US Army Corps of Engineers ®
Wilmington District

HATTERAS TO HATTERAS INLET CHANNEL REALIGNMENT CHANGES, ROLLINSON CHANNEL NAVIGATION PROJECT

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DRAFT ENVIRONMENTAL ASSESSMENT

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1.0 INTRODUCTION.

The National Environmental Policy Act of 1969 (NEPA), as amended, requires consideration of the environmental impacts for major Federal actions. The purpose of this Environmental Assessment (EA) is to ensure the environmental consequences of the proposed action are considered and that environmental and project information is available to the public. The United States Army Corps of Engineers (USACE) has prepared this EA in accordance with NEPA, the Council on Environmental Quality regulations (40 Code of Federal Regulations (CFR) parts 1500-1508,1515-1518), Phase II Final Rule, effective July 2024, and Engineer Regulation (ER) 200-2-2.

The navigation mission of USACE is to provide safe, reliable, efficient, effective, and environmentally sustainable waterborne transportation systems (i.e., channels, harbors, and waterways). As part of the navigation mission, USACE is responsible for maintenance of the federally authorized Rollinson Channel project, which includes Rollinson Channel and Hatteras Ferry Connecting Channel, both fixed channels. In addition to the fixed channels, the Federal project includes Hatteras Ferry Channel Ranges 2, 3, 4, and 5, as well as the current horseshoe route through the inlet, which includes Barney Slough, Pamlico Sound Channel, Sloop Channel, and Hatteras Connector Channel. Hatteras Basin, colloquially known as Hatteras Harbor Marina, is an existing federally authorized area at the south end of Rollinson Channel. The Federal navigation project is shown on Figure 1.

The proposed changes addressed in this EA are for the navigation corridor within the Hatteras Inlet complex, currently known as the “horseshoe route”, the Hatteras Ferry Channel, and the addition of three open water dredged material placement areas that may be used for all channels that make up the Rollinson Channel Federal navigation project, including Rollinson Channel and Hatteras Ferry Connecting Channel. The proposed project would also include the placement of beach quality sand via pipeline in the littoral zone adjacent to the Hatteras and Ocracoke Island shorelines. The project area is located within waters of Pamlico Sound, on the backside of Hatteras Island, Dare and Hyde Counties, North Carolina. The Hatteras Ferry Connecting Channel and Hatteras Ferry Channel allow for safe passage between Hatteras Harbor Marina and the horseshoe route at Barney Slough South Channel. Rollinson Channel provides access from Hatteras Island to Pamlico Sound, allowing safe passage between Hatteras Harbor Marina through Pamlico Sound to mainland North Carolina. Historically, the Federal navigation channel connected Hatteras Harbor Marina to the Hatteras Inlet gorge by a direct route that ran behind and parallel to the islands (Figure 2). This route provided mariners, fishermen, and the U.S. Coast Guard (USCG) access to the Atlantic Ocean, as well as safe ferry transportation between Ocracoke Island and Hatteras Island (Figure 2). Due to the dynamic nature of the Hatteras Inlet complex, the surface and subsurface environment constantly shifts and changes. Extensive erosion has significantly increased the width of Hatteras Inlet. In 1993, Hatteras Inlet was approximately one-third of a mile wide; that distance has currently increased to over two

miles, which made it impossible to maintain the historic route efficiently and safely. This led to the development of the 2022 USACE *Hatteras to Hatteras Inlet Channel Realignment, Rollinson Channel Environmental Assessment and Finding of No Significant Impact* (hereafter noted as the 2022 Hatteras EA/FONSI), which authorized the horseshoe route and the associated navigation corridor. Presently, the horseshoe route around the flood tidal delta within the inlet provides the safest passage for mariners. However, despite the changes to the navigation route following completion of the 2022 Hatteras EA/FONSI, the dynamic nature of the inlet continues to present challenges to USACE in maintaining a navigable channel within the horseshoe route. Several times per year, USACE conducts urgent dredging within the Barney Slough and Sloop Channel portions of the horseshoe route (Figure 1) at the request of North Carolina Department of Transportation's (NCDOT) Ferry Division and the USCG.

The authorized dimensions of all navigation channels within the horseshoe route, Hatteras Ferry Channel, and Hatteras Ferry Connecting Channel are 100-feet-wide and 10-feet-deep with 2 feet of allowable overdepth, while Rollinson Channel's authorized dimensions are 100-feet-wide at a depth of 12 feet, with 2 feet of allowable overdepth, and these will not change; however, channel locations will differ within the horseshoe route and Hatteras Ferry Channel by following the best, naturally deep water within proposed navigation corridors.

This EA explores a reasonable range of alternatives to reestablish a safe and navigable channel between Hatteras and Ocracoke Islands and Pamlico Sound, which includes the horseshoe route, Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, and Rollinson Channel. With the No Action alternative there would be no changes to maintenance dredging practices for any channels that make up the Rollinson Federal navigation project. The two action alternatives consider navigation corridors that account for changes over time to the inlet complex. A navigation corridor allows for maintenance of the authorized dimensions of the Federal channel in a manner that follows natural channel migrations (i.e., natural deep water). Navigation corridors allow for a safer, more reliable channel, reduced dredging effort, and an associated reduction in maintenance dredging costs, as well as having the least impact to the environment.

The proposed action is to expand the existing navigation corridor for the horseshoe route, to establish a navigation corridor for the Hatteras Ferry Channel, and to add three open water dredged material placement areas that may be used for any channels within the authorized project, as well as littoral zone placement via pipeline. These corridors and additional placement areas will provide flexibility and cost savings in maintaining the Federal navigation channel. Maintenance dredging would only be performed in shoaled areas to maintain the authorized channel dimensions (Figure 3). The current horseshoe route navigation corridor is proposed to be expanded to encompass the entire Hatteras Inlet complex to allow for naturally occurring deep-water shifts while maintaining the authorized 100-foot-wide channel.

The current inlet corridor allows for limited change in the navigation channel route, whereas the proposed expansion, which encompasses the entire inlet complex, would allow USACE to follow deep-water shifts over time as the natural channel migrates.

The creation of a corridor for the Hatteras Ferry Channel will allow USACE to more efficiently maintain that channel. This area is very dynamic and shoaling from the inlet directly impacts vessel accessibility. Currently, the Hatteras Ferry Channel Ranges 2, 3, 4, and 5 are fixed navigation channels, meaning they have always been maintained in the same location regardless of changing shoaling patterns (Figure 1). Establishing a navigation corridor for the Hatteras Ferry Channel would allow for flexibility to follow naturally deep-water anywhere within the corridor.

No changes are proposed for maintenance dredging of the Hatteras Ferry Connecting Channel, Rollinson Channel, or Hatteras Basin; however, three open water dredged material placement areas that may be used for any type of dredged material from any of the project's navigation channels are proposed and are addressed in this EA. Also addressed in this EA, is the placement of beach quality dredged material within the littoral zones of Ocracoke and Hatteras Islands, which can be used for wave break protection and erosion control, from any navigation channel in the project area.

Maintenance dredging of the project area is proposed by both contracted hydraulic cutter suction (pipeline) dredge and Government-owned plant, either sidecast or special purpose hopper dredges. Contracted hydraulic pipeline dredges can work any time of year in the project area; however, to protect fisheries resources, Government plant dredging has an environmental timeframe to conduct work between 1 October through 31 March for Barney Slough Channel, Pamlico Sound Channel, and Sloop Channel South. Within the horseshoe route, Sloop Channel North and Hatteras Connector Channel have no environmental timeframes associated with dredging actions. There are also environmental timeframes for placement of dredged material on beaches and bird islands (16 November to 31 March and 1 September to 31 March, respectively), which are proposed to remain unchanged. These timeframes are in place to protect nesting shorebirds and sea turtle habitats established by the U.S. Fish and Wildlife Service (USFWS) and North Carolina Wildlife Resources Commission (NCWRC).

A contracted hydraulic pipeline would be used approximately every 3 to 5 years to maintain the project area to its authorized dimensions and Government plant would be used to remove shoaling on an as-needed basis between contracted pipeline events. Based on sampling, the general corridor area consists predominantly of beach quality dredged material (≥90% sand), which is suitable for placement on beaches and bird islands, as well as the littoral zone and nearshore placement areas.

Figure 1. Existing authorized USACE corridor and channels, per the 2022 Hatteras EA/FONSI.

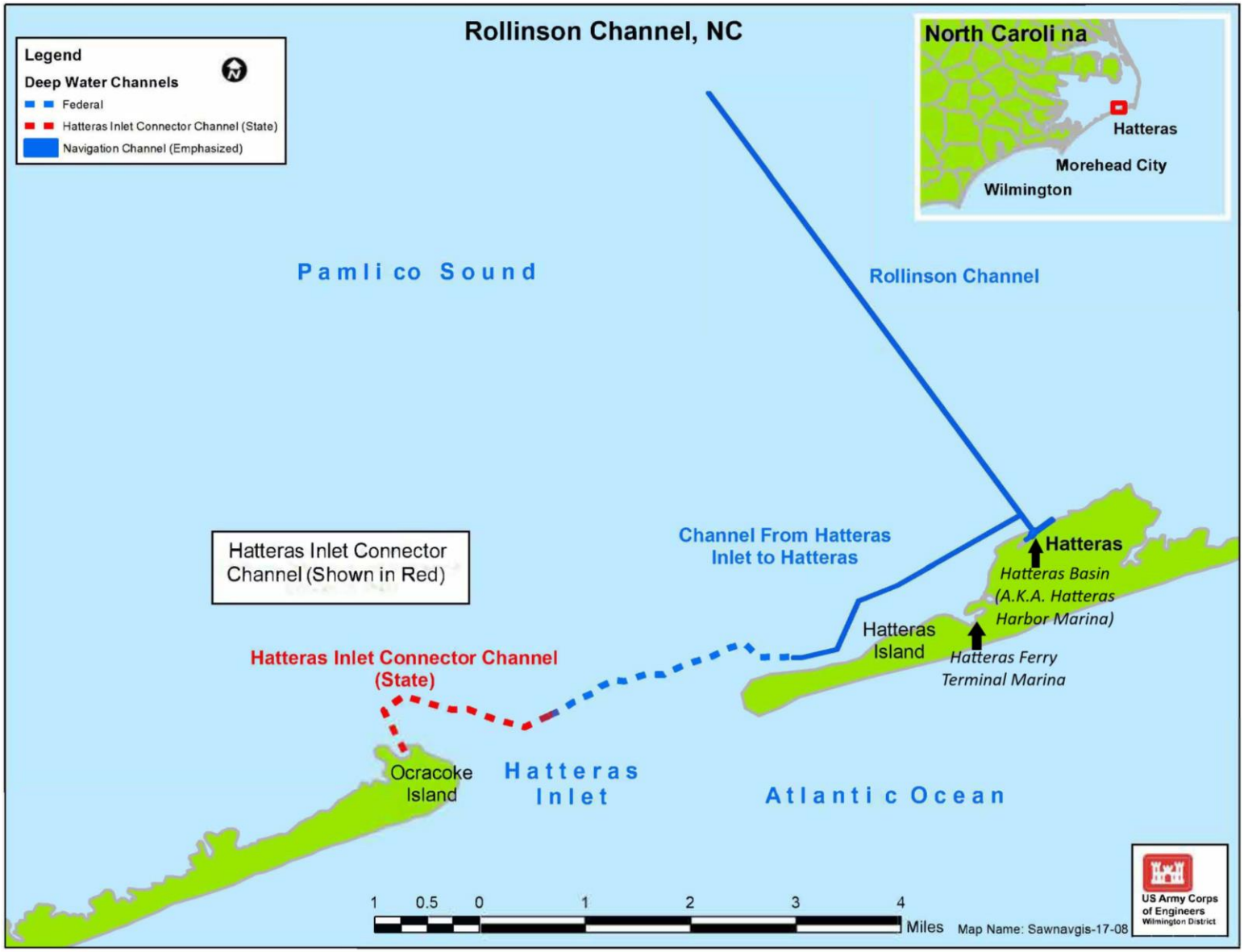


Figure 2. Hatteras Inlet area map showing historic route (pre-2013).

