that these projects would have on fish and wildlife and must also provide for improvement of these resources. Under the FWCA, 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 federally managed and do not have designated EFH.

It is important to note that these consultations take place between NOAA Fisheries and federal action agencies. **As a result, EFH assessments, including this worksheet, must be provided to us by the federal agency, not by permit applicants or consultants.**

Use of the Worksheet

This worksheet can serve as an EFH assessment for **Abbreviated EFH Consultations**, and as a means to provide information on potential effects to other NOAA trust resources considered under the FWCA. An abbreviated consultation allows us to determine quickly whether, and to what degree, a federal action may adversely affect EFH. Abbreviated consultation procedures can be used when federal actions do not have the potential to cause substantial adverse effects on EFH and when adverse effects could be alleviated through minor modifications.

The intent of the EFH worksheet is to provide a guide for determining the information needed to fully assess the effects of a proposed action on EFH. In addition, the worksheet may be used as a tool to assist you in developing a more comprehensive EFH assessment for larger projects that may have more substantial adverse effects to EFH. However, for large, complex projects that have the potential for significant adverse effects, an **Expanded EFH Consultation** may be warranted and the use of this worksheet alone is not appropriate as your EFH assessment.

An **adverse effect** is any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Consultation under the MSA is not required if there is no adverse effect on EFH or if no EFH has been designated in the project area. However, because the definition of “adverse effect” is very broad, most in-water work will result in some level of adverse effect requiring consultation with us, even if the impact is temporary or the overall result of the project is habitat restoration or enhancement. It is important to remember that an adverse effect determination is a trigger to consult with us. It does not mean that a project cannot proceed as proposed, or that project modifications are necessary. An adverse effect determination under the EFH provisions of the MSA simply means that the effects of the proposed action on EFH must be evaluated to determine if there are ways to avoid, minimize, or offset adverse effects. Additional details on EFH consultations, tools, and resources, including [frequently asked questions](#) can be found on our [website](#).

Instructions

This worksheet should be used as your EFH assessment for **Abbreviated EFH Consultations** or as a guide to develop your EFH assessment. It is not appropriate to use this worksheet as your EFH assessment for large, complex projects, or those requiring an Expanded EFH Consultation.

When completed fully and with sufficient information to clearly describe the activities proposed, habitats affected, and project impacts, as well as the measures taken to avoid, minimize or offset any unavoidable adverse effects, this worksheet provides us with required components of an EFH assessment including:

1. A description of the proposed action.
2. An analysis of the potential adverse effects on EFH and the federally managed species.
3. The federal agency’s conclusions regarding the effects of the action on EFH.
4. Proposed mitigation, if applicable.

When completing this worksheet and submitting information to us, it is important to ensure that sufficient information is provided to clearly describe the proposed project and the activities proposed. At a minimum, this should include the public notice (if applicable) or project application and project plans showing:

- location map of the project site with area of impact.
- existing and proposed conditions.
- all in-water work and the location of all proposed structures and/or fill.
- all waters of the U.S. on the project site with mean low water (MLW), mean high water (MHW), high tide line (HTL), and water depths clearly marked.
- Habitat Areas of Particular Concern (HAPCs).
- sensitive habitats mapped, including special aquatic sites (submerged aquatic vegetation, saltmarsh, mudflats, riffles and pools, coral reefs, and sanctuaries and refuges), hard bottom or natural rocky habitat areas, and shellfish beds.
- site photographs, if available.

Your analysis of effects **should focus on impacts that reduce the quality and/or quantity of the habitat or result in conversion to a different habitat type** for all life stages of species with designated EFH within the action area. Simply stating that fish will move away or that the project

will only affect a small percentage of the overall population is not a sufficient analysis of the effects of an action on EFH. Also, since the intent of the EFH consultation is to evaluate the direct, indirect, individual and cumulative effects of a particular federal action on EFH and to identify options to avoid, minimize or offset the adverse effects of that action, is it not appropriate to conclude that an impact is minimal just because the area affected is a small percentage of the total area of EFH designated. The focus of the consultation is to reduce impacts resulting from the activities evaluated in the assessment. Similarly, a large area of distribution or range of the fish species is also not appropriate rationale for concluding the impacts of a particular project are minimal.

Use the information on the our [EFH consultation website](#) and [NOAA's EFH Mapper](#) to complete this worksheet. The mapper is a useful tool for viewing the spatial distribution of designated EFH and HAPCs. Because summer flounder HAPC (defined 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”) does not have region-wide mapping, local sources and on-site surveys may be needed to identify submerged aquatic vegetation beds within the project area. The full designations for each species may be viewed as PDF links provided for each species within the Mapper, or via our website links to the [New England Fishery Management Councils Omnibus Habitat Amendment 2](#) (Omnibus EFH Amendment), the [Mid-Atlantic Fishery Management Councils FMPs](#) (MAMFC - Fish Habitat), or the [Highly Migratory Species](#) website. Additional information on species specific life histories can be found in the EFH source documents accessible through the [Habitat and Ecosystem Services Division website](#). This information can be useful in evaluating the effects of a proposed action. Habitat and Ecosystem Services Division (HESD) staff have also developed a technical memorandum *Impacts to Marine Fisheries Habitat from Non-fishing Activities in the Northeastern United States*, [NOAA Technical Memorandum NMFS-NE-209](#) to assist in evaluating the effects of non-fishing activities on EFH. If you have questions, please contact the [HESD staff member](#) in your area to assist you.

Federal agencies or their non-federal designated lead agency should email the completed worksheet and necessary attachments to the HESD New England (ME, NH, MA, CT, RI) or Mid- Atlantic (NY, NJ, PA, DE, MD, VA) Branch Chief and the regional biologist listed on the [Contact Regional Office Staff section](#) on our [EFH consultation website](#) and listed below.

We will provide our EFH conservation recommendations under the MSA, and recommendations under the FWCA, as appropriate, within 30 days of receipt of a **complete** EFH assessment for an abbreviated consultation. Please ensure that the EFH worksheet is completed in full and includes detail to minimize delays in completing the consultation. If we are unable to assess potential impacts based on the information provided, we may request additional information necessary to assess the effects of the proposed action on our trust resources before we can begin a consultation. If the worksheet is not completely filled out, it may be returned to you for completion. **The EFH consultation and our response clock does not begin until we have sufficient information upon which to consult.**

If this worksheet is not used, you should include all the information required to complete this worksheet in your EFH assessment. The level of detail that you provide should be commensurate with the magnitude of impacts associated with the proposed project. You may need to prepare a more detailed EFH assessment for more substantial or complex projects to fully characterize the effects of the project and the avoidance and minimization of impacts to EFH. The format of the EFH worksheet may not be sufficient to incorporate the extent of detail required for large-scale projects, and a separate EFH assessment may be required.

Regardless of the format, you should include an analysis as outlined in this worksheet for an expanded EFH assessment, along with any additional necessary information including:

- the results of on-site inspections to evaluate habitat and site-specific effects.
- the views of recognized experts on habitat or the species that may be affected.
- a review of pertinent literature and related information.
- an analysis of alternatives that could avoid or minimize adverse effects on EFH.

For these larger scale projects, interagency coordination meetings should be scheduled to discuss the contents of the EFH consultation and the site-specific information that may be needed in order to initiate the consultation.

Please contact our Greater Atlantic Regional Fisheries Office, [Protected Resources Division](#) regarding potential impacts to marine mammals or threatened and endangered species and the appropriate consultation procedures.

HESD Contacts*

New England - ME, NH, MA, RI, CT

Chris Boelke, Branch Chief

Mike Johnson - ME, NH

Kaitlyn Shaw - ME, NH, MA

Sabrina Pereira -RI, CT

christopher.boelke@noaa.gov

mike.r.johnson@noaa.gov

kaitlyn.shaw@noaa.gov

sabrina.pereira@noaa.gov

Mid-Atlantic - NY, NJ, PA, MD, VA

Karen Greene, Branch Chief

Jessie Murray - NY, Northern NJ (Monmouth Co. and north)

Keith Hanson - NJ (Ocean Co. and south), DE and PA, Mid-Atlantic wind

Maggie Sager - NJ (Ocean Co. and south), DE and PA

Jonathan Watson - MD, DC

David O'Brien - VA

karen.greene@noaa.gov

jessie.murray@noaa.gov

keith.hanson@noaa.gov

lauren.m.sager@noaa.gov

jonathan.watson@noaa.gov

david.l.obrien@noaa.gov

Ecosystem Management (Wind/Aquaculture)

Peter Burns, Branch Chief

Alison Verkade (NE Wind)

Susan Tuxbury (wind coordinator)

peter.burns@noaa.gov

alison.verkade@noaa.gov

susan.tuxbury@noaa.gov

***Please check for the most current staffing list on our [contact us page](#) prior to submitting your assessment.**

3. Site Description

EFH includes the biological, chemical, and physical components of the habitat. This includes the substrate and associated biological resources (e.g., benthic organisms, submerged aquatic vegetation, shellfish beds, salt marsh wetlands), the water column, and prey species.

