

US Army Corps of Engineers  
Philadelphia District

***DRAFT***

## **ENVIRONMENTAL ASSESSMENT**

### **Delaware City Dredged Material Placement Facility New Castle County, Delaware**

EAXX-202-00-E5O-1727859158



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**September 23, 2024**

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***Draft***  
**FINDING OF NO SIGNIFICANT IMPACT**  
**DELAWARE CITY DREDGED MATERIAL PLACEMENT FACILITY**  
**NEW CASTLE COUNTY, DELAWARE**  
EAXX-202-00-E5O-1727859158

The U.S. Army Corps of Engineers, Philadelphia District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The draft Environmental Assessment (EA) titled *Delaware City Dredge Material Placement Facility – New Castle County, Delaware* evaluates the existing environmental, cultural, and socio-economic conditions at the proposed project site within the Delaware City Dredged Material Placement Facility (DMPF). The EA also evaluates the effects of not placing dredge material within the Delaware City DMPF (No Action Alternative).

The USACE conducts routine maintenance dredging of the Delaware River, Philadelphia to Sea (DPS) Federal Navigation Channel (FNC) to maintain the 45-foot-deep navigation channel in the waterway. The USACE also conducts routine maintenance dredging of the Federally authorized 35-foot-deep Chesapeake and Delaware (C&D) Canal. Maintaining the DPS FNC supports the efficient transportation of containerized, dry and liquid bulk, break bulk, roll-on/roll-off, and project cargoes to and from the Delaware River ports. The C&D Canal navigation channel connects the Delaware River to the Chesapeake Bay and provides a continuous sea level channel connecting the Port of Baltimore to the ports of Wilmington, Philadelphia, and the northern trade routes. Conducting maintenance dredging removes critical shoaling to maintain safe navigation within the Federal navigation channels.

The primary objective of this project is to provide a long-term, safe, disposal facility for dredged materials related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and maintenance of the Branch Canal channel, as needed. The proposed disposal of DPS FNC maintenance dredging material includes the Deepwater Point, Bulkhead Bar, and New Castle Ranges and from within the C&D Canal. The Delaware City DMPF project meets the need of providing the USACE with a long-term disposal site within pumping distance range (approximately five to six miles) from the locations identified above. The project as proposed involves the initial placement of approximately 900,000 to one million cubic yards of dredged materials from the DPS FNC to be placed within the Delaware City DMPF at a time. Placement of maintenance dredged material is expected to occur as early as the winter of 2025. Subsequent dredged material placements would be required as needed and capacity allows.

The Delaware City DMPF was last used as a placement facility in the 1970s when the C&D Canal was widened to its current configuration. Since then, the site has not been utilized for the placement of dredged material but continues to be maintained by the USACE as a DMPF. Recently, increased shoaling in the DPS FNC has resulted

in the increased use of the Reedy North and Reedy South DMPFs, which are located just east of the Delaware City DMPF. Both the Reedy Point North and Reedy Point South DMPFs do not have adequate capacity for the DPS FNC dredged materials as currently constructed and maintained. Additionally, the Killcohook DMPF located on the New Jersey side of the Delaware River is undergoing maintenance work that precludes that area from being available for dredge material placement within the next few years. The Delaware City DMPF was identified as a suitable facility for the placement of the maintenance dredging materials because of three factors: location, current condition, and available capacity. For all alternatives, the potential effects were evaluated, as appropriate.

In addition to a “No Action” alternative, five (5) other alternatives were evaluated. Those alternatives include the Reedy Island North and South DMPFs, the Governor Bacon DMPF, the Biddles Point DMPF, the Killcohook DMPF, and the beneficial use of dredge material. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

**Table 1: Summary of Potential Effects of the Recommended Plan**

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquatic resources/wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish and wildlife habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Threatened/Endangered species/critical habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historic properties	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other cultural resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Floodplains	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hazardous, toxic & radioactive waste	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hydrology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Navigation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Noise levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Socio-economics	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Environmental justice	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tribal trust resources	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Climate change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The recommended plan will result in unavoidable adverse impacts to approximately 108-acres of open water aquatic habitat that includes about 16 separate ponded areas, with the largest being approximately 85-acres and the smallest is approximately 690 square feet (0.016-acres) in size. The open water aquatic habitat areas are not jurisdictional Waters of the United States regulated under Section 404 of the Clean Water Act, nor are they wetlands regulated pursuant to Title 7 of the Delaware Code (§7212) and Section 6607 of the Wetlands Act of 1973 (Title 7 Delaware Code Ch. 66).

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts.<sup>1</sup> Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, a determination that the project may affect, but is not likely to adversely affect listed species or critical habitat was submitted to National Oceanic and Atmospheric Administration (NOAA) Fisheries Greater Atlantic Regional Field Office and U.S. Fish and Wildlife Service (USFWS) for review. All terms and conditions of the Section 7 consultation with NOAA Fisheries and USFWS shall be implemented in order to minimize take or jeopardizing endangered species.

Public review of the draft EA will be initiated on September 23, 2024, and all comments submitted during the public review period will be addressed in the Final EA and included in the Correspondence Appendix.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE determined that no historic properties will be adversely affected by the recommended plan. The determination was submitted to the Delaware State Historic Preservation Office for review and concurrence.

Water Quality Certification pursuant to Section 401 of the Clean Water Act will be obtained from the Delaware Department of Natural Resources and Environmental Control (DNREC) via concurrence from DNREC that the project meets the conditions associated with a Nationwide Permit 16 – Return Water from Upland Contained Disposal Area. All conditions of the Water Quality Certification shall be implemented in order to minimize adverse impacts to water quality.

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<sup>1</sup> 40 CFR 1505.2(a)(3) all practicable means to avoid and minimize environmental harm are adopted.

A determination of consistency with the Delaware Coastal Zone Management Program pursuant to the Coastal Zone Management Act of 1972 will be obtained. All conditions of the consistency determination shall be implemented in order to minimize adverse impacts to the coastal zone.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials will be completed following review of the draft Environmental Assessment. Based on this Environmental Assessment, the upcoming reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

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Date

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Jeffrey M. Beeman  
Lieutenant Colonel, Corps of Engineers  
District Commander

## EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers, Philadelphia District, (USACE) has prepared this draft Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, for the Delaware City Dredged Material Placement Facility (DMPF) in New Castle County, Delaware. This EA only considers potential effects relating to the placement of dredged materials from the Delaware River Philadelphia to Sea (DPS) federal navigation channel (FNC), the Chesapeake and Delaware (C&D) Canal navigation channel, and the Delaware City Branch Canal (Branch Canal). The deepening of the DPS FNC and maintenance dredging activity have been the subject of numerous EAs, and environmental impact statements completed in recent years. Similarly, the proposed deepening of the C&D Canal was studied in a 1996 Feasibility Report and Environmental Impact Statement (EIS).

The Delaware River Main Channel Deepening and Maintenance Dredging Project was authorized for construction by Public Law 102-580, Section 101 (6) of WRDA 1992; modified by Public Law 106-53, Section 308 of WRDA 1999 and further modified by Public Law 106-541, Section 306 of WRDA 2000. The Delaware River Main Channel Deepening project included deepening the existing DPS FNC from 40 to 45 feet from Philadelphia, Pennsylvania, and Camden, New Jersey, to the mouth of the Delaware Bay; appropriate bend widening; partial deepening of the Marcus Hook anchorage; and relocation and addition of aids to navigation. The deepening project was constructed between 2010 to 2021, and USACE is now engaged in maintenance dredging activities to maintain the authorized 45-foot depth within the authorized navigation channel. The DPS FNC supports the efficient transportation of containerized, dry and liquid bulk, break bulk, roll-on/roll-off, and project cargoes to and from the Delaware River ports.

The C&D Canal connects the Delaware River to the Chesapeake Bay. The C&D Canal system provides a continuous sea level channel connecting the Port of Baltimore to the ports of Wilmington, Philadelphia, and the northern trade routes.

The need for the use of the Delaware City DMPF is primarily driven by the large quantity of dredged materials generated by maintaining the authorized depths of the DPS FNC and the C&D Canal. Annual maintenance dredging of both the DPS and C&D Canal navigation channels is essential to sustain commercial traffic in the Chesapeake Bay and Delaware River and vital to the ports of Philadelphia, Wilmington, and Baltimore. Maintenance dredging, which removes the silt, clay, and sand that settles in the channel and reduces its depth, hindering navigation, accounts for most of the dredging activity in the DPS and C&D Canal channels. Because the Delaware River is constantly generating sediment accumulations from upland areas to the sea, the need for maintenance dredging is nearly continuous (USACE 1975). Maintaining the 45-foot-deep DPS navigation channel and 35-foot-deep C&D Canal navigation channel is critical to sustaining economic activity in the region and is evidenced by the approximately combined 31,000,000 tons of commerce annually moved through these waters. To maintain the authorized dimensions of the DPS FNC, the USACE has

historically dredged approximately 3 million cubic yards (CYs) of material annually between 1995 and 2020 in order to maintain the channels authorized depth.

The primary objective of this project is to provide a long-term, safe, disposal facility for dredged materials related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and maintenance of the Branch Canal channel as needed. The proposed disposal of DPS FNC maintenance dredging material includes the Deepwater, Bulkhead Bar, and New Castle Ranges and includes the maintenance dredging material from the C&D Canal from the Delaware River to Pools Island in the Chesapeake Bay. The Delaware City DMPF project meets the need of providing the USACE with a long-term disposal site within pumping distance range (approximately five to six miles) from the locations identified above. The project as proposed involves the initial placement of approximately 900,000 cubic yards of dredged materials from the DPS FNC to be placed within the Delaware City DMPF at a time. Placement of maintenance dredge material is expected to occur as early as the winter of 2025. Subsequent dredged material placements would be required as needed and capacity allows.

The Delaware City DMPF was last used as a placement facility in the 1970s when the C&D Canal was widened to its current configuration. Since then, the site has not been utilized for the placement of dredged material but continues to be maintained by the USACE as a DMPF. Recently, increased shoaling in the DPS FNC has resulted in the increased use of the Reedy North and Reedy South DMPFs, which are located just east of the Delaware City DMPF. Both the Reedy Point North and Reedy Point South DMPFs do not have adequate capacity as currently constructed and maintained. Additionally, the Killcohook DMPF located on the New Jersey side of the Delaware River is undergoing maintenance work that precludes that area from being available for dredge material placement for the next several years. The Delaware City DMPF was identified as a suitable facility for the placement of the maintenance dredging materials because of three factors: location, current condition, and available capacity.

The existing diked portion of Delaware City DMPF totals approximately 364 acres, and the existing facility can currently accommodate approximately 2.0 million cubic yards (CYs) of dredge material. Additional dike maintenance work can raise the available capacity of the Delaware City DMPF to approximately 3 million CYs (USACE, 2024).

The preferred alternative plan entails pumping dredged material from the Delaware River, C&D Canal, and Branch Canal into the existing federally owned and maintained Delaware City DMPF where there is available capacity to accept dredge material from the three waterways. Through the NEPA process every effort has been made to minimize environmental impacts associated with the use of this DMPF. The proposed action would result in the permanent loss of approximately 108-acres of existing open water aquatic habitat. The approximately 108-acres of open water aquatic habitat includes about 16 separate ponded areas, the largest being approximately 85-acres and the smallest is approximately 690 square feet (0.016-acres) in size. The open water aquatic habitat areas are not jurisdictional Waters of the United States (WOTUS) regulated under Section 404 of the Clean Water Act (CWA), nor are they wetlands

regulated pursuant to Title 7 of the Delaware Code (§7212) and Section 6607 of the Wetlands Act of 1973 (Title 7 Delaware Code Ch. 66).

**ENVIRONMENTAL ASSESSMENT  
DELAWARE CITY DREDGED MATERIAL PLACEMENT FACILITY**

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## ACRONYMS

BU	Beneficial Use (of Dredge Material)
°C	Degrees Celsius
C&D	Chesapeake & Delaware (Canal)
CEQ	Council for Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CY	Cubic yards
dB	Decibels
dBA	A weighted sound level measured in decibels
dBC	C weighted sound level measured in decibels
DE	State of Delaware
DFW	Division of Fish and Wildlife
DGS	Delaware Geological Survey
DFW	Division of Fish and Wildlife
DMPF	Dredge Material Placement Facility
DNREC	Delaware Department of Natural Resources and Environmental Control
DO	Dissolved oxygen
DPS	Delaware River Philadelphia to Sea
EA	Environmental Assessment
EFH	Essential Fish Habitat
EFHA	Essential Fish Habitat Area
EIS	Environmental Impact Statement
EJ	Environmental Justice
EqP	Equilibrium partitioning
ERI	Environmental Resources, Inc.
ESA	Endangered Species Act
°F	Degrees Fahrenheit
FMP	Fishery Management Plan
FNC	Federal Navigation Channel
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
GARFO	Greater Atlantic Regional Fisheries Office
GHG	Greenhouse Gas
HAPC	Habitat Areas of Particular Concern
Hz	Hertz
IPaC	Information, Planning, and Conservation (USFWS)
LiDAR	Light Detection and Ranging
MBTA	Migratory Bird Treaty Act
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MHHW	Mean Higher High Water
MHW	Mean High Water
MLLW	Mean Lower Low Water

## ACRONYMS

MLW	Mean Low Water
msl	Mean sea level
NAAQS	National Ambient Air Quality Standards
NAP	North Atlantic Philadelphia (Philadelphia District USACE)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO	Nitric oxide
NO <sub>2</sub>	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
NWI	National Wetlands Inventory
O <sub>3</sub>	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
Pg/L	Picogram per liter
PM10	Particulate matter less than 10 micrometers in diameter
PM2.5	Particulate matter less than 2.5 micrometers in diameter
ppm	Parts per million
ppt	Parts per thousand
RHA	Rivers and Harbors Act
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Office
SLR	Sea Level Rise
SO <sub>2</sub>	Sulfur Dioxide
TSS	Total Suspended Solids
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WQC	Water Quality Certificate
WOTUS	Waters of the United States
WRDA	Water Resources Development Act

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## **1.0 INTRODUCTION**

The U.S. Army Corps of Engineers (USACE), Philadelphia District has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, for the Delaware City Dredged Material Placement Facility (DMPF) Project in New Castle County, Delaware. This EA evaluates the potential effects on the existing Delaware City DMPF, relating to its continued use as a dredged material placement site for nearby ranges of the Delaware River Philadelphia to Sea (DPS) federal navigation channel (FNC), the Chesapeake and Delaware (C&D) Canal navigation channel, and the Delaware City Branch Canal (Branch Canal) navigation channel. This EA reviews the disposal of maintenance dredged materials from all three navigation channels into the existing federally owned and maintained Delaware City DMPF and alternatives to that proposed Federal action.

The existing diked portion of Delaware City DMPF totals approximately 364 acres, and the existing facility can currently accommodate approximately 2 million cubic yards (CYs) of dredge material. Additional dike maintenance work can raise the available capacity of the Delaware City DMPF to approximately 3 million CYs (USACE, 2024). To maintain the authorized dimensions of the DPS FNC, the USACE has historically dredged approximately 3 million cubic yards (CYs) of material annually between 1995 and 2020 in order to maintain the channels authorized depth.

### **1.1 Federal Navigation Channel Authority**

The Delaware River Main Channel Deepening and Maintenance Dredging Project was authorized for construction by Public Law 102-580, Section 101 (6) of Water Resources Development Act (WRDA) 1992; modified by Public Law 106-53, Section 308 of WRDA 1999 and further modified by Public Law 106-541, Section 306 of WRDA 2000. The DPS FNC provides a 45-foot-deep channel at mean low lower water (MLLW) with an allowable dredging overdepth of one foot. The authorized DPS channel width is 400 feet in the Philadelphia Harbor (length of 2.5 miles); 800 feet from the Philadelphia Navy Yard to Bombay Hook (length of 55.7 miles); and 1,000 feet from Bombay Hook to the mouth of Delaware Bay (length of 44.3 miles).

The C&D Canal project under the jurisdiction of the Philadelphia District of the USACE was adopted as House Document 63-196 in 1919 and modified by Section 3 of the Rivers and Harbors Act (RHA) of 1927, by Rivers and Harbors Committee Document 71-41 and Senate Document 71-151 in 1930, by House Document 72-201, House Document 73-18, and House Document 73-24 in 1935, and by Senate Document 83-123 in 1954. That project consisted initially of the purchase of the C&D Canal by the United States with subsequent modification for enlargements and bridge crossings. The C&D Canal is maintained as a 35-foot deep channel at MLLW by 450-feet wide.

### **1.2 Project Location and Setting**

The Delaware City DMPF is located in eastern New Castle County, Delaware (Figure 1) at N39.559721, W75.605196 approximately 13 miles south of Wilmington, Delaware. The existing diked portion of Delaware City DMPF totals approximately 364 acres and is located directly north of the C&D Canal and approximately 4,500 feet west of the

Delaware River. The site is bounded by the C&D Canal to the south, Cox Neck Road to the north, undeveloped privately owned and federally owned land to the west, and residential properties and the Branch Canal waterway to the east.



Figure 1. Delaware City DMPF Vicinity Map





Figure 2. Action Area and Vicinity



### 1.3 Scope of Action

The scope of action for this project is the placement of maintenance dredge materials from the navigation channels of DPS, the C&D Canal, and the Branch Canal into the Delaware City DMPF. It is believed that Delaware City DMPF was first utilized in 1925 during the reconstruction and widening of the C&D Canal (Brown, E and Chambers, F.T., ASCE 1931) and a review of historical aerial imagery from 1926 depicts a canal levee to the south of the facility. Dikes surrounding the perimeter of the facility first appear in a 1968 aerial image (NETR Online, 2023) in the orientation and location as they currently exist. The last disposal of dredge material within the Delaware City DMPF was in the 1970s when the C&D Canal was widened to its current configuration and since that time the DMPF has been maintained by the USACE and utilized as a component of the C&D Canal Conservation Area under a lease between the Delaware Department of Natural Resources and Environmental Control (DNREC) and the USACE. A Master Plan developed by the USACE in the 1970's determined that the existing DMPFs along the C&D Canal would be retained for disposal to accommodate future needs (1996 USACE Feasibility Report). As such, dredged material is proposed to be placed in the Delaware City DMPF to continue the areas purpose as a Federally owned and maintained upland confined dredged material disposal facility.

The following sections briefly summarize a selection of various actions undertaken by federal, state, and other entities to manage the C&D Canal, the federally owned DMPFs, and the various other federal lands located adjacent to the C&D Canal.

#### 1.3.1. Prior USACE Actions

##### *1973 Inland Waterway from Delaware River to Chesapeake Bay, Delaware and Maryland (Chesapeake and Delaware Canal) Final Environmental Impact Statement*

The objective of the 1973 Final Environmental Impact Statement (FEIS) was to evaluate the engineering feasibility, environmental impacts, and the economic factors of regional and national resource development associated with the deepening and widening of the C&D Canal. The deepening and widening were proposed from the existing 27-foot deep by 250-foot wide channel to a 35 foot-deep by 450-foot wide channel.

##### *1977 Chesapeake and Delaware Canal Design Memorandum No. 28 Master Plan*

The objective of the master plan study was to highlight the immediate and long-range potentials of the Federal lands adjacent to the C&D Canal and to offer a broad scope of recreational development possibilities designed to provide regional economic and recreational support.

##### *1994 Habitat Assessment of the C&D Canal Upland Disposal Areas for the C&D Canal Deepening Feasibility Study*

The objective of the habitat assessment was to evaluate the environmental resource value of the 13 DMPFs along the C&D Canal. The habitat assessment was part of a

feasibility study to evaluate project alternatives that will better accommodate current and future shipping traffic from Baltimore Harbor through the southern and northern approach channels of the C&D Canal to the Delaware River.

*1996 Chesapeake and Delaware Canal – Baltimore Harbor Connecting Channels (Deepening) Delaware and Maryland, Final Feasibility Report and Final Environmental Impact Statement (EIS)*

The objective of the Environmental Impact Statement was to determine the feasibility of measures to promote and encourage the efficient, economic, and logistical development of the channel system serving the Port of Baltimore. The report recommended the full width C&D Canal channel with a 40-foot MLLW depth, with appropriate advanced maintenance, and an allowable overdepth of one foot and channel widths of 450 and 600 feet.

*1992 Delaware River Comprehensive Navigation Study Main Channel Deepening Final Interim Feasibility Report*

The objective of the 1992 Final Interim Feasibility Report was based on the results of an interim feasibility study and partial response to a resolution adopted by the House Committee on Public Works authorizing the Delaware River Comprehensive Navigation Study as well as the 1 March 1954 resolution by the Committee on Public Works of the United States Senate regarding channel dimension of the DPS project. The 1992 report analyzed channel depths ranging up to 50 feet and channel widths to accommodate one-way and two-way vessel traffic, along with examining anchorages and the needs of certain tributary projects. The 1992 feasibility study recommended a two-way full vessel width channel of variable width and a depth of 45-feet from deep water in the Delaware Bay into Philadelphia Harbor, bend widening, partial deepening of the Marcus Hook Anchorage, disposal areas, and navigation aids.

*1997 Delaware River Main Channel Deepening Project (Pennsylvania, New Jersey, and Delaware), Supplemental Environmental Impact Statement*

The objective of the 1997 Supplemental Environmental Impact Statement (SEIS) was to provide additional information and environmental analysis to address environmental concerns raised during the review of the 1992 Feasibility Report and Environmental Impact Statement. Environmental analyses included: three-dimensional hydrodynamic modeling of the Delaware estuary to evaluate potential changes in salinity and circulation patterns; benthic invertebrate sampling to assess habitat quality at selected beneficial use sites in Delaware Bay, biological effects based testing to determine the impact of open water disposal on aquatic ecosystems; detailed environmental assessments of selected upland dredged material disposal sites; consultation with both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, pursuant to Section 7 of the Endangered Species Act; cultural resource investigations in dredging and disposal locations; and coordination with the regional oil spill response team to review the adequacy of existing Delaware River spill contingency plan.

### *2009 Delaware River Main Stem and Channel Deepening Project Environmental Assessment*

The purpose of the 2009 EA was to evaluate the impacts of changes to the Congressionally authorized project for the Delaware River Main Stem and Channel Deepening Project, which were the result of the detailed Preconstruction, Engineering and Design studies, as well as changes to the existing conditions in the project area from those described in the 1992 EIS, 1997 SEIS, and 1998 Record of Decision document, and to consolidate and document the results of the post-SEIS monitoring and data collection methods. The proposed changes in the 2009 EA included the determination that four new DMPFs identified in the SEIS were not needed due to significant reduction on dredge material quantities, the proposed placement of sand dredged in the Delaware Bay directly on Broadkill Beach rather than offshore sand stockpiling stated in the SEIS, and the deferment of the restoration of 145 acres of intertidal habitat adjacent to Egg Island Point due to the reduction on dredge material quantity.

### *2011 Final Environmental Assessment Delaware River Main Channel Deepening Project*

The purpose of the 2011 EA was to evaluate changes to the affected environment and changes to the Delaware River Main Channel Deepening Project from the completion of the 2009 EA. The 2011 EA document addressed the proposed listing of the New York Bight Distinct Population Segment of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) as a Federally listed species; the proposed listing of the northwest Atlantic Distinct Population Segment of loggerhead sea turtle (*Caretta caretta*) as a federally listed endangered species; changes to the Deepening Project schedule; and revisions to the dredged material disposal plan. The 2011 EA document updated the 1992 EIS, the 1997 SEIS, and the 2009 EA.

### *2013 Final Environmental Assessment Delaware River Main Channel Deepening Project Delaware Bay Economic Loading, Mechanical Dredging and Placement of Dredged Material at the Fort Mifflin Dredged Material Placement Facility*

The purpose of the 2013 EA was to evaluate the impacts of changes to the Congressionally authorized Delaware River Main Channel Deepening Project, from that described in the 1992 Environmental Impact Statement (USACE, 1992), 1997 Supplemental Environmental Impact Statement (USACE, 1997), 1998 Record of Decision (USACE, 1998) and the 2009 and 2011 Environmental Assessments (USACE, 2009 and 2011). The 2013 EA addressed economic loading of hopper dredges and hopper scows in the Delaware Bay portion of the Delaware River Main Channel Deepening Project, the use of mechanical dredging in project reaches other than the rock removal area, and placement of dredged material from the upper reaches of the project in the existing Federally-owned Fort Mifflin DMPF.



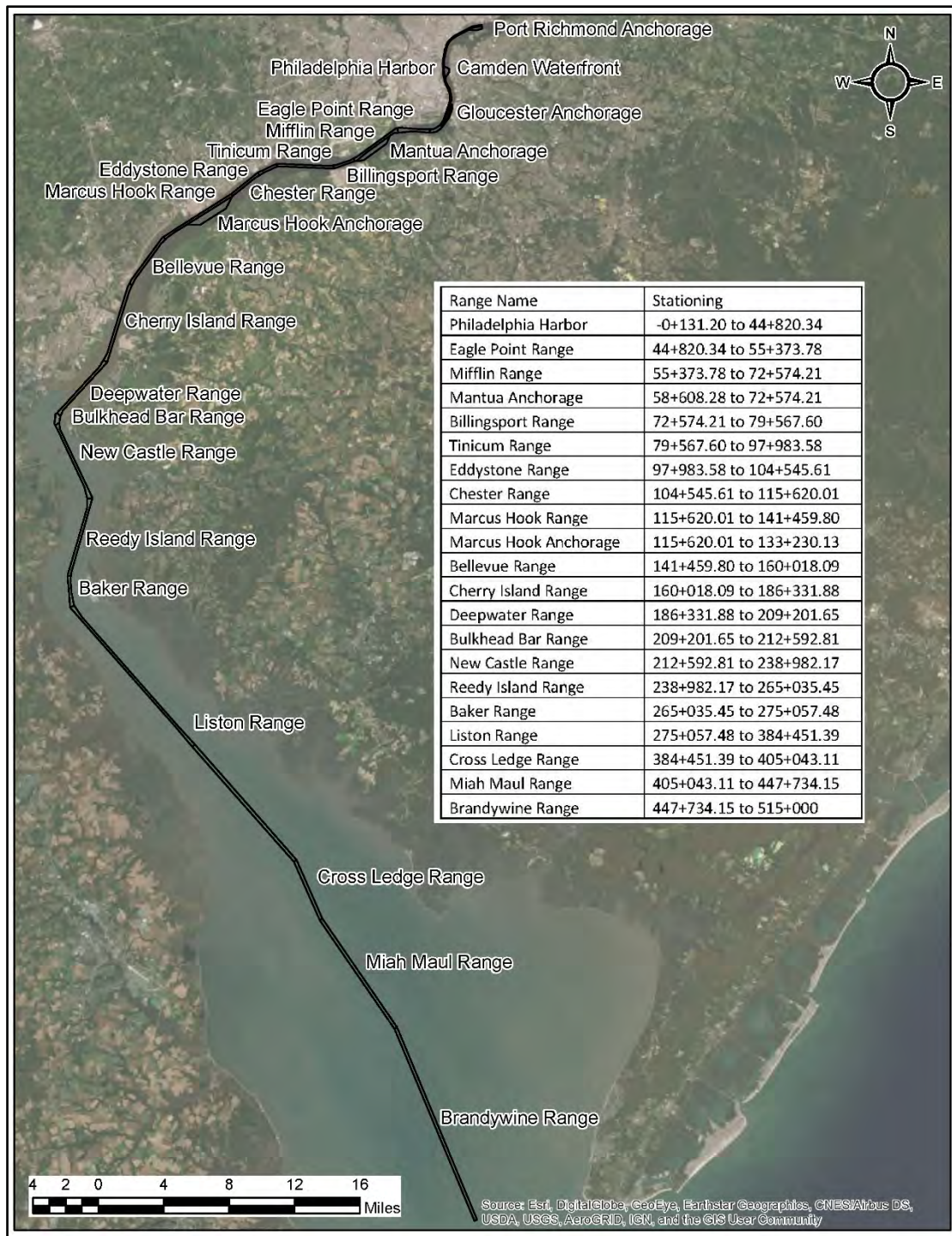


Figure 3. Delaware River, Philadelphia to Sea Federal Navigation Channel Ranges

## **2.0 PURPOSE AND NEED**

### **2.1 Purpose**

The purpose of the proposed Federal action is to provide long-term, safe disposal for the placement of maintenance dredge materials from the DPS, C&D Canal, and Branch Canal navigation channels. Maintaining the 45-foot-deep DPS navigation channel and 35-foot-deep C&D navigation channel is critical to sustaining economic activity in the region and is vital to the ports of Philadelphia, Wilmington, and Baltimore. It is estimated approximately combined 31,000,000 tons of commerce is moved annually through the waters. Maintenance dredging, which removes the silt, clay, and sand that settles in the channel and reduces its depth, hindering navigation, accounts for most of the dredging activity in the DPS and C&D Canal channels. Because the Delaware River is constantly transporting sediment from upland areas to the sea, the need for maintenance dredging is nearly continuous (USACE 1975). To maintain the authorized dimensions of the DPS FNC, the USACE has historically dredged approximately 3 million cubic yards (CYs) of material annually between 1995 and 2020.

The 2025 DPS maintenance dredging operation cycle will generate approximately 900,000 to one million CYs of material, which is proposed to be placed within the Delaware City DMPF. The C&D Canal FNC maintenance dredging also remove shoals to maintain safe navigable depths in the channel to -35 feet MLLW however the estimated quantity of material is unknown at this time and maintenance dredging is not scheduled at this time. The Branch Channel requires periodic dredging to maintain the navigation channel at a frequency less than the Delaware River FNC and the C&D Canal FNC.

### **2.2 Need**

The need for the use of the Delaware DMPF is driven by the large amount of material which will be generated largely by the ongoing and future maintenance dredging of the Delaware River FNC and C&D Canal navigation channel. Routine maintenance dredging is continually needed to sustain the authorized 45-foot channel depth within the Delaware River DPS and the authorized 35-foot navigation channel within the C&D Canal to facilitate commercial maritime traffic within the navigation channels to and from area ports. To maintain the authorized dimensions of DPS FNC, the USACE historically dredged approximately 3 million cubic yards of material annually between 1995 and 2020. The majority of the required annual DPS maintenance dredging is the result of shoaling in four “hot spots” which have historically accounted for 80 percent of the total O&M dredging within DPS. The four “hot spots” include the Marcus Hook Range, Cherry Island Range/Wilmington Harbor, Deepwater Point Range, and the New Castle Range. The C&D Canal maintenance dredging is conducted on a less frequent basis than the DPS FNC and occurs as needed to maintain the authorized dimensions of that channel.

Due to recent increased shoaling in the DPS FNC, the existing Federally owned DMPFs along the Delaware River, including the Reedy Point North and South DMPFs and the Artificial Island DMPF have limited capacity as currently constructed and maintained.

Additionally, the Killcohook DMPF is unavailable for dredge material placement for the next several years due to ongoing construction activities to expand capacity at the facility. As such, the USACE is seeking to utilize existing Federally owned DMPFs with adequate capacity in proximity to the New Castle Range, Deepwater Range, and Reedy Island Ranges of the DPS FNC and the C&D Canal navigation channel for the placement of maintenance dredge materials.

The major stakeholder user of the Delaware River FNC is PhilaPort (formerly Philadelphia Regional Port Authority). The stakeholder uses of the C&D Canal are PhilaPort and the Maryland Department of Transportation Port Administration.

### **3.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES**

#### **3.1 Proposed Action**

The Proposed Action includes the disposal of maintenance dredged materials into the existing Delaware City DMPF from the DPS FNC, the C&D Canal, and the Branch Canal (as needed). The Proposed Action includes the initial disposal of approximately 900,000 to one million CYs of maintenance dredged materials from the DPS and C&D Canal navigation channels in 2025 and any subsequent need for dredge material placement for future maintenance dredging events. This area periodically received dredged material placement from the 1920's through the 1970's from various expansions, and maintenance dredging activities for the C&D Canal. The Proposed Action will include the filling of approximately 108-acres of open water aquatic habitat and approximately 105-acres of common reed (*Phragmites australis*) dominated marsh areas with dredge sediments. The open water and common reed marsh areas were determined to not be jurisdictional WOTUS regulated areas under Section 404 of the CWA based on a 20 March 2024 Memorandum for Record from the USACE Philadelphia District Regulatory Branch. The Proposed Action will also include the disturbance of 151-acres of other vegetated areas within the Delaware City DMPF due to site preparation and the placement and management of dredge material within the facility. These other vegetated areas include upland fields, shrubland and successional woodlands consisting of black locust (*Robinia pseudoacacia*), black cherry (*Prunus serotina*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), Gray birch (*Betula populifolia*), staghorn sumac (*Rhus typhina*) and winged sumac (*Rhus copallinum*), which were partially cleared in early 2023.

#### **3.2 Alternative 1: No Action**

The No Action alternative would entail that the maintenance dredging of the DPS FNC and the C&D Canal would continue and that placement of dredged material would continue to be placed within the Killcohook DMPF (DPS FNC) and Reedy Points North and South (C&D Canal). Periodic dredging is necessary to maintain the authorized navigable depths in the DPS FNC and C&D Canal channels to allow vessel access to area ports. However, due to ongoing construction and maintenance activities at the Killcohook DMPF and limited capacity at the Reedy Point North and South DMPFs, Governor Bacon DMPF, and the Artificial Island DMPF, those existing DMPFs in proximity to the navigation channels cannot be utilized, leaving no placement options for the ongoing maintenance dredging.

#### **3.3 Alternative 2: Reedy Point North DMPF and Reedy Point South DMPF**

The Reedy Point South DMPF is located to the southeast of the Delaware City DMPF, along the southern side of the C&D Canal and the western bank of the Delaware River. The Reedy Point North DMPF is located to the east of the Delaware City DMPF, along the northern side of the C&D Canal and the western bank of the Delaware River. The

Reedy Point North DMPF is approximately 130-acres in size and does not have adequate capacity for any future dredge material placement events as currently constructed and maintained.

The Reedy Point South DMPF is approximately 135-acres in size and does not have adequate capacity for the DPS FNC maintenance dredge materials as currently constructed and maintained. Both the Reedy Point South and Reedy Point North DMPFs would require modifications such as dewatering or dike raising or the removal of sediments to create additional capacity, however those actions are not proposed or scheduled at this time due to the recent use of the DMPFs and the need for the dredged material to naturally consolidate and dewater. Due to inadequate capacity to meet the needs of the DPS and C&D maintenance dredging, the Reedy Point North and South DMPFs were not included for future consideration, as the facilities do not suit the maintenance dredging disposal purpose and need.

### **3.4 Alternative 3: Governor Bacon DMPF**

The Governor Bacon DMPF is located approximately 0.75-miles northeast of the Delaware City DMPF and is located along the western bank of the Delaware River and eastern bank of the Branch Canal. The Governor Bacon DMPF is approximately seven (7) acres in size. Due to the limited size of the Governor Bacon DMPF, this site has no capacity for a typical maintenance dredging project of the DPS FNC or C&D Canal and therefore, this alternative was not included for future consideration as it does not suit the maintenance dredging disposal purpose and need.

### **3.5 Alternative 4: Biddles Point DMPF**

The Biddles Point DMPF is located approximately 1,400 feet west of the Delaware City DMPF to the south of Cox Neck Road and along the northern bank of the C&D Canal. The Biddles Point DMPF is approximately 300-acres in size and has the capacity for approximately 1.6 million CY of dredge material (USACE, 2011). The Biddles Point DMPF has not been utilized for dredge disposal since the 1970s and is a component of the C&D Canal Conservation Area managed by DNREC Division of Fish and Wildlife (DFW). Approximately 265 acres of the 300 acres comprising the Biddles Point DMPF are currently wooded. The woody areas consist of tree species including black locust (*Robinia pseudoacacia*), black cherry (*Prunus serotina*), staghorn sumac (*Rhus typhina*), winged sumac (*Rhus copallinum*), box elder (*Acer negundo*), mulberry (*Morus* spp.), red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*), and sweetgum (*Liquidambar styraciflua*) (ERI, 1994). DNREC DFW has indicated that the Biddles Point DMPF is an important public location for the hunting of white-tailed deer (*Odocoileus virginianus*) due to its size and popularity (pers. comm. R. Hossler, DNREC DFW, 2024). While exact data on the number of hunters which utilize the Biddles Point DMPF specifically could not be provided, it was stated by DNREC DFW that a survey revealed that 644 deer hunters



use the entire C&D Canal Conservation Area annually, and it's estimated that between 46 and 110 hunters use the entire conservation area for turkey and small game hunting annually. Due to current conditions at the Biddles Point DMPF, extensive vegetation maintenance and tree clearing would be required to prepare the site for dredge disposal operations, which could not be accomplished for the 2024/2025 maintenance dredging cycle. For Delaware River maintenance dredging, this site would have the furthest pumping distance to a DMPF and would add more than one mile of pipeline than the preferred location.

### **3.6 Alternative 5: Killcohook DMPF**

The Killcohook DMPF is located approximately 3.25-miles north of the Delaware City DMPF and is located along the east bank of the Delaware River along the Salem County, NJ coastline. The Killcohook DMPF complex includes three distinct cells (referred to as Killcohook No. 1, Killcohook No. 2, and Killcohook No. 3). Due to ongoing maintenance and dewatering operations at the Killcohook DMPF, the complex is unavailable for maintenance dredge disposal for several years. Due to the Killcohook DMPF being offline for the 2025 maintenance dredging cycle, this alternative was not included at this time as it does not suit the current maintenance dredging placement purpose and need but will be available for future consideration once the facility becomes available.

### **3.7 Alternative 6: Beneficial Use of the Dredge Material (BUDM)**

Interest in beneficially using dredged material as an alternative to conventional placement practices has increased in the region in recent years. The BUDM reduces the adverse effects of both land and water dredged material placement. By considering dredged material as a resource, a dual objective is achieved. Beneficial use of dredged material is strongly supported by USACE command. On January 25, 2023, Lieutenant General Spellmon issued a "Beneficial Use of Dredged Material Command Philosophy Notice", which outlines a vision for expanding the U.S. Army Corps of Engineers BUDM program. This document includes a framework for achieving the goal of 70% BUDM by the year 2030.

The USACE creates value from dredged sediments through beneficial uses such as beach nourishment, enhancing or creating wetland habitat, brownfield reconstruction, landfill cap, and other land applications. The USACE allows for and promotes private contractors to remove sediments at no cost from DMPFs for landfill cap and construction purposes. A construction contractor was recently removing up to a million CYs of dredge material from the Fort Mifflin DMPF in Philadelphia, Pennsylvania for use in a construction project in Morrisville, PA. While the removal of material from an existing DMPF is a BUDM and creates additional capacity within the DMPFs, the

removal activities do not occur frequently and therefore are not reliable for maintaining predictable capacity within the existing USACE DMPFs.

The USACE Philadelphia District has completed several projects which included the BUDM. Those projects included nearshore nourishment (Harvey Cedars, NJ and Lewes, DE), beach nourishment (Broadkill Beach, DE), and placing dredge sediments in degraded marsh habitat to improve wetland resiliency and reduce erosion (Stone Harbor and Heislerville, NJ). Maintenance dredging of the Salem River federal navigation channel was conducted in 2024 and included the BUDM for marsh restoration at Goose Pond in the Supawna Meadows National Wildlife Refuge. Several successful BUDM projects have been completed along the New Jersey Intracoastal Waterway (NJIWW) for habitat restoration. As part of the NJIWW, the Seven Mile Island Innovation Laboratory in Cape May County is a partnership of Federal, State and non-governmental organizations to advance and improve dredging and marsh restoration techniques in coastal New Jersey through innovative research, collaboration, knowledge sharing and practical application.

A previous study on BUDM along the DPS FNC addressed the potential for dredged material from the DPS FNC to be leveraged for coastal storm risk management along both the Delaware and New Jersey shorelines. Between the two main studies (one for New Jersey and one for Delaware), the final array of alternative plans primarily consisted of using sandy dredged material for construction and beach restoration. Wetland creation and other BU was initially considered but had limited coastal storm risk management performance benefits. The recommended plan for the Delaware BU study, identified seven BU placement locations along a 29-mile stretch of the Delaware Bay (USACE, 2019). The seven locations along the Delaware Bay shoreline in Delaware included (from north to south) Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach, and Lewes (Figure 4). The recommended plan for the New Jersey BU study, identified three locations along the Delaware Bay shoreline in New Jersey included (from north to south) Gandy's Beach, Fortescue, and Villas South (Figure 5).

A Project Partnership Agreement (PPA) for the cost sharing of implementing the project and defining the responsibilities for operations and maintenance associated with the BU projects was recently executed between USACE and DNREC in July 2024 for sites along the Delaware Bayshore. The nearest site selected as part of the DE study, Pickering Beach, is located approximately 35 miles south of the Delaware City DMPF site and eastern portion of the C&D Canal and approximately 35-miles south of the New Castle Range of the DPS FNC. The nearest site selected as part of the NJ study, Gandy's Beach, is located approximately 30 miles south of the Delaware City DMPF site and eastern portion of the C&D Canal 25 miles south of the New Castle Range. A PPA has not been executed between the USACE and the State of New Jersey to date.

Due to the distances between the maintenance dredging areas and the recommended BU sites both in Delaware and New Jersey, the pumping of the dredge materials would

be infeasible and the transport of the dredge material via barges or scows would be expensive, time consuming, and operationally impractical. Additionally, the maintenance dredge materials which are proposed to be placed in the Delaware City DMPF would not be suitable for beach renourishment as the dredge materials are likely to contain a high content of fine-grained sediments (clays and silt).

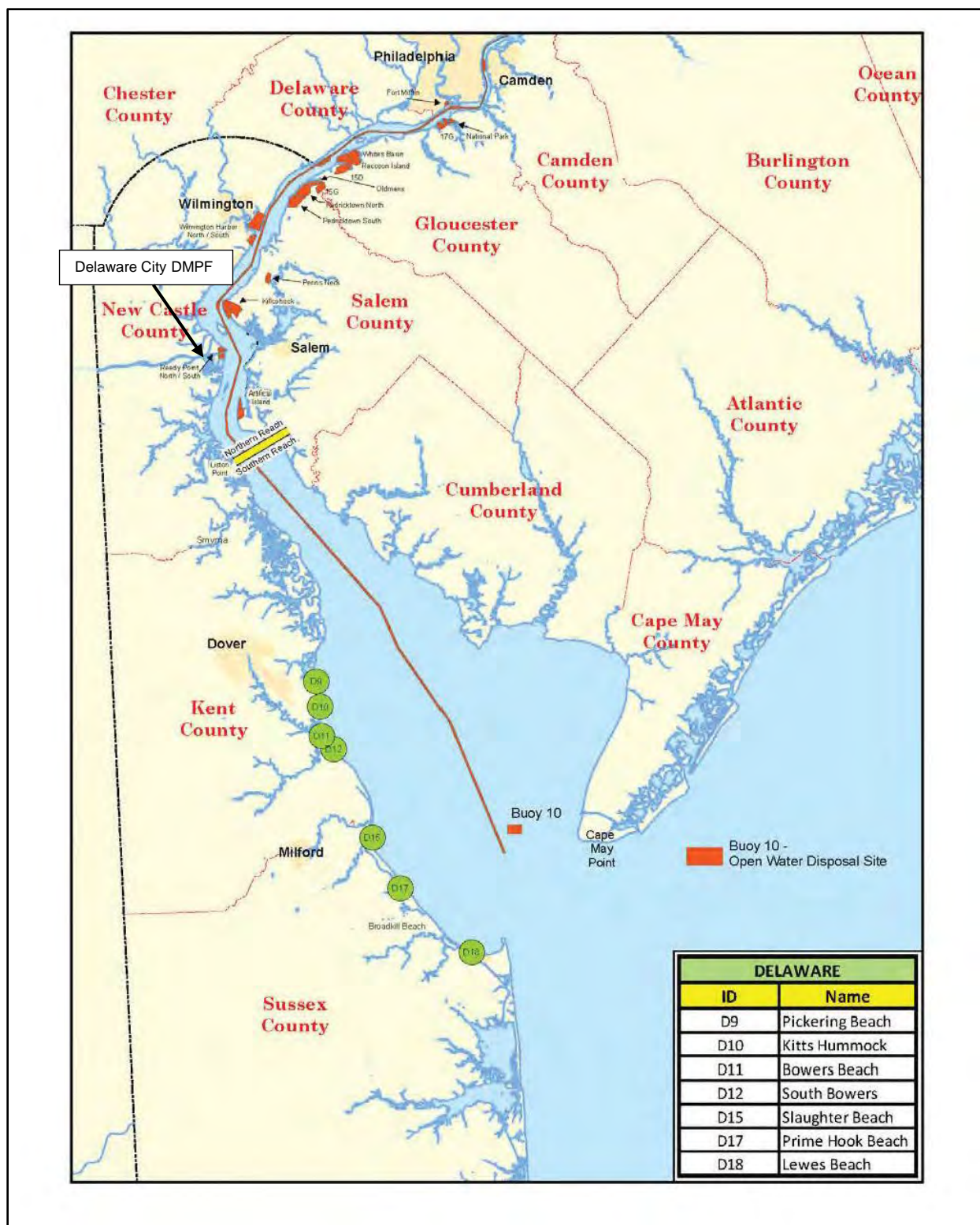


Figure 4. Proposed BU Sites in Delaware adjacent to the DPS FNC



Figure 5. Proposed BU Sites in New Jersey adjacent to the DPS FNC

For the BUDM alternative, the DPS FNC and C&D Canal maintenance dredge materials, a site or sites would need to be selected and subsequently authorized for use by the State and Federal regulatory agencies. Due to the estimated timeframe, approximately 12 to 18 months for the planning, developing, and authorizations needed for BU of those maintenance dredge materials, that effort cannot be completed in time for the 2025 maintenance dredging cycle, and therefore this alternative does not meet the current project purpose and need. It should be noted however, that the USACE Philadelphia District is preparing a dredge material management plan study for the DPS FNC which will recommend a plan for managing the dredge materials over the next 20 years. The plan will be consistent with sound engineering practices meeting all Federal environmental standards and will evaluate different alternatives for dredge material management, including options for the BU of the maintenance dredge materials. Therefore, BUDM may be a viable alternative for future consideration.



### 3.8 Alternative Selection

Table 1. presents a summary of the alternatives and decision rationales for selecting a plan that provides a facility for disposal of the maintenance dredge materials.

Alternatives 3, 4, 5, 6, and 7 (in red) were not considered further.

Table 1. Decision Rationale for Delaware City DMPF / Other Placement Alternatives					
Disposal Alternative	Disposal Classification	Pros/Cons	Operational Considerations	Environmental Considerations	Selection Status
1. No Action	NA	<b>Pros:</b> Environmental <b>Cons:</b> Does not meet objective of continued use of the federally owned and maintained Delaware City DMPF	Jeopardizes the ability to perform critical maintenance dredging operations	-no effect on WQ -no effect on air quality or GHG's -no loss of open water aquatic habitat -no short-term impacts to terrestrial habitat	Not Selected as the No Action does not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle
Delaware City DMPF	DMPF	<b>Pros:</b> -minimizes water quality impacts thru sediment retention -operationally feasible and efficient -historically utilized and maintained as DMPF <b>Cons:</b> -use reduces lifetime capacity of DMPF -permanent loss of open water habitat and temporary impacts to wildlife habitat	Will continue to be maintained and utilized as Federally owned DMPF.	-Will result in permanent loss of approximately 108-acres of open water habitat (determined not to be "Waters of the United States") and public freshwater fishing and waterfowl hunting location -Temporary impact to recreational opportunities within DMPF during maintenance disposal operations -Permanent impacts to aesthetic and visual resources of DMPF	Preferred disposal facility as can accept dredge materials as currently maintained and has available capacity
3. Reedy Point North DMPF and Reedy Point South DMPF	DMPF	<b>Pros:</b> Existing federally owned DMPFs <b>Cons:</b> The capacity at both DMPFs is not adequate for the quantity of DPS FNC maintenance dredge materials	Both DMPFs would need dewatering and/or dike raising to be operational in 2025.	N/A, the DMPFs cannot be utilized due to inadequate capacity.	Not Selected as the DMPFs do not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle
4. Governor Bacon DMPF	DMPF	<b>Pros:</b> Historically utilized and maintained as DMPF. <b>Cons:</b> Size of DMPF is not adequate for maintenance dredge disposal needs.	The location of the DMPF does not allow for expansion to add additional capacity.	N/A, the DMPF cannot be utilized due to inadequate capacity.	Not Selected as the DMPF does not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle

Table 1. Decision Rationale for Delaware City DMPF / Other Placement Alternatives					
Disposal Alternative	Disposal Classification	Pros/Cons	Operational Considerations	Environmental Considerations	Selection Status
5. Biddles Point DMPF	DMPF	<p><b>Pros:</b> Historically utilized as DMPF. Within pumping distance of DPS FNC ranges and C&amp;D Canal. -The DMPF has adequate capacity (approx. 1.6 M CY)</p> <p><b>Cons:</b> Site is wooded and would require extensive tree clearing (approximately 265-acres) and other maintenance activities to prep the site. Site would be more than 1 mile additional pumping distance from dredging locations. Site is considered to have good deer and small game hunting habitat</p>	Would utilize the DMPF as it was designed.	<p>-Approximately 30-acres of the DMPF are mapped as palustrine wetlands.</p> <p>-Approximately 265-acres of wooded land would be impacted.</p> <p>-Hunting habitat would be impacted.</p> <p>-Generally, an environmentally acceptable disposal option</p>	Not selected as the DMPF does not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle
6. Killcohook DMPF	DMPF	<p><b>Pros:</b> Historically utilized as DMPF. Within pumping distance of DPS FNC ranges and C&amp;D Canal</p> <p><b>Cons:</b> The DMPF complex is not available for dredge disposal due to ongoing maintenance activities</p>	Perpetual and long term availability of DMPF complex due to ongoing maintenance activities	<p>-Water quality impacts minimized through DMPF discharges</p> <p>-no effects on fish and wildlife habitat</p> <p>-environmentally acceptable disposal option</p>	Not selected as the DMPF does not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle
7. Beneficial Use of Dredge Material	Beneficial Use (BU)	<p><b>Pros:</b> Beneficially using the maintenance dredge materials keeps the sediment in the aquatic system and has shown it can have positive impacts to the ecosystem. Suitable material could be used as construction substrate.</p> <p><b>Cons:</b> Suitable BU sites within feasible pumping range (5 to 6-miles) from DPS FNC and C&amp;D Canal maintenance dredging reaches have not been identified.</p>	N/A, would be contingent on selected BU sites.	N/A, would be contingent on selected BU sites.	Not selected as the beneficial use does not meet objective of providing a viable maintenance dredged material disposal option for 2025 dredging cycle



### **3.9 Preferred Plan**

The preferred plan includes placement of maintenance dredge materials into the existing Delaware City DMPF. This plan allows for the continued use of the Federally owned facility as it was designed and previously utilized. The Delaware City DMPF has available capacity and is within the acceptable pumping distance to the DPS FNC, and the C&D Canal navigation channel, and the Branch Canal navigation channel. As part of the plan, the site will require preparation by the clearing and removal of woody vegetation, the installation of drainage channels to de-water standing water, maintenance of the containment dikes to ensure their integrity, installation of new drainage pipeline and maintenance of the sluice/weir system. Once the site is prepared for use, an influent pipeline will temporarily make landfall from the C&D Canal at the southeast corner of the site. A cutter head pipeline dredge will remove sediment within the federal channel and pump the sediment into the DMPF through a pipeline that runs from the dredge to the DMPF. A dredge pipeline run will originate from the dredge location and will float on the surface. From the Delaware River, two potential pipeline routes exist through the C&D Branch Canal and/or through Reedy Point and would follow along the north side of the C&D Canal to the DMPF. This pipeline will temporarily cross the recreational trail, which will require its closure to the public during the duration of the dredging and placement (approximate duration of +/-2 months pending on the latest shoaling in the river). The pipeline will cross over the top of the earthen dike, and a mixture of a water and sediment slurry will be pumped into the interior of the DMPF. As the water rises within the DMPF, boards would be added within the sluice/weir structure in order to allow for the settlement and retention of sediment/solids, and for the supernatant (water) to discharge through the effluent pipeline into the C&D Canal. Once the dredging and placement operations cease, the interior of the DMPF will remain flooded while continuously draining through the sluice/weir structure and discharging through the effluent pipeline until drainage is minimal through the sluice. The sediments retained within the DMPF will be given time to consolidate and dewater. Interior ditching utilizing excavators may occur approximately 6 months following the dredging activities to facilitate this dewatering/consolidation process, which may take several months to complete. Repairs or raising of the earthen dikes would occur with dozers and excavators to maintain the containment dike system following the interior ditching operation. Subsequent maintenance dredging cycles would require a repeat of the same steps as described above.

## **4.0 AFFECTED ENVIRONMENT**

The Affected Environment of the proposed project area is described below.

### **4.1 Physical Environment**

#### **4.1.1. Topography, Physiography, Geology, and Soils**

The topography of the Delaware City DMPF is relatively flat and is situated between approximately 3 to 24 feet above mean sea level (msl) (Figure 6). The elevation within the Delaware City DMPF is highest along the top of the perimeter dike with a maximum elevation of 24 feet and grades down into the interior portions of the facility. Net local surface water drainage from the Delaware City DMPF drains from an existing sluice box into an existing manmade ditch which in turn discharges into the C&D Canal waterway via three adjacent corrugated High Density Polyethylene (HDPE) outfall pipes underneath the Michael N. Castle Trail (USACE Field Observations, 2023).

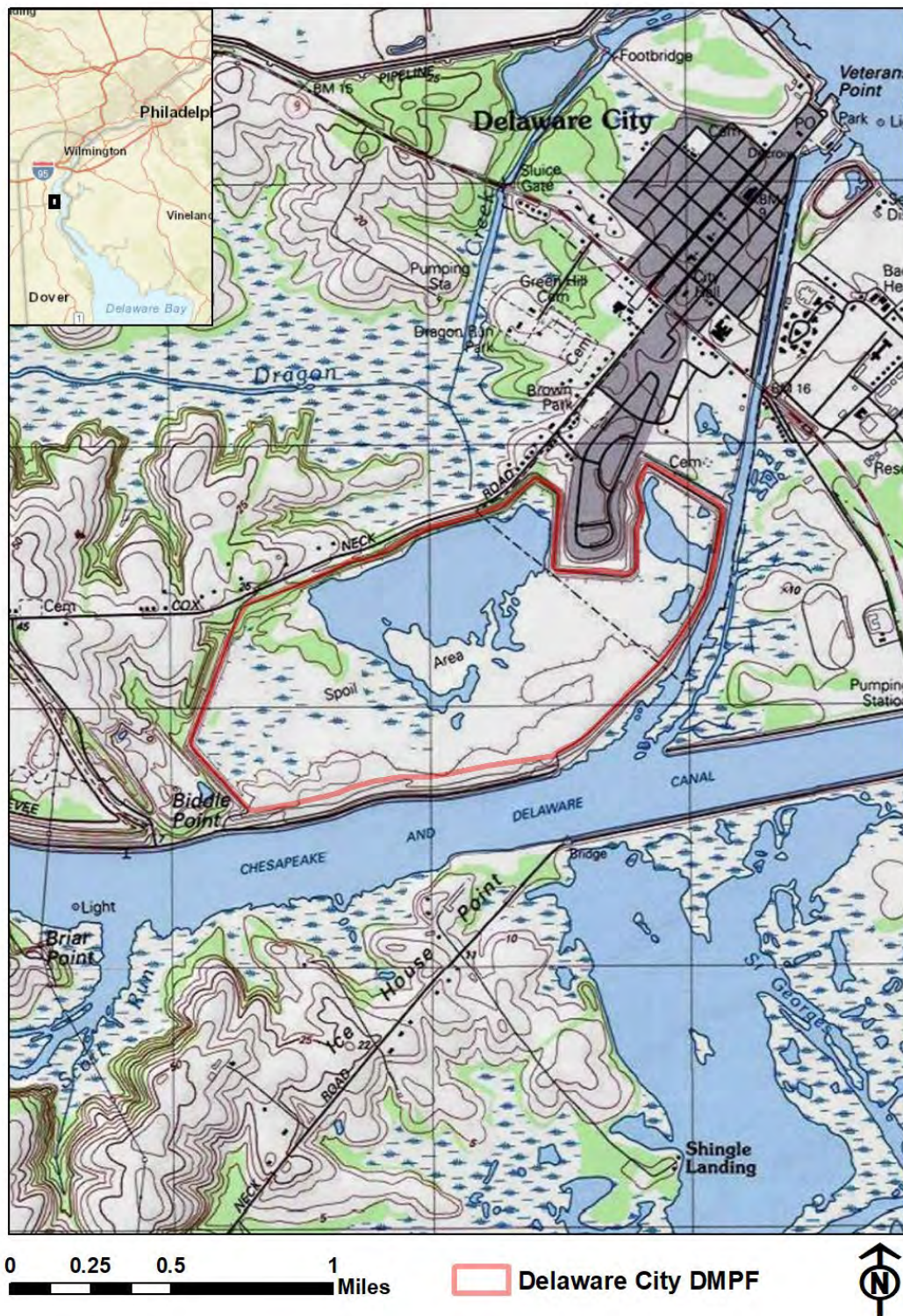


Figure 6. Topographic Map (National Geographic Society, 2013)

The Delaware City DMPF is located within the Atlantic Coastal Plain physiographic province of Delaware. The Coastal Plain is made up of sediments, mostly silt, sand, and gravel that have been eroded off the Piedmont and adjacent Appalachian Mountains. The eroded sediments were transported east via rivers and deposited where the waterways met the ocean to form a delta. Marine silt and sand deposits are found on top of these fluvial deposits. The varying compositions found in the shallow subsurface indicates changing depositional environments over time, and therefore the rise and fall of sea level over time. The most recent deposit on the marine deposits is a thin layer of sand and gravel that was transported by meltwater from glacier fronts, which carried significant sand, silt, and gravel, during the last Ice Age (Plank and Schenk, 1998).

There are five units from the Upper Cretaceous that occur in the shallow subsurface of the area; (oldest to youngest) the Magothy, Merchantville, Englishtown, Marshalltown, and Mount Laurel Formations. The Magothy Formation consists of a gray clayey silt with lignite interbedded, with very fine to medium, well-sorted sand. The depositional setting being a coastal alluvial plain or in an estuarine setting. The thick, clean sands of the Magothy Formation serve as a confined aquifer in parts of southern New Castle County. The Merchantville Formation is composed of dark gray to black silt to clayey silt with intervals of fine-grained sandy silty clay, deposited in a shallow, open marine environment. The Englishtown Formation is similar to the Merchantville Formation, but it is more sand-dominant with its composition of silty fine-grained sand. The Marshalltown Formation is composed of dark gray sandy silt with some quartz and mica, deposited in a deeper marine environment. The Mount Laurel Formation is characterized by fine to coarse sands and thin beds of clay, with a depositional environment of mid-shelf to nearshore (Jengo et al., 2013; Tomlinson and Ramsey, 2023).

The Delaware City DMPF is located in a low marsh area with Holocene age sediments and soils. Gray to brown to yellow clayey silt with laminae of organic fragments overlain by dark brown peat (Tomlinson and Ramsey, 2023). The dredge placement deposits are material which was dredged from stream or river channels or from the C&D Canal and placed either along the banks of the stream or in impoundments (including DMPFs). Dredge placement material consists of clay, silt, and sand that is primarily a mixture of Cretaceous and Quaternary geologic units (DE Geologic Society).

The soils within the Delaware City DMPF generally consist of historic dredge material which was deposited into the facility during previous dredge placement events. The soils mapped within the Project area include the following soil map units (USDA NRSCS 2023 and DNREC, Division of Fish and Wildlife, 2012).

- Udorthents, 0 to 10 percent slopes (UzC)  
The UzC soil map unit is typically found on flats and knolls and is derived from fluviomarine sediments. UzC are described as sandy loam soils which are well drained with no frequency of flooding or ponding.
- Udorthents, 0 to 30 percent slopes (UzF)



The UzF soil map unit is typically found on hillslopes and knolls and is derived from fluviomarine sediments. UzC are described as sandy loam soils which are well drained with no frequency of flooding or ponding.

