



## Indian River Flood Shoal Dredging and Beneficial Use Project

September 2024

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## Permit Supplement

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## ABBREVIATIONS

BU	Beneficial Use
CWA	Clean Water Act
CY	Cubic Yards
CZM	Coastal Zone Management
DNREC	Delaware Department of Natural Resources and Environmental Control
EFH	Essential Fish Habitat
IPaC	Information for Planning and Consultation
NAVD	North American Vertical Datum
North Beach	North Indian River Inlet Beach (northside)
Project	Indian River Flood Shoal and Beneficial Use Project
SHPO	State Historic Preservation Office
SR-1	Delaware State Route-1
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

# 1. Introduction

This document has been developed to support applications for federal- and state-related permits and approvals required for dredging of three potential borrow sites near Indian River Inlet and beneficial use (BU) of the dredged material at the North Indian River Inlet Beach (North Beach), Delaware Seashore State Park, Sussex County, Delaware. The Project aims to dredge up to 800,000 cubic yards (cy) of sediment from the Indian River Flood Shoal, Middle Island Shoal, and/or Burton Island Shoal to rebuild over 5,200 linear feet of coastline.

Conditions at North Beach have been severely deteriorating overtime and adding sand via truck haul can no longer overcome the current rate of erosion. North Beach needs to be rebuilt with a large volume of sand that is delivered rapidly; therefore DNREC's Shoreline and Waterway Management Section is seeking emergency authorization to restore the dune system at North Beach as the northbound lanes of Delaware State Route-1 (SR-1) near the Charles W. Cullen Memorial Bridge are at high risk of inundation. The current emergency repair work also requires a lane closure, which reduces the capacity of SR-1 that is an emergency evacuation route.

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

- U.S. Army Corps of Engineers (USACE):
  - Clean Water Act (CWA) Section 404 permit for dredging and fill activities, Individual Permit
  - Section 408 Review
- DNREC Wetlands and Waterways Section
  - CWA Section 401 Water Quality Certification
- Delaware Coastal Programs
  - Coastal Zone Management Act (CZM) Federal Consistency determination

# 1.1 Project Location

Dredging would occur in the Indian River Flood Shoal, Middle Island Shoal, and/or Burton Island Shoal borrow areas located in Delaware waters near the federal navigation channel of Indian River Inlet, Sussex County, Delaware (Figure 1). The North Beach placement area is located within Delaware Seashore State Park on the north side of the Indian River Inlet. Restoration would occur from the north jetty and extend northward for over 5,200 linear feet.