- | | | |
|---|-----|----|
| Is the project in designated EFH ³ ? | Yes | No |
| Is the project in designated HAPC? | Yes | No |
| Does the project contain any Special Aquatic Sites ⁴ ? | Yes | No |
| Is this coordination under FWCA only? | Yes | No |

Total area of impact to EFH (indicate sq ft or acres):

Total area of impact to HAPC (indicate sq ft or acres):

Current range of water depths at MLW Salinity range (PPT): Water temperature range (°F):

³Use the tables in Sections 5 and 6 to list species within designated EFH or the type of designated HAPC present. See the worksheet instructions to find out where EFH and HAPC designations can be found. ⁴Special aquatic sites (SAS) are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region. They include sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes (40 CFR Subpart E). If the project area contains SAS (i.e. sanctuaries and refuges, wetlands, mudflats, vegetated shallows/SAV, coral reefs, and/or riffle and pool complexes, describe the SAS, species or habitat present, and area of impact.

4. Habitat Types

In the table below, select the location and type(s) for each habitat your project overlaps. For each habitat type selected, indicate the total area of expected impacts, then what portion of the total is expected to be temporary (less than 12 months) and what portion is expected to be permanent (habitat conversion), and if the portion of temporary impacts will be actively restored to pre- construction conditions by the project proponent or not. A project may overlap with multiple habitat types.

Habitat Location	Habitat Type	Total impacts (lf/ft ² /ft ³)	Temporary impacts (lf/ft ² /ft ³)	Permanent impacts (lf/ft ² /ft ³)	Restored to pre-existing conditions?*

*Restored to pre-existing conditions means that as part of the project, the temporary impacts will be actively restored, such as restoring the project elevations to pre-existing conditions and replanting. It does not include natural restoration or compensatory mitigation.

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)
[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 38° 31' 58" N, Longitude = 76° 55' 27" W
Decimal Degrees: Latitude = 38.533, Longitude = -75.076

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Longfin Inshore Squid	Eggs	Mid-Atlantic	Atlantic Mackerel, Squid, & Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Atlantic Butterfish	Eggs Larvae Adult	Mid-Atlantic	Atlantic Mackerel, Squid, & Butterfish Amendment 11
		Spiny Dogfish	Sub-Adult Female	Mid-Atlantic	Amendment 3 to the Spiny Dogfish FMP
		Scup	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Summer Flounder	Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Black Sea Bass	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)**

All spatial data is currently available for the Mid-Atlantic and New England councils,

Secretarial EFH,

Bigeye Sand Tiger Shark,

Bigeye Sixgill Shark,

Caribbean Sharpnose Shark,

Galapagos Shark,

Narrowtooth Shark,

Sevengill Shark,

Sixgill Shark,

Smooth Hammerhead Shark,

Smalltail Shark

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)
[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 38° 30' 16" N, Longitude = 76° 55' 41" W
Decimal Degrees: Latitude = 38.504, Longitude = -75.072















The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile	New England	Amendment 3 to the Atlantic Herring FMP
		Red Hake	Adult	New England	Amendment 14 to the Northeast Multispecies FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Longfin Inshore Squid	Eggs	Mid-Atlantic	Atlantic Mackerel, Squid, & Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
		Atlantic Butterfish	Eggs Larvae Adult Juvenile	Mid-Atlantic	Atlantic Mackerel, Squid, & Butterfish Amendment 11
		Spiny Dogfish	Sub-Adult Female	Mid-Atlantic	Amendment 3 to the Spiny Dogfish FMP
		Scup	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Summer Flounder	Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Black Sea Bass	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)**

All spatial data is currently available for the Mid-Atlantic and New England councils,

Secretarial EFH,

Bigeye Sand Tiger Shark,

Bigeye Sixgill Shark,

Caribbean Sharpnose Shark,

Galapagos Shark,

Narrowtooth Shark,

Sevengill Shark,

Sixgill Shark,

Smooth Hammerhead Shark,

Smalltail Shark

5. EFH and HAPC Designations

Within the Greater Atlantic Region, EFH has been designated by the New England, Mid-Atlantic, and South Atlantic Fisheries Management Councils and NOAA Fisheries. Use the [EFH mapper](#) to determine if EFH may be present in the project area and enter all species and life stages that have designated EFH. Optionally, you may review the EFH text descriptions linked to each species in the EFH mapper and use them to determine if the described habitat is present at your project site. If the habitat characteristics described in the text descriptions do not exist at your site, you may be able to exclude some species or life stages from additional consideration. For example, the water depths at your site are shallower than those described in the text description for a particular species or life stage. We recommend this for larger projects to help you determine what your impacts are.

Species Present	EFH is designated/mapped for:				What is the source of the EFH information included?
	EFH: eggs	EFH: larvae	EFH: juvenile	EFH: adults/spawning adults	
Spiny Dogfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper d
Red Hake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper d

6. Habitat Areas of Particular Concern (HAPCs)

HAPCs are subsets of EFH that are important for long-term productivity of federally managed species. HAPCs merit special consideration based their ecological function (current or historic), sensitivity to human-induced degradation, stresses from development, and/or rarity of the habitat. While many HAPC designations have geographic boundaries, there are also habitat specific HAPC designations for certain species, see note below. Use the [EFH mapper](#) to identify HAPCs within your project area. Select all that apply.

Summer flounder: SAV ⁷	Alvin & Atlantis Canyons
Sandbar shark	Baltimore Canyon
Sand Tiger Shark (Delaware Bay)	Bear Seamount
Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)	Heezen Canyon
Inshore 20m Juvenile Cod ⁸	Hudson Canyon
Great South Channel Juvenile Cod	Hydrographer Canyon
Northern Edge Juvenile Cod	Jeffreys & Stellwagen
Lydonia Canyon	Lydonia, Gilbert & Oceanographer Canyons
Norfolk Canyon (Mid-Atlantic)	Norfolk Canyon (New England)
Oceanographer Canyon	Retriever Seamount
Veatch Canyon (Mid-Atlantic)	Toms, Middle Toms & Hendrickson Canyons
Veatch Canyon (New England)	Washington Canyon
Cashes Ledge	Wilmington Canyon
Atlantic Salmon	

⁷ Summer flounder HAPC is defined 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. In locations where native species have been eliminated from an area, then exotic species are included. Use local information to determine the locations of HAPC.

⁸ The purpose of this HAPC is to recognize the importance of inshore areas to juvenile Atlantic cod. The coastal areas of the Gulf of Maine and Southern New England contain structurally complex rocky-bottom habitat that supports a wide variety of emergent epifauna and benthic invertebrates. Although this habitat type is not rare in the coastal Gulf of Maine, it provides two key ecological functions for juvenile cod: protection from predation, and readily available prey. See [EFH mapper](#) for links to text descriptions for HAPCs.

7. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture - <u>List species here:</u>
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
	Other:

8. Effects Evaluation

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
	Benthic community disturbance
	Impacts to prey species

Select all that apply and if temporary ⁹ or permanent		Habitat alterations caused by the activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
		Habitat type conversion
		Other:
		Other:

⁹ Temporary in this instance means during construction. ¹⁰ Entrainment is the voluntary or involuntary movement of aquatic organisms from a water body into a surface diversion or through, under, or around screens and results in the loss of the organisms from the population. Impingement is the involuntary contact and entrapment of aquatic organisms on the surface of intake screens caused when the approach velocity exceeds the swimming capability of the organism.

Details - project impacts and mitigation

Briefly describe how the project would impact each of the habitat types selected above and the amount (i.e., acreage or sf) of each habitat impacted. Include temporary and permanent impact descriptions and direct and indirect impacts. For example, dredging has a direct impact on bottom sediments and associated benthic communities. The turbidity generated can result in a temporary impact to water quality which may have an indirect effect on some species and habitats such as winter flounder eggs, SAV or rocky habitats. The level of detail that you provide should be commensurate with the magnitude of impacts associated with the proposed project. Attach supplemental information if necessary.

What specific measures will be used to avoid and minimize impacts, including project design, turbidity controls, acoustic controls, and time of year restrictions? If impacts cannot be avoided or minimized, why not?

Is compensatory mitigation proposed? Yes No

If compensatory mitigation is not proposed, why not? If yes, describe plans for compensatory mitigation (e.g. permittee responsible, mitigation bank, in-lieu fee) and how this will offset impacts to EFH and other aquatic resources. Include a proposed compensatory mitigation and monitoring plan as applicable.