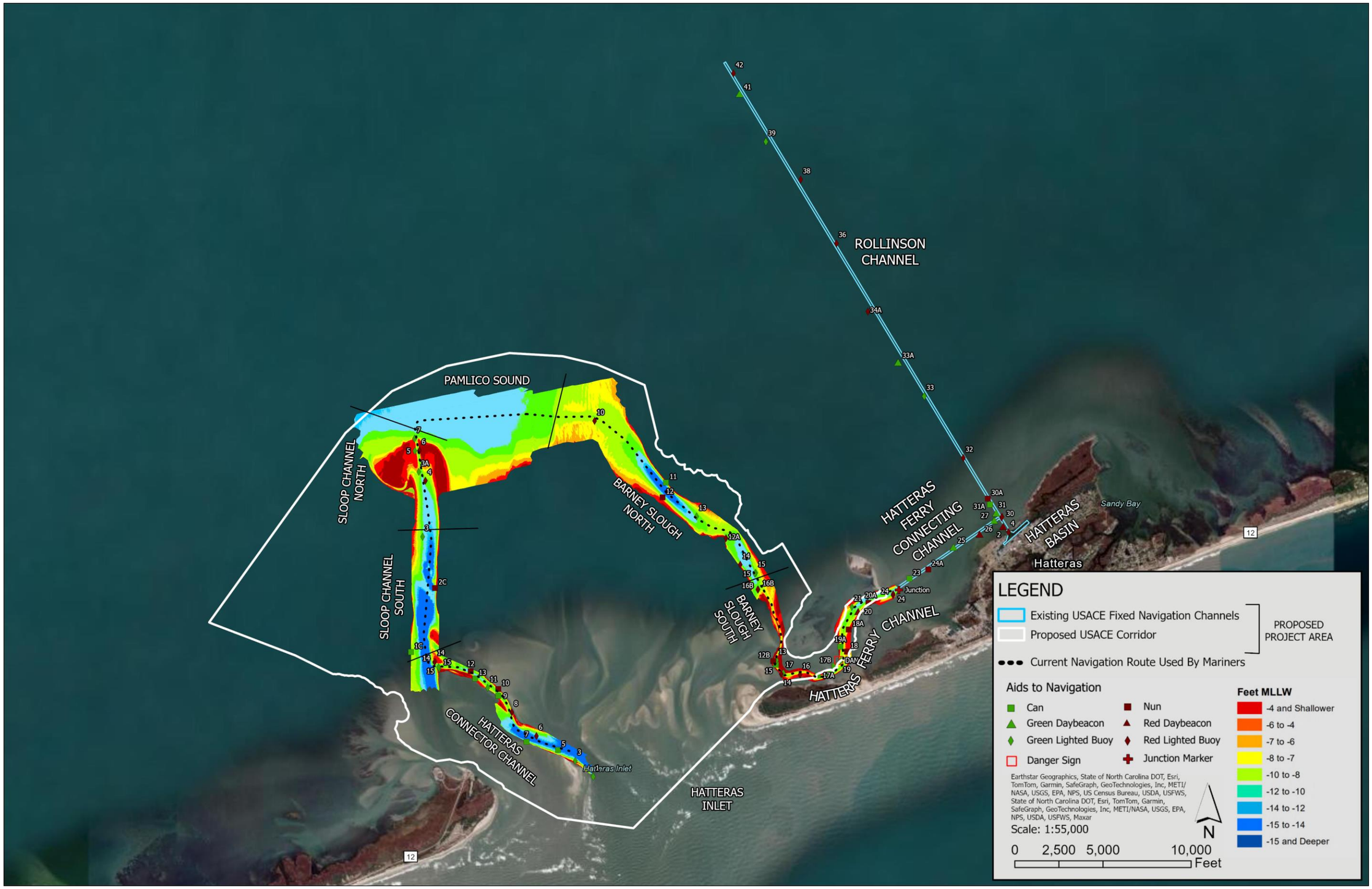


Figure 3. Proposed corridor with 2024 hydrographic survey.

1.1 Authority.
The project includes several Federal navigation channels, authorized as detailed below.

An initial channel from Pamlico Sound to Hatteras Basin (Rollinson Channel), at a depth of 6 feet plus 2 feet of allowable overdepth, as measured at mean lower low water (MLLW), a width of 100 feet, and length of 5 miles, was authorized by the River and Harbor Act of 30 August 1935, as specified in House Document 218/72/1. On 23 October 1962, House Document 457/87/2, authorized an increase in channel depth to 12 feet plus two feet of allowable overdepth, as measured at MLLW. Hatteras Ferry Connecting Channel and Hatteras Ferry Channel (also known as (a.k.a.) the Channel from Hatteras to Hatteras Inlet Gorge) was authorized at 100 feet wide, 10 feet deep plus two feet of allowable overdepth, as measured at MLLW, and 4 miles long, by the Rivers and Harbors Act of 23 October 1962, under House Document 457/87/2.

Hatteras Basin (a.k.a. Hatteras Harbor Marina) is part of the federally authorized project. Hatteras Basin was authorized to a depth of 6 feet, as measured at MLLW, on 2 March 1945, in House Document 236/76/1, and later authorized to 12 feet, as measured at MLLW, on 23 October 1962, in House Document 4557/87/2.

The dimensions of the horseshoe route were authorized under the 2022 Hatteras EA/FONSI, as noted above. With completion of the 2022 Hatteras EA/FONSI, USACE realigned a portion of the Hatteras to Hatteras Inlet Channel to follow the horseshoe route and established a navigation corridor so the channel could be maintained following deep water within the very dynamic Hatteras Inlet system. Pursuant to ER 1165-2-119, Modifications to Completed Projects, “where not otherwise precluded by project authorization, the location of a completed channel may be altered during the course of the periodic maintenance program if the maintenance can thereby be more economically accomplished and related aids to navigation are readily adjustable to suit the restored channel dimensions at the shifted location.” The project’s authorization does not specify the precise location of the channel, and therefore the location may be altered if found to be justified. The horseshoe route follows best available natural deep water with a maximum width of 100 feet and a maintained depth of 10 feet with 2 feet of allowable overdepth, as measured at MLLW; because the channels follow natural deep-water, water depths may exceed 10 feet, but USACE never dredges below this depth.

1.2 Background.
The southwest end of Hatteras Island began receding dramatically around 1993, when the inlet was only 0.35 miles wide. Running parallel on the backside of the island, the traditional “direct route” to the inlet gorge was maintained by USACE until winter/spring 2013 when it became impossible to do so safely. To maintain operations and access, NCDOT ferry service and local mariners began utilizing the horseshoe route to access Ocracoke Island.

From 2014 to 2020, USACE considered various maintenance options for the direct route; however, in 2017 these efforts ceased when it became apparent that the maintenance dredging needs would exceed available funding. Hatteras Island continued

to erode, and by 2019, approximately 1.7 miles (~9,000 feet) of shoreline and approximately 315 acres of dry land were lost. Approximately 2,000 feet of shoreline (roughly 130 acres) were lost on Ocracoke Island (Figure 4). The significant erosion in both locations has transformed upland beach into subtidal shoals resulting in an inlet that is now over two miles wide.

By 2021, regular vessel traffic had been using the horseshoe route for about eight years and the channel had remained relatively stable, so USACE began preparation of an EA to realign the historic Hatteras to Hatteras Inlet channel. The 2022 Hatteras EA/FONSI established the horseshoe route and navigation corridor. The horseshoe route begins at the inlet gorge to the southwest, allows mariners to travel north for approximately 3.5 miles through Hatteras Connector Channel and Sloop Channel, then east for approximately 1.5 miles through Pamlico Sound, then travel southeast approximately 3.3 miles through Barney Slough Channel to the Hatteras Ferry Channel Ranges 2, 3, 4, and 5, then northeast through Hatteras Ferry Connecting Channel, through to Rollinson Channel or Hatteras Basin (Figure 1). However, by January 2024, significant shoaling in Sloop Channel North and Barney Slough Channel resulted in vessels running aground and large vessels, like the Hatteras ferries, having to wait for other vessels to pass before transiting through the marked navigation channel. Due to these high shoaling events, it became increasingly difficult to maintain a safe channel within the horseshoe route at these locations. At Barney Slough South Channel, between Buoys 12A and 12B, extreme shoaling has forced the channel to migrate farther and farther east. The naturally deep-water slough shifted approximately 700 feet to the east between 2015 and 2023. The migration of this portion of Barney Slough South Channel has resulted in the natural deep-water channel being outside the navigation corridor authorized in the 2022 Hatteras EA/FONSI. The continued migration of this portion of the channel led to three urgent dredging requests to State and Federal agencies in 2023 to obtain approval to maintain the channel outside of the approved corridor. Figure 1 indicates the currently utilized route by mariners, which travels outside of the currently authorized UASCE corridor in Sloop Channel North, Barney Slough South, and Hatteras Ferry Channel Ranges 2, 3, 4, and 5.

In addition, Sloop Channel North has experienced shoaling that has shifted and narrowed the natural deep-water channel maintained by USACE. The navigable channel through Sloop Channel North has changed dramatically over the past eight years. This section of waterway is highly dynamic due to strong currents flowing between Pamlico Sound and Hatteras Inlet. Since 2015, the channel has rotated approximately 45 degrees, so the northern end of the channel is now approximately 2,400 feet westward of its 2015 alignment, and the southern end of the channel is now about 800 feet to the east of its 2015 location. The navigation channel cuts through a significant shoal, where depths on both sides of the channel are 5 feet or less. On 12 January 2024, USACE made an Emergency Declaration Request to USACE, South Atlantic Division (SAD), to allow for dredging outside of the authorized horseshoe route corridor at Sloop Channel North. The emergency request was to dredge a 100-foot-wide

navigation channel to a depth of 8 feet, with 2 feet of allowable overdepth, as measured at MLLW, through a large shoal to the northeast of the navigation channel. The Emergency Declaration was signed by USACE Headquarters on 19 January 2024, and State and Federal agency coordination took place between 22 January and 31 January 2024. The North Carolina Division of Coastal Management (NCDCM), NCWRC, North Carolina Division of Marine Fisheries (NCDMF), and the Environmental Protection Agency (EPA) had no concerns; the USFWS requested that the 2017 Manatee Guidelines be followed during work and the National Marine Fisheries Service (NMFS), Habitat Conservation Division (HCD) did not have sufficient staff to review the request at the time. The emergency dredging took place between 2 March and 2 April 2024, with the removal of approximately 41,330 cubic yards of material using the Government plant sidecast dredge Merritt, allowing for a navigable channel for mariners to safely navigate the area.

On 15 December 2023, Dare County received a Major Coastal Area Management Act (CAMA) Permit No. 14-23 to maintain those Federal channels in the project area within the county limits at the same dimensions as federally authorized via use of the shallow-draft hopper dredge Miss Katie or a similarly designed privately-owned special purpose dredge. Operations are primarily anticipated to occur between 1 October through 31 March to abide by fisheries timeframes. Placement of the dredged material may occur within approved Open Water Placement Areas in Pamlico Sound, Barney Slough Deep Water Placement Area, and within the nearshore placement areas off Hatteras and Ocracoke Islands. Dare County's work is expected to supplement USACEs dredging efforts in the area. The number of dredging events and amount of dredged material removed by the County would be dependent on the amount of shoaling in the navigation channels. Dare County has previously dredged the current horseshoe route, as well as the emergency dredge area in Sloop Channel, multiple times in 2025.