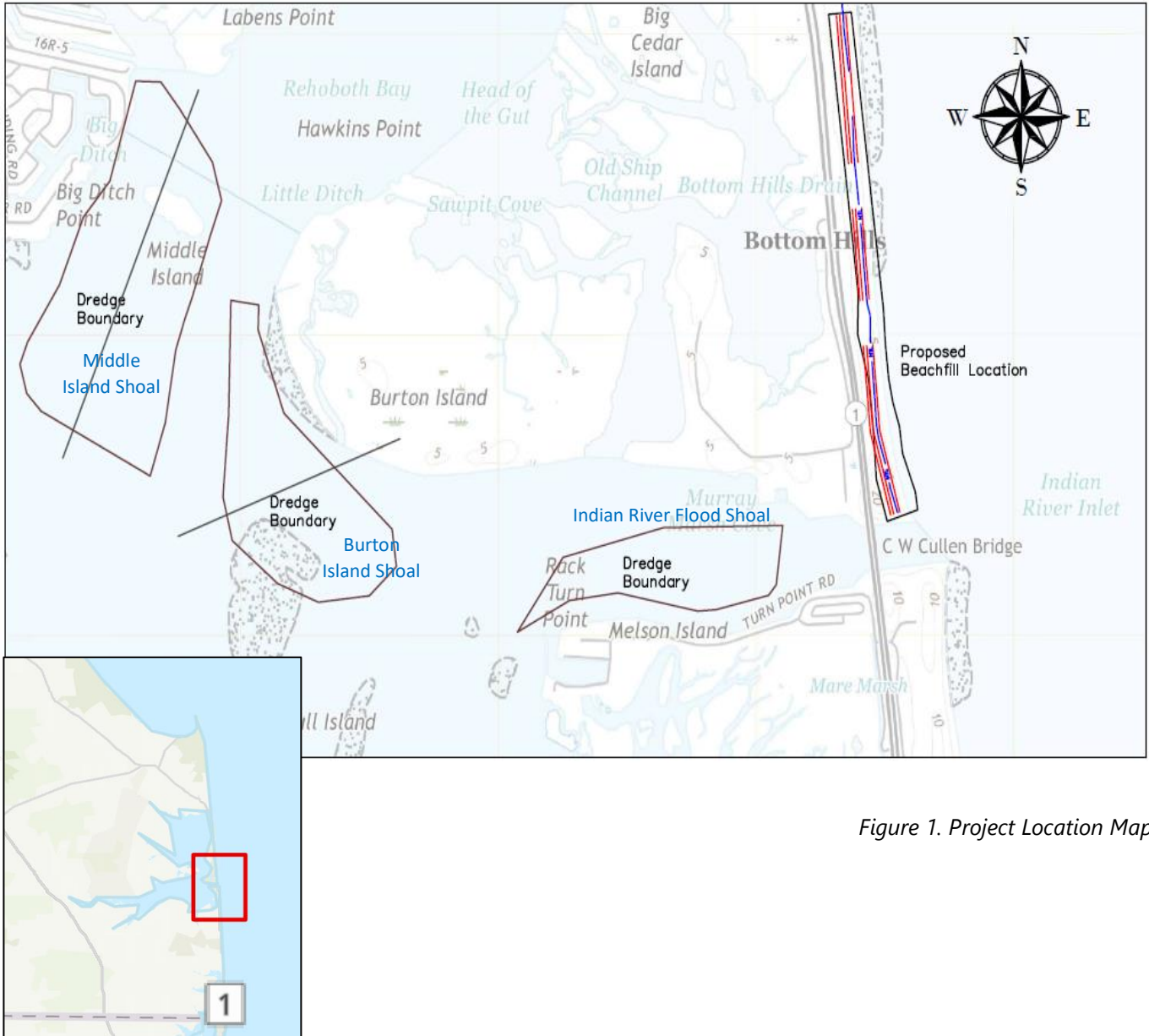


Figure 1. Project Location Map

## 1.2 Project Purpose

The northside Indian River Inlet coastline (North Beach) has a long history of erosion due to the interruption of the northward flow of sand caused by the construction of the inlet jetties. This erosion has made critical infrastructure, such as SR-1 and the Charles W. Cullen Memorial (Inlet) Bridge, more vulnerable to storm damages. To mitigate risk and provide a consistent source of sand to North Beach, a sand bypass facility was constructed in 1990 by USACE and is operated and maintained by the State of Delaware. The sand bypass system imitates the natural flow of sand from south to north by continuously pumping sand from the southside beach, across the inlet to North Beach. Sand pumping rates are variable and average 50,000 cy of sand per year.

In addition to the deprivation of sediment trapped by the south jetty, North Beach losses material from northeast storms, which advect sand along the north jetty that is subsequently carried into the inlet. This sand settles to form the Indian River Flood Shoal. After the flood shoal reaches its stable volume, tidal currents carry sediment further into Indian River Bay.

Prior to the construction of the sand bypass system, sand was periodically obtained from the interior Indian River Inlet and placed on North Beach. From 1957 to 1990, over 2 million cy of sand was dredged from the Inlet interior to maintain the Federal navigation channel and to obtain beach fill for the eroding shoreline north of the Inlet (USACE 2014). Once the sand bypass system was operational in 1990, dredging within the Inlet was only necessary in 2010 to fill scour holes located near the USCG facility. Otherwise, no additional dredging of the interior Inlet was performed to obtain beach fill or maintain the channel until Hurricane Sandy hit in October 2012.

Hurricane Sandy eroded hundreds of thousands of cy of sand from North Beach, resulting in overwash from the storm surge that flooded SR-1 and the approach to the newly constructed Inlet Bridge. Overwash forced the closure of this critical highway and evacuation route for several days until State crews could remove sand from the roadway and make the necessary repairs. Following Hurricane Sandy, over 500,000 cy of sand was required to rebuild the beach template, which is a far greater volume than the sand bypass system could accommodate. Therefore in 2013 under a coastal emergency action, the USACE dredged the Indian River flood shoal borrow area and used all dredged material to rebuild the berm and dune system at North Beach.