9. Effects of Climate Change

Effects of climate change should be included in the EFH assessment if the effects of climate change may amplify or exacerbate the adverse effects of the proposed action on EFH. Use the [Intergovernmental Panel on Climate Change \(IPCC\) Representative Concentration Pathways \(RCP\) 8.5/high greenhouse gas emission scenario \(IPCC 2014\)](#), at a minimum, to evaluate the future effects of climate change on the proposed projections. For sea level rise effects, use the intermediate-high and extreme scenario projections as defined in [Sweet et al. \(2017\)](#). For more information on climate change effects to species and habitats relative to NMFS trust resources, see [Guidance for Integrating Climate Change Information in Greater Atlantic Region Habitat Conservation Division Consultation Processes](#).

1. Could species or habitats be adversely affected by the proposed action due to projected changes in the climate? If yes, please describe how:
2. Is the expected lifespan of the action greater than 10 years? If yes, please describe project lifespan:
3. Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change? If yes, please describe how:
4. Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change? If yes, please describe how:
5. Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate? If yes, please describe how:

10. Federal Agency Determination

Federal Action Agency's EFH determination (select one)	
	There is no adverse effect ⁷ on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
	The adverse effect ⁷ on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect ⁷ on EFH is substantial. This is a request for an expanded EFH consultation. We will provide more detailed information, including an alternatives analysis and NEPA documents, if applicable.

⁷ An adverse effect is any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

11. Fish and Wildlife Coordination Act

Under the FWCA, federal agencies are required to consult with us if actions that the authorize, fund, or undertake will result in modifications to a natural stream or body of water. Federal agencies are required to consider the effects these modifications may have on fish and wildlife resources, as well as provide for the improvement of those resources. Under this authority, we consider the effects of actions on NOAA-trust resources, such as anadromous fish, shellfish, crustaceans, or their habitats, that are not managed under a federal fisheries management plan. Some examples of other NOAA-trust resources are listed below. Some of these species, including diadromous fishes, serve as prey for a number of federally-managed species and are therefore considered a component of EFH pursuant to the MSA. We will be considering the effects of your project on these species and their habitats as part of the EFH/FWCA consultation process and may make recommendations to avoid, minimize or offset and adverse effects concurrently with our EFH conservation recommendations.

Please contact our Greater Atlantic Regional Fisheries Office, [Protected Resources Division](#) regarding potential impacts to marine mammals or species listed under the Endangered Species Act and the appropriate consultation procedures.

Fish and Wildlife Coordination Act Resources

Species known to occur at site (list others that may apply)	Describe habitat impact type (i.e., physical, chemical, or biological disruption of spawning and/or egg development habitat, juvenile nursery and/or adult feeding or migration habitat). Please note, impacts to federally listed species of fish, sea turtles, and marine mammals must be coordinated with the GARFO Protected Resources Division.
alewife	
American eel	
American shad	
Atlantic menhaden	
blue crab	
blue mussel	
blueback herring	
Eastern oyster	
horseshoe crab	
quahog	
soft-shell clams	
striped bass	
other species:	
other species:	
other species:	

12. Useful Links

[National Wetland Inventory Maps](#)

[EPA's National Estuary Program \(NEP\)](#)

[Northeast Regional Ocean Council \(NROC\) Data Portal](#)

[Mid-Atlantic Regional Council on the Ocean \(MARCO\) Data Portal](#)

Resources by State

Maine

[Maine Office of GIS Data Catalog](#)

[Town shellfish information including shellfish conservation area maps](#)

[State of Maine Shellfish Sanitation and Management](#)

[Eelgrass maps](#)

[Casco Bay Estuary Partnership](#)

[Maine GIS Stream Habitat Viewer](#)

New Hampshire

[NH Statewide GIS Clearinghouse, NH GRANIT](#)

[NH Coastal Viewer](#)

[State of NH Shellfish Program](#)

Massachusetts

[MA DMF Shellfish Sanitation and Management Program](#)

[MassGIS Data \(Including Eelgrass Maps\)](#)

[MA DMF Recommended TOY Restrictions Document Massachusetts](#)

[Bays National Estuary Program](#)

[Buzzards Bay National Estuary Program](#)

[Massachusetts Division of Marine Fisheries](#)

[Massachusetts Office of Coastal Zone Management](#)

Rhode Island

[RI Shellfish and Aquaculture](#)

[RI Shellfish Management Plan](#)

[RI Eelgrass Maps](#)

[Narragansett Bay Estuary Program](#)

[Rhode Island Division of Marine Fisheries](#)

[Rhode Island Coastal Resources Management Council](#)

Connecticut

[CT Bureau of Aquaculture](#)

[Natural Shellfish Beds in CT](#)

[Eelgrass Maps](#)

[Long Island Sound Study](#)

[CT GIS Resources](#)

[CT DEEP Office of Long Island Sound Programs and Fisheries](#)

[CT River Watershed Council](#)

New York

[Eelgrass Report](#)

[Peconic Estuary Program](#)

[NY/NJ Harbor Estuary Program](#)

[New York GIS Clearinghouse](#)

New Jersey

[Submerged Aquatic Vegetation Mapping](#)

[Barnegat Bay Partnership](#)

[NJ GeoWeb](#)

[NJ DEP Shellfish Maps](#)

Pennsylvania

[Delaware River Management Plan](#)

[PA DEP Coastal Resources Management Program](#)

[PA DEP GIS Mapping Tools](#)

Delaware

[Partnership for the Delaware Estuary](#)

[Center for Delaware Inland Bays](#)

[Delaware FirstMap](#)

Maryland

[Submerged Aquatic Vegetation Mapping](#)

[MERLIN \(Maryland's Environmental Resources and Land Information Network\)](#)

[Maryland Coastal Atlas](#)

[Maryland Coastal Bays Program](#)

Virginia

[VMRC Habitat Management Division](#)

[Submerged Aquatic Vegetation mapping](#)



March 2023
Assawoman Canal Dredging and Beneficial Use Project



Permit Supplement

Prepared for Delaware Department of Natural Resources and Environmental Control

March 2023

Assawoman Canal Dredging and Beneficial Use Project

Permit Supplement

Prepared for

Delaware Department of Natural Resources
and Environmental Control
Shoreline and Waterway Management
Section
89 Kings Highway
Dover, Delaware 19901

Prepared by

Anchor QEA-Woods Hole Group
Joint Venture
755 Business Center Drive, Suite 220
Horsham, Pennsylvania 19044

TABLE OF CONTENTS

1	Introduction	1
1.1	Project Location	1
1.2	Project Purpose	2
1.3	Existing Conditions	3
1.4	Muddy Neck Baseline Conditions Data and Initial Restoration Activity	6
2	Project and Construction Methods	8
2.1	Dredging at Assawoman Canal	8
2.2	Beneficial Use at Muddy Neck Marsh Complex	8
2.2.1	Muddy Neck Thin Layer Placement Layout	10
2.2.2	Discharge Locations and Controls	11
2.2.3	Containment	11
2.2.4	Placement Elevations	12
2.3	Best Management Practices	13
2.4	Project Alternatives Considered	14
3	Environmental Analysis	15
3.1	Sediment and Water Quality	15
3.2	Special Status Habitat and Species	16
3.2.1	Special Status Species	16
3.2.2	Essential Fish Habitat	17
3.3	Cultural Resources	18
3.4	Aesthetics	19
3.5	Coastal Consistency	19
3.6	Notice to Navigational Interests	19
4	Summary	20
5	References	21

TABLES

Table 1	Dredged Material Quantities per Muddy Neck Marsh Complex BU Cell	9
Table 2	Federal Special Status Species within the Project Area	17
Table 3	Species for Which Essential Fish Habitat is Mapped within Delaware Bay and the Delaware Inland Bays	18

FIGURES

Figure 1	Project Location Map
Figure 2	Present Conditions
Figure 3	Aerial View of the Muddy Neck Marsh Complex
Figure 4	Aerial Analysis Year: 1926
Figure 5	Aerial Analysis Year: 1954
Figure 6	Aerial Analysis Year: 1961
Figure 7	Aerial Analysis Year: 1992
Figure 8	Aerial Analysis Year: 2002
Figure 9	Aerial Analysis Year: 2007
Figure 10	Aerial Analysis Year: 2017
Figure 11	Ponding Analysis: 2007 - 2017
Figure 12	Cells in Muddy Neck Marsh Complex
Figure 13	Delaware Sea Level Rise Planning Scenario Curves
Figure 14	Water Level Data from 2012 through 2021 from USGS 01484696 Jefferson Creek at South Bethany, Delaware

ABBREVIATIONS

CDF	confined disposal facility
CWA	Clean Water Act
DFW	Division of Fish and Wildlife
DNREC	Delaware Department of Natural Resources and Environmental Control
EFH	Essential Fish Habitat
HDPE	high-density polyethylene
IPaC	Information for Planning and Consultation
MLLW	mean lower low water
MLW	mean low water
NOAA	National Oceanic and Atmospheric Administration
Project	Assawoman Canal Dredging and Beneficial Use Project
TLP	Thin layer placement
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

1 Introduction

This document has been developed on behalf of the Delaware Department of Natural Resources and Environmental Control (DNREC) Division of Watershed Stewardship to support applications for federal- and state-related permits and approvals necessary for maintenance dredging at Assawoman Canal (the Canal), Sussex County, Delaware, and beneficial use (BU) of the dredged material at the Muddy Neck Marsh Complex of Assawoman Wildlife Area (AWA), Little Assawoman Bay, Delaware (Project). As part of the Project, up to approximately 50,000 cubic yards of sediment will be dredged from Assawoman Canal consistent with previous dredge design depths, transported to Muddy Neck Marsh Complex, and placed by thin layer placement (TLP) to restore the existing wetland area.