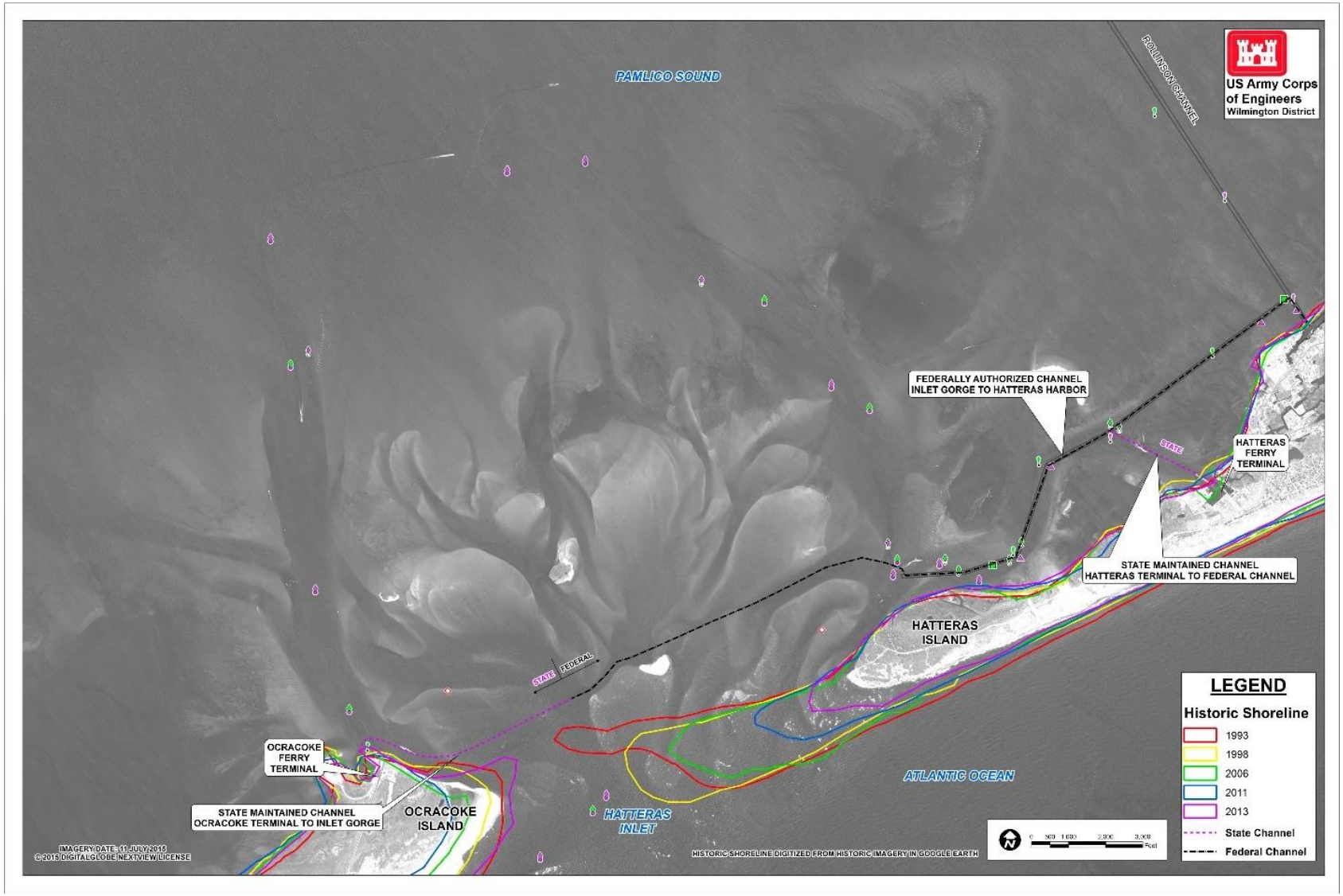


Figure 4. Erosion on Ocracoke and Hatteras over a 20-year period.

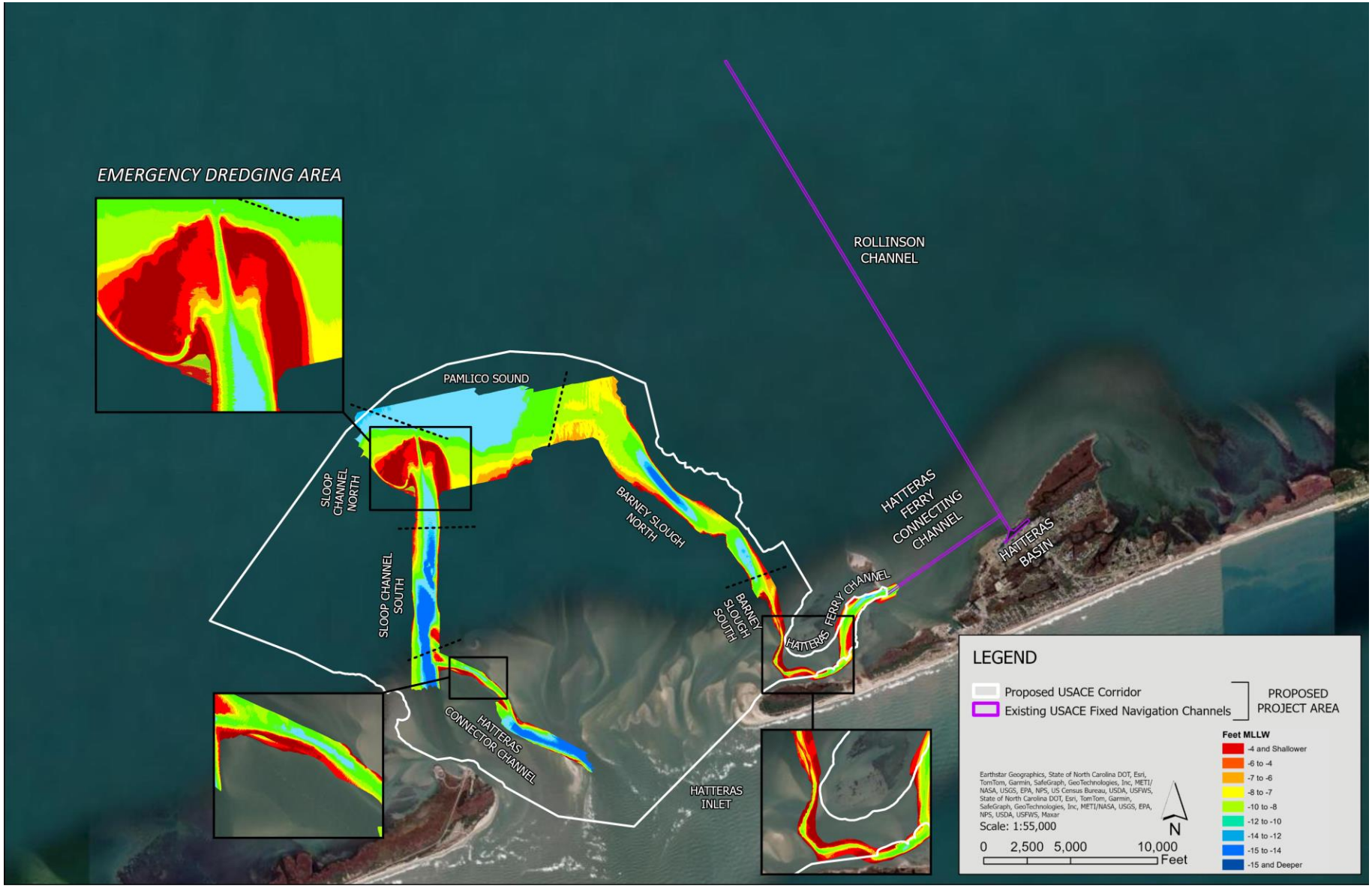


Figure 5. Proposed corridor identifying hot spot shoaling areas and emergency/urgent dredging areas.

1.3 Project Area (Dredging and Placement).
The project area consists of the proposed expanded horseshoe route navigation corridor, Hatteras Ferry Channel navigation corridor, Hatteras Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel. The proposed navigation corridor expansion encompasses the entire Hatteras Inlet complex between Ocracoke Island (Hyde County) and Hatteras Island (Dare County). The Hatteras Island side begins at approximately greenlight Buoy 15 and includes Barney Slough, a small portion of Pamlico Sound, Sloop Channel, and Hatteras Connector Channel (Figure 3).

The proposed placement areas for dredged material include sidecasting, where material is typically sidecast about 80 feet from the sides of the dredge, resulting in dredged material placement in open water within or outside the corridor, depending on the location of natural deep water. Other placement options include placement on the NCDOT Upland Confined Placement Facility; Cora June Island, DOT Island, and Legged Lump Island bird islands; nearshore placement (typically in depths of -11 to -17 feet MLLW) off the east end of Ocracoke Island or off the west end of Hatteras Island; placement in deep water to protect the Ocracoke Ferry Landing sheet pile wall; on oceanside beaches on both Hatteras and Ocracoke Islands; littoral zone placement via pipeline off Ocracoke and Hatteras Islands; deep water placement areas within the horseshoe route; open-water placement within the flood tidal delta on the west side of Ocracoke Inlet; and open-water placement in two locations within Pamlico Sound north and northeast of the horseshoe route (Figure 6). All of these placement areas have been previously authorized for use, except for littoral zones adjacent to Hatteras and Ocracoke Islands, placement on Legged Lump Island, the NCDOT Upland Confined Placement Facility, and open water placement in Pamlico Sound and the flood tidal delta.

The proposed expansion of the inlet navigation corridor would encompass the entire inlet complex, allowing the channel to shift while following naturally deep water. The authorized channel within the corridor would be 100-feet-wide, 10 feet deep with two feet of allowable overdepth, and 3:1 side slopes. Rollinson Channel and Hatteras Ferry Connecting Channel are fixed navigation channels not within a proposed navigation corridor. It is the intent of USACE to dredge the smallest area necessary to maintain these navigation channels, and a corridor concept provides flexibility in doing so, while also reducing costs and environmental impacts.

In 2000, Tideland Electric Membership Corporation installed a submarine power cable between Hatteras Island and Ocracoke Island. The cable transects the navigation corridor through the Hatteras Connector Channel on the Ocracoke Island side of the horseshoe route, and it is the only source for power and communications on Ocracoke Island (Figure 7). The active cable, 4.5 inches in diameter, is located within the corridor at depths ranging between -7 and -12 feet MLLW. There are also two inactive (disconnected) cables within the project area, located east of the active line.

From an operational standpoint, Government plant would maintain a minimum dredging distance of 100 feet from either side of the active submarine power cable, since it is located within the authorized navigation channel limits and associated overdepth. The dredging safety buffer will be removed once the line is relocated to a minimum depth of -15 feet mean low water (MLW) within the corridor.

Figure 6. Proposed corridor showing placement areas.

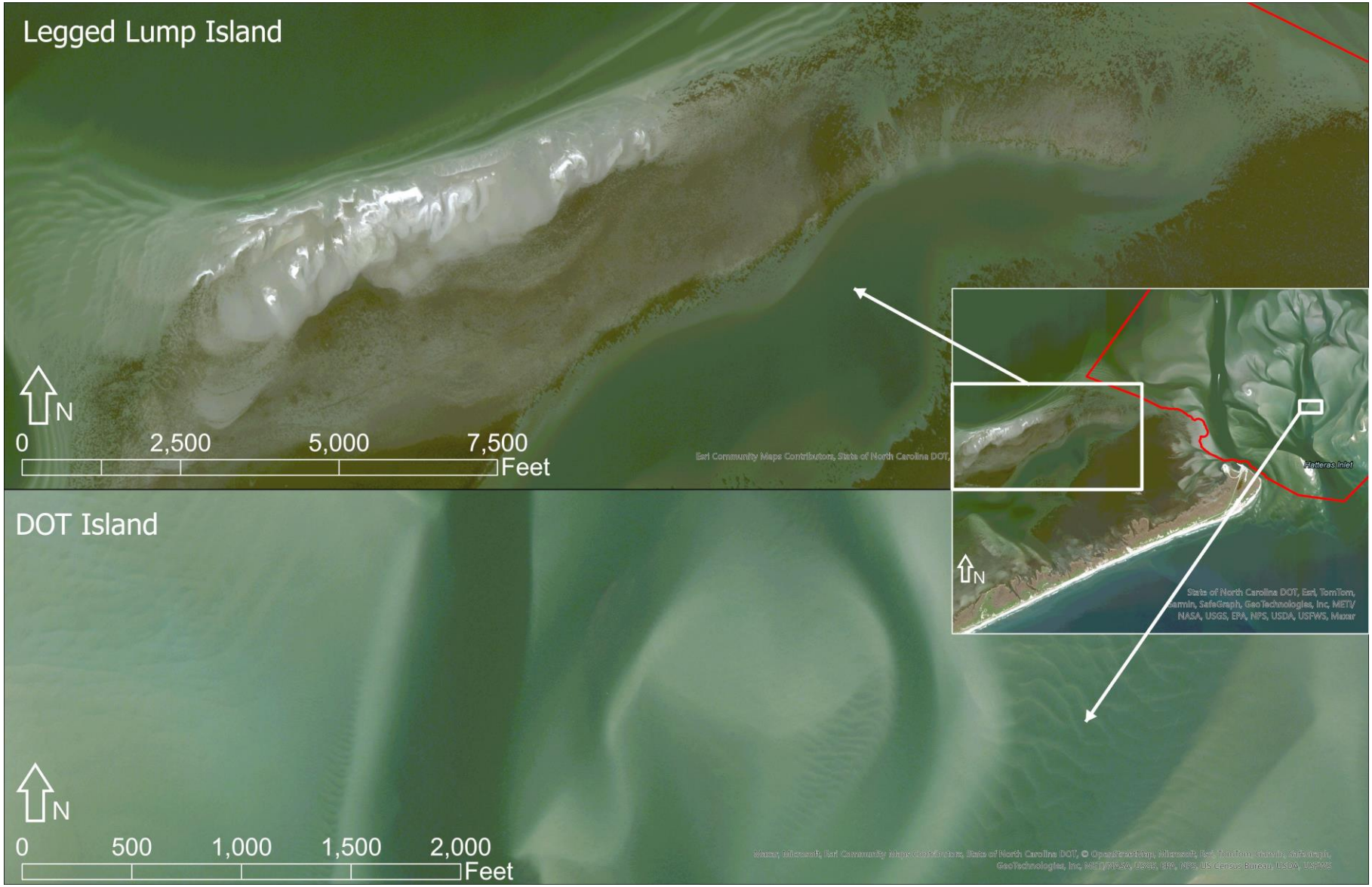


Figure 6a. Legged Lump Island (top) and DOT Island (bottom) placement areas (2024 imagery).