For several years the annual pumping of the sand bypass system helped mitigate erosion at North Beach and was the primary maintenance activity; however in 2020 the system became inoperable. Since then, DNREC Shoreline and Waterway Management Section has judiciously added sand to North Beach via truck haul which has been ineffective for mitigating risk. In response to the inadequate maintenance, the dune system at North Beach is severely eroded and prone to scour from direct wave energy on a regular high tide. By implementing this Project and fixing the sand bypass system, which is expected to be operational in December 2024, North Beach will be sustained for many years going forward.

The purpose of the Project is to restore the severely eroded berm and dune system at North Beach using dredged material from three potential borrow sites to enhance resiliency and protect critical infrastructure from the effects of coastal erosion. The Project includes the following key components:

- Dredge up to 800,000 cy of material from the Indian River Flood Shoal, Middle Island Shoal, and/or Burton Island Shoal.
- Transport dredged material, via pipeline, to the beneficial use placement site at North Beach.
- Spread and grade dredged material to restore the berm and dune system per the approved design plans. Placement will begin at the north jetty and extend northward for over 5,200 linear feet.

### 1.3 Existing Emergency Conditions & Photographs

The current condition of North Beach is such that a minor storm surge or swell event is very likely to breach the dune. This has the potential to flood Delaware State Route-1 (SR-1), an evacuation route, and erode the existing Inlet Bridge. A dune breach occurred most recently on August 17, 2024, that forced the closure of SR-1 for several hours as ocean water, sand and debris flooded the roadway (Figures 2-3).

Severe erosion at North Beach has also exposed hazardous debris from historical roads that had previously washed out (Figure 4). There have been extensive clean-up efforts among DNREC and local volunteers, but as the beach erodes further, additional debris becomes exposed. The debris is now more difficult to remove since the beach elevation has lowered leaving no dry beach above the intertidal zone during high tide (Figure 5). In response, beachgoers are walking and sitting on the dune face and crest, which is an additional stressor. During low tide at North Beach, beachgoers sit in the intertidal zone among the large pieces of marine debris that are now exposed and washing ashore (Figure 6). In addition, swimmers and waders may be unaware of the hazards posed by debris and the currents driven by wave energy from the dune. A sweep of exposed debris will be removed ahead of the beach fill; however, no excavation will be performed to look for buried debris.

Currently, the only means to add sand to attempt to repair North Beach is truck haul sand from inland sources. The volume and rate of sand delivery is inadequate such that sand moved onto the beach gets washed out within one tidal cycle. The beach needs to be rebuilt and requires a large volume of sand that is delivered rapidly. To do so, DNREC is seeking emergency authorization to repair North Beach.



*Figure 2. August 17, 2024. Aerial view of the dune breach at Delaware Seashore State Park (looking north). The SR-1 northbound lane is closed to vehicles and completely covered in ocean water, sand, and debris.*



*Figure 3. August 17, 2024. View of the dune breach at Delaware Seashore State Park (looking south). The SR-1 northbound lane is covered in water and sand, forcing a road closure.*





*Figure 4. April 2024. View (looking south) of hazardous debris exposed on North Beach due to erosion*



*Figure 5. July 26, 2024. View of North Beach from the Atlantic Ocean during high tide. No observable dry beach above the intertidal zone. Beachgoers sit on the dune face and crest.*



*Figure 6. August 2, 2024. Bird's-eye view of North Beach during low tide. Beachgoers sit in the intertidal zone among large pieces of potentially hazardous debris.*

## 1.4 Baseline Conditions & Historical Data

Baseline site conditions have been documented at the Indian River Flood Shoal, Middle Island Shoal, Burton Island Shoal, and North Beach for comparison during future monitoring plans. In addition, baseline data collected from each of the potential borrow site locations will be used to understand the amount of sediment available for beneficial reuse. The following investigations were performed to access current conditions:

- Field reconnaissance and collection of site photographs
- Topographic survey via real-time kinematic (RTK) GPS

The expectation is that if dredged, the Indian River Inlet flood shoal will recover sediment as it has following the previous USACE dredging project in 2013. After one year, survey data indicated that nearly 50% of the material dredged ended up back in the flood shoal, and nearly 100% after four years.

The *Modified Indian River Flood Shoal Sampling and Analysis Plan* is included with the permit application and describes the sediment investigation planned for mid-September 2024. An evaluation of the geotechnical and chemical results will be provided as soon as available for all samples collected from the Indian River Flood Shoal, Middle Island Shoal, and Burton Island Shoal.