This Permit Supplement document provides additional Project background and supporting material for the following permits and regulatory approval:

- U.S. Army Corps of Engineers (USACE):
 - Clean Water Act (CWA) Section 404 (33 United States Code 1344): The Project would require a Section 404 permit for the dredging and fill activities associated with the Project.
- DNREC Wetlands and Subaqueous Lands Permit:
 - DNREC Wetlands and Subaqueous Lands Permit and Appendices H, L, M, and R
 - CWA Section 401 (33 United States Code 1344)
 - An Erosion and Sediment Control Plan approval will be provided to DNREC when obtained.
- Coastal Zone Management Act:
 - The Project would require a consistency determination.

1.1 Project Location

Dredging would occur in Assawoman Canal in Sussex County, Delaware (Figure 1). The Muddy Neck Marsh Complex restoration area is located west of the southern end of Assawoman Canal.

Photographs of the Project areas are provided along with the permit application materials.

Figure 1
Project Location Map



1.2 Project Purpose

The purpose of the Project is to improve navigability in Assawoman Canal and restore an area of highly degraded coastal salt marsh using dredged material, thereby providing enhanced resiliency to

coastal wetlands from the continued effects of sea level rise and other environmental stressors. To accomplish these goals, the following key Project objectives must be accomplished:

- Dredge up to approximately 50,000 cubic yards of shoaled sediments from the Assawoman Canal, consistent with previously dredged depths.
- BU of the dredged material for wetland restoration at the Muddy Neck Marsh Complex, located in close proximity to the dredging site, to restore historically degraded wetlands, and to improve coastal resiliency of the marsh (from future storm events).
- Use TLP to minimize marsh impacts and to restore the marsh so that natural recolonization of vegetation is promoted where suited.

1.3 Existing Conditions

Assawoman Canal is a tidally influenced navigational channel serving as a connection between White Creek to the north and Little Assawoman Bay to the south. Figure 2 is a photograph of present conditions.

Figure 2
Present Conditions



The Canal is popular for recreational boating and is bordered by vegetated shoreline, salt marshes, and residential development. The Canal was last dredged in 2018. Sedimentation and shoaling since that time has led to navigational hazards and Assawoman Canal was identified during a 2019 stakeholder survey¹ as a high-priority waterway for maintenance dredging activity (DNREC 2022). Bathymetric surveys conducted in 2022 confirmed high sediment deposition and evidence of shoaling within the Canal; if dredging does not occur, sedimentation may further inhibit navigation in the Canal, eliminating access between Indian River Bay and Little Assawoman Bay.

Muddy Neck Marsh Complex is an expansive coastal salt marsh system stretching up to a half mile from the adjacent upland shoreline. Miller Creek is located immediately south of the marsh system. Figure 3 provides an aerial view of the Muddy Neck Marsh Complex. The site is a fragmented tidal wetland complex within the AWA, located within the Little Assawoman Bay watershed. Predominant vegetative species in the area include smooth cordgrass, salt hay cordgrass, spike grass, common reed, glassworts, sea lavender, marsh elder, groundsel bush, salt marsh bulrush, and switchgrass (AQ-WHG JV 2022a). The AWA also supports a variety of fish species, including Atlantic silverside, mummichog, spot, striped killifish, summer flounder, and sheepshead minnow (McGowan et al. 2017). The marsh is remotely located with limited and infrequent recreational access for hunting.

¹ This study was conducted by DNREC from October to November 2019. In a total of three public meetings, more than 1,000 survey responses helped provide data on waterway use, navigation, and dredging need.

Figure 3
Aerial View of the Muddy Neck Marsh Complex Prior to Start of White Creek Restoration Work



In 2022, a similar project – the White Creek Dredging and Beneficial Use Project – was authorized for dredging and beneficial use of sediments from White Creek at the Muddy Neck Marsh Complex with the intention of restoring select areas of degraded coastal marsh. Under this project, approximately 70,000 cubic yards of sediment will be hydraulically dredged and beneficially used through a TLP application. Construction activities for the White Creek Dredging and Beneficial Use Project began in February 2023 and are anticipated to continue through mid-April 2023 before pausing to observe environmental timing restrictions with work completed in Fall 2023 prior to the start of the planned Assawoman Canal Dredging and Beneficial Use Project.

Section 1.4 discusses the need for additional restoration backfill in order to achieve the targeted restoration goals approved for the White Creek Dredging and Beneficial Use Project; sediment from Assawoman Canal can be implemented to address some or all of this restoration backfill deficit.

The Muddy Neck Marsh Complex has experienced widespread ponding and fragmentation over the last 60 to 70 years. U.S Geological Survey (USGS) aerials, taken from the U.S. Department of Agriculture’s National Agriculture Imagery Program and National Aerial Photography Program photographs, show the loss of wetlands over time (see Figures 4 through 10). Between 2007 and 2017 alone, the approved restoration areas within Muddy Neck Marsh Complex experienced approximately 10 acres of pool expansion and associated loss of vegetated area (CIB 2021; see Figure 11). Of the approximately 112 acres approved for TLP, this imagery analysis shows that

approximately 66 acres, or 59% of the overall area, was unvegetated at the start of the White Creek dredging project and associated restoration work in February 2023. Causes of this ponding and of this fragmentation are suspected to include sea level rise, sediment deficiency, herbivory by snow geese (*Chen caerulescens*), and sudden wetland dieback (CIB 2021; DNREC 2021a; Jo et al. 2014). Other ponded and pooled areas in the AWA have not naturally recovered over time, which demonstrated the need for restoration intervention in a sediment-starved system (CIB 2021). In the absence of restoration activities, the Muddy Neck Marsh Complex was anticipated to experience continued pond expansion, erosion, loss of high and low marsh vegetation, and degradation of valuable wildlife habitat that this area provides.

1.4 Muddy Neck Baseline Conditions Data and Initial Restoration Activity

Baseline site conditions at the Muddy Neck Marsh Complex were documented during a January 2022 site investigation to verify the presence of degraded conditions evident in aerial imagery and provide a baseline dataset for comparison in future monitoring efforts. The following investigations were performed as part of that effort:

- Field reconnaissance and collection of field photographs of the Site
- Collection of surface sediment samples for geotechnical evaluation
- Collection of a topographic survey transects via real-time kinematic (RTK) GPS of vegetated and unvegetated areas
- Mid-Atlantic Tidal Wetland Rapid Assessment Method (MidTRAM) data collection characterizing bio-benchmarks and wetland health

Lab data, field forms, and figures associated with this baseline conditions are provided along with the permit application attachments.

Restoration activities associated with the aforementioned White Creek Dredging and Beneficial Use Project began in February 2023 and are anticipated to continue through mid-April 2023 before pausing to observe environmental timing restrictions with work completed in Fall 2023 prior to the start of the planned Assawoman Canal Dredging and Beneficial Use Project. These activities include TLP of restoration backfill at three distinct placement cells within the Muddy Neck Marsh Complex. Pre-construction survey of the restoration area cells was performed prior to the start of the White Creek project in late 2022 and identified an increase in volume needed to achieve the targeted restoration elevation for these areas as summarized in Table 1. Based on the anticipated White Creek project dredging volume of approximately 70,000 cubic yards, additional material will be needed to achieve targeted restoration elevations within the placement cells. Additional restoration backfill material dredged as part of the Assawoman Canal Dredging and Beneficial Use Project can be used

to address this restoration backfill deficit and achieve the restoration goals originally approved for the White Creek Dredging and Beneficial Use Project.

2 Project and Construction Methods

The Project design is illustrated in the construction plans that are included as part of the permit application package. Construction is expected to commence in October 2023, with an estimated completion by March 2024.