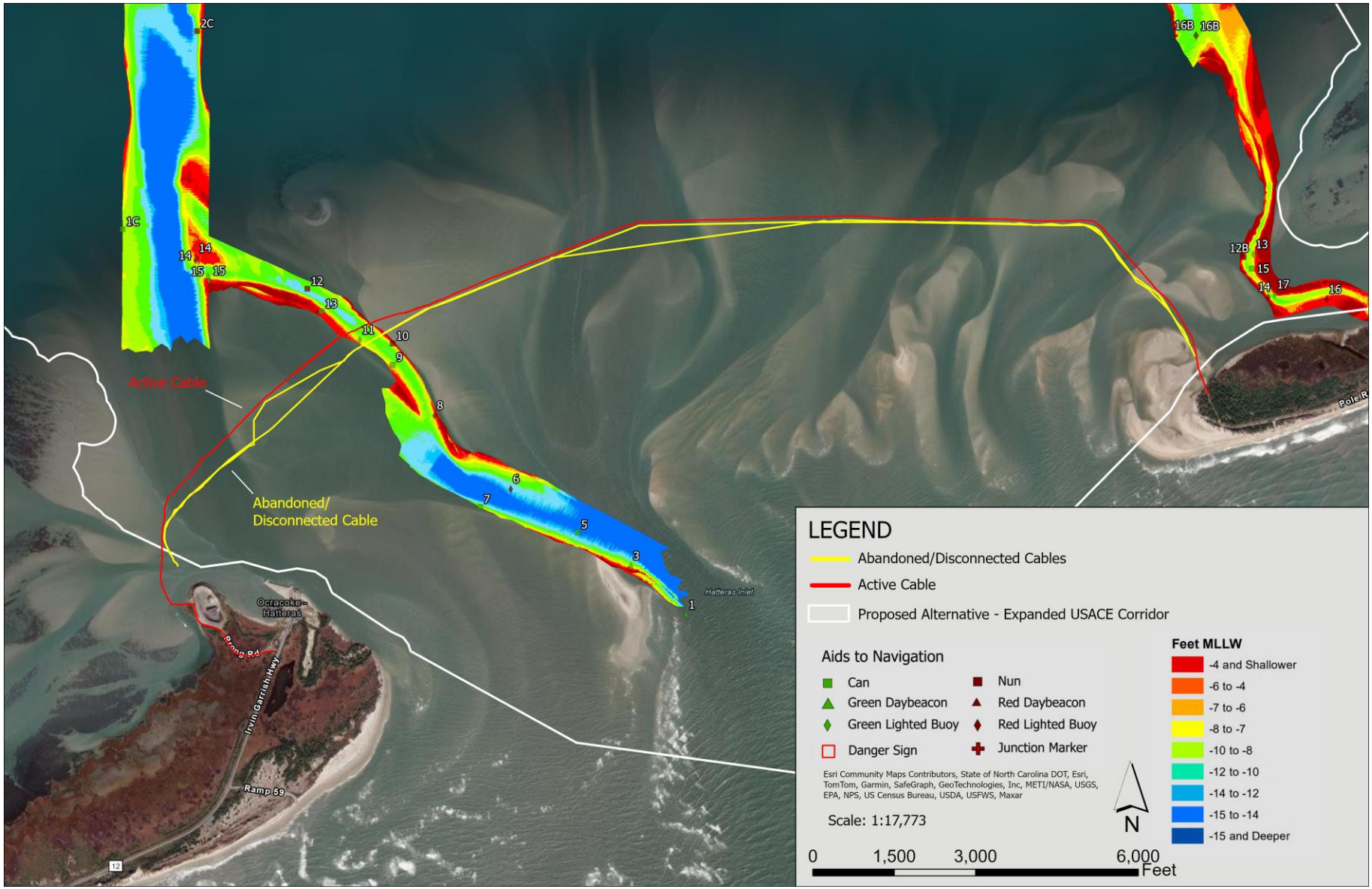


Figure 7. Ocracoke Island active cable line (in red).

2.0 PURPOSE AND NEED.

The purpose of the proposed Federal action is to expand the horseshoe route navigation corridor and to establish a navigation corridor for the Hatteras Ferry Channel to ensure (1) a safe, reliable navigation channel for residents, visitors, supplies, and services to and from Ocracoke and Hatteras Islands and (2) safe access to the Hatteras Inlet gorge enroute to the ocean for the USCG and commercial and recreational fishermen.

The NCDOT ferry service is a lifeline to this area, connecting the mainland from Cedar Island and Swan Quarter to the Ocracoke ferry terminal on the south end of Ocracoke Island. Another ferry on the north end of Ocracoke takes passengers and supplies over to Hatteras Island by way of the Hatteras Ferry Channel. The only other access to Hatteras Island is a single route, NC Highway 12, which takes approximately two hours by vehicle to reach the next barrier island to the north. There is no vehicle access to Ocracoke Island that does not involve a ferry, so safe navigability of the ferry route between Hatteras Island and Ocracoke is critical for the transport of people, supplies, and services from Hatteras and Dare County.

Hatteras Inlet is the only access to the Atlantic Ocean for many miles: Ocracoke Inlet is 18 miles to the south and Oregon Inlet is approximately 55 miles to the north. The USCG Search and Rescue Operations from the Oregon Inlet boat ramp would take hours to respond to a distressed mariner off the coast of Hatteras or Ocracoke Islands, with close-to-land emergencies taking the longest to access. It is critical for USCG Station Hatteras Inlet, located east of the Hatteras Ferry Terminal marina, to access the open ocean year-round to support life-safety missions and effectively protect the coastal waters and the mariners who use them.

Local commercial and recreational fishing, as well as tourism, are the lifeblood of the Outer Banks economy. Nearshore and offshore fishing have provided generations of income to residents and tourism dollars to the entire state. Access to offshore fishing areas has been strained for the last 20+ years due to the eroding adjacent shorelines and increased shoaling in Hatteras Inlet. The USCG is constantly monitoring and adjusting safe navigation routes for fishermen to ensure they do not become stranded or worse. A stable and maintainable channel is needed to reduce the risks to fishermen to navigate Hatteras Inlet. The likely outcome is increased use by the local fishing fleet due to the improved safety and thus economic stimulation.

The 2022 Hatteras EA/FONSI established the horseshoe route as the authorized Federal channel and designated an associated navigation corridor; however, due to the increasingly dynamic nature of the inlet, particularly in Barney Slough South and Sloop Channel North, since 2022, USACE has been forced to conduct dredging outside of the authorized navigation corridor at times to maintain a navigable channel. In addition, extreme shoaling within the navigation corridor at Barney Slough South Channel has pushed the deep-water channel farther east and continues to cause vessel and ferry traffic to be disrupted to the point where only one boat can navigate through portions of the channel at a time, resulting in hazardous conditions for mariners. The USACE has

been forced to conduct urgent dredging operations outside of the authorized navigation corridor to maintain a safe, navigable channel. This increased safety hazard and need for dredging outside of the navigation corridor established in 2022 has resulted in the need to expand the corridor for the horseshoe route, as well as to designate a new navigation corridor for the Hatteras Ferry Channel. The proposed project presents the best options to maintain safe access to and around Hatteras Inlet and will allow maintenance dredging of the best available, naturally deep-water route, providing flexibility for USACE by decreasing the need for maintenance dredging, thus reducing dredging costs and impacts to the environment.

Beneficial use of dredged material will help keep valuable sediments within the system and potentially decrease rates of erosion and habitat loss. By placing beach quality material in the nearshore, and on beaches and bird islands, USACE can protect and buffer existing shorelines and infrastructure and rebuild upland habitats to reduce risks to inshore areas from the effects of storm surge and high tides.

Because there is no way to predict when a shoaling event will require maintenance dredging, USACE needs the ability to continue to dredge any time of year using hydraulic pipeline dredges and would continue to follow the 1 October to 31 March environmental timeframe for use of Government plant to protect fisheries resources for all channels within the horseshoe route, except for Sloop Channel North, Hatteras Connector Channel, and the westernmost portion of Hatteras Ferry Channel Range 2 (for sidecast dredging only). Ferry services from Hatteras to Ocracoke Islands operate year-round with the number and frequency of ferry trips peaking in May through August, making this timeframe critical for USACE dredging events. Environmental timeframes for specific placement areas would also continue to be followed as required (see the Alternatives section for specifics).

Given the dynamic nature of sediment movement within the project area, following natural deep water to the extent practicable, and having the ability to dredge during the prescribed timeframes would result in a safer, more reliable channel, a reduced dredging effort and the associated reduction in maintenance costs.

3.0 INCORPORATION BY REFERENCE.

The proposed work will be conducted by dredging and placement methods previously used for maintenance dredging of federally authorized channels in the project area. The environmental acceptability of these methods has been addressed in previous NEPA documents that were circulated for public and environmental agency review between 1977 and 2022. Incorporated by reference, these documents include the following:

a) Maintenance of the Navigation Projects on Sounds of North Carolina, Final Environmental Statement. July 1976, U.S. Army Corps of Engineers.

b) Manteo (Shallowbag) Bay North Carolina, Final Environmental Statement. July 1977, U.S. Army Corps of Engineers.

c) Maintenance Dredging of Rodanthe, Avon, and Rollinson Channels. Environmental Assessment. December 1996, U.S. Army Corps of Engineers.

d) Maintenance Dredging of Rodanthe, Avon, and Rollinson Channels. Finding of No Significant Impact. February 1997, U.S. Army Corps of Engineers.

e) Maintenance of Rollinson Channel, Hatteras to Hatteras Inlet Channel Section, Dare and Hyde Counties, North Carolina. Environmental Assessment and Finding of No Significant Impact. 2000, U.S. Army Corps of Engineers.

f) Use of Government Plant to Dredge in Federally Authorized Navigation Projects in North Carolina. Environmental Assessment. March 2004, U.S. Army Corps of Engineers.

g) Use of Government Plant to Dredge in Federally Authorized Navigation Projects in North Carolina. Finding of No Significant Impact. September 2004, U.S. Army Corps of Engineers.

h) Sidecast Maintenance Dredging of a Portion of Hatteras-to-Hatteras Inlet Channel Pamlico Sound, North Carolina. Environmental Assessment. November 2013, U.S. Army Corps of Engineers.

i) Sidecast Maintenance Dredging of a Portion of Hatteras-to-Hatteras Inlet Channel Pamlico Sound, North Carolina. Finding of No Significant Impact. February 2014, U.S. Army Corps of Engineers.

j) Hatteras to Hatteras Inlet Channel Realignment, Rollinson Channel Navigation Project. Environmental Assessment and Finding of No Significant Impact. November 2022, U.S. Army Corps of Engineers.