- Water (W)  
This soil map unit consists of water features.

The soils within the Biddles Point and Reedy Point South DMPFs are mapped as consisting entirely of the Udorthents soil map unit and the Reedy Point North DMPF is mapped as consisting entirely of the Broadkill mucky peat (Figure 7). It should be noted that the Biddles Point DMPF includes historic dredge sediments and the Reedy Point North and South DMPFs also include recent placement of dredge sediments, therefore any native soils are located beneath the dredge sediments at various depths.

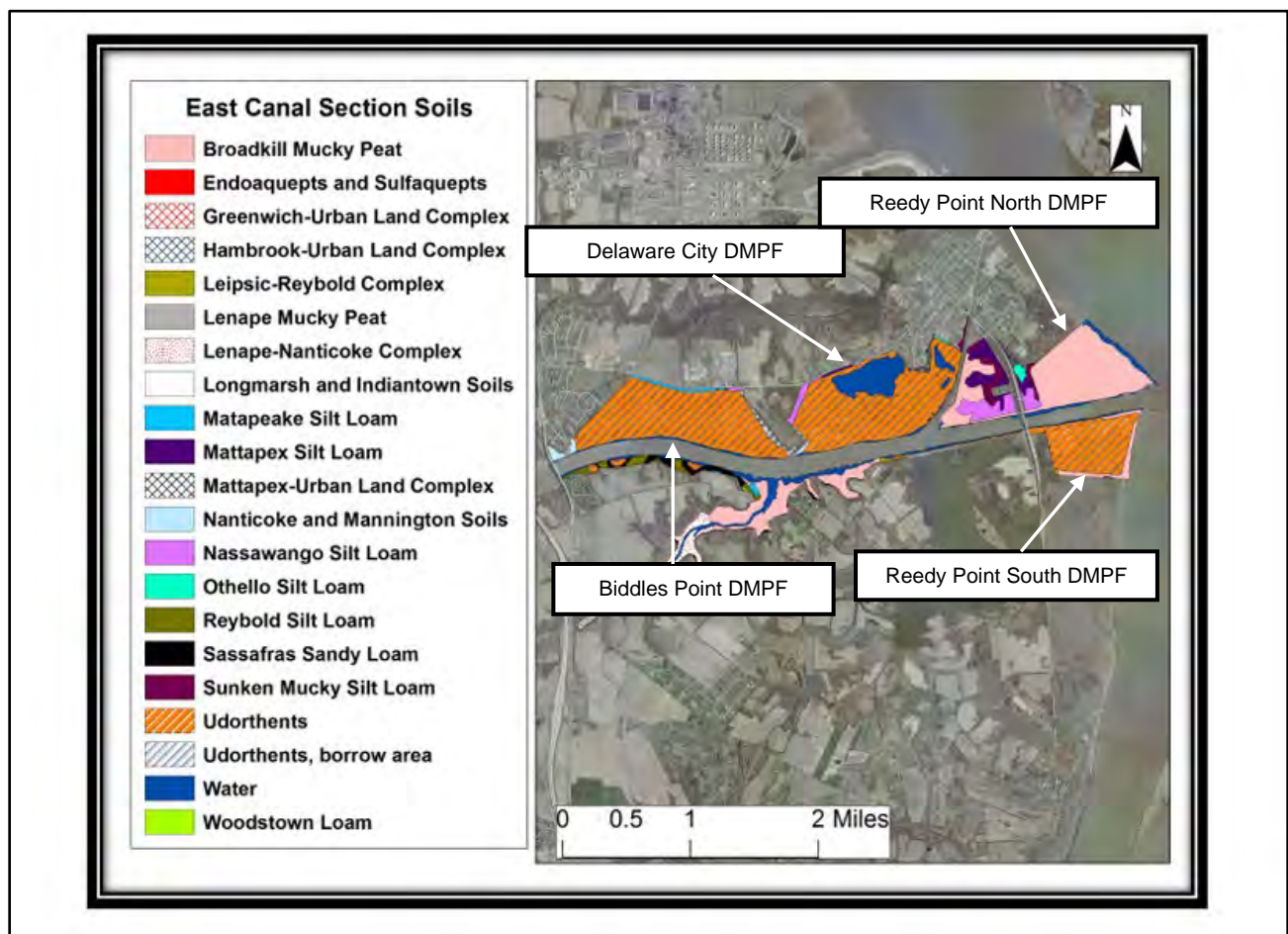


Figure 7. Soils Map (courtesy of DNREC Division of Fish and Wildlife, 2012)

#### 4.1.2. Groundwater

The sediments found within the Delaware City DMPF include the dredge materials from the last use of the facility in the 1970s and marsh deposits also surficially underlie the

project area. The marsh deposits found in the disposal facility function primarily as a confining unit due to its fine-grained composition. The degree to which they impede groundwater flow depends on the thickness and degree of compaction. The Scotts Corners Formation, which functions as part of the Columbia aquifer, is also present beneath the Delaware City DMPF along with the Biddles Point and the Reedy Point North and South DMPFs. The water table usually occurs in the unit because of its near-surface position. The Scotts Corners Formation has a large influence on rates and locations of ground-water recharge. However, due to the limited thickness, stream incision, and near-surface locations, water supply wells are not permitted in this unit (Dugan, et al. 2008). Similarly, the Columbia Formation has a large influence on rates and locations of groundwater recharge to the Columbia aquifer due to its near-surface positions, contact with streams and underlying aquifers, and permeable nature (Dugan, et al. 2008).

Beneath the Columbia aquifer are several other aquifers within older Coastal Plain units. Key aquifers briefly described below (from youngest to oldest) with corresponding chart (Dugan, et al. 2008):

- Rancocas – This aquifer is comprised of the Manasquan and Vincentown Formations. The Rancocas aquifer functions as a leaky confining unit where the unit is siltier in the Manasquan Formation. The Vincentown Formation is the primary unit hosting the Rancocas aquifer. If the overlying units are relatively thin or absent, the water table can be found in the Vincentown Formation and receives recharge from precipitation and discharges groundwater to streams and swamps.
- Mount Laurel – In areas where the overlying units are thin or absent, the Mount Laurel Formation receives recharge directly from precipitation and discharges groundwater to streams and swamps. The Mount Laurel aquifer is fair to good with maximum well yields of 400 gpm.
- Marshalltown – The silty composition of the Formation causes its likely primary function to be that of a leaky confining unit. Head measurements are not adequate to quantify the amount of leakage to overlying and underlying units although it is likely that the leakage rate is greater where the unit is thinner and sandier.
- Englishtown – Sands in the Formation function as an aquifer, commonly referred to as the Englishtown aquifer. It is considered a poor aquifer due to its relatively thin (5 to 24 ft thick) and somewhat silty composition.
- Merchantville – The Merchantville Formation is thought to function as a leaky confining layer.
- Magothy – The Magothy aquifer ranges from a fair to good aquifer due to its heterogeneous composition and variable thickness. The aquifer ranges from 5 to

56 ft, where the thicker, sandier zones are capable of yielding more than 100 gpm to wells.

Age	Geologic Unit	Hydrologic Unit
Holocene	Dredge spoil, marsh, swamp, alluvial deposits, undrained depressions	Confining beds and minor sand beds
Pleistocene	Scotts Corners Fm. Lynch Heights Fm. Columbia Fm.	Columbia aquifer fair to excellent yield
Miocene	Calvert Fm.	Confining beds
Eocene	Shark River Fm. Manasquan Fm.	Confining beds
Paleocene	Vincetown Fm. Hornerstown Fm.	Rancocas aquifer fair to good yield interbedded confining units
Cretaceous	Navesink Fm.	Confining beds
	Mt. Laurel Fm.	Mt. Laurel aquifer poor to good yield
	Marshalltown Fm.	Confining bed
	Englishtown Fm.	Englishtown aquifer poor to fair yield
	Merchantville Fm.	Confining beds
	Magothy Fm.	Magothy aquifer fair to good yield
	Potomac Fm.	Potomac aquifers and confining units fair to excellent yields

Figure 8: Lithostratigraphy and hydrostratigraphy chart (Dugan, et al. 2008).

#### 4.1.3. Climate and Sea Level Rise

Climate. The State of Delaware is situated in a transition zone between humid subtropical climate conditions to the south and humid continental conditions to the north. The state has a continental climate, with cold winter temperatures, hot summers and

ample precipitation throughout the year. The temperatures within the state average 5°C (41°F) in winter and 30°C (86°F) in summer. The average annual precipitation is approximately 45-inches, however precipitation amounts can vary greatly from one year to another. Delaware is often affected by seasonally occurring severe weather including winter and spring nor-easters that can drop heavy snow and cause coastal flooding, autumn tropical systems with high winds, coastal flooding and heavy rainfall and spring and summer severe thunderstorms (Delaware Climate Office, 2023).

Climate Change. Historic climate trends for the State of Delaware indicate that the annual and seasonal temperatures have increased by approximately 2°F since 1900. An analysis of historical climate data for Delaware for the period of 1895 through 2012 indicates that temperatures have been increasing at approximately 0.2°F per decade annually and in all seasons. Delaware's temperatures are expected to increase another 2.5 °F to 4.5 °F by 2050, with an up to 8°F increase by 2100. Historically, days above 100°F have occurred less than once per year in Delaware. It is predicted that by 2050, Delaware can expect two to eight days per year to reach above 100°F (DNREC, 2024). Rainfall in the autumn season has been increasing 0.27-inches per decade and overall rainfall in Delaware is expected to increase by 10% in 2100 and the number of very wet days, defined as two or more inches of rainfall, is also expected to increase.

Sea Level Rise. In 2009, DNREC formed a Sea Level Rise Technical Workgroup to provide planning scenarios for sea level rise up to the year 2100. The workgroup was comprised of scientists from the University of Delaware, Delaware Geological Survey Center for the Inland Bays, Partnership for the Delaware Estuary, and DNREC. The workgroup reviewed historical data for sea level rise and reviewed the findings of international and national expert panels. Based on the information, the workgroup chose to recommend a range of scenarios for understanding and planning for sea level rise. The three scenarios agreed upon for local sea level rise for the next century: 0.5 meters (low estimate), 1 meter (intermediate estimate), and 1.5 meters (high estimate) (DNREC, 2012).



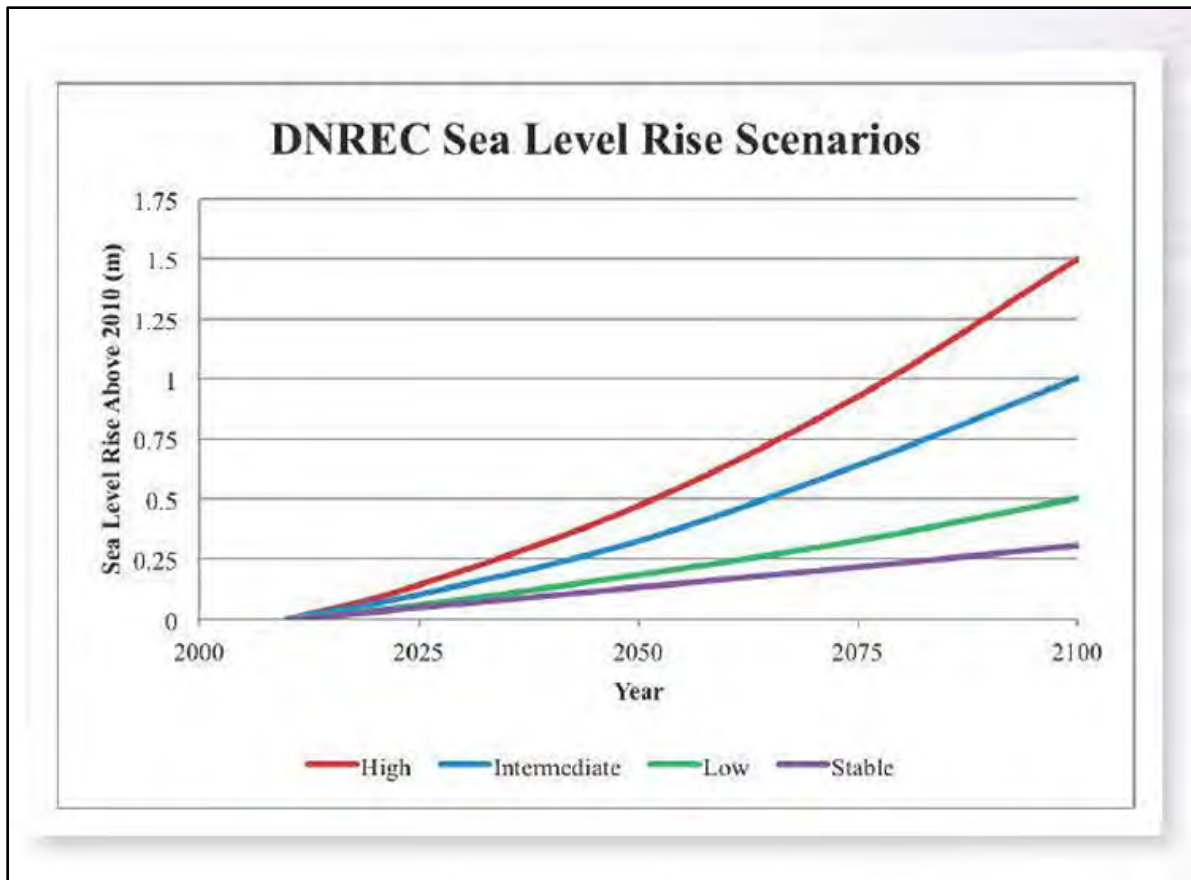


Figure 9. Delaware's Sea Level Rise Scenarios Year 2000-2100 (DNREC, 2012).

Figure 10 below represents light detecting and ranging (LiDAR) based one meter digital elevation model data which was used to develop bathtub-model coastal inundation maps for the State of Delaware, as created by the Delaware Geological Survey. The inundation maps include surfaces from mean higher-high water (MHHW) to seven feet above MHHW, in one-foot increments. The maps were designed to help access the potential impacts of sea-level rise, storm surges, and numerous other applications and will advise long-range planning of infrastructure, facilities, land management, land use, and capital spending. As depicted in Figure 10, due to the existing perimeter dikes surrounding Delaware City DMPF, the facility is not located within a modeled SLR coastal inundated area. Similarly, due to the perimeter dikes surrounding the Biddles Point and Reedy Point North and South DMPFs, those facilities are also not within a modeled SLR coastal inundated area.

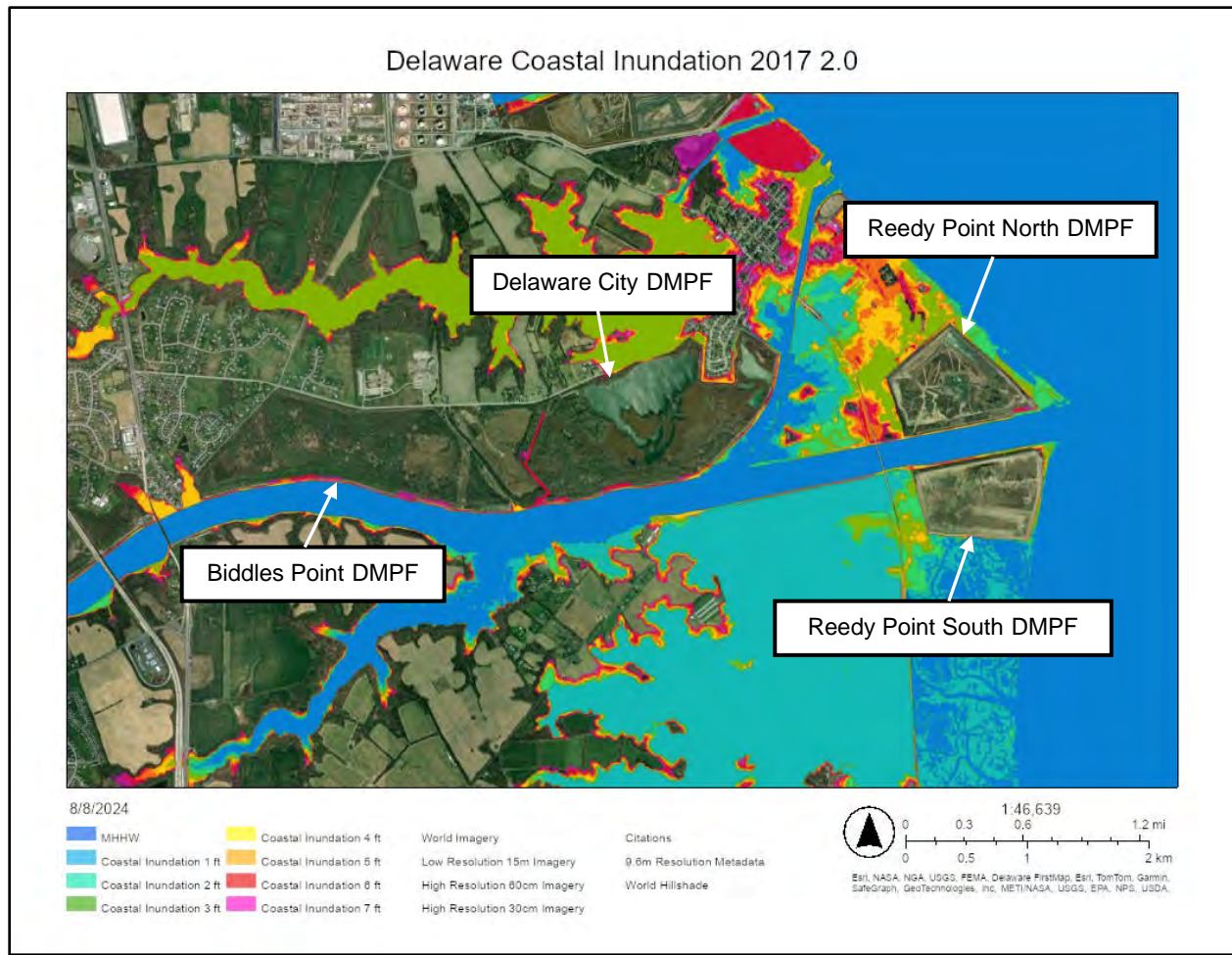


Figure 10. Delaware Coastal 2017 Inundation Map (DGS, 2017).

#### 4.1.4. Tides and Currents

The tides affecting the C&D Canal to the south of the Delaware City DMPF are semi-diurnal with two nearly equal high tides and two nearly equal low tides per day (or approximately 12 hrs. and 25 minutes per tidal period, as shown in Figure 11 for NOAA Station No. 8551910. The closed control tide gauge is located just east of the Delaware City DMPF at Reedy Point, adjacent to the confluence of the C&D Canal and the Delaware River. The mean range at the tidal station is 5.34 feet while the Diurnal Range is 5.84 feet. There is no tidal connection between the Delaware City DMPF and the C&D Canal due to the sluice box within the DMPF and the invert elevation of the culvert pipes which discharge the return water from the manmade ditch to the canal.

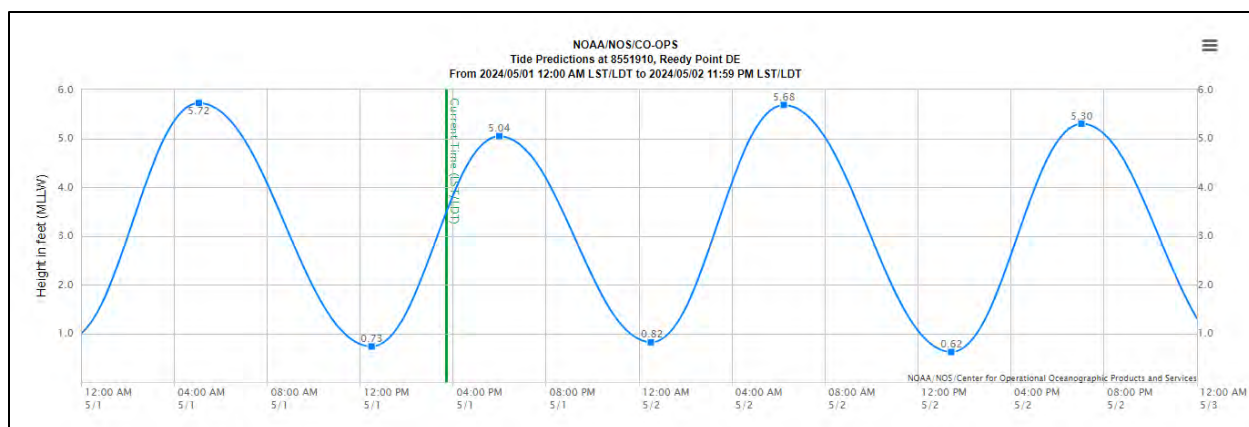


Figure 11. Example of Tide Predictions for Reedy Point DE (NOAA, 2024).

Table 2. Decision Rationale summarizes the 1983 – 2001 tidal epoch datums relative to MLLW and NAVD88 from NOAA’s Tide and Currents (2024).

Datum	Description	Elevation (ft. MLLW)	Elevation (ft. NAVD88)
MHW	Mean High Water	5.52	2.55
MTL	Mean Tide Level	2.85	-0.05
MLW	Mean Low Water	0.18	-2.79
MLLW	Mean Lower-Low Water	0.00	-2.97

A hydraulic study of the C&D Canal published in 2009 (Ward, Gebert, and Weggel, 2009) found that there is a long-term net eastward flow in the canal that is driven by a higher mean sea level (MSL) at the western end of the canal in Maryland compared to mean sea level at the eastern end of the canal in Reedy Point, Delaware. The simulations used in the study suggested an average discharge of between 3,000 and 4,000 cubic feet per second in the canal.

#### 4.1.5. Air Quality

As required by the Clean Air Act, the U.S. Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) for six (6) common air pollutants known as “criteria pollutants” (*i.e.*, ozone (O<sub>3</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and lead (Pb). After the EPA sets the NAAQS, it determines which areas of the country meets those standards. If the air quality in a geographic area meets or is cleaner than the standard, it is called an attainment area. Areas that do not meet a standard are called nonattainment areas.

Air quality is generally good in the Delaware Bay region; however, the project area (New Castle County, Delaware) is located within the Philadelphia-Wilmington-Atlantic City,

PA- NJ-MD-DE nonattainment area for the 8-hour ozone NAAQS but was reclassified from “marginal” to “moderate” nonattainment by the U.S. EPA effective November 7, 2022. According to the 8-hour ozone (2015 standard) classifications, “Moderate” nonattainment has a design value of 0.081 up to but not including 0.093 parts per million (ppm) of ozone. A marginal classification (below moderate) is the lowest classification and classifications above moderate range from serious to severe to extreme nonattainment.

As required by the Clean Air Act, the State of Delaware has a State Implementation Plan (SIP) in place describing how the 8-hour ozone NAAQS will be achieved and maintained in nonattainment areas. General Conformity is a process to implement Section 176(c) of the Clean Air Act to ensure actions conducted or sponsored by Federal agencies in nonattainment or maintenance areas are consistent with the SIP. General Conformity requires that reasonably foreseeable emissions from Federal actions will not cause or contribute to new violations of a NAAQS, increase the frequency or severity of existing NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone towards achieving attainment. However, a General Conformity determination is not required if the emissions from the federal action will fall below the *de minimis* levels set forth in the Clean Air Act regulations. The *de minimis* emission threshold for a moderate ozone nonattainment area is 100 tons/year of NO<sub>x</sub> or 50 tons/year VOC. New Castle County is also in nonattainment for sulfur dioxide (SO<sub>2</sub>), however for the remaining 4 NAAQS criteria pollutants (CO, Pb, NO<sub>2</sub>, and particle pollution), New Castle County is in attainment.

Greenhouse gases (GHG) trap heat in the atmosphere. Carbon dioxide is the most abundant GHG and enters the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g. manufacture of cement). Carbon dioxide is removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle. Methane is emitted during the production and transport of coal, natural gas and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substance (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons) (USEPA, 2016). The largest source of GHG emissions from human activities in the United States is from burning fossil fuels for electricity, heat and transportation. The USEPA tracks total U.S. emissions and reports the total national GHG emissions and removals associated with human activities.

#### **4.1.6. Water and Sediment Quality**

Water levels in the open water areas within the Delaware City DMPF are driven by precipitation events such as rainfall or snow melt. The open water areas are freshwater and do not receive any tidal inflow from the C&D Canal to the south of the DMPF. The

C&D Canal adjacent to the project area is predominately driven by astronomical tides; however, other factors such as sustained wind (*i.e.*, fetch), inflow from the Delaware River, Chesapeake Bay, and C&D Canal tributaries, rainwater runoff, and strong tides driven by storms can also affect water levels in the canal. The C&D Canal waters where the DMPF return water will discharge are considered brackish and oligohaline with an average salinity at the St. Georges Bridge of approximately 3.6 ppt (DNREC, 2022).

Due to the brackish nature of the C&D Canal waters at the confluence with the Delaware River, this area falls within the Delaware estuary turbidity maximum zone, which results in normal background turbidity to be significantly higher than other salinity zones of the basin. According to Standard Methods (2005), “Turbidity in water is caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms.” These factors determine the amount of clarity in a water body. Figure 12 displays the C&D Canal and Delaware River confluence area (approximately Delaware River Mile 58.5) and the distribution of turbidity levels within the Delaware River between 1999 and 2016, which shows the average turbidity within the Delaware River system is highest in this area (DRBC, retrieved from website: <https://johnyagecic.shinyapps.io/BoatRunExplorer/> on 4/19/2024).

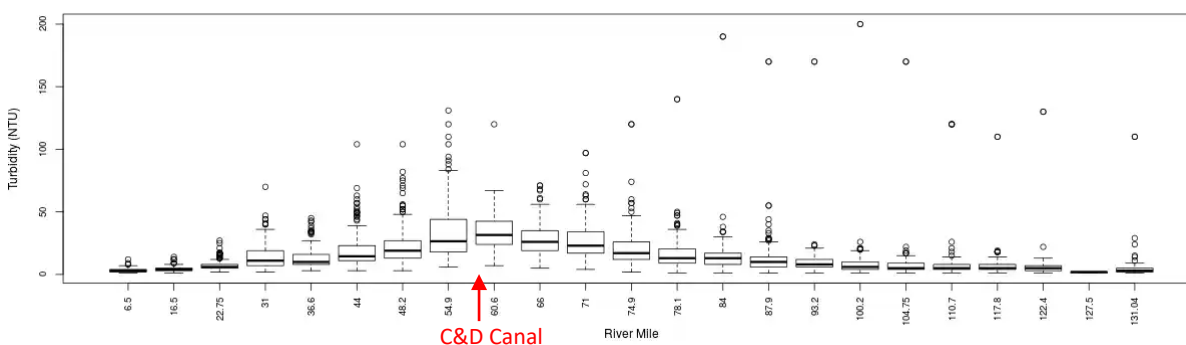


Figure 12. Turbidity in Box-Plot Distribution of the Delaware River (Source: DRBC Delaware Estuary Water Quality (Boat Run) Explorer retrieved from internet website <https://johnyagecic.shinyapps.io/BoatRunExplorer/> on 4/19/2024).

The Delaware City DMPF, Biddles Point DMPF, and Reedy Point South and North DMPFs are located adjacent to Zone 5 of the Delaware River Basin Commission’s Delaware River Main Stem Interstate Zones. Zone 5 occurs between river miles 48.2 on the southern end upstream to River Mile 78.8 on the northern end. The affected area occurs west of River Mile 61. DRBC designates Zone 5 for the following water uses: Aquatic Life, Primary Contact Recreation, and Fish Consumption. As an interstate waterway, Zone 5 also functions as a water quality Assessment Unit (AU). Specifically, these uses include:

- Industrial water supplies after reasonable treatment.
- Maintenance of resident fish and other aquatic life.
- Propagation of resident fish from river mile 70.0 to river mile 48.2.



- Passage of anadromous fish.
- Wildlife.
- Recreation.
- Navigation.

Zone 5 did not meet Water Quality Criteria in the 2020 assessment for Aquatic Life and was assigned as not supporting (“NSE”), but this is “based primarily on fewer than 10% exceedances of criteria”. This was due to both Dissolved oxygen (DO) and temperature did not achieve 100% daily measurement criteria. However, DO and temperature did meet 96.9% and 98.9% of the daily observation criteria (DRBC, 2020). Criteria were met for pH, alkalinity, turbidity and toxic pollutants. Total dissolved solids are not assessed in this zone due to natural high background levels from higher salinities.

Although toxic pollutants observation criteria were met for Aquatic Life for Zone 5, DRBC (2020) discusses that multiple exceedances were observed of DRBC acute and chronic marine stream quality objectives for copper in Zone 5. However, they note that assessment was complicated by factors such as field sampling and analytical issues with contamination, a need to assess revisions to current criteria, and the influence of other water quality attributes that influence the partitioning and toxicity of copper.

Data showed numerous exceedances of aluminum acute and chronic freshwater objectives for the support of aquatic life over multiple years. With enhanced monitoring in 2017, the chronic criterion was exceeded in Zones 2, 3 4, and 5 and acute criterion was exceeded in Zones 4 and 5.

Exceedance of dieldrin human health objectives (carcinogens) were observed in Zones 2, 3, 4, 5 and 6 in as part of a single enhanced monitoring survey. Additional monitoring and assessment of pesticides is recommended in Zones 2 through 6.

As reported in DRBC (2020), the exceedances of toxic pollutants criteria are indicated by the presence of fish consumption advisories and are further supported by the presence of measurable PCB concentrations in the water column in excess of the applicable surface water quality PCB criterion. Twenty-two main stem channel sites in the tidal Estuary were sampled in 2015 for PCBs and analyzed using EPA method 1668 Rev A. Sampling stations, which were located from Biles Channel near Trenton NJ to the ocean boundary between Cape May and Lewes. Whole water samples were analyzed for all 209 PCB congeners. Results indicated that whole water concentrations ranged from approximately 400 picogram per liter (pg/L) near the ocean to a maximum of 17,700 pg/L in Zone 5 (the project area) and decreasing to an average concentration of 2,000 pg/L in Zone 2. All PCB concentrations exceed the current PCB water quality criterion for the protection of human health from carcinogenic effects at 16 pg/L.

Because of persistent bioaccumulation of toxic pollutants, the States of Delaware and New Jersey have adopted fish consumption advisories for Zone 5 north of C&D Canal, where both states advise only 3 meals per year for all finfish due to PCBs,

dioxins/furans and dieldrin. Specific advisories for various fish species in both states are also in place for waters south of the C&D Canal.

The State of Delaware 2022 Combined Watershed Assessment Report (305(b)) and Determination for the CWA Section 303(d) List of Waters Needing TMDLs provides a statewide assessment of surface water and groundwater resources and provides a list a list of waters that need Total Maximum Daily Load (TMDL) regulations to meet Federal water quality standards. The establishment of TMDLs is required pursuant to the Sections 305(b) and 303(d) of the CWA, as amended in 1981 and 1987. The 2022 report also summarizes statewide water quality assessments and provides an overview of initiatives and concerns with impaired waters. The report utilized from the period of January 2016 through December 2020. DNREC's Water Quality Standards program works with stakeholders and coregulators to set the Designated Uses and Criteria for the State's waters to protect them as required under the CWA, EPA regulations and Delaware Code. The waterbodies within the state that do not meet their designated uses due to pollutants, and thus part of the State's 303(d) list of impaired waters, are required to have TMDLs to meet their criteria.

The designated uses for the C&D Canal includes Primary Contact Recreation and Fish, Aquatic Life, and Wildlife. The C&D Canal waterway is listed as Category 2 for enterococcus for the Primary Contact Recreation use, total ammonia, dissolved oxygen, and nutrients for the Fish, Aquatic Life, and Wildlife use, and dichlorodiphenyltrichloroethane (DDT) and chlordane for the Fish Consumption use. Category 2 waters are defined as "some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met". The C&D Canal waterway is also listed as Category 5MNR for dieldrin, dioxin, and furan compounds for the Fish Consumption use. Waters in Category 5MNR are defined as those that remain in EPA Category 5 (water is impaired or threatened and a TMDL is needed for at least on pollutant or stressor) and as such will require a TMDL at a future date if expected decreases do not actually occur. If trends analyzed at later dates show that trends in 5MNR waters are not in fact trending downward, or reaching their target levels, the Department will reclassify those waters as Category 5 and TMDLs for those pollutants will be developed.

#### 4.1.6.1 Sediment Analyses

Sediment shoaling within the Delaware River FNC represent recent sediment accumulations deposited subsequent to previous maintenance dredging and/or the deepening of the Main Navigation Channel. Sediment quality of Delaware River main navigation channel sediments was assessed in USACE (1997) (2009) and (2013), and Greene (2010) for the Delaware River Main Channel Deepening Project where the authorized channel was deepened from 40 feet to 45 feet between 2010 and 2021. Previous sediment quality analyses were conducted within or near the Delaware River FNC of the Deepwater Point and New Castle Ranges (Greeley-Polhemus Group, 1995, Versar, 1997; Versar, 2003; Versar, 2005; and DEBI, 2008). Also, sediment quality analyses were performed at the eastern entrance to the C&D Canal (Tetra Tech,



2020a), and the Salem River FNC entrance channel within the Delaware River (Tetra Tech, 2020b). The sample locations for these investigations are presented in Figure 13. Because of the large data set encompassing over 45 samples within the affected area, Table 3. presents the concentration data in ranges for detected constituents and the averages of the concentrations of detections within the Delaware River region encompassing the Deepwater Point and New Castle Ranges inside and outside of the navigation channel. With the exception of the samples from DEBI (2008), sediments represented by the sample locations from the navigation channels (Delaware River and Salem River) represent historic data where the sediments have likely been removed from either maintenance dredging or the Delaware River Main Channel Deepening project subsequent to their sample dates. In the absence of recent data for the affected areas to undergo the next maintenance dredging cycle, these samples provide a historic context to the types of sediment constituents and their concentrations expected and/or previously encountered in these river ranges and were placed in upland DMPFs. An updated sediment investigation within the Deepwater Point and New Castle Ranges of the Delaware River FNC is planned for the Fall of 2024.

Bulk sediment analyses conducted on these sediments included inorganics, organic pesticides, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and dioxins/furans. Since the sediments would be placed in a confined upland dredged material placement facility (DMPF), the concentrations detected in the sediments were compared to the Delaware Hazardous Substance Clean Up Act (HSCA) screening levels for soils (HSCA, 2023) (Table 3). “The HSCA Screening Level Table combines background, risk-based and regulatory values in soil, groundwater, soil gas, sediment and surface water. The screening levels should be used to determine the contaminants of potential concern (COPCs) in the risk assessment process.” For the purposes of identifying COPCs, the soil screening levels were used because of their placement in an upland confined DMPF, and will not be placed for aquatic use.

Inorganics tested in the sediments included heavy metals and cyanide. Table 3 provides the number samples for each constituent, the number of detections (detections were counted based on an analyte being detected above the method detection level), the range of detected analytes, the means of the detected concentrations, and the number of analyte samples that exceed a HSCA soil screening level. Five of the inorganic analytes had exceedances of the HSCA soil screening levels, which include: antimony, arsenic, cadmium, selenium and thallium.

For antimony, one sample (out of forty-five samples) (detected at 13 mg/kg) exceeded the HSCA soil level of 3.3 mg/kg. This sample (DE 0563) was located outside and west of the navigation channel near DRBC River Mile 65. However, the mean of all samples detected were measured at 1.1 mg/kg, which were below the 3.3 mg/kg screening level.



Figure 13. Historic Delaware River sediment sample locations proximate to the Delaware City DMPF.



**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples										
Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
Percent Total Organic Carbon (TOC)		47	47	0.2	-	35.9	5.4	7.3	NA	NA
Percent Silt/Clay		24	24	0.1	-	88.5	48.4	26.5	NA	NA
<b>Inorganic_units</b>	<b>mg/kg</b>			<b>mg/kg</b>		<b>mg/kg</b>	<b>mg/kg</b>			
Aluminum	51,200	29	29	1600	-	23200	9222.8	6022.0	0	0%
Antimony	3.1	45	18	0.1	-	13	1.1	3.0	1	6%
Arsenite (As III)	---	1	1	6.5	-	6.5	6.5	NA	0	0%
Arsenate (As V)	---	1	1	1.7	-	1.7	1.7	NA	0	0%
Arsenic (TAL)	11	45	45	0.8	-	37.4	10.2	6.9	19	42%
Barium	1,500	20	20	8.2	-	117	48.5	34.5	0	0%
Beryllium	16	30	30	0.1	-	1.4	0.6	0.4	0	0%
Cadmium	0.71	45	42	0.04	-	4.8	0.9	1.0	21	50%
Calcium	---	14	14	140	-	4050	1699.3	1216.7	NA	NA
Chromium	214	39	39	5.8	-	131	42.3	26.2	0	0%
Cobalt	34	14	14	2.2	-	17.2	8.0	4.4	0	0%
Copper	310	45	45	2.2	-	94.6	23.1	17.4	0	0%
Total_Cyanide_solid	2.3	30	7	0.1	-	0.4	0.2	0.1	0	0%
Iron	74,767	29	29	4610	-	38000	19063.1	8680.3	0	0%
Lead	400	45	45	2.96	-	148	35.4	27.2	0	0%
Magnesium	---	14	14	490	-	7170	3257.0	2311.6	NA	NA
Manganese	2,100	29	29	153	-	1310	695.2	331.1	0	0%
Mercury	1.1	45	37	0.01	-	0.9	0.2	0.2	0	0%
Nickel	150	45	45	3.9	-	35.6	20.0	9.4	0	0%
Potassium	---	14	14	366	-	3610	1852.1	1155.7	NA	NA

**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples

Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
Selenium	39	45	38	0.2	-	136	14.7	37.2	4	11%
Silver	39	45	31	0.03	-	1.7	0.4	0.4	0	0%
Sodium	---	14	14	237	-	1120	640.1	260.6	NA	NA
Thallium	0.078	30	21	0.06	-	4.9	1.9	1.7	19	76%
Tin	---	15	15	0.9	-	8.0	2.3	2.0	0	0%
Vanadium	134	20	20	5.2	-	61.8	33.6	20.1	0	0%
Zinc	2,300	45	45	17.7	-	563	144.3	106.2	0	0%
<b>Organic_Pesticide_Units</b>	<b>ug/kg</b>			<b>ug/kg</b>		<b>ug/kg</b>	<b>ug/kg</b>	<b>ug/kg</b>		
Aldrin	39	30	0		-					
Alpha BHC	86	30	0		-					
Alpha Chlordane	3,600	24	0		-					
BetaBHC	300	30	2	0.1	-	1	0.4	0.4	0	0%
Delta BHC	---	30	0		-					
Dieldrin	34	30	0		-					
Endosulfan I	47,000	30	0		-					
Endosulfan II	47,000	30	0		-					
Endosulfan Sulfate	38,000	30	0		-					
Endrin	1,900	30	6	0.03	-	0.34	0.2	0.1	0	0%
Endrin Aldehyde	---	30	0		-					
Endrin Ketone	---	24	0		-					
Gamma BHC _ Lindane	570	30	0		-					
Gamma Chlordane	3,600	24	0		-					
Heptachlor	130	30	0		-					
Heptachlor Epoxide	70	30	0		-					

**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples

Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
Methoxychlor	32,000	20	0		-					
p_p_DDD	2,300	30	14	0.2	-	60	16.0	20.6	0	0%
p_p_DDE	2,000	30	20	0.3	-	89	15.4	20.0	0	0%
p_p_DDT	1,900	30	3	10.0	-	190	77.7	98.0	0	0%
Toxaphene	490	30	0		-					
<b>PCB_Aroclor_Units</b>	<b>ug/kg</b>			<b>ug/kg</b>		<b>ug/kg</b>	<b>ug/kg</b>	<b>ug/kg</b>		
PCB_1016	410	24	0		-					
PCB_1221	200	24	0		-					
PCB_1232	170	24	0		-					
PCB_1242	230	24	0		-					
PCB_1248	230	24	1	8.1	-	8.1	8.1	NA	0	0%
PCB_1254	120	24	0		-					
PCB_1260	240	24	3	7.5	-	160	92.5	77.7	0	0%
<b>PCB_Congener/Homolog_Units</b>	<b>ug/kg</b>			<b>ug/kg</b>		<b>ug/kg</b>	<b>ug/kg</b>	<b>ug/kg</b>		
<b>TOTAL PCB (sum of congeners or homologs)</b>	230	18	18	0.003	-	138.12	22.21	32.43	0	0%
<b>Semi_Volatile_Organic_Compound_Units</b>	<b>ug/kg</b>			<b>ug/kg</b>		<b>ug/kg</b>	<b>ug/kg</b>	<b>ug/kg</b>		
1_1_Biphenyl	4,700	7	1	1.3	-	1.3	1.3	NA	0	0%
1_2_4_Trichlorobenzene	5,800	30	1	79.0	-	79.0	79.0	NA	0	0%
1_2_Dichlorobenzene	180,000	30	0		-					
1_3_Dichlorobenzene	---	30	0		-					
1_4_Dichlorobenzene	2,600	30	0		-					
2_2_oxybis_1_Chloropropane_	310,000	30	0		-					

**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples										
Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
2_4_5_Trichlorophenol	630,000	30	0		-					
2_4_6_Trichlorophenol	6,300	30	0		-					
2_4_Dichlorophenol	19,000	30	0		-					
2_4_Dimethylphenol	130,000	30	0		-					
2_4_Dinitrophenol	13,000	30	0		-					
2_4_Dinitrotoluene	1,700	30	0		-					
2_6_Dinitrotoluene	360	30	0		-					
2_Chloroanphthalene	480,000	30	0		-					
2_Chlorophenol	39,000	30	0		-					
2_Methylnaphthalene (PAH)	24,000	30	5	1.7	-	300.0	79.4	132.1	0	0%
2_Methylphenol	320,000	30	0		-					
2_Nitroaniline	63,000	30	0		-					
2_Nitrophenol	---	30	0		-					
3_3_Dichlorobenzidine	1,200	30	0		-					
3_Nitroaniline	---	30	0		-					
4_6_Dinitro_2_methylphenol	510	30	0		-					
4_Bromophenyl_phenlether	---	30	0		-					
4_Chloro_3_methylphenol	630,000	30	0		-					
4_Chloroaniline	2,700	30	0		-					
4_Chlorophenyl_phenylether	---	30	0		-					
4_Methylphenol (p-cresol)	130,000	30	1	510.0	-	510	510.0	NA	0	0%
4_Nitroaniline	25,000	30	0		-					
4_Nitrophenol	---	30	0		-					
Acenaphthene (PAH)	360,000	30	2	27.0	-	72	49.5	31.8	0	0%

**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples										
Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
Acenaphthylene (PAH)		30	4	1.7	-	120	38.9	55.9	0	0%
Acetophenone		7	0		-					
Anthracene (PAH)	1,800,000	30	6	1.2	-	230	45.5	91.3	0	0%
Atrazine	2,400	7	0		-					
Benzaldehyde	170,000	7	0		-					
Benzo_a_anthracene (PAH)	1,100	30	18	3.0	-	340	80.4	114.6	0	0%
Benzo_a_pyrene (PAH)	240	30	18	3.2	-	340	104.0	123.4	2	11%
Benzo_b_flouranthene (PAH)	1,100	30	19	3.5	-	400	154.0	108.3	0	0%
Benzo_g_h_i_erylene (PAH)	---	30	14	2.3	-	330	90.8	84.6	0	0%
Benzo_k_fluoranthene (PAH)	11,000	30	14	1.7	-	160	70.8	51.0	0	0%
bis_2_Chloroethoxy_methane	19,000	30	0		-					
bis_2_Chloroethyl_ether	230	30	0		-					
bis_2_Ethylhexyl_phthalate	39,000	30	9	160.0	-	550			0	0%
Butylbenzylphthalate	290,000	30	0		-					
Caprolactam	3,100,000	7	0		-					
Carbazole	---	30	1	13	-	13	13.0	NA	0	0%
Chrysene (PAH)	110,000	30	17	3.4	-	220	107.9	68.5	0	0%
Dibenz_a_h_anthracene	170	30	2	34.0	-	79	56.5	31.8	0	0%
Dibenzofuran	7,800	30	2	6.2	-	95	50.6	62.8	0	0%
Diethylphthalate	5,100,000	30	0		-					
Dimethylphthalate	---	30	0		-					
Di_n_butylphthalate	630,000	30	0		-					
Di_n_octylphthalate	63,000	30	0		-					
Fluoranthene (PAH)	240,000	30	21	2.2	-	630	165.7	156.6	0	0%



**Table 3. Composite Summary of Bulk Sediment Samples Obtained from Within the Delaware River Deepwater Point and New Castle Ranges Inside and Outside of the Federal Navigation Channel from 1995 to 2020**

Composite of All Samples										
Parameter	Delaware HSCA Screen Level for Soil (2023)	# of Samples (Total)	# of Detections (Total)	Ranges			Mean Concentration of Detections	Std. Deviation (+/-)	# of Detections that Exceed HSCA Soils (Total)	% of Detections that Exceed HSCA Soils
				Minimum Concentration of Detections		Maximum Concentration of Detections				
Fluorene (PAH)	240,000	30	4	1.4	-	170	8.0	81.5	0	0%
Hexachlorobenzene	78	30	0		-					
Hexachlorobutadiene	1,200	30	0		-					
Hexachlorocyclopentadiene	180	30	0		-					
Hexachloroethane	1,800	30	0		-					
Indeno_1_2_3_cd_pyrene (PAH)	1,300	30	13	4.1	-	190	82.1	55.7	0	0%
Isophorone	570,000	30	0		-					
Methylphenol, 3 & 4	130,000	7	0		-					
Naphthalene (PAH)	2,000	30	9	1.3	-	470	86.6	149.9	0	0%
Nitrobenzene	5,100	30	0		-					
N_Nitroso_di_n_propylamine	78	30	0		-					
N_Nitrosodiphenylamine	110,000	30	1	360	-	360	360.0	NA	0	0%
Pentachlorophenol	1,000	30	0		-					
Phenanthrene (PAH)	180,000	30	19	1.1	-	490	107.6	115.3	0	0%
Phenol	1,900,000	30	0		-					
Pyrene (PAH)	180,000	30	21	3.0	-	850	177.1	190.2	0	0%
<b>Volatile_Organic_Compound_Units</b>	<b>ug/kg</b>			<b>ug/kg</b>		<b>ug/kg</b>	<b>ug/kg</b>	<b>ug/kg</b>		
1_1_1_Trichloroethane	810,000	30	0		-					
1_2_2_Tetrachloroethane	600	30	0		-					
1,1,2_Trichloro_1,2,2_trifluoroethane	670,000	7	0		-					
1_1_2_Trichloroethane	150	30	0		-					
1_1_Dichloroethane	3,600	30	0		-					
1_1_Dichloroethene	23,000	30	0		-					
1,2_Dibromo_3_Chloropropane	5	7	0		-					

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Composite of All Samples										
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				Minimum Concentration of Detections		Maximum Concentration of Detections				
1,2_Dibromoethane	36	7	0		-					
1_2_Dichloroethane	460	30	0		-					
1,2_Dichloroethene, Total	7,000	7	0		-					
1_2_Dichloropropane	1,600	30	0		-					
2_Butanone (Methyl ethyl ketone)	2,700,000	30	16	7.0	-	83	21.1	21.0	0	0%
2_Hexanone	20,000	30	0		-					
4_Methyl_2_pentanone	3,300,000	30	0		-					
Acetone	7,000,000	30	19	10.5	-	360	95.1	97.3	0	0%
Benzene	1,200	30	0		-					
Bromodichloromethane	---	24	0		-					
Bromoform	19,000	30	0		-					
Bromomethane	680	30	0		-					
Carbon Disulfide	77,000	30	0		-					
Carbon Tetrachloride	650	30	0		-					
Chlorobenzene	28,000	30	0		-					
Chloroethane	1,400,000	30	0		-					
Chloroform	320	30	0		-					
Chloromethane	11,000	30	0		-					
cis_1_2_Dichloroethane	16,000	24	0		-					
cis_1_3_Dichloropropene	1,800	30	0		-					
Cyclohexane	650,000	7	0		-					
Dichlorobromomethane	290	13	0		-					
Dichlorodifluoromethane	8,700	7	0		-					
Dibromochloromethane	290	24	0		-					

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Composite of All Samples										
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				Minimum Concentration of Detections		Maximum Concentration of Detections				
Ethylbenzene	5,800	30	0		-					
Isopropylbenzene	190,000	7	0		-					
Methyl acetate	7,800,000	7	0		-					
Methyl tert-butyl ether	47,000	7	0		-					
Methylcyclohexane	---	7	0		-					
Methylene Chloride	35,000	30	15	5.0	-	15	9.1	3.4	0	0%
m_Xylene & p_Xylene	55,000	7	0		-					
o_Xylene	65,000	7	0		-					
Styrene	600,000	30	0		-					
Tetrachloroethene	8,100	30	0		-					
Toluene	490,000	30	0		-					
trans_1_2_Dichloroethene	7,000	24	0		-					
trans_1_3_Dichloropropene	470	30	0		-					
Trichloroethene	410	30	3	2.0	-	3	2.3	0.6	0	0%
Trichlorofluoromethane	55,000	7	0		-					
Vinyl Chloride	59	30	0		-					
Xylene _Total_	58,000	30	0		-					
<b>Dioxins/Furans Units</b>	<b>pg/g</b>			<b>pg/g</b>		<b>pg/g</b>	<b>pg/g</b>	<b>pg/g</b>		
TEQ (WHO)	4.8	7	7	0.7	-	9.8	4.6	3.6	3	43%
Indicates an exceedance of a HSCA level										
mg/kg = parts per million; ug/kg= parts per billion; pg/g = parts per trillion TEQ -- Toxic equivalence in terms of the dioxin 2,3,7,8-TCDD using WHO 2005 Toxicity Equivalence Factors (TEFs). HSCA – Delaware Hazardous Substance Clean Up Act Screening Level Table Guidance Revised 2023 PAH – Polynuclear Aromatic Hydrocarbon										

No samples previously collected within the navigation channel exceeded the HSCA level.

Arsenic was detected in all forty-five samples collected within the region of these two river ranges. The range of arsenic detections was from 0.8 mg/kg to 37.4 mg/kg. These detections had a mean concentration of 10.2 mg/kg. The HSCA screening level is at 11 mg/kg. Nineteen of the forty-five samples exceeded the HSCA screening level. The highest concentration was 37.4 mg/kg (DRV-24) and was sampled in 2005 at the upstream end of the Deepwater Point Range from within the navigation channel. Arsenic exceedances were fairly distributed among the sample events and locations where 16 of the 19 exceedances were 18.2 mg/kg or less.

The HSCA screening level for cadmium is 0.71 mg/kg, which was detected in forty-two of forty-five samples. The range of detections was 0.4 mg/kg to 4.8 mg/kg with a mean concentration of the detections measured slightly above the HSCA level at 0.9 mg/kg. Twenty-one of the forty-two samples (50%) exceeded the HSCA screening level with the majority (16) of these exceedances occurring in the 1995 and 2003 data sets (GPG, 1995 and Versar, 2003).

Selenium was detected in thirty-eight of forty-two samples obtained from within the Deepwater Point and New Castle Ranges with a detection range of 0.2 mg/kg to 136 mg/kg. The mean concentration of the thirty-eight detections was 14.7 mg/kg. The highest concentration detected at 136 mg/kg along with three other samples exceeded the HSCA screening level for selenium of 45 mg/kg. All of these four exceedances of HSCA screening levels were in the 1995 (GPG, 1995) data set, which represents 11% of all detections. The majority of the selenium detections were an order of magnitude (or more) below the HSCA exceedances.

Thallium was detected in twenty-one of thirty samples with a detection range of 0.06 mg/kg to 4.9 mg/kg with a mean concentration of 1.9 mg/kg. Thallium had the highest HSCA exceedances where 90% of the detections exceeded the HSCA screening level of 0.078 mg/kg.

Organic pesticides that were detected among thirty samples included Beta BHC (a byproduct of Lindane), Endrin, DDT, and the DDT metabolites: DDE and DDD were detected in several samples. DDE had the most detections in twenty of the samples, but the concentrations were far below the HSCA screening levels by two orders of magnitude. The other DDT metabolite, DDD, had the next highest number of detections of with fourteen out of thirty samples, and also had the highest concentration two orders of magnitude than the HSCA screening level. DDT was detected in three of thirty samples with the highest concentration one order of magnitude below the HSCA screening level. Beta BHC was detected in two of thirty samples with the highest concentration of 1 ug/kg being two orders of magnitude below the HSCA screening level of 300 ug/kg. Six samples had detection of Endrin that ranged from 0.03 ug/kg to 0.34 ug/kg, which were three to four orders of magnitude lower than the HSCA screening level of 1,900 ug/kg.

Polychlorinated biphenyls in the form of commercial Aroclor mixtures, PCB homolog groups or individual PCB congeners were sampled during the various sampling events between 1995 and 2020. Aroclors were sampled in 1995 (GPG, 1995), 2003 (Versar, 2003), 2005 (Versar, 2005), and 2020 (Tetra Tech, 2020a). These sampling events (combined) resulted in a total of 24 samples for Aroclors. Of these, two Aroclors were detected. Aroclor 1248 was detected in one sample at a concentration of 8.1 ug/kg and three of the samples detected Aroclor 1260 at a range of 7.5 ug/kg to 160 ug/kg (a mean of 92.5 ug/kg). Both Aroclors were detected below the HSCA screening levels of 230 ug/kg and 240 ug/kg, respectively.

PCB homolog groups (mono-deca) were analyzed in PDE (2008) for 7 surficial sediment sample locations within the Deepwater Point and New Castle Ranges of the Delaware River, but were sampled at locations outside of the navigation channel. Because high resolution techniques were used, all homolog groups were detected for all of the samples. When the homolog groups were summed to provide a total PCB concentration, the ranges of concentrations were 0.8 ug/kg to 138.8 ug/kg with a mean of 27.3 ug/kg, which did not result in any exceedances of the HSCA screening level for total PCBs at 230 ug/kg.

Individual PCB congeners were analyzed under high resolution by Versar (1997), Tetra Tech (2020a), and Tetra Tech (2020b). The Versar (1997) study analyzed 65 targeted individual PCB congeners within the navigation channel. Two stations were within the Deepwater Point and New Castle Ranges. These sample stations contained a surficial sample and a bottom core composite to 5 feet resulting in a total of four samples in this region. The sum of congeners for each sample resulted in concentrations of total PCBs ranging from 0.0034 ug/kg to 20.3 ug/kg with a mean of 10.1 ug/kg. Tetra Tech (2020a) had one sample core composite (6 feet) at the eastern entrance channel to the Chesapeake and Delaware Canal, in this sample 209 PCB congeners were analyzed. When accounting for co-eluting PCBs, the sum of congeners at this location was 37.8 ug/kg. Tetra Tech (2000b) evaluated channel sediments within the Salem River approach channel, which occurs within the New Castle Range region of the Delaware River but is not within the Delaware River Main Navigation Channel. Six composite cores were obtained from within the Salem River approach channel. These samples also analyzed 209 PCB congeners with adjustments for co-eluting PCBs. The sum of congeners resulted in a range of 3.5 ug/kg to 43 ug/kg and a mean of 21.8 ug/kg, all below the HSCA screening level for total PCBs at 230 ug/kg.

When combining all samples (18 samples) with summed PCBs through either homolog groups or individual congeners, a range of total PCB concentrations was 0.003 ug/kg to 138.1 ug/kg and a mean concentration of 22.2 ug/kg within this region of the Delaware River. The sample with the highest concentration was at Station DE08-0566 (PDE, 2008), which was outside of the Federal navigation channel near the upstream end of the New Castle Range.

Semi-volatile organic compounds (SVOCs) detections in sediments were composed of primarily of seventeen polynuclear aromatic hydrocarbons (PAHs) that were found in over 50% of the samples. PAHs are primarily formed through combustion of fossil fuels and are expected to be found in highly industrialized and populated regions. With the exception of the PAH, benzo(a)pyrene, most of the PAHs were detected at low levels. Benzo(a)pyrene was detected in eighteen of thirty samples with a detection concentration range of 3.2 ug/kg to 340 ug/kg with a mean of the detected concentrations of 104 ug/kg. However, it should be noted that the samples in the GPG (1995) data set (6 samples) had no detected PAHs, but the MDL's were higher than the HSCA screening levels. Therefore, it is not known if there were PAH's above the HSCA screening levels. Two of the eighteen detections of Benzo(a)pyrene exceeded the HSCA screening level of 240 ug/kg.

Other SVOCs including 1,1'-Biphenyl, 1,2,4-Trichlorobenzene, 4-Methylphenol (p-cresol), bis-2-Ethylhexyl phthalate, Carbazole, Dibenzofuran, and n-Nitrosodiphenylamine were detected in less than 10% of the samples at low levels below their respective HSCA screening levels.

Volatile organic compounds (VOCs) were detected at low levels in several samples including 2-Butanone (Methyl ethyl ketone), acetone, and Methylene chloride, which are common laboratory contaminants from cleansing glassware and equipment. Another VOC detected in 3 samples at low levels below the HSCA screening level was Trichloroethene (TCE), an industrial solvent.

Dioxins and furans were analyzed for seven samples with high resolution detection limits in Tetra Tech (2020a and 2020b). These samples were obtained from the eastern entrance to the C&D Canal and the Delaware River entrance channel to the Salem River Navigation Channel. The most toxic form of Dioxin is the compound 2,3,7,8-TCDD. When analyzing dioxins and furans, a toxicity equivalence factor (TEF) of dioxin and dioxin-like compounds from the 2005 World Health Organization table was applied to adjust the concentrations to a 2,3,7,8-TCDD toxicity equivalent (TEQ) concentration. The total TEQ was then compared to the HSCA screening level for 2,3,7,8-TCDD of 4.8 pg/g (parts per trillion). A TEQ was established for each of the seven samples that resulted in a range of concentrations of 0.7 pg/g to 9.8 pg/g. The mean concentration was 4.6 pg/g. Three of the seven samples had concentrations that slightly exceeded the HSCA screening level. These three samples were from the Salem River approach channel data set.

The sampling and analyses of the DPS maintenance dredge materials and historic dredge materials within the Delaware City DMPF has not been conducted as of this draft EA. However, sampling will be conducted, and the analytic results will be distributed for review prior to the placement of dredge materials into the DMPF.

## 4.2 Biological Environment

### 4.2.1 Wetlands

The USFWS National Wetlands Inventory (NWI) online mapping system was created to provide users with a graphic representation of the type, size, and location of wetlands, deepwater or riparian habitats in the United States using the Cowardin et. al. 2<sup>nd</sup> Edition (2013) definition of wetland. The NWI wetland data has been prepared from the analysis of high-altitude imagery in conjunction with collateral data sources and field work. The wetlands displayed on the NWI mapper show wetland type and extent using a biological definition of wetlands. It should be noted that the NWI mapping is indicative of the approximate location of wetland resources and Waters of the United States, and therefore the mapped wetland areas do not define the limits of jurisdiction of any Federal, State, or local regulatory agencies. A review of the NWI mapping for the Delaware City DMPF site classifies potential wetlands within the facility boundaries as the following (Figure 14):

- Lacustrine, limnetic, unconsolidated bottom, artificially flooded, spoils habitat (L1UBKs).
- Palustrine, scrub-shrub, broad-leaved deciduous, needle-leaved evergreen, artificially flooded, spoils habitat (PSS1/4Ks).
- Palustrine, scrub-shrub, broad-leaved deciduous, artificially flooded, spoils habitat (PSS1Ks).
- Palustrine, emergent, *Phragmites australis*, artificially flooded, spoils habitat (PEM5Ks).
- Palustrine, unconsolidated bottom, artificially flooded, spoils habitat (PUBKs).
- Palustrine, scrub-shrub, broad-leaved deciduous, emergent, persistent, artificially flooded, spoils habitat (PSS1/EM1Ks).
- Palustrine, scrub-shrub, broad-leaved deciduous, emergent, persistent, artificially flooded, spoils habitat (PSS1/EM1Ks).
- Palustrine, forested, broad-leaved deciduous, artificially flooded, spoils habitat (PFO1Ks).
- Estuarine, intertidal, emergent, *Phragmites australis*, irregularly flooded (E2EM5P). This mapped wetland area is located outside of the DMPF boundary and adjacent to the confluence of the Branch Canal and the C&D Canal.