2.1 Dredging at Assawoman Canal

The Project involves hydraulically dredging 50,000 cubic yards within the historical dredging footprint of the Canal. Dredging within the northernmost 0.4 miles of the Canal was approved and partially completed in February 2023 as part of the White Creek Dredging and Beneficial Use Project, prior to suspending the work due to an environmental timing restriction for this area. As the contractor was not able to complete the northernmost 0.4 miles of the Canal in the planned timeframe, the area will either be revisited in the fall under the White Creek Dredging and Beneficial Use Project or appended to the planned dredging extents for the Assawoman Canal Dredging and Beneficial Use Project.

Sediment removal will be conducted using a cutter suction dredge and 10- to 12-inch high-density polyethylene (HDPE) dredge pipeline. Floats will be attached to the dredge pipeline so that the pipeline remains on the surface and it will be clearly marked for navigational boaters. The Project will restore depths of -3 MLW (-2.79 MLLW) in a 35-foot-wide channel. Dredged material will be transported along the up to 4-mile route from the northern extent of Assawoman Canal, utilizing the aforementioned pipeline as well as up to three strategically located booster pumps that will provide necessary power to convey material through the pipeline at this distance.

Dredging will be conducted in winter months (offseason, October to March) to minimize disruption to migrating fish and native aquatic species in the waterway.

2.2 Beneficial Use at Muddy Neck Marsh Complex

The dredged material will be transported via pipelines to the Muddy Neck Marsh Complex for wetland restoration using TLP methodologies. TLP is a USACE-accepted form of BU that involves the placement of sediments in thin, uniform layers over eroding wetlands to enhance resiliency of marshes and maintain existing natural vegetation and habitat (Mohan and Piercy 2021). For this Project, TLP will mimic long-term natural deposition processes by adding 6 to 9 inches of sediment (and up to 18 inches in most degraded areas) over the wetland platform, without exceeding elevations of state-regulated wetlands or the mean higher high water when accounting for modest near-term sea level rise considerations. Consistent with the procedures in the USACE guidance on TLP (Mohan and Piercy 2021), dredged material will be placed without lateral confinement (i.e., relying on existing site topography to contain sediment dispersion throughout the area). Limited areas of biodegradable or temporary physical barriers (e.g., coir logs and silt curtains, respectively)

will be placed in the field. TLP will be applied in 3- to 6-inch increments with designated settlement and consolidation periods. At any time, TLP will not exceed the maximum target elevation to avoid damaging existing vegetation. An adaptive management approach will guide implementation to account for any variation in bulking, settlement, and consolidation of the material.

TLP will be applied to three cells in Muddy Neck Marsh Complex, shown in Figure 12. The corresponding volumes per cell are included in Table 1.



Table 1
Dredged Material Quantities per Muddy Neck Marsh Complex BU Cell

Cell	Area (acres)	Targeted Restoration Backfill Volume (cubic yards)	Anticipated Placement Volume – White Creek (cubic yards)	Restoration Backfill Deficit (cubic yards)
1	12.6	13,200	0	13,200
2	35.2	79,700	35,000	34,700
3	43.9	50,000	0	50,000

Restoration at Muddy Neck Marsh Complex was determined as the preferred option in the *Alternatives Analysis* memorandum (AQ-WHG JV 2023a) due to the combination of ecological uplift

(via marsh restoration), improved resiliency, lower implementation costs, and minimal community impacts when compared to other BU alternatives.

Additionally, although a nearby CDF (Muddy Neck CDF No. 2) was used for previous dredging operations, DNREC Division of Fish and Wildlife (DFW) staff in charge of its overall management have expressed concern regarding continued use of and disturbance to this feature, which has become naturalized with extensive tree and shrub habitat for game species. Further, DNREC DFW, as the landowner of both Muddy Neck CDF No. 2 and the Muddy Neck Marsh Complex Property and surrounding coastal marsh areas, prefer marsh restoration over CDF disposal when suitable options for ecological uplift exist. Use of TLP will enhance the resiliency of the fragmented marsh areas by providing ecological uplift and facilitating revegetation of native marsh grass, while avoiding propagation of invasive phragmites. Because of these outcomes, BU has been recommended by the Center for Inland Bays and DNREC as a priority for restoration in areas where natural marsh restoration is limited by development, sea level rise, saltwater intrusion, and other degradation factors, such as in the Project's targeted area (CIB 2021; DNREC 2021a). The extent of TLP will be limited to historical marsh habitat and not create habitat in open water.

An adaptive management plan was developed for Muddy Neck Marsh Complex restoration and is included within the *Project Monitoring Plan* (AQ-WHG JV 2023b) provided as part of the permit application package. As part of the plan, a post-construction survey of the BU area and a post-dredge bathymetry study of the Assawoman Canal will be submitted (pre-dredge bathymetric surveys were completed November 2022; see submittal as part of permit package).

2.2.1 Muddy Neck Thin Layer Placement Layout

The Muddy Neck TLP design involves multiple-point, low-pressure, on-shore discharge to three identified placement cells. The location and extent of the individual cells was established following evaluation of marsh topography, limits of interior ponds and mudflats, and location of tidal creeks and channels in the marsh interior. Cell placement limits were refined by applying a horizontal offset from the marsh shoreline to minimize the potential for transport of placed materials beyond the intended limits and into adjacent waterways. A transition zone was established for each placement cell to establish acceptable limits for final deposition of placed material and to provide nourishment for low-lying areas of vegetated marsh. The transition zone was generally established as a 50-foot horizontal offset from the targeted placement area.

Cell capacities were determined for each area based on available LIDAR data. The anticipated settlement of the underlying marsh and consolidation of placed material will be evaluated to further refine cell capacities prior to implementation.

2.2.2 Discharge Locations and Controls

Approximate discharge locations for each cell will be indicated in the final construction drawings, although the selected restoration contractor will be able to seek approval to modify designated discharge locations to correspond to the specific equipment used to conduct the work. Generally, discharge locations will be established near the boundary of the cell closest to the borrow source (i.e., the dredge footprint) so the dredged material can move across the placement cell from the discharge point. Use of wye assemblies and multiple discharge points will reduce the pressure of the slurry in the pipeline at the point of discharge. The pipeline discharge shall be outfitted with an energy-reducing attachment to promote spreading of the placement material and prevent scour of the underlying marsh surface near the discharge point.

2.2.3 Containment

TLP operations will use various techniques to prevent overflow material from potentially entering the adjacent waterbody. Unconfined placement will rely on existing site topography to act as natural obstacles to material movement. Biodegradable physical barriers will be positioned to protect key marsh features such as tidal creeks, channels, and shoreline areas near placement cells.

The unconfined placement approach has been used successfully in similar projects and has many benefits for the proposed project. Because the placement cells were designed using site topographic data to target areas of lower elevation, they can be effectively bound by the areas of higher elevation marsh that surround them. By engineering with nature through use of these natural topographic changes, the placement operations will result in gradual, natural transitions of restoration material over the existing marsh as the placement thickness tapers out along the perimeter within the defined transition zones and the even distribution of material is promoted during periods of inundation. Recent TLP restoration projects in Delaware and Georgia, and pilot projects in New Jersey, detail the difficulty in removing marsh containment following TLP. These challenges occur due to hay bales or coir logs becoming saturated and, consequently, difficult to move without construction equipment and unnecessary disturbance to the marsh. The use of low-ground-pressure equipment to remove the controls and frequent traffic over the marsh areas can cause substantial distress to areas that would otherwise be undisturbed by the placement operations. Furthermore, leaving perimeter controls in place for too long after TLP disrupts natural inundation patterns and can delay marsh recovery. Limiting physical controls to only critical boundaries, and not fully encircling any placement areas, reduces overall disruption of the marsh footprint and promotes more natural edges following placement.

Areas of limited placement for physical containment barriers are shown in the Design Drawings. Placement boundaries may be supplemented in the field, as necessary. Containment in these areas shall be biodegradable coir logs constructed with natural fibers from coconut husk and between 12

and 18 inches in diameter. This material is strong, relatively waterproof, and resistant to saltwater damage. It has proven to be a successful tool for managing sediment movement in wetland environments. Coir logs shall be secured in place using wood stakes prior to the start of placement. Because the coir log will not completely surround the placement area at any location, the TLP cells will not be isolated from typical inundation patterns and removing the coir logs shortly following placement is not as critical. As the edge of placement adjacent to a coir log consolidates over the initial 30-90 days following placement, the stakes securing the containment can be removed and the material can be allowed to degrade naturally. This will avoid the need to further disturb the marsh footprint by removing the containment materials.

2.2.4 Placement Elevations

Anchor QEA performed a water level analysis to estimate tidal datum elevations that are relevant to the restoration work and to inform the project design. Specifically, the mean tide level (MTL) and mean higher high water (MHHW) tidal datum elevations were estimated since the range between MTL and MHHW corresponds to the known survival range for native low and high marsh vegetation species that are targeted for restoration.