4.0 ALTERNATIVES.

The goal of the project is to maintain a safe, navigable channel throughout the horseshoe route, Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel using the most cost-effective means, while maintaining high environmental standards. Due to the dynamic nature of the area, shifting the channel as needed throughout a larger navigation corridor for the horseshoe route will lead to less dredging and fewer environmental impacts, as will the establishment of a

navigation corridor for the Hatteras Ferry Channel. Discussed below are the alternative options and methods considered for this project.

4.1 Dredge Types and Placement Options.

Various dredge types may be used to maintain the navigation channels within the project area, depending on dredge availability and channel conditions, such as shoaling and controlling water depths. Dredge type and placement options are described below and would be applicable to any of the three alternatives described in Section 4.2.

4.1.1 Pipeline Dredge.

To maintain the navigation channels, a contracted hydraulic pipeline dredge would be used approximately every 3-5 years, depending upon shoaling rates and available funding. Pipeline dredges typically use pipelines with diameters of 18-24 inches, operate 24 hours per day, and have the capability to remove larger volumes of material (≥150,000 cubic yards [CYs]) per contract. Cutterhead suction horsepower of small non-ocean certified dredges usually ranges between 1,300 – 2,000 horsepower (HP), whereas larger pipeline dredges range from 3,000 – 4,500 HP. Beneficial use of dredged material may occur with placement of beach quality sand on Hatteras and Ocracoke Island beaches and/or onto Cora June, Legged Lump, and DOT bird islands for the purpose of restoring habitat for nesting sea turtles and shorebirds, respectively.

Historically, pipeline dredging in the vicinity of the project area has occurred outside of bird nesting season (1 September – 31 March) with dredged material pumped onto nearby Cora June Island, a well-known bird nesting habitat site in the area, located one mile west of Hatteras Basin. Presently, the island has reached maximum size (approximately 25 acres) and will not hold additional material until it naturally erodes to a smaller footprint. Although currently non-existent due to erosion, DOT Island was formerly located centrally inside the proposed horseshoe route corridor. Authorizations currently held by NCWRC allow for the placement of dredged material on DOT Island by control-of-effluent to a maximum footprint above mean high water (MHW) of 25 acres. Legged Lump Island, whose elevations vary from year-to-year, is considered a coastal sanctuary located 1.7 miles west of Sloop Channel. Multiple nesting bird species and other species of concern have been observed in recent years, making the island a potential habitat enhancement area for beneficially used dredged material. Currently, there are no permits covering placement of dredged material onto Legged Lump Island, which is owned by North Carolina Audubon. Any required permits will be obtained before placement is initiated and will be done in coordination with NCWRC and Audubon. Any placement of dredged material on bird islands would adhere to the 1 September to 31 March environmental timeframe to protect nesting birds.

Pipeline dredging may also place dredged material directly onto adjacent Ocracoke and Hatteras Island beaches for purposes of habitat restoration and to combat shoreline erosion. Placement timeframes for dredged material are driven by the presence of bird nesting habitat (16 November – 31 March) on these beaches. The National Park

Service (NPS) has declared areas of beachfront within Cape Hatteras National Seashore (CAHA) as eligible for receiving sand once a Special Use Permit (SUP) has been obtained. Any placement of dredged material within CAHA outside of these designated beach placement areas would be coordinated with NPS prior to work taking place.

Placement of dredged material into the littoral zone via pipeline could also take place off CAHA beaches. In this scenario, a pipeline would be placed across Hatteras and Ocracoke Islands, most likely perpendicular to the barrier island, but not required, for one or both islands. Dredged material placed in the littoral zone would allow waves and currents to naturally carry sediment to the beach face or alongshore. This placement methodology keeps dredged material in the natural system and allows for oceanographic processes to work the sediment naturally. This methodology also requires less handling and manipulation of dredged material and minimizes disruption and burial of the natural environment. An SUP would be obtained from the NPS prior to conducting this activity within CAHA boundaries.

Placement of dredged material into deep water placement areas using a pipeline could be accomplished by sinking the end of the pipeline in the deepest part of the placement area and allowing dredged material to flow directly into deep water. Placing dredged material in this way would minimize water quality issues by discharging sediment closer to the placement area instead of allowing material to settle down through the water column.

There is an existing upland confined placement facility on Ocracoke Island adjacent to the state ferry terminal. This placement facility is owned and operated by NCDOT. Currently, USACE does not have authorization for its use; however, should there be a need to use the site, USACE would coordinate with NCDOT prior to placement.

4.1.2 Special Purpose Hopper Dredge.

The Wilmington District currently has one shallow-draft special purpose hopper dredge (Murden). This vessel typically operates during daylight hours approximately 300 out of 365 days per year, 12 hours per day. The Murden is capable of dredging in a minimum depth of 5.5 feet of water partially loaded and 9 feet fully loaded and has two dragarms with dragheads that pump material at 100-110 HP into a hopper that can overflow to obtain an economic load. Once the hopper is full (~300 to 500 CYs), the dredged material would be taken to nearshore ocean waters where the split-hull hopper would be opened, and the material placed. The Murden, or equivalent dredge, is used to remove small and/or isolated, regularly occurring shoals when contract dredging is not scheduled.

Nearshore placement areas (between -11 and -17 feet MLLW) previously established under the 2004 Government Plant EA and the 2022 Hatteras EA/FONSI have been, and continue to be, utilized by special purpose hopper dredges. The nearshore location on the Ocracoke side of the inlet is also used by Dare County to place material from South

Ferry Channel. Placement in both locations will help protect adjacent beaches by acting as a wave energy dissipator and/or to distribute the beach quality dredged material onto the beaches, offering erosion protection.

In addition to nearshore placement, special purpose hopper dredges can place material into deep water placement sites, such as the area directly adjacent to the Ocracoke Ferry Terminal sheet pile wall. The purpose of this effort would be to provide sediment protection for the sheet pile wall which was installed to decrease the erosion occurring at the facility. Smaller amounts of material (typically ≤5,000 CY) would be placed in this location when specifically requested by NCDOT. Dredged material could also be placed within deep water placement areas in the horseshoe route channels, specifically those in Barney Slough and Sloop Channel. Dredged material placed in deep water placement areas may be fine-grained (<90% sand) or coarse-grained (≥90% sand) and would be placed to a depth no shallower than –14 feet MLLW.

Three additional open-water placement options are also proposed for the two action alternatives described below: (1) Rollinson Channel Open-Water Placement Area, located at the northern terminus of Rollinson Channel, (2) Hatteras Ferry Channel Open-Water Placement Area, located north of Sloop Channel, and (3) Hatteras Inlet Flood Channel Open-Water Placement Area, located within the flood tidal delta adjacent and within the Hatteras Connector Channel. These open-water placement area options could be used to place fine-grained (<90% sand) or coarse-grained (≥90% sand) material. The open water placement areas are currently permitted for use by Dare County, and have no depth restrictions, which USACE will follow.

Any use of Government plant special purpose hopper dredges in Barney Slough Channel, Pamlico Sound Channel, and Sloop Channel South would adhere to an environmental timeframe of 1 October to 31 March to protect fisheries resources. For all other channels, which include Hatteras Connector Channel, Sloop Channel North, Hatteras Ferry Channel Ranges 2-5, Hatteras Ferry Connecting Channel, and Rollinson Channel, dredging may be accomplished any time of year.

4.1.3 Sidecast Dredge.

The Wilmington District presently has one sidecast dredge, the Merritt. The Merritt is capable of dredging in a minimum water depth of 5 feet, has two adjustable dragarms with dragheads, has a 12-inch discharge pipe that is 80 feet long with an available 10-foot pipe extension, and a working suction pump of 110 HP. The Merritt is only used in areas with ≥90% sand that settles out quickly. Material is cast approximately 80 feet from the port or starboard side of the vessel into adjacent open waters where the predominant currents carry the sediments away from the channel. As with the special purpose hopper dredge, the sidecaster operates only during daylight hours (12 hours/day).

Due to its shallow draft capability, the sidecast dredge is often the only method of dredging available for shoal removal. The Merritt is often used for digging pilot channels

to provide access for special purpose or contract dredges to conduct maintenance dredging to authorized dimensions. Sidecast dredging takes less time than special purpose hopper dredging since transit time for dredged material placement is not required. When maintenance dredging is required and other dredge types are not available, USACE proposes to sidecast dredge.

Since all dredged material in the vicinity of the corridor is ≥90% sand, sidecasting has been previously authorized to occur on an as-needed basis within the horseshoe route. Similar to Government plant special purpose hopper dredges, the sidecaster would adhere to an environmental timeframe of 1 October to 31 March in Barney Slough North and South Channels, Pamlico Sound Channel, and Sloop Channel South to protect fisheries resources. Sidecasting is not allowed within Rollinson Channel, Hatteras Ferry Connecting Channel, and most of Hatteras Ferry Channel Ranges 2, 3, 4, and 5 due to the presence of submerged aquatic vegetation (SAV) as noted in the USACE September 2004 FONSI for Use of Government Plant; however, the 2014 Sidecast Dredge EA/FONSI allowed for the use of sidecast dredges in the western-most portion of Hatteras Ferry Channel Range 2. This portion of the channel has sufficient buffers from SAV that use of a sidecast dredge poses no risk to the resource. Before sidecast dredging is performed in the allowable channels, aerial and State GIS analysis of adjacent areas will be performed to ensure no SAV would be affected.

4.2 Alternative 1 – No Action.

The No Action alternative refers to USACEs ongoing maintenance of the channels within the previously established horseshoe route navigation corridor, Rollinson Channel, Hatteras Ferry Channel, Hatteras Basin, and Hatteras Ferry Connecting Channel, as authorized, within the project area.

4.2.1 Horseshoe Route.

No action would mean no change to the navigation corridor, spanning approximately 1,580 acres, that allows the navigation channel to follow best available deep water within the Hatteras Inlet complex. This corridor allows USACE to maintain the channel's authorized dimensions following the best available, naturally deep-water, avoiding SAV and other important resources like Essential Fish Habitat (EFH).

Maintenance dredging utilizing the navigation corridor began following completion of the 2022 Hatteras EA/FONSI; however, inlet dynamics and increased shoaling resulted in Barney Slough South Channel and Sloop Channel North migrating outside the authorized navigation corridor, forcing USACE to obtain urgent/emergency approvals to maintain those channels outside the navigation corridor. The USACE does not have appropriate NEPA coverage or adequate permits/approvals to continually dredge outside the current navigation corridor. In addition, it's not feasible for USACE to attempt to maintain the navigation channel within the existing corridor as maintenance would require constant dredging due to inlet dynamics and continual shoaling in these channels. Staying within the existing corridor is not cost-effective, presents safety

issues for vessels transiting the area, and results in increased disturbance to aquatic resources.

There is no timeframe for dredging of the horseshoe route via hydraulic pipeline. Any use of Government plant dredges in Barney Slough Channel, Pamlico Sound Channel, and Sloop Channel South would adhere to an environmental timeframe of 1 October to 31 March to protect fisheries resources; Sloop Channel North and Hatteras Connector Channel may be dredged any time of year.

4.2.2 Hatteras Ferry Channel Ranges 2, 3, 4, and 5 (from southwest end of Hatteras Island to Cora June Island).
Under the No Action alternative, Hatteras Ferry Channel, which connects the inlet to the State ferry marina on Hatteras Island, would remain the same as authorized in the 1976 ES, which is an approximately 2.4 mile long, 100-foot-wide, fixed channel. High shoaling in the authorized channel where it connects to the horseshoe route has occurred as Hatteras Inlet has widened, leading to issues with two-way vessel traffic, large vessels navigating the area, and safety concerns. The inlet and surrounding area have changed extensively since the 1976 ES was finalized, making the ferry route from the inlet to the marina less safe as storm events, tides, and wakes from large vessels influence the deepest water route. Similar to Barney Slough South, the channel is difficult to maintain in its current fixed location as flood tides push more and more sediment into the channel. Sidecasting is prohibited within Hatteras Ferry Channel Ranges 2, 3, 4, and 5 to protect SAV; sidecasting is permitted in areas directly west of the fixed channel of Range 2 (outlined in purple on Figure 1) per the 2014 Hatteras Sidecast Maintenance Dredging EA/FONSI. Hopper dredging using Government plant may be conducted within Hatteras Ferry Channel Ranges 2-5, any time of year. There is no dredging timeframe for use of pipeline dredges in Hatteras Ferry Channel.