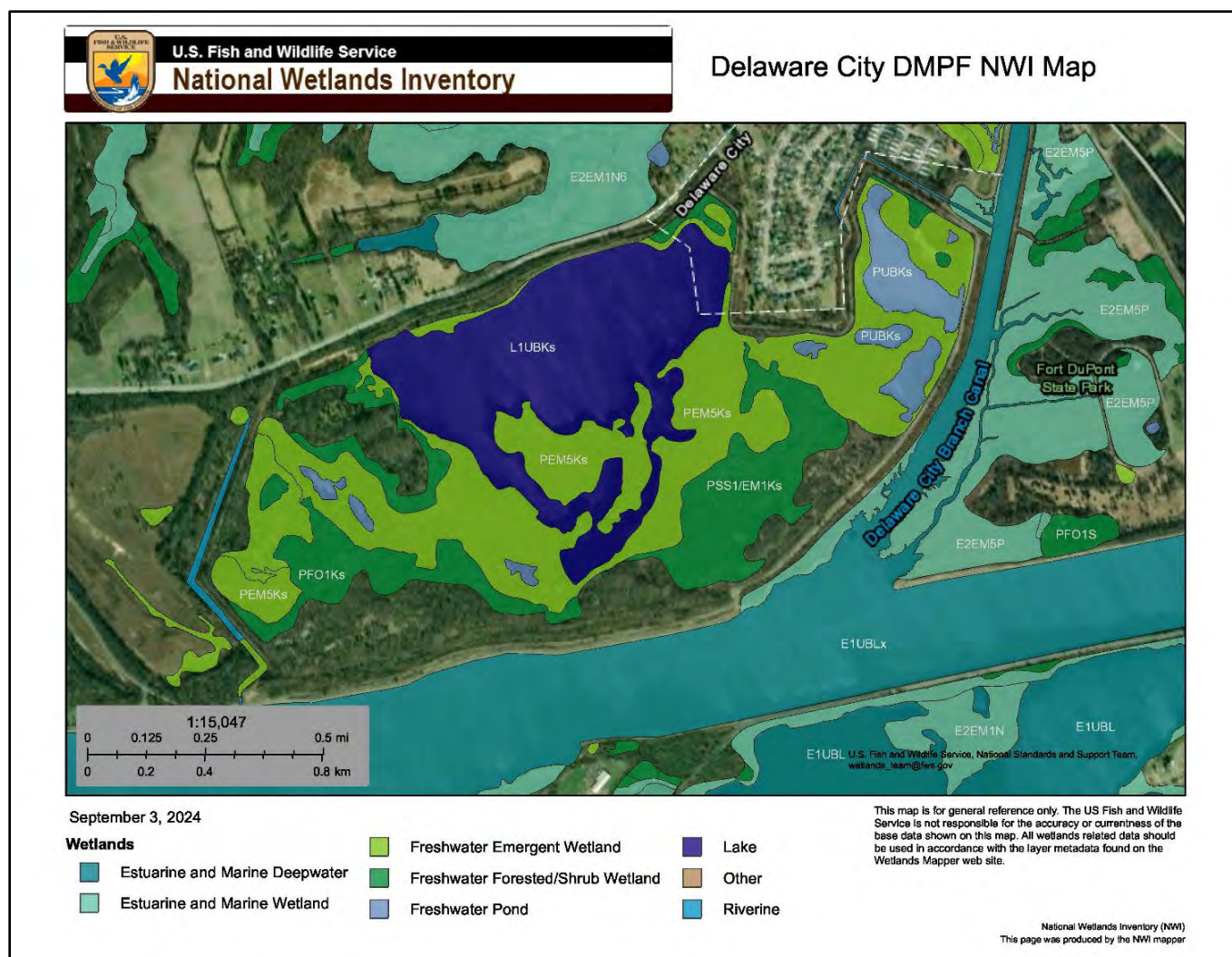


Figure 14. National Wetlands Inventory (NWI) Mapped Wetlands within the Delaware City DMPF (USFWS, 2024).

A review of the NWI mapping for the Biddles Point DMPF classifies potential wetlands within the facility boundaries as the following (Figure 15):

- Palustrine, forested, broad-leaved deciduous, temporary flooded, diked/impounded (PFO1Ah).
- Palustrine, emergent, persistent, seasonally flooded/saturated (PEM1E).

- Palustrine, emergent, *Phragmites australis*, seasonally flooded/saturated (PEM5E).

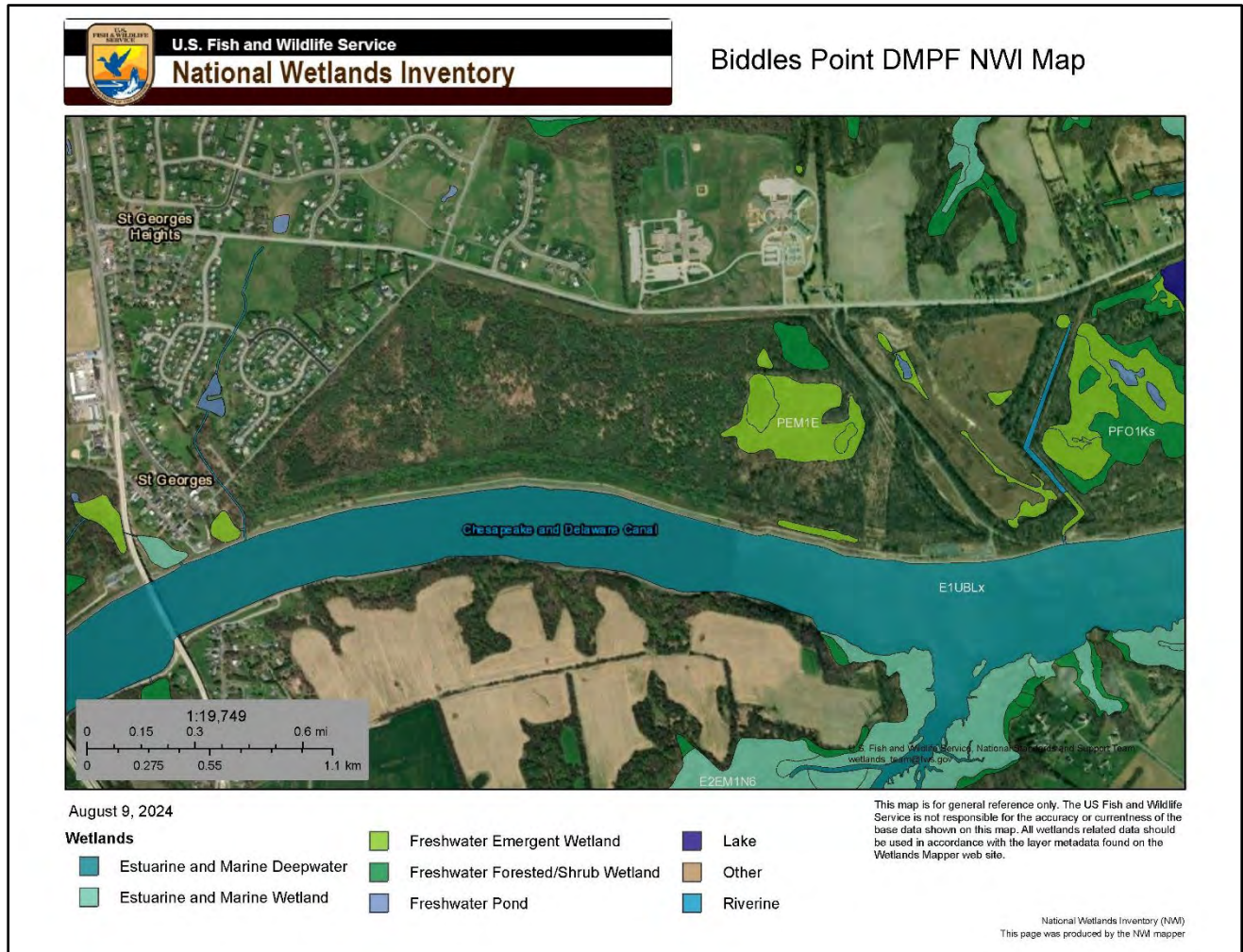


Figure 15. National Wetlands Inventory (NWI) Mapped Wetlands within the Biddles Point DMPF (USFWS, 2024).

A review of the NWI mapping for the Reedy Point North DMPF classifies potential wetlands within the facility boundaries as the following (Figure 16).

- Palustrine, emergent, *Phragmites australis*, artificially flooded, spoils (PEM5Ks).
- Palustrine, emergent, persistent, scrub-shrub, broad-leaved deciduous, artificially flooded, spoils (PEM1/SS1Ks).
- Palustrine, scrub-shrub, broad-leaved deciduous, artificially flooded, spoils (PSS1Ks).
- Palustrine, emergent, persistent, artificially flooded, spoils (PEM1Ks).
- Palustrine, emergent, *Phragmites australis*, scrub-shrub, broad-leaved deciduous, artificially flooded (PEM5/SS1Ks).



A review of the NWI mapping for the Reedy Point South DMPF classifies potential wetlands within the facility boundaries as the following (Figure 16).

- Palustrine, unconsolidated bottom, artificially flooded, spoils (PUBKs).
- Palustrine, emergent, *Phragmites australis*, artificially flooded, spoils (PEM5Ks).

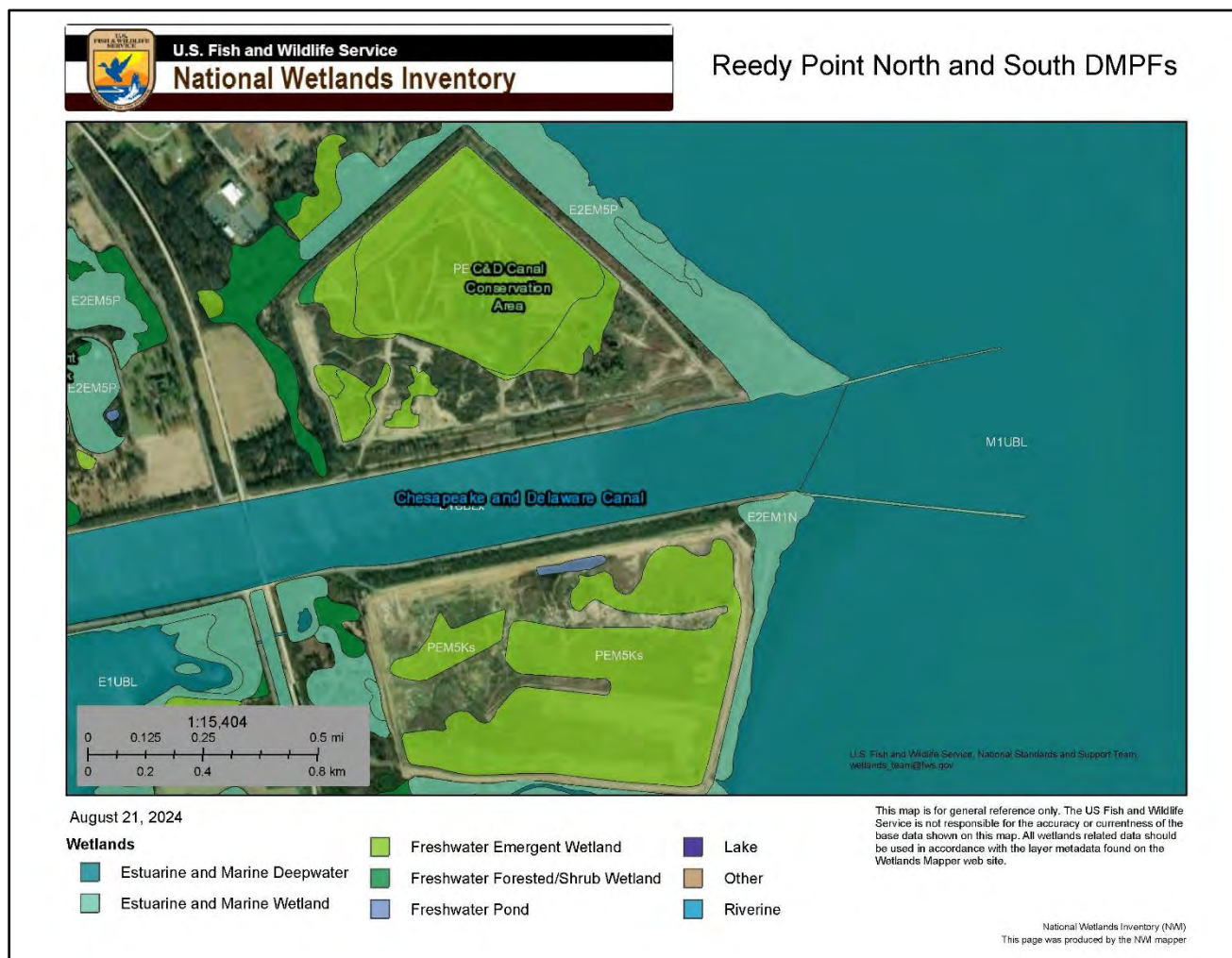


Figure 16. National Wetlands Inventory (NWI) Mapped Wetlands within the Reedy Point North and Reedy Point South DMPFs (USFWS, 2024).

The USACE Philadelphia District Regulatory Branch reviewed the aquatic features, including the wetlands and ponds, within the Delaware City DMPF and provided an assessment as to whether any of those aquatic features are jurisdictional waters of the United States (WOTUS). Site visits by the USACE Philadelphia District Regulatory Branch staff were conducted on November 6, 2023, and December 5, 2023. Following completion of the site visits, further review was conducted to assess whether the aquatic features within the DMPF meet the definition of WOTUS. In the State of Delaware, the operative definition of a WOTUS is the 2023 WOTUS Rule as identified in 88 FR 3004 “Revised Definition of Waters of the United States”, January 18, 2023, rule

as amended by 88 FR 61964 “Revised Definition of Waters of the United States; Conforming”, September 8, 2023. The Regulatory Branch assessment concluded that the aquatic features within the Delaware City DMPF meet the exclusion definition listed under 33 CFR 328.3(b)(1), and therefore are not jurisdictional WOTUS. The exclusion under 33 CFR 328.3(b)(1) includes “waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act” which are not WOTUS. Additionally, the 2023 WOTUS Rule reaffirmed the exclusion under 33 CFR 328.3(b)(1) by stating the following in 88 FR 3004 (January 18, 2023) “A waste treatment system constructed prior to the 1972 Clean Water Act (CWA) amendments is still eligible for the exclusion so long as the system is in compliance with the currently application CWA requirements, such as treating water that discharges from the system.” The objective of the Delaware City DMPF is to retain dredged material solids, while allowing clean processed water to discharge the confined area. As the dredged slurry settles within the dikes of the DMPF, water exits via the sluice and solids are retained. As such, based on 88 FR 3004, the Delaware City DMPF is in compliance with the CWA requirements and the waste treatment system exclusion applies. The same finding would apply to the Biddles Point DMPF and the Reedy Point South and North DMPFs as those facilities were in use prior to 1972 and still function as a waste treatment systems similar to the Delaware City DMPF.

The mapped estuarine wetlands located along the northern shoreline of the Branch Canal and southeast of the Delaware City DMPF are considered to be jurisdictional WOTUS. This area was delineated by the USACE in May 2007 for the proposed construction of the Michael N. Castle trail. This wetland area is dominated by common reed (*Phragmites australis*) and also includes sphagnum moss (*Sphagnum* spp.), jewelweed (*Impatiens pallida*), sensitive fern (*Onoclea sensibilis*), swamp rose (*Rosa palustris*), and winged loosestrife (*Lythrum alatum*) (USACE, 2007).

The State of Delaware regulates all of the tidal wetlands located within the state as well as non-tidal wetlands that include 400 or more contiguous acres under the Delaware Wetlands Act (7 Del. Code, Chapter 66) and the Wetlands Regulations (7 DE Admin. Code 7502). The location of Delaware regulated wetlands is found on the State Regulated Wetland Map Index (<https://dnrec.alpha.delaware.gov/water/wetlands-subaqueous/state-regulated-wetlands/>). The DNREC State Regulated Wetlands Map Index (Map Numbers 344, 374, 453) depict the Delaware City DMPF as mapped as “O” – Other (Upland or Non-tidal wetlands less than 400 acres). The DNREC State Regulated Wetlands Map Index (Map Numbers 373, 374, and 379) depict the entirety of the Biddles Point DMPF as mapped as “O”. The DNREC State Regulated Wetlands Map Index (Map Numbers 340 and 341) depict the majority of the Reedy Point North DMPF as mapped as “O” and the northern portions of the DMPF as “MS” – Marsh in spoil areas and “WS” – Water in a spoil area. The DNREC State Regulated Wetlands Map Index (Map Number 340) depicts the entirety of the Reedy Point South DMPF as “O”.

A report prepared for the USACE in December 1994 by Environmental Resources, Inc. (ERI), entitled *Habitat Assessment of C&D Canal Upland Disposal Areas for the C&D*

*Canal Deeping Feasibility Study* reviewed 13 federally owned DMPFs along the C&D Canal, including the Delaware City DMPF. The ERI report indicated that approximately 152-acres, or approximately 42% of the DMPF area, includes common reed dominated marsh areas which are interspersed with broad-leaved cattail (*Typha latifolia*). Approximately 93 acres, or approximately 26% of the site, consists of open water area with submerged aquatic vegetation (SAV) (Figure 17). The SAV observed in the open water appeared to be either the non-native and invasive Eurasian watermilfoil (*Myriophyllum spicatum*) or coontail (*Ceratophyllum demersum*). Floating primrose-willow (*Ludwigia peploides*), broad-leaved cattail, and common reed were also observed growing along the fringes of the open water areas. Approximately 11%, or 39 acres, of the DMPF is covered by common reed dominated marsh areas with scattered trees located in two separate stands. The remaining approximately 21% of the site is believed to be upland areas according to the 1994 ERI report. The ERI distribution of the habitat types within the Delaware City DMPF was generally confirmed by USACE biologists and Regulatory Branch staff members during field observations in fall 2023.

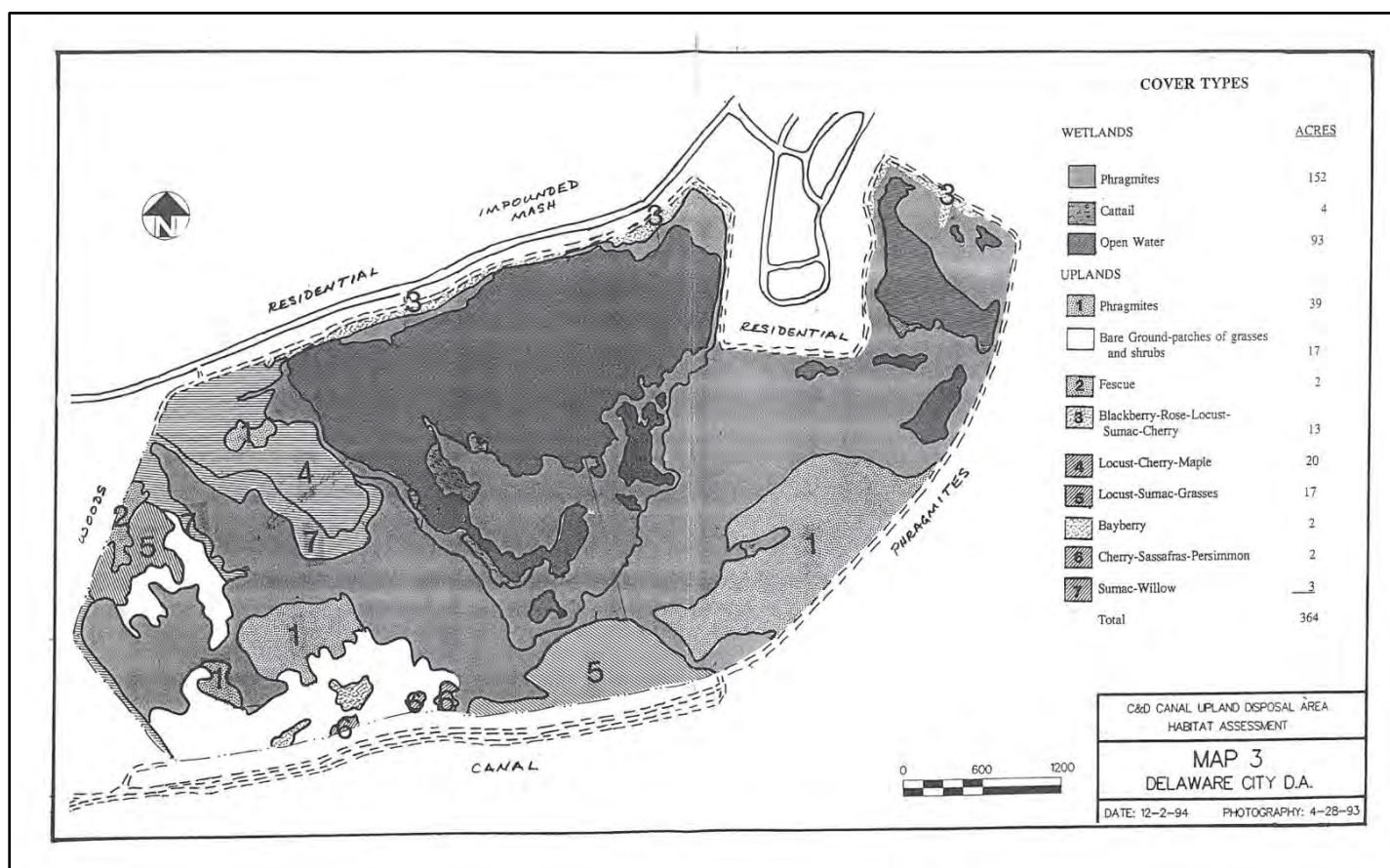


Figure 17. 1994 ERI Habitat Assessment Map of Delaware City DMPF (ERI, 1994).

#### 4.2.2. Fish

The DNREC Division of Fish and Wildlife (DFW) provided data on 4 January 2024 regarding the fish species within the large impounded open water area within the Delaware City DMPF, which is locally referred to as the “Canal Pond” or “the Everglades”. While DNREC DFW has not conducted fish surveys within the open water area, they provided a list of fish which was documented from fish kills in 2010 and 2016 and from a 2018 statewide survey of licensed anglers. The list provided by DNREC only includes those fish species considered “gamefish”, with the exception of mosquitofish (*Gambusia affinis*), as the gamefish are the only species targeted by anglers. DNREC DFW indicated that non-gamefish are likely present in the open water area, however those species have not been documented due to a lack of targeted surveys. The list of species that DNREC DFW indicated are known to occur in the open water area in the Delaware River DMPF include largemouth bass (*Micropterus salmoides*), striped bass (*Morone saxatilis*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), chain pickerel (*Esox niger*), white perch (*Morone americana*), catfish (*Siluriformes* spp.), common carp (*Cyprinus carpio*), and mosquitofish. The large open water area within the Delaware City DMPF is generally between approximately three to five feet deep. There are no permanent waterbodies or fish resources within the Biddles Point, Reedy Point North, and Reedy Point South DMPFs.

The C&D Canal, Delaware River, and associated tributaries provide important spawning, nursery, feeding and migratory pathways for a host of finfish species. Finfish represent a major resource group in the Delaware River and C&D Canal. The finfish population of the Delaware Estuary is extensive and diverse. Because of the large salinity range within the affected area, both freshwater and marine species utilize these habitats. Some of the species spend only part of their life cycle in the area, others just migrate through, and finally some spend their whole life in this part of the estuary. Table 4 provides a list of common fish and their scientific names that utilize the estuary between Wilmington and Liston Point, Delaware at some point in their life cycle.

Table 4. Common Fish Species That Utilize the Delaware Estuary Between Wilmington and Liston Point, Delaware (USACE, 1999).				
Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Atlantic sturgeon <i>Acipenser oxyrinchus</i>		Anadromous (spring)	March - May	Unknown

Table 4. Common Fish Species That Utilize the Delaware Estuary Between Wilmington and Liston Point, Delaware (USACE, 1999).

Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
American eel <i>Anquilla rostrata</i>		Catadromous (adults in fall)		Feb. - April
Blueback herring <i>Alosa aestivalis</i>		Anadromous (Mar. - May)		late April - Nov.
Alewife <i>Alosa pseudoharengus</i>		Anadromous (Mar. - May)		April - Nov.
American shad <i>Alosa sapidissima</i>		Anadromous (Mar. - May)		
Atlantic menhaden <i>Brevoortia tyrannus</i>				summer - early fall
Bay anchovy <i>Anchoa mitchilli</i>	year round		May - Sept.	May - Nov.
Carp <i>Cyprinus carpio</i>	year round			May – fall
Silvery minnow <i>Hybognathus nuchalis</i>	year round			
Spottail shiner <i>Notropis hudsonius</i>				April – fall
White catfish <i>Ictalurus catus</i>	year round			May – fall



Table 4. Common Fish Species That Utilize the Delaware Estuary Between Wilmington and Liston Point, Delaware (USACE, 1999).

Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Brown bullhead <i>Ictalurus nebulosus</i>	year round			
Channel catfish <i>Ictalurus punctatus</i>	year round			
Banded killifish <i>Fundulus diaphanus</i>	year round			
Mummichog <i>Fundulus heteroclitus</i>	year round		April - Sept.	May - Dec.
Atlantic silverside <i>Menidia menidia</i>	year round		April - Aug.	
White perch <i>Morone americana</i>	winter			April. - Oct.
Striped Bass <i>Morone saxatilis</i>	year round		Early April - Early July	Early April - Fall
Weakfish <i>Cynoscion regalis</i>				mid May – Fall
Spot <i>Leiostomus xanthurus</i>	year round			June - Dec.
Summer flounder <i>Paralichthys dentatus</i>				fall – spring

Table 4. Common Fish Species That Utilize the Delaware Estuary Between Wilmington and Liston Point, Delaware (USACE, 1999).				
Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Windowpane flounder <i>Scophthalmus aquosus</i>	year round		late April - Dec.	late summer - fall
Hogchoker <i>Trinectes maculatus</i>	year round		May - Aug.	May – fall

#### 4.2.2.1 Essential Fish Habitat

Under provisions of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act of 1996, the project area, due to its proximity to the C&D Canal and Delaware River, is designated as Essential Fish Habitat (EFH) for species with Fishery Management Plans, and their important prey species. This includes EFH for various life stages for 12 species of managed fish and shellfish. Table 5. presents the managed species and their life stage that EFH is identified for within the affected geographic area as searched in the EFH mapper (<https://www.habitat.noaa.gov/apps/efhmapper/efhreport/>). This encompasses locations in the Delaware Bay that the National Marine Fisheries Service has identified as the biosalinity mixing zone.

Table 5. Essential Fish Habitat Mapper Listed Species (NMFS, 2024).					
Managed Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
Windowpane flounder ( <i>Scophthalmus aquosus</i> )			X	X	
Atlantic sea herring ( <i>Clupea harengus</i> )			X	X	
Bluefish ( <i>Pomatomus saltatrix</i> )			X	X	
Long finned inshore squid	X				

Table 5. Essential Fish Habitat Mapper Listed Species (NMFS, 2024).					
Managed Species	Eggs	Larvae	Juveniles	Adults	Spawning Adults
<i>(Loligo pealei)</i>					
Atlantic butterfish ( <i>Peprilus tricanthus</i> )		X		X	
Summer flounder ( <i>Paralichthys dentatus</i> )			X	X	
Scup ( <i>Stenotomus chrysops</i> )			X	X	
Black sea bass ( <i>Centropristus striata</i> )			X	X	
Red hake ( <i>Rachycentron canadum</i> )				X	
Clearence skate ( <i>Raja eglanteria</i> )			X	X	
Little skate ( <i>Leucoraja erinacea</i> )			X	X	
Winter skate ( <i>Leucoraja ocellata</i> )			X	X	

There are no Habitat Areas of Particular Concern (HAPC) or EFH Areas Protected from Fishing (EFHA) documented within the project area. A HAPC for summer flounder exists, however it is contingent on the presence of SAV, which based on a review of available SAV mapping is not believed to exist in the C&D Canal nor the Delaware River estuary near the Delaware City DMPF or the other adjacent DMPFs.

### 4.2.3. Terrestrial Resources

#### 4.2.3.1 Terrestrial Habitats

Upland terrestrial habitat areas are located in the southern and northwestern portions of the Delaware City DMPF (ERI, 1994 and USACE Field Observations, 2023). The southern portion of the DMPF includes herbaceous and woody species such as bayberry (*Myrica* spp.), broomsedge (*Andropogon* spp.), and grasses (*Graminaea*, *Panicum*, or *Poaceae* spp.). Tree and shrub species observed growing along the upland terrestrial portions of the dike include black locust, black willow (*Salix nigra*), black cherry, staghorn sumac, and winged sumac. The invasive vine, porcelain berry (*Ampelopsis brevipedunculata*), was also observed growing in large patches in the

southwestern portion of the project site and along the dike (USACE Field Observations, 2023).

Wooded upland areas within the Delaware City DMPF typically support tree species such as black locust, silver maple, black cherry, red maple, gray birch (*Betula populifolia*), and big-tooth aspen (*Populus grandidentata*). The shrub and vine species typically found within the wooded upland areas include Tartarian honeysuckle (*Lonicera tatarica*), winged sumac, staghorn sumac, sassafras (*Sassafras albidum*), arrowwood (*Viburnum* spp.), blackberry (*Rubus* spp.), Japanese honeysuckle (*Lonicera japonica*), Virginia creeper (*Parthenocissus quinquefolia*), eastern poison ivy (*Toxicodendron radicans*), trumpet creeper (*Campsis radicans*), and wild grape (*Vitis vinifera*) (ERI, 1994).

Herbaceous and emergent upland vegetation areas within the Delaware City DMPF typically support species such as lespedeza (*Lespedeza* spp.), goldenrods (*Solidago* spp.), broomsedge (*Andropogon virginicus*), common reed, common mullein (*Verbascum thapsus*), yellow nutsedge (*Cyperus esculentus*), foxtail grass (*Alopecurus* spp.), smartweeds (*Persicaria* spp.), American pokeweed (*Phytolacca americana*), and various grasses (*Poaceae* or *Gramineae* spp.). Invasive vines growing throughout portions of the DMPF include porcelain berry and mile-a-minute (*Persicaria perfoliata*) (USACE Field Observations, 2023).

A 2012 report prepared by the DNREC, Division of Fish and Wildlife entitled *Historical Analysis and Map of Vegetation Communities, Land Covers, and Habitats of C and D Canal Wildlife Area New Castle County, Delaware* characterized the vegetation communities by section of the C&D Canal. The 2012 report breaks up the C&D Canal Wildlife Area into three sections, East Canal, West Canal, and Middle Canal. The Delaware City DMPF, Biddles Point DMPF, and Reedy Point North and South DMPFs are located in the East Canal Section of the C&D Canal Wildlife Area. The vegetation communities depicted in a 2007 Vegetation Community Map for the Delaware City DMPF include eastern reed marsh, northeastern modified successional forest, northeastern successional shrubland, and water areas (Figure 18).

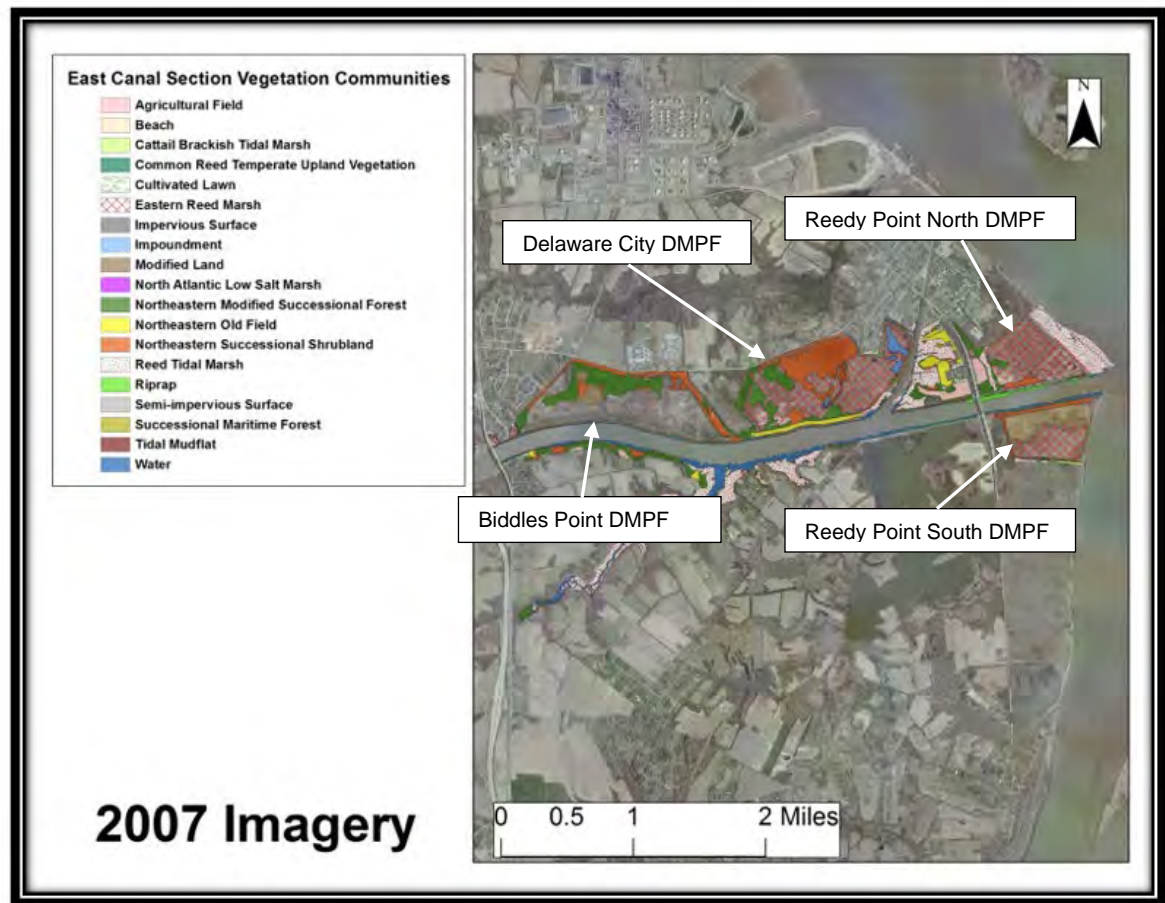


Figure 18: 2007 Vegetation Community Map for the East Canal Section (courtesy of DNREC, DFW, 2012).

Descriptions provided for the vegetation community types depicted in the Delaware City DMPF and the other adjacent DMPFs (DNREC, Division of Fish and Wildlife, 2012) are listed below:

- Eastern Reed Marsh (red hatched polygon) – This community is composed of a monoculture of eastern (common) reed in a non-tidal wetland situation.
- Northeastern Modified Successional Forest (green polygon) – This community is composed of shrubs present. Common canopy species include red maple, sweetgum, northern red oak (*Quercus rubra*), tuliptree (*Liriodendron tulipifera*), black cherry, willow oak (*Quercus phellos*), loblolly pine (*Pinus taeda*), and black locust. The understories are dense in most examples and include smaller members of the species above plus eastern red cedar (*Juniperus virginiana*), sassafras (*Sassafras albidum*), flowering dogwood (*Cornus florida*), and blackgum (*Nyssa sylvatica*). The shrub and vine layer is often composed of sweet pepperbush (*Clethra alnifolia*), common greenbrier (*Smilax rotundifolia*),

Japanese honeysuckle, eastern poison ivy, arrow-wood (*Viburnum dentatum*), winged euonymus (*Euonymus alata*), multiflora rose (*Rosa multiflora*), highbush blueberry (*Vaccinium corymbosum*), Oriental bittersweet (*Celastrus orbiculatus*), white-leaf greenbrier (*Smilax glauca*), and Ligustrum (*Ligustrum sinense*).

Common herbs include Japanese stiltgrass, American pokeweed, swan's sedge (*Carex swanii*), Virginia creeper (*Parthenocissus quinquefolia*), ground pine (*Dendrolycopodium obscurum*), cinnamon fern (*Osmunda cinnamomea*), and netted chainfern (*Woodwardia areolata*).

- Northeastern Successional Shrubland (orange polygon) - This shrub community is composed of shrubs present in the Northeastern Modified Successional Forest such as multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), Oriental bittersweet (*Celastrus orbiculatus*), blackberry (*Rubus* sp.), and ligustrum (*Ligustrum sinense*). It should be noted that the approximately 85-acre ponded area within the Delaware City DMPF is shown as Northern Successional Shrubland but likely should be classified as an Impoundment similar to other open water areas within the facility. The Impoundment land use cover is defined as a water body that is larger than five acres in size.

Recent vegetation and dike maintenance has occurred within the Delaware City DMPF and included tree clearing in the southern and western portions of the facility. Aerial treatment of large sections of common reed with a broad-spectrum glyphosate herbicide was conducted within the Delaware City DMPF by DNREC DFW on 15 September 2022. The treatment of the common reed within the DMPF, and other areas within the C&D Canal Conservation Area, was requested by Eric Ludwig, DNREC DFW Regional Wildlife Manager for New Castle. The DNREC DFW routinely conducts aerial treatment of common reed within the State of Delaware, including areas surrounding the C&D Canal such as the Thousand Acre Marsh and Augustine Wildlife Area to the south of the Delaware City DMPF (pers. comm. J. Joachimowski, DNREC DFW, 2024). The aerial treatment of common reed in 2022 has resulted in large areas of dead standing common reed stems (also referred to as “canes”) within the Delaware City DMPF as depicted in Figure 19 below.





Figure 19: Photograph of dead standing common reed canes in the western portion of the Delaware City DMPF (USACE, 13 October 2023).

The Biddles Point DMPF has not been utilized since the 1970s and has largely been unmaintained allowing heavy wooded conditions to develop. The Reedy Point North and South DMPFs have been utilized recently for dredge placement and are generally dominated by common reed and other successional herbaceous and scrub shrub species.

#### 4.2.3.2 Avifauna

The Delaware Bay estuary lies along the Mid-Atlantic Flyway which is a major migratory corridor for avian species. The avian species likely to utilize or be observed within the Delaware City DMPF include great-crested flycatcher (*Myiarchus crinitus*), American goldfinch (*Spinus tristis*), eastern towhee (*Pipilo erythrophthalmus*), field sparrow (*Spizella pusilla*), olive-sided flycatcher (*Contopus cooperi*), Carolina wren (*Thryothorus ludovicianus*), winter wren (*Troglodytes hiemalis*), eastern kingbird (*Tyrannus tyrannus*), mourning dove (*Zenaidura macroura*), bobwhite quail (*Colinus virginianus*), gray catbird (*Dumetella carolinensis*), prothonotary warbler (*Protonotaria citrea*), red-winged



blackbird (*Agelaius phoeniceus*), tree swallow (*Tachycineta bicolor*), turkey vulture (*Cathartes aura*), American crow (*Corvus brachyrhynchos*), great-blue heron (*Ardea herodias*), laughing gull (*Leucophaeus atricilla*), ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), and Caspian tern (*Hydroprogne caspia*). The mallard (*Anas platyrhynchos*), American black duck (*Anas rubripes*), and teal (*Anas crecca*) were reported to utilize the open water area within the Delaware City DMPF area (ERI, 1994).

The avian sighting website eBird.org, managed by the Cornell Lab of Ornithology, includes birding hotspots around the world. The eBird website lists 180 different avian species that have been reported as observed in the Delaware City DMPF (referred to on the eBird website as the “C&D Canal Wildlife Area--Canal Pond” - <https://ebird.org/hotspot/L674708>). The reported species included those listed above from the 1994 ERI report and many additional avian species. Please see Appendix A for a list of the reported species for the “Canal Pond” within the Delaware City DMPF from the eBird website.

The eBird website does not include a hotspot for the Biddles Point DMPF or the Reedy Point North DMPF but does include a hotspot for the Reedy Point South DMPF. The Reedy Point south hotspot (referred to on the eBird website as “C&D Canal WA—Reedy Point” - <https://ebird.org/hotspot/L1156214>) lists 165 different avian species that have been observed at the birding hotspot.

The 1994 ERI Habitat Assessment of C&D Canal DMPFs lists that bird species observed at the Biddles Point, Reedy Point North DMPF and Reedy Point South DMPFs. The avian species observed within the Biddles Point DMPF include the eastern kingbird, American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), catbird (*Dumetella* spp.), song sparrow (*Melospiza melodia*), northern mockingbird (*Mimus polyglottos*), field sparrow, American crow, turkey vulture, American goldfinch, house sparrow (*Passer domesticus*), olive-sided flycatcher, Carolina wren, rofuous sided-towhee (eastern towhee), bobwhite quail, tree swallow, and bank swallow (*Riparia riparia*). The avian species observed within the Reedy Point North DMPF included red winged blackbird, tree swallow, American robin, Carolina wren, and rufous-sided towhee (eastern towhee). The assessment indicated that most of the avian use was in clumps of trees within the Reedy Point North DMPF and due to recent maintenance and placement, no tree cover exists within the diked portion of the DMPF. The avian species observed within the Reedy Point South DMPF only included red-winged blackbird, however ring-necked pheasant (*Phasianus colchicus*) tracks were observed in the maintenance road south of the DMPF dike and the pheasant likely utilized the common reed within the facility as escape cover.

#### 4.2.3.3 Mammals

Mammals that are likely to occur in the Delaware City DMPF include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), grey fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), groundhog (*Marmota monax*), eastern cottontail (*Sylvilagus*

*floridanus*), striped skunk (*Mephitis mephitis*), eastern chipmunk (*Tamias striatus*), and voles (*Microtus* spp.). The mammals that are likely to occur in the Biddles Point DMPF include eastern cottontail, white-tailed deer, grey fox, and raccoon (*Procyon lotor*). The mammals likely to occur within the Reedy Point North and South DMPFs include white-tailed deer, eastern cottontail, and gray fox (ERI, 1994).

#### 4.2.3.4 Reptiles and Amphibians

The amphibians and reptiles that are likely to occur in the Delaware City DMPF include eastern painted turtle (*Chrysemys picta*), northern red-bellied turtle (*Pseudemys rubriventris*), snapping turtle (*Chelydra serpentina*), northern water snake (*Nerodia sipedon*), black rat snake (*Pantherophis obsoletus*), eastern box turtle (*Terrapene carolina carolina*), green frog (*Lithobates clamitans*), spring peeper (*Pseudacris crucifer*), pickerel frog (*Lithobates palustris*), Fowler's toad (*Anaxyrus fowleri*), Atlantic coast leopard frog (*Rana kauffeldi*), northern two-lined salamander (*Eurycea bislineata*), and American bullfrog (*Lithobates catesbeianus*) (ERI, 1994 and DNREC DFW, 2023). The USACE could not locate data on amphibians and reptiles species and abundance within the Biddles Point, Reedy Island North, and Reedy Island South DMPFs. The 1994 ERI report did not list any amphibians and reptiles species and indicated that the wildlife value of those three DMPFs was low.

#### 4.2.4. Rare, Threatened and Endangered Species

The Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered species and a means for conserving the ecosystems upon which those species depend. Section 7 (a)(2) of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to ensure their activities are not likely to jeopardize the continued existence of listed species or destroy or adversely modify their critical habitat. Under the ESA, an endangered species is in danger of extinction and a threatened species is likely to become endangered within the foreseeable future.

The Delaware Wildlife Action Plan was completed by DNREC and approved by the USFWS in 2015 and is designed to help Delaware fulfil the State's responsibility to conserve its abundant fish and wildlife and natural habitats for future generations and keeping common species common (DNREC, 2015). The species of greatest conservation need (SGCN) identified in the Delaware Wildlife Action Plan includes three tiers (Tier 1, Tier 2, and Tier 3) for species identified in the plan. Tier 1 species are in the highest need of conservation action and include the rarest species in the state, those that are highly globally imperiled, and species with regionally important Delaware populations that are also under high threat from climate change. Tier 2 species are of moderate conservation concern in Delaware and include species that have rare to uncommon breeding populations in the state, species with broad distributions that are threatened by climate change, and species for which Delaware has high responsibility within the Northeast region. Tier 3 are those species which are still relatively common in

Delaware but are listed as SCCN for various reasons, including documented population declines, high responsibility of the northeast region for the global population, continued need for monitoring and/or management, and/or non-breeding species that are uncommon in Delaware (DNREC, 2015).

DNREC DWF has indicated that many bird species, which are listed as SGCN, have been observed and/or documented within the Delaware City DMPF. The marsh bird SGCN observed/documented include sora (*Porzana carolina*, Tier 2), least bittern (*Ixobrychus exilis*, Tier 2), king rail (*Rallus elegans*, Tier 1), marsh wren (*Cistothorus palustris*, Tier 2), Virginia rail (*Rallus limicola*, Tier 2), Coastal Plain swamp sparrow (*Melospiza georgiana*, Tier 1), clapper rail (*Rallus crepitans*, Tier 1), pied-billed grebe (*Podilymbus podiceps*, State-listed endangered, Tier 1), great blue heron (Tier 2), little blue heron (*Egretta caerulea*, Tier 2), snowy egret (*Egretta thula*, Tier 2), tri-colored heron (*Egretta tricolor*, Tier 2), American black duck (Tier 1), and Forster's tern (*Sterna forsteri*, State-listed endangered, Tier 1). The land bird SGCN observed/documented include American redstart (*Setophaga ruticilla*, Tier 2), bald eagle (*Haliaeetus leucocephalus*, Tier 3), bank swallow (*Riparia riparia*, Tier 2), broad-winged hawk (*Buteo platypterus*, State-listed endangered, Tier 1), brown creeper (*Certhia americana*, Tier 2), cliff swallow (*Petrochelidon pyrrhonota*, Tier 2), northern parula (*Setophaga americana*, Tier 2), red-shouldered hawk (*Buteo lineatus*, Tier 3), rusty blackbird (*Euphagus carolinus*, Tier 1), veery (*Catharus fuscescens*, Tier 2), and willow flycatcher (*Empidonax traillii*, Tier 2).

There are six rare plants known to exist in the C&D Canal Conservation Area (DNREC, Division of Fish and Wildlife, 2012), however it is unknown if the conservation area, the Delaware City DMPF, or other adjacent DMPFS have been extensively surveyed for those rare plants. The six rare plant species are listed below in Table 6.

Table 6. Rare Plants Known to Existing in the C&D Canal Conservation Area (DNREC, Division of Fish and Wildlife, 2012).			
Common Name	Scientific Name	State Status Rank (2012)	Last Observed
Yellow giant hyssop	<i>Agatache nepetoides</i>	S2	1991
Mitchell's sedge	<i>Carex mitchelliana</i>	S2	1994
Marginal wood fern	<i>Dryopteris marginalis</i>	CPS1	Unknown
Southern Adder's Tongue	<i>Ophioglossum vulgatum</i>	S3	1992
Spongy Arrowhead	<i>Sagittaria calycina</i>	S3	1994
Weakstalk Bulrush	<i>Schoenoplectus purshianus</i>	S2	1994
CPS1= Coastal Plain Rare or Uncommon-very Rare to Extremely Rare; S2= Rare and of conservation concern; typically between 6 and 20 known occurrences or populations; may be susceptible to be extirpated; S3= Uncommon not of conservation concern; typically, 5 or fewer extant occurrences or populations in the state; or only a few remaining individuals; may be especially vulnerable to extirpation.			

There are two rare animals which are known to occur in the C&D Canal Conservation Area (Table 7) (DNREC DFW, 2012). It is unknown if the Delaware City DMPF or the other DMPFs were surveyed for the two rare animal species. Based on the habitat descriptions for each species, it is unlikely that they would be found in the Delaware City DMPF.

Table 7. Rare Animals Known to Existing in the C&D Canal Conservation Area (DNREC, Division of Fish and Wildlife).			
Common Name	Scientific Name	State Status Rank (2012)	Last Observed
Great purple hairstreak	<i>Atildes halesus</i>	S1	1981
Queen snake	<i>Regina septemvittata</i>	S1	1972
S1= Rare and of conservation concern; typically 5 or fewer extant occurrences or populations in the state; or only a few remaining individuals; may be especially vulnerable to extirpation; S2= Rare and of conservation concern; typically between 6 and 20 known occurrences or populations; may be susceptible to be extirpated; S3= No ranking information provided.			

The great purple hairstreak (*Atildes halesus*) is a butterfly species which is commonly found throughout the southern United States where its host plants, the parasitic mistletoe genus (*Phoradendron* spp.) are commonly located. The species can also be found as far north as Maryland and southern Pennsylvania, however its much less common in the northern part of its distribution due to the absence of its host plant (University of Florida, 2019). As mistletoe species were not observed within the Delaware City DMPF, it is unlikely that the great purple hairstreak would occur within the facility. It is also unlikely to be found in the Biddles Point, Reedy Point North, and Reedy Point South DMPFs due to the lack of mistletoe in those facilities.

The queen snake (*Regina septemvittata*) is a small, slender species, ranging in size from 15 to 24-inches. The queen snake is most commonly found along riparian corridors, along streams with ample shrubby floodplain and adjacent wetland habitats. The streams are typically shallow, warm, and have a rocky bottom. The queen snakes may be found basking in shrubby vegetation over water amongst streamside debris and aquatic vegetation, however queen snakes may also be found along the edges of ponds, ditches, and canals if similar basking conditions exist (New York State Department of Conservation, 2024). Due to the absence of such riparian and wetland habitat within the Delaware City DMPF, it is unlikely that the queen snake would occur within the habitat area.

The USFWS Information for Planning and Consultation (IPaC) was queried on 19 August 2024 to determine the potential occurrence of federally listed threatened, endangered, or candidate species within the DMPF project area. The IPaC online system provides a list of species and critical habitats under the purview of the USFWS Ecological Services Program that are known or expected to occur in the project vicinity. Table 8 provides the results of this query. Three species (and one candidate species) were identified in the IPaC Official Species List and include the endangered northern long-eared bat (*Myotis septentrionalis*), the proposed endangered tricolored bat

(*Perimyotis subflavus*), the threatened bog turtle (*Glyptemys muhlenbergii*), and the candidate species the monarch butterfly (*Danaus plexippus*).

Table 8. IPaC Findings for Potential Federally Listed Threatened and Endangered Species in or Near the Project Area (USFWS IPaC, 2024).			
Common Name	Scientific Name	Federal Status	Critical Habitat in Affected Area?
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	FE DE	No
Tricolored Bat	<i>Perimyotis subflavus</i>	PFE	No
Bog Turtle	<i>Glyptemys muhlenbergii</i>	FT DE	No
Monarch Butterfly	<i>Danaus plexippus</i>	FC	No
FT=Federally Threatened; FE=Federally Endangered; FC=Federal Candidate; PFE=Proposed Federal Endangered; DE=Delaware Endangered.			

Northern Long-eared Bat and Tricolored Bat: Northern long-eared bats spend their winters hibernating in hibernaculums such as caves and mines. There are no hibernaculums within the affected area. In the spring and summers, and into the fall, they move into forested areas and would be found roosting singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags, or dead trees. Tricolored bat has similar seasonal habitat requirements and is not expected to be roosting within the affected area.

Bog Turtle: Bog turtles inhabit open-canopy herbaceous sedge bogs, fens or wet meadows, with few trees present that would shade out plants that bog turtles like, such as the tussock sedges that form hummocks used for basking and nesting, shrubby cinquefoil, poison sumac, grass-of-parnassus, and cattail, among many other plant species. The affected open water areas, forested areas, and phragmites dominated marsh areas are not suitable habitat for bog turtles and therefore, bog turtles are not expected to be within the affected area.

Monarch Butterfly: Monarch butterflies migrate to a mountainous region in Mexico to spend their winters but can be found throughout the area from spring through fall feeding on flower nectar and specifically utilize the milkweed plants: swamp milkweed (*Asclepias incarnata*) and common milkweed (*Asclepias syriaca*) to lay eggs. The common milkweed and swamp milkweed were not observed within the Project area, nor have those species historically been documented as being present in the site. Therefore, the affected areas are not expected to be a significant breeding area for monarchs.

The IPaC results did not indicate that bald or golden eagles may be present in the project area nor any USFWS listed Birds of Conservation Concern.

The Greater Atlantic Regional Fisheries Office (GARFO) Section 7 ESA mapper was accessed on 25 October 2023 to determine the presence of Federally listed threatened

or endangered species and critical habitat within and adjacent to the Delaware City DMPF. The search identified two Federally-listed threatened or endangered species including: Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) have the potential to occur in the project area or vicinity (Table 9).

Table 9. Threatened and Endangered Species Under NOAA Fisheries (NMFS) Jurisdiction (NMFS, 2024)						
SPECIES	STATUS	ZONE	LIFE STAGE	BEHAVIOR	DATES	CRITICAL HABITAT
Atlantic Sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	FE DE	Del. River	Post yolk sack larvae	Migrating and Foraging	04/01-09/30	Yes
	FE DE	Del. River	Subadult	Migrating and Foraging	03/15-11/30	
	FE DE	Del. River	Young of year	Migrating and Foraging	01/01-1/31	
	FE DE	Del. River	Adult	Migrating and Foraging	03/15-11/30	
	FE DE	Del. River	Juvenile	Migrating and Foraging	01/01-12/31	
	FE DE	C&D Canal	Subadult	Migrating and Foraging	03/15-11/30	
	FE DE	C&D Canal	Juvenile	Migrating and Foraging	01/01-12/31	
	FE DE	C&D Canal	Adult	Migrating and Foraging	03/15-11/30	
Shortnose Sturgeon ( <i>Acipenser brevirostrum</i> )	FE DE	Del. River	Young of year	Migrating and Foraging	01/01-12/31	No
	FE DE	Del. River	Post yolk sack larvae	Migrating and Foraging	03/15-07/31	
	FE DE	Del. River	Juvenile	Overwintering	11/01-3/31	
	FE DE	Del. River	Juvenile	Migrating and Foraging	01/01-12/31	
	FE DE	Del. River	Adult	Migrating and Foraging	01/01-12/31	
	FE DE	C&D Canal	Adult	Migrating and Foraging	03/01-11/30	
	FE DE	C&D Canal	Juvenile	Migrating and Foraging	03/01-11/30	
FT=Federally Threatened; FE=Federally Endangered; DE=Delaware Endangered						

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) was listed as Federally endangered and threatened in 2012 and is listed as endangered in Delaware. Atlantic sturgeon spawn in the freshwater regions of the Delaware River. By the end of their first summer the majority of young-of-the-year Atlantic sturgeon remain in their natal river while older subadults begin to migrate to the lower Delaware Bay or nearshore Atlantic Ocean. Older subadult Atlantic sturgeon are known to undertake extensive marine migrations, returning to their natal river in the late spring, summer, and early fall months (Dovel and Berggren, 1983). While sub-adult and adult Atlantic sturgeon use of marine habitat is not completely understood, they are known to use nearshore coastal waters for their marine migration (NOAA Fisheries, 2020b). The shortnose sturgeon has been found throughout the Delaware River estuary.

#### 4.3 Social, Economic and Cultural Resources



#### **4.3.1.Land Use**

New Castle County contains approximately 426 square miles of land and approximately 41% is developed, 32% is undeveloped, and 27% of the land area is preserved. The preserved land includes 15% public land, 5% agricultural easements, 4% privately owned open space, and 3% conservation easements (New Castle County, Comprehensive Plan 2050). Adjacent land uses to the Delaware City DMPF include the C&D Canal and Branch Channel, residential single family dwellings, recreational land, undeveloped wooded and agricultural land, tidal marshes and local roadways. The current land use of the project area is undeveloped land both maintained by the USACE as a DMPF and also managed by DNREC for recreation. The 1977 C&D Canal Master Plan determined that the Federally owned properties along the canal would (1) be retained for dredged material to accommodate present and future needs, (2) provide long term and intermittent use to accommodate recreational and wildlife uses, (3) not be considered for the creation of new disposal areas in peripheral sites, (4) be considered for the possibility of limited land transfers, and (5) be carefully coordinated for the level of recreational development with timing estimates and for the re-use of disposal areas in the disposition of dredged materials (USACE, 1996).

#### **4.3.2.Socioeconomics**

New Castle County has a land area of approximately 426 square miles and has the highest population and overall population density of any county within the State of Delaware. New Castle County is home to over half of the state's population and there were 575,494 residents estimated to be living in the County as of July 1, 2022. The County's workforce was projected to be 285,930 in 2020 and there are 236,626 housing units within the County. The County's median household income is \$78,428 and the median value of an owner-occupied residential property is \$275,600. The economy of New Castle County employs approximately 283,000 people and the health care and social assistance, retail trade, and finance and insurance workers are the most common employment sectors for those who live in the County (U.S. Census Bureau).

#### **4.3.3. Environmental Justice**

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, on minority populations and low-income populations" (Executive Order 12898, 59 Federal Register 7629 [Section 1-201]).

The EPA's Environmental Justice website EJScreen: (<https://www.epa.gov/ejscreen>) was used to evaluate indicators for the project area to gauge if there would be potential to EJ communities in the area. Based on the Environmental Justice (EJ) indices from EJScreen for the project area, the search area resulted in an overall demographic index

of 27% (Table 10). The demographic index is based on the average of two socioeconomic indicators: low-income and people of color within the defined search radius. This area is in the 32<sup>rd</sup> and 35<sup>th</sup> percentile of Delaware and nationally, respectively for the demographic index.

The other EJ indices consider air pollutant levels; respiratory hazards; cancer risk; traffic levels; lead paint; proximity to Superfund sites, hazardous waste, and wastewater discharge; as well as demographic indicators such as minority populations, low income, linguistic isolation, education level, and age (under 5 and over 64 years of age). These results are given in percentiles relative to the state and national averages. For example, the national percentile tells you what percent of the U.S. population has an equal or lower value, meaning less potential for exposure/ risk/ proximity to certain facilities, or a lower percent minority. The results of the 4-mile radius search are presented in Table 10 below.

Table 10. Results of EJ Screen for 4-Mile radius from the project area where the area is less than the 70<sup>th</sup> percentile for these variables when compared to the State of Delaware and nationally.