The water level analysis was performed using water level elevation data from USGS station 01484696 Jefferson Creek at South Bethany, Delaware which is close to (i.e., less than one mile) the Muddy Neck TLP areas (USGS 2022). High resolution water level data (e.g., 6-minute interval) for over 14 years was available and used in the evaluation (October 1, 2007 through December 31, 2021). To estimate the MTL and MHHW tidal datum elevations, the USGS water level data was evaluated using the National Oceanic and Atmospheric Administration (NOAA) Center for Operational Oceanographic Products and Services (CO-OPS) Tidal Analysis Datum Calculator (NOAA 2022). The NOAA tidal datum calculator computed a MTL elevation equal to 0.26 foot North American Vertical Datum of 1988 (NAVD88) and a MHHW elevation equal to 0.71 foot NAVD88.

An additional evaluation was performed to estimate a 10-year sea-level rise value to incorporate into the project design. The evaluation was based on guidance published by the Delaware Sea-Level Rise Technical Committee in November 2017 in the *Recommendation of Sea-Level Rise Planning Scenarios for Delaware: Technical Report* (DE SLR TC 2017). The approach of incorporating sea-level rise (SLR) in ecological restoration projects is consistent with policies established in Delaware's *Climate Action Plan* (DNREC 2021b). Figure 13 shows the sea-level rise (SLR) planning scenario curves from DE SLR TC (2017). As shown on Figure 13, to estimate the amount of SLR that may occur during the 10-year period from 2023 to 2033, the intermediate SLR value in 2033 was converted to be relative to mean sea level 2023 using the methodology described in DE SLR TC (2017) and equaled 0.37 foot. To further evaluate the estimated intermediate 10-year SLR from the DE SLT TC (2017), the linear trend of the last ten years of water level data from USGS 01484696 was evaluated (January 1, 2012 through December 31, 2021). Figure 14 shows the USGS data and the linear trendline slope computed for the

data. Based on the linear trendline slope shown on Figure 14, the estimated 10-year SLR equaled 0.36 foot, which was approximately equal to the estimated intermediate 10-year SLR using the recommended planning scenario curves. Therefore, a 10-year SLR value equal to 0.37 foot was selected to inform the project design.

To increase the resiliency of the restored marsh areas, the project design maximum fill elevation within the Muddy Neck TLP areas considered both the computed MHHW elevation and the estimated intermediate 10-year sea-level rise value. The design fill elevation equaled 0.71 foot NAVD88 plus 0.37 foot of sea-level rise, which equaled 1.08 feet NAVD88, but was set to 1.0 foot NAVD88 for constructability considerations.

2.3 Best Management Practices

The following best management practices and construction controls would be included as part of the construction plans and specifications to ensure the Project is completed in accordance with the design and applicable regulations:

- Taking lessons from recent TLP projects in New Jersey that demonstrated that physical perimeter controls can result in negative impacts on adjacent sites and water quality when installed and removed (The Nature Conservancy and New Jersey Department of Environmental Protection 2021), the Project will instead rely on alternative methods for containment, including the following:
 - Transition zones comprising up to 50-foot horizontal offsets from marsh edges
 - Biodegradable coir logs and hay bales secured by wooden stakes (by hand) and maintained to withstand inclement weather throughout the duration of the Project (stakes to be removed after 30 to 90 days to allow for sediment consolidation); installed for protection of existing shoreline, tidal creeks, and channels
- Unconfined placement will rely on existing site topography to limit material movement to unintended areas (i.e., elevated marsh will confine TLP to the targeted pond areas).
- The pipeline transporting the dredged material slurry will be submerged in White Creek and along the Assawoman Canal, solely in the Project area, to avoid impacts to adjacent wetlands.
- Dredging during the winter months will limit disruption to migrating fish and aquatic species that would otherwise be impacted by turbidity impacts.
- Proper construction oversight will also be used to ensure no negative impacts to adjacent water quality (e.g., daily site inspections of perimeter controls and adjacent marsh areas by construction manager).
- Similar to the White Creek Dredging and Beneficial Use Project, the staging area for TLP is anticipated to be located at the Muddy Neck CDF No. 2; its use will only be for means of access to the site. No dredged material will be placed at the CDF. To protect the upland area,

construction access shall be by means that avoid or minimize impacts to terrestrial and aquatic sites (e.g., low pressure equipment, biodegradable erosion blankets, and mats).

- Project workers shall not harass or impact any waterfowl or fish in the Project area.
- To monitor the variable settlement and consolidation rates, an adaptive management plan has been developed.

2.4 Project Alternatives Considered

In absence of the Project, no dredging would occur, and navigational constraints would remain due to shoaling throughout the Canal. In addition, further degradation of the Muddy Neck Marsh Complex and continued creation of open water pools within the marsh system and associated loss of critical wetland habitat would occur. In the *Alternatives Analysis* (AQ-WHG JV 2023a), additional dredged material management alternatives were thoroughly explored in lieu of ultimate BU placement at Muddy Neck Marsh Complex:

- As discussed above, the Muddy Neck CDF No. 2 was considered due to its prior use for dredged sediments, but DNREC DFW are concerned over potential impacts to established vegetation within the CDF and prefer using the sediment as restoration backfill within the Muddy Neck Marsh Complex.
- In addition to considering Muddy Neck Marsh Complex as a potential BU repository, a beach nourishment site at Fenwick Island State Park was also explored. Ultimately, constructability challenges associated with routing a pipeline under Delaware Route 1 eliminated this alternative. Additionally, based on the observed level of wetland degradation, Muddy Creek Marsh Complex was ultimately selected as the most viable BU option and best opportunity for marsh enhancement.
- A no-action alternative was considered but would result in continued navigability concerns within the Canal and continued degradation of the Muddy Creek Marsh Complex.

3 Environmental Analysis

The following subsections provide additional information about the Project and potential effects on the environment because of the Project.

3.1 Sediment and Water Quality

Material in the navigational channels is primarily a mix between fine silt/clay and medium-to-fine sand. Samples range from 0.4% to 41% fine-grained (i.e., silt and clay) content and 53% to 99% sand (i.e., coarse, medium, and fine sand) content based on the sample area. Sand content is highest at the mouth and headwaters of White Creek.

Shell fragments were not noted in the available characterization data, but it is assumed that they would be present to some extent in this marine environment. Average salinity recorded between October and March from USGS gauges located in the vicinity of White Creek and Muddy Neck Marsh Complex which bracket the Project area, per the Delaware Water Quality Portal, are similar, with monthly average differences ranging from 0.05 to 3.51 parts per trillion (Center for Environmental Monitoring and Analysis 2022).

A chemical characterization found levels of pesticides in the proposed dredged material exceed DNREC ecological sediment screening criteria; however, they are less than alternate screening values. The characterization found levels of metals in the proposed dredged material exceed their respective DNREC marine or surface sediment screening criteria; however, they are less than alternate screening values and are also consistent with the range of background values observed in the inland bay region. Other contaminants² detected were determined to be low enough to not pose risks to ecological or human health at the Project site. Therefore, the results of the analysis support BU of Assawoman Canal dredged material in Muddy Neck Marsh Complex. Further physical and chemical characterization reports of the material and surrounding area can be found as an attachment in the permit package and a detailed screening of sediment chemistry is provided in *Analysis of Chemical Constituents in Sediments* (AQ-WHG JV 2023c) provided along with the Project permit application materials.

As discussed in Section 2.2.3, to control turbidity, silt screens and other biodegradable controls will be placed in and along areas where dredging is to occur and will be monitored frequently, per State of Delaware requirements. Dredging during the winter months will also limit disruption to migrating fish and aquatic species that would otherwise be impacted by turbidity impacts. In addition, close construction administration will also be implemented to ensure no negative impacts to adjacent water quality (e.g., daily site inspections by the construction manager).

² Tested contaminants included three pesticides, 34 semi-volatile organic compounds, 21 metals, and polychlorinated biphenyls.

3.2 Special Status Habitat and Species

The area supports a variety of nektonic species, including Atlantic silverside, mummichog, spot, striped killifish, summer flounder, sheepshead minnow, and blue crab (McGowan 2017). The shorelines and inner, upland areas in and along Assawoman Canal consist of intertidal flats, emergent wetlands, and scrub-shrub wetlands. Intertidal flats consist of mainly smooth cordgrass. Emergent wetlands, or tide marsh, consist of low marsh and high marsh vegetation species. Scrub-shrub wetlands contain upland portions of the tidal marshes with mainly marsh elder and groundsel bush. The following are common vegetation species native to the area in and along Assawoman Canal: smooth cordgrass, salt hay cordgrass, spike grass, common reed, glassworts, sea lavender, orach, marsh elder, groundsel bush, salt marsh bulrush, and switchgrass (DNREC 1995). However, within the proposed Assawoman Canal dredging area, there is no reported submerged vegetation to be affected (DNREC 2021a); additionally, dredging will be limited to the center of the channel and will not directly impact surrounding wetlands.