4.2.3 Rollinson Channel, Hatteras Ferry Connecting Channel, and Hatteras Basin.
Under the No Action alternative, Rollinson and Hatteras Ferry Connecting Channels and Hatteras Basin would remain as authorized and discussed in the 1976 ES. Rollinson Channel was authorized as a fixed, 5-mile-long, 100-foot-wide navigation channel, connecting Hatteras Basin to mainland North Carolina through Pamlico Sound; Hatteras Ferry Connector Channel was authorized at 100-feet-wide, 10 feet deep, and 4 miles long; and Hatteras Basin was authorized to a depth of 12 feet. The Hatteras Ferry Connecting Channel connects Rollinson Channel to the Hatteras Ferry Channel. Neither of these channels experience high shoaling activity, and the historic routes are currently safe for all mariners. Rollinson Channel, Hatteras Ferry Connector Channel, and Hatteras Basin may be dredged any time of year using pipeline or special purpose hopper dredges; however, sidecast dredging is prohibited in these areas.

4.2.4 Placement.
With No Action, dredged material placement would not change. Current placement areas for all channels include oceanfront beach placement on Ocracoke and Hatteras Islands, nearshore placement off both islands, deep water placement within the

horseshoe route and at the sheet-pile wall adjacent to the State ferry terminal on Ocracoke Island, and DOT and Cora June bird islands. Rollinson Channel and Hatteras Basin previously had an upland placement site to the southwest of Hatteras Basin that is no longer available due to the construction of residential development.

If USACE were to make no changes to current dredging and placement practices, the amount of dredged material and frequency of dredging would likely continue to increase. Vessels would continue to have issues passing within the inlet, leading to unsafe conditions for ferries, recreational and commercial vessels, and USCG. Some placement areas previously authorized are not currently available for use, such as Cora June Island or the former upland placement site on Hatteras Island, which poses a problem for USACE in making cost-effective, environmentally prudent decisions regarding dredging and placement of material in the project area.

4.3 Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas.

Alternative 2 includes a slightly widened navigation corridor for portions of the horseshoe route within the Hatteras Inlet complex, as well as the creation of a navigation corridor for the Hatteras Ferry Channel (Ranges 2, 3, 4, and 5) between the inlet and State ferry terminal (Figure 8). Alternative 2 also includes the current fixed channels of Hatteras Ferry Connecting Channel and Rollinson Channel.

Under Alternative 2, USACE would expand the previously authorized horseshoe route navigation corridor to approximately 3,373 acres, specifically at Barney Slough Channel and Sloop Channel North (Figure 8); the remainder of the horseshoe route navigation corridor would be unchanged. Shoaling in Sloop Channel North and Barney Slough has resulted in a shift of deep water outside of the authorized navigation corridor and poses difficulties in maintaining the channel. This alternative would expand the horseshoe route at Barney Slough towards the east to encompass the shift of the existing navigation channel. It would also include the route dredged by USACE at Sloop Channel North under the emergency dredging declaration in early 2024. However, based on the dynamic nature of the inlet complex, it's highly likely that the deep-water channel through the current horseshoe route will migrate outside of this slightly expanded corridor in the future due to inlet widening and shoaling after large storm events. Maintenance dredging with Government plant would continue to occur any time of year in Sloop Channel North as is currently authorized, while Barney Slough would follow the 1 October to 31 March timeframe.

Alternative 2 would also include the implementation of a 284-acre navigation corridor for the Hatteras Ferry Channel to allow USACE to follow the best available deep-water channel between the inlet and State ferry marina on Hatteras Island. The current fixed channel has experienced higher shoaling rates than in the past and having a navigation corridor here would allow the channel to follow natural deep water, resulting in less

dredging. This alternative would also allow either Government plant or hydraulic pipeline maintenance dredging any time of year in this corridor. Government plant sidecast dredges would not be used in Ranges 2 (eastern-most portion), 3, 4, and 5; a sidecast dredge could be used in the western-most portion of Range 2.

Under this alternative there would be no changes proposed to Rollinson Channel, Hatteras Ferry Connecting Channel, and Hatteras Basin, except for the addition of the proposed open water, deep water, and littoral zone placement areas for dredged material throughout the project area. There are currently no environmental timeframes for dredging with use of any dredge plant in these channels.

All placement areas for Alternative 2 are detailed in Section 4.1 and include: littoral zone and nearshore placement areas adjacent to Ocracoke and Hatteras Islands, beach placement, open water placement, deep water placement, NCDOTs confined upland placement facility, and bird island placement.

While this alternative allows for increased flexibility within areas that experience high shoaling rates, it is unlikely that the best deep-water route will be able to be maintained long-term within the expanded horseshoe route navigation corridor. It is expected that due to the highly dynamic nature of Hatteras Inlet, the flood tidal shoals would continue to push more sediment into the area and shift any naturally occurring deep-water channel outside of the authorized navigation corridor. The primary limitation for this alternative is the limited inlet complex corridor. The inlet is dynamic, with both deep-water and shoaling changing frequently. This alternative could lead to more dredging, in both quantity and frequency, compared to the proposed action, as well as continued safety concerns for mariners, State ferries, and USCG, as well as the potential for additional navigation corridor expansions in the future. Overall, this alternative may not improve safety conditions or decrease the need for dredging.

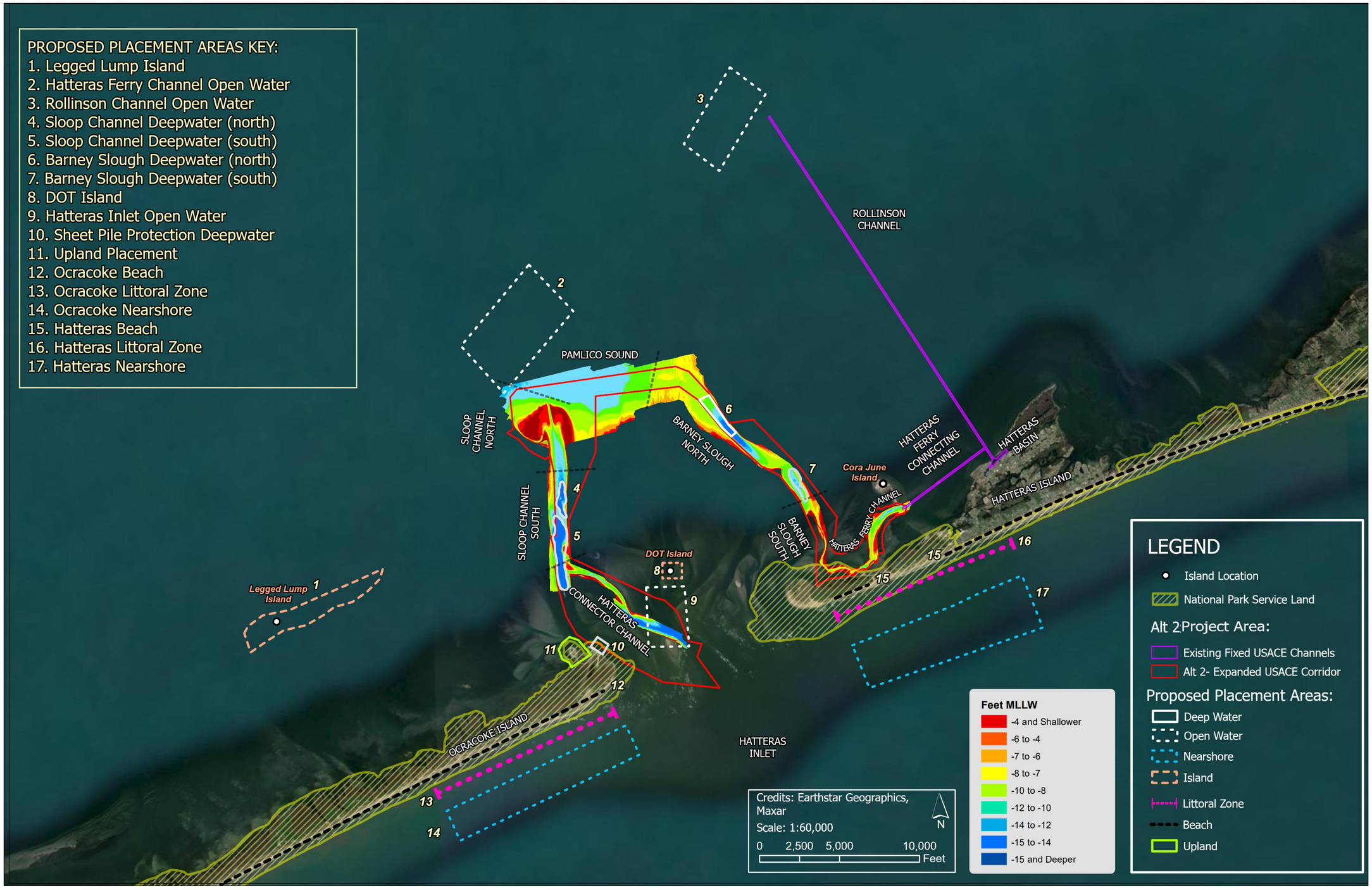


Figure 8. Alternative 2 - Expanded horseshoe route navigation corridor only at Barney Slough and Sloop Channel North, navigation corridor at Hatteras Ferry Channel, addition of three open water and two littoral zone dredged material placement area

4.4 Alternative 3 (Proposed Action) – Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open-water and two littoral zone dredged material placement areas.

Alternative 3, the proposed action, includes: (1) an expanded navigation corridor that encompasses the entire Hatteras Inlet complex, (2) the establishment of a navigation corridor at Hatteras Ferry Channel between the inlet and Cora June Island, and (3) the addition of three open-water dredged material placement areas, littoral zone placement via hydraulic pipeline, for all channels that make up the Rollinson Federal navigation project (Figure 9). These navigation channels allow for safe vessel movement within the project area, from island to island, and to and from mainland North Carolina. The proposed action would allow USACE to dredge following best available, naturally deep-water within the two proposed navigation corridors, which vary as the sediment dynamics of the inlet are constantly redistributing material through the current horseshoe and ferry routes. The Proposed Action would result in less dredging than No Action or Alternative 2, in both quantity and frequency, as the proposed corridors allow for more flexibility in maintaining the channels. Following the best available deep water is the safest, most cost-effective, and least environmentally damaging practicable alternative (LEDPA) for maintenance of the Rollinson Federal navigation project. In addition, any areas within the corridors requiring new dredging by USACE will have sediment sampling performed prior to any dredging. This would allow USACE to determine which of the proposed placement locations would be utilized based on sediment characteristics.

Maintenance dredging of the authorized navigation channel (approximately 8.5-miles-long, 100-feet-wide, 10 feet deep [with 2 feet of allowable overdepth]), regardless of the size of the navigation corridor, may impact up to approximately 183 acres. The entire horseshoe route proposed navigation corridor is 12,852 acres, so the maintained channel would be approximately 1.1% of the total corridor area if the entire horseshoe route required dredging, which is not likely since the channel would follow natural deep water.

With completion of the 2022 Hatteras EA/FONSI, maintenance dredging of the horseshoe route using pipeline dredges may occur any time of year; however, an environmental timeframe of 1 October through 31 March was instituted for the use of any Government plant in all channels except for Sloop Channel North and Hatteras Connector Channel, where dredging may occur any time of year. These environmental timeframes would continue to be followed. In addition to the timeframes outlined in the 2022 Hatteras EA/FONSI, the 2004 Government Plant Dredging EA/FONSI authorized the use of special purpose hopper dredges within Rollinson Channel, Hatteras Ferry Connecting Channel, and Hatteras Ferry Channel, while the 2014 Hatteras Sidecast Maintenance Dredging EA/FONSI authorized the use of Government plant sidecast

dredging in the western portion of Hatteras Ferry Channel Range 2. There are no environmental timeframes for dredging these channels with any Government plant.