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
<b>POLLUTION AND SOURCES</b>					
Particulate Matter ( $\mu\text{g}/\text{m}^3$ )	7.51	7.7	46	8.08	32
Ozone (ppb)	64.9	63.7	45	61.6	74
Diesel Particulate Matter ( $\mu\text{g}/\text{m}^3$ )	0.236	0.224	54	0.261	54
Air Toxics Cancer Risk* (lifetime risk per million)	20	25	0	25	5
Air Toxics Respiratory HI*	0.3	0.26	37	0.31	31
Toxic Releases to Air	1,900	4,300	59	4,600	71
Traffic Proximity (daily traffic count/distance to road)	49	130	40	210	39
Lead Paint (% Pre-1960 Housing)	0.16	0.27	51	0.3	43
Superfund Proximity (site count/km distance)	0.4	0.35	75	0.13	93
RMP Facility Proximity (facility count/km distance)	0.28	0.31	71	0.43	66
Hazardous Waste Proximity (facility count/km distance)	0.73	1.4	53	1.9	55
Underground Storage Tanks (count/km <sup>2</sup> )	0.33	2.3	32	3.9	35
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0044	0.1	58	22	61
<b>SOCIOECONOMIC INDICATORS</b>					
Demographic Index	27%	32%	46	35%	46
Supplemental Demographic Index	10%	12%	41	14%	35
People of Color	35%	38%	53	39%	55
Low Income	19%	26%	43	31%	34
Unemployment Rate	6%	6%	65	6%	66
Limited English Speaking Households	0%	2%	0	5%	0
Less Than High School Education	5%	9%	44	12%	36
Under Age 5	5%	5%	58	6%	54
Over Age 64	14%	21%	39	17%	45
Low Life Expectancy	20%	20%	48	20%	58

\*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: <https://www.epa.gov/haps/air-toxics-data-update>

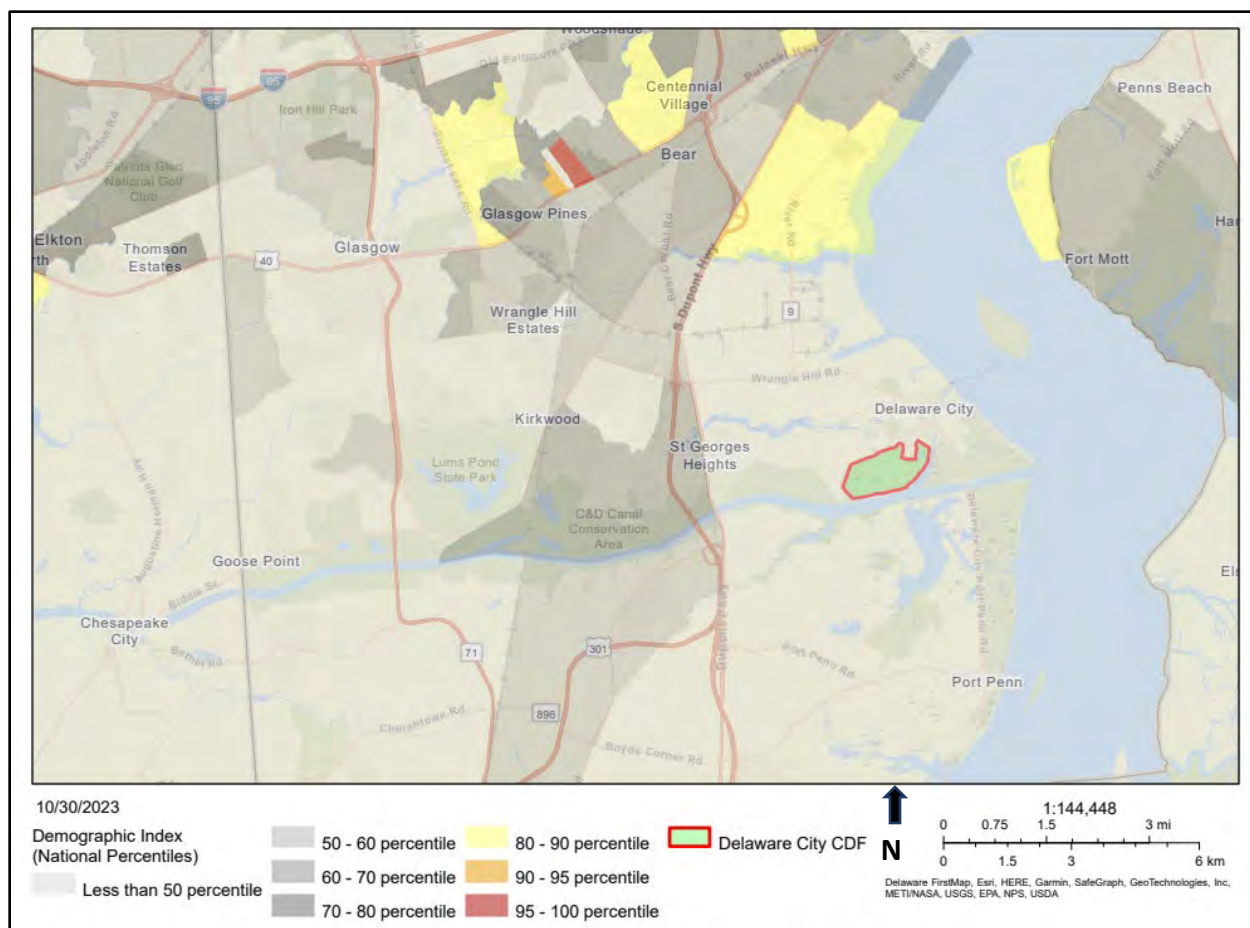


Figure 20. Results of EJ Screen for project area within a 4-mile Radius for Demographic Index (courtesy of EPA, 2023).

#### 4.3.4.Recreation

Recreational areas are present along both the south and north sides of the C&D Canal. The Michael N. Castle Trail is a scenic trail along the north side of the C&D Canal and includes 12.1 miles of paved trail surface, three trailheads, and other amenities (benches, kiosk comfort stations, and landscaping). The Michael N. Castle Trail provides recreational opportunities for pedestrians, bicyclists, anglers, equestrians, and bird-watchers. Trail counters measuring usage estimate visits exceeding 200,000 annually (Delaware Greenways, 2023). A portion of the Michael N. Castle Trail is situated atop the Delaware City DMPF dike in the southern and southeastern portions of the project area. Access to the Michael N. Castle Trail is provided to the west of the Delaware City DMPF via the Biddle Point Trail Head and to the northeast via the Branch Canal Trail. The Micheal N. Castle Trail is also located to the south of the Biddles Point DMPF.

The C&D Canal Lands (also referred to as the “C&D Conservation Area”) includes approximately 5,178 Federally owned acres within Delaware with lands located to the

south and north of the C&D Canal and includes the Delaware City DMPF. The C&D Canal Conservation Area consists of lands owned by the USACE and managed by the USACE and DNREC Division of Fish and Wildlife (DFW). The C&D Canal Conservation Area recreational activities include deer hunting, upland game hunting, waterfowl hunting, dog training, fishing, bird watching, and biking. The conservation area is one of the State's most popular hunting area due to its size, easy access, and proximity to the most densely populated portion of Delaware. The C&D Canal Conservation Area is the most popular public white-tailed deer hunting location in New Castle County with DNREC DFW and public survey data reporting that 644 deer hunters and between 46 and 100 turkey and small game hunters use the entire conservation area annually. Exact data on the number of hunters which utilize specific areas of the conservation area (such as the Biddles Point DMPF or Delaware City DMPF) was not provided by DNREC.

The C&D Canal Conservation Area includes the Delaware City DMPF and the recreational activities included within the DMPF include fishing in the large open water portion of the DMPF (locally referred to as the "Canal Pond" or "the Everglades"), and deer, waterfowl, and upland game hunting throughout the DMPF. DNREC DFW data indicates that from the most recent statewide survey of Delaware licensed anglers, 2,174 angling trips were made to the pond and over 8,600 fish were caught in 2018 making it a popular freshwater fishing location in the northern part of the state (DNREC DFW, 2023). DNREC DFW has also indicated that the Delaware City DMPF is the most important waterfowl hunting area within the C&D Canal Conservation Area (pers. comm. R. Hossler, DNREC DFW, 2024). Both the Reedy Point North and South DMPFs are also a component of the C&D Canal Conservation Area. Due to the frequent use of those DMPFs, the recreational opportunities are limited but include bird watching and viewing the C&D Canal, Delaware River, and Reedy Point Bridge.

#### **4.3.5.Cultural and Historic Resources**

As a Federal agency, the USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with any proposed undertaking. Current statutes and regulations governing the identification, protection, and preservation of these resources include the NHPA; NEPA; Executive Order 11593; and the regulations implementing Section 106 of the NHPA (36 CFR Part 800, Protection of Historic Properties, August 2004). The NHPA and its implementing regulations requires Federal decision makers to consider historic properties in their evaluation of effects associated with an undertaking. Under the NHPA, historic property means any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP maintained by the Secretary of the Interior (SOI). Under NEPA, Federal agencies are charged with considering impacts to cultural and historic resources which encompasses a broader range of resources, including archaeological collections, sacred sites and some



resources that may not meet the SOL's criteria for eligibility to the National Register of Historic Places (NRHP).

The NRHP is administered by the National Park Service (NPS) and is the official list of the properties in the United States that are significant in terms of prehistory, history, architecture, or engineering. Generally, resources must be more than 50 years old to be considered eligible for the NRHP. To meet the evaluation criteria for eligibility to the NRHP, a property needs to be significant under one or more NRHP evaluation criteria (36 CFR Part 60.4) and retain historic integrity expressive of the significance. More recent structures might be eligible for listing in the NRHP if they are of exceptional importance or if they have the potential to gain significance in the future per special NRHP considerations.

#### 4.3.5.1 Area of Potential Effect

The Area of Potential Effect (APE) includes the footprint of the entire facility, along with any access and staging as needed.

##### Cultural Context

The temporal cultural context was extracted from the report entitled, *Phase I Archaeological Survey of the Cavalier Country Club Redevelopment Wastewater Conveyance System, New Castle County, Delaware* prepared by Dovetail Cultural Resource Group for Duffield Associates, Inc and dated May 2018.

#### 4.3.5.2 Pre-Contact Period Context

There are five chronological periods of Indigenous cultures of the Delmarva Peninsula defined by Custer (1984, 1986, 1989): Paleoindian (15000-8500 BP), Archaic (8500-5000 BP), Woodland I (5000-1000 BP), Woodland II (1000 BP – AD 1650), and the Contact Period (AD 1650-1750).

##### Paleoindian Period

The Paleoindian period marks the retreating of glacial conditions and the beginning of a Holocene environment that is characterized by cold temperatures and alternating periods of wet and dry climate. Human adaptation to these environmental conditions resulted in small groups of nomadic indigenous hunters and gatherers. Although direct archaeological evidence of non-mammalian food resources by Paleoindian groups is lacking in Delaware, paleoenvironmental data suggests that deciduous, boreal, and grassland biomes were present in the Paleoindian period. These environs would have provided grazing, browsing and shelter for animals and provided foraging opportunities. Primarily, the Paleoindian toolkits were designed for game procurement and processing.

The fluted point is the early diagnostic of this period. Later point forms of the period were notched and often serrated. Toolkits often displayed high degrees of maintenance and reworking, which is consistent with nomadic lifestyles and migration between lithic raw material sources.

### Archaic Period

The Archaic period is characterized by the emergence of full Holocene environmental conditions and a landscape that was dominated by mesic oak and hemlock forests. These forests attracted smaller game, such as deer and turkey, which replaced the cold adapted grazing animal species like bison and caribou. A rise in sea level caused lowland flooding and the formation of river systems and swamp areas within the mid-peninsular drainage divide. The Indigenous peoples possibly shifted from a pattern of hunting and foraging in small bands during the Paleoindian period to one where plants became a more important food source (Custer 1989). Archaic toolkits include a number of tools indicative of plant food processing, grinding stones, netsinkers and stone mortars along with the projectile points, scrapers and hafted knives for game procurement and processing. Custer (1986) identifies swampy, poorly drained landforms away from the major rivers as likely settings for small camps and procurement sites.

### Woodland Period I

The Woodland I period is marked by a pronounced warm and dry period, and dramatic changes in local environments and climate. Sea level rise slowed, allowing stabilization of riverine and estuarine areas, which in turn led to an increase in aquatic resources. This led to a higher degree of sedentism by the Woodland I peoples who began utilizing large microband base camps with evidence of use year-round (Custer 1989). Storage pits and evidence of house structures are found at these sites for the first time. Increased social complexity is also evident during this period in the form of grave goods indicating complex mortuary ceremonies beginning around 2500 BP. The Woodland I period is also marked by stemmed, broad-bladed and fishtail points as well and an increased use of rhyolite and argillite. Ceramics replaced steatite bowls around 3000 BP (Custer 1984). The Delmarva Adena complex was a thriving community in central Delaware, while the Black Rock complex was present in New Castle County. Components from the Black Rock complex are found at the Clyde Farm complex sites. These two complexes seem to have ended by 2000 BP and the Carey complex appears followed by the Delaware Park complex by 1500 BP (Custer 1989).

### Woodland II Period

The Woodland II period is generally marked by more intensive use of plant foods in the Middle Atlantic region and shift to a primarily sedentary lifestyle and the development of an agricultural system. However, this shift to more of an agricultural system is absent in the Delmarva Peninsula (Custer 1989). There are two Woodland II complexes identified in Delaware; the Slaughter Creek complex and the Minguannan complex. The sites

associated with the complexes are in the same environmental contexts as those of the Woodland I period, specifically marshes and wetland areas. This indicates that there were no major changes in the lifestyles of the peoples in Delaware during this time (Custer 1989).

### Contact Period

The Contact period is marked by the initial contact between the indigenous peoples of Delaware and European colonists. This was followed by the collapse of traditional native lifeways, as European goods and practices were adopted and disease and conflict over the fur trade caused a severe loss of life among native groups. Evidence indicates that resident indigenous populations in Delaware had minimal interaction with European settlers and were prevented from interacting with them by the Susquehannocks of the Susquehanna River region who dominated the fur trade. The Susquehannocks were exterminated by the Europeans by 1763 and the Delaware were pushed west into Wisconsin and parts of Oklahoma. By the mid-1700s traditional native settlement practices in the Delmarva Peninsula had come to an end.

#### 4.3.5.3 Historic Context

The history of Delaware is divided into six time periods beginning with the exploration of the area by numerous European groups in North America and concluding with modern suburbanization. These period include: Exploration and Frontier settlement (1630-1730); Intensified Occupation (1730-1770); Early Industrialization (1770-1830); Industrialization and Capitalization (1830-1880); Urbanization and Suburbanization (1880-1940); and, Suburbanization and early Ex-Urbanization (1940-1960). These periods are identified in the Delaware's Historic Preservation Plan (Delaware Historical and Cultural Affairs 2022) and other relevant historic contexts (Ames et al 1989; Frederick et al 2006).

### Exploration and Frontier Settlement (1630-1730)

The first Europeans to explore the Delaware River was Henry Hudson in 1609, yet it was the Dutch West India Company who sent the first settlers to the area and established settlements at High Island in 1624 and Lewes in 1630, that opened the region for colonization (Weslager 1961). By 1632, conflict with the indigenous populations forced the settlements to be abandoned. In 1638, after "purchasing" land from the indigenous people, Swedish and Finnish colonists established settlements on the banks of the Delaware River from Cape Henlopen to Trenton with the center of the colony being Fort Christina. The entire coastline from New York to the Chesapeake Bay was still claimed by the Dutch West India Company and by 1651 they established Fort Casimir at the site of present-day New Castle.

In 1664, Sir Robert Carr, acting on behalf of James, Duke of York and Albany, confiscated the lands, houses and property of Dutch officials in the Delaware Valley region and transferred authority of the Dutch Colonies to England. In 1681, William



Penn received property rights over Pennsylvania from King Charles II, but believed the land was too far from the sea and in 1692, persuaded the Duke of York to convey the three Delaware counties to him. However, the Pennsylvania and Delaware colonists could not agree on voting power, appropriations, and religious affiliation, leading to the three counties breaking away to form their own colony of Delaware in 1704 (Munroe 1984). The ports of Philadelphia, Wilmington and New Castle grew steadily and had a large commercial role in the growth of Delaware during this era and beyond.

#### Intensified and Durable Occupation (1730-1770)

In the eighteenth century, Delaware saw an increase in population and commercial expansion. The main settlements were in Wilmington, New Castle and Lewes. Settlement in Sussex County relied upon navigable water routes, particularly in the western part of the county further away from major bodies of water (Davies and Martin 2001). The lumber industry grew rampantly in the Lower Peninsula Zone which required a population of foresters and shippers (Ames et al 1989). Although most of the state's residents were farmers, lands reserved as forests and marshes were cleared and incorporated into the crop cycle as the need for more agricultural land increased. Many large estates were divided creating new farm properties centered on supplying the market driven agricultural economy (Frederick et al 2006). Livestock supplemented farmers' income and labor was filled by indentured servants and slaves (Frederick et al 2006).

#### Early Industrialization (1770-1830)

The American Revolution brought disarray to the region with social and political unrest to the region with Delaware in support for the Revolutionaries. One Revolutionary War battle was fought in Delaware at Cooch's Bridge near Scottsborough in 1777, during the campaign that led to the Battle of Brandywine. After that, the British troops occupied Wilmington and threatened the state Capital at New Castle. The capital was moved to Dover and became Delaware's permanent capital in 1781.

The war of 1812 similarly avoided the state, but its economic impacts were felt in a series of embargoes negatively affecting trade, depletion of soil quality and competition from new lands in the West. From 1800 to 1830 agricultural productivity in Delaware decreased markedly and many farmers were forced to sell their land and move to the industrial centers to find employment (Frederick et al 2006).

The Chesapeake and Delaware Canal (C&D Canal) was opened to traffic in 1829, connecting the Chesapeake Bay with the Delaware River and provided improved market access for area farmers and industrialists (Fredrick et al 2006). Overland transportation routes were both constructed and improved to accommodate increased numbers of travelers and trade. The economic depression of 1819 brought on by low costs of wheat and other grains further decreased the value of agricultural lands and crops across the state. The most successful agrarians diversified their interests by purchasing rural and urban properties, investing in banking and manufacturing and

supporting the growth of the transportation infrastructure. This elite class promoted scientific farming and agricultural reform, advocating for the enclosure of farmland and use of new machinery.

#### Industrialization and Capitalization (1830-1880)

The Industrial Revolution led to significant advances in transportation, urbanization, and industrialization in northern Delaware. In the 1840s, the Pennsylvania, Washington and Baltimore Railroad connected Newport to Wilmington, with a branch line connected New Castle to Delaware Junction. The railroad and the C&D Canal allowed for increased opportunity to ship products to markets in the eastern urban areas and abroad. Improved farming techniques increased productivity to include the production of perishable goods such as dairy, fruits and vegetables for market. Manufacturing in Delaware grew to include roughly 380 factories reported at the start of the Civil War, many specializing in brick making, milling, and canning (Frederick et al 2006).

Delaware, as a border state, was not impacted by military conflict during the Civil War, but played an important role in the Underground Railroad. Following the Emancipation Proclamation in 1863, many African Americans came to Delaware from the South in search of opportunity. This emigration of labor created an economic boom following the war.

#### Urbanization and Suburbanization (1880-1940)

An increase in the population of Delaware in the late nineteenth and early twentieth centuries led to an urban expansion as immigrants from Europe settled in the region. Population increase was trending across the country with more people residing in the cities than ever, aided by improved transportation opportunities and the age of the automobile. Delaware's first paved highway, known as US Highway 13, constructed in 1923 by T. Colman DuPont stretching from Wilmington to the Delaware-Maryland state line (Frederick et al 2006).

Manufacturing and urbanization pushed farmers to increase mechanization to accommodate for the loss of labor to the cities. Increased urban populations brought new concerns regarding sewer services, water supplies and other infrastructure. This led to the development of scattered suburban clusters on the edges of urban communities in proximity to highways for daily commutes.

#### Suburbanization and Early Ex-Urbanization (1940-1960+)

After World War II, suburban and commercial development spread across New Castle County, altering the land use patterns and landscape of the region. This growth began in Wilmington and radiated outwards affecting the towns of Newark and New Castle and eventually moving into the countryside. The mechanization of farming increased production, however the amount of land involved in the agricultural industry declined.

Planned suburban communities spread as improved roadways and increase in employment opportunities brought more traffic to the state's rural areas. Significant transportation developments like the construction of I-95 and SR 1 provided efficient travel routes across the state. Although the use of railroads declined, large manufacturing companies like DuPont and Chrysler built substantial operations in Delaware to service worldwide (Frederick et al 2006).

#### Historic properties

Archival and database (CHRIS) research was conducted for a 2-mile radius of the center of the project area. Several Historic Districts, sites, and structures were found eligible for or listed on the National Register of Historic Places (NRHP).

#### 4.3.5.4 Archaeological Sites

There are no recorded indigenous or historic archaeological sites within the APE; however, there is a historic archaeological site located within the boundaries of the Fort Dupont Historic District. The Wingate House archaeological site holds the remains of a brick and stone house was built between 1830 and 1837 and was occupied by the Delaware City lock tender, William M. Wingate. The Wingate House archaeological site is not within the APE and will not be affected by the proposed project.

#### 4.3.5.5 Historic Resources

##### Historic Districts

Two listed historic districts are within 2 miles of the project area; the Delaware City Historic District and the Fort Dupont historic district. The Delaware City Historic District is located in New Castle County, Delaware. There are over 200 contributing structures and one contributing site in the historic district. Notable buildings include the Delaware City Hotel (1828), the Christ Episcopal Church (1849), Delaware City Academy (1858) and the Dunlap-Worrell House (1826). The historic district was listed on the NRHP in 1983 (National Register Information System 2024).

The Fort DuPont Historic District consists of 321 acres of New Castle County just south of Delaware City. Fort Dupont contains a planned military landscape of the late nineteenth and early twentieth centuries. While the purpose and function of the fort changed several times between 1870 and 1945, key features of the military landscape survive intact. These include resources such as the batteries, parade grounds, as well as significant examples of barracks and officers' housing, hospitals, administrative and support resources. Although the fort has sustained some significant loss of resources, the landscape and physical features that remain provide an excellent example of a

military base from the period. The historic district was listed on the NRHP in 1999 (National Register Information System 2024).

### Resource Areas

The Red Lion Hundred Multiple Resource Area includes the St. Georges Cemetery and Caretakers house. In March of 1871, by an act of the Delaware Legislature, the St. Georges Cemetery Company of Red Lion Hundred was formed with the objective of buying the burial ground connected with the Presbyterian Church. Although the church was demolished in the 1940s, the caretakers house is the only example of the Gothic Revival cottage in Red Lion Hundred, and only one of two examples in New Castle County. Although this structure was erected toward the end of the popularity of this style, the characteristic elements of this revival style are present. The house and cemetery were listed on the NRHP in 1980 (National Register Information System 2024).

These historic districts and resources are in the vicinity of the APE; however, none of them will be impacted by the proposed project.

#### **4.3.6. Visual and Aesthetic Resources**

Visual and aesthetic resources refer to the sensory quality of the resources (sight, sound, smell, taste, and touch) of the project area, especially with respect to judgment about their pleasurable qualities (Canter 1993; Smardon et al. 1986). The aesthetic quality of the area is influenced by the natural and developed environment. Visual resources include the natural and man-made features that comprise the visual qualities of a given area, or “viewshed.” These features form the overall impression that an observer receives of an area or its landscape character. The Delaware City DMPF is aesthetically appealing due to the open water, forested, and vegetated areas within the DMPF and views of the Reedy Point Bridge and C&D Canal from the dike berm surrounding the DMPF, including the portions of the Michael Castle recreational trail situated atop the dike berm in the southern and southeastern portion of the DMPF. As noted in Section 4.2.3, the common reed within the Delaware City DMPF was treated by DNREC DFW with a broad-spectrum herbicide in 2022 which has resulted in large areas of visible dead standing plant material.

Similar to the Delaware City DMPF, the Biddles Point DMPF would be considered aesthetically appealing due to it being primarily wooded, largely unmaintained, and adjacent to the C&D Canal. The Reedy Point North and South DMPFs would be also both be considered aesthetically appealing due to their proximity from and views of the Delaware River, C&D Canal, the Reedy Point Bridge, and adjacent undeveloped marsh areas.

#### **4.3.7. Hazardous, Toxic, and Radioactive Waste**

For Civil Works projects, Engineer Regulation (ER) 1165-2-132 provides guidance on evaluating Hazardous, Toxic, and Radioactive Waste (HTRW) and requires that a site

investigation be conducted as early as possible to identify and evaluate potential HTRW problems. The definition of HTRW according to ER 1165-2-132, page 1, paragraph 4(a) is as follows: "Except for dredged material and sediments beneath navigable waters proposed for dredging, for purposes of this guidance, HTRW includes any material listed as 'hazardous substance' under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq (CERCLA). (See 42 U.S.C. 9601(14).) Hazardous substances regulated under CERCLA include 'hazardous wastes' under Sec. 3001 of the Resource Conservation and Recovery Act, 42 U.S.C. 6921 et seq; 'hazardous substances' identified under Section 311 of the Clean Air Act, 33 U.S.C. 1321, 'toxic pollutants' designated under Section 307 of the CWA, 33 U.S.C. 1317, 'hazardous air pollutants' designated under Section 112 of the Clean Air Act 42 U.S.C. 7412; and 'imminently hazardous chemical substances or mixtures' on which EPA has taken action under Section 7 of the Toxic Substance Control Act, 15 U.S.C. 2606; these do not include petroleum or natural gas unless already included in the above categories (See 42 U.S.C. 9601(14).)" As noted in 42 U.S.C. 9601(14), the term "hazardous substance" does not include crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance, nor does the term include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel. Underground storage tanks (USTs) are federally regulated under 40 CFR Part 280, which includes technical standards and corrective action requirements for owners and operators of USTs.

A HTRW review was conducted for various facilities or materials within or surrounding the Delaware City DMPF via the DNREC NavMap web-based mapping system (<https://dnrec.maps.arcgis.com/apps/webappviewer/index.html>). The DNREC NavMap review included the following mapping layers:

- Leaky Underground Storage Tanks;
- Underground Storage Tanks;
- Areas of Historic Fill;
- Deed Notice Areas;
- Groundwater Management Areas;
- Certified Brownfields;
- Known Contaminated Sites List;
- Site Remediation Professional (SRP) Preferred Identification (ID) List; and
- Underground Storage Tanks.

DNREC mapping does not depict any of the above listed mapping layers within the Delaware City DMPF project area, however several sites were identified within the greater Delaware City area. These sites consisted of a number of underground storage tanks, remediation sites, and areas of historic fill (see Figure 21 below).

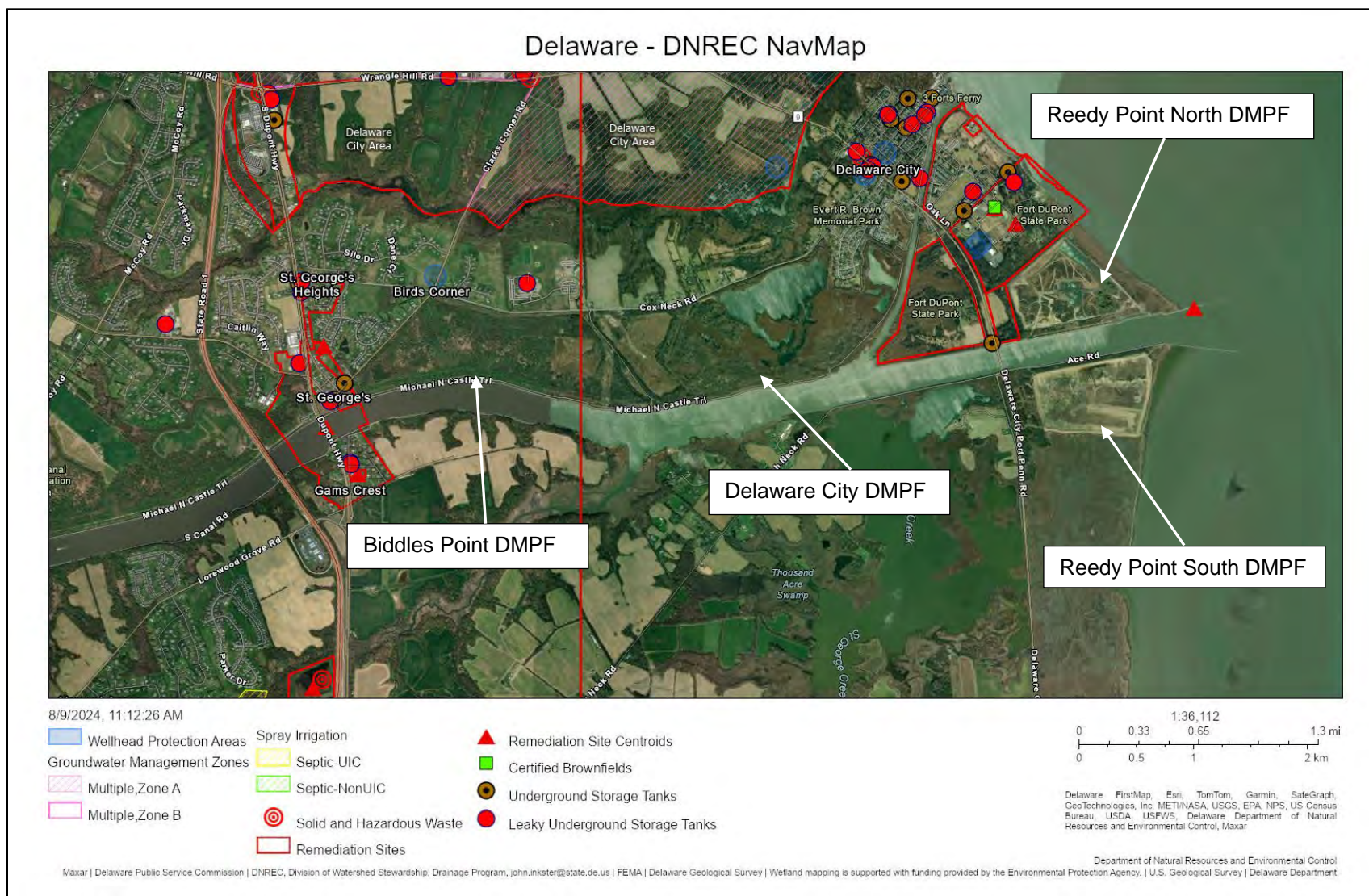


Figure 21. DNREC NavMap Sites in proximity of the Delaware City DMPF and the surrounding DMPFs.

The EPA's Cleanups in My Community mapper was reviewed for hazardous waste cleanups locations in proximity to the project area. The Cleanups in My Community mapper indicates that the Delaware City Refinery site is mapped north and northwest (approximately 950 feet at its nearest point) of the Delaware City DMPF. The Delaware City Refinery site includes 5,050-acres approximately one-mile northwest of Delaware City, and the refinery site itself occupies approximately 1,000 acres out of the 5,050 acres. The refinery historically processed a variety of crude oils, including diesel, gasoline, jet fuel, fuel oil, aromatics, and methanol and propane fuels. The refinery currently produces approximately 180,000 barrels of petroleum products daily (EPA, 2023). The Delaware City Refinery site is managed under EPA and DNREC (EPA ID# DED002329738) and the contaminants include metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and chlorinated solvents. Site investigations identified 35 Solid Waste Management Units (SWMUs) and areas of groundwater contamination were delineated. Currently, three SWMUs are under post-closure care, two SWMUs are near closure (Industrial Waste Landfill and Fly ash Ponds) and two others, Guard Basin Four (GB4) and the Oily Sludge Area (OSA) are being remediated through interim measures (EPA, 2023). The groundwater investigations delineated the areas where groundwater is impacted from releases from releases from the refinery. The investigations show that contaminants have not migrated beyond site property boundaries or into surface waters above levels of concern to human health or the environment. Site-wide groundwater monitoring is also performed at approximately 140 monitoring wells to identify potential changes to the location and characteristics of the area of impacted groundwater. Based on this information, it is believed that impacted groundwater is not present in the project site.



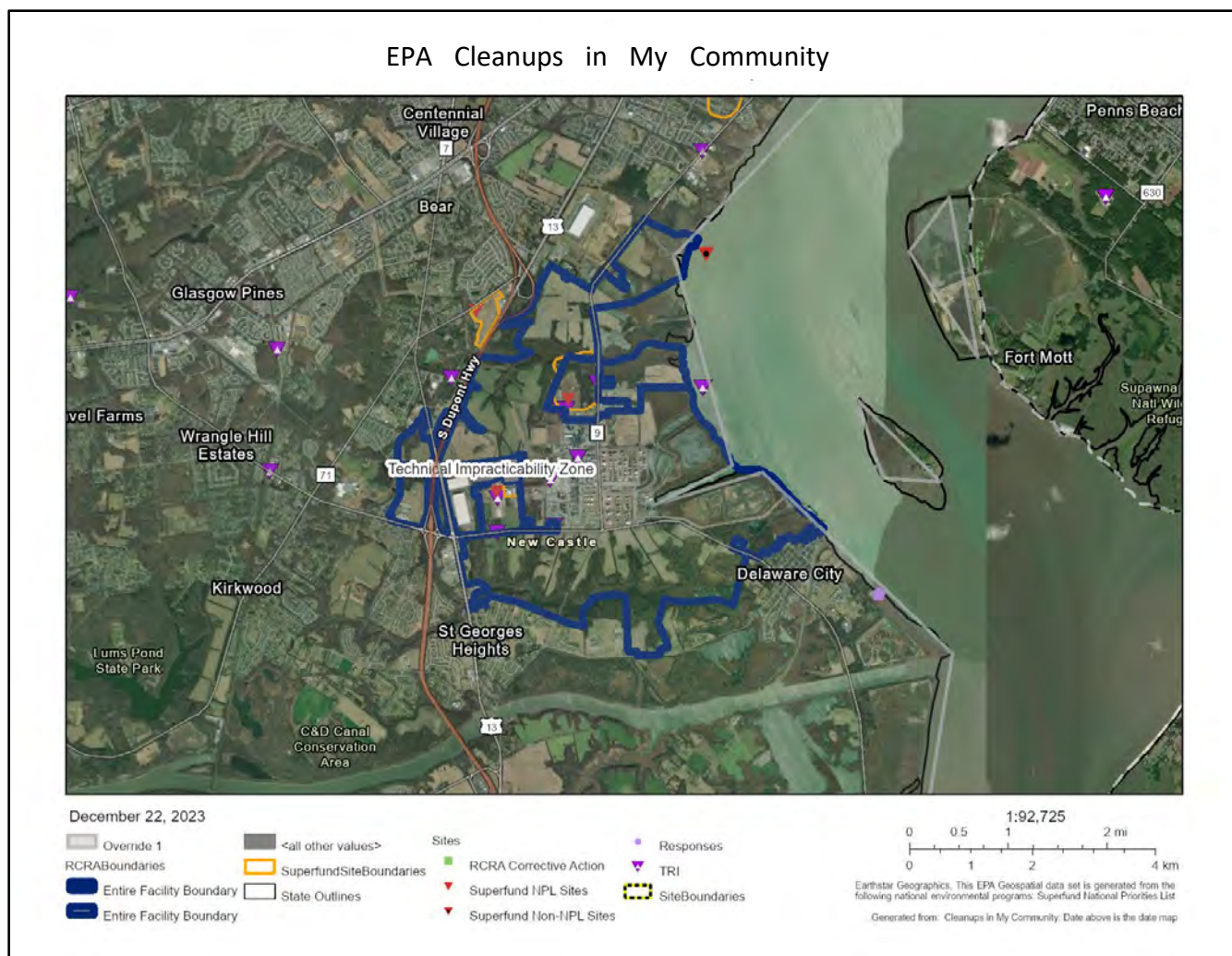


Figure 22. EPA Cleanups in My Community Map (EPA, 2023).

Additional queries were made with the U.S. EPA's Enviromapper, indicating facilities under several different programs; Air Pollution (Integrated Compliance System-AIR), Superfund Sites (National Priority List), Toxic Release Inventory, Hazardous Waste (Resource Conservation and Recovery Act), and Water Dischargers (National Pollutant Discharge Elimination System). Refer to the figures with associated tables below for each EPA program category. The Enviromapper queries have identified several potential sources of contaminants within the greater area of the Delaware City DMPF. However, no facilities were identified within the boundaries of the DMPF or in the immediate proximity.

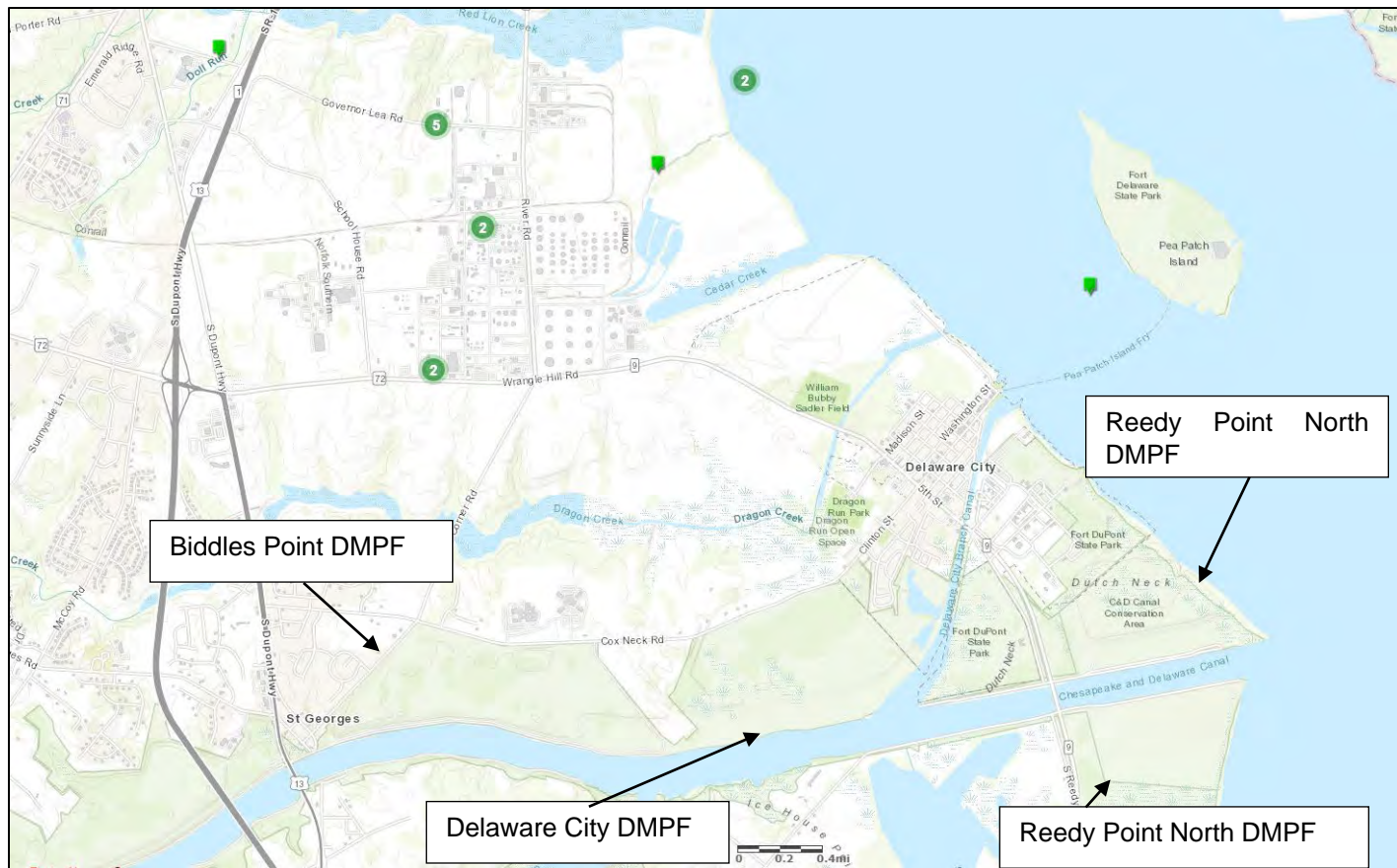


Figure 23. EPA Enviromapper Air Pollution Sites (EPA, 2023).

Table 11: Air Pollution (ICIS-AIR) Sites in Proximity of the Delaware City DMPF.			
SITE NAME	ADDRESS	LATITUDE	LONGITUDE
Air Liquide Industrial Us Lp	4442 WRANGLE HILL ROAD	39.58109	-75.638463
Air Products & Chemicals Inc Delaware City	755 GOVERNOR LEA RD	39.59816	-75.63822
Delaware City Power Plant	4550 WRANGLE HILL RD	39.59592	-75.63237
Delaware City Refinery	4550 WRANGLE HILL RD	39.591	-75.634
Eastern Shore Natural Gas Delaware City	711 SCHOOL HOUSE ROAD	39.5817	-75.643451
Formosa Plastics Corporation	780 SCHOOLHOUSE ROAD	39.5851	-75.6492
Kaneka Delaware Corporation	1685 RIVER ROAD	39.60125	-75.610333
Kuehne Chemical Co	1645 RIVER RD	39.60195	-75.63025
Liveo Research Inc.	1389 SCHOOL HOUSE ROAD	39.59458	-75.61825



Table 11: Air Pollution (ICIS-AIR) Sites in Proximity of the Delaware City DMPF.			
SITE NAME	ADDRESS	LATITUDE	LONGITUDE
Occidental Chemical Corp	1657 RIVER RD	39.60125	-75.610147
Rogers Corporation - Bear	1100 GOVERNOR LEA ROAD	39.60265	-75.6579
Standard Chlorine Of Delaware, Inc. Superfund Site	745 GOVERNOR LEA ROAD	39.59807	-75.63618
Veolia - Red Lion Plant	766 GOVERNOR LEA ROAD	39.59812	-75.63718
Vpi Mirrex Corporation (Closed)	1389 SCHOOLHOUSE ROAD	39.58611	-75.579167

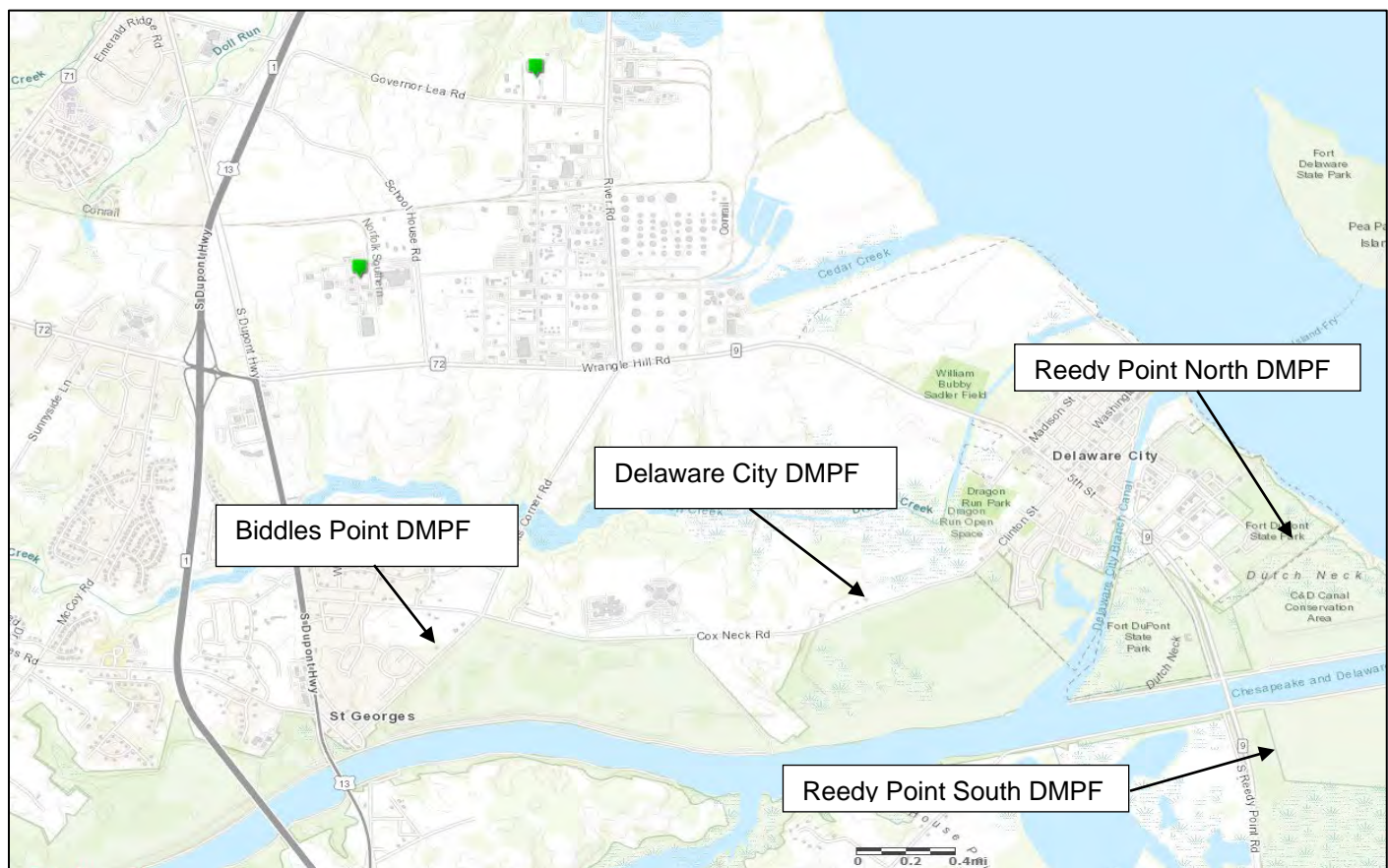


Figure 24. EPA Enviromapper Superfund Sites in proximity to the Delaware City DMPF.

Table 12: Superfund Sites (NPL) in Proximity to the Delaware City DMPF			
NAME	ADDRESS	LATITUDE	LONGITUDE
Delaware City Pvc Plant	780 SCHOOL HOUSE ROAD	39.58611	-75.649439
Standard Chlorine Of Delaware, Inc.	745 GOVERNOR LEA ROAD	39.59958	-75.635831

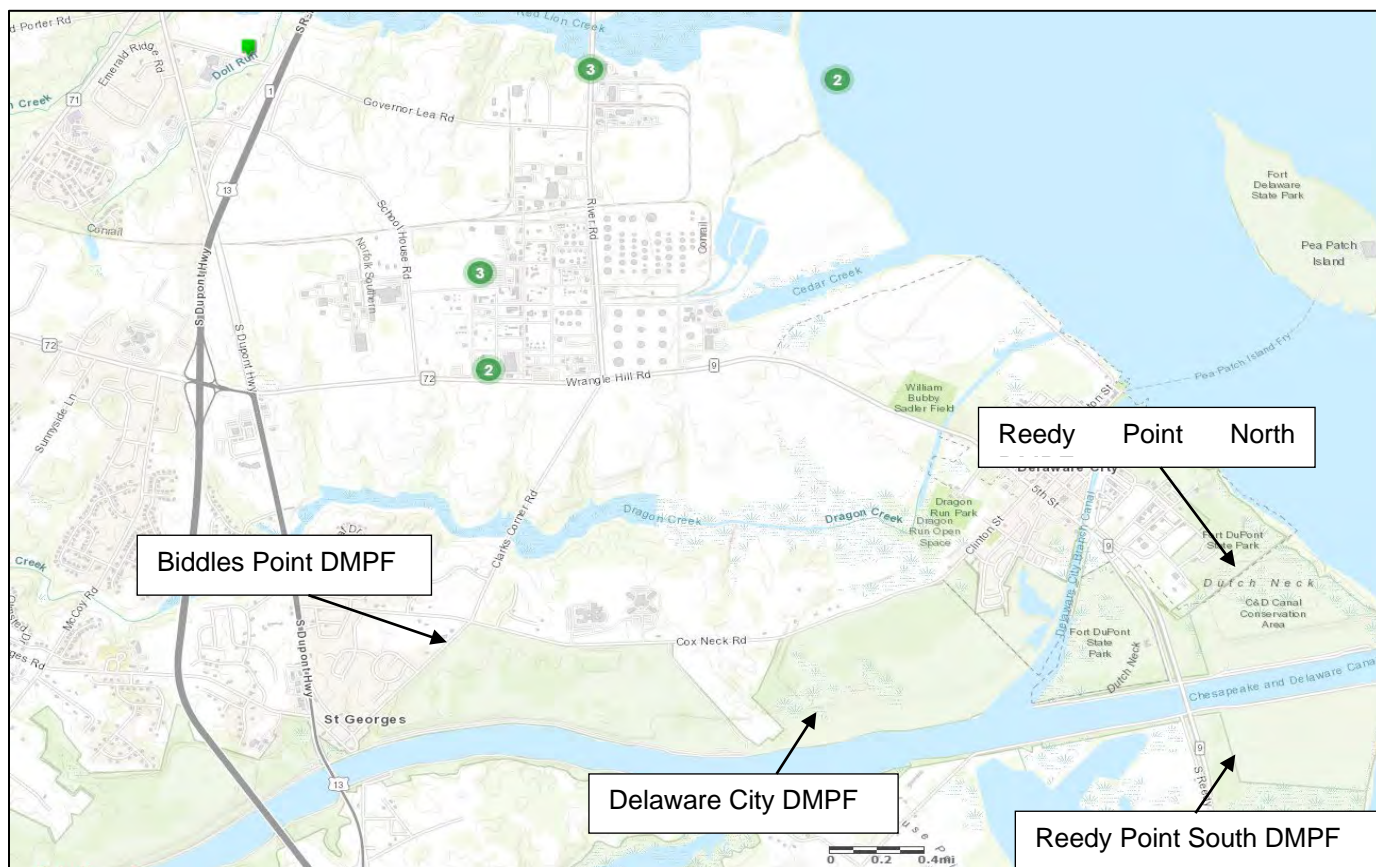


Figure 25. EPA EnviroMapper Toxic Release Inventory Sites in proximity to the Delaware City DMPF.

Table 13: Toxic Release Inventory Sites in Proximity to the Delaware City DMPF.			
NAME	ADDRESS	LATITUDE	LONGITUDE
Air Liquide Industrial Us Lp	4442 WRANGLE HILL ROAD	39.58109	-75.638463
Air Products & Chemicals, Inc. H2 Smr Plant At Delaware City Refining Company	WRANGLE HILL RD	39.58012	-75.649341
Akzo Chemicals Inc.	1385 SCHOOLHOUSE ROAD	39.5878	-75.6392
Delaware City Refinery	4550 WRANGLE HILL RD	39.591	-75.634
Formosa Plastics Corporation	780 SCHOOLHOUSE ROAD	39.5851	-75.6492
Kaneka Delaware Corporation	1685 RIVER ROAD	39.60125	-75.610333
Kuehne Chemical Co	1645 RIVER RD	39.60195	-75.63025



Table 13: Toxic Release Inventory Sites in Proximity to the Delaware City DMPF.			
NAME	ADDRESS	LATITUDE	LONGITUDE
Occidental Chemical Corp	1657 RIVER RD	39.60125	-75.610147
Rogers Corporation - Bear	1100 GOVERNOR LEA ROAD	39.60265	-75.6579
Standard Chlorine Of Delaware, Inc. Superfund Site	745 GOVERNOR LEA ROAD	39.59807	-75.63618
Veolia - Red Lion Plant	766 GOVERNOR LEA ROAD	39.59812	-75.63718

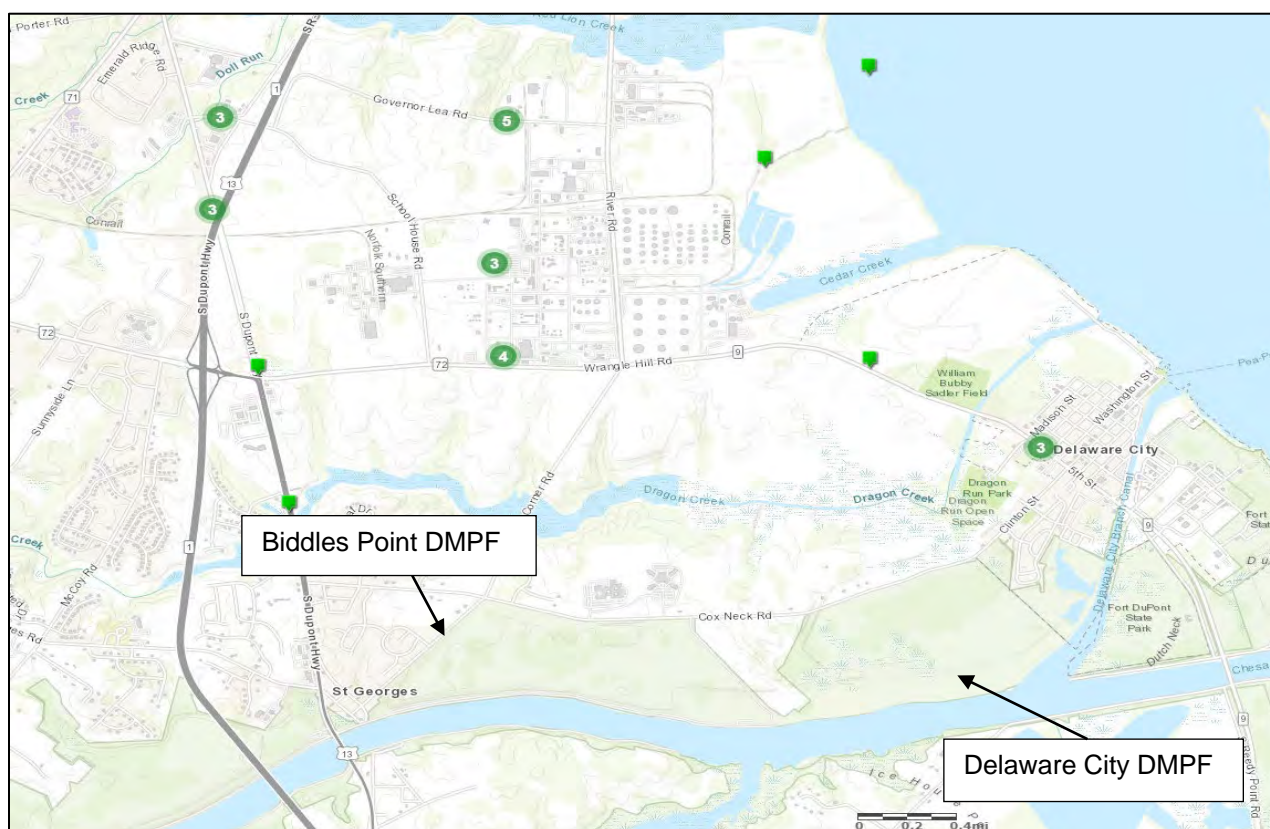


Figure 26. EPA Enviromapper Hazardous Waste Sites in proximity to the Delaware City DMPF.

Table 14: Hazardous Waste (RCRA) Sites in Proximity to the Delaware River DMPF.			
NAME	ADDRESS	LATITUDE	LONGITUDE
Air Liquide Industrial Us Lp	4442 WRANGLE HILL ROAD	39.58109	-75.638463
Air Products & Chemicals Inc Delaware City	755 GOVERNOR LEA RD	39.59816	-75.63822
Air Products New Castle De	4550 WRANGLE HILL	39.58027	-75.631114

Table 14: Hazardous Waste (RCRA) Sites in Proximity to the Delaware River DMPF.			
NAME	ADDRESS	LATITUDE	LONGITUDE
H2 Plant	ROAD		
Airport li Cleaners	550 S DUPONT HWY	39.59172	-75.66102
Akzo Chemicals Inc.	1385 SCHOOLHOUSE ROAD	39.5878	-75.6392
Buds Auto Body Inc	704 5TH ST	39.57443	-75.59679
Delaware City Refinery	4550 WRANGLE HILL RD	39.591	-75.634
Delaware City Wastewater Treatment Plant	GOVERNOR BACON CENTER	39.57695	-75.584786
Essex Envelope	1053 LOWER TWIN	39.59842	-75.66044
Exxon Ras #20624	RTS 13 & 40	39.57946	-75.657564
Formosa Plastics Corporation	780 SCHOOLHOUSE ROAD	39.5851	-75.6492
Guy J Johnson Transport - 2070 Bear Corbitt Rd, Bear	2070 BEAR CORBITT ROAD	39.5993	-75.663053
Kuehne Chemical Co	1645 RIVER RD	39.60195	-75.63025
Linde Inc.	4550 WRANGLE HILL ROAD	39.58001	-75.610059
Liveo Research Inc.	1389 SCHOOLHOUSE ROAD	39.59458	-75.61825
Occidental Chemical Corp	1657 RIVER RD	39.60125	-75.610147
Phillips 66 Caustic Scrubber Material	766 GOVERNOR LEA ROAD	39.59812	-75.63718
Rayco Car Service - 1507 Dupont Highway, New Castle	1507 DUPONT HIGHWAY	39.56956	-75.655134
Rogers Corporation - Bear	1100 GOVERNOR LEA ROAD	39.60265	-75.6579
Seaway Service Inc	34 CLINTON ST	39.57913	-75.58792
Sheridan Nissan	114 S DUPONT HWY	39.59172	-75.66102
Standard Chlorine Of Delaware, Inc. Superfund Site	745 GOVERNOR LEA ROAD	39.59807	-75.63618
Stone & Webster Engineering Corp	SCHOOLHOUSE RD	39.57028	-75.636667
Veolia - Red Lion Plant	766 GOVERNOR LEA ROAD	39.59812	-75.63718
Wawa #870	3601 WRANGLE HILL ROAD	39.58502	-75.68351
Zarnas, G C & Co Inc	WRANGLE HILL ROAD	39.57028	-75.636667

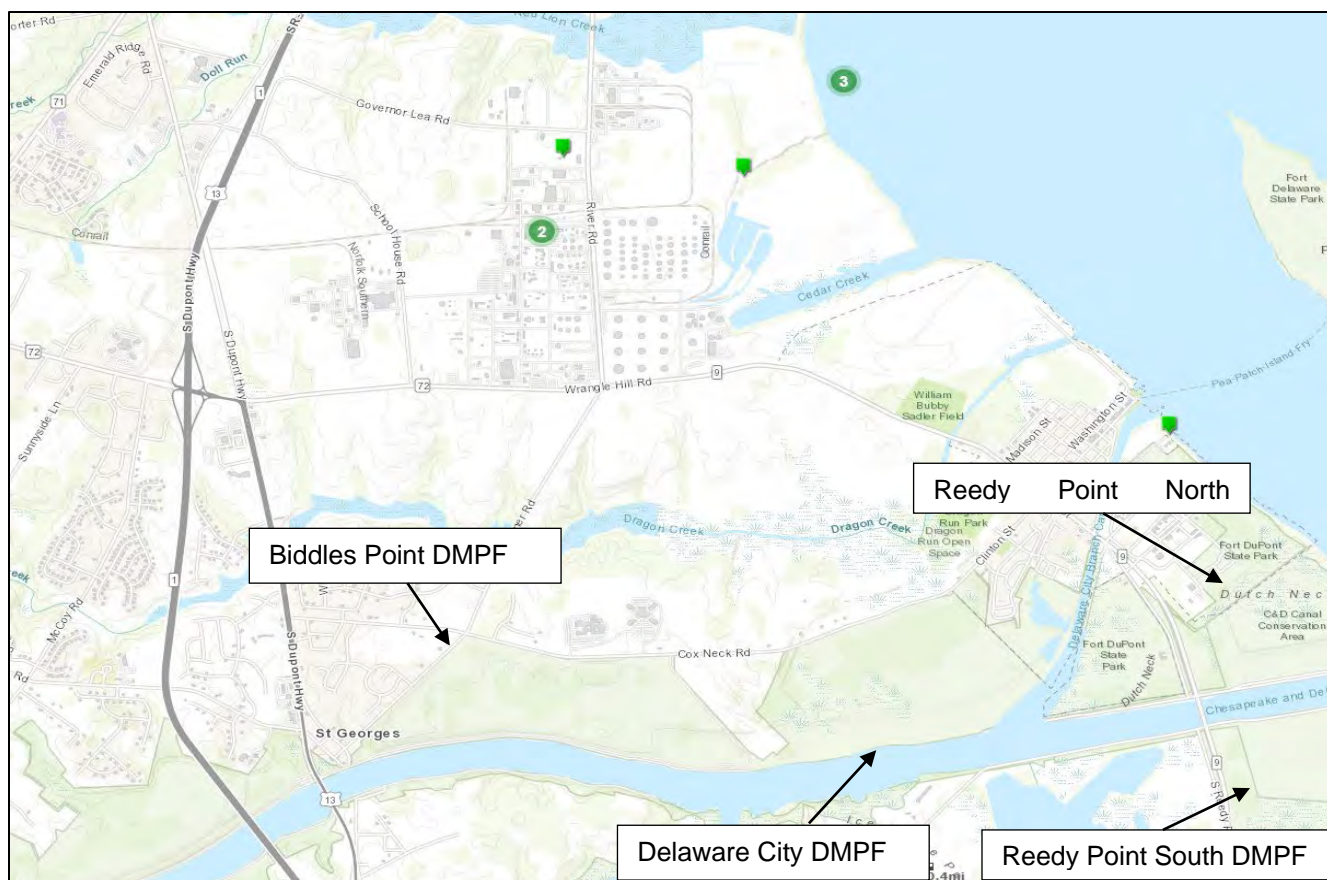


Figure 27. EPA National Pollutant Discharge Elimination System Sites in proximity to the Delaware City DMPF.