Based on a previous report by the USACE in 2013 and recent field reconnaissance data, dredge material is expected to be mostly sand (>94%) and free of any contaminants of concern that would pose a human health risk if sediment were dredged, dewatered, and placed at North Beach.

## 2. Project and Construction Methods

DNREC has contracted Anchor QEA, Inc. to develop the engineering plan set that will be provided as soon as available (expected Sept 2024). Construction is planned to commence November 2024, with completion expected by March 2024 to minimize disruption to migrating fish and native aquatic species.

### 2.1 Dredging from Indian River Flood Shoal, Middle Island Shoal and/or Burton Island Shoal

The Project aims to hydraulically dredge up to 800,000 cy of mostly (>90%) sandy material from three potential borrow areas located in and adjacent to the Federal navigation channel within Indian River Inlet. The three potential borrow areas include the Indian River Flood Shoal, Middle Island Shoal, and Burton Island Shoal. The Indian River Flood Shoal would be dredged to the previously authorized channel elevation of -24 ft NAVD with 1 ft of allowable over-dredge and 640-ft wide. Middle Island and Burton Island Shoals would be dredged to  $\pm$  -10 ft NAVD. Dredging these potential borrow areas provides advance maintenance of the Indian River channel by reducing infilling of adjacent sediments.

Sediment removal will be conducted using a cutterhead dredge and transported via pipeline to North Beach. The dredge pipeline will be submerged and anchored to the bottom surface in areas crossing any navigable channels. The dredge pipeline will be clearly marked and kept in good condition in all other areas, including any nearshore or upland alignments. \*Please note, locations of the pipeline placement will be included in the updated plan set.

### 2.2 Beneficial Use at North Indian River Inlet Beach

Dredged material will be transported via pipeline to North Beach to reconstruct the berm and dune system beginning at the north jetty and extending northward for over 5,200 linear feet. The minimal beachfill quantity to be placed at any one location will be at least 40 cy per linear foot of shoreline, excluding taper areas. Front-end loaders and bulldozers will be used to spread and grade material consistent with the authorized plan followed by the USACE in 2013. Profiles will be constructed to have a 100 to 150 ft wide berm with an elevation of +9.0 ft NAVD. The constructed dune will have a crest elevation of +16.0 ft NAVD and width of 25 ft. Nourishment activities will temporarily inhibit access to North Beach and may initially result in a steeper beach profile before adapting to a more natural slope.

#### 2.2.1 Containment

Dredged material will be placed onto North Beach without lateral containment. The beach will be allowed to erode and accrete under natural conditions. It is expected that some material may be transported northward along the coastline, while the majority will be washed out along the north jetty and then siphoned through the inlet prior to being deposited in the flood shoal.

### 2.3 Best Management Practices

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

- Dredging during the winter months will limit disruption to migrating fish and aquatic species that could otherwise be impacted by water column turbidity.
- The dredge pipeline will be submerged and anchored to the bottom surface in areas crossing any navigable channels.

- The dredge pipeline will be clearly marked and kept in good condition when included in any nearshore or upland alignments.
- Proper construction oversight via inspections of dredging operations will be performed to document conditions and verify that best operational practices are being employed to prevent excessive turbidity.
- The staging areas are anticipated to be located within the Delaware Seashore State Park. \*Please note, staging area locations will be included in the updated plan set.
- Unconfined placement will rely on the existing site topography and environmental forcing to allow the beach to erode and accrete naturally.
- Project workers shall not harass or impact any waterfowl, fish, or aquatic species in the Project area.

## 2.4 Project Alternatives Considered

Alternatives considered for protecting the North Indian River Inlet Beach (North Beach) at Delaware Seashore State Park include: 1) no action, 2) using truck haul sand from inland sources to nourish North Beach, 3) transporting sand from the southside Inlet beach to North Beach, and 4) the beneficial use of dredged material from three potential borrow areas to reconstruct North Beach. The alternatives were considered with respect to project cost, habitat loss due to construction activities, turbidity increases, disturbances to fish and wildlife, human safety, and recreational uses of the area.