As noted, shoaling in these areas is unpredictable, both temporally and spatially. Dredging events would most likely be minor, with a few shoaled areas of the channel throughout the project area requiring as-needed maintenance. Hydraulic pipeline dredging would occur about every 3-5 years (depending on shoaling and available funding), while Government plant would be used between contracts to remove shoaling. The frequency of dredging using a specific dredge plant, including quantities and frequency of dredging, is included in the draft Hatteras Inlet Management Plan (HIMP) (Appendix D).

Under this alternative there would be no change to the maintenance of Rollinson Channel, Hatteras Ferry Connecting Channel, and Hatteras Basin except for the addition of the proposed open-water and deep-water placement areas for dredged material. There are no environmental timeframes for dredging with use of any dredge plant in these channels.

Placement areas for the proposed alternative build on previously authorized areas. Oceanfront beach placement on both Ocracoke and Hatteras Islands within CAHA boundaries have been identified in coordination with the NPS. These beaches experience frequent erosion and would benefit from placement of dredged material. Nearshore areas along both islands have also been previously authorized and would continue to be used as a placement option for Government plant special purpose hopper dredges. Deep-water placement areas (deeper than -14 feet MLLW) within the horseshoe route have previously been identified as placement areas for fine-grained sediments, along with a deep-water placement area adjacent to the sheet pile wall at the State ferry terminal on Ocracoke Island. In addition, the use of Government-owned sidecast dredges would place beach quality (≥90% sand) dredged material in open water within or outside of the navigation corridor. Bird island placement is proposed to continue; USACE identified Cora June and DOT Islands in the 2022 Hatteras EA/FONSI, and they would continue to be utilized, as would the inclusion of Legged Lump Island, all of which have had nesting bird habitat. Currently, Cora June Island cannot accept additional sediment as it has reached its maximum size of 25 acres, while DOT Island is non-existent, having completely eroded. As these bird islands are able to accept dredged material, USACE would consider them as placement options in coordination with NCWRC and/or North Carolina Audubon. Placement on these islands could encourage habitat restoration for various species, like piping plover, red knot, and diamondback terrapins. In addition to those previously authorized, new placement options include littoral zone placement via pipeline on both Hatteras and Ocracoke Islands; open-water placement within the flood tidal delta on the west side of Ocracoke Inlet; open-water placement within Pamlico Sound north of the horseshoe route; and open-water placement at the northern end of Rollinson Channel in Pamlico Sound.

A draft HIMP was developed at the request of agencies during completion of the 2022 Hatteras EA/FONSI. The HIMP details USACE and Dare County's dredging activities for the project area and is a way for agencies to track dredging efforts in the Hatteras area. The HIMP would be updated annually and distributed to agencies. The HIMP is included in Appendix D.

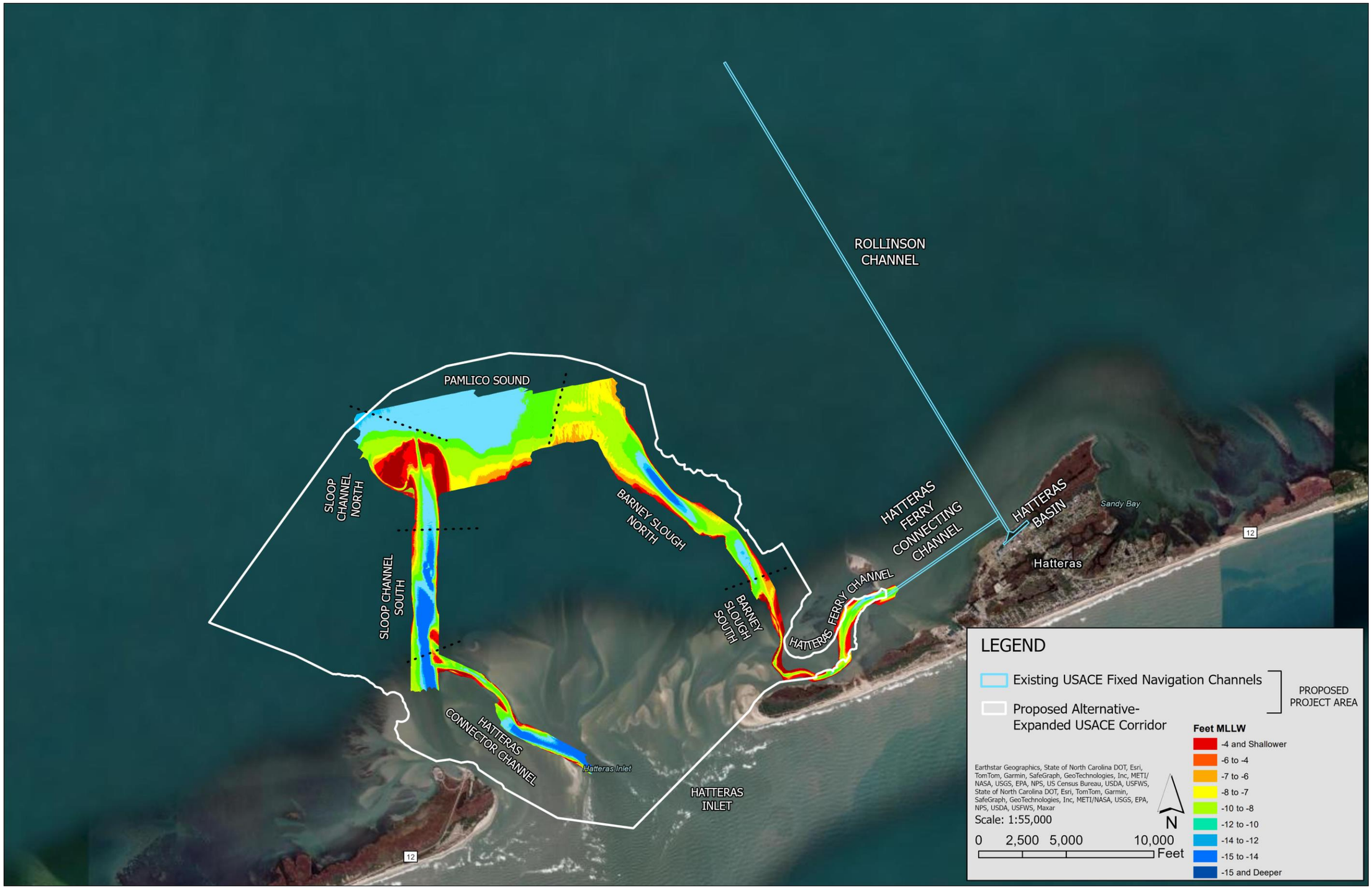


Figure 9. Alternative 3 (proposed action) - expanded navigation corridor encompassing Hatteras Inlet and new navigation corridor for Hatteras Ferry Channel, as well as existing fixed channels: Hatteras Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel.

5.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.

The area of dredging effects to both benthic species, and those found in the water column are limited by the dredge types covered. Government plant dredges have small dragheads (2 feet by 3 feet), resulting in a small linear dredging footprint with each dredging pass, which limits the area affected. Those species that may be in the area surrounding the dredge draghead are at low risk of entrainment due to the low dredge intake velocity. Dredging by pipeline would also be limited to the small area where the cutterhead is actively dredging. The cutterhead is in a fixed location and swings slowly in an arch pattern limiting entrainment to a few feet from the suction created at the cutterhead. Neither dredge type would engage pumps until the suction portion of the dredge is on the seafloor, limiting the area of disturbance and potential entrainment to less than 10 feet total. Since the suction is occurring at the seafloor, potential disturbance or entrainment within the water column is not likely. Time of year does not change the area that will be affected by these equipment types.

Effects from placement of material from these dredge types will also be minimal to both benthic species and those found within the water column. All material proposed for dredging in the project area, except a portion of Rollinson Channel (from the Basin out to Channel Marker No. 32) and Hatteras Basin, consists of beach quality sand (≥90% sand) and placement on nearshore areas, beaches, or bird islands would be done in accordance with the designated timeframes for the protection of nesting birds and sea turtles. Material dredged from Hatteras Harbor out to Channel Marker No. 32 contains high percentages of fine-grained sediment considered to be non-beach quality (<90%) sand. Channel areas that contain <90% sand would be placed in deep-water or open-water placement areas. Existing clearances and conditions that allow placement by control-of-effluent onto bird islands will be implemented. Placement onto NPS CAHA beaches on Hatteras and Ocracoke Islands would occur only after an SUP is obtained. Additionally, placement will abide by the 2021 Cape Hatteras National Seashore Sediment Management Framework FEIS and the terms and conditions and conservation recommendations described in the 2017 USFWS Statewide Programmatic Biological Opinion (BO) or any superseding BO. The USACE is working with USFWS on the development of a Wilmington District-specific Programmatic Biological Opinion (PBO) for Sand Placement Activities. Once signed and issued by USFWS, USACE will abide by the terms and conditions of that PBO.

Hydraulic pipeline dredging within the proposed navigation corridors will be assessed for environmental effects since the expanded horseshoe route navigation corridor and the creation of a new navigation corridor for Hatteras Ferry Channel may result in new areas of dredging; however, pipeline dredging with placement on beaches would be limited to the cold weather months (16 November – 31 March) based on placement restrictions protecting sea turtle and bird nesting areas, while placement on bird islands would be conducted between 1 September and 31 March.

Dredging and placement with any Government-owned plant are limited to 1 October through 31 March for Barney Slough Channel, Pamlico Sound Channel, and Sloop

Channel South within the horseshoe route to protect fisheries resources. Neither Rollinson or Hatteras Ferry Connecting Channels, nor Hatteras Basin, have dredging timeframes when using Government plant. Special purpose hopper dredges suction bottom material into the hopper and would transport it to an approved nearshore, deep-water, or open-water area for placement. Sidecast dredging suctions beach quality (≥90% sand) dredged material and redistributes it into adjacent waters, atop existing sandy sediments. The dredged material is cast approximately 80 feet from the port or starboard side of the vessel into open water flowing away from the channel being dredged. Since dredging may occur up to the edge of the corridor, sidecasting up to 80 feet outside of the proposed corridor may result. All areas that will be maintained with a sidecast dredge would consist of ≥90% sand (grain-size between 0.075 mm and 4.75mm), which settles out quickly, limiting effects outside of the placement area from increased turbidity or sedimentation effects, such as the burial of nearby resources. The dredged material spray results in a thin layer of material placement that is not expected to permanently affect these areas adjacent to the channel, as benthic species will either survive the placement or repopulate the areas quickly.

The impacts of these activities will be addressed for the three alternatives, described above as 1) No Action - maintaining all navigation channels as authorized; 2) Alternative 2 - only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open-water and two littoral zone dredged material placement areas; and 3) Proposed Alternative - expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open-water and two littoral zone dredged material placement areas.

5.1 Sediments.

In addition to the vibracores taken for the development of the 2022 Hatteras EA/FONSI, three vibracores were collected in late 2022 in anticipation of an emergency dredging request outside of the approved corridor in Sloop Channel North. Out of a targeted ten vibracores, USACE was only able to navigate to seven targets due to shoaling, wind, and wave conditions. Vibracores designated HFC-22-01, HFC-22-02, and HFC-22-03 were drilled to characterize the desired horseshoe channel route. Materials sampled by these three vibracores consist primarily of poorly graded sands with some poorly graded sand with silt at depth. Composited fines content within the proposed dredge prism is anticipated to be less than 10%, suitable for beach or bird island placement. Four vibracores were drilled within the distal edge of the Hatteras flood tidal delta where a combination of poorly graded sand and silty sand was found. The composite fines content in these borings ranged from 5.6% to 18.7%; however, these borings lie outside of the navigation corridor that was being considered in the 2022 Hatteras EA/FONSI. Results of all vibracores collected to date in the project area, including drilling logs and gradation testing, are available upon request from the USACE Wilmington District office (see section 9.0 Point of Contact). Once all the vibracores were collected, they were split open. The sampled soils were logged and designated for testing, and the vertical shoal strata between the channel bottom and -12 feet MLLW was characterized using

the drilling logs and cross-sections. The boring logs, core photos, and lab test data that will be available after completion of this EA will also be available from USACE, upon request.