Table 15: National Pollutant Discharge Elimination System Sites in Proximity to the Delaware City DMPF			
NAME	ADDRESS	LATITUDE	LONGITUDE
Delaware City Power Plant	4550 WRANGLE HILL RD	39.59592	-75.63237
Delaware City Refinery	4550 WRANGLE HILL RD	39.591	-75.634
Delaware City Wastewater Treatment Plant	GOVERNOR BACON CENTER	39.57695	-75.584786
Formosa Plastics Corporation	780 SCHOOLHOUSE ROAD	39.5851	-75.6492
Kaneka Delaware Corporation	1685 RIVER ROAD	39.60125	-75.610333
Liveo Research Inc.	1389 SCHOOLHOUSE ROAD	39.59458	-75.61825
Metachem Products, Llc Delaware	GOVERNOR LEA ROAD	39.60206	-75.612583
Occidental Chemical Corp	1657 RIVER RD	39.60125	-75.610147



#### **4.3.8. Noise**

Noise is of environmental concern because it can cause annoyance and adverse health effects to humans and animal life. Noise can impact such activities as conversing, reading, recreation, listening to music, working, and sleeping. Wildlife behaviors can be disrupted by noises also, which can disrupt feeding and nesting activities. Noise can be characterized by the following four factors: frequency, intensity, duration, and distance. Each of these factors is described below:

- **Frequency** – Sound travels in waves, and the frequency of a sound is the number of wave cycles per second, measured in hertz (Hz). High frequency sounds have many cycles per second; low frequency sounds have fewer.
- **Intensity** – Noise intensity is the power (average energy per unit time) transmitted through a unit area in a specific direction. Sound intensity (i.e. loudness) is measured in decibels (dB). The dB is a relative unit of measure describing the logarithm of the ratio of a sound's intensity to a reference intensity. Because of the logarithmic scale, decibels are not directly additive (e.g. two 70 dB sounds results in 73 dB cumulative sound, but not a doubling, or 140 dB sound). For broadband sounds, a 3 dB change is the minimum change perceptible to the human ear.
- **Duration** – The duration of a sound affects its potential impact. Generally, long-term sounds are considered more harmful than short bursts of sound. "Masking" occurs when the pressure of a sound masks a sound of interest, by being equal to or greater in sound.
- **Distance** – Sound radiates in all directions from the source, in a spherical pattern. As the sound radiates, the pressure wave increases in size and the power of the wave dissipates.

The two most common types of noise are point source and line source. Existing noise in the vicinity of the Delaware DMPF and the other adjacent DMPFs includes vehicular traffic on Cox Neck Road and the Reedy Point Bridge (State Route 9), residential activity adjacent to the DMPF, commercial and recreational boating activity within the C&D Canal and Branch Canal, and recreational activity along the Michael N. Castle Trail.

## **5.0 ENVIRONMENTAL EFFECTS**

This section evaluates the No Action alternative and the Preferred Alternative in terms of their potential impacts to natural and socioeconomic resources in the project area. The Preferred Alternative includes the disposal of maintenance dredge material into the

Delaware City DMPF and therefore the environmental effects will focus on the No Action Alternative and the Preferred Alternative.

## **5.1 Physical Environment**

### **5.1.1. Topography, Physiography, and Geology**

No Action. The No Action alternative will result in no changes to the topography, physiography, and geology of the project area as no additional dredge materials will be placed into the Delaware City DMPF.

Preferred Alternative. The Preferred Alternative will result in permanent changes to the existing topography within the Delaware City DMPF due to the increase in sediment and other dredge material which will be pumped within the project area. It is anticipated based on the existing topography within the Delaware City DMPF that the open water areas which are the lowest lying will be filled initially and those areas will subsequently increase in elevation. Additional maintenance dredge sediment disposals will further increase the topographic grade within the DMPF, however USACE requirements mandate that there is two feet of freeboard between the height of the material within the DMPF and the height of the perimeter dikes.

The Preferred Alternative is not anticipated to affect the geology and physiography in the DMPF as the subsoils currently consist of historic dredge materials. The topography, geology, and physiography of the areas surrounding the DMPF will be unaffected as the dikes will confine the dredge material in the DMPF. The placement of the dredge material is also not expected to introduce any contaminants or adversely affect groundwater resources and this expectation will be confirmed through analytical testing, the installation of groundwater monitoring wells, and conducting geotechnical soil borings.

### **5.1.2. Groundwater**

No Action. The No Action alternative will result in no changes to the existing groundwater conditions beneath the Delaware City DMPF or the surrounding area as no additional dredge materials will be placed in the DMPF.

Preferred Alternative. The Preferred Alternative is not anticipated to impact the groundwater beneath the Delaware DMPF nor the surrounding area. Under the Preferred Alternative, the effects on groundwater at the facility will depend on the dredge material composition that is placed within the facility. In general, a heterogeneous composition of the dredge materials allows them to function as both aquifer and confining unit. Sands will transmit water due to its permeable quality, whereas finer silts and clays will impede flow. When sediment is dredged from the canal or nearby rivers, the pore spaces are saturated with saline water, which has the possibility to penetrate the underlying aquifer units. In addition to the dredge deposits found currently at the DMPF (from when it was previously used as an active placement facility), marsh deposits are also present. The marsh deposits found in the disposal facility function primarily as a confining unit due to its fine-grained composition. The

degree to which they impede groundwater flow depends on the thickness and degree of compaction. The Scotts Corners Formation, which functions as part of the Columbia aquifer, is also present at the site. The water table usually occurs in the unit because of its near-surface position. The Scotts Corners Formation has a large influence on rates and locations of ground-water recharge. However, due to the limited thickness, stream incision, and near-surface locations, water supply wells are not permitted in this unit (Dugan, et al. 2008).

The USACE will be conducting geotechnical soil borings prior to dredge material placement operations to examine the depth and extent of confining layers beneath the DMPF and the depth of the regional groundwater table. The geotechnical borings and installation of groundwater wells will be completed in 2025. In parallel, groundwater monitoring wells will be installed so the groundwater quality and flow can be monitored to prevent any saline influence on water supply wells in proximity to the DMPF. The testing of the existing historic dredge sediments and water quality within the DMPF will be conducted prior to dredge placement to ensure that all State and Federal water quality parameters are met.

### **5.1.3. Climate and Sea Level Rise**

Under both the No Action alternative as well as the Preferred Alternative, the region surrounding the Delaware City DMPF will continue to experience a moderate climate due to the area's low elevation and the presence adjacent to the Delaware River and north of the Delaware Bay and Atlantic Ocean. Sea level rise is predicted to continue under the three scenarios predicted by the Sea Level Rise Technical Workgroup. It is difficult to predict the impact of climate change on species that inhabit the project area. Climate change and SLR will likely result in species shifts due to temperature changes favoring expansion of southern species into northern areas. The mid-Atlantic region contains considerable overlap of southern and northern species distributions, but climate change could result in losses of northern species in favor of more southern species. There is significant uncertainty in the rate and timing of climate change as well as the effects that may result. Warmer water temperatures can impact dissolved oxygen levels, particularly during summer months in shallow waters, decreasing water quality. Rising sea levels are anticipated to continue to affect coastal fish and wildlife habitats, including those utilized by waterfowl, wading birds, and shorebirds.

As discussed in Section 4.1.3 and depicted on Figure 10, the affected area is not located within an area which has the potential to be inundated by sea level rise as mapped by the Delaware Geological Survey as the Delaware City DMPF is surrounded by perimeter dikes.

### **5.1.4. Tides and Currents**

No Action. The No Action alternative will have no impacts on tides and currents. The tides will remain as semi-diurnal with nearly equal tides each day where the mean range

is 5.34' while the Diurnal Range is 5.84 ft. Sea level rise will continue with significant increases in the upper limit of the MHW and MHHW lines.

Preferred Alternative. The Preferred Alternative will have no impacts on tides and currents as there is no tidal surface water connection between the Delaware City DMPF and the C&D Canal and the discharge of return water from the sluice box is controlled by the weir boards.

### **5.1.5.Air Quality**

No Action. The No Action alternative would not result in the use of any construction equipment, beyond what is used for typical maintenance activities within the Delaware DMPF; therefore, there would be no short-term direct impacts to air quality. Under the No Action alternative, air quality would continue in the current regional condition. The No Action alternative would pose no additional impact on GHG emissions.

Preferred Alternative. The Preferred Alternative would result in the maintenance of existing regional air quality conditions in New Castle County, Delaware, which is part of the Philadelphia-Wilmington-Atlantic City, PA- NJ-MD-DE nonattainment area for the 8-hour ozone NAAQS. There would be some minor, short-term effects during dredge material placement operations from the use of additional diesel engines and construction equipment during dredge material disposal operations. The use of additional construction equipment during the dredging material placement will produce temporary localized increases in NO<sub>x</sub>, VOCs, CO, SO<sub>2</sub> and PM<sub>2.5</sub> emissions.

Based on the size of the operation and duration, air emissions are expected to be below the *de minimus* threshold for a moderate ozone nonattainment area. An emissions estimate for criteria pollutants is provided in Table 16 and Appendix B. The proposed action would meet *de minimus* thresholds for ozone (100 tons NO<sub>x</sub> and 50 tons VOCs per calendar year) and sulfur dioxide (100 tons per year). The other pollutants are in attainment of NAAQS for New Castle County and *de minimis* thresholds do not apply. Therefore, a General Conformity determination is not required based on the expected *de minimus* level emissions along with the proposed action meeting the exemption for maintenance dredging under 40 CFR § 93.153 (c)(2)(ix).

The use of diesel engines on a hydraulic dredge and associated construction equipment for a typical maintenance dredging project of 900,000 cubic yards will produce temporary localized increases in NO<sub>x</sub>, VOCs, CO, SO<sub>2</sub> and PM<sub>2.5</sub> emissions. Based on the size of the operation and duration, air emissions are expected to be below the *de minimus* threshold for a moderate ozone nonattainment area. An emissions estimate for criteria pollutants is provided in Table 17 and Appendix B. The proposed action would meet *de minimus* thresholds for ozone (100 tons NO<sub>x</sub> and 50 tons VOCs per calendar year). The other pollutants are in attainment of NAAQS for New Castle County and *de minimis* thresholds do not apply. Therefore, a General Conformity determination is not required based on the expected *de minimus* level emissions along with the proposed

action meeting the exemption for maintenance dredging under 40 CFR § 93.153 (c)(2)(ix).

Table 16. Criteria Pollutant Emissions Estimates (Tons)					
	NO <sub>x</sub> (O <sub>3</sub> precursor)	VOC (O <sub>3</sub> precursor)	PM <sub>2.5</sub>	SO <sub>x</sub>	CO
DPS Maintenance Dredging (900,000 CY) and Delaware City DMPF Operations	<b>44.7</b>	<b>1.34</b>	<b>2.3</b>	<b>0.02</b>	<b>5.4</b>
Clean Air Act General Conformity Rule Limit (Threshold Tons/Year)	100	50	NA	NA	NA

#### 5.1.5.1 Greenhouse Gases (GHGs)

No Action. Maintenance dredging will continue to occur, however there will be no disposal of dredge material into the Delaware City DMPF and as a result there will be no GHG effects in the local area from the No Action alternative.

Preferred Alternative. Maintenance dredging will utilize the Delaware DMPF as a dredge material disposal facility. An estimate for the maintenance dredging and dredge material placement indicates that those operations will produce GHG's including CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Based on the estimate of 900,000 cubic yards provided in Table 16 and Appendix B, approximately 2,556 tons of CO<sub>2</sub> would be emitted from the dredge, support equipment, and dredge placement operations during a typical maintenance dredging cycle.

Table 17. Greenhouse Gas Emissions Estimates (Tons)			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
DPS Maintenance Dredging and Placement Operations (900,000 CY)	<b>3,556</b>	<b>0.32</b>	<b>0.07</b>

There are no practicable alternatives that obviate the need for the Delaware River FNC and C&D Canal maintenance dredging to avoid emitting GHGs. Minimization is likely through less frequent dredging (fewer mobilizations that emit CO<sub>2</sub>) and implementing practices that reduce unneeded idling of engines would be considered.

#### 5.1.6. Water and Sediment Quality

No Action. Under the No Action alternative, there will be no changes to the existing water and sediment quality within the Delaware City DMPF and the Chesapeake and Delaware Canal as no dredge materials would be disposed of into the DMPF and effluent discharges into the C&D Canal.

Preferred Alternative. Dredging and dredged material placement into a DMPF will generate turbidity above background at the point of dredging and at the placement facility in the form of effluent from the weir discharge. Likewise, mobilization of contaminants into the water column can occur at these points of exposure. Unlike particulate substances bound to sediment, dissolved substances are available for potential uptake by aquatic organisms and can affect water quality acutely and chronically.

Maintenance dredging operations would deposit large quantities of sediments into the DMPF, which is a confined area generally located upland of any waterbody. A DMPF is simply a large settling basin designed to accept and dewater dredged material. When in operation, a mixture of dredged material and water is pumped into one end of the DMPF. As the mixture flows through the DMPF, the solids settle to the bottom and the water flows to the discharge location where it flows back into the river. Often baffle dikes are constructed within the cells of the DMPF to lengthen the path the dredged material mixture must take to reach the discharge location. This increases the settling time and, thus, increases the efficiency of the DMPF in dewatering the material. Water pumped with the dredged material must be contained in the DMPF until sufficient solids settle out to allow the discharge to meet specified conditions. Heavier, coarser-grained sands and gravels drop out of the water column close to where material enters the DMPF. As the water moves through the DMPF it slows, allowing finer-grained sediment particles to settle out. Finally, water reaches the weir and is discharged from the site. The purpose of the weir structure is to regulate the release of ponded water from the DMPF. Proper weir design and operation can control potential resuspension and release of solids. As the height of the weir is increased, the depth of the pond increases and only the cleaner surface waters of the pond are released into the receiving waters.

Dredged sediments may contain contaminants such as heavy metals, PAHs, and PCBs, which can be mobilized through the dredging/agitation of sediments at the point of dredging and at the weir discharge from an upland DMPF, which would affect water quality. Degradation of water quality in the receiving water body can result from exceedances of acute and chronic water quality criteria. To gauge the degree of release of contaminants into the water column, Equilibrium partitioning (EqP) was used to predict levels of contaminants that may become dissolved in the water column at the point of dredging, and to further understand the potential ecological effects of sediment contaminant concentrations and bioavailability to aquatic life. This approach was adapted from procedures described in Greene (2010) for application within the Delaware Estuary. EqP theory is a simple mathematical method of estimating the proportion a chemical sorbed to sediment to the chemical dissolved in water. With a known concentration of chemical per unit weight of sediment/soil, and a known weight of total sediment/soil, this method can be used to determine the concentration of the



chemical in the water. Assuming linear relationships between sediment concentration, fraction of organic carbon, and the octanol/water partition coefficient, concentrations of organic chemicals in sediment can be multiplied by a factor to yield a concentration of that chemical in the water column. The partitioning between sorbed and dissolved metals, PAH's and PCBs were modeled using historic data from 1995 to 2020 in the bulk sediment analyses for the Delaware River sediments and approach to the C&D Canal. These outputs were computed as ratios with chronic and/or acute water quality criteria for aquatic life in Delaware. Because discharges from the DMPF would be in brackish water, which may fluctuate in salinity, computations of potential water quality effects utilized both marine and freshwater comparisons. The average salinity within the C&D Canal in the vicinity of the Delaware City DMPF is 3.6 ppt, which would be classified as freshwater for these analyses. The freshwater criteria are generally the more stringent values.

For heavy metals, the ratio of the inorganic metal concentration in the porewater to the applicable criterion was expressed as toxic units (TUs), where ratios greater than 1.0 suggest exposure concentrations in excess of the criterion and, additionally, the chronic toxic units for cadmium, copper, lead, nickel, silver and zinc were summed to produce an interstitial water benchmark unit (IWBU) as described in EPA, 2005b. For freshwater criteria, two samples of the forty-five had total acute TU's (based on the sum of the aforementioned metals) that exceeded 1.0 suggesting some acute toxicity attributed to the stringent cadmium water quality criteria for freshwater (Appendix C). The mean (0.37) and median (0.27) acute values of these TU's suggest overall low acute toxicity (Figure 28). However, the freshwater IWBU had twenty-eight of forty-five samples that exceeded 1.0 with a mean IWBU of 1.99 and median of 1.59 suggesting chronic toxicity. These elevated IWBU's for chronic toxicity are mainly attributed to the presence of cadmium and the stringent water quality criteria for cadmium. Greene (2010) discussed the same issue with regards to cadmium where cadmium was a main driver for higher IWBU results in sediments analyzed using the Delaware Estuary Benthic Index (DEBI, 2008). In this investigation, it was concluded that cadmium is "likely overprotective when applied to sediment pore water because it does not account for strong cadmium sulfide binding and POC in the sediments which act to reduce bioavailability and toxicity of the dissolved free metal ion thought to be primarily responsible for toxicity."

Because of variations in salinity in this zone of the Delaware Estuary, there is a potential for receiving waters to periodically exceed 5 ppt. in salinity, which would classify them as marine. Exceedances of IWBU's occur from cadmium and also copper (copper acute and chronic criteria are lower for marine waters) for eighteen of forty-five samples; however, the mean and medians of these samples are below the TU's and IWBU's thresholds for toxicity (Figure 29).

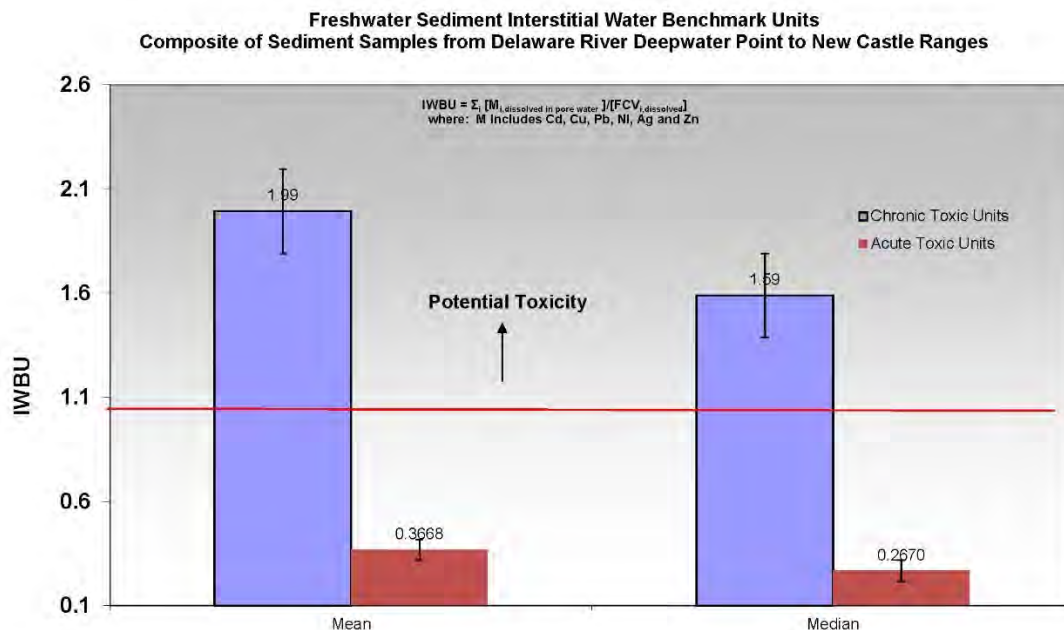


Figure 28. Mean and Median Values of Interstitial Water Bench Mark Units IWBU of Delaware River Sediment Samples from within Deepwater Point Range to New Castle Range For Metals Utilizing Freshwater Water Quality Criteria (Adapted from Greene, 2010).

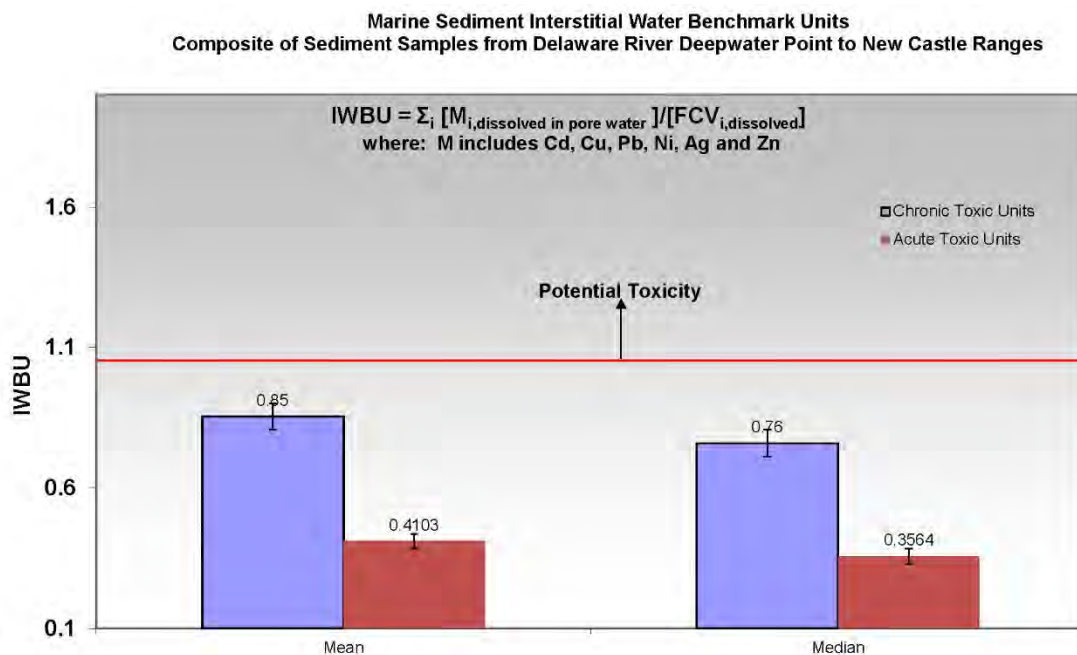


Figure 29. Mean and Median Values of Interstitial Water Bench Mark Units IWBU of Delaware River Sediment Samples from within Deepwater Point Range to New Castle Range For Metals Utilizing Marine Water Quality Criteria (Adapted from Greene, 2010).

The Delaware River and entrance to C&D Canal sediments had a number of PAH's detected. For PAHs, the method used to evaluate toxicity of most of the PAHs detected was to compare organic carbon normalized concentrations to literature derived EqP based mechanistic sediment quality guidelines called Equilibrium Partitioning Sediment Benchmarks (ESBs) (Burgess et. al. 2013). Sediment concentrations less than or equal to the ESB values may result in adverse effects to benthic organisms. These analyses assumed one half of the method detection levels for PAH's that were not detected. A total of 17 different PAH compounds were analyzed (among 24 samples) in these data sets (Appendix C). The results are expressed as a ratio of the organic carbon normalized concentration to the ESB with ratios greater than 1.0 indicating an increased likelihood of risk to ecological receptors. For all samples, the sum of the 17 PAH ratios were two orders of magnitude below 1.0 and none of the PAHs detected in the sediment samples exceeded compound specific ESBs. Therefore, potential toxicity to aquatic life from PAHs in from the navigation channel sediments is not expected. Based on these results, there is low to no potential for chronic and acute toxicity to aquatic life from dredging/dewatering activities.

For PCBs, the approach used to evaluate potential toxicity of PCBs to benthic organisms followed that of Fuchsman et al. (2006), with minor modification. The aim of the approach is to determine an organic carbon normalized concentration in the sediments in equilibrium with a porewater concentration equal to a chronic aquatic life criterion. Fuchsman (2006) refers to such an organic carbon normalized sediment concentration as a Sediment Quality Benchmark (SQB). Similar to those methods employed for metals and PAHs, if the ratio of the measured organic carbon normalized concentration in the sediment to the SQB is less than 1, then chronic aquatic life toxicity in the sediments is unlikely. Ratios greater than 1 indicate that the pore water exposure may be high enough to cause toxicity to benthic organisms. This would provide an indication that the narrative criteria for water quality standards was not being met, with the understanding that sediments and their associated pore waters are an integral part of Delaware's surface water environment. For the Delaware River sediment samples, an SQB for freshwater was applied, and the largest chronic toxicity unit value was 0.15 (DE08-0566 at 138 ppb), which is well below 1, thereby indicating that aquatic toxicity due to PCBs is not expected.

Because PCBs bioaccumulate in fish and other aquatic life, PCBs are the primary risk driver for fish consumption advisories in Delaware. The potential for PCBs in the sediments to contribute to bioaccumulation in the Delaware River was first evaluated by comparing the total PCB concentrations in the samples to a bioaccumulation-based sediment quality criterion (Greene, 1997). Four of the 18 samples exceed the bioaccumulation-based sediment quality guideline (BBSQG) of 33.2 ppb calculated for the Delaware Estuary (Appendix C). One sample (DE08-0566) had a total concentration of 138 ppb, which resulted in a BBSQG ratio to total PCB of 4.16 exceeding the 1.0 ratio. This sample was obtained in DEBI (2008) and is a surficial sample located outside of the navigation channel. The three remaining samples that exceed the BBSQC are by 10 ppb or less.

The use of the Delaware City DMPF for the disposal of DPS FNC and C&D Canal maintenance dredge materials and discharge of return water from the DMPF are expected to meet DE water quality criteria pursuant to 7 Del. Admin Code 7401 Surface Water Quality Standards, 7 Del. Admin. Code 7201 Surface Water Discharge Regulations, and §§ 301, 302, 303, 306, and 307 of the CWA. The USACE will request concurrence from DNREC that the project meets the conditions associated with a Nationwide Permit 16 – Return Water from Upland Contained Disposal Areas for this issuance of a WQC prior to placement at the facility. During dewatering operations, the return water leaving the sluice will be required to meet the USACE effluent sampling and testing specifications. The return water will not exceed the State regulatory threshold of 4 grams per liter for total suspended solids (TSS) during dewatering through the use of best management practices (BMPs). The BMPs will include raising the sluice weir boards to reduce the flow, moving the influent point within the DMPF, and/or constructing baffle dikes to allow more space for the dredge material to meander which provides additional time for fine grain settlement.

## **5.2 Biological Environment**

### **5.2.1. Wetlands**

No Action. The No Action alternative will not impact wetlands.

Preferred Alternative. As mentioned above, the Delaware City DMPF does not include jurisdictional wetlands, as regulated pursuant to Section 404 of the CWA, Title 7 of the Delaware Code (§7212) and Section 6607 of the Wetlands Act of 1973 (Title 7 Delaware Code Ch. 66). Therefore, the Preferred Alternative to dispose of the maintenance dredge materials into the Delaware City DMPF will not result in the temporary or permanent impacts of jurisdictional wetlands within the DMPF.

The maintenance dredge pipeline into the DMPF will be located within State and Federally regulated wetlands located alongside the northern banks of the Branch Canal. The two dredge discharge pipelines will be temporarily placed within State regulated wetlands identified as “Marsh” in DNREC Map No. DNR453 (DNREC, 1988) as depicted in Figure 30. The NWI maps describe the wetlands as estuarine, intertidal, emergent, *Phragmites australis*, irregularly flooded (E2EM5P). Approximately 1,275 square feet (175 feet x 3 foot diameter pipe) of Delaware regulated wetlands will be temporarily impacted where the two dredge discharge pipelines will be placed on the ground surface of the area. The temporary wetland impacts will be minor and no long-term impacts to the wetlands will occur as a result of the project.

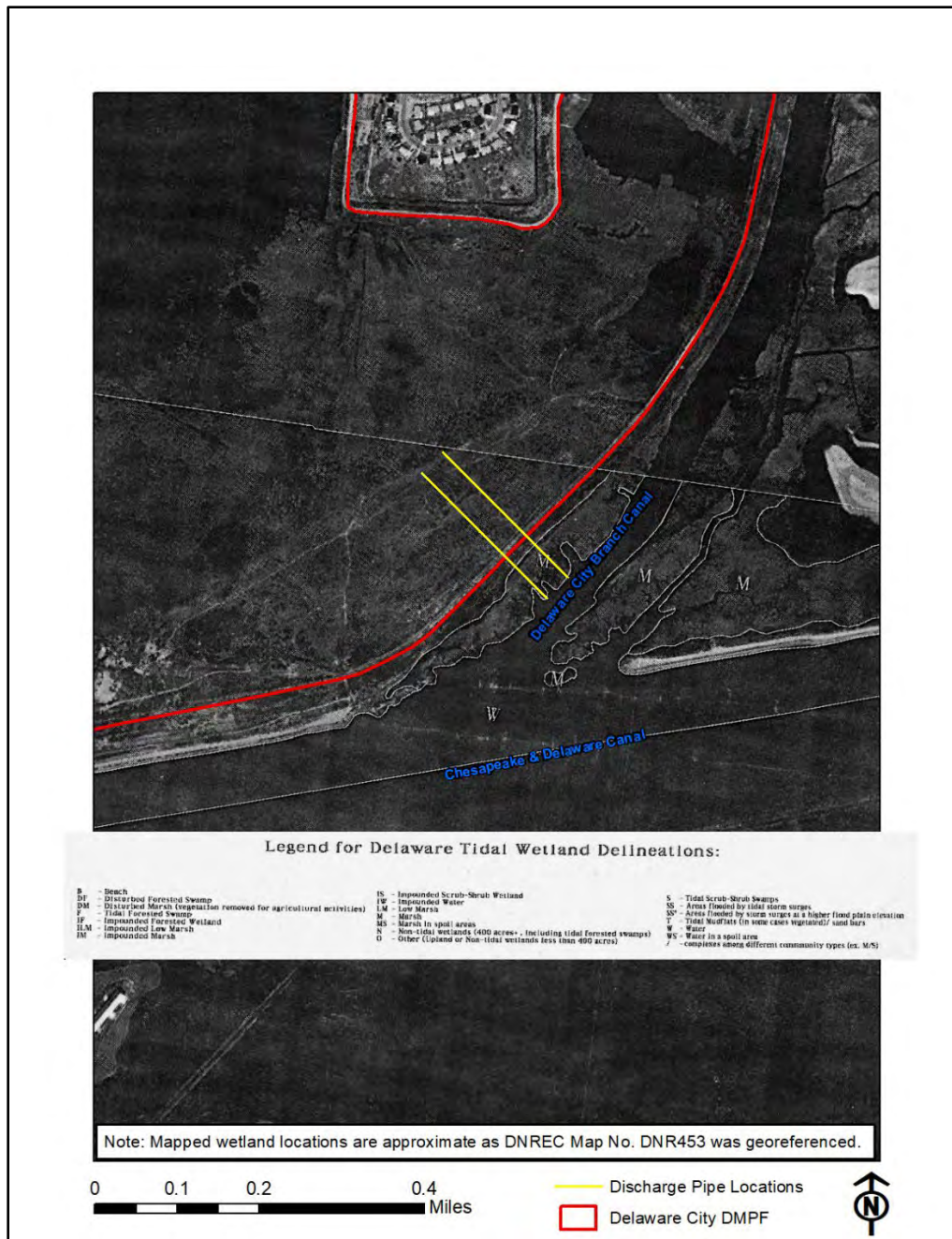


Figure 30. DNREC Mapped Wetlands Proximate to the Intake Pipeline (DNREC, 1988).

### 5.2.2.Fish

**No Action:** Under the No Action alternative, there will be no additional effects on fish and aquatic resources beyond those that result from maintenance dredging operations.

**Preferred Alternative:** The Preferred Alternative to dispose of the maintenance dredge materials into the Delaware City DMPF will have permanent impacts on the fish species

identified by DNREC DFW which inhabit the open water habitat area within the DMPF. The Preferred Alternative will include the permanent impact of approximately 108-acres of open water habitat, including the approximately 85-acre open water area which is utilized by the public for freshwater fishing. As dredge sediments are pumped into the proposed project area, the sediments are expected to flow downgradient to the lowest points in the DMPF which includes the approximately 85-acre open water area.

The USACE is working with a private fisheries contractor and DNREC to plan and receive regulatory approvals for the capture and relocation of fish from the approximately 85-acre open water area. Prior to the capture of the fish, the open water area will be dewatered to a suitable size (approximately one-acre) for electrofishing and/or seine netting. The fish species will be identified as they are being caught and any invasive, non-native species such as blue catfish (*Ictalurus furcatus*), flathead catfish (*Pylodictis olivaris*), common carp (*Cyprinus carpio*), mirror carp (*Cyprinus carpio*), and northern snakehead (*Channa argus*) that may inhabit the pond will be killed and legally disposed of per DNREC regulations. It should be noted that northern snakeheads have not been documented by DNREC or anglers within the open water areas within the DMPF, however they have been reported in the C&D Canal and Delaware River and can travel between waterbodies as they are able to survive for up to four days out of water. Per DNREC's recommendation, any white perch (*Morone americana*) captured will not be relocated to a freshwater body and will be relocated to the C&D Canal waterway. The suitable fish species for relocation will be placed in holding tanks for transport. Both the electrofishing and seine netting methods to capture the fish species rarely causes injury or harm to the species as they typically recover in a matter of minutes after being captured and placed back in water.

While the USACE and the fisheries consultant will make every effort to capture and transport all the suitable fish species from the DMPF waterbody, it is understood that not all fish species will be captured using the seine netting and electrofishing methods and there will be permanent loss of fish. A specific freshwater body has not been selected for the relocation of the fish species, however the USACE has identified two adjacent waterbodies which are located approximately four-miles west of the Delaware City DMPF which may be suitable for the relocated fish species (Figure 31). The two adjacent waterbodies are located within the publicly accessible C&D Canal Conservation Area and are currently being evaluated for suitability to accept the Delaware City DMPF fish species. Prior to a fish relocation, the USACE and a contracted private fisheries contractor will work with DNREC to provide the pertinent details and obtain all necessary regulatory approvals.





Figure 31. Potential fish relocation areas within the C&D Canal Lands.

Although there will be the permanent loss of the publicly accessible freshwater fishing in the Delaware City DMPF, comparable public freshwater fishing is also provided at Lums Pond, within the Lums Pond State Park. DNREC describes Lums Pond as some of the best freshwater fishing in the State of Delaware and indicates that largemouth bass, bluegill, crappie (*Pomoxis* spp.), catfish, and chain pickerel are found in the pond and stripped bass is stocked in the pond periodically (DNREC, 2023). Lums Pond is located approximately five-miles west of the Delaware City DMPF.

Sediment and water quality testing of the existing sediments and large open waterbody within the Delaware City DMPF will be conducted prior to dredge material placement operations. Sediment testing of the DPS FNC areas proposed to be dredged during the 2025 maintenance dredging cycle will also be conducted prior to placement within the DMPF. The sediment and water quality testing will evaluate the potential for harmful effects on aquatic organisms through the discharge of waters within the DMPF, however it is anticipated that there will be no adverse impacts to fish species in the C&D Canal or other waterbodies as a result of the dredged material placement.

#### Essential Fish Habitat (EFH).

No Action: The No Action alternative will have no effects on EFH.

Preferred Alternative: The Preferred Alternative is not anticipated to affect EFH. The 1996 amendments to the Magnuson-Stevens Fishery Conservation Management strengthen the ability of the NMFS to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat (EFH)," and is broadly defined to include, "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." All the fish species listed in Table 5 in Section 4.2.2.1, which are designated species identified by the EFH mapper which may be found proximate to the project area. As the open water areas within the Delaware City DMPF do not include a direct surface water connection to the tidally flowed C&D Canal and Branch Canal, and by virtue the Delaware River, the identified EFH species would not be found within the project area. The existing sluice box prevents a direct surface water connection and fish passage between the ditch to the west of the Delaware City DMPF and the open water areas within the DMPF. Additionally, the monitoring of total suspended solids (TSS) leaving the sluice will be conducted during dewatering operations and return water control practices to ensure the regulatory threshold of 4 grams per liter is not exceeded. To control the TSS leaving the sluice box, the sluice weir boards can be raised, baffle dikes can be constructed, and/or the slurry intake density can be reduced. No effects to EFH species are anticipated due to the monitoring of the TSS and employment of controls to limit the flow of return water to the C&D Canal. An EFH Consultation Worksheet is provided as Appendix C.

### **5.2.3. Terrestrial Habitats**

No Action: No changes and impacts would occur to terrestrial habitats under the No Action alternative.

Preferred Alternative: The Preferred Alternative is anticipated to have short term temporary impacts on terrestrial habitats as the pumping of dredge material into the project area may raise the elevation of the terrestrial habitat and cause vegetation, including woody vegetation such as trees, saplings, and shrubs, to die back as a result

of the elevation change and additional sediment overtop of roots. As previously noted, an aerial treatment of large areas of common reed within the Delaware City DMPF was conducted by DNREC DFW on 15 September 2022. The treatment has resulted in a prevalence of dead standing common reed canes visible within large portions of the facility. It is likely that formerly open water areas will be filled with sediment and the elevation raised leading to additional terrestrial habitat within the DMPF. Upon stabilization of the site, the disturbed areas will be colonized by vegetation and species of wildlife that utilize shrubby and/or oldfield habitats.

#### **5.2.4. Avifauna and Other Wildlife**

No Action: Under the No Action alternative, avifauna and other wildlife species will not be affected.

Preferred Alternative: With the Preferred Alternative, during the pumping and disposal of the dredge material it is anticipated that wildlife and avifauna species will be displaced from the affected area due to the human activity, noise, and settling of dredge sediments. The displaced terrestrial wildlife and avifauna species are expected to flee to suitable habitats adjacent to the affected area, including the forested and oldfield habitats to the west of the Delaware City DMPF. It is likely that terrestrial wildlife and avifauna species will return once operations cease, the area stabilizes, and the vegetation recolonizes.

The avifauna and migratory bird species which utilize the open water aquatic habitat areas within the DMPF are similarly expected to flee to suitable open water habitats in the region as the dredge disposal operations commence. To the south of the Delaware city DMPF and C&D Canal is a large, open water habitat area, which is commonly referred to as the “Thousand Acre Marsh” and a portion of which is located in the Ashton Tract within the Augustine Wildlife Area. According to the eBird website, the Thousand Acre Marsh had 231 different bird species observed (as of 3 May 2024 - <https://ebird.org/hotspot/L1156220>). The observed bird species largely included those which eBird reported as being observed within the Delaware City DMPF and additional species which have not been reported as being observed within the DMPF such as semipalmated plover (*Charadrius semipalmatus*), dunlin (*Calidris alpina*), semipalmated sandpiper (*Calidris pusilla*), short-billed dowitcher (*Limnodromus griseus*), and ruff (*Calidris pugnax*). Therefore, although there will be a permanent loss of open water aquatic habitat utilized by avian species, it is anticipated that the species will utilize similar habitat in the region and the Preferred Alternative will not have a significant negative impact on wildlife and avifauna in the region.

The Preferred Alternative will include the permanent impact of approximately 108-acres of open water habitat, including the approximately 85-acre open water aquatic habitat area which is a popular with the public for freshwater fishing and waterfowl hunting. As dredge sediments are pumped into the proposed action area, they are expected to flow downgradient to the lowest points in the DMPF, which includes the large open water area. The USACE will work with the fisheries contractor during the proposed relocation

of the fish species from the large open water area within the Delaware City DMPF to transfer all reptiles and amphibians discovered to suitable habitat on Federal lands.

#### **5.2.5.Rare, Threatened and Endangered Species**

No Action: The No Action alternative would not have any direct impacts to threatened and endangered species beyond those that result from the maintenance dredging operations.

Preferred Alternative: The IPaC search results for the project site include one federally endangered species (northern long-eared bat), one federally threatened species (bog turtle), and a federal candidate species (monarch butterfly). While no surveys for the species identified in the IPaC search were conducted, it is not anticipated that the Delaware City DMPF contains suitable habitat for those species as discussed in Section 4.2.4.

The GARFO Section 7 ESA mapper indicates the presence of two federally endangered species (Atlantic sturgeon and shortnose sturgeon) and critical habitat for the Atlantic sturgeon is located within or adjacent to the project area. The Atlantic sturgeon and shortnose sturgeon are not found within the project area and no disturbance to the C&D Canal or Delaware River is proposed which would have a negative impact on those endangered species or the critical habitat. As previously mentioned, the monitoring of TSS leaving the sluice will be conducted during dewatering operations and return water control practices to ensure the regulatory threshold of 4 grams per liter is not exceeded for water discharged to the C&D Canal.

The bird species listed in the Delaware Wildlife Action Plan SCGN include many of the bird species which have been observed in the project area as reported by ERI in 1994 and the eBird website. The Preferred Alternative will negatively affect avian habitat through the removal and die-back of vegetation and the loss of open water aquatic habitat. Similar terrestrial habitat for the bird species is present in other areas within the C&D Canal Conservation Area adjacent to the project area and likewise similar open water habitat is present in the Augustine Wildlife Area to the south of the project area and other areas to the north and west. As such, the Preferred Alternative is expected to have minimal to no effects on the birds identified in the SCGN and is not likely to adversely affect the continued existence of the Federal and State listed threatened and endangered species which may utilize the affected area. This determination will be coordinated with the NMFS, DNREC and USFWS during the review of the draft EA by those respective regulatory agencies. The threatened and endangered species information (IPaC search results and GARFO Section 7 ESA mapper results) are provided in Appendix D.

## 5.3 Social, Economic, and Cultural Resources

### 5.3.1. Land Use and Socioeconomic Conditions

No Action: Under the No Action alternative there will be no changes to land use and socioeconomic conditions.

Preferred Alternative: With the Preferred Alternative, the disposal of maintenance dredge materials would not adversely affect socioeconomic resources, infrastructure, or utilities in the region as the project utilizes an existing federally owned and maintained DMPF. As demonstrated within this EA, the disposal of maintenance dredging materials into the Delaware City DMPF is needed as other federally owned DMPFs in the region do not have sufficient capacity.

The Delaware City DMPF is currently publicly accessible as the facility is leased to DNREC as a component of the C&D Canal Conservation Area. The placement of dredge material will alter the land use of the Delaware City DMPF by raising the elevation within the facility and filling the approximately 108-acres of open water areas with dredge materials. The open water areas within the DMPF are currently utilized by the public for recreation including birding/wildlife viewing, waterfowl hunting, and fishing. Those recreational activities within the DMPF will likely be permanently lost with the Preferred Alternative, however similar recreational areas, including the other areas within the C&D Canal Conservation Area, the Augustine Wildlife Area, and Lums Pond State Park, are located in close proximity to the project area for public use.

### 5.3.2. Environmental Justice

In accordance with Executive Order (Environmental Justice in Minority Populations) 12989 dated 11 February 1994, a review was conducted of the populations within the affected area. The Executive Order requires that “each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The U.S. Environmental Protection Agency definition for Environmental Justice is: “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

No Action: The No Action alternative provides no benefits nor effects to the population regardless of race, color, national origin or income levels.

Preferred Alternative: The Preferred Alternative is not expected to result in high or adverse human health or environmental effects on any EJ communities. As depicted in Figure 20 in Section 4.3.3, there are no EJ communities within close proximity to the Delaware City DMPF.



### 5.3.3. Recreation

No Action: The No Action alternative would not have any direct impacts on recreation.

Preferred Alternative: The placement and management of maintenance dredge materials associated with the Preferred Alternative will temporarily restrict access for recreation opportunities within the DMPF. The C&D Canal Conservation Area includes the Delaware City DMPF and the property is leased to DNREC by the USACE. The real estate instruments described in the 1974 USACE Master Plan reserve the right to terminate/suspend the recreational use if the facility is needed for project purposes. As such, during dredge placement operations at the Delaware City DMPF, access will be restricted to the public due to health and safety reasons associated with the dangers from the machinery and equipment operating within the DMPF and the unstable nature of the dredge sediments being pumped into the DMPF. Once the dredging operations cease and the site stabilizes the site will reopen for permitted recreational activities as part of the C&D Canal Conservation Area managed by DNREC.

During the maintenance dredge placement operations, a pipeline which transports the pumped sediments from the maintenance dredging to the Delaware City DMPF will be situated across the Michael N. Castle recreational trail. Due to the safety concerns from the pipeline being placed across the trail and the unstable nature of the dredged materials, the section of the Micheal N. Castle trail which runs a top and along the Delaware City DMPF will be temporarily closed during the placement of the dredged materials. The anticipated temporary trail closure will prohibit access of the recreational trail between the Branch Canal Trail in Delaware City to the Biddles Point trailhead area to the west of the Delaware City DMPF. It should be noted that the proposed trail closure would likely be during the winter months when trail usage is expected to be less than the warmer months of the year. The closure duration is anticipated to be approximately two months after the commencement of the maintenance dredging.

The Preferred Alternative will also include the permanent disturbance of the open water aquatic habitat areas due to the dredge material disposal which will result in the draining and filling of those open water areas with dredged sediments. The largest open water area within the DMPF, which is approximately 85 acres, is a publicly accessible freshwater fishing area. As dredge sediments are pumped into the proposed action area, they are expected to flow downgradient and fill the lowest points in the DMPF which includes the large open water area. The filling of the open water areas will result in the permanent loss of recreational opportunities in those areas including, but not limited to, fishing, waterfowl hunting, and birdwatching.

The Augustine Wildlife Area is located to the south of the Delaware City DMPF and C&D Canal and offers recreational opportunities including hiking, birding, wildlife viewing, photography, fishing, trapping waterfowl hunting, and deer hunting, similar to those that will be impacted under the Preferred Alternative. As previously discussed, the Port Penn Tract and Ashton Tract within the Augustine Wildlife Area include observation decks for viewing wildlife. The wildlife observation deck within the Ashton is an



approximately seven-minute drive (4.8-miles) from the Delaware City DMPF entrance south of Cox Neck Road.

Lums Pond, in the Lums Pond State Park, offers comparable publicly accessible freshwater fishing to that which is found in the open water areas of the Delaware City DMPF. DNREC describes Lums Pond as some of the best freshwater fishing in the State of Delaware and indicates that largemouth bass, bluegill, crappie, catfish, and chain pickerel are found in the pond and striped bass is stocked in the pond periodically (DNREC, 2023). The Lums Pond State Park also offers deer hunting during the hunting season. Lums Pond State Park is located approximately five miles to the west of the Delaware City DMPF which is an approximately 11-minute drive (7.3-miles) between the two locations and also provides very similar recreational opportunities, including fishing, hunting, and birding/wildlife observing, to those that will be impacted by the Preferred Alternative.

Disruption to hunters and wildlife observers will also occur due to dredge disposal activities causing some wildlife to temporarily move out of the affected area. It is anticipated that as the affected area stabilizes, vegetation recolonizes, and wildlife returns, the opportunities for hunting and wildlife observing will return to the DMPF. As mentioned in Section 5.2.2, the capture and relocation of selected fish species is proposed to stock nearby publicly accessible freshwater bodies and minimize the mortality of fish species from the dewatering of the large open water area within the DMPF.

#### **5.3.4.Cultural and Historic Resources**

No Action: The No Action alternative will result in no effects to cultural and historic resources.

Preferred Alternative:

The USACE has determined that the proposed action will have *No Effect* on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1).

#### **5.3.5.Visual and Aesthetic Resources**

No Action: The No Action alternative will result in no effects to visual and aesthetic resources.

Preferred Alternative: The open water areas within the Delaware City DMPF are considered to have visual and aesthetic value to the public who may view those areas from the Michael N. Castle recreational trail or from within the site. Under the Preferred Alternative, there will be permanent impacts to the open water areas within the Delaware City DMPF and therefore, those visual and aesthetic values of the open water areas will be lost permanently. Temporary negative impacts will also occur to the visual

and aesthetic resources in other portions of the site due to the removal and die-back of vegetation as dredge materials are placed within the DMPF. After disposal operations have ceased, it is anticipated that vegetation will recolonize within the DMPF and visual and aesthetic resource value will return to the site.

Similar visual and aesthetic resources to those being lost are available to the public nearby in areas to the west, south, and southeast of the Delaware City DMPF and C&D Canal. To the south of the DMPF and C&D Canal is a large, open water habitat area, in the Ashton Tract within the Augustine Wildlife Area (referred to as the “Thousand Acre Marsh”). The Aston Tract in the Augustine Wildlife Area offers a 700-foot wheelchair-accessible trail and observation deck overlooking the Thousand Acre Marsh. Additionally, the Port Penn Tract which is also within the Augustine Wildlife Area and is located southeast of the Delaware City DMPF. The Port Penn Tract is located along the Delaware River and includes a 550 foot wheelchair-accessible trail, including a 140-foot wetlands boardwalk, which leads to an accessible observation deck which overlooks wetlands (referred to as “Land Marsh”). The Port Penn observation deck is described as providing views of both the wetlands and Delaware River and is a great spot for gulls, herons, egrets, and resident songbirds. Lums Pond State Park also provides visual and aesthetic resources as it contains Delaware’s largest pond, many hiking trails, and areas of pond edge habitat to view wildlife and nature.

Additionally, under the Preferred Alternative, there may be short-term negative impacts to aesthetics during dredge material disposal from discharges of sediments originating from an oxygen-poor environment could produce temporary odor issues such as hydrogen sulfide odors which should subside a short time after disposal operations have ceased. Any hydrogen sulfide odor emitted from the facility will at very low levels and will cause no impacts to human health.

#### **5.3.6. Hazardous, Toxic, and Radioactive Wastes (HTRW)**

No Action: The No Action alternative will result in no changes or impacts to HTRW sites or facilities.

Preferred Alternative: For the Preferred Alternative, the DNREC NavMap, EPA Cleanups In My Community, and EPA MyEnvironment mapping websites were reviewed for various facilities or materials in the proposed action area and surrounding vicinity. As discussed in Section 4.3.7, the Delaware City Refinery site is mapped north and northwest of the proposed action area, however the investigations conducted under RCRA show that contaminants have not migrated beyond the Delaware River Refinery site property boundaries or into surface waters above levels of concern to human health or the environment. As there are no identified facilities and sites within the proposed project area, it is anticipated that the proposed action area will not be impacted by HTRW.

The USACE would be responsible for managing the proper storage and disposal of any hazardous materials such as oil and fuels used during the dredged material placement operations and management within the Delaware City DMPF.

### **5.3.7.Noise**

No Action: Under the No Action alternative there would be no changes to existing noise levels.

Preferred Alternative: The principal noise generated from the dredge material placement activities will include the use of heavy machinery and equipment which will be used to raise and/or maintain the dikes where needed and manage the dredge material while its being pumped into the DMPF from the maintenance dredge areas. The Delaware City DMPF includes existing ambient noise sources from boat traffic within the C&D Canal, vehicular traffic on Cox Neck Road and other local roadways, and users of the Michael N. Castle trail and C&D Canal Conservation Area lands.

The Occupational Safety and Health Administration (OSHA) regulations state that workers must not be exposed to noise levels above 85 dBA as an 8-hour noise exposure level (A-weighted sound levels (dBA)) are dB scale readings adjusted for the varying sensitivity of the human ear to different frequencies of sound) or to 140 dBC as a peak sound level (C-weighted sound levels (dBC)) are dB scale readings used for specifying peak or impact noise levels).

This Proposed Action would generate point source noise, that is, noise associated with a source that remains in one place for extended periods of time, such as with most construction activities (WSDOT 2013). Typical construction equipment associated with point sources associated with the Preferred Alternative includes:

- Front end loader (~80 dBA at 50 feet)
- Bulldozer (~85 dBA at 50 feet)
- Backhoe (~80 dBA at 50 feet)
- Pumps (~80-90 dBA at 50 feet)

Although the noise generated from the equipment used during the dredged material disposal activities are expected to be close to 8-hour threshold levels set for humans, the construction crew will wear any necessary hearing protection. There are residential properties located north of the DMPF along Cox Neck Road and adjacent to the northeastern portions of the DMPF in Delaware City along Warfel Road, Cleaver Road, Clover Road, Reybold Drive, and the residential properties south of 7<sup>th</sup> Street. Once the maintenance dredging begins, the pumping and placement of the dredged materials within the Delaware City DMPF will be continuous for 24 hours per day, seven days per week. At the dredge pipeline discharge location, shown in Figure 30 above, there will be lights to observe the pipelines and vehicles accessing that area at night to monitor the

conditions of the discharge. All other work within the DMPF involving construction equipment and personnel will be during the daylight hours.

The nearest residential properties are generally between 100 to 200 feet from the DMPF boundaries and approximately 1,500 feet from the pipeline discharge location. Due to the distances between those residential properties, the DMPF boundary, and the pipeline discharge location, it is not anticipated that the additional noise from dredged material placement activities will jeopardize the health or welfare of the public or the wildlife in the area surrounding the DMPF.

#### **5.4 Cumulative Effects**

The CEQ regulations for implementing the NEPA define cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). The methodology for performing a cumulative effects analysis is set forth in *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997), and includes the following:

1. Identification of the geographic area in which effects of the action may be felt.
2. Assessment of the impacts that are expected in that area from the action.
3. Identification of other actions (past, present, and reasonably foreseeable) that have had or are expected to have impacts in the same geographic area.
4. Assessment of the impacts or expected impacts from these other actions.
5. Assessment of the overall impact that can be expected if the individual impacts are allowed to accumulate.

No Action: The No Action alternative will not impose additional adverse impacts on affected resources.

Preferred Alternative: This Delaware City DMPF is proposed to be used for placement of materials resulting from the maintenance dredging of the Delaware River FNC and C&D Canal navigation channel. Periodic placement of the maintenance dredging sediments into the Delaware City DMPF would decrease (cumulatively) the existing capacity of the DMPF. However, current capacity estimates of the Delaware City DMPF do not indicate any issues within the near future. The periodic placement of dredge materials within the DMPF would have temporary and localized adverse impacts on vegetation and wildlife habitat, however it would not result in an expansion or increase the magnitude of these impacts and all impacts would be contained within the existing confines of the facility. Therefore, the cumulative effects of maintenance dredge material placement at the Delaware City DMPF would be minimal.

## **6.0 ENVIRONMENTAL COMPLIANCE**

Compliance with applicable Federal Statutes, Executive Orders, and Executive Memoranda is ongoing and is summarized in Table 18. This is a complete listing of compliance status relative to environmental quality protection statutes and other environmental review requirements.

The proposed maintenance dredging in the Delaware River FNC and C&D Canal provides for continued safe navigation in those waterways and the associated economic benefits those navigation channels provide to the region.

The project complies with and will be conducted in a manner consistent with Delaware's requirements with regard to Section 401 of the CWA and the Coastal Zone Management Act. Concurrence that the project complies with the conditions of a Nationwide Permit 16 (Return Water from Upland Contained Disposal Areas) for a Water Quality Certificate and a Federal Coastal Zone Consistency Determination is being requested from the DNREC with the circulation of this EA.

The proposed action will be coordinated with the USFWS and NOAA Fisheries pursuant to the Fish and Wildlife Coordination Act, the Endangered Species Act, and the Magnuson Stevens Fishery Conservation and Management Act. The proposed action requires State approval pursuant to Section 307 of the Coastal Zone Management Act, and concurrence with Section 106 of the National Historic Preservation Act. The Corps has applied for these approvals. All approvals will be obtained prior to initiation of construction. A Federal consistency evaluation is presented in Appendix E. The dredge material placement operations described in this document are not expected to have significant changes in air quality impacts and complies with Section 176(c)(1) of the Clean Air Act amendments of 1990.

Table 18. Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements	
<b>FEDERAL STATUTES</b>	<b>COMPLIANCE STATUS</b>
Archeological - Resources Protection Act of 1979, as amended	Full
Bald and Golden Eagle Protection Act	Full
Clean Air Act, as amended	Full
Clean Water Act of 1977	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act of 1972, as amended	Partial
Endangered Species Act of 1973, as amended	Partial
Estuary Protection Act	Full
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act	Partial
Land and Water Conservation Fund Act, as amended	N/A
Marine Protection, Research and Sanctuaries Act	Full
Magnuson-Stevens Fishery Conservation and Management Act	Partial

Table 18. Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements	
<b>FEDERAL STATUTES</b>	<b>COMPLIANCE STATUS</b>
Migratory Bird Treaty Act	Full
National Historic Preservation Act of 1966, as amended	Partial
National Environmental Policy Act, as amended	Full
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	N/A
Wild and Scenic River Act	N/A
<b>Executive Orders, Memorandums, etc.</b>	
Executive Order 11988, Floodplain Management	Full
EO 11990, Protection of Wetlands	Full
EO12114, Environmental Effects of Major Federal Actions	Full
EO 12989, Environmental Justice in Minority Populations and Low-Income Populations	Full
EO 13045, Protection of Children from Environmental Health Risks and Safety Risks	Full
County Land Use Plan	Full

**Full Compliance** - Requirements of the statute, EO, or other environmental requirements are met for the current stage of review.

**Partial Compliance** - Some requirements and permits of the statute, E.O., or other policy and related regulations remain to be met and coordination is ongoing.

**Noncompliance** - None of the requirements of the statute, E.O., or other policy and related regulations have been met.

**N/A** - Statute, E.O. or other policy and related regulations are not applicable.

Pertinent public laws applicable to the Proposed Action are presented below:

#### **National Environmental Policy Act of 1970, As Amended, 42 U.S.C. 4321, et seq.**

NEPA requires that all federal agencies use a systematic, interdisciplinary approach to protect the human environment. NEPA requires the preparation of an EIS for any major federal action that could have a significant impact on quality of the human environment or the preparation of an EA for those federal actions that do not cause a significant impact but do not qualify for a categorical exclusion. Section 102 of the Act authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act. This EA was prepared as a full-disclosure document in accordance with NEPA.

#### **Clean Air Act, as amended, 42 U.S.C. 7401, et seq.**



The Clean Air Act regulates air emissions from stationary and mobile sources. The law authorizes USEPA to establish NAAQS to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Based on ambient levels of a pollutant compared with the established national standards for that pollutant, regions are designated as either being in attainment or non-attainment. New Castle County is in a nonattainment area for 8-hour ozone and SO<sub>2</sub> but is in attainment for CO, Pb, NO<sub>2</sub>, and particle pollution for all priority pollutants. The draft EA will be forwarded to the USEPA and DNREC for their review to confirm compliance with Section 309 of the Clean Air Act.

### **Clean Water Act, 33 U.S.C. 1251, et seq.**

Coordination has been completed to document that the preferred alternative is in compliance with the CWA of 1977 and subsequent amendments. A Section 401 Water Quality Certification (WQC) is required for the project due to the discharge of return water from the Delaware City DMPF sluice box to the C&D Canal waterway. The project qualifies with the conditions outlined in Nationwide Permit (NWP) 16 – Return Water From Upland Contained Disposal Areas (effective February 25, 2022, NWP Final Notice, 85 FR 73522). The State of Delaware issues a WQC for the NWP 16 provided the following conditions are met.

- The Applicant provides a pre-construction notification to DNREC Wetlands and Subaqueous Lands Section including information demonstrating that the proposed discharge of dredge or fill material will not result in a statistically significant reduction, accounting for natural variations, in biological, chemical, or habitat quality as measured or predicted using appropriate assessment protocols.
- NWP 16 is not certified for discharges of dredge or fill materials from locations with known contaminants such as brownfield sites unless those contaminants are specifically addressed in a Contaminated Materials Management Plan (CMMP) for that site. Proof of an approved CMMP must be submitted to DNREC, Wetlands and Subaqueous Lands Section.

The project will not result in a statistically significant reduction in the biological, chemical or habitat quality as the discharge of the return water will be monitored to ensure its clean and meets State and Federal standards. Additionally, the project will not include the discharge of dredge or fill materials with known contaminants. Implementation of the Preferred Alternative will not result in permanent changes in water quality and all state water quality standards will be met. Section 404(b)(1) Guidelines (40 CFR 230) analysis is not required if the activity meets the terms and conditions under the NWP 16 and the evaluation process under 40 CFR 230.7(b). The USACE will request concurrence from DNREC that the Preferred Alternative is consistent with the conditions applicable to a NWP 16 sufficient for the issuance of a WQC.

### **Coastal Zone Management Act of 1972**

The proposed project is within the coastal zone managed under DNREC's Delaware Coastal Management Program (DCMP) and Delaware Coastal Zone Act (7 Del. C. Chapter 70). A Federal consistency determination in accordance with 15 CFR 930 Subpart C has been made stating that the Preferred Alternative is consistent with the enforceable policies of Delaware's federally approved coastal management program. The USACE has requested concurrence with the determination that the Preferred Alternative is consistent with Delaware's CZMP enforceable policies along with their review of the draft EA.

### **Endangered Species Act of 1973**

The preferred alternative will be in compliance with the Endangered Species Act of 1973 (ESA) upon completion of consultation with the natural resource regulatory agencies. The Preferred Alternative is not anticipated to adversely affect the continued existence of any rare, threatened, or endangered species. The USFWS and NMFS have been provided the draft EA for review and comment.