### 2.4.1 No Action

If no action is taken to rebuild the North Beach berm and dune system, continued erosion from coastal storm events will severely endanger SR-1 and the Inlet Bridge from becoming impassible and eventually result in total failure. Loss of the roadway and use of the bridge would severely hinder first responders and emergency personnel who rely on SR-1 and the Inlet Bridge to access areas in and around the Indian River area by land. SR-1 is also an important hurricane evacuation route in Delaware. In addition, economic interruptions could affect businesses and communities as the Inlet Bridge provides the only reasonable means of reaching the southside of Indian River Inlet via roadway in Delaware. Additionally, if no action is taken erosion will continue to expose hazardous road debris at North Beach that will increasingly threaten human safety.

### 2.4.2 Using Truck Haul Sand from Inland Sources to North Beach

Sand is available for purchase from inland quarries that is suitable for beach nourishment; however this is not an ideal option mainly due to the cost and volume of sand needed. Costs associated with transporting up to 800,000 cy of sand at approximately 12 cy per truck (66,700 trucks), as well as the wear and tear on the existing road system, increased emissions, and the increased traffic on an already congested roadway are all factors that negatively impact this option. In addition, this option does not improve navigability within Indian River Inlet. Furthermore, the rate of sand delivery to the beach via truck haul is an order of magnitude less than the rate at which dredge material is discharged onto the beach. Since the current condition of the beach is such that there is no berm and a dune toe that is exposed to direct wave action at high tide, sand delivery must outpace the rate of erosion. The emergency truck haul repairs have proved that the rate of delivery is too slow when the beach is in such an eroded condition. Therefore, using truck-hauled sand from inland sources is not recommended.

### 2.4.3 Transporting Sand from Southside of the Inlet to North Beach

Accretion occurs on the southside Indian River Inlet beach due to the Inlet jetties disrupting the northward flow of sand caused by the longshore current; therefore the sand bypass system was installed to help transport sand back to North Beach. Given the sand bypass system has not been operational since 2020, adequate sand has accumulated onto the southside beach. One alternative is to move sand manually using front-end loaders and trucks from the southside beach to North Beach for nourishment; however this is not an ideal option. Cost and manpower associated with transporting up to 800,000 cy of sand at approximately 12 cy per truck (66,700 trucks), as well as the wear and tear on the vehicles and existing road system, increased emissions, and the increased traffic are all factors that negatively impact this option. In addition, removing up to 800,000 cy of sand from southside would significantly alter the dune profile and leave the beach looking sparse. Furthermore, the rate of delivery will not keep pace with beach erosion as described in Section 2.4.2. Therefore, using trucks to transport sand from the southside of the Inlet to North Beach is not recommended.

### 2.4.4 Beneficial Use of Dredged Material to Reconstruct North Beach

The preferred alternative is to dredge from three potential borrow sites and then use all dredged material for reconstructing the berm and dune system at North Beach for a length of over 5,200 linear feet of shoreline beginning from the north jetty and extending northward. Smaller truck-haul beach nourishment projects can no longer keep up with the rapid rate of erosion occurring at North Beach. This area needs to be rebuilt with a large volume of material that is delivered rapidly, and there is a significant quantity of sand available in the Indian River Flood Shoal, Middle Island Shoal, and Burton Island Shoal. Dredging these areas will also provide advance maintenance of the Indian River Inlet channel by reducing infilling of adjacent sediments.

Up to 800,000 cy of mostly sandy (90%) material would be hydraulically dredged and then spread and graded using front-end loaders and bulldozers to construct the berm and dune system based on the construction template. The estimated result will be a 100 to 150-ft wide berm with an elevation of +9.0 ft NAVD. The berm will have a dune on top with an overall elevation of +16.0 NAVD and width of 25 ft. The installation of dune fencing, crossovers, and dune grass planting would subsequently be conducted by the State of Delaware. The project essentially replicates a USACE project that successfully repaired the beach following Hurricane Sandy.

The beneficial use of dredged material would allow for the nearly immediate protection of critical infrastructure, like SR-1 and the Inlet Bridge, from coastal erosion. Dredging any of the potential borrow areas has temporary environmental impacts to the local ecosystem, but should not have any long-term detrimental effects on the area. The use of staging areas is beneficial to the Project by decreasing costs and emissions from the transport of personnel and equipment to the site. Environmental impacts from the use of staging areas will be minimal. The preferred design alternative is the most cost-effective and least environmentally damaging alternative that would meet the project goals.

### 3. Environmental Analysis

The following subsections address the potential environmental impacts due to dredging from three potential borrow sites and using all dredged material for reconstructing the dune system at North Beach.