A hydraulic cutterhead dredge shall be used to transport sediment from the areas being dredged to the planned TLP locations. The use of a dredge is necessary but is limited in size to enable optimal production for the TLP and marsh nourishment operations without overloading receiving cells and creating water management issues. Additionally, pipeline installation may create temporary effects on wildlife, but management will be supported by a low-ground pressure or amphibious excavator to move or reposition pipelines and wye valve assemblies. Dredging flow rate and production will be controlled in the field by the dredging operator and at the discretion of construction managers to minimize runoff from the TLP locations into Assawoman Canal, White Creek, Little Assawoman Bay, and nearby tidal creeks.

TLP will cause initial smothering of vegetation; however, by limiting lift thickness to less than 9 to 12 inches,³ currently vegetated areas are expected to regrow within two to three growing seasons. Vegetation monitoring will be conducted to document marsh recovery and to confirm no long-term adverse vegetative impacts. Vegetative impacts will be monitored and assessed with respect to wetland vegetation dominance, percent coverage, presence of invasive species, inundation patterns, and wetland soils. Additional details are provided in the *Project Monitoring Plan* for the Project (AQ-WHG JV 2023b).

3.2.1 Special Status Species

Data from the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) planning tool and species list for the State of Delaware was used to determine the potential for special status species to occur within the Project areas (USFWS 2022a, 2022b). Table 2 presents the federally listed special status species with the potential to occur in or adjacent to the Project area.

³ Up to approximately 18 inches may be applied in currently unvegetated areas.

None of the special status species are expected to be affected during dredging; the Project area does not contain critical habitat for the eastern black rail and the species does not forage in the open water. Eastern black rail populations have been declining in the eastern United States for more than a century. This decline has resulted in a retraction of its breeding range, an overall reduction in the number of breeding locations within its core range, and a loss of individuals within historical strongholds.

While monarch butterflies may be within the dredging area during the October and early November timeframe, they would be expected to avoid the dredging equipment and activities. Monarch butterflies would not be present in the area and any similar species that may be present would be expected to leave the area during dredging operations. The IPaC report is included as an attachment to the permit package.

Table 2
Federal Special Status Species within the Project Area

Scientific Name	Common Name	Category	Special Status
<i>Laterallus jamaicensis ssp. jamaicensis</i>	Eastern black rail	Birds	Federally Threatened
<i>Danaus plexippus</i>	Monarch butterfly	Insects	Candidate Species

Source: USFWS 2022b

Delaware maintains a list of species of greatest conservation need and has developed the Delaware Wildlife Action Plan (DNREC 2015). Of the listed species, several including the bog turtle (*Glyptemmys mullenbergii*) and the spotted turtle (*Clemmys guttata*) are associated with wetlands and are likely to be in the Project area during TLP. Similar to species discussed above, these species would be expected to leave the immediate Project area during construction but would benefit from additional habitat following marsh restoration.

3.2.2 Essential Fish Habitat

The Project area contains Essential Fish Habitat (EFH) for both highly migratory and New England/Mid-Atlantic species that may be adversely affected during dredging, though the expected construction window in the winter accommodates many dredging restrictions, such as that of summer flounder, and limits impacts to when aquatic species are not as active as in other seasons. Juveniles and adults are expected to vacate the area once construction starts; however, nearby ponds outside of the placement area will remain and can serve as EFH. The disturbance of bottom sediments associated with dredging could interfere with feeding, predation, and avoidance patterns. However, adverse impacts are expected to be temporary and highly localized. Some eggs and larvae may be entrained during dredging operations; however, this would be temporary and localized to the area being dredged. The Project will ensure low marsh remains in the area to benefit the

heterogeneity of fish species. EFH Assessment Worksheets are included as an attachment to the permit package.

Table 3
Species for Which Essential Fish Habitat is Mapped within Project Area Limits

Species	Project Area
Atlantic Herring	J
Black Sea Bass	JA
Bluefish	JA
Clearence Skate	JA
Little Skate	JA
Red Hake	A
Scup	JA
Summer Flounder	LJA
Windowpane Flounder	ELJA
Winter Skate	JA
Butterfish	ELJA
Longfin Inshore Squid	E
Spiny Dogfish	A
Total Species	13

Abbreviations: E: eggs; L: larvae; J: juveniles; A: adults; X: data not developed for individual life stages
 Source: NOAA/TNC

3.3 Cultural Resources

There are no known cultural resources in the Assawoman Canal or immediate Muddy Neck Marsh Complex area (DNREC 1995). However, outside of the BU area, several culturally sensitive sites exist across the adjacent waterbody of Miller Creek. To ensure any unanticipated find would be protected, the following cultural resources measure would be added to the construction plan and contract:

- In the unlikely event that any artifact or an unusual amount of bone, shell, or non-native stone is encountered during construction, work shall be immediately stopped and relocated to another area. The contractor shall stop construction within 30 feet of the exposure of these finds until a qualified archaeologist can be retained to evaluate the find. Examples of such cultural materials might include concentrations of ground stone tools, such as mortars, bowls, pestles, and manos; chipped stone tools, such as projectile points or choppers; flakes of stone not consistent with the immediate geology, such as obsidian or fused shale; a historical trash pit containing bottles or ceramics; or structural remains. If the resources are found to be

significant, they shall be avoided or shall be mitigated consistent with Delaware's State Historic Preservation Office guidelines.

3.4 Aesthetics

The Project will result in aesthetic impacts, though they will be localized and temporary. Residents proximal to the Project area will be able to view the dredge, but operations will be limited to the 5- to 6-month construction window (fall and winter) and will not coincide with typical peak months of recreation. Staging equipment at the existing Muddy Neck CDF No. 2 makes use of an area with consistent purpose, instead of creating a new construction area that could interfere with aesthetics. The pipeline used to transport the dredged material will be submerged to reduce both navigational and visual impact, though navigational buoys will mark the pipeline's location. The target marsh areas will not differ visually from others in the system, except for the initial months of vegetation smothering and elevated platforms, with vegetative restoration reoccurring within two to three growing seasons.

3.5 Coastal Consistency

Delaware Coastal Programs manages the Delaware's Coastal Zone Management Federal Consistency reviews to ensure that state and federal actions in the coastal zone are consistent and coordinated. Delaware's Coastal Zone Act Program regulates new and existing manufacturing and heavy industrial activities in Delaware's Coastal Zone, which generally runs the length of the state along the Delaware River, the Delaware Bay, the Inland Bays, and the Atlantic Ocean. The Project is regulated under the Coastal Zone Management Act of 1972, as amended, and the National Oceanic and Atmospheric Administration's Federal Consistency Regulations (15 Code of Federal Regulations 930). Therefore, a Delaware Coastal Management Program Federal Consistency Determination form has been completed to support the Project. As identified, the Project is consistent with applicable policies. The Project would reduce navigational constraints for users of Assawoman Canal and enhance wetland resiliency in the Muddy Neck Marsh Complex. The Project includes best management practices and controls to ensure environmental protections.

3.6 Notice to Navigational Interests

Because the Project would occur partially within the navigational channel, assuming the Project is approved by USACE, a Notice to Navigational Interests would be filed prior to initiating work. During construction, navigational buoys will indicate the location of the submerged pipeline along Assawoman Canal for safety.

4 Summary

In summary, the Project improves navigation in waterways extensively used by local residents and tourists, by removing shoaled sediment. Dredged material from the Project will restore historically degraded wetlands in the area and improve ecological value and overall resilience of the marsh from future coastal storms. No environmental detriments exist for the project and project construction impacts are determined to be temporary and controlled by construction means and methods (via project specifications and construction contract).