### **Fish and Wildlife Coordination Act**

The Fish and Wildlife Coordination Act (FWCA) requires Federal agencies to consult with the USFWS, NMFS, and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted or otherwise controlled or modified" by any agency under a federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources." The intent is to give fish and wildlife conservation equal consideration with other purposes of water resources development projects. The USFWS and NMFS have been provided the draft EA for review and comment, pursuant to the FWCA in fulfillment of Section 2(b) of the FWCA (48 Stat.401, as amended, 16 U.S.C. 661 *et seq.*).

### **Magnuson-Stevens Fishery Conservation and Management Act**

The Magnuson-Stevens Fishery Conservation & Management Act (MSA) is the primary law governing marine fisheries management in U.S. federal waters. Pursuant to Section 305(b)(2) of this act, the USACE is required to prepare an Essential Fish Habitat [EFH] Assessment for the proposed maintenance dredge material placement in the Delaware City DMPF. The draft EA and an EFH Consultation Worksheet assessment (Appendix D) was submitted to NMFS for their review.

### **Migratory Bird Treaty Act, 16 U.S.C. 715-715s and Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds**

The Migratory Bird Treaty Act (MBTA) prohibits the taking or harming of any migratory bird, its eggs, nests, or young without an appropriate federal permit. Almost all native birds, including any bird listed in wildlife treaties between the United States and several other countries are covered by this Act. A "migratory bird" includes the living bird, any parts of the bird, its nest, or eggs. The take of migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreation purposes and requiring harvest to be limited to levels that prevent over-utilization.

Section 704 of the MBTA states that the Secretary of the Interior is authorized and directed to determine if, and by what means, the take of migratory birds should be allowed and to adopt suitable regulations permitting and governing take. Disturbance of the nest of a migratory bird requires a permit issued by the USFWS pursuant to Title 50 of the CFR. Bird sightings reported by eBird and information provided by DNREC indicate that the Delaware City DMPF indicates that migratory birds utilize the DMPF. A timing restriction on the placement of dredge materials is recommended between April 1 and September 1 to minimize the impacts on migratory birds in accordance with the MBTA and Executive Order 13186.

### **National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge Improvement Act of 1997(16 U.S.C. 668dd-668ee)**

The National Wildlife Refuge System Administration Act provides authority, guidelines and directives for the Service to improve the National Wildlife Refuge System; administers a national network of lands and waters for the conservation, management, and restoration of fish, wildlife and plant resources and habitat; ensures the biological integrity, diversity, and environmental health of refuges is maintained; defines compatible wildlife-dependent recreation as appropriate general public use of refuges; establishes hunting, fishing, wildlife observation and photography, and environmental education as priority uses; establish a formal process for determining compatible uses of refuges; and provide for public involvement in developing comprehensive conservation plans for refuges. The Preferred Alternative will not be located within nor in close proximity to any lands under the National Wildlife Refuge System Administration Act.

### **Section 106 of the National Historic Preservation Act of 1966, as amended**

The National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 306108), and its implementing regulations require USACE, in consultation with the DNREC State Historic Preservation Office (SHPO), to consider the effects of the undertaking on historic properties in the project area. If any historic properties listed on or eligible for inclusion in the National Register of Historic Places were to be adversely affected, USACE must develop mitigation measures in coordination with the DE SHPO, however this is not anticipated as the USACE has determined that the proposed action will have No Effect on historic properties eligible for or listed on the National Register of Historic Places pursuant to 36CFR800.4(d)(1). Nonetheless, the DNREC SHPO and tribal nations will be provided the draft EA for review and comment.

### **Resource Conservation and Recovery Act, as amended, 43 U.S. C. 6901, et seq.**

The Resource Conservation and Recovery Act (RCRA) controls the management and disposal of hazardous waste. "Hazardous and/or toxic wastes", classified by RCRA, are materials that may pose a potential hazard to human health or the environment due to quantity, concentration, chemical characteristics, or physical characteristics. This applies to discarded or spent materials that are listed in 40 CFR 261.31-.34 and/or that exhibit one of the following characteristics: ignitable, corrosive, reactive, or toxic. Radioactive wastes are materials contaminated with radioactive isotopes from

anthropogenic sources (e.g., generated by fission reactions) or naturally occurring radioactive materials (e.g., radon gas, uranium ore). There are no known hazardous materials concerns associated with the Preferred Alternative. Nonetheless, sediment testing will be conducted within the proposed DPS FNC maintenance dredge areas and testing of the existing sediments and water within the Delaware DMPF will also be performed. The preferred alternative is in compliance with the RCRA.

#### **Executive Order 11990, Protection of Wetlands**

This Executive Order directs federal agencies to avoid undertaking or assisting in new construction located in wetlands unless no practicable alternative is available. As stated in Section 4.2.1, no State or Federal jurisdictional wetlands were identified within the Delaware City DMPF. Minor and temporary impacts to State and Federally jurisdictional wetlands will occur as a result of the placement of the maintenance dredge intake pipelines within wetlands adjacent to the Branch Canal. However, no long term or permanent impacts to wetlands are proposed or anticipated. Therefore, the preferred alternative is in compliance with Executive Order 11990.

#### **Executive Order 11988, Floodplain Management**

Executive Order 11988 directs federal agencies to evaluate the potential effects of proposed actions on floodplains. Such actions should not be undertaken that directly or indirectly induce growth in the floodplain unless there is no practicable alternative. The Preferred Alternative will not place fill within areas designated as floodplains, and will not affect flooding in floodplains, and is therefore in compliance with Executive Order 11988 and would have no effect on development within floodplains.

#### **Executive Order 12898, Environmental Justice**

This Executive Order directs Federal agencies to determine whether a federal action would have a disproportionate adverse impact on minority or low-income population groups within the project area. The Preferred Alternative is not expected to result in disproportionately high or adverse human health or environmental effects on minority or low-income populations, and is therefore in compliance with Executive Order 12898.

#### **Executive Order 13045, Protection of Children from Environmental and Safety Risks**

This Executive Order requires federal agencies to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and to ensure that policies, programs, activities, and standards address these risks. No risks to children are expected from the Preferred Alternative.

## **7.0 CONCLUSIONS AND RECOMMENDATIONS**

The selected plan includes the placement of maintenance dredge materials within the Delaware City DMPF from the DPS, C&D Canal, and Branch Canal navigation channels. The maintenance dredging and subsequent placement of dredge materials will continue to allow for the safe navigation of those channels by commercial and

recreational vessels. The Delaware City DMPF was established for the purpose of dredge material disposal site and has been maintained as a DMPF since its last use in the 1970s.

As part of the selected plan, the capture and relocation of the fish species within the large open water area within the Delaware City DMPF will be performed to minimize the loss of those aquatic species. The placement of maintenance dredge materials within the Delaware City DMPF will result in the permanent loss of some recreational activities (freshwater fishing and waterfowl hunting) through the filling of the open water areas, however there are publicly available lands near the DMPF which provide access for those recreational activities.

This EA concludes that the placement of the maintenance dredge materials into the Delaware City DMPF as a disposal option is not a major Federal action significantly affecting the human environment. Therefore, it has been determined that preparation of an Environmental Impact Statement (EIS) is not warranted for the project as identified herein, and a Finding of No Significant Impact (FONSI) for the proposed project is appropriate.

## **8.0 LIST OF PREPARERS**

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## **APPENDIX A**

### **eBird Sightings – C&D Canal Wildlife Area – Canal Pond (as of September 2024)**

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Change Region

# C&D Canal Wildlife Area--Canal Pond

New Castle, Delaware, United States



HOTSPOT NAVIGATION

## Bird List

Updated ~16 seconds ago

180  
All Years

57  
This Year

0  
This Month

Last Observed		First Observed	High Count		Custom Time Period ▼	
SPECIES NAME		COUNT	DATE ▼	OBSERVER	LOCATION	
1.	<b>Canada Goose</b> <i>Branta canadensis</i>	15	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
2.	<b>King Rail</b> <i>Rallus elegans</i>	2	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
3.	<b>Virginia Rail</b> <i>Rallus limicola</i>	2	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
4.	<b>Solitary Sandpiper</b> <i>Tringa solitaria</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
5.	<b>American Bittern</b> <i>Botaurus lentiginosus</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
6.	<b>Black-crowned Night Heron</b> <i>Nycticorax nycticorax</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
7.	<b>Great Blue Heron</b> <i>Ardea herodias</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	
8.	<b>Eastern Kingbird</b> <i>Tyrannus tyrannus</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond	



9.	<b>Marsh Wren</b> <i>Cistothorus palustris</i>	3	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond
10.	<b>Swamp Sparrow</b> <i>Melospiza georgiana</i>	1	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond
11.	<b>Common Yellowthroat</b> <i>Geothlypis trichas</i>	2	1 May 2024	Andrew Markel	C&D Canal Wildlife Area-- Canal Pond
12.	<b>Mute Swan</b> <i>Cygnus olor</i> *	8	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
13.	<b>Pied-billed Grebe</b> <i>Podilymbus podiceps</i>	2	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
14.	<b>Mourning Dove</b> <i>Zenaida macroura</i>	2	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
15.	<b>Caspian Tern</b> <i>Hydroprogne caspia</i>	3	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
16.	<b>Downy Woodpecker</b> <i>Dryobates pubescens</i>	1	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
17.	<b>Blue Jay</b> <i>Cyanocitta cristata</i>	2	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
18.	<b>American Crow</b> <i>Corvus brachyrhynchos</i>	3	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
19.	<b>Tree Swallow</b> <i>Tachycineta bicolor</i>	60	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
20.	<b>Carolina Wren</b> <i>Thryothorus ludovicianus</i>	2	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
21.	<b>Eastern Bluebird</b> <i>Sialia sialis</i>	3	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
22.	<b>Yellow-rumped Warbler</b> <i>Setophaga coronata</i>	4	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
23.	<b>Northern Cardinal</b> <i>Cardinalis cardinalis</i>	4	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
24.	<b>Turkey Vulture</b> <i>Cathartes aura</i>	9	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond














25.	<b>Red-bellied Woodpecker</b> <i>Melanerpes carolinus</i>	2	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
26.	<b>Northern Flicker</b> <i>Colaptes auratus</i>	1	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
27.	<b>Tufted Titmouse</b> <i>Baeolophus bicolor</i>	2	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
28.	<b>European Starling</b> <i>Sturnus vulgaris</i>	* 12	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
29.	<b>American Robin</b> <i>Turdus migratorius</i>	4	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
30.	<b>Song Sparrow</b> <i>Melospiza melodia</i>	4	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
31.	<b>Eastern Towhee</b> <i>Pipilo erythrophthalmus</i>	1	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
32.	<b>Red-winged Blackbird</b> <i>Agelaius phoeniceus</i>	15	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
33.	<b>Common Grackle</b> <i>Quiscalus quiscula</i>	13	22 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
34.	<b>Great Egret</b> <i>Ardea alba</i>	1	19 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
35.	<b>Bald Eagle</b> <i>Haliaeetus leucocephalus</i>	1	19 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
36.	<b>Fish Crow</b> <i>Corvus ossifragus</i>	1	19 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
37.	<b>Double-crested Cormorant</b> <i>Nannopterum auritum</i>	1	18 Mar 2024	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond
38.	<b>Northern Harrier</b> <i>Circus hudsonius</i>	1	18 Mar 2024	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond
39.	<b>Wood Duck</b> <i>Aix sponsa</i>	12	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
40.	<b>Mallard</b> <i>Anas platyrhynchos</i>	2	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond















41.	<b>American Coot</b> <i>Fulica americana</i>	10	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
42.	<b>Killdeer</b> <i>Charadrius vociferus</i>	1	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
43.	<b>Carolina Chickadee</b> <i>Poecile carolinensis</i>	1	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
44.	<b>White-throated Sparrow</b> <i>Zonotrichia albicollis</i>	1	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
45.	<b>Eastern Meadowlark</b> <i>Sturnella magna</i>	1	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond
46.	<b>Ring-billed Gull</b> <i>Larus delawarensis</i>	2	16 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
47.	<b>Black Vulture</b> <i>Coragyps atratus</i>	2	16 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
48.	<b>Pileated Woodpecker</b> <i>Dryocopus pileatus</i>	2	16 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
49.	<b>Dark-eyed Junco</b> <i>Junco hyemalis</i>	4	16 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
50.	<b>Common Merganser</b> <i>Mergus merganser</i>	6	7 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond
51.	<b>Sandhill Crane</b> <i>Antigone canadensis</i>	2	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond
52.	<b>Gray Catbird</b> <i>Dumetella carolinensis</i>	1	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond
53.	<b>Northern Shoveler</b> <i>Spatula clypeata</i>	5	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond
54.	<b>Gadwall</b> <i>Mareca strepera</i>	7	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond
55.	<b>Ring-necked Duck</b> <i>Aythya collaris</i>	16	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond
56.	<b>Sharp-shinned Hawk</b> <i>Accipiter striatus</i>	1	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond







57.	<b>Belted Kingfisher</b> <i>Megaceryle alcyon</i>	1	10 Feb 2024	John Skibicki	C&D Canal Wildlife Area-- Canal Pond	
58.	<b>Northern Pintail</b> <i>Anas acuta</i>	10	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
59.	<b>Cooper's Hawk</b> <i>Accipiter cooperii</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
60.	<b>Red-shouldered Hawk</b> <i>Buteo lineatus</i>	2	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
61.	<b>Red-tailed Hawk</b> <i>Buteo jamaicensis</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
62.	<b>Ruby-crowned Kinglet</b> <i>Corthylio calendula</i>	2	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
63.	<b>Winter Wren</b> <i>Troglodytes hiemalis</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
64.	<b>Northern Mockingbird</b> <i>Mimus polyglottos</i>	3	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
65.	<b>Hermit Thrush</b> <i>Catharus guttatus</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
66.	<b>American Goldfinch</b> <i>Spinus tristis</i>	3	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
67.	<b>Field Sparrow</b> <i>Spizella pusilla</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
68.	<b>White-crowned Sparrow</b> <i>Zonotrichia leucophrys</i>	4	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
69.	<b>Savannah Sparrow</b> <i>Passerculus sandwichensis</i>	5	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
70.	<b>Palm Warbler</b> <i>Setophaga palmarum</i>	1	21 Dec 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
71.	<b>Golden-crowned Kinglet</b> <i>Regulus satrapa</i>	1	30 Nov 2023	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	
72.	<b>White-breasted Nuthatch</b> <i>Sitta carolinensis</i>	1	30 Nov 2023	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	












73.	<b>Yellow-bellied Sapsucker</b> <i>Sphyrapicus varius</i>	1	29 Nov 2023	Carolyn Holland	C&D Canal Wildlife Area--Canal Pond	 
74.	<b>Brown Creeper</b> <i>Certhia americana</i>	1	29 Nov 2023	Carolyn Holland	C&D Canal Wildlife Area--Canal Pond	
75.	<b>Brown Thrasher</b> <i>Toxostoma rufum</i>	1	29 Nov 2023	Carolyn Holland	C&D Canal Wildlife Area--Canal Pond	
76.	<b>Nashville Warbler</b> <i>Leiothlypis ruficapilla</i>	1	29 Nov 2023	Carolyn Holland	C&D Canal Wildlife Area--Canal Pond	 
77.	<b>Chimney Swift</b> <i>Chaetura pelagica</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
78.	<b>Ruby-throated Hummingbird</b> <i>Archilochus colubris</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
79.	<b>Laughing Gull</b> <i>Leucophaeus atricilla</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
80.	<b>Green Heron</b> <i>Butorides virescens</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
81.	<b>Western Cattle Egret</b> <i>Bubulcus ibis</i>	10	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
82.	<b>Osprey</b> <i>Pandion haliaetus</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
83.	<b>Hairy Woodpecker</b> <i>Dryobates villosus</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
84.	<b>Eastern Wood-Pewee</b> <i>Contopus virens</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
85.	<b>Great Crested Flycatcher</b> <i>Myiarchus crinitus</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
86.	<b>White-eyed Vireo</b> <i>Vireo griseus</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
87.	<b>Red-eyed Vireo</b> <i>Vireo olivaceus</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	



88.	<b>Barn Swallow</b> <i>Hirundo rustica</i>	10	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
89.	<b>Blue-gray Gnatcatcher</b> <i>Poliophtila caerulea</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
90.	<b>Chipping Sparrow</b> <i>Spizella passerina</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
91.	<b>Yellow-breasted Chat</b> <i>Icteria virens</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
92.	<b>Orchard Oriole</b> <i>Icterus spurius</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
93.	<b>Brown-headed Cowbird</b> <i>Molothrus ater</i>	4	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
94.	<b>Magnolia Warbler</b> <i>Setophaga magnolia</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
95.	<b>Yellow Warbler</b> <i>Setophaga petechia</i>	2	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
96.	<b>Blackpoll Warbler</b> <i>Setophaga striata</i>	1	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
97.	<b>Indigo Bunting</b> <i>Passerina cyanea</i>	4	14 May 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
98.	<b>Purple Martin</b> <i>Progne subis</i>	1	8 May 2023	Bernard Foy	C&D Canal Wildlife Area--Canal Pond	
99.	<b>Northern Parula</b> <i>Setophaga americana</i>	1	8 May 2023	Bernard Foy	C&D Canal Wildlife Area--Canal Pond	
100.	<b>Little Blue Heron</b> <i>Egretta caerulea</i>	10	18 Apr 2023	Wendy Cesario	C&D Canal Wildlife Area--Canal Pond	
101.	<b>Snowy Egret</b> <i>Egretta thula</i>	30	18 Apr 2023	Wendy Cesario	C&D Canal Wildlife Area--Canal Pond	
102.	<b>Glossy Ibis</b> <i>Plegadis falcinellus</i>	4	27 Mar 2023	Mary Braun	C&D Canal Wildlife Area--Canal Pond	
103.	<b>Eastern Phoebe</b> <i>Sayornis phoebe</i>	1	27 Mar 2023	Mary Braun	C&D Canal Wildlife Area--Canal Pond	


















104.	<b>Green-winged Teal</b> <i>Anas crecca</i>	1	20 Mar 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
105.	<b>Bufflehead</b> <i>Bucephala albeola</i>	15	18 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
106.	<b>Rusty Blackbird</b> <i>Euphagus carolinus</i>	1	18 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
107.	<b>Orange-crowned Warbler</b> <i>Leiothlypis celata</i>	1	18 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
108.	<b>American Wigeon</b> <i>Mareca americana</i>	2	5 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
109.	<b>American Black Duck</b> <i>Anas rubripes</i>	1	5 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
110.	<b>Hooded Merganser</b> <i>Lophodytes cucullatus</i>	1	5 Mar 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
111.	<b>Tundra Swan</b> <i>Cygnus columbianus</i>	1	26 Feb 2023	John Skibicki	C&D Canal Wildlife Area-- Canal Pond	
112.	<b>Common Raven</b> <i>Corvus corax</i>	1	24 Feb 2023	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	
113.	<b>Lesser Scaup</b> <i>Aythya affinis</i>	8	21 Feb 2023	Greg Darone	C&D Canal Wildlife Area-- Canal Pond	
114.	<b>Common Goldeneye</b> <i>Bucephala clangula</i>	1	21 Feb 2023	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
115.	<b>Snow Goose</b> <i>Anser caerulescens</i>	242	20 Feb 2023	Joseph Tricarico	C&D Canal Wildlife Area-- Canal Pond	
116.	<b>American Woodcock</b> <i>Scolopax minor</i>	5	20 Feb 2023	Joseph Tricarico	C&D Canal Wildlife Area-- Canal Pond	
117.	<b>Canvasback</b> <i>Aythya valisineria</i>	1	20 Feb 2023	David Brown	C&D Canal Wildlife Area-- Canal Pond	
118.	<b>House Finch</b>  <i>Haemorhous mexicanus</i>	1	19 Feb 2023	Jason Horn	C&D Canal Wildlife Area-- Canal Pond	
119.	<b>Cackling Goose</b> <i>Branta hutchinsii</i>	1	14 Feb 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	








120.	<b>Ruddy Duck</b> <i>Oxyura jamaicensis</i>	6	16 Jan 2023	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
121.	<b>Black-and-white Warbler</b> <i>Mniotilta varia</i>	1	16 Sep 2022	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	
122.	<b>American Redstart</b> <i>Setophaga ruticilla</i>	2	16 Sep 2022	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	
123.	<b>Yellow-billed Cuckoo</b> <i>Coccyzus americanus</i>	1	13 Sep 2022	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
124.	<b>Greater Yellowlegs</b> <i>Tringa melanoleuca</i>	1	21 Apr 2022	Jason Horn	C&D Canal Wildlife Area-- Canal Pond	
125.	<b>Northern Rough-winged Swallow</b> <i>Stelgidopteryx serripennis</i>	X	12 Apr 2022	Doug Batt	C&D Canal Wildlife Area-- Canal Pond	
126.	<b>Pine Warbler</b> <i>Setophaga pinus</i>	1	12 Apr 2022	Doug Batt	C&D Canal Wildlife Area-- Canal Pond	
127.	<b>Fox Sparrow</b> <i>Passerella iliaca</i>	2	5 Apr 2022	Michael Moore	C&D Canal Wildlife Area-- Canal Pond	
128.	<b>House Sparrow</b>  <i>Passer domesticus</i>	4	3 Apr 2022	Andrew Dunn	C&D Canal Wildlife Area-- Canal Pond	
129.	<b>Wilson's Snipe</b> <i>Gallinago delicata</i>	1	2 Apr 2022	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
130.	<b>Herring Gull</b> <i>Larus argentatus</i>	4	1 Apr 2022	Michael Moore	C&D Canal Wildlife Area-- Canal Pond	
131.	<b>Blue-winged Teal</b> <i>Spatula discors</i>	1	27 Feb 2022	Megan Kasprzak	C&D Canal Wildlife Area--Canal Pond	
132.	<b>Purple Finch</b> <i>Haemorhous purpureus</i>	2	9 Feb 2022	Michael Moore	C&D Canal Wildlife Area--Canal Pond	
133.	<b>Barred Owl</b> <i>Strix varia</i>	1	23 Jan 2022	Joe Francis	C&D Canal Wildlife Area-- Canal Pond	
134.	<b>Cedar Waxwing</b> <i>Bombycilla cedrorum</i>	15	5 Dec 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	



135.	<b>American Tree Sparrow</b> <i>Spizelloides arborea</i>	2	24 Nov 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
136.	<b>House Wren</b> <i>Troglodytes aedon</i>	2	28 Aug 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
137.	<b>Northern Bobwhite</b> <i>Colinus virginianus</i>	1	19 Jul 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
138.	<b>Blue Grosbeak</b> <i>Passerina caerulea</i>	1	5 Jun 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
139.	<b>Acadian Flycatcher</b> <i>Empidonax virescens</i>	1	15 May 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	
140.	<b>Prairie Warbler</b> <i>Setophaga discolor</i>	1	10 May 2021	Greg Darone	C&D Canal Wildlife Area--Canal Pond	 
141.	<b>Peregrine Falcon</b> <i>Falco peregrinus</i>	1	27 Mar 2021	Megan Kasprzak	C&D Canal Wildlife Area--Canal Pond	 
142.	<b>Greater Scaup</b> <i>Aythya marila</i>	1	13 Mar 2021	Megan Kasprzak	C&D Canal Wildlife Area--Canal Pond	
143.	<b>Redhead</b> <i>Aythya americana</i>	1	10 Mar 2021	Megan Kasprzak	C&D Canal Wildlife Area--Canal Pond	
144.	<b>Horned Grebe</b> <i>Podiceps auritus</i>	1	26 Feb 2021	Megan Kasprzak	C&D Canal Wildlife Area--Canal Pond	 
145.	<b>Wild Turkey</b> <i>Meleagris gallopavo</i>	4	12 Apr 2020	Andrew Ednie	C&D Canal Wildlife Area--Canal Pond	
146.	<b>Broad-winged Hawk</b> <i>Buteo platypterus</i>	1	12 Apr 2020	Andrew Ednie	C&D Canal Wildlife Area--Canal Pond	
147.	<b>Rock Pigeon</b> <i>Columba livia</i>	* 2	6 Apr 2020	Andrew Ednie	C&D Canal Wildlife Area--Canal Pond	
148.	<b>Merlin</b> <i>Falco columbarius</i>	1	17 Feb 2020	Andrew Ednie	C&D Canal Wildlife Area--Canal Pond	
149.	<b>Forster's Tern</b> <i>Sterna forsteri</i>	1	7 Oct 2019	LIMP Rowe	C&D Canal Wildlife Area--Canal Pond	
150.	<b>Black-throated Blue Warbler</b> <i>Setophaga caerulescens</i>	1	7 Oct 2019	LIMP Rowe	C&D Canal Wildlife Area--Canal Pond	



151.	<b>Blue-headed Vireo</b> <i>Vireo solitarius</i>	1	28 Apr 2019	Andrew Ednie	C&D Canal Wildlife Area-- Canal Pond	
152.	<b>Red-breasted Nuthatch</b> <i>Sitta canadensis</i>	1	17 Mar 2019	Michael Moore	C&D Canal Wildlife Area--Canal Pond	 
153.	<b>Eurasian Wigeon</b> <i>Mareca penelope</i>	1	10 Mar 2019	Sean O'Connor	C&D Canal Wildlife Area-- Canal Pond	
154.	<b>Red-breasted Merganser</b> <i>Mergus serrator</i>	1	10 Mar 2019	Al Guarente	C&D Canal Wildlife Area-- Canal Pond	
155.	<b>Great Black-backed Gull</b> <i>Larus marinus</i>	1	23 Dec 2018	David Brown	C&D Canal Wildlife Area-- Canal Pond	
156.	<b>Baltimore Oriole</b> <i>Icterus galbula</i>	1	24 Jun 2018	LIMP Rowe	C&D Canal Wildlife Area-- Canal Pond	
157.	<b>Red-necked Grebe</b> <i>Podiceps grisegena</i>	1	21 Apr 2018	Jason Wood	C&D Canal Wildlife Area-- Canal Pond	
158.	<b>Willow Flycatcher</b> <i>Empidonax traillii</i>	1	26 Jul 2017	Kevin Graff	C&D Canal Wildlife Area-- Canal Pond	
159.	<b>Black-capped Chickadee</b> <i>Poecile atricapillus</i>	1	29 Dec 2016	Brian Henderson	C&D Canal Wildlife Area-- Canal Pond	
160.	<b>Bobolink</b> <i>Dolichonyx oryzivorus</i>	4	29 Aug 2016	Timothy Freiday	C&D Canal Wildlife Area-- Canal Pond	
161.	<b>Cliff Swallow</b> <i>Petrochelidon pyrrhonota</i>	6	17 Jul 2016	Carlton Groff	C&D Canal Wildlife Area-- Canal Pond	
162.	<b>American Kestrel</b> <i>Falco sparverius</i>	1	30 Jan 2016	Andy McGann	C&D Canal Wildlife Area-- Canal Pond	
163.	<b>Wood Thrush</b> <i>Hylocichla mustelina</i>	1	14 Jun 2015	Jim Austin-Cole	C&D Canal Wildlife Area-- Canal Pond	
164.	<b>Veery</b> <i>Catharus fuscescens</i>	2	15 May 2015	Timothy Freiday	C&D Canal Wildlife Area-- Canal Pond	
165.	<b>Northern Waterthrush</b> <i>Parkesia noveboracensis</i>	2	15 May 2015	Timothy Freiday	C&D Canal Wildlife Area-- Canal Pond	
166.	<b>Common Gallinule</b> <i>Gallinula galeata</i>	1	3 May 2014	Bill Stewart	C&D Canal Wildlife Area-- Canal Pond	



167.	<b>Spotted Sandpiper</b> <i>Actitis macularius</i>	1	3 May 2014	Bill Stewart	C&D Canal Wildlife Area-- Canal Pond	
168.	<b>Bonaparte's Gull</b> <i>Chroicocephalus philadelphia</i>	7	3 May 2014	Bill Stewart	C&D Canal Wildlife Area-- Canal Pond	
169.	<b>Least Sandpiper</b> <i>Calidris minutilla</i>	2	11 May 2013	William Keim	C&D Canal Wildlife Area-- Canal Pond	
170.	<b>Common Loon</b> <i>Gavia immer</i>	3	11 May 2013	William Keim	C&D Canal Wildlife Area-- Canal Pond	
171.	<b>Tricolored Heron</b> <i>Egretta tricolor</i>	1	4 Sep 2011	Andrew Ednie	C&D Canal Wildlife Area-- Canal Pond	
172.	<b>Ovenbird</b> <i>Seiurus aurocapilla</i>	1	4 Sep 2011	Andrew Ednie	C&D Canal Wildlife Area-- Canal Pond	
173.	<b>Canada Warbler</b> <i>Cardellina canadensis</i>	1	4 Sep 2011	Andrew Ednie	C&D Canal Wildlife Area-- Canal Pond	
174.	<b>Least Bittern</b> <i>Ixobrychus exilis</i>	1	4 May 2009	Matthew Sarver	C&D Canal Wildlife Area-- Canal Pond	
175.	<b>Sora</b> <i>Porzana carolina</i>	1	15 May 1996	Al Guarente	C&D Canal Wildlife Area-- Canal Pond	
176.	<b>Bank Swallow</b> <i>Riparia riparia</i>	1	27 Apr 1996	Al Guarente	C&D Canal Wildlife Area-- Canal Pond	
177.	<b>Black-bellied Plover</b> <i>Pluvialis squatarola</i>	1	23 Mar 1992	Nick Pulcinella	C&D Canal Wildlife Area-- Canal Pond	
178.	<b>Wilson's Phalarope</b> <i>Phalaropus tricolor</i>	18	14 Aug 1982	August Mirabella	C&D Canal Wildlife Area-- Canal Pond	
179.	<b>Stilt Sandpiper</b> <i>Calidris himantopus</i>	25	14 Aug 1982	August Mirabella	C&D Canal Wildlife Area-- Canal Pond	
180.	<b>Purple Gallinule</b> <i>Porphyrio martinica</i>	1	22 May 1974	Andrew Ednie	C&D Canal Wildlife Area-- Canal Pond	

### ADDITIONAL TAXA (19)

	Cackling/Canada Goose <i>Branta hutchinsii/canadensis</i>	2	30 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond	
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Greater/Lesser Scaup <i>Aythya marila/affinis</i>	6	17 Mar 2024	John Finch	C&D Canal Wildlife Area-- Canal Pond	
crow sp. <i>Corvus sp. (crow sp.)</i>	4	16 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond	
Sharp-shinned/Cooper's Hawk <i>Accipiter striatus/cooperii</i>	1	7 Mar 2024	Frank Rohrbacher	C&D Canal Wildlife Area-- Canal Pond	
duck sp. <i>Anatidae (duck sp.)</i>	3	30 Nov 2023	Wendy Cesario	C&D Canal Wildlife Area-- Canal Pond	
gull sp. <i>Larinae sp.</i>	2	20 Feb 2023	Joseph Tricarico	C&D Canal Wildlife Area-- Canal Pond	
King/Clapper Rail <i>Rallus elegans/crepitans</i>	2	10 Apr 2022	Joe Francis	C&D Canal Wildlife Area-- Canal Pond	
new world sparrow sp. <i>Passerellidae sp.</i>	3	3 Mar 2022	Curt Davis	C&D Canal Wildlife Area-- Canal Pond	
Carolina/Black-capped Chickadee <i>Poecile carolinensis/atricapillus</i>	2	27 Feb 2022	Michael Moore	C&D Canal Wildlife Area-- Canal Pond	
Buteo sp. <i>Buteo sp.</i>	1	27 Dec 2021	Megan Kasprzak	C&D Canal Wildlife Area-- Canal Pond	
woodpecker sp. <i>Picidae sp.</i>	1	23 Dec 2021	Curt Davis	C&D Canal Wildlife Area-- Canal Pond	
new world warbler sp. <i>Parulidae sp.</i>	10	29 Oct 2016	Gerri Hayward	C&D Canal Wildlife Area-- Canal Pond	
Alder/Willow Flycatcher (Traill's Flycatcher) <i>Empidonax alnorum/traillii</i>	2	16 Aug 2014	William Almeida	C&D Canal Wildlife Area-- Canal Pond	
white egret sp. <i>Egretta/Bubulcus/Ardea sp.</i>	1	21 Jun 2014	Brian Henderson	C&D Canal Wildlife Area-- Canal Pond	
passerine sp. <i>Passeriformes sp.</i>	1	14 Feb 2014	Charles clopper	C&D Canal Wildlife Area-- Canal Pond	
Mallard/American Black Duck <i>Anas platyrhynchos/rubripes</i>	1	29 Dec 2013	Brian Henderson	C&D Canal Wildlife Area-- Canal Pond	





blackbird sp. <i>Icteridae</i> sp.	X	1 Dec 2013	Brian Henderson	C&D Canal Wildlife Area--Canal Pond
Accipiter sp. <i>Accipiter</i> sp.	1	15 Dec 2012	Tim Schreckengost	C&D Canal Wildlife Area--Canal Pond
diurnal raptor sp. <i>Accipitriformes/Falconiformes</i> sp.	1	15 Dec 2012	Tim Schreckengost	C&D Canal Wildlife Area--Canal Pond

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# **APPENDIX B**

## **Air Emissions Estimate**

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## Appendix B-3

# **APPENDIX C**

## **Sediment Testing**

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# Acute Toxicity Units (for Freshwater)

Sample ID	Cadmium T.U. <sub>a</sub>	Copper T.U. <sub>a</sub>	Lead T.U. <sub>a</sub>	Nickel T.U. <sub>a</sub>	Silver T.U. <sub>a</sub>	Zinc T.U. <sub>a</sub>	Σ T.U. <sub>a</sub>
DRV-10-94S	1.0806	0.2032	0.0153	0.0081	0.1095	0.0607	1.4472
DRV-10-94B	0.8181	0.0428	0.0053	0.0064	0.0986	0.0154	0.9866
DRV-11-94S	0.7665	0.1103	0.0085	0.0065	0.0924	0.0345	1.0188
DRV-11-94B	0.7352	0.0408	0.0048	0.0062	0.0862	0.0141	0.8873
DRV-12-94S	0.2219	0.0172	0.0012	0.0015	0.0215	0.0037	0.2670
DRV-12-94B	0.2082	0.0216	0.0014	0.0019	0.0205	0.0043	0.2578
Ph_Sea 6	0.2443	0.1723	0.0090	0.0085	0.0366	0.0495	0.5202
Ph_Sea 7	0.1963	0.1452	0.0072	0.0072	0.0122	0.0415	0.4097
Ph_Sea 8	0.2017	0.1443	0.0071	0.0069	0.0398	0.0432	0.4431
Ph_Sea 9	0.3541	0.2050	0.0117	0.0088	0.0538	0.0569	0.6903
Ph_Sea 10	0.2600	0.1923	0.0098	0.0083	0.0123	0.0518	0.5346
Ph_Sea 11	0.1686	0.1164	0.0058	0.0063	0.0112	0.0356	0.3438
Ph_Sea 12	0.1816	0.1382	0.0067	0.0072	0.0127	0.0396	0.3860
Ph_Sea 13	0.1694	0.1217	0.0060	0.0065	0.0117	0.0366	0.3519
Ph_Sea 14	0.1742	0.1143	0.0056	0.0060	0.0116	0.0345	0.3461
Ph_Sea 15	0.1764	0.1300	0.0065	0.0066	0.0118	0.0375	0.3688
DRV-24	0.4886	0.4125	0.0241	0.0083	0.1343	0.1191	1.1871
DRV-25	0.2264	0.1587	0.0081	0.0080	0.0346	0.0430	0.4787
DRV-26	0.0744	0.0497	0.0018	0.0062	0.0126	0.0135	0.1582
DRV-27	0.0108	0.0182	0.0005	0.0015	0.0165	0.0041	0.0516
DRV-28	0.0264	0.0097	0.0005	0.0013	0.0081	0.0044	0.0503
DRV-29	0.0174	0.0999	0.0052	0.0064	0.0273	0.0315	0.1877
DRV-30	0.0143	0.0654	0.0057	0.0036	0.0485	0.0233	0.1609
DE08-0560	0.0448	0.0331	0.0033	0.0018	0.0039	0.0155	0.1024
DE08-0561	0.0448	0.0379	0.0039	0.0026	0.0039	0.0209	0.1140
DE08-0562	0.0897	0.0711	0.0040	0.0033	0.0078	0.0252	0.2010
DE08-0563	0.1345	0.1265	0.0077	0.0066	0.0233	0.0408	0.3394
DE08-0564	0.1121	0.0624	0.0037	0.0032	0.0155	0.0214	0.2182
DE08-0565	0.0897	0.0580	0.0022	0.0028	0.0078	0.0185	0.1790
DE08-0566	0.2690	0.1788	0.0102	0.0063	0.0233	0.0931	0.5806
DE08-0567	0.1345	0.0994	0.0042	0.0047	0.0233	0.0296	0.2958
DE08-0568	0.0897	0.0720	0.0031	0.0036	0.0155	0.0150	0.1988
DE08-0569	0.2017	0.1352	0.0061	0.0060	0.0311	0.0413	0.4213
DE08-0571	0.1121	0.0689	0.0026	0.0035	0.0155	0.0212	0.2238
DE08-0572	0.1793	0.2128	0.0125	0.0067	0.0233	0.0525	0.4871
DE08-0573	0.0897	0.0741	0.0039	0.0035	0.0155	0.0231	0.2098
DE08-0574	0.1121	0.1967	0.0116	0.0069	0.0155	0.0326	0.3754
DE08-0575	0.0897	0.0641	0.0034	0.0029	0.0155	0.0208	0.1964
C&D Canal East Entrance (CD-1)	0.0605	0.0523	0.0036	0.0030	0.0132	0.0188	0.1514
SR1	0.0560	0.0567	0.0029	0.0037	0.0093	0.0169	0.1456
SR2	0.0717	0.0741	0.0041	0.0044	0.0101	0.0233	0.1878
SR3	0.0628	0.0741	0.0039	0.0040	0.0109	0.0212	0.1768
SR4	0.0090	0.0118	0.0008	0.0010	0.0007	0.0049	0.0280
SR5	0.0188	0.0218	0.0016	0.0019	0.0036	0.0095	0.0572
SR6	0.0182	0.0174	0.0016	0.0025	0.0020	0.0104	0.0521
N							45.0000
Mean							0.3668
Stand. Error							0.0470
Median							0.2670

Values in red are non-detects and entered as 1/2 the value of the MDL

Sample ID	% of T.U. <sub>a</sub> from Cd	% of T.U. <sub>a</sub> from Cu	% of T.U. <sub>a</sub> from Pb	% of T.U. <sub>a</sub> from Ni	% of T.U. <sub>a</sub> from Ag	% of T.U. <sub>a</sub> from Zn
DRV-10-94S	73.13	13.76	1.04	0.55	7.41	4.11
DRV-10-94B	82.92	4.34	0.54	0.65	10.00	1.56
DRV-11-94S	75.24	10.83	0.84	0.64	9.07	3.39
DRV-11-94B	82.86	4.60	0.54	0.70	9.72	1.59
DRV-12-94S	83.10	6.43	0.44	0.57	8.06	1.40
DRV-12-94B	80.76	8.37	0.54	0.74	7.94	1.66
Ph_Sea 6	46.97	33.12	1.73	1.63	7.03	9.52
Ph_Sea 7	47.92	35.44	1.76	1.77	2.99	10.12
Ph_Sea 8	45.53	32.58	1.60	1.56	8.99	9.74
Ph_Sea 9	51.30	29.69	1.69	1.27	7.80	8.25
Ph_Sea 10	48.64	35.98	1.84	1.55	2.30	9.70
Ph_Sea 11	48.03	33.87	1.68	1.83	3.25	10.34
Ph_Sea 12	47.03	35.81	1.75	1.88	3.29	10.25
Ph_Sea 13	48.15	34.57	1.72	1.83	3.32	10.40
Ph_Sea 14	50.32	33.02	1.63	1.72	3.34	9.97
Ph_Sea 15	47.83	35.24	1.76	1.80	3.21	10.16
DRV-24	41.16	34.75	2.03	0.70	11.32	10.04
DRV-25	47.29	33.16	1.69	1.66	7.22	8.98
DRV-26	47.04	31.43	1.12	3.92	7.98	8.51
DRV-27	20.90	35.25	0.95	2.83	32.07	8.00
DRV-28	52.55	19.23	0.96	2.55	16.05	8.66
DRV-29	9.26	53.21	2.77	3.40	14.56	16.80
DRV-30	8.91	40.65	3.56	2.26	30.16	14.46
DE08-0560	43.77	32.36	3.23	1.74	3.79	15.12
DE08-0561	39.32	33.28	3.43	2.28	3.41	18.30
DE08-0562	44.61	35.37	2.01	1.62	3.86	12.53
DE08-0563	39.62	37.26	2.28	1.94	6.86	12.03
DE08-0564	51.36	28.58	1.68	1.46	7.12	9.80
DE08-0565	50.09	32.40	1.25	1.59	4.34	10.33
DE08-0566	46.32	30.79	1.76	1.08	4.01	16.04
DE08-0567	45.47	33.62	1.43	1.59	7.88	10.02
DE08-0568	45.09	36.19	1.55	1.80	7.81	7.56
DE08-0569	47.88	32.09	1.44	1.41	7.37	9.80
DE08-0571	50.08	30.79	1.18	1.56	6.94	9.46
DE08-0572	36.81	43.69	2.57	1.38	4.78	10.77
DE08-0573	42.73	35.33	1.85	1.68	7.40	10.99
DE08-0574	29.86	52.40	3.08	1.85	4.14	8.68
DE08-0575	45.66	32.65	1.76	1.46	7.91	10.57
C&D Canal East Entrance (CD-1)	39.96	34.56	2.36	1.96	8.72	12.44
SR1	38.48	38.93	2.01	2.55	6.40	11.63
SR2	38.20	39.49	2.17	2.37	5.38	12.40
SR3	35.50	41.93	2.21	2.24	6.15	11.97
SR4	31.98	42.00	2.73	3.44	2.49	17.36
SR5	32.91	38.11	2.84	3.24	6.24	16.65
SR6	34.86	33.49	3.12	4.75	3.88	19.91



# Chronic Toxicity Units and IWBUs (for Freshwater)

Sample ID	Cadmium T.U. <sub>c</sub>	Copper T.U. <sub>c</sub>	Lead T.U. <sub>c</sub>	Nickel T.U. <sub>c</sub>	Silver T.U. <sub>c</sub>	Zinc T.U. <sub>c</sub>	IWBU all	Sample ID	% of IWBU from Cd	% of IWBU from Cu	% of IWBU from Pb	% of IWBU from Ni	% of IWBU from Ag	% of IWBU from Zn
DRV-10-94S	8.8437	0.3049	0.3938	0.0726	0.0000	0.0602	9.69	DRV-10-94S	91.41	3.15	4.07	0.75	0.00	0.62
DRV-10-94B	6.6970	0.0642	0.1368	0.0574	0.0000	0.0153	8.97	DRV-10-94B	96.08	0.92	1.96	0.82	0.00	0.22
DRV-11-94S	6.2750	0.1656	0.2188	0.0585	0.0000	0.0342	8.75	DRV-11-94S	92.93	2.45	3.24	0.87	0.00	0.51
DRV-11-94B	6.0181	0.0612	0.1219	0.0561	0.0000	0.0140	8.27	DRV-11-94B	95.96	0.98	1.94	0.89	0.00	0.22
DRV-12-94S	1.8164	0.0258	0.0304	0.0136	0.0000	0.0037	1.89	DRV-12-94S	96.11	1.36	1.61	0.72	0.00	0.20
DRV-12-94B	1.7045	0.0324	0.0354	0.0171	0.0000	0.0042	1.79	DRV-12-94B	95.03	1.81	1.97	0.95	0.00	0.24
Ph_Sea 6	1.9999	0.2585	0.2309	0.0766	0.0000	0.0491	2.62	Ph_Sea 6	76.48	9.88	8.83	2.93	0.00	1.88
Ph_Sea 7	1.6073	0.2179	0.1854	0.0652	0.0000	0.0411	2.12	Ph_Sea 7	75.92	10.29	8.76	3.08	0.00	1.94
Ph_Sea 8	1.6513	0.2166	0.1825	0.0621	0.0000	0.0428	2.16	Ph_Sea 8	76.62	10.05	8.47	2.88	0.00	1.99
Ph_Sea 9	2.8990	0.3076	0.2994	0.0792	0.0000	0.0565	3.69	Ph_Sea 9	79.61	8.45	8.22	2.18	0.00	1.55
Ph_Sea 10	2.1283	0.2886	0.2522	0.0748	0.0000	0.0514	2.80	Ph_Sea 10	76.14	10.32	9.02	2.68	0.00	1.84
Ph_Sea 11	1.3798	0.1747	0.1483	0.0565	0.0000	0.0353	1.79	Ph_Sea 11	76.89	9.74	8.26	3.15	0.00	1.97
Ph_Sea 12	1.4862	0.2074	0.1729	0.0652	0.0000	0.0393	1.97	Ph_Sea 12	75.40	10.52	8.77	3.31	0.00	1.99
Ph_Sea 13	1.3871	0.1826	0.1549	0.0581	0.0000	0.0363	1.85	Ph_Sea 13	76.26	10.04	8.52	3.19	0.00	2.00
Ph_Sea 14	1.4256	0.1715	0.1445	0.0536	0.0000	0.0342	1.83	Ph_Sea 14	77.93	9.37	7.90	2.93	0.00	1.87
Ph_Sea 15	1.4440	0.1950	0.1670	0.0599	0.0000	0.0372	1.90	Ph_Sea 15	75.88	10.25	8.78	3.15	0.00	1.95
DRV-24	3.9998	0.6191	0.6181	0.0750	0.0000	0.1182	5.43	DRV-24	73.66	11.40	11.38	1.38	0.00	2.18
DRV-25	1.8531	0.2382	0.2071	0.0717	0.0000	0.0426	2.41	DRV-25	76.81	9.87	8.58	2.97	0.00	1.77
DRV-26	0.6091	0.0746	0.0455	0.0559	0.0000	0.0134	0.80	DRV-26	76.29	9.34	5.70	7.00	0.00	1.67
DRV-27	0.0883	0.0273	0.0126	0.0131	0.0000	0.0041	0.15	DRV-27	60.71	18.77	8.68	9.03	0.00	2.82
DRV-28	0.2165	0.0145	0.0124	0.0116	0.0000	0.0043	0.26	DRV-28	83.50	5.60	4.77	4.46	0.00	1.67
DRV-29	0.1422	0.1499	0.1336	0.0574	0.0000	0.0313	0.51	DRV-29	27.64	29.13	25.98	11.16	0.00	6.08
DRV-30	0.1174	0.0982	0.1470	0.0327	0.0000	0.0231	0.42	DRV-30	28.07	23.46	35.13	7.82	0.00	5.52
DE08-0560	0.3670	0.0497	0.0848	0.0160	0.0000	0.0154	0.53	DE08-0560	68.87	9.33	15.91	3.01	0.00	2.88
DE08-0561	0.3670	0.0569	0.1002	0.0234	0.0000	0.0207	0.57	DE08-0561	64.58	10.02	17.64	4.11	0.00	3.64
DE08-0562	0.7339	0.1067	0.1036	0.0294	0.0000	0.0250	1.00	DE08-0562	73.50	10.68	10.37	2.94	0.00	2.50
DE08-0563	1.1009	0.1898	0.1984	0.0594	0.0000	0.0405	1.59	DE08-0563	69.28	11.94	12.48	3.74	0.00	2.55
DE08-0564	0.9174	0.0936	0.0940	0.0287	0.0000	0.0212	1.15	DE08-0564	79.44	8.10	8.14	2.49	0.00	1.84
DE08-0565	0.7339	0.0870	0.0576	0.0256	0.0000	0.0183	0.92	DE08-0565	79.56	9.43	6.25	2.77	0.00	1.99
DE08-0566	2.2017	0.2683	0.2618	0.0563	0.0000	0.0924	2.89	DE08-0566	76.43	9.31	9.09	1.95	0.00	3.21
DE08-0567	1.1009	0.1492	0.1086	0.0423	0.0000	0.0294	1.43	DE08-0567	76.97	10.43	7.59	2.96	0.00	2.05
DE08-0568	0.7339	0.1080	0.0793	0.0323	0.0000	0.0149	0.97	DE08-0568	75.79	11.15	8.19	3.33	0.00	1.54
DE08-0569	1.6513	0.2029	0.1558	0.0536	0.0000	0.0409	2.10	DE08-0569	78.47	9.64	7.40	2.55	0.00	1.94
DE08-0571	0.9174	0.1034	0.0677	0.0314	0.0000	0.0210	1.18	DE08-0571	80.42	9.06	5.93	2.75	0.00	1.84
DE08-0572	1.4678	0.3193	0.3216	0.0603	0.0000	0.0521	2.22	DE08-0572	66.09	14.38	14.48	2.72	0.00	2.34
DE08-0573	0.7339	0.1112	0.0998	0.0318	0.0000	0.0229	1.00	DE08-0573	73.42	11.13	9.98	3.18	0.00	2.29
DE08-0574	0.9174	0.2951	0.2965	0.0625	0.0000	0.0323	1.60	DE08-0574	57.20	18.40	18.49	3.90	0.00	2.02
DE08-0575	0.7339	0.0962	0.0885	0.0258	0.0000	0.0206	0.97	DE08-0575	76.05	9.97	9.17	2.68	0.00	2.13
C&D Canal East Entrance (CD-1)	0.4954	0.0785	0.0919	0.0267	0.0000	0.0187	0.71	C&D Canal East Entrance (CD-1)	69.66	11.04	12.92	3.76	0.00	2.63
SR1	0.4587	0.0851	0.0752	0.0334	0.0000	0.0168	0.67	SR1	68.55	12.71	11.23	4.99	0.00	2.51
SR2	0.5871	0.1112	0.1044	0.0401	0.0000	0.0231	0.87	SR2	67.80	12.85	12.06	4.63	0.00	2.67
SR3	0.5137	0.1112	0.1002	0.0356	0.0000	0.0210	0.78	SR3	65.71	14.23	12.82	4.55	0.00	2.68
SR4	0.0734	0.0177	0.0196	0.0087	0.0000	0.0048	0.12	SR4	59.09	14.23	15.80	6.99	0.00	3.89
SR5	0.1541	0.0327	0.0418	0.0167	0.0000	0.0094	0.25	SR5	60.50	12.84	16.39	6.55	0.00	3.71
SR6	0.1486	0.0262	0.0418	0.0223	0.0000	0.0103	0.25	SR6	59.66	10.51	16.76	8.93	0.00	4.13
N							45							
Mean							1.99							
Std. Error							0.3025							
Median							1.59							

Values in red are non-detects and entered as 1/2 the value of the MDL



# Acute Toxicity Units (Marine)

Sample ID	Cadmium T.U. <sub>a</sub>	Copper T.U. <sub>a</sub>	Lead T.U. <sub>a</sub>	Nickel T.U. <sub>a</sub>	Silver T.U. <sub>a</sub>	Zinc T.U. <sub>a</sub>	Σ T.U. <sub>a</sub>
DRV-10-94S	0.0544	0.5690	0.0047	0.0510	0.1854	0.0791	0.9435
DRV-10-94B	0.0412	0.1198	0.0016	0.0404	0.1670	0.0201	0.3900
DRV-11-94S	0.0386	0.3089	0.0026	0.0411	0.1565	0.0449	0.5926
DRV-11-94B	0.0370	0.1142	0.0015	0.0394	0.1459	0.0184	0.3564
DRV-12-94S	0.0112	0.0481	0.0004	0.0096	0.0364	0.0049	0.1105
DRV-12-94B	0.0105	0.0604	0.0004	0.0120	0.0346	0.0056	0.1236
Ph_Sea 6	0.0123	0.4823	0.0028	0.0538	0.0619	0.0645	0.6776
Ph_Sea 7	0.0099	0.4066	0.0022	0.0458	0.0207	0.0540	0.5392
Ph_Sea 8	0.0102	0.4041	0.0022	0.0436	0.0674	0.0562	0.5838
Ph_Sea 9	0.0178	0.5739	0.0036	0.0557	0.0911	0.0741	0.8162
Ph_Sea 10	0.0131	0.5384	0.0030	0.0526	0.0208	0.0675	0.6954
Ph_Sea 11	0.0085	0.3260	0.0018	0.0397	0.0189	0.0463	0.4412
Ph_Sea 12	0.0091	0.3870	0.0021	0.0458	0.0215	0.0515	0.5171
Ph_Sea 13	0.0085	0.3406	0.0019	0.0408	0.0198	0.0477	0.4593
Ph_Sea 14	0.0088	0.3199	0.0017	0.0377	0.0186	0.0449	0.4326
Ph_Sea 15	0.0089	0.3638	0.0020	0.0421	0.0201	0.0488	0.4856
DRV-24	0.0246	1.1550	0.0074	0.0527	0.2275	0.1551	1.6723
DRV-25	0.0114	0.4444	0.0025	0.0504	0.0585	0.0559	0.6231
DRV-26	0.0037	0.1392	0.0005	0.0393	0.0214	0.0175	0.2216
DRV-27	0.0005	0.0509	0.0002	0.0092	0.0280	0.0054	0.0942
DRV-28	0.0013	0.0271	0.0001	0.0081	0.0137	0.0057	0.0561
DRV-29	0.0009	0.2796	0.0016	0.0404	0.0463	0.0411	0.4098
DRV-30	0.0007	0.1831	0.0018	0.0230	0.0822	0.0303	0.3211
DE08-0560	0.0023	0.0928	0.0010	0.0113	0.0066	0.0202	0.1341
DE08-0561	0.0023	0.1062	0.0012	0.0164	0.0066	0.0272	0.1598
DE08-0562	0.0045	0.1990	0.0012	0.0206	0.0131	0.0328	0.2714
DE08-0563	0.0068	0.3541	0.0024	0.0418	0.0394	0.0532	0.4976
DE08-0564	0.0056	0.1746	0.0011	0.0202	0.0263	0.0278	0.2557
DE08-0565	0.0045	0.1624	0.0007	0.0180	0.0131	0.0241	0.2228
DE08-0566	0.0135	0.5006	0.0031	0.0396	0.0394	0.1212	0.7175
DE08-0567	0.0068	0.2784	0.0013	0.0297	0.0394	0.0386	0.3942
DE08-0568	0.0045	0.2015	0.0010	0.0227	0.0263	0.0196	0.2755
DE08-0569	0.0102	0.3785	0.0019	0.0377	0.0526	0.0537	0.5345
DE08-0571	0.0056	0.1929	0.0008	0.0221	0.0263	0.0276	0.2753
DE08-0572	0.0090	0.5958	0.0039	0.0424	0.0394	0.0683	0.7589
DE08-0573	0.0045	0.2076	0.0012	0.0224	0.0263	0.0300	0.2920
DE08-0574	0.0056	0.5507	0.0036	0.0440	0.0263	0.0424	0.6725
DE08-0575	0.0045	0.1795	0.0011	0.0181	0.0263	0.0270	0.2565
C&D Canal East Entrance (CD-1)	0.0030	0.1465	0.0011	0.0188	0.0224	0.0245	0.2163
SR1	0.0028	0.1587	0.0009	0.0235	0.0158	0.0220	0.2237
SR2	0.0036	0.2076	0.0013	0.0282	0.0171	0.0303	0.2880
SR3	0.0032	0.2076	0.0012	0.0250	0.0184	0.0276	0.2829
SR4	0.0005	0.0330	0.0002	0.0061	0.0012	0.0063	0.0473
SR5	0.0009	0.0610	0.0005	0.0117	0.0060	0.0124	0.0927
SR6	0.0009	0.0488	0.0005	0.0156	0.0034	0.0135	0.0828
N							45
Mean							0.4103
Stand. Error							0.0433
Median							0.3564

Values in red are non-detects and entered as 1/2 the value of the MDL

Sample ID	% of T.U. <sub>a</sub> from Cd	% of T.U. <sub>a</sub> from Cu	% of T.U. <sub>a</sub> from Pb	% of T.U. <sub>a</sub> from Ni	% of T.U. <sub>a</sub> from Ag	% of T.U. <sub>a</sub> from Zn
DRV-10-94S	5.76	60.30	0.50	5.40	19.65	8.38
DRV-10-94B	10.56	30.71	0.42	10.35	42.81	5.15
DRV-11-94S	6.51	52.12	0.44	6.94	26.40	7.58
DRV-11-94B	10.38	32.03	0.41	11.06	40.95	5.16
DRV-12-94S	10.11	43.54	0.33	8.65	32.96	4.41
DRV-12-94B	8.48	48.91	0.34	9.72	28.04	4.50
Ph_Sea 6	1.82	71.18	0.41	7.94	9.14	9.52
Ph_Sea 7	1.83	75.40	0.41	8.50	3.84	10.02
Ph_Sea 8	1.74	69.23	0.37	7.48	11.55	9.63
Ph_Sea 9	2.18	70.31	0.44	6.82	11.16	9.08
Ph_Sea 10	1.88	77.43	0.43	7.56	2.99	9.71
Ph_Sea 11	1.92	73.89	0.40	9.00	4.29	10.49
Ph_Sea 12	1.77	74.85	0.40	8.86	4.16	9.96
Ph_Sea 13	1.86	74.16	0.40	8.89	4.31	10.38
Ph_Sea 14	2.03	73.95	0.40	8.71	4.53	10.38
Ph_Sea 15	1.83	74.92	0.41	8.66	4.13	10.04
DRV-24	1.52	71.20	0.46	3.25	14.02	9.56
DRV-25	1.83	71.32	0.40	8.08	9.39	8.98
DRV-26	1.69	62.80	0.25	17.71	9.64	7.91
DRV-27	0.58	54.04	0.16	9.79	29.72	5.70
DRV-28	2.37	48.34	0.26	14.51	24.39	10.12
DRV-29	0.21	68.23	0.39	9.85	11.29	10.02
DRV-30	0.22	57.04	0.55	7.16	25.59	9.44
DE08-0560	1.68	69.21	0.76	8.40	4.90	15.04
DE08-0561	1.41	66.45	0.75	10.27	4.11	17.00
DE08-0562	1.66	73.34	0.46	7.61	4.85	12.08
DE08-0563	1.36	71.16	0.48	8.39	7.93	10.69
DE08-0564	2.21	68.29	0.44	7.89	10.29	10.89
DE08-0565	2.03	72.88	0.31	8.07	5.90	10.81
DE08-0566	1.89	69.77	0.44	5.51	5.50	16.90
DE08-0567	1.72	70.62	0.33	7.54	10.01	9.79
DE08-0568	1.64	73.14	0.35	8.23	9.55	7.10
DE08-0569	1.90	70.81	0.35	7.05	9.84	10.05
DE08-0571	2.05	70.08	0.29	8.01	9.55	10.01
DE08-0572	1.19	78.52	0.51	5.59	5.20	9.00
DE08-0573	1.55	71.09	0.41	7.66	9.01	10.29
DE08-0574	0.84	81.88	0.53	6.54	3.91	6.31
DE08-0575	1.76	69.97	0.41	7.07	10.25	10.54
C&D Canal East Entrance (CD-1)	1.41	67.74	0.51	8.68	10.33	11.34
SR1	1.26	70.95	0.40	10.49	7.05	9.85
SR2	1.25	72.08	0.43	9.78	5.94	10.52
SR3	1.12	73.37	0.42	8.85	6.51	9.74
SR4	0.95	69.74	0.50	12.90	2.50	13.41
SR5	1.02	65.87	0.54	12.66	6.53	13.38
SR6	1.10	58.97	0.60	18.89	4.13	16.30



# Chronic Toxicity Units and IWBUs (Marine)

Sample ID	Cadmium T.U. <sub>c</sub>	Copper T.U. <sub>c</sub>	Lead T.U. <sub>c</sub>	Nickel T.U. <sub>c</sub>	Silver T.U. <sub>c</sub>	Zinc T.U. <sub>c</sub>	IWBU all	Sample ID	% of IWBU from Cd	% of IWBU from Cu	% of IWBU from Pb	% of IWBU from Ni	% of IWBU from Ag	% of IWBU from Zn
DRV-10-94S	0.2472	0.8810	0.1224	0.4601	0.0000	0.0879	1.00	DRV-10-94S	13.75	48.98	6.80	25.58	0.00	4.89
DRV-10-94B	0.1872	0.1855	0.0424	0.3642	0.0000	0.0223	0.80	DRV-10-94B	23.35	23.14	5.29	45.43	0.00	2.78
DRV-11-94S	0.1754	0.4783	0.0680	0.3712	0.0000	0.0499	1.14	DRV-11-94S	15.35	41.85	5.95	32.48	0.00	4.37
DRV-11-94B	0.1682	0.1768	0.0379	0.3557	0.0000	0.0205	0.76	DRV-11-94B	22.16	23.29	4.99	46.86	0.00	2.69
DRV-12-94S	0.0508	0.0745	0.0094	0.0862	0.0000	0.0054	0.23	DRV-12-94S	22.43	32.90	4.17	38.10	0.00	2.39
DRV-12-94B	0.0476	0.0936	0.0110	0.1084	0.0000	0.0062	0.27	DRV-12-94B	17.86	35.07	4.12	40.63	0.00	2.32
Ph_Sea 6	0.0559	0.7468	0.0718	0.4855	0.0000	0.0716	1.43	Ph_Sea 6	3.91	52.16	5.01	33.92	0.00	5.00
Ph_Sea 7	0.0449	0.6295	0.0576	0.4136	0.0000	0.0600	1.21	Ph_Sea 7	3.73	52.22	4.78	34.30	0.00	4.98
Ph_Sea 8	0.0462	0.6258	0.0567	0.3938	0.0000	0.0625	1.18	Ph_Sea 8	3.90	52.81	4.79	33.24	0.00	5.27
Ph_Sea 9	0.0810	0.8885	0.0930	0.5025	0.0000	0.0824	1.65	Ph_Sea 9	4.92	53.93	5.65	30.50	0.00	5.00
Ph_Sea 10	0.0595	0.8337	0.0784	0.4743	0.0000	0.0750	1.62	Ph_Sea 10	3.91	54.82	5.15	31.18	0.00	4.93
Ph_Sea 11	0.0386	0.5048	0.0461	0.3585	0.0000	0.0514	1.00	Ph_Sea 11	3.86	50.51	4.61	35.87	0.00	5.15
Ph_Sea 12	0.0415	0.5993	0.0537	0.4136	0.0000	0.0573	1.17	Ph_Sea 12	3.56	51.43	4.61	35.49	0.00	4.91
Ph_Sea 13	0.0388	0.5275	0.0481	0.3684	0.0000	0.0530	1.04	Ph_Sea 13	3.74	50.93	4.65	35.57	0.00	5.11
Ph_Sea 14	0.0399	0.4953	0.0449	0.3402	0.0000	0.0499	0.97	Ph_Sea 14	4.11	51.06	4.63	35.06	0.00	5.14
Ph_Sea 15	0.0404	0.5634	0.0519	0.3797	0.0000	0.0542	1.08	Ph_Sea 15	3.70	51.71	4.76	34.85	0.00	4.97
DRV-24	0.1118	1.7884	0.1920	0.4757	0.0000	0.1724	2.74	DRV-24	4.08	65.26	7.01	17.36	0.00	6.29
DRV-25	0.0518	0.6892	0.0644	0.4545	0.0000	0.0621	1.32	DRV-25	3.92	52.09	4.87	34.41	0.00	4.70
DRV-26	0.0170	0.2155	0.0141	0.3543	0.0000	0.0195	0.62	DRV-26	2.74	34.74	2.28	57.10	0.00	3.14
DRV-27	0.0025	0.0788	0.0039	0.0833	0.0000	0.0060	0.17	DRV-27	1.41	45.19	2.25	47.73	0.00	3.42
DRV-28	0.0061	0.0420	0.0038	0.0734	0.0000	0.0063	0.13	DRV-28	4.60	31.90	2.92	55.79	0.00	4.79
DRV-29	0.0040	0.4329	0.0415	0.3642	0.0000	0.0456	0.89	DRV-29	0.45	48.74	4.67	41.00	0.00	5.14
DRV-30	0.0033	0.2836	0.0457	0.2075	0.0000	0.0337	0.57	DRV-30	0.57	49.43	7.96	36.17	0.00	5.87
DE08-0560	0.0103	0.1437	0.0263	0.1016	0.0000	0.0224	0.30	DE08-0560	3.37	47.21	8.66	33.40	0.00	7.36
DE08-0561	0.0103	0.1645	0.0311	0.1482	0.0000	0.0302	0.38	DE08-0561	2.67	42.80	8.10	38.57	0.00	7.86
DE08-0562	0.0205	0.3082	0.0322	0.1863	0.0000	0.0364	0.58	DE08-0562	3.52	52.80	5.51	31.93	0.00	6.24
DE08-0563	0.0308	0.5483	0.0616	0.3769	0.0000	0.0591	1.08	DE08-0563	2.86	50.92	5.72	35.00	0.00	5.49
DE08-0564	0.0256	0.2703	0.0292	0.1821	0.0000	0.0309	0.54	DE08-0564	4.77	50.23	5.42	33.83	0.00	5.75
DE08-0565	0.0205	0.2514	0.0179	0.1623	0.0000	0.0268	0.48	DE08-0565	4.28	52.50	3.74	33.89	0.00	5.59
DE08-0566	0.0615	0.7751	0.0814	0.3571	0.0000	0.1347	1.41	DE08-0566	4.37	54.98	5.77	25.33	0.00	9.55
DE08-0567	0.0308	0.4310	0.0337	0.2682	0.0000	0.0429	0.81	DE08-0567	3.82	53.44	4.18	33.25	0.00	5.31
DE08-0568	0.0205	0.3119	0.0247	0.2047	0.0000	0.0217	0.58	DE08-0568	3.52	53.46	4.22	35.07	0.00	3.73
DE08-0569	0.0462	0.5861	0.0484	0.3402	0.0000	0.0597	1.08	DE08-0569	4.27	54.24	4.48	31.48	0.00	5.53
DE08-0571	0.0256	0.2987	0.0210	0.1990	0.0000	0.0306	0.58	DE08-0571	4.46	51.95	3.66	34.61	0.00	5.32
DE08-0572	0.0410	0.9226	0.0999	0.3825	0.0000	0.0759	1.52	DE08-0572	2.70	60.62	6.56	25.13	0.00	4.99
DE08-0573	0.0205	0.3214	0.0310	0.2018	0.0000	0.0334	0.61	DE08-0573	3.37	52.85	5.10	33.19	0.00	5.49
DE08-0574	0.0256	0.8526	0.0921	0.3966	0.0000	0.0471	1.41	DE08-0574	1.81	60.29	6.51	28.05	0.00	3.33
DE08-0575	0.0205	0.2779	0.0275	0.1637	0.0000	0.0300	0.52	DE08-0575	3.95	53.48	5.29	31.51	0.00	5.78
C&D Canal East Entrance (CD-1)								C&D Canal East Entrance (CD-1)						
SR1	0.0138	0.2269	0.0285	0.1694	0.0000	0.0272	0.47	SR1	2.97	48.70	6.13	36.36	0.00	5.85
SR2	0.0128	0.2458	0.0234	0.2117	0.0000	0.0245	0.52	SR2	2.47	47.43	4.51	40.86	0.00	4.73
SR3	0.0164	0.3214	0.0324	0.2541	0.0000	0.0337	0.66	SR3	2.49	48.84	4.93	38.61	0.00	5.12
SR4	0.0144	0.3214	0.0311	0.2258	0.0000	0.0306	0.62	SR4	2.30	51.56	5.00	36.23	0.00	4.91
SR5	0.0021	0.0510	0.0061	0.0550	0.0000	0.0070	0.12	SR5	1.69	42.09	5.03	45.39	0.00	5.81
SR6	0.0043	0.0945	0.0130	0.1059	0.0000	0.0138	0.23	SR6	1.86	40.84	5.61	45.74	0.00	5.95
	0.0042	0.0756	0.0130	0.1411	0.0000	0.0150	0.25		1.67	30.38	5.21	56.71	0.00	6.03
N							45							
Mean							0.85							
Std. Error							0.079323							
Median							0.76							

Values in red are non-detects and entered as 1/2 the value of the MDL



**SVOC data - Summary of Detections  
Matrix**

Sediment

A list of sediment quality guidelines (SQGs) was published by Burgess et al 2013. These equilibrium partitioning (EqP) based guidelines are called equilibrium partitioning sediment benchmarks (ESBs). Carbon normalized sediment concentrations less than or equal to the ESB values are not expected to result in adverse effects while concentrations in excess of the ESB values may result in adverse effects to benthic organisms.