Per the subsurface investigation scope of work (SOW) for the project, a total of 36 vibracores are to be drilled within the proposed expanded navigation corridor in summer of 2025. Within the investigation area, the bathymetry ranges from about 0 feet to -15 feet MLLW. The vibracores shall be drilled in 10- and 20-foot lengths. The maximum project depth of the deepest channel in the project area is -14 feet MLLW. If the vibracores penetrate deeper than -14 feet MLLW, the cored sediments will still be visually classified, photographed, and may be tested. The results from this subsurface investigation will be utilized to identify the material characteristics, which determine the appropriate dredged material placement options.

The contractor shall designate vibracores from the proposed project corridors as 'HFCRC-25-V-###'. Vibracores shall be performed within 150 feet (horizontally), yet as close as practicable to the locations provided by USACE. Vibracore drilling shall be accomplished by vibrating a vertical 3-inch diameter sampling tube to the run length (10- or 20-feet) designated for each vibracore. Per the South Atlantic Regional Biological Opinion (SARBO) for Endangered Species Act compliance, the vibracore sampler shall not be operated until the vibracore platform and barrel contact the substrate at the bottom of the seafloor. The vibracore sampler shall not be operated during retrieval operations (SARBO 2020). The recovered sediments in each vibracore shall not be less than 75% of drive length unless the collected vibracore encounters refusal. To document vibracore refusal, penetrometer data collection shall be recorded and presented for verification. Vibracore refusal is defined as the sampling barrel having a penetration rate of less than 0.2 feet over a 30 second period. If vibracore refusal is encountered at the seabed, the contractor shall offset up to 20 feet and conduct an additional vibracore attempt at a separate location within 20 horizontal feet of the original sampling location. Location information and refusal depth shall be recorded for each location where refusal is encountered. An estimated 217 samples will be collected. The boring logs, core photos, and lab test data referenced EA will be available from USACE, upon request.

To test the collected subaqueous soil, three test procedures shall be performed on each sample:

1. ASTM D6913, "Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis," modified by using the following sieve sizes: 1-in., 3/8-in., No. 4, No. 7, No. 10, No. 14, No. 18, No. 25, No. 35, No. 40, No. 60, No. 80, No. 120, No. 170, No. 200, and No. 230;

2. ASTM D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soils Classification System)"; and,

3. Visual, volumetric percentage of shell and rock fragment determination. Visual percent shell content and visual percent rock fragment content shall be estimated for the 1-in., 3/8-in., and No. 4 sieve sizes.

New borings and associated testing will be performed in any new areas of dredging that have not been previously sampled, prior to any dredging event. No dangerous debris,

including unexploded ordnance, is anticipated to be encountered in any portion of the corridor. However, should such debris be found, procedures would be followed to dispose of the debris appropriately to avoid injury to the dredge crew and the public, as well as damage to property or the environment.

Environmental Consequences.

Alternative 1 - No Action: Under the No Action alternative, USACE would continue to maintain the horseshoe route within the inlet complex, along with the Federal navigation channels that include the Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel. This alternative would require frequent dredging events to keep the channel from migrating outside the horseshoe route corridor. This may result in the need for continuous dredging of these channels (Hatteras Connector, Sloop, Pamlico Sound, Barney Slough) and Hatteras Ferry Channel, along with placement of sediments within a very dynamic area. The other channels (Hatteras Ferry Connecting Channel, Rollinson Channel, and Hatteras Basin) would not require as much dredging and placement as those are lower shoaling areas but may need maintenance dredging in the future to maintain the authorized channel depths. Impacts of No Action to sediments would be minor since the project area is so dynamic.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: This alternative would expand the navigation corridor for the horseshoe route and create a new navigation corridor for the Hatteras Ferry Channel. However, only those portions of the horseshoe route navigation corridor adjacent to Sloop Channel North and Barney Slough Channel would be expanded. Due to the dynamic nature of the horseshoe route, this may not alleviate the need for urgent and/or emergency dredging. Shoaling continues to push the flood tidal delta farther north, east, and west into the inlet complex, thus causing shifts of the navigation channel further outside of the navigation corridor. This alternative, compared to the No-Action Alternative, would require less frequent dredging and lesser quantities of dredged material to be removed to maintain a 100-foot-wide, 10-foot-deep (with 2 feet of allowable overdepth) channel. This alternative would lead to less sediment disturbance and dredging than the No-Action Alternative, as the expanded corridor in hotspot areas would allow USACE to follow current deep-water channels. However, if the natural deep-water channel were to shift outside of the expanded corridor, which is very likely due to inlet dynamics, then USACE would have to dredge outside of the authorized navigation channel, as currently occurs under the No Action alternative, which would require multiple dredging events and disturbance to the environment in any given year.

New placement options for dredged material would include three open-water areas and littoral zone placement via pipeline. Currently, fine-grained dredged material is placed in deep-water locations within the horseshoe route. Alternative 2 would allow for placement of any dredged material type into any of the three proposed open-water placement options. In addition, littoral zone placement of beach quality sand via pipeline

would keep sediment within the natural system to be worked by currents, waves, and tides. All new and existing placement options would keep sediments within the estuarine system. Long-term, maintenance dredging would have minor impacts on sediment dynamics since sediments periodically removed from all channels would not be lost to the system but would be redistributed. This would avoid any possibility of creating a sediment starved environment.

Alternative 3 (Proposed Action) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Alternative 3 is the same as Alternative 2; however, the larger expanded horseshoe route navigation corridor would allow for less dredging to maintain the navigation channel. In particular, expanding the horseshoe route navigation corridor to include the entire flood tidal delta inlet complex allows for flexibility in following the best available, naturally occurring deep-water route and adjusting the 100-foot-wide channel as needed throughout the inlet. As with Alternative 2, initial channel dredging would have the largest impact on sediment movement and smaller maintenance events would result in less impacts since sediment quantities removed would be expected to be less. The proposed alternative would likely decrease the need for dredging events as compared to the other alternatives. This alternative would allow for the channel to shift as needed in deeper waters with less dredging and less sediment redistribution. Therefore, the proposed action alternative would have minor impacts to sediments due to the need for less dredging and placement of dredged material.

5.2 Water Resources.

5.2.1 Hydrology.

Tides in the project area are semidiurnal and the mean tidal range (difference between MHW and MLW) is approximately 3.5 feet. Wind is a noticeable factor in tide level. The estuarine waters of Hatteras Inlet and the surrounding area display considerable daily variation in current and salinity conditions due to freshwater inflow, tides, and wind. Regular reversals of flow occur with each tidal cycle. The salinity of the area is 35 parts per thousand (ppt) due to the proximity of the inlet with the Atlantic Ocean. Rollinson Channel expands farther into Pamlico Sound than the inlet complex and Hatteras Ferry and Hatteras Ferry Connecting Channels. Pamlico Sound varies in salinity, but averages around 20 ppt.

Environmental Consequences.

Alternative 1 - No Action: Under the No Action alternative, USACE would continue to dredge all of the project channels with placement options unchanged. Dredging and dredged material placement related impacts on hydrology (changes to salinity, tides, etc.) within the project area would be minor and localized to the previously established routes, if they occur at all. Due to the dynamic nature of the inlet, these changes are not expected to be detectable.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Dredging under Alternative 2 would be minimized by allowing best available, natural deep-water to dictate where the channel is, and most of the dredging would occur within shoaling hot spots. Where shoaling is apparent, dredging would result in increases to water depths within the channel, possibly having minor effects on flows; however, in comparison to the size of the inlet complex, impacts within the minimal area of dredging would be minor, temporary, and would not affect the overall hydrology or salinity of the area.

The placement options for both Alterative 2 and 3 include three new open-water placement sites and pipeline of dredged material to the littoral zone. The impacts to salinity and other water quality factors would be temporary and minor regardless of dredge type or placement option. The majority of the material in the channel is sand, which will settle out quickly. Other impacts to hydrology of the inlet, Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel would also be minor, as the inlet and surrounding area is a highly dynamic area.

Alternative 3 (Proposed Action) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: The proposed action would allow USACE to follow the best available, naturally occurring deep-water navigation channel within both the horseshoe route and Hatteras Ferry Channel. Similar to Alternative 2, this allows for the least amount of disturbance and is not expected to result in changes to hydrology or salinity.

5.2.2 Water Quality and Characteristics.

The project area is in North Carolina Division of Water Resources (NCDWR) Pasquotank River basin and U.S. Geologic Survey (USGS) Hydrologic Unit 03020105.

The Clean Water Act (CWA) of 1972 requires the surface waters of each state be classified according to designated uses. North Carolina's tidal salt waters are classified with the following categories:

- Class SC: Secondary Recreation (i.e., fishing, boating) and Aquatic Life Propagation
- Class SB: Primary Recreation (swimming) plus SC uses
- Class SA: Commercial Shellfish Harvesting plus SC/SB uses
- HQW: High Quality Waters (all SA waters; excellent quality)
- OWR: Outstanding Resource Waters (all HQWs; outstanding fish habitat/fisheries)

The NCDWR classifies Pamlico Sound (Index No. 30-22) and Hatteras Inlet (Index No. 30-22-33), which encompasses the proposed project area, as SA and HQW. Waters classified as SA are protected for commercial shell fishing along with all designated SB and SC uses. Class SA commercial shell fishing waters are assigned a Shellfish

Growing Area Status of Approved, Conditional, or Prohibited based on North Carolina Division of Marine Fisheries (NCDMF) Shellfish Sanitation fecal coliform criteria. Ocean waters beyond the Hatteras inlet mouth are classified as SB waters (15 NC Administrative Code 2B .0311). Waters adjacent to the proposed project area, within northern Hatteras Island, are prohibited for shellfish growth and harvesting.

If a waterbody does not meet the state designated use standards, it is considered impaired and is placed on the 303(d) list. There are no designated 303(d) waters within the project area; however, the proposed Hatteras Ferry Channel navigation corridor is adjacent to impaired waters (Figure 10). Two marinas on Hatteras Island, along with a channel running through the island peninsula named "The Slash", are considered 303(d) impaired waters by the state of North Carolina for fecal coliform bacteria and/or salinity exceedances, thereby prohibiting shellfish harvesting (NCDEQ Integrated Report, 2024). This is primarily due to septic tanks on Hatteras Island, which, due to their proximity to high erosive areas, are constantly exposed and damaged, leading to an influx of nutrients and bacteria into the water table and surface waters (Mallin and McIver 2012).

While the proposed project area is adjacent to the listed 303(d) waters, the project will have no effect on fecal coliform bacteria quantities, the driver of the listed impairment. The proposed project is not expected to affect the sediment on Hatteras Island residential areas that could be near buried septic tanks, both on the proposed channels to be dredged and the beach and nearshore placement sites. There are multiple dune systems in place on the beaches in Hatteras, adding an additional barrier between any placement and residential areas that could have septic tanks.

AU Name	AU ID	AU Number	Parameter	IR Category	Waterbody Type	Classification
Austin Creek (Clubhouse...	10345	30-22-31	Shellfish Growing Area S...	5	Estuary	SA;HQW
Duck Ponds and Isaac Po...	10344	30-22-30-1-1	Shellfish Growing Area S...	5	Estuary	SA;HQW
Pamlico Sound	10309	30-22b	Shellfish Growing Area S...	5	Estuary	SA;HQW
Pamlico Sound	10310	30-22c	Shellfish Growing Area S...	5	Estuary	SA;HQW
Pamlico Sound	10311	30-22d	Shellfish Growing Area S...	5	Estuary	SA;HQW
Sandy Bay	10342	30-22-30a	Shellfish Growing Area S...	5	Estuary	SA;HQW
The Slash	10343	30-22-30-1	Shellfish Growing Area S...	5	Estuary	SA;HQW

Figure 10. Listed 303(d) waters near project area (NC DEQ, 2024).

The potential water quality impacts of dredging include minor and short-term suspended sediment plumes and the release of soluble trace constituents from the sediment. Suspended sediments also affect turbidity, an optical property of water (measured in nephelometric turbidity units [NTUs]) that affects light penetration into the water column. During dredging, turbidity increases outside the dredging area should be less than 25 NTUs to be considered insignificant. In the case of overflowing Government-owned hopper dredges to obtain economic loads, sediment that is ≥90% sand is not likely to produce significant turbidity or other water quality impacts since material is expected to dissipate from the water column relatively rapidly (USACE 1997).

Section 