#### 3.1 Sediment and Water Quality

Anchor QEA, Inc. has been contracted to collect sediment samples from the three potential borrow sites for geotechnical and chemical testing. Sample locations are described in the *Modified Indian River Flood Shoal Sampling and Analysis Plan*, which includes the composite schemes and laboratory test methods.

\*Please note, the geotechnical and chemical evaluations of sediment samples will be provided as soon as available. Sample collection is currently scheduled for mid-September 2024. Once results are received, sediment data will be compared to DNREC risk-based screening criteria to determine if contaminants are at low enough concentrations to pose no risk to humans if dredged and placed on North Beach. If contaminant levels exceed screening level values, additional assessment methods will be performed to further assess risk to human health and safety at the Project site.

#### 3.2 Habitat and Species

Initial construction activities could result in water column turbidity and loss of some benthic organisms, especially non-motile species in the immediate site vicinity. This would be a short-term impact as benthic recovery normally begins soon after the disturbance has ended. Any adverse impacts are expected to be temporary and localized during construction. In addition, beach nourishment would not disturb any benthic organisms that inhabit the beach and/or cover potential food sources for seabirds since no beach currently exists above the intertidal zone at high tide due to severe coastal erosion. Overall, the proposed project will enhance species habitat and coastal resiliency by rebuilding the beach template to withstand natural forcing for several ( $\pm$  5-7) years in the future.

##### 3.2.1 Aquatic and Terrestrial Biological Resources

The Delaware Seashore State Park dune system at North Beach supports many terrestrial species including the ghost crab (*Ocypode quadrata*), horseshoe crab (*Limulus polyphemus*), and wolf spider (*Lycosidae sp.*) and is host to many coastal plant communities. The predominant vegetation that grows in dune areas consists of American beachgrass (*Ammophila breviligulata*), seaside goldenrod (*Solidago sempervirens*), sea rocket (*Cakile dentata*), and beach clotbur (*Xanthium echinatum*). Since erosion removed mostly all of the preexisting dune system at North Beach, the communities of fauna inhabiting the dune and intertidal zone are scarce with little vegetation and biological activity.

North Beach also supports a variety of avian species including many species of gull such as the herring gull (*Larus smithsonianus*), laughing gull (*Leucophaeus atricilla*), and terns (*Sternidae sp.*). Gulls may be present within the upper and lower beach and may be observed feeding on carrion, plant matter or invertebrates within the wrack line. The lower beach including the intertidal zone is frequently inhabited by shorebirds including sanderling (*Calidris alba*), semipalmated sandpiper (*C. pusilla*), and western sandpiper (*C. mauri*), which utilize these areas to feed on invertebrate infauna. Other avians common to the dune and shoreline vary based on the time of year, but encompass a wide range of species including sandpipers like the killdeer (*Charadrius vociferus*), wrens such as the Carolina wren (*Thryothorus ludovicianus*) and a multitude of migratory songbirds including but not limited to: warblers, sparrows, robins, and finches.

Direct impacts to finfish would be minimal due to their ability to avoid the dredging equipment and project area during the construction period. Fish populations would most likely utilize a different area of Delaware Bay and return once the disturbance is complete.

### 3.2.2 Special Status Species

Data from the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) planning tool and species list for the State of Delaware was used to determine the potential for special status species to occur within the Project areas. Table 1 presents the federally listed special status species with the potential to occur in or adjacent to the Project area.

Table 1. Federal Special Status Species within the Project Area

Common Name	Scientific Name	Special Status	Special Status
Monarch butterfly	<i>Danaus Plexippus</i>	Insect	Candidate species
Roseate Tern	<i>Sterna dougallii dougallii</i>	Bird	Endangered species
Seabeach Amaranth	<i>Amaranthus pumilus</i>	Flowering Plant	Threatened species

None of the special status species are expected to be affected during dredging and placement activities. It is expected that monarch butterflies and roseate terns will prefer to leave or avoid the dredging area, if present. Severe dune scarping and loss of beach and vegetation on North Beach suggests that special status species are not likely to be present, and thus adversely effected by the proposed Project.