	PAH-2	PAH-3	PAH-4	PAH-5	PAH-6	PAH-7	PAH-8	PAH-9	PAH-10	PAH-11	PAH-12	PAH-13	PAH-14	PAH-15	PAH-16	PAH-17	PAH-18	PAH-19	PAH-20	PAH-21	PAH-22	PAH-23	PAH-24	PAH-25	PAH-26	PAH-27	PAH-28	PAH-29	PAH-30	CD-1	SR1	SR2	SR3	SR4	SR5	SR6		
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
2-Methylnaphthalene	36.5	35	34.5	34.5	35	33	36.5	34.5	33.5	34.5	300	33.5	29	19	18.5	30	25.5	14	1.8	0.85	1.9	0.5	1.7	0.49														
Acenaphthene	36.5	35	34.5	34.5	35	33	36.5	34.5	33.5	34.5	72	33.5	29	19	18.5	30	25.5	27	0.95	1	0.9	0.65	0.65	7.5														
Acenaphthylene	36.5	35	34.5	34.5	35	33	36.5	34.5	33.5	34.5	120	33.5	29	19	18.5	30	25.5	32	1.7	0.8	2	0.475	0.49	0.6														
Anthracene	36.5	35	34.5	34.5	49	33	36.5	34.5	33.5	34.5	230	33.5	29	19	18.5	30	25.5	35	2.2	2.2	2.4	1.2	0.6	0.55														
Benzo a anthracene	130	100	190	130	210	84	90	92	140	120	340	120	29	19	18.5	66	25.5	96	5.6	5.8	6.6	3	1	1.3														
Benzo a pyrene	150	120	200	180	260	99	100	100	150	130	340	110	29	19	18.5	64	25.5	140	5.8	6	6.8	3.2	0.95	0.95														
Benzo b fluoranthene	210	160	260	220	330	150	150	140	200	180	400	150	29	19	18.5	70	180	7.2	6.8	8.5	3.5	0.55	0.9															
Benzo g h i perylene	93	83	110	110	160	33	36.5	34.5	84	80	330	93	29	19	18.5	30	25.5	110	4.8	5	6.4	2.3	0.485	0.5														
Benzo k fluoranthene	85	76	100	92	140	33	36.5	34.5	81	72	160	95	29	19	18.5	30	25.5	81	2.5	2.5	2.9	1.7	0.65	0.455														
Chrysene	170	110	170	150	220	90	97	92	170	150	190	150	29	19	18.5	81	25.5	160	6.9	6.5	7.9	3.4	1.25	0.49														
Dibenz a h anthracene	36.5	35	34.5	34.5	35	33	36.5	34.5	33.5	34.5	79	33.5	29	19	18.5	30	25.5	34	2.1	2.25	2	1.4	1.45	1.15														
Fluoranthene	260	180	300	260	400	170	160	160	250	220	630	200	29	19	18.5	99	62	88	9	9.2	10	4.8	5.5	6														
Fluorene	36.5	35	34.5	34.5	35	33	36.5	34.5	33.5	34.5	170	33.5	29	19	18.5	30	25.5	21	1.7	0.7	1.4	0.425	0.44	0.415														
Indeno 1 2 3 cd pyrene	91	75	110	100	160	33	36.5	34.5	80	77	190	73	29	19	18.5	30	25.5	97	4.8	4.1	5	1.1	1.1	1.05														
Naphthalene	90	35	76	110	35	33	36.5	34.5	33.5	34.5	470	33.5	29	19	18.5	30	25.5	22	3.6	3	3.8	1.3	0.435	0.41														
Phenanthrene	160	110	140	130	220	88	86	95	150	120	490	130	29	19	18.5	30	25.5	47	5.3	5.2	5.3	3.1	5.3	1.1														
Pyrene	250	190	280	250	400	140	180	150	220	190	850	250	29	19	18.5	110	94	120	9.8	9.5	11	5.5	7.3	3														
Total Organic Carbon (mg/kg)	80000	57600	69900	126100	110800	58300	65800	66600	39600	15100	105900	73600	53900	3200	3200	49000	31600	70000	19000	22000	14000	2700	4700	2900														
Total Organic Carbon (%)	8.00	5.76	6.99	12.61	11.08	5.83	6.58	6.66	3.96	1.51	10.59	7.36	5.33	0.32	0.32	4.90	3.16	7.00	1.90	2.20	1.40	0.27	0.47	0.29														
Total Organic Carbon (kg OC/kg sed)	0.08	0.06	0.07	0.13	0.11	0.06	0.07	0.07	0.04	0.02	0.11	0.07	0.05	0.00	0.00	0.05	0.03	0.07	0.02	0.02	0.01	0.00	0.00	0.00														

Carbon Normalized Concentration (ug sed/g oc)	PAH-2	PAH-3	PAH-4	PAH-5	PAH-6	PAH-7	PAH-8	PAH-9	PAH-10	PAH-11	PAH-12	PAH-13	PAH-14	PAH-15	PAH-16	PAH-17	PAH-18	PAH-19	PAH-20	PAH-21	PAH-22	PAH-23	PAH-24	PAH-25	PAH-26	PAH-27	PAH-28	PAH-29	PAH-30	CD-1	SR1	SR2	SR3	SR4	SR5	SR6
2-Methylnaphthalene	0.4563	0.6076	0.4936	0.2736	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	2.8329	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.2000	0.0947	0.0395	0.1357	0.1852	0.3617	0.1690												
Acenaphthene	0.4563	0.6076	0.4936	0.4313	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	0.6799	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.3857	0.0500	0.0455	0.0643	0.2407	0.1383	2.5852												
Acenaphthylene	0.4563	0.6076	0.4936	0.4313	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	1.1331	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.4571	0.0895	0.0364	0.1429	0.1759	0.1043	0.2059												
Anthracene	0.4563	0.6076	0.4936	0.4313	0.4422	0.5660	0.5229	0.5180	0.8460	2.2848	2.1719	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.5000	0.1159	0.0040	0.1714	0.4444	0.1277	0.1897												
Benzo a anthracene	1.6250	1.7361	2.7182	1.6250	1.8953	1.4408	1.2694	1.3814	3.5354	7.9470	3.2106	1.6304	0.5441	5.9375	5.7813	1.3468	0.8070	1.3714	0.2947	0.2636	0.4714	1.1111	0.2125	0.4483												
Benzo a pyrene	1.8750	2.0833	2.9512	2.2500	2.3466	1.9981	1.4327	1.5015	3.7879	8.8093	3.2106	1.4945	0.5441	5.9375	5.7813	1.3061	0.8070	2.0000	0.3653	0.2727	0.4957	1.1852	0.2021	0.3276												
Benzo b fluoranthene	2.6250	2.7778	3.7196	2.7500	2.9783	2.5729	2.1490	2.1021	5.0505	11.9205	2.0360	1.0344	0.5441	5.9375	5.7813	2.0408	2.2152	2.5714	0.3789	0.3091	0.6071	1.2963	0.1170	0.3103												
Benzo g h i perylene	1.1625	1.4410	1.5737	1.3750	1.4440	0.5660	0.5229	0.5180	2.1212	5.2980	3.1161	1.2636	0.5441	5.9375	5.7813	0.6122	0.8070	1.5714	0.2526	0.2273	0.4571	0.8519	0.1032	0.1724												
Benzo k fluoranthene	1.0625	1.3194	1.4306	1.1600	1.2635	0.5660	0.5229	0.5180	2.0455	4.7882	1.5109	1.2908	0.5441	5.9375	5.7813	0.6122	0.8070	1.1571	0.1316	0.1136	0.2071	0.6296	0.1383	0.1569												
Chrysene	2.1250	1.9097	2.4320	1.8750	1.9556	1.5437	1.3897	1.3814	4.2929	9.9339	1.7941	2.0360	0.5441	5.9375	5.7813	1.5531	0.8070	2.2857	0.3632	0.2955	0.5643	1.2939	0.2680	0.1690												
Dibenz a h anthracene	0.4563	0.6076	0.4936	0.4313	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	0.7460	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.4857	0.1105	0.1023	0.1429	0.5195	0.3085	0.3995												
Fluoranthene	3.2500	3.1250	4.2918	3.2500	3.6101	2.9160	2.2923	2.4024	6.3131	14.5695	5.9490	2.7174	0.5441	5.9375	5.7813	2.0304	1.9620	1.2571	0.4737	0.4182	0.7143	1.7778	1.3830	2.0590												
Fluorene	0.4563	0.6076	0.4936	0.4313	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	1.6053	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.3000	0.0895	0.0318	0.1000	0.1574	0.0936	0.1431												
Indeno 1 2 3 cd pyrene	1.1375	1.3021	1.5737	1.2500	1.4440	0.5660	0.5229	0.5180	2.0202	5.0993	1.7941	0.9918	0.5441	5.9375	5.7813	0.6122	0.8070	1.3857	0.2526	0.1864	0.3571	0.4074	0.2340	0.3521												
Naphthalene	1.1250	0.6076	1.0873	1.3750	0.3159	0.5660	0.5229	0.5180	0.8460	2.2848	4.381	0.4552	0.5441	5.9375	5.7813	0.6122	0.8070	0.3143	0.1895	0.1364	0.2714	0.4815	0.0926	0.1414												
Phenanthrene	2.0000	1.9097	2.0029	2.2500	1.9556	1.5094	1.2321	1.4715	3.7879	7.9470	4.6270	1.7683	0.5441	5.9375	5.7813	0.6122	0.8070	0.6714	0.2789	0.2364	0.3786	1.1481	1.1277	0.3793												
Pyrene	3.1250	3.2968	4.0057	3.2500	3.6101	2.4014	2.2923	2.2523	5.5556	12.5828	8.0264	3.5326	0.5441	5.9375	5.7813	2.2449	2.9747	1.7143	0.5158	0.4318	0.7857	2.0370	1.5532	1.0345												



# Assessment of PCB Data for Sediment, Surface Water and Elutriate Samples in the Delaware River Deepwater Pt. to New Castle Ranges

	UNITS	DRV-07S	DRV-07B	DRV-08S	DRV-08B	DE08-0560	DE08-0561	DE08-0566	DE08-0570 DUF	DE08-0571	DE08-0572	DE08-0574	CD1	SR1	SR2	SR3	SR4	SR5	SR6
Total PCB (ng/g or ug/kg)	ug/kg	18.48006	20.26804	0.00344	1.63556	16.11145	9.91624	138.11861	0.90873	23.20794	1.88816	0.90979	37.8473	40.8981	43.0419	31.3438	5.9392	5.9267	3.46251
TOC (%)	kg oc/kg sed	0.0214	0.0303	0.0265	0.0238	0.0074	0.014	0.0326	0.00208	0.0147	0.0397	0.0352	0.234	0.019	0.022	0.014	0.0027	0.0047	0.0029
Total PCB (carbon normalized)	ug/kg oc	863.55	688.91	0.13	71.74	2177.22	708.30	4236.77	436.89	1578.77	47.56	23.01	161.74	2152.53	1956.45	2238.84	2199.70	1261.00	1193.97
Total PCB (carbon normalized)	ug/g oc	0.86	0.67	0.00	0.07	2.18	0.71	4.24	0.44	1.58	0.05	0.02	0.16	2.15	1.96	2.24	2.20	1.26	1.19

## Octanol-Water Partition Coefficient

	log $K_{ow}$	$K_{owoc}$
Log $K_{ow}$	6.3	1995262.315

## Calculation of Dissolved Porewater Concentration

	DRV-07S	DRV-07B	DRV-08S	DRV-08B	DE08-0560	DE08-0561	DE08-0566	DE08-0570 DUF	DE08-0571	DE08-0572	DE08-0574	CD1	SR1	SR2	SR3	SR4	SR5	SR6	
Dissolved Porewater Concentration	ug/L	4.33E-04	3.35E-04	6.51E-08	3.60E-05	1.08E-03	3.55E-04	2.12E-03	2.19E-04	7.91E-04	2.38E-05	1.15E-05	8.11E-05	1.08E-03	9.81E-04	1.12E-03	1.10E-03	6.32E-04	5.98E-04

## Delaware Organic Carbon Normalized Sediment Quality Benchmark (SQB) to Protect Aquatic Life from PCBs

SQB (ug PCB/g o.c.) = CCC (ug/L) x  $K_{ow}$  (L/kg) x (1 kg/1000 g), where:

CCC Fresh = 0.014 ug/L DNREC, 2011

	DRV-07S	DRV-07B	DRV-08S	DRV-08B	DE08-0560	DE08-0561	DE08-0566	DE08-0570 DUP	DE08-0571	DE08-0572	DE08-0574	CD1	SR1	SR2	SR3	SR4	SR5	SR6
SQB Fresh (ug PCB/g oc)	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28

## Comparison of SQB to Measured Total PCB

	DRV-07S	DRV-07B	DRV-08S	DRV-08B	DE08-0560	DE08-0561	DE08-0566	DE08-0570 DUF	DE08-0571	DE08-0572	DE08-0574	CD1	SR1	SR2	SR3	SR4	SR5	SR6
Measured Total PCB (carbon normalized)	0.86	0.67	0.00	0.07	2.18	0.71	4.24	0.44	1.58	0.05	0.02	0.16	2.15	1.96	2.24	2.20	1.26	1.19
Ratio Measured PCB to SQB Marine	0.030914	0.023946447	4.647E-06	0.002568051	0.077943	0.0253566	0.151672402	0.015640243	0.056519577	0.00170263	0.000823572	0.005790166	0.077059	0.070039	0.080149	0.078747	0.045143	0.042743

Mean	Std. Error	Median	Min	Max
0.043709	0.009511	0.036829	4.64713E-06	0.151672

## PCB Bioaccumulation-Based Sediment Quality Guideline (BBSQG) for Human Health Protection

BBSQG = 33.2 ug/kg Greene, 1997 (avg. TOC used in calculation 2.5%)

## Comparison of BBSQG to Measured Total PCB

	DRV-07S	DRV-07B	DRV-08S	DRV-08B	DE08-0560	DE08-0561	DE08-0566	DE08-0570 DUF	DE08-0571	DE08-0572	DE08-0574	CD1	SR1	SR2	SR3	SR4	SR5	SR6
Measured Total PCB	18.48	20.27	0.00	1.64	16.11	9.92	138.12	0.91	23.21	1.89	0.81	37.85	40.90	43.04	31.34	5.94	5.93	3.46
Ratio Measured PCB to BBSQG	0.5566	0.6105	0.0001	0.0493	0.4853	0.2967	4.1602	0.0274	0.6990	0.0569	0.0244	1.1400	1.2319	1.2964	0.9441	0.1789	0.1785	0.1043

Mean	Std. Error	Median	Min	Max
0.669022	0.230213	0.391983	0.000103614	4.160199

Effects Range - Low = 22.7 ug/kg  
Effects Range - Median = 180.00 ug/kg

## Equations

$$K_{oc} = K_d / F_{oc}$$

therefore:  $K_d = K_{oc} * F_{oc}$  where  $K_{oc} = K_{ow}$

$$K_d = C_{sed} / C_{oc}$$

therefore:  $C_{oc} = C_{sed} / K_d$

## **APPENDIX D**

### **NOAA Fisheries GARFO ESA Section 7: NLAA Program Verification Form**

**and**

### **Essential Fish Habitat Assessment and Fish and Wildlife Coordination Act Consultation Worksheet**



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## GARFO ESA Section 7: NLAA Program Verification Form

(Please submit a signed version of this form, together with any project plans, maps, supporting analyses, etc., to [nmfs.gar.esa.section7@noaa.gov](mailto:nmfs.gar.esa.section7@noaa.gov) with "USACE NLAA Program: [Application Number]" in the subject line)

### Section 1: General Project Details

Application Number:		Delaware City DMPF-2024-2034	
Reinitiation:		No	
Applicant(s):		U.S. Army Corps of Engineers, Philadelphia District	
Permit Type:		Civil Works/Federal Navigation	
Anticipated project start date (e.g., 10/1/2020)		10/31/2024	
Anticipated project end date (e.g., 12/31/2022 – if there is no permit expiration date, write "N/A")		10/31/2034	
Project Type/Category (check all that apply to entire action):			
<input type="checkbox"/>	Aquaculture (shellfish) and artificial reef creation	<input type="checkbox"/>	Mitigation (fish/wildlife enhancement or restoration)
<input checked="" type="checkbox"/>	Dredging and disposal/beach nourishment	<input type="checkbox"/>	Bank stabilization
<input type="checkbox"/>	Piers, ramps, floats, and other structures	<input checked="" type="checkbox"/>	If other, describe project type category: Maintenance Dredge Placement Operations
Town/City:	Delaware City	Zip:	19706
State:	Delaware	Water body:	Delaware River and Chesapeake and

The information below references the C&D Canal as that is

<b>Project/Action Description and Purpose</b> waterway the Delaware City DMPF discharges to. <i>(include relevant permit conditions that are not captured elsewhere on form):</i>		
The primary objective of this evaluation is to provide long-term, safe placement option for dredged material related to the Delaware River, Philadelphia to Sea navigation maintenance project, the C&D Canal navigation maintenance project, and the Delaware City Branch Canal (as needed). Recently, increased shoaling in the DPS navigation channel has resulted in the increased use of the existing upland dredged material placement facilities (DMPFs) along the Delaware River which has resulted in decreased capacity at these DMPFs. The Delaware City DMPF is an area being considered for future placement of dredged material, with approximately 1.2 million cubic yards (CYs) of existing capacity. The DMPF is within the acceptable pumping distance range (approximately five to six miles) from the maintenance dredge locations. The discharge of return water from the Delaware City DMPF to the C&D Canal will be beneath the acceptable thresholds for turbidity and total suspended solids (TSS) of 4 grams per liter. This verification does not cover the DPS maintenance dredging operations as that is covered under separate verifications and consultation with NMFS, including the 2019 Biological Opinion associated with the deepening		
<b>Type of Bottom Habitat Modified:</b>	<b>Permanent/Temporary:</b>	<b>Area (acres):</b>
Select Type of Bottom Habitat	Select Permanent or Temporary	
Select Type of Bottom Habitat	Select Permanent or Temporary	
Select Type of Bottom Habitat	Select Permanent or Temporary	
Project Latitude (e.g., 42.625884)	39.563531	
Project Longitude (e.g., -70.646114)	-75.605816	
Mean Low Water (MLW)(m)	10.70	
Mean High Water (MHW)(m)	12.19	
Width (m) of water body in action area:	Stressor Category (stressor that extends furthest distance into water body – e.g., turbidity plume; sound pressure wave):	Max extent (m) of stressor into the water body:
137.00	Turbidity/Total Suspended Solids	30.50

## Section 2: ESA-listed species and/or critical habitat in the action area:

<input checked="" type="checkbox"/>	Atlantic sturgeon (all DPSs)	<input type="checkbox"/>	Kemp's ridley sea turtle
<input checked="" type="checkbox"/>	Atlantic sturgeon critical habitat Indicate which DPS : NYB	<input type="checkbox"/>	Loggerhead sea turtle (NW Atlantic DPS)
<input checked="" type="checkbox"/>	Shortnose sturgeon	<input type="checkbox"/>	Leatherback sea turtle
<input type="checkbox"/>	Atlantic salmon (GOM DPS)	<input type="checkbox"/>	North Atlantic right whale
<input type="checkbox"/>	Atlantic salmon critical habitat (GOM DPS)	<input type="checkbox"/>	North Atlantic right whale critical habitat
<input type="checkbox"/>	Green sea turtle (N. Atlantic DPS)	<input type="checkbox"/>	Fin whale

\* Please consult GARFO PRD's ESA Section 7 Mapper for ESA-listed species and critical habitat information for your action area at: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-species-critical-habitat-information-maps-greater>.

**Section 3: NLAA Determination (check all applicable fields):**

If the Project Design Criteria (PDC) is met, select Yes. If the PDC is not applicable (N/A) for your project (e.g., the stressor category is not included for your project activity, or for PDC 2, your project does not occur within the range of the GOM DPS of Atlantic salmon), select N/A. If the PDC is applicable, but is not met, leave both boxes blank and provide a justification for that PDC in Section 4.

a) GENERAL PDC			
Yes	N/A	PDC #	PDC Description
<input checked="" type="checkbox"/>		1.	No portion of the proposed action will individually or cumulatively have an adverse effect on ESA-listed species or designated critical habitat.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.	No portion of the proposed action will occur in the tidally influenced portion of rivers/streams where Atlantic salmon presence is possible from April 10–November 7.  <b>Note:</b> If the project will occur within the geographic range of the GOM DPS Atlantic salmon but their presence is not expected following the best available commercial scientific data, the work window does not need to be applied (include reference in project description).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.	No portion of the proposed action that may affect shortnose or Atlantic sturgeon will occur in areas identified as spawning grounds as follows: i. Gulf of Maine: April 1–Aug. 31 ii. Southern New England/New York Bight: Mar. 15–Aug. 31 iii. Chesapeake Bay: March 15–July 1 and Sept. 15–Nov. 1  <b>Note:</b> If river specific information exists that provides better or more refined time of year information, those dates may be substituted with NMFS approval (include reference in project description).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.	No portion of the proposed action that may affect shortnose or Atlantic sturgeon will occur in areas identified as overwintering grounds, where dense aggregations are known to occur, as follows: i. Gulf of Maine: Oct. 15–April 30 ii. Southern New England/ New York Bight: Nov. 1–Mar. 15 iii. Chesapeake Bay: Nov. 1–Mar. 15  <b>Note:</b> If river specific information exists that provides better or more refined time of year information, those dates may be substituted with NMFS approval (include reference in project description).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.	Within designated Atlantic salmon critical habitat, no portion of the proposed action will affect spawning and rearing areas (PBFs 1-7).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6.	Within designated Atlantic sturgeon critical habitat, no work will affect hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0-0.5 parts per thousand) (PBF 1).

Yes	N/A	PDC #	PDC Description
<input checked="" type="checkbox"/>		7.	Work will result in no or only temporary/short-term changes in water temperature, water flow, salinity, or dissolved oxygen levels.
<input type="checkbox"/>		8.	If ESA-listed species are (a) likely to pass through the action area at the time of year when project activities occur; and/or (b) the project will create an obstruction to passage when in-water work is completed, then a zone of passage (~50% of water body) with appropriate habitat for ESA-listed species (e.g., depth, water velocity, etc.) must be maintained (i.e., physical or biological stressors such as turbidity and sound pressure must not create barrier to passage).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.	Any work in designated North Atlantic right whale critical habitat must have no effect on the physical and biological features (PBFs).
<input checked="" type="checkbox"/>		10.	The project will not adversely impact any submerged aquatic vegetation (SAV).
<input checked="" type="checkbox"/>		11.	No blasting or use of explosives will occur.

b) The following stressors are applicable to the action  
(check all that apply – use Stressor Category Table for guidance):

<input type="checkbox"/>	Sound Pressure
<input type="checkbox"/>	Impingement/Entrapment/Capture
<input checked="" type="checkbox"/>	Turbidity/Water Quality
<input type="checkbox"/>	Entanglement (Aquaculture)
<input type="checkbox"/>	Habitat Modification
<input checked="" type="checkbox"/>	Vessel Traffic

Activity Category	Stressor Category					
	Sound Pressure	Impingement/Entrapment/Capture	Turbidity/Water Quality	Entanglement	Habitat Mod.	Vessel Traffic
Aquaculture (shellfish) and artificial reef creation	N	N	Y	Y	Y	Y
Dredging and disposal/beach nourishment	N	Y	Y	N	Y	Y

Activity Category	Stressor Category					
	Sound Pressure	Impingement/ Entrapment/ Capture	Turbidity/ Water Quality	Entanglement	Habitat Mod.	Vessel Traffic
Piers, ramps, floats, and other structures	Y	N	Y	N	Y	Y
Transportation and development (e.g., culvert construction, bridge repair)	Y	N	Y	N	Y	Y
Mitigation (fish/wildlife enhancement or restoration)	N	N	Y	N	Y	Y
Bank stabilization and dam maintenance	Y	N	Y	N	Y	Y

### c) SOUND PRESSURE PDC

#### Information for Pile Driving:

If your project includes **pile driving of any kind**, please attach your calculation to this verification form to verify that it fits within the scope of the behavioral/injury threshold analysis for ESA-listed species in the action area. The NMFS Office of Protected Resources Acoustic Calculator is available as one source, should you not have other information:

<https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-effects-analysis-acoustics-greater-atlantic-region>

	Pile material	Pile diameter/width (inches)	Number of piles	Installation method
a)	Select pile material			Select installation method
b)	Select pile material			Select installation method
c)	Select pile material			Select installation method
d)	Select pile material			Select installation method



Yes	N/A	PDC #	PDC Description
<input type="checkbox"/>	<input checked="" type="checkbox"/>	12.	<p>If pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold, a “soft start” is required to allow animals an opportunity to leave the project vicinity before sound pressure levels increase. <i>In addition to using a soft start at the beginning of the work day for pile driving, one must also be used at any time following cessation of pile driving for a period of 30 minutes or longer.</i></p> <p><u>For impact pile driving:</u> pile driving will commence with an initial set of three strikes by the hammer at 40% energy, followed by a one minute wait period, then two subsequent 3-strike sets at 40% energy, with one-minute waiting periods, before initiating continuous impact driving.</p> <p><u>For vibratory pile installation:</u> pile driving will be initiated for 15 seconds at reduced energy followed by a one-minute waiting period. This sequence of 15 seconds of reduced energy driving, one-minute waiting period will be repeated two additional times, followed immediately by pile-driving at full rate and energy.</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	13.	Any new pile supported structure must involve the installation of $\leq 50$ piles (below MHW).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	14.	All underwater noise (pressure) is below ( $<$ ) the physiological/injury noise threshold for ESA-species in the action area.
d) IMPINGEMENT/ENTRAINMENT/CAPTURE PDC			Maintenance dredging activities are covered under separate verification.
<b>Information for Dredging/Disposal:</b>			
Type of dredge:		Select type of dredge	
Maintenance dredging?:		Select Yes or No	If “Yes”, how many acres?
If maintenance, when was the last dredge cycle?			
New dredging:		Select Yes or No	If “Yes”, how many acres?
Estimated number of dredging events covered by permit:			
ESA-species exclusion measures required (e.g., cofferdam, turbidity curtain):		Select Yes or No	
If no exclusion measures required, explain why:		Select reason why no exclusion measures are required	
<b>Information for Intake Structures:</b>			
Mesh screen size (mm) for temporary intake:			

Yes	N/A	PDC #	PDC Description
<input type="checkbox"/>	<input type="checkbox"/>	15.	Only mechanical, cutterhead, and low volume hopper (e.g., CURRITUCK, ~300 cubic yard maximum bin capacity) dredges may be used.
<input type="checkbox"/>	<input type="checkbox"/>	16.	No new dredging in Atlantic sturgeon or Atlantic salmon critical habitat (maintenance dredging still must meet all other PDCs). New dredging outside Atlantic sturgeon or salmon critical habitat is limited to one time dredge events (e.g., burying a utility line) and minor ( $\leq 2$ acres) expansions of areas already subject to maintenance dredging (e.g., marina/harbor expansion).
<input type="checkbox"/>	<input type="checkbox"/>	17.	Work behind cofferdams, turbidity curtains, or other methods to block access of animals to dredge footprint is required when operationally feasible or beneficial and ESA-listed species are likely to be present (if presence is limited to rare, transient individuals, exclusion methods are not necessary).
<input type="checkbox"/>	<input type="checkbox"/>	18.	Temporary intakes related to construction must be equipped with appropriate sized mesh screening (as determined by GARFO section 7 biologist and/or according to <a href="#">Chapter 11 of the NOAA Fisheries Anadromous Salmonid Passage Facility Design</a> ) and must not have greater than 0.5 fps intake velocities, to prevent impingement or entrainment of any ESA-listed species life stage.
<input type="checkbox"/>	<input type="checkbox"/>	19.	No new permanent intake structures related to cooling water, or any other inflow at facilities (e.g. water treatment plants, power plants, etc.).

#### e) TURBIDITY/WATER QUALITY PDC

##### Information for Turbidity Producing Activity (excluding disposal):

ESA-species turbidity control measures required (e.g., turbidity curtain):	Yes
If no turbidity control measures required, explain why:	Select reason why no turbidity control measures are required

##### Information for Dredged Material Disposal:

Disposal site:	Upland
Estimated number of trips to disposal site:	
Relevant disposal site permit/special conditions required (NAE: for offshore disposal, include Group A, B, C, or relevant Long Island Sound consultation):	CWA Section 401 Water Quality Certification, 7 Del. Admin. Code 7401 Surface Water Quality Standards, 7 Del. Admin. Code 7201 Surface Water Discharge Regulations, and consistency with the Delaware Coastal Management Program.

Yes	N/A	PDC #	PDC Description
<input checked="" type="checkbox"/>	<input type="checkbox"/>	20.	Work behind cofferdams, turbidity curtains, or other methods to control turbidity is required when operationally feasible or beneficial and ESA-listed species are likely to be present (if presence is limited to rare, transient individuals, turbidity control methods are not necessary).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	21.	In-water offshore disposal may only occur at designated disposal sites that have been the subject of ESA section 7 consultation with NMFS, where a valid consultation is in place and appropriate permit/special conditions are included.

Yes	N/A	PDC #	PDC Description
<input checked="" type="checkbox"/>	<input type="checkbox"/>	22.	Any temporary discharges must meet state water quality standards (e.g., no discharges of substances in concentrations that may cause acute or chronic adverse reactions, as defined by EPA water quality standards criteria).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	23.	Only repair, upgrades, relocations and improvements of existing discharge pipes or replacement in-kind are allowed; no new construction of untreated discharges.
f) ENTANGLEMENT PDC      Not applicable			
<b>Information for Aquaculture Projects:</b>			
Approximate distance from shore (MHW)(m):			
Grow season begins (approximate):			
Grow season ends (approximate):			
Total number of vertical lines:			
Total number of horizontal lines:			
Is any gear seasonally removed from the water? If yes, which parts and when?			
	Aquaculture Gear	Acreage (total permit footprint)	Type of Shellfish Cultivated
a)	Select aquaculture gear		Select type of shellfish cultivated
b)	Select aquaculture gear		Select type of shellfish cultivated
c)	Select aquaculture gear		Select type of shellfish cultivated
Yes	N/A	PDC #	PDC Description
<input type="checkbox"/>	<input type="checkbox"/>	24.	Shell on bottom <50 acres with maximum of 4 corner marker buoys;
<input type="checkbox"/>	<input type="checkbox"/>	25.	Cage on bottom with no loose floating lines <5 acres and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
<input type="checkbox"/>	<input type="checkbox"/>	26.	Floating cages in <3 acres in waters and shallower than -10 feet MLLW with no loose lines and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
<input type="checkbox"/>	<input type="checkbox"/>	27.	Floating upweller docks in >10 feet MLLW.
<input type="checkbox"/>	<input type="checkbox"/>	28.	Any in-water lines, ropes, or chains must be made of materials and installed in a manner to minimize or avoid the risk of entanglement by using thick, heavy, and taut lines that do not loop or entangle. Lines can be enclosed in a rigid sleeve.
g) HABITAT MODIFICATION PDC      Not applicable			
Yes	N/A	PDC #	PDC Description
<input type="checkbox"/>	<input type="checkbox"/>	29.	No conversion of habitat type (soft bottom to hard, or vice versa) for aquaculture or reef creation.

h) VESSEL TRAFFIC PDC			
<b>Information for Vessel Traffic:</b>			
	Temporary Project Vessel Type		Number of Vessels
a)	Dredge vessel		1
b)	Crew support vessel		1
c)	Select temporary vessel type		
	Type of Non-Commercial or Aquaculture Vessels Added – only include if there is a net increase directly/indirectly resulting from project)		Number of Vessels (if sum > 2, PDC 33 is not met and justification required in Section 4)
a)	Select type of non-commercial or aquaculture vessels		
b)	Select type of non-commercial or aquaculture vessels		
	Type of Commercial Vessels Added (only include if there is a net increase directly/indirectly resulting from project)		Number of Vessels (if > 0, PDC 33 is not met and justification required in Section 4)
a)			
b)			
If no temporary/permanent vessel traffic, briefly explain (e.g., all land-based work, no net increase in vessel traffic)			
Yes	N/A	PDC #	PDC Description
<input checked="" type="checkbox"/>	<input type="checkbox"/>	30.	Maintain project vessels operating within the action area to speed limits below 10 knots and dredge vessel speeds of 4 knots maximum, while dredging.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	31.	Maintain a 1,500-foot buffer between project vessels and ESA-listed whales and a 150-foot buffer between project vessels and sea turtles unless the vessel is navigating to an in-water disposal site/activity. If the vessel is navigating to an in-water disposal site/activity, refer to and include the conditions contained in the appropriate GARFO-USACE/EPA consultation for the disposal site.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	32.	The number of project vessels must be limited to the greatest extent possible, as appropriate to size and scale of project.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	33.	The permanent net increase in vessels resulting from a project (e.g., dock/float/pier/boating facility) must not exceed two non-commercial vessels. A project must not result in the permanent net increase of any commercial vessels (e.g., a ferry terminal).

#### Section 4: Justification for Review under the NLAA Program

If the action is not in compliance with all of the General PDC and appropriate stressor PDC, but you can provide justification and/or special conditions to demonstrate why the project still meets the NLAA determination and is consistent with the aggregate effects considered in the programmatic consultation, you may still certify your project through the NLAA program using

this verification form. Please identify which PDC your project does not meet (e.g., PDC 9, PDC 15, PDC 22, etc.) and provide your rationale and justification for why the project is still eligible for the verification form.

To demonstrate that the project is still NLAA, you must explain why the effects on ESA-listed species or critical habitat are **insignificant** (i.e., too small to be meaningfully measured or detected) or **discountable** (i.e., extremely unlikely to occur). **Please use this language in your justification.**

PDC#	Justification
21	The proposed project will include the placement of maintenance dredging sediments into the Federally owned and maintained Delaware City DMPF. The DMPF discharges to a manmade canal via a sluice box and the ditch discharges to the C&D Canal via three outfall pipes. The C&D Canal and the Delaware City DMPF are only hydrologically connected when there is flow out of the sluice box, and as such there is no tidal connection between the canal and DMPF nor an avenue for fish passage. The turbidity and TSS from the return water (effluent) leaving the CDF could result in minor and temporary impacts within the C&D Canal, however TSS and turbidity are controlled through multiple best management practices (BMPs). The BMPs include raising the sluice weir boards to flow flow and retain more solids, moving the inflow point of the dredge material to allow for greater particle settlement, creating baffle dikes within the DMPF, and reducing the intake slurry density. Due to tidal flow and currents, any minor turbidity will subside immediately upon cessation of the operation and is not cumulative. All of
PDC #	
PDC #	

PDC #	
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### Section 5: USACE Verification of Determination

<input checked="" type="checkbox"/>	In accordance with the NLAA Program, USACE has determined that the action complies with all applicable PDC and is not likely to adversely affect listed species.
<input type="checkbox"/>	In accordance with the NLAA Program, the USACE has determined that the action is not likely to adversely affect listed species per the justification and/or special conditions provided in Section 4.
USACE Signature:	
GREENWOOD.COLIN.M ATTHEW.1627673074	Digitally signed by GREENWOOD.COLIN.MATTHEW.162767307 4 Date: 2024.09.23 13:47:06 -04'00'
Date:	
09/23/2024	

### Section 6: GARFO Concurrence

<input type="checkbox"/>	In accordance with the NLAA Program, GARFO PRD concurs with USACE's determination that the action complies with all applicable PDC and is not likely to adversely affect listed species or critical habitat.
<input type="checkbox"/>	In accordance with the NLAA Program, GARFO PRD concurs with USACE's determination that the action is not likely to adversely affect listed species or critical habitat per the justification and/or special conditions provided in Section 4.
<input type="checkbox"/>	GARFO PRD does not concur with USACE's determination that the action complies with the applicable PDC (with or without justification), and recommends an individual Section 7 consultation to be completed independent from the NLAA Program.
GARFO Signature:	
Date:	



**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**

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

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

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

**EFH Assessment Worksheet rev. August 2021**  
Please read and follow all of the directions provided when filling out this form.

**1. General Project Information**

Date Submitted: 09/24/2024

Project/Application Number:

Project Name: Delaware City Dredge Material Placement Facility - Environmental Assessment

Project Sponsor/Applicant: U.S. Army Corps of Engineers, Philadelphia District

Federal Action Agency (or state agency if the federal agency has provided written notice delegating the authority<sup>1</sup>):

Fast-41: Yes ☐

No ☒

Action Agency Contact Name: Colin Greenwood

Contact Phone: (215) 656-2338

Contact Email: Colin.M.Greenwood@usace.army.mil

Address, City/Town, State:

1650 Arch Street  
Philadelphia, PA 19103

**2. Project Description**

<sup>2</sup>Latitude: 39.563531°

Longitude: -75.605816°

Body of Water (e.g., HUC 6 name): Chesapeake and Delaware (C&D) Canal

Project Purpose:

The placement of maintenance dredge materials into the federally owned and maintained Delaware City Dredge Material Placement Facility (DMPF).

Project Description:

The primary objective of this evaluation is to provide long-term, safe placement for maintenance dredge materials associated with the Delaware River, Philadelphia to Sea (DPS) Federal navigation channel (FNC), the C&D Canal navigation channel, and the Delaware City Branch Canal (as needed). Recently, increased shoaling in the DPS navigation channel has resulted in the increased use of the existing upland DMPFs along the Delaware River which has resulted in decreased capacity at these DMPFs. The Delaware City DMPF is an area being considered for future placement of dredged material, with approximately 1.2 million cubic yards (CYs) of existing capacity. The CDF is within the acceptable pumping distance range (approximately five to six miles) from the maintenance dredge locations. The discharge of return water from the Delaware City DMPF to the C&D Canal will be within the acceptable thresholds (a maximum of 4 grams per liter) for turbidity and total suspended solids (TSS). This EFH Assessment does not cover the DPS FNC or the C&D Canal maintenance dredging operations as those actions are covered under separate assessments, including the 2019 Biological Opinion (GARFO-2019-01942) for the DPS FNC.

Anticipated Duration of In-Water Work including planned Start/End Dates and any seasonal restrictions proposed to be included in the schedule:

This assessment and worksheet only covers the placement of dredge materials into the Delaware City DMPF. The project will result in the discharge of return water effluent from the DMPF into the C&D Canal during dredge placement and dewatering operations. The maintenance dredging operations for the DPS FNC will be conducted in accordance with the 2019 Biological Opinion and with notice provided to NMFS. The C&D Canal and Branch Canal maintenance dredging will be coordinated with the NMFS for compliance with EFH and the FWCA prior to the commencement of any dredging operations.

<sup>1</sup> A federal agency may designate a non-Federal representative to conduct an EFH consultation by giving written notice of such designation to NMFS. If a non-federal representative is used, the Federal action agency remains ultimately responsible for compliance with sections 305(b)(2) and 305(b)(4)(B) of the Magnuson-Stevens Act. <sup>2</sup> Provide the decimal, or the degrees, minutes, seconds values for latitude and longitude using the World Geodetic System 1984 (WGS84) and negative degree values where applicable.

### 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<sup>3</sup>?

☒ Yes ☐ No

Is the project in designated HAPC?

☒ Yes ☐ No

Does the project contain any Special Aquatic Sites<sup>4</sup>?

☐ Yes ☒ No

Is this coordination under FWCA only?

☐ Yes ☒ No

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

N/A-no marine/estuarine in-water proposed

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

N/A-no marine/estuarine in-water proposed

Current range of water depths at MLW

Salinity range (PPT):

Water temperature range (°F):

35 feet

6-9

35-85

<sup>3</sup>Use 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. <sup>4</sup> Special 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 <sup>2</sup> /ft <sup>3</sup> )	Temporary impacts (lf/ft <sup>2</sup> /ft <sup>3</sup> )	Permanent impacts (lf/ft <sup>2</sup> /ft <sup>3</sup> )	Restored to pre-existing conditions?*
Estuarine	Shore (unconsolidated)	0	0	0	Yes
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one
Select one	Select One				Select one

\*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.



**Submerged Aquatic Vegetation (SAV) Present?:**Yes: ☐No: ☒

If the project area contains SAV, or has historically contained SAV, list SAV species and provide survey results including plans showing its location, years present and densities if available. Refer to Section 12 below to determine if local SAV mapping resources are available for your project area.

**Sediment Characteristics:** Sediment testing of the existing sediments within the DMPF and those from the DPS FNC will be performed prior to any placement operations.

The level of detail required is dependent on your project – e.g., a grain size analysis may be necessary for dredging. In addition, if the project area contains rocky/hard bottom habitat <sup>6</sup>(pebble, cobble, boulder, bedrock outcrop/ledge) identified as Rocky (coral/rock), Substrate (cobble/gravel), or Substrate (rock) above, describe the composition of the habitat using the following table.

Substrate Type* (grain size) N/A	Present at Site? (Y/N)	Approximate Percentage of Total Substrate on Site
Silt/Mud (<0.063mm)	Select one	
Sand (0.063-2mm)	Select one	
Rocky: Pebble/Gravel /Cobble(2-256mm)**	Select one	
Rocky: Boulder (256- 4096mm)**	Select one	
Rocky: Coral	Select one	
Bedrock**	Select one	

<sup>6</sup>The type(s) of rocky habitat will help you determine if the area is cod HAPC.

\* Grain sizes are based on Wentworth grain size classification scale for granules, pebbles, cobbles, and boulders.

\*\* Sediment samples with a content of 10% or more of pebble-gravel-cobble and/or boulder in the top layer (6-12 inches) should be delineated and material with epifauna/macroalgae should be differentiated from bare pebble-gravel-cobble and boulder.

If no grain size analysis has been conducted, please provide a general description of the composition of the sediment. If available please attach images of the substrate.

The USACE will be performing sediment testing and grain size analysis of the sediments proposed to be removed as part of the DPS FNC maintenance dredging prior to the placement of material into the Delaware City DMPF. The results of the testing and grain size analysis will be made available to the NMFS.

**Diadromous Fish (migratory or spawning habitat- identify species under Section 10 below):**Yes: ☒No: ☐

## 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: C&D Canal and Delaware River				What is the source of the EFH information included?
	EFH: eggs	EFH: larvae	EFH: juvenile	EFH: adults/spawning adults	
Atlantic butterfish	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
Atlantic herring	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
Black sea bass	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
bluefish	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
clearnose skate	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
little skate	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
long-finned squid	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EFH Mapper c
red hake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
scup	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
summer flounder	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c
windowpane flounder	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	EFH Mapper c

winter skate

X

X

EFH Mapper

## 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.

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

<sup>7</sup> 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.

<sup>8</sup> 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	
<input type="checkbox"/>	Agriculture	
<input type="checkbox"/>	Aquaculture - <u>List species here:</u>	
<input type="checkbox"/>	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)	
<input type="checkbox"/>	Beach renourishment	
<input type="checkbox"/>	Dredging/excavation	
<input type="checkbox"/>	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind	
<input checked="" type="checkbox"/>	Fill Placement of dredge materials into existing Federal facility	
<input type="checkbox"/>	Forestry	
<input type="checkbox"/>	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)	
<input type="checkbox"/>	Intake/outfall	
<input type="checkbox"/>	Military (e.g., acoustic testing, training exercises)	
<input type="checkbox"/>	Mining (e.g., sand, gravel)	
<input type="checkbox"/>	Overboard dredged material placement	
<input type="checkbox"/>	Piers, ramps, floats, and other structures	
<input type="checkbox"/>	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)	
<input type="checkbox"/>	Survey (e.g., geotechnical, geophysical, habitat, fisheries)	
<input type="checkbox"/>	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)	
<input type="checkbox"/>	Other:	

## 8. Effects Evaluation

Select all that apply	Potential Stressors Caused by the Activity	Select all that apply and if temporary <sup>9</sup> or permanent	Habitat alterations caused by the activity	
<input type="checkbox"/>	Underwater noise	Temp	Perm	N/A
<input checked="" type="checkbox"/>	Water quality/turbidity/contaminant release	<input type="checkbox"/>	<input type="checkbox"/>	Water depth change
<input type="checkbox"/>	Vessel traffic/barge grounding	<input type="checkbox"/>	<input type="checkbox"/>	Tidal flow change
<input type="checkbox"/>	Impingement/entrainment	<input type="checkbox"/>	<input type="checkbox"/>	Fill
<input type="checkbox"/>	Prevent fish passage/spawning	<input type="checkbox"/>	<input type="checkbox"/>	Habitat type conversion
<input type="checkbox"/>	Benthic community disturbance	<input type="checkbox"/>	<input type="checkbox"/>	Other: <input type="text"/>
<input type="checkbox"/>	Impacts to prey species	<input type="checkbox"/>	<input type="checkbox"/>	Other: <input type="text"/>

<sup>9</sup> Temporary in this instance means during construction. <sup>10</sup> 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.

The proposed project will include the placement of maintenance dredging sediments into the Federally owned and maintained Delaware City DMPF. The DMPF discharges to a manmade canal via a sluice box which discharges to the C&D Canal via three plastic outfall pipes. The C&D Canal and the Delaware City DMPF are only hydrologically connected when there is flow out of the sluice box, and as such there is no tidal connection between the canal and DMPF nor avenue for fish passage (see attached figure). The turbidity and TSS from the return water (effluent) leaving the DMPF could result in minor and temporary impacts within the C&D Canal, however TSS and turbidity are controlled through multiple best management practices (BMPs). The BMPs include raising the sluice weir boards to flow flow and retain more solids, moving the inflow point of the dredge material to allow for greater particle settlement, creating baffle dikes within the DMPF, and reducing the intake slurry density. Due to tidal flow and currents, any minor turbidity will subside immediately upon cessation of the operation and is not cumulative. All of those BMPs will ensure that return water does not exceed the regulatory threshold of 4 grams per liter during dredge placement and dewatering operations.

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?

The proposed project will be subject to a Delaware Resources and Environmental Control (DNREC) review in accordance with 7 Del. Admin. Code 7401 Surface Water Quality Standards, 7 Del. Admin. Code 7201 Surface Water Discharge Regulations, and §§ 301, 302, 303, 306, and 307 of the federal Clean Water Act for the issuance of a Water Quality Certificate (WQC). The conditions in the WQC will require USACE to meet effluent sampling and testing specifications to ensure TSS and turbidity do not exceed the threshold of 4 g/L during dredge disposal and dewatering operations.

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.

Any minor impacts to EFH from the discharge of the DMPF return water are temporary.

## 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:

No.

2. Is the expected lifespan of the action greater than 10 years? If yes, please describe project lifespan:

Yes. The use of the Delaware City DMPF will occur periodically as necessary until the capacity of the facility is reached. The requested consultation period is 10 years.

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:

No. The proposed action will not be amplified by climate change effects.

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:

No. The proposed action has no effect on climate change impacts to habitats or species.

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:

Yes, the use of BMPs to meet regulatory standards for TSS and turbidity will be utilized.



## 10. Federal Agency Determination

Federal Action Agency's EFH determination (select one)	
<input type="checkbox"/>	There is no adverse effect <sup>7</sup> on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
<input checked="" type="checkbox"/>	The adverse effect <sup>7</sup> 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.
<input type="checkbox"/>	The adverse effect <sup>7</sup> 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.

<sup>7</sup> 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	The potential impacts to habitat for this species that may occur in the action area due to a temporary elevated water turbidity is minimal due to tides and currents.
American shad	
Atlantic menhaden	The potential impacts to habitat for this species that may occur in the action area due to a temporary elevated water turbidity is minimal due to tides and currents.
blue crab	
blue mussel	
blueback herring	The potential impacts to habitat for this species that may occur in the action area due to a temporary elevated water turbidity is minimal due to tides and currents.
Eastern oyster	
horseshoe crab	
quahog	
soft-shell clams	
striped bass	The potential impacts to habitat for this species that may occur in the action area due to a temporary elevated water turbidity is minimal due to tides and currents.
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](#)

## **APPENDIX E**

### **Endangered Species Information**

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Chesapeake Bay Ecological Services Field Office  
177 Admiral Cochrane Drive  
Annapolis, MD 21401-7307  
Phone: (410) 573-4599 Fax: (410) 266-9127



In Reply Refer To:

08/19/2024 20:13:48 UTC

Project Code: 2024-0006815

Project Name: Delaware City Dredge Material Placement Facility (DMPF)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see [Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service \(fws.gov\)](#).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

## OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Chesapeake Bay Ecological Services Field Office**

177 Admiral Cochrane Drive

Annapolis, MD 21401-7307

(410) 573-4599

## PROJECT SUMMARY

Project Code: 2024-0006815  
Project Name: Delaware City Dredge Material Placement Facility (DMPF)  
Project Type: Disposal Dredge Material  
Project Description: Use of an existing dredge material placement facility for the placement of maintenance dredge sediments from the Federally authorized Delaware River, Philadelphia to Sea navigation channel, the Chesapeake and Delaware (C&D) Canal navigation channel, and the Delaware City Branch Canal.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@39.5616493,-75.60419440931513,14z>



Counties: New Castle County, Delaware

## ENDANGERED SPECIES ACT SPECIES

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/10515">https://ecos.fws.gov/ecp/species/10515</a>	Proposed Endangered

## REPTILES

NAME	STATUS
Bog Turtle <i>Glyptemys muhlenbergii</i> Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/6962">https://ecos.fws.gov/ecp/species/6962</a>	Threatened

## INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.



## **IPAC USER CONTACT INFORMATION**

Agency: Army Corps of Engineers

Name: Colin Greenwood

Address: 1650 Arch Street

City: Philadelphia

State: PA

Zip: 19103

Email: colin.m.greenwood@usace.army.mil

Phone: 2156562338



STATE OF DELAWARE  
**DEPARTMENT OF NATURAL RESOURCES AND  
ENVIRONMENTAL CONTROL**

DIVISION OF FISH & WILDLIFE  
RICHARDSON & ROBBINS BUILDING  
89 KINGS HIGHWAY  
DOVER, DELAWARE 19901

**DIRECTOR'S  
OFFICE**

PHONE  
(302) 739-9910

January 4, 2024

Colin Greenwood  
U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch  
1650 Arch Street  
Philadelphia, PA 19103-2004

*Re: USACE 2023 C&D Canal - Delaware City CDF, Tax Parcel # 1202800011*

Dear Colin:

Thank you for contacting the Division of Fish and Wildlife (DFW) Species Conservation and Research Program about information on rare, threatened and endangered species, unique natural communities, and other significant natural resources as they relate to the above referenced project.

*Fisheries*

The DFW has not conducted fish surveys of the waterbody locally known as 'Canal Pond' or 'the Everglades'. The incomplete list of fish provided below are those documented from fish kills in 2010 and 2016, and from the most recently completed statewide survey of licensed anglers. Note that there is no abundance data on these fish species. Except for mosquitofish, only fish species considered 'gamefish' or those typically targeted by anglers are represented. Non-game fish likely occur in this water body; however, the species have not been documented due to a lack of targeted surveys.

Incomplete list of fish species known to occur in the Canal Pond:

- Largemouth bass
- Striped bass
- Black crappie
- Bluegill
- Chain pickerel
- White perch
- Catfish (not identified to species level)
- Common carp
- Mosquitofish

The draining and filling of this water body will be a loss to the recreational angling community. According to the most recent statewide survey of Delaware licensed anglers, 2,174 angling trips were made to the pond and over 8,600 fish were caught in 2018. Another survey is currently being conducted, so more recent angler effort and catch data will be available in 2024. This water body is popular with anglers because the gamefish are relatively sizeable and there are few comparable public freshwater impoundments in the northern part of the state that are so easily accessible.