5 References

- AQ-WHG JV (Anchor QEA-Woods Hole Group Joint Venture), 2023a. *Alternatives Analysis*. Assawoman Canal Dredging and Beneficial Use Project.
- AQ-WHG JV, 2023b. *Project Monitoring Plan*. Assawoman Canal Dredging and Beneficial Use Project. March 2023.
- AQ-WHG JV, 2023c. *Analysis of Chemical Constituents in Sediments*. Assawoman Canal Dredging and Beneficial Use Project.
- Center for Environmental Monitoring and Analysis, 2022. Delaware Water Quality Portal. Accessed February 16, 2022. Available at: <http://demac.udel.edu/waterquality/>.
- CIB (Center for Inland Bays), 2021. *Delaware Inland Bays Comprehensive Conservation and Management Plan*. Accessed January 18, 2022. Available at: <https://www.inlandbays.org/get-involved/ccmp/>.
- DNREC (Delaware Department of Natural Resources and Environmental Control), 1995. *Memorandum: A Survey of Proposed Assawoman Canal Dredge Spoil Sites*. Cultural and Recreational Services Section. Accessed January 24, 2022.
- DNREC, 2015. 2015-2025 Delaware Wildlife Action Plan. Accessed February 21, 2022. Available at: (Delaware Wildlife Action Plan - DNREC Alpha).
- DNREC, 2021a. *Inland Bays Wetland Strategy*. Accessed January 18, 2022. Available at: <https://dnrec.alpha.delaware.gov/watershed-stewardship/wetlands/assessments/inland-bays/>.
- DNREC, 2021b. *Delaware's Climate Action Plan*. Available at: <https://documents.dnrec.delaware.gov/energy/Documents/Climate/Plan/Delaware-Climate-Action-Plan-2021.pdf>
- DNREC, 2022. Determining Dredging Priorities. Accessed January 27, 2022. Available at: <https://dnrec.alpha.delaware.gov/watershed-stewardship/waterways/dredging-priorities/>.
- Jo, Y.H., K.R. Philipp, R.T. Field, A.R. Homsey, C. Bason, K. Somers, 2014. *RARE Report to the Center for Inland Bays and the US EPA: Acreage and Condition Trends for Marshes of Delaware's Inland Bays as an Environmental Indicator and Management Tool*. A report to the Center for the Inland Bays to identify and document recent trends in the salt marshes of Rehoboth, Indian River and Little Assawoman Bays. Accessed January 24, 2022. Available at: <https://www.inlandbays.org/publications-science-research/>.

McGowan, A., R. Miller, D. Bartow, 2017. *Inshore Fish and Blue Crab Survey of Rehoboth Bay, Indian River Bay, and Little Assawoman Bay for 2016*. Accessed January 25, 2022. Available at: https://www.inlandbays.org/wp-content/uploads/CIB-2016-Fish-and-Blue-Crab-Survey-Report_FINAL-WEB.pdf.

Mohan, R., and C. Piercy, 2021. "Marsh Enhancement Special Focus Issue." *Shore & Beach*, Vol. 89, No. 4. American Shore and Beach Preservation Association, Florida.

State of Delaware, 2022. DHCA Cultural and Historical Resource Information System Application Gallery. Accessed January 24, 2022. Available at: <https://chris-users.delaware.gov/#/>.

The Nature Conservancy and New Jersey Department of Environmental Conservation, 2021. *Beneficial Use of Dredged Material to Enhance Salt Marsh Habitat in New Jersey*. Accessed January 24, 2022. Available at: <https://www.nj.gov/dep/dsr/wetlands/beneficial-use-dredged-material-project-summary-lessons-learned.pdf>.

USFWS (U.S. Fish and Wildlife Service), 2022a. ECOS Environmental Conservation Online System: Listed Species Believed or Known to Occur in Delaware. Accessed January 18, 2022. Available at: <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=DE&stateName=Delaware&statusCategory=Listed>.

USFWS, 2022b. IPaC Information for Planning and Consultation: Explore Location. Accessed January 18, 2022. Available at: <https://ecos.fws.gov/ipac/location/BSSZRZCQ5VHODJXQ33B3YY4JEQ/resources>.

Figures

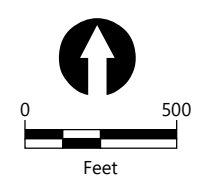







LEGEND:
[Yellow outline] Proposed Thin Layer Placement Cells

NOTES:
Source: Delaware First Map
DE_Imagery/DE_Imagery_1961

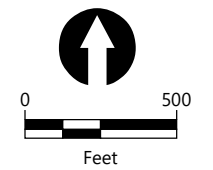






LEGEND:
 Proposed Thin Layer Placement Cells

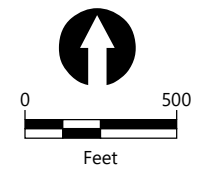
NOTES:
 Source: Delaware First Map
 DE_Imagery/DE_Imagery_2002





LEGEND:
[Yellow outline] Proposed Thin Layer Placement Cells

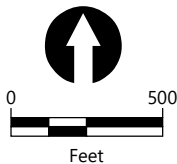
NOTES:
Source: Delaware First Map
DE_Imagery/DE_Imagery_2007





LEGEND:
[Yellow outline] Proposed Thin Layer Placement Cells

NOTES:
Source: Delaware First Map
DE_Imagery/DE_Imagery_2017





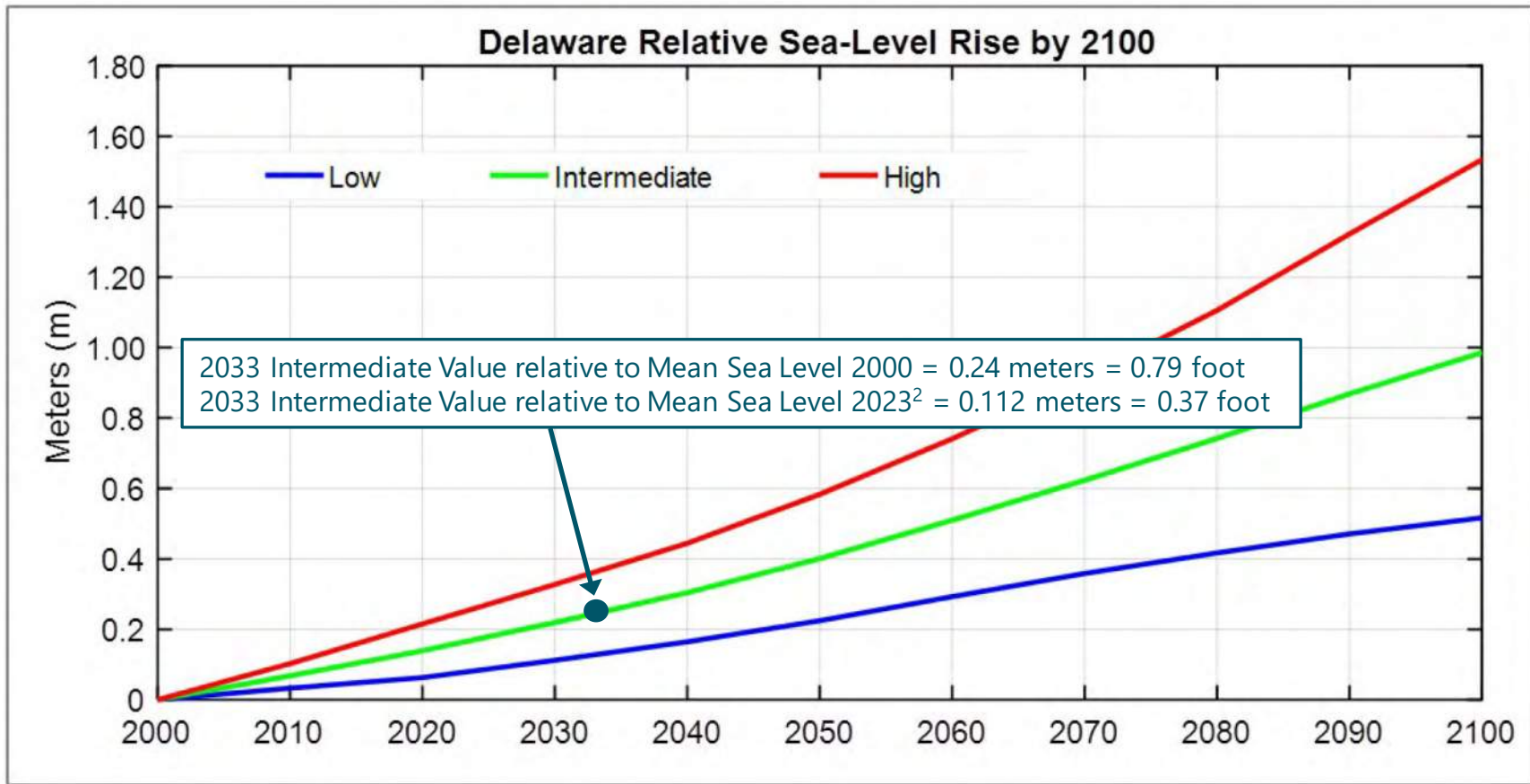


Figure ES-7. The 2017 Delaware SLR planning scenario curves to the year 2100. The Low, Intermediate and High planning scenarios correspond with the 5%, 50%, and 95% probability levels.

Notes:

1. Figure shown is from *Recommendation of Sea-Level Rise Planning Scenarios for Delaware: Technical Report* dated November 2017 developed by the Delaware Sea-Level Rise Technical Committee (DE SLR TC 2017).
2. 2033 Intermediate Sea Level Rise value converted to be relative to Mean Sea Level 2023 using methodology described in DE SLR TC (2017) to estimate 10-year sea-level rise.