### 3.2.3 Essential Fish Habitat

The Project area contains Essential Fish Habitat (EFH) for both highly migratory and New England/Mid-Atlantic species that may be adversely affected during dredging. However, the expected construction window during winter months accommodates many dredging restrictions, including for summer flounder and sand tiger sharks, and limits impacts to when aquatic species are not as active as in other seasons. For example, during summer months the Inlet is typically utilized as a forage area for juveniles and adults, and a nursery area for larvae and young of the year life stages. Juveniles and adults are expected to vacate the area once construction starts, and nearby waters outside of the Project site will remain and serve as EFH. The disturbance of bottom sediments associated with dredging could interfere with feeding, predation, and avoidance patterns; however, adverse impacts are expected to be temporary and highly localized. EFH Assessment Worksheets are included as an attachment to the permit package. No critical habitats have been identified within the Project area.

## 3.3 Cultural Resources

The Inlet flood shoal area has been previously dredged, in whole or in part, on seven occasions since 1970 for the purposes of obtaining sandy beachfill for the chronically eroding shoreline of North Beach or for filling in deep scour holes. Table 2 presents the dates and approximate dredged volumes of these seven operations.

Based on previous surveys, the probability of buried shipwrecks in the Inlet is relatively low. The Delaware Division of Historical and Culture Affairs, State Historic Preservation Office (SPHO) was consulted and concluded there are no known archeological sites or historic properties within the Indian River Flood Shoal or North Beach placement site (see SHPO letter included in the application package).

\*Please note that SHPO was consulted again on 9/16/2024 for review of the Middle Island and Burton Island Shoals. The second consultation request is included in the application package. A formal letter from SHPO regarding the two additional borrow locations will be provided once available.

Table 2. Historical dredging volumes of the Indian River Inlet flood shoal

Year	1973	1975	1978	1984	1990	2010	2013
Volume (cy)	774,000	143,000	700,000	468,000	175,000	220,000	520,000

### 3.4 Aesthetics

The Project will result in aesthetic impacts, though they will be localized and temporary. A view of the dredge and machinery will be visible during operations, which are limited to the four-month construction window (Nov 2024 – Feb 2025) and will not coincide with typical peak months of tourism and recreation.

### 3.5 Coastal Consistency

Delaware Coastal Programs manages Delaware's Coastal Zone Management Federal Consistency reviews to ensure that state and federal actions in the coastal zone are consistent and coordinated. Delaware's Coastal Zone Act Program regulates new and existing manufacturing and heavy industrial activities in Delaware's Coastal Zone, which generally runs the length of the state along the Delaware River, the Delaware Bay, the Inland Bays, and the Atlantic Ocean. The Project is regulated under the Coastal Zone Management Act of 1972, as amended, and the National Oceanic and Atmospheric Administration's Federal Consistency Regulations (15 Code of Federal Regulations 930). Therefore, a Delaware Coastal management Program Federal Consistency Determination package has been completed to support the Project.

### 3.6 Notice to Navigational Interests

Since the Project would occur within Indian River Inlet and adjacent to the Federal navigation channel, a Notice to Navigational Interests will be filed prior to initiating the work upon approval. The dredge pipeline will be submerged and anchored to the bottom surface in areas crossing any navigable channels.

## 4. Summary

The current condition at North Beach suggests imminent risk to critical infrastructure as a minor storm surge or swell event is very likely to breach the dune and cause flooding to the SR-1 evacuation route and Charles W. Cullen Memorial (Inlet) Bridge. The proposed Project will enhance coastal resiliency and protection from coastal storms by dredging up to 800,000 cy of sediment from three potential borrow areas and using all dredged material to rebuild the dune system at North Beach. DNREC is seeing emergency approval to commence construction in November 2024. No adverse impacts to the environment are expected at any of the borrow areas or North Beach. Construction impacts are determined to be temporary and localized to the Project site.



## 5. References

Anchor-QEA, 2024. Indian River Flood Shoal Sampling and Analysis Plan

National Oceanic and Atmospheric Administration, Essential Fish Habitat Mapper online tool for New England/Mid-Atlantic species, available at: <https://www.habitat.noaa.gov/apps/efhmapper>.

State of Delaware, Division of Historic and Cultural Affairs, State Historic Preservation Office consultation for archeological and historical site review.

U.S. Army Corps of Engineers (USACE), 2014. Environmental Assessment – Flood Control and Coastal Emergency Repair Indian River Inlet North Shore, Sussex County, Delaware. Flood Control and Coastal Emergency Act (PL 84-99). Philadelphia District – U.S. Army Corps of Engineers.

U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) online tool, available at: <https://ipac.ecosphere.fws.gov>. Accessed June 5-6, 2024.