### *Birds*

The draining and filling of this pond will be a loss to hunters as well as recreational birders, as this pond is a highly popular area for waterfowl hunting and is an eBird hotspot. This site is relatively accessible to view a wide variety of species, with 177 different bird species recorded and 349 birding checklists submitted by the public in this area. Birds are seen using this area year-round based on eBird checklist submissions and photos, suggesting that this area is used for breeding and year-round foraging. Therefore, loss of this habitat will likely affect many bird species at various points in their life cycles.

#### Marsh birds:

Saltmarsh Habitat and Avian Research Program (SHARP) marsh bird survey points at the pond and near the pond that were surveyed in 2014 and 2015 as part of a king rail investigation project. Marsh bird Species of Greatest Conservation (SGCN) that have been detected either at or near the pond include sora (Tier 2, S2), least bittern (Tier 2, S1B), king rail (Tier 1, S2), marsh wren (Tier 2, S4B), Virginia rail (Tier 2, S4), Coastal Plain swamp sparrow (Tier 1, S3B), and clapper rail (Tier 1, S5). Additional marsh bird SGCN that have been detected by the public according to eBird photos and checklists include pied-billed grebe (state-listed endangered, Tier 1, S1B/S3N), great blue heron (Tier 2, S2B), little blue heron (Tier 2, S1B), snowy egret (Tier 2, S1B), tricolored heron (Tier 2, S1B), American black duck (Tier 1, S4), and Forster's tern (state-listed endangered, Tier 1, S1B).

Wetland maps and imagery indicate that the area is a shallow artificial freshwater pond surrounded by a mix of emergent and scrub-shrub/forested wetland vegetation. Based on habitat present, SHARP and eBird data, and known breeding bird habitat type preferences, we would be most concerned during the breeding season for sora, least bittern, king rail, marsh wren, Virginia rail, and Coastal Plain swamp sparrow. Because the project area contains habitat suitable for breeding for all those species, and they've all been detected either at the project area or in close proximity to the project area, we recommend a marsh bird time of year restriction from **April 1<sup>st</sup> to July 31<sup>st</sup>** for any construction activity associated with this project, including vegetation clearing, water draining, and filling with dredged material.

#### Land birds:

SGCN that have been detected by the public according to eBird photos and checklists include American redstart (Tier 2, S1B), bald eagle (Tier 3, S2B/S3N), bank swallow (Tier 2, S2B), broad-winged hawk (State-listed endangered, Tier 1, S1B), brown creeper (Tier 2, S1B/S4N), cliff swallow (Tier 2, S1B), northern parula (Tier 2, S1B), red-shouldered hawk (Tier 3 S2B/S3N), rusty blackbird (Tier 1), veery (Tier 2, S2B), and willow flycatcher (Tier 2, S3B). Many of these species require, or at minimum prefer, riparian habitat; therefore, the draining and filling of this water body will likely affect species composition, driving out species which rely on

this habitat. We recommend, at minimum, a time of year restriction of **April 1<sup>st</sup> to July 31<sup>st</sup>** to avoid impacts to nesting birds.

### *Herptiles*

SGCN that occur at the project site include the northern red-bellied cooter (Tier 2, S5), eastern box turtle (Tier 1, S5), and Atlantic coast leopard frog (Tier 1). It is unclear how large of an impact there will be to these species; however, the draining and filling of this water body and seasonally filled pools will negatively impact red-bellied cooter and Atlantic coast leopard frog through loss of habitat. Clearing of upland habitats will negatively impact box turtle through loss of habitat.

### *Mammals*

#### Bats:

A review of our database indicates that the northern long-eared bat (*Myotis septentrionalis*) may occur on or adjacent to the project site. Due to population declines largely caused by white-nose syndrome, a fungal disease known only to affect bats, this species is federally-listed as endangered under the U.S. Endangered Species Act. Section 7 consultation may be necessary. To determine the potential effect your project may have on northern long-eared bat, visit the USFWS Information for Planning and Consultation (iPaC) tool to obtain an official species list and to use the Northern Long-eared Bat Rangewide Determination Key.

We are continually updating our records on Delaware's rare, threatened and endangered species, unique natural communities and other significant natural resources. If the start of the project is delayed more than a year past the date of this letter, please contact us again for the latest information.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,

A handwritten signature in black ink that reads "Danielle Ellis". The signature is written in a cursive, flowing style.

Danielle Ellis  
*Environmental Review Coordinator*  
Phone: (302) 223-2446  
6180 Hay Point Landing Road  
Smyrna, DE 19977

## **APPENDIX F**

### **Delaware Coastal Zone Consistency Compliance**

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DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT  
1650 ARCH STREET  
PHILADELPHIA PA 19103-2004

Environmental Resources Branch

September 23, 2024

Ms. Kimberly Cole  
Delaware Coastal Program  
Department of Natural Resources  
and Environmental Control  
100 W. Water Street, Suite 7B  
Dover, DE 19904  
[Kimberly.Cole@delaware.gov](mailto:Kimberly.Cole@delaware.gov)

Dear Ms. Cole:

The purpose of this letter is to request Federal consistency concurrence with the Delaware Coastal Management Program (DCMP) pursuant to Section 307(c) of the Coastal Zone Management Act (CZMA), as amended, for the proposed use of the existing Federally owned and maintained Delaware City Dredged Material Placement Facility (DMPF) in Delaware City, New Castle County, Delaware (Figure 1). The Philadelphia District - U.S. Army Corps (USACE) proposes to place approximately 900,000 to one million cubic yards of dredged materials from maintenance of the Delaware River Philadelphia to Sea (DPS) federal navigation channel (FNC), and future maintenance dredging of the Chesapeake and Delaware Canal.

In accordance with Section 102 of the National Environmental Policy Act, enclosed for your review and comment and to facilitate your review under Section 307(c) of the CZMA, is a draft Environmental Assessment (EA) titled: *Delaware City Dredged Material Placement Facility New Castle County, Delaware*. The EA evaluates the existing environmental, cultural, and socio-economic conditions at the proposed project site within the Delaware City DMPF. The EA also evaluates the effects of not placing dredged material within the Delaware City DMPF (No Action Alternative).

The USACE conducts routine maintenance dredging of the Delaware River, Philadelphia to Sea (DPS) Federal Navigation Channel (FNC) to maintain the 45-foot-deep navigation channel in the waterway. The USACE also conducts maintenance dredging of the Federally authorized 35-foot-deep Chesapeake and Delaware (C&D) Canal. Maintaining the DPS FNC supports the efficient transportation of containerized, dry and liquid bulk, break bulk, roll-on/roll-off, and project cargoes to and from the Delaware River ports. The C&D Canal navigation channel connects the Delaware River to the Chesapeake Bay and provides a continuous sea level channel connecting the Port of Baltimore to the ports of Wilmington, Philadelphia, and the northern trade routes. Conducting maintenance dredging removes critical shoaling to maintain safe navigation within the Federal navigation channels.

The primary objective of this project is to provide a long-term, safe, placement facility for dredged materials related to the DPS navigation maintenance project and the C&D Canal navigation maintenance project. The proposed placement of DPS FNC maintenance dredging material includes the Deepwater Point, Bulkhead Bar, and New Castle Ranges and from within the C&D Canal. The Delaware City DMPF project meets the need of providing the USACE with a long-term disposal site within pumping distance range (approximately five to six miles) from the locations identified above. The project as proposed involves the initial placement of approximately 900,000 to one million cubic yards of dredged materials from the DPS FNC to be placed within the Delaware City DMPF and subsequent placements of dredged material from future maintenance dredging, as needed. Placement of maintenance dredged materials is expected to occur as early as the winter of 2025. The Delaware City DMPF drains from a sluice box into an existing manmade ditch which discharges into the C&D Canal waterway via three adjacent corrugated outfall pipes as depicted in Figure 2.

The Delaware City DMPF was last used as a placement facility in the 1970s. Since then, the site has not been utilized for the placement of dredged material but continues to be maintained by the USACE as a DMPF. Recently, increased shoaling in the DPS FNC has resulted in the increased use of the Reedy North and Reedy South DMPFs, which are located just east of the Delaware City DMPF. Both the Reedy Point North and Reedy Point South DMPFs do not have adequate capacity as currently constructed and maintained. Additionally, the Killcohook DMPF located on the New Jersey side of the Delaware River is undergoing maintenance work that precludes that area from being available for dredged material placement within the next few years. The Delaware City DMPF was identified as a suitable facility for the placement of the maintenance dredging materials because of three factors: location, current condition, and available capacity. For all alternatives, the potential effects were evaluated, as appropriate.

In addition to a “No Action” alternative, five (5) other alternatives were evaluated. Those alternatives include the Reedy Island North and South DMPFs, the Governor Bacon DMPF, the Biddles Point DMPF, the Killcohook DMPF, and the beneficial use of dredged material.

The recommended plan will result in unavoidable adverse impacts to approximately 108-acres of freshwater, impounded aquatic habitat that includes about 16 separate freshwater ponded areas, with the largest being approximately 85-acres and the smallest is approximately 690 square feet (0.016-acres) in size. The open water aquatic habitat areas are not jurisdictional Waters of the United States regulated under Section 404 of the Clean Water Act, nor are they wetlands regulated pursuant to Title 7 of the Delaware Code (§7212) and Section 6607 of the Wetlands Act of 1973 (Title 7 Delaware Code Ch. 66).

The USACE is requesting a Federal consistency concurrence for maintenance

dredging placement operations in anticipation that future placement events may occur within the Delaware City DMPF. The proposed maintenance dredging placement has been evaluated for consistency with the Rules on Coastal Zone Management and this assessment is enclosed for your review.

Based on a review of all applicable regulations and policies in the document “*Federal Consistency Policy and Procedures – Comprehensive Update and Routine Implementation- November 20, 2018*”, and the completed *Coastal Zone Management Act Federal Consistency Form* (in Appendix D of the EA), it is USACE’s finding that the proposed action, as described in the document, complies with Delaware’s approved coastal management program and will be conducted in a manner consistent with the program. We request your concurrence with our consistency determination pursuant to Delaware’s Coastal Zone Management Program within 60 days. If significant modifications of the maintenance dredging placement operations are required in the future, the USACE will coordinate with your office with regard to Federal consistency, pursuant to the National Oceanic and Atmospheric Administration’s regulations (15 CFR 930). We request your concurrence that the proposed use and placement of dredged material into the Delaware City DMPF is consistent with Delaware’s Federally-approved Coastal Zone Management Program.

If you have any questions regarding this Federal action, please contact Steven Allen of our Environmental Resources Branch at (215) 656- 6559 or via email [Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil) or Michael Hart of our Operations Division at 215-656-6513 or via email [Michael.F.Hart@usace.army.mil](mailto:Michael.F.Hart@usace.army.mil).

Sincerely,

BRANDRETH.MAR  
Y.ELIZABETH.122  
9130427

Digitally signed by  
BRANDRETH.MARY.ELIZABETH  
H.1229130427  
Date: 2024.09.23 17:04:14  
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FOR

Adrian Leary  
Chief, Planning Division

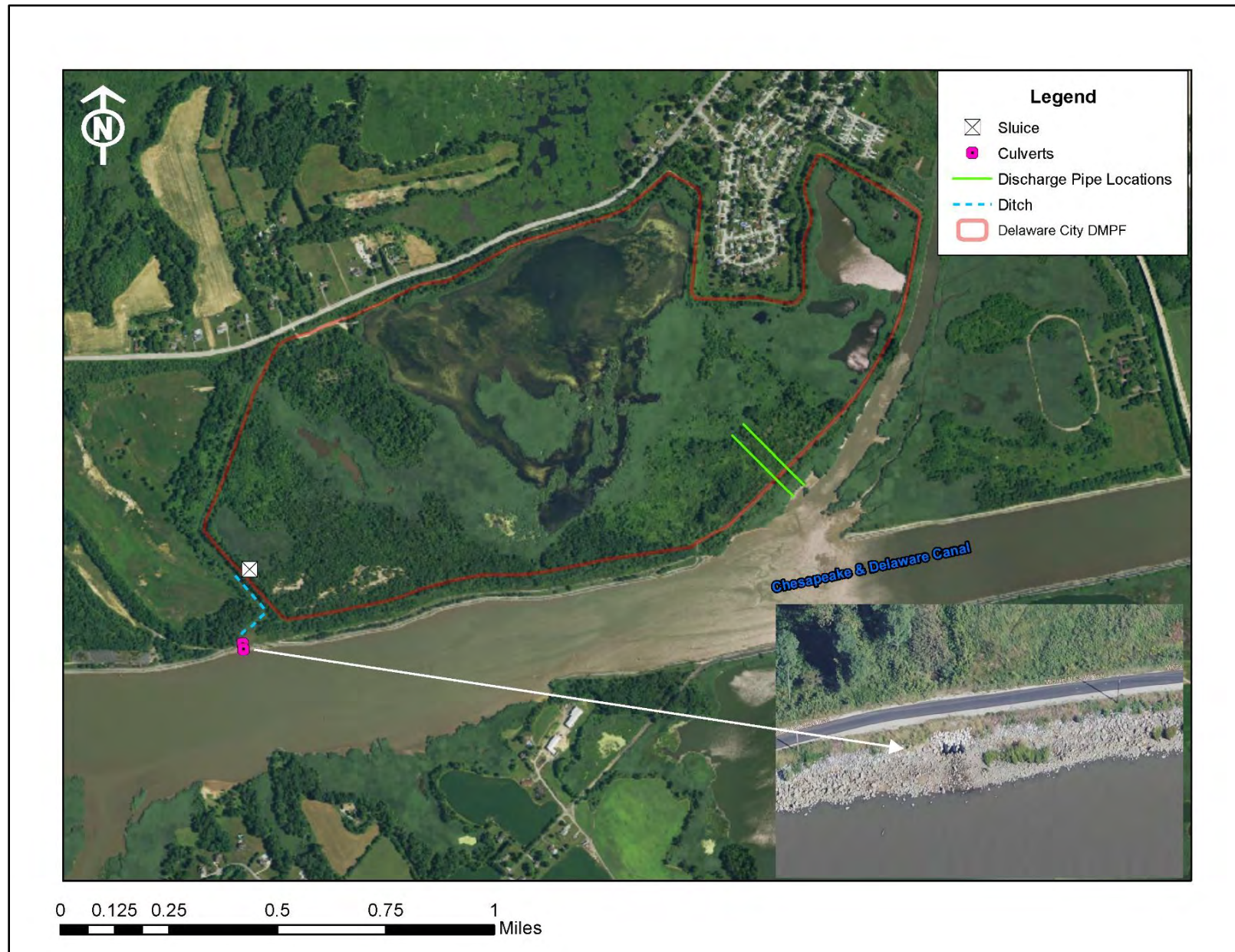
Enclosures

**Figure 1: Project Location Map – Delaware City DMPF**





Figure 2: Delaware City DMPF Map





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)

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

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

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

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

### 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:			
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 [attach comments]
Decision type: <small>(objections or conditions attach details)</small>	Decision Date:	

## **APPENDIX G**

### **Correspondence**



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Public Notice of Scoping Phase.

THIS IS NOT A PAID ADVERTISEMENT



**US Army Corps  
of Engineers**  
Philadelphia District

## Public Notice

Public Notice No.  
CENAP-PL-E-24-01

Date  
April 10, 2024

In Reply Refer to:  
Environmental Resources Branch

### **DELAWARE CITY CONFINED DISPOSAL FACILITY NEW CASTLE COUNTY, DELAWARE**

Notice is hereby given that the U.S. Army Corps of Engineers (USACE), Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the National Environmental Policy Act (NEPA) of 1969, this notice serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

The Philadelphia District is preparing this environmental assessment to address dredged material disposal needs for the ongoing O&M of the DPS and the C&D Canal navigation channels. The O&M for the DPS FNC was authorized in 1910 (HD 733, 61st Cong., 2nd Session) and modified in 1930 (HD 304, 71st Cong., 3rd Session); 1935 (R&H Comm. Doc 5, 73rd Cong., 1st Session); 1938 (SD 159, 75th Cong., 3rd Session); 1945 (HD 580, 76th Cong., 3rd Session and HD 340, 77th Cong., 1st Session); 1954 (HD 358, 83rd Cong., 2nd Session) and 1958 (HD 185, 85th Cong., 1st Session). The O&M for the C&D Canal navigation channel was authorized in 1935 (HD 201, 72nd cong., 1st Session) and modified in 1935 (R&H Com Doc 11, R&H Docs 18 and 24, 73rd Cong., 2nd Session), in 1939 (PL 310, 76th Cong., 1st Session and in 1954 (SD 123, 83rd Cong., 2nd Session).

The primary objective of this evaluation is to provide long-term, safe disposal for dredged material related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and the Delaware City Branch Canal (also referred to as the "Branch Canal"). The maintenance dredging of the navigation channels, and associated upland disposal of the dredge material, helps ensure safe navigation within the federally maintained channels. Maintaining the authorized 45-foot-deep DPS navigation channel and 35-foot-deep C&D Canal navigation channel is critical to sustaining economic activity in the region. Recently, increased shoaling in the DPS navigation channel has resulted in the increased use of the existing upland dredged material confined disposal facilities (CDFs) along the Delaware River which has resulted in decreased capacity at these CDFs. The upland CDFs are also commonly referred to as "dredge material placement facilities".

The EA will evaluate several dredged material disposal alternatives including the continued use of the upland CDFs along the Delaware River and C&D Canal (such as the Killcohook CDF, Reedy Point North and South CDFs, Artificial Island CDF, Biddles Point CDF, and the Delaware City CDF). Estimates of available dredged material capacities at the actively utilized CDFs along the Delaware River, including the Killcohook, Artificial Island, and Reedy Point North and South CDFs, have demonstrated that there is a need for additional disposal capacity for the maintenance dredging of the DPS and C&D navigation channels.

The Delaware City CDF is an area being considered for future placement of dredged material, with approximately 1.2 million cubic yards (CYs) of existing capacity. The CDF is within the acceptable pumping distance range (approximately five to six miles) from the maintenance dredge locations. Additional dike maintenance work can increase the available capacity of the Delaware City CDF to approximately 3 million CYs. This facility is located west of Delaware City, New Castle County, Delaware and approximately 13 miles south of Wilmington, Delaware (Figure 1). The Delaware City CDF is approximately 364 acres in size and is located directly north of the C&D Canal navigation channel and approximately 2.5-miles west of the New Castle Range of the DPS navigation channel. The Delaware City CDF was last used in the 1970s when the C&D Canal was widened to its current configuration. Since then, the site has not been utilized for the placement of dredge material but continues to be maintained by the USACE as a disposal facility. The EA will investigate any environmental, cultural, and socio-economic impacts associated with the proposed reuse of the Delaware City CDF as a dredge material disposal facility in accordance with the NEPA regulations.

This notice initiates scoping procedures as outlined in 33 CFR Part 230.12. Scoping is an early and open process for identifying any significant issues related to the proposed Federal action. Participation of the general public and other interested parties and stakeholders in identifying significant issues and alternatives is being solicited by means of this public notice. The public and other interested parties are invited to participate in the project scoping by providing written comments, questions, and concerns to this office within 30 days from the date of this notice.

For further information on this assessment, please contact:

Mr. Stephen Rochette  
U.S. Army Corps of Engineers  
ATTN: CENAP  
1650 Arch Street  
Philadelphia, PA 19103-2004

e-mail: [Stephen.Rochette@usace.army.mil](mailto:Stephen.Rochette@usace.army.mil)

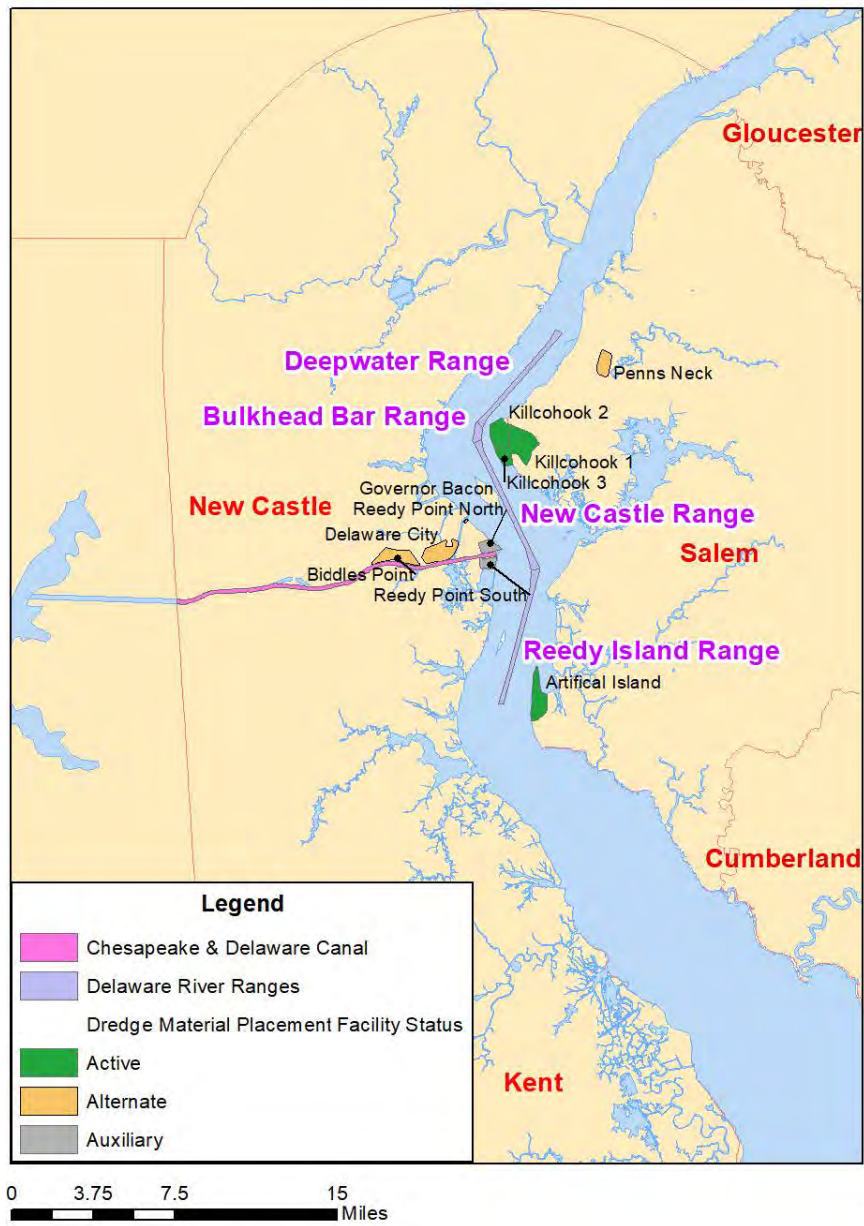
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Adrian Leary  
Acting Chief, Planning Division  
Philadelphia District  
U.S. Army Corps of Engineers



*Figure 1: Location of Delaware City Confined Disposal Facility*



*Figure 2: CDFs proximate to the Delaware River, Philadelphia to Sea Navigation Channel Ranges (Deepwater, Bulkhead Bar, New Castle, and Reedy Island Ranges) and the Chesapeake & Delaware Canal*





**DEPARTMENT OF THE ARMY**  
**U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT**  
1650 ARCH STREET  
PHILADELPHIA PA 19103-2004

10 April 2024

Dear Interested Party:

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the NEPA, this notice serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

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The primary objective of this evaluation is to provide long-term, safe disposal for dredged material related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and the Delaware City Branch Canal (also referred to as the "Branch Canal"). The maintenance dredging of the navigation channels, and associated upland disposal of the dredge material, helps ensure safe navigation within the federally maintained channels. Maintaining the authorized 45-foot-deep DPS navigation channel and 35-foot-deep C&D Canal navigation channel is critical to sustaining economic activity in the region. Recently, increased shoaling in the DPS navigation channel has resulted in the increased use of the existing upland dredged material confined disposal facilities (CDFs) along the Delaware River which has resulted in decreased capacity at these CDFs. The upland CDFs are also commonly referred to as "dredge material placement facilities".

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the actively utilized CDFs along the Delaware River, including the Killcohook, Artificial Island, and Reedy Point North and South CDFs, have demonstrated that there is a need for additional disposal capacity for the maintenance dredging of the DPS and C&D navigation channels.

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By this letter, we are inviting your agency/organization to participate in the scoping of this study. Please provide any relevant information within your agency's purview, and any comments or concerns that may have an impact on this assessment and the alternatives being considered within 30 days of the date of this letter.

Please direct your response and any environmental concerns to Steven Allen of the Environmental Resources Branch via email at [Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil). If you have any questions regarding the overall project, please contact Michael Hart, Project Manager, via email at [Michael.F.Hart@usace.army.mil](mailto:Michael.F.Hart@usace.army.mil) or by phone at (215) 656-6513.

Sincerely,

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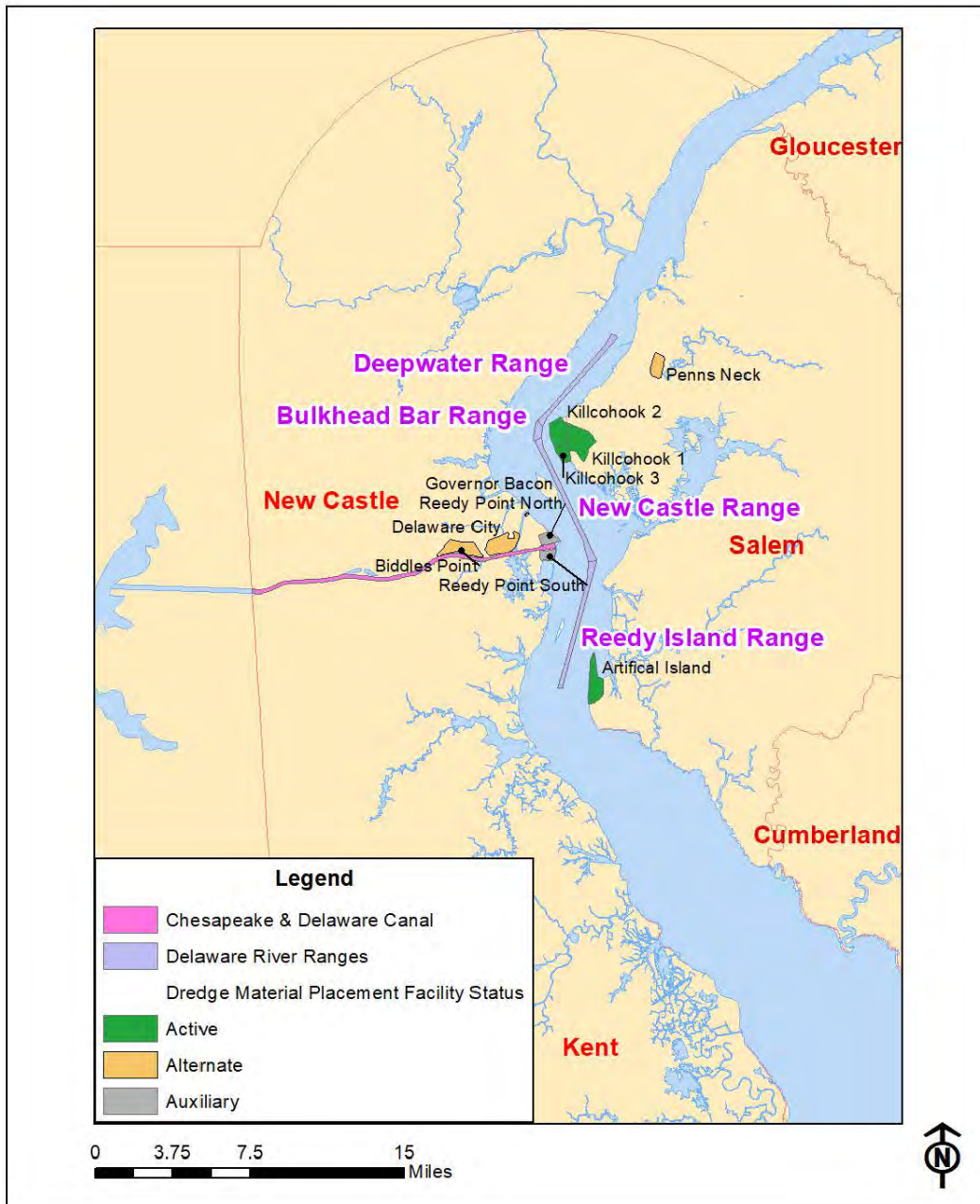
Adrian Leary  
Acting Chief, Planning Division

Enclosures

**Figure 1: Project Location Map – Location of Delaware City CDF**



**Figure 2: CDFs proximate to the Delaware River, Philadelphia to Sea Navigation Channel Ranges (Deepwater, Bulkhead Bar, New Castle and Reedy Island Ranges) and the Chesapeake & Delaware Canal**







DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT  
1650 ARCH STREET  
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### COORDINATION LIST (Enclosure 1)

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Sarah Carr  
Cultural Preservation Specialist  
Delaware State Historic Preservation Office  
29 North State Street  
Dover, DE 19901  
[sarah.carr@delaware.gov](mailto:sarah.carr@delaware.gov)

**From:** [Greenwood, Colin M CIV \(USA\)](#)  
**To:** [john.cargill@delaware.gov](#); [matthew.jones@delaware.gov](#); [Steve.williams@delaware.gov](#); [Edna.Stetzer@delaware.gov](#); [james.joachimowski@delaware.gov](#); [anthony.gonzon@delaware.gov](#); [patrick.emory@delaware.gov](#); [kimberly.cole@delaware.gov](#); [Hosler, Robert \(DNREC\)](#); [Rebecca.bobola@delaware.gov](#); [laura.mensch@delaware.gov](#); [john.clark@delaware.gov](#)  
**Cc:** [Allen, Steven D CIV USARMY CENAP \(USA\)](#)  
**Subject:** USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter  
**Date:** Thursday, April 11, 2024 1:24:00 PM  
**Attachments:** [USACE-Delaware City Confined Disposal Facility Scoping Letter.pdf](#)

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Dear Interested Party,

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the NEPA, this email and the attached letter serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

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By this email and the attached letter, we are inviting your agency to participate in the scoping of the assessment. Please provide any relevant information within your agency's purview, and any comments or concerns that may have an impact on this assessment and the alternatives being considered within 30 days of the date of this email. Please forward along to any of your colleagues at DNREC who are not included on this email.

Very respectfully,

**Colin Greenwood**

U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch  
1650 Arch Street  
Philadelphia, PA 19103-2004  
O: (215) 656-2338

**From:** [Greenwood, Colin M CTV \(USA\)](#)  
**To:** [Wiltman, Timothy](#); [traver.carrie@epa.gov](mailto:traver.carrie@epa.gov); [voigt.gregory@epa.gov](mailto:voigt.gregory@epa.gov); [Mazzarella, Christine](#)  
**Cc:** [Allen, Steven D CTV USARMY CENAP \(USA\)](#)  
**Subject:** USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter  
**Date:** Thursday, April 11, 2024 12:44:00 PM  
**Attachments:** [USACE-Delaware City Confined Disposal Facility Scoping Letter.pdf](#)

---

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Very respectfully,

**Colin Greenwood**

U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch  
1650 Arch Street  
Philadelphia, PA 19103-2004  
O: (215) 656-2338



**From:** [Greenwood, Colin M CTV \(USA\)](#)  
**To:** [sheila\\_eylem@fws.gov](#); [Genevieve\\_larouche@fws.gov](#)  
**Cc:** [Allen, Steven D CTV USARMY CENAP \(USA\)](#)  
**Subject:** USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter  
**Date:** Thursday, April 11, 2024 1:36:00 PM  
**Attachments:** [USACE-Delaware City Confined Disposal Facility Scoping Letter.pdf](#)

---

Dear Genevieve and Sheila,

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the NEPA, this email and the attached letter serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

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Very respectfully,

**Colin Greenwood**

U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch  
1650 Arch Street  
Philadelphia, PA 19103-2004  
O: (215) 656-2338

**From:** [Minnichbach, Nicole C CTV USARMY CENAP \(USA\)](#)  
**To:** [Davis, Gwen \(DOS\); Sarah Carr](#)  
**Cc:** [Greenwood, Colin M CTV \(USA\)](#)  
**Subject:** Delaware City CDF Scoping Letter  
**Date:** Thursday, April 11, 2024 12:54:08 PM  
**Attachments:** [USACE-Delaware City CDF Scoping Letter.pdf](#)  
[Delaware City CDF.kmz](#)

---

Please see the attached letter regarding the Delaware City Confined Disposal Facility (CDF).

Thank you.

Nikki Minnichbach  
Cultural Resource Specialist and Tribal Liaison  
USACE Philadelphia District  
1650 Arch Street  
Philadelphia, PA 19103  
(o) 215-656-6556  
(m) 215-834-1065



**From:** [Minnichbach, Nicole C CTV USARMY CENAP \(USA\)](#)  
**To:** [Darren Bonaparte; Eastern Shawnee Tribe of Oklahoma \(THPO\); Jeff Bendremer; Bergevin, Jesse; klucas@delawarenation-nsn.gov; Paul Lepsch \(paul.lepsch@snj.org\); Rhonda Barnes; Susan Bachor; thpo](#)  
**Cc:** [Greenwood, Colin M CTV \(USA\)](#)  
**Subject:** Delaware City CDF Scoping Letter  
**Date:** Thursday, April 11, 2024 12:55:14 PM  
**Attachments:** [USACE-Delaware City CDF Scoping Letter.pdf](#)  
[Delaware City CDF.kmz](#)

---

Good afternoon THPOs and Reviewers,

Please see the attached letter regarding the Delaware City Confined Disposal Facility (CDF).

Respectfully,

Nikki Minnichbach  
Cultural Resource Specialist and Tribal Liaison  
USACE Philadelphia District  
1650 Arch Street  
Philadelphia, PA 19103  
(o) 215-656-6556  
(m) 215-834-1065

Comments received by John Cargill, Hydrologist from DNREC's Watershed Assessment and Management Section during the Scoping Phase.

**From:** [Cargill IV, John G. \(DNREC\)](#)  
**To:** [Allen, Steven D.CIV USARMY CENAP \(USA\)](#); [Greenwood, Colin M.CIV \(USA\)](#); [Hart, Michael F.CIV USARMY CENAP \(USA\)](#)  
**Cc:** [Jones, Matthew B. \(DNREC\)](#); [Williams, Stephen N. \(DNREC\)](#); [Stetzer, Edna \(DNREC\)](#); [Joachimowski, James M. \(DNREC\)](#); [Emory, Patrick J. \(DNREC\)](#); [Cole, Kimberly B. \(DNREC\)](#); [Hossler, Robert \(DNREC\)](#); [Bobola, Rebecca \(DNREC\)](#); [Clark, John \(DNREC\)](#); [Bott, Michael M. \(DNREC\)](#)  
**Subject:** [Non-DoD Source] RE: USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter  
**Date:** Friday, May 10, 2024 2:02:14 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
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[image004.png](#)  
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[image006.png](#)  
[image007.png](#)  
[image008.png](#)  
[image009.png](#)

Steve, Michael and Colin:

With regard to the referenced project, a TMDL exist for PCBs in the C&D Canal and the adjacent Delaware River, and fish consumption advisories exist for both the Delaware River and the C&D Canal. In addition, DNREC's Watershed Assessment & Management Section and USEPA are currently developing an Advance Restoration Plan (ARP) for toxic contaminants in the C&D Canal watershed. The development of the C&D Canal ARP is driven by Delaware's 303(d) listings of impaired waters, specifically for PCBs, dioxins/furans, and dieldrin (these are the same contaminants driving fish consumption advisories). The intent of the ARP is to identify potential sources (or source categories) of the impairment driving chemical(s), and develop plans to assess, track and/or mitigate future releases from primary or secondary contaminant sources. The USACE C&D Canal dredge disposal sites are one documented potential source of the risk driving chemicals, primarily due to the historic placement of municipal sewage sludge as a bioamendment to many of the former disposal sites. Although available documentation does not indicate that the Delaware City CDF received an application of biosolids in the past, the records are limited.

So, to ensure that the proposed activity(ies) will not cause any increase of impacts to the C&D Canal and/or adjacent Delaware River from contaminants of concern, DNREC requests that the pond water be sampled and analyzed prior to its discharge to the C&D Canal. In addition, DNREC requests that a samples of the existing sediment in the former CDF be sampled and analyzed to ensure that excavation and subsequent berm construction will not expose potentially buried contaminants from prior dredging activities to construction workers or ecological receptors.

Samples should be characterized, at a minimum, for metals, PCBs (using a non-aroclor method), dioxin and furan TEQs, and chlorinated pesticides.

If you have any additional questions, please don't hesitate to reach out.

Have a great weekend.

John



## John G. Cargill, IV, P.G.

Hydrologist M, WAMS

302-395-2600 (New Castle) 302-739-9939 (Dover)

[John.Cargill@delaware.gov](mailto:John.Cargill@delaware.gov)

391 Lukens Drive, New Castle, DE 19720

285 Beiser Blvd., Suite 102, Dover, DE 19904

[dnrec.delaware.gov](http://dnrec.delaware.gov)



**From:** Greenwood, Colin M CIV (USA) <Colin.M.Greenwood@usace.army.mil>

**Sent:** Thursday, April 11, 2024 1:25 PM

**To:** Cargill IV, John G. (DNREC) <John.Cargill@delaware.gov>; Jones, Matthew R. (DNREC)

<Matthew.Jones@delaware.gov>; Steve.williams@delaware.gov; Stetzar, Edna (DNREC)

<Edna.Stetzar@delaware.gov>; Joachimowski, James M. (DNREC)

<James.Joachimowski@delaware.gov>; Gonzon, Anthony T. (DNREC)

<Anthony.Gonzon@delaware.gov>; Emory, Patrick J. (DNREC) <Patrick.Emory@delaware.gov>; Cole,

Kimberly B. (DNREC) <Kimberly.Cole@delaware.gov>; Hossler, Robert (DNREC)

<Robert.Hossler@delaware.gov>; Bobola, Rebecca (DNREC) <Rebecca.Bobola@delaware.gov>;

laura.mensch@delaware.gov; Clark, John (DNREC) <John.Clark@delaware.gov>

**Cc:** Allen, Steven D CIV USARMY CENAP (USA) <Steven.D.Allen@usace.army.mil>

**Subject:** USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter

Dear Interested Party,

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the NEPA, this email and the attached letter serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

The primary objective of this evaluation is to provide long-term, safe disposal for dredged material related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and the Delaware City Branch Canal (also referred to as the "Branch Canal"). The Delaware City CDF is an area being considered for future placement of dredged material, with approximately 1.2 million cubic yards of existing capacity. The Delaware City CDF is within the acceptable pumping distance range (approximately five to six miles) from the maintenance dredge locations. Additional information is provided in the attached scoping letter.



Comments received by Emma Esch, Life Scientist and NEPA Reviewer from USEPA Mid-Atlantic Region (Region 3).

**From:** [Allen, Steven D CIV USARMY CENAP \(USA\)](#)  
**To:** [Greenwood, Colin M CIV \(USA\)](#)  
**Cc:** [Brandreth, Mary F CIV USARMY CENAP \(USA\)](#)  
**Subject:** FW: Delaware City CDF Scoping Comments  
**Date:** Thursday, May 9, 2024 10:59:01 AM

---

-----Original Message-----

From: Esch, Emma (she/her/hers) <Esch.Emma@epa.gov>  
Sent: Thursday, May 09, 2024 10:47 AM  
To: Allen, Steven D CIV USARMY CENAP (USA) <Steven.D.Allen@usace.army.mil>  
Cc: Witman, Timothy <witman.timothy@epa.gov>; Traver, Carrie <Traver.Carrie@epa.gov>; Motley, Natalie <Motley.Natalie@epa.gov>  
Subject: [Non-DoD Source] Delaware City CDF Scoping Comments

Dear Mr. Allen,

Thank you for providing notice that the U.S. Army Corps of Engineers (USACE) Philadelphia District is preparing an Environmental Assessment (EA or Study) in accordance with the National Environmental Policy Act (NEPA). The EA will evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel, and the O&M for the Chesapeake and Delaware Canal navigation channel. The EA will evaluate several dredged material disposal alternatives and assess impacts, including the proposed use of the Delaware City confined disposal facility (CDF).

As described, the Delaware City CDF was last utilized as an upland disposal facility in the late 1970s. Since then, the site has not been utilized for the placement of dredged material. Due to the site's dormancy for approximately 50 years, the full range of potential impacts from the reuse of the Delaware City CDF should be assessed.

#### Water Quality

The EA should include a summary of water quality monitoring data and other information regarding the existing surface water, groundwater, and hydrologic regime at the site and surrounding waters that may be affected by the proposed project. This will inform the impacts analysis and should be used to plan any avoidance, minimization, or mitigation efforts needed to prevent or reduce impacts to water resources.

Currently, much of the CDF area appears to be mapped as wetlands by both NWI and Delaware Department of Natural Resources and Environmental Control. The mapped wetlands range from open water to palustrine emergent (PEM) and palustrine forested and/or scrub shrub (PFO/PSS). These areas are also mapped as 'Head of Tide' wetlands. We recommend providing a current or recent delineation of resources. The EA should include an assessment of the presence of wetlands and the suite of functions they provide as well as the jurisdictional context (federally or state regulated or exempt.)

EPA's R3 Wetlands Branch provides the following comments:

\* The scoping letter indicates that the Delaware City CDF is an upland disposal facility that could continue to be used as a dredged material disposal alternative location. However, based on review of mapping resources and material presented at the JPP meeting on March 21, 2024, is not entirely comprised of uplands. Specifically, the presentation noted that the 364-acre site consists of 108 acres of open water, 150 acres phragmites dominated area, 78 acres other land (scrub/shrub, barren), and 28-acres wooded. As such, EPA recommends that the EA provide

information indicating the amount of area (acreage or square footage) of the aquatic resources that may be impacted. Additionally, the inclusion of an impact map demonstrating the locations, area amount, and aquatic resource type affected would help illustrate the project's proposed impacts.

\* If temporary impacts to Waters of the United States (WOTUS) associated with the dredging equipment, such as pipelines are anticipated, EPA also recommends the EA show the temporary impact locations on a map or plan and detail how these temporary impacts will be restored to baseline conditions.

\* Should a Section 404 permit be needed, the application should include an alternative analysis and supporting information to document why the preferred alternative is the least environmentally practicable alternative (LEDPA) as required by the CWA Section 404 (b)(1) Guidelines.

\* The Guidelines state that secondary and cumulative effects should be considered when evaluating the LEDPA. Filling of aquatic resources is not only a direct impact but will likely lead to changes in the biogeochemical and hydrologic conditions of the remaining aquatic resources. As such, the EA should provide documentation noting how potential secondary effects to remaining aquatic resources were evaluated and best management practices (BMPs) that will be implemented to avoid and minimize such effects.

\* It was stated at the March 21, 2024 JPP meeting that the Delaware City CDF project may qualify under the Waste Treatment Exclusion criteria. The EA should address whether it will be considered under this exclusion, and provide information documenting how the waters will function as a waste treatment system and serve a treatment purpose.

#### Biological Resources

Critical to the EA will be an assessment of impacts to habitat the Delaware City CDF site currently provides, especially for birds and herpetofauna. Habitat loss combined with stressors such as climate change contributes to the decline of at-risk species, including birds of conservation concern, bats, and herpetiles, as well as other state and federally listed species. Using the area for dredged material may have adverse effects on habitat for some species; to assess and reduce such effects, the assessment should identify sensitive species and their habitats. Potential direct, indirect, and cumulative impacts should be fully evaluated.

\* We note the area is generally part of Delaware Coastal Zone Important Bird Area (IBA). eBird reports sighting of 178 bird species in the vicinity of the "Canal Pond," including a number of waterfowl and wading birds. The EA should identify habitat, including areas for breeding, nesting, or other key life stages.

\* We recommend that the USACE consider how the Proposed Action will support habitat connectivity and wildlife corridors in accordance with the March 21, 2023 CEQ Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors, especially those that may have limited mobility across roads or other obstructions.

\* The EA should include consideration of measures that will avoid and minimize adverse effects, such as time of year restrictions or avoidance of sensitive areas where possible.

#### Community Impacts

A residential area is located adjacent to the Delaware City CDF. Given the proximity of this community to the project site, it is imperative to thoroughly assess potential impacts on the community, including noise, traffic, and visual effects. Additionally, the potential impacts on localized flooding and sea level rise in the area, as well as any impacts to historic or cultural resources, should be discussed.

EPA recommends the inclusion of a comprehensive outreach plan to address community concerns and minimize adverse effects wherever feasible. We encourage ongoing dialogue with the affected community to address potential impacts and incorporate mitigation measures into the project's planning and execution.

#### Environmental Justice

Executive Order (EO) 12898 Federal Actions to Address Environmental justice in Minority Populations and Low-Income Populations, February 11, 1994, was supplemented with EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All on April 26, 2023. EO 14096 directs federal agencies, as appropriate and consistent with applicable law: to identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of Federal activities, including those related to climate change and cumulative impacts of environmental and other burdens on communities with environmental justice concerns.

#### Climate Change

On January 9, 2023, the Council on Environmental Quality (CEQ) published interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews.  
<https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>  
<Blockedhttps://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate> CEQ developed this guidance in response to EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. CEQ indicated that agencies should use this interim guidance to inform the NEPA review for all new proposed actions. EPA recommends the USACE apply the interim guidance as appropriate to ensure robust consideration of potential climate impacts, mitigation, and adaptation.

EPA recommends that the USACE use updated climate change projections to assess future impacts on dredge material placement in the CDF. An assessment of the ongoing and intensifying impacts from climate change, the ways such impacts might further exacerbate potential project impacts and any appropriate adaptation measures should be included in the analysis. This assessment should specifically address the impacts of the proposed action on localized flooding and sea level rise.

#### Cumulative Impacts

Cumulative impacts, including past impacts to wetlands from the construction and operation of the CDF, should be fully evaluated in the EA.

We look forward to future discussion and coordination. Please provide future project notifications to me and Tim Witman at [witman.timothy@epa.gov](mailto:witman.timothy@epa.gov) <<mailto:witman.timothy@epa.gov>> via email.

Thank you.

Emma Esch

Life Scientist, NEPA Reviewer



EJ, Community Health, & Environmental Review Division

US EPA Mid-Atlantic Region

Phone 215-814-2723

Email [esch.emma@epa.gov](mailto:esch.emma@epa.gov) <Blocked<http://esch.emma@epa.gov/>>

<Blocked<https://www.facebook.com/EPAregion3>> <Blocked<http://twitter.com/EPAregion3>>  
<Blocked<http://linkedin.com/company/us-epa>>

Comments received from Meagan Riley, Biologist, ESA Section 7 from NOAA Fisheries Greater Atlantic Regional Fisheries Office in response to the Scoping Letter.

From: Meagan Riley, NOAA Federal  
To: [Greenwood, Colin M. CIV \(USA\)](#)  
Cc: [Blin, Steven D. CIV \(US Army Corps of Engineers\)](#); [Kurtz, Virginia](#); [HQA, Federal](#); [HQA, Federal](#); [HQA, Federal](#)  
Subject: Re: [Non-Redacted] HQA Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter  
Date: Wednesday, August 14, 2024 4:02:32 PM  
Attachments: [mwa2024.dcf](#)

Thank you very much for the information, Colin.

The additional placement location for dredged material (Delaware City CDF) will result in 1. vessel traffic routes may change within a 3 mile span on the Delaware River, and 2. a net increase of one to the total number of CDFs utilized for the of the Philadelphia to the Sea navigational channel dredging project. Project vessels routed to Delaware City CDF instead of Kilchook CDF will not necessarily travel farther to reach the disposal location and may travel a shorter distance to a chosen disposal site, and will depend on where dredging will take place within Reach C. We expect that the vessel routes related to disposal activities will change slightly, but based on the information you provided, the total number of vessel trips is not expected to increase as a result of this change. Therefore, this proposed change to the project will not change our assessment of effects related to vessel traffic analyzed in the BiOp. Therefore, reinitiation of consultation is not required at this time. If there are any other changes to the project that may warrant reinitiation, please reach out at that time.

Meagan

Meagan Riley  
Biologist, ESA Section 7  
Greater Atlantic Regional Fisheries Office  
NOAA Fisheries | U.S. Department of Commerce  
Office: (978) 281-9339



On Wed, Aug 14, 2024 at 2:15 PM Greenwood, Colin M. CIV (USA) <[Colin.M.Greenwood@usace.army.mil](mailto:Colin.M.Greenwood@usace.army.mil)> wrote:

Hi Meagan,

Apologies for the delay in my response to your previous email and the questions you posed. The dredged material proposed to be placed in the Delaware City CDF (also referred to as a "Dredge Material Placement Facility" or "DMPF") will be from Reach C. As to the Delaware City Branch Canal, that waterway has not been dredged by the Corps in some time, so its unlikely ESA Section 7 consultation has been completed for maintenance dredging of the waterway. There are no plans for the Corps to dredge the Branch Canal at this time, however consultation with NMFS for ESA Section 7 and EFH will be initiated prior to any future maintenance dredging of the waterway.

Please let me know of any further questions.

Thanks,

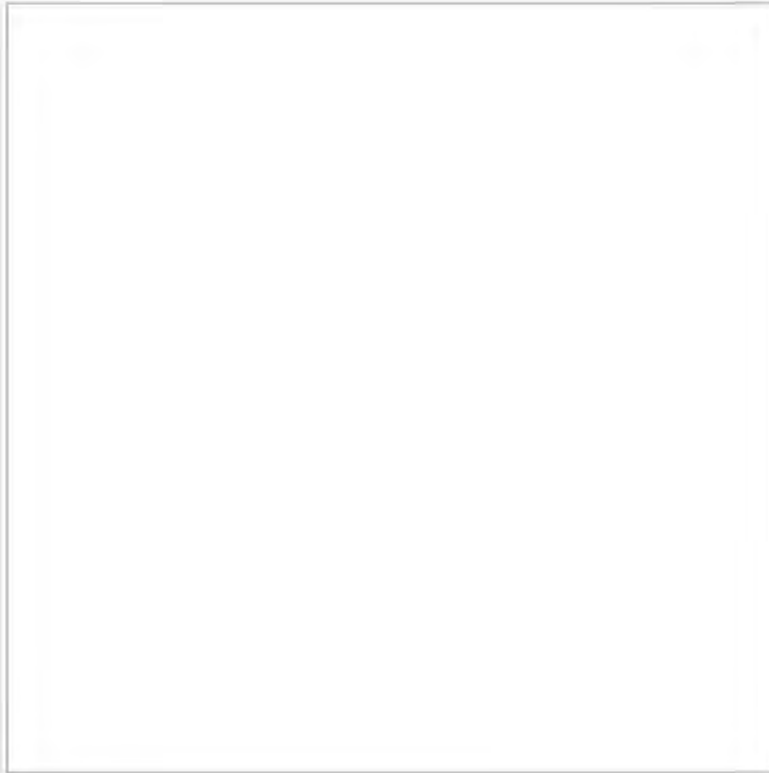
Colin Greenwood

U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch

[1650 Arch Street](#)

[Philadelphia, PA 19103-2004](#)

Or: (215) 656-2338



**From:** Meagan Riley - NOAA Federal <[meagan.riley@noaa.gov](mailto:meagan.riley@noaa.gov)>  
**Sent:** Thursday, June 27, 2024 12:10 PM  
**To:** Greenwood, Colin M CTV (USA) <[Colin.M.Greenwood@usace.army.mil](mailto:Colin.M.Greenwood@usace.army.mil)>  
**Cc:** Allen, Steven D CTV USARMY CENAP (USA) <[Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil)>; Rooney, Timothy J CTV (USA) <[Timothy.J.Rooney@usace.army.mil](mailto:Timothy.J.Rooney@usace.army.mil)>; Karen Greene - NOAA Federal <[karen.greene@noaa.gov](mailto:karen.greene@noaa.gov)>; Robert Bourdon - NOAA Federal <[robert.bourdon@noaa.gov](mailto:robert.bourdon@noaa.gov)>  
**Subject:** Re: [Non-DoD Source] Re: USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter

Hi Colin. Thanks for the additional information.

The proposed activity involves changes to dredged material placement in association with the maintenance dredging of the Philadelphia to the Sea navigational channel project analyzed in the 2019 Delaware Deepening BiOp. The USACE proposes to add the Delaware City CDF as a disposal site for dredged material and will divert some dredged material from Kilcohook CDF to Delaware City CDF for the life of the project. The 2019 BiOp states that "dredged material (approximately 2,000,000 cu/y) from maintenance dredging of Reach C will be disposed of at the Kilcohook and Pedricktown CDFs." There is no analysis of impacts from placement at Delaware City CDF in the BiOp. Will dredged material from any Reaches besides Reach C be disposed of at the Delaware City CDF? Please see Figure 2 in the attached BiOp for our designation of Reach C.

Also, you also mention the Delaware City Branch Canal (also referred to as the "Branch Canal") dredging project in your letter. Please confirm that ESA Section 7 consultation was completed for that project.

Thanks,  
Meagan

Meagan Riley  
Biologia, ESA Section 7

Greater Atlantic Regional Fisheries Office  
NOAA Fisheries | U.S. Department of Commerce  
Office: (978) 281-9339



On Tue, Jun 18, 2024 at 8:57 AM Greenwood, Colin M CIV (USA) <[Colin.M.Greenwood@usace.army.mil](mailto:Colin.M.Greenwood@usace.army.mil)> wrote:

Hi Megan,

The Delaware City Dredge Material Placement Facility (DMPF) (these sites are also commonly referred to as CDFs – “Confined Disposal Facilities”) is proposed to be used as an alternate to the Kilcohook DMPF as that facility will be “offline” in 2025 for construction and dewatering activities and will not be available for maintenance dredge placement for several years. Once the construction and dewatering activities are complete at Kilcohook, that site will be brought back online for maintenance dredging placement and the Delaware City DMPF will also be utilized for placement as needed in combination with all the other existing Delaware River DMPFs.

Let us know of any further questions

Thanks,

**Colin Greenwood**

U.S. Army Corps of Engineers, Philadelphia District

Environmental Resources Branch

[1650 Arch Street](#)

[Philadelphia, PA 19103-2004](#)

Or: (215) 656-2338

**From:** Megan Riley - NOAA Federal <[megan.riley@noaa.gov](mailto:megan.riley@noaa.gov)>  
**Sent:** Monday, June 17, 2024 1:34 PM  
**To:** Allen, Steven D CTV USARMY CENAP (USA) <[Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil)>  
**Cc:** Greenwood, Colin M CTV (USA) <[Colin.M.Greenwood@usace.army.mil](mailto:Colin.M.Greenwood@usace.army.mil)>  
**Subject:** Re: [Non-DoD Source] Re: USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter

Thanks, Steven.

Hi Colin, is the Delaware City CDF going to be used in place of other disposal sites (will some sites no longer be used for this project)? Or will it be used in addition to the other sites I listed below (the total number of disposal sites used for the project will increase)?

Thanks,

Megan

Megan Riley  
Biologist, ESA Section 7

Greater Atlantic Regional Fisheries Office  
NOAA Fisheries | U.S. Department of Commerce  
Office: (978) 281-9339

On Fri, Jun 14, 2024 at 10:45 AM Allen, Steven D CIV USARMY CENAP (USA) <[Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil)> wrote:

Good Morning Megan,

Thank you for reaching out and providing your questions on the scoping for the Delaware City CDF EA. I attached a map showing the CDF location in yellow with the geographic coordinates for the approximate center of the site. This site is an existing CDF that was last used in the 1970's. The dikes have been maintained and the interior of the site remains non-tidal with an operational sluice structure. Please let me know if you'd like to set up a call to discuss for further questions/information and develop a recommended course of action for ESA compliance. I cc'd Colin Greenwood, who is working on the EA. Thanks and have a great weekend!

Steve

V/R

Steven D. Allen  
U.S. Army Corps of Engineers, Philadelphia District  
Environmental Resources Branch  
1650 Arch Street  
Philadelphia, PA 19103-2094  
(215) 656-6559 (Desk)  
(445) 942-9478 (Mobile)

-----Original Message-----

From: Megan Riley - NOAA Federal <[megan.riley@noaa.gov](mailto:megan.riley@noaa.gov)>

Sent: Thursday, June 13, 2024 5:33 PM

To: Allen, Steven D CIV USARMY CENAP (USA) <[Steven.D.Allen@usace.army.mil](mailto:Steven.D.Allen@usace.army.mil)>

Subject: [Non-DOD Source] Re: USACE-Delaware City Confined Disposal Facility Environmental Assessment Scoping Letter

Hi Steven. I hope you are well!

I have the following comments and questions regarding the placement of dredged material for the Delaware River, Philadelphia to the Sea (DPS) navigation channel at the Delaware City CDF:

According to the 2019 Biological Opinion (BiOp) for Deepening and Maintenance of the Delaware River Federal Navigation Channel (GARFO-2019-01942 <<https://repository.library.noaa.gov/view/noaa/22748>> ), dredged material from maintenance of the Philadelphia to the Sea channel is to be disposed of at the following disposal sites: open water disposal at Buoy 10, Artificial Island CDF, Killbuck CDF, Pedrick-town CDF, Fort Mifflin CDF, Delaware Artificial Reef, Nation Park CDF, and Oldmans CDF. Disposal of dredged material at Delaware City CDF was not analyzed in the BiOp. If the ACOE decides to move forward with this change to utilize the Delaware City CDF for dredged material, we would like to discuss any potential changes in vessel traffic and how the change in location of placement could impact critical habitat and ESA-listed species. Could you please provide the coordinates for the Delaware City CDF?

Thanks,  
Megan

Megan Riley  
Biologist, ESA Section 7  
Greater Atlantic Regional Fisheries Office  
NOAA Fisheries | U.S. Department of Commerce  
Office: (978) 281-9339  
<[https://h6.googleusercontent.com/yrf66neooSQX1gyVivHARG5lpYVCmgRk3iKecRQqidefe83MgewfyC7KjCbOMP7FW028ylguba\\_dTmbkESb5N-xG6Avtse7JNfUWKqgRl6B3mrE5KzCa5TWsLXduhYqQtSys=s1600](https://h6.googleusercontent.com/yrf66neooSQX1gyVivHARG5lpYVCmgRk3iKecRQqidefe83MgewfyC7KjCbOMP7FW028ylguba_dTmbkESb5N-xG6Avtse7JNfUWKqgRl6B3mrE5KzCa5TWsLXduhYqQtSys=s1600)>

On Tue, Apr 30, 2024 at 9:32 AM Greenwood, Colin M CIV (USA) <[Colin.M.Greenwood@usace.army.mil](mailto:Colin.M.Greenwood@usace.army.mil)> <<mailto:Colin.M.Greenwood@usace.army.mil>> wrote:

Dear Interested Party,

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is initiating the scoping phase for an environmental assessment (EA) to evaluate dredged material disposal alternatives that address disposal capacity needs for the operation and maintenance (O&M) of the Delaware River, Philadelphia to the Sea (DPS) navigation channel and the O&M for the Chesapeake and Delaware (C&D) Canal navigation channel. In accordance with the NEPA, this email and the attached letter serves as the initiation of the scoping process as outlined in 33 CFR Part 230.12 for any potential project or Federal action proposed in the EA.

The primary objective of this evaluation is to provide long-term, safe disposal for dredged material related to the DPS navigation maintenance project, the C&D Canal navigation maintenance project, and the Delaware City Branch Canal (also referred to as the "Branch Canal"). The Delaware City CDF is an area being considered for future placement of dredged material, with approximately 1.2 million cubic yards of existing capacity. The Delaware City CDF is within the acceptable pumping distance range (approximately five to six miles) from the maintenance dredge locations. Additional information is provided in the attached scoping letter.

By this email and the attached letter, we are inviting your agency to participate in the scoping of the assessment. Please provide any relevant information within your agency's purview, and any comments or concerns that may have an impact on this assessment and the alternatives being considered within 30 days of the date of this email (April 30th). Please forward along to any of your colleagues at NOAA NMFS who are not included on this email.

Thanks,



Colin Greenwood

U.S. Army Corps of Engineers, Philadelphia District

Environmental Resources Branch

[1650 Arch Street](#)

[Philadelphia, PA 19103-2004](#)

Or: (215) 656-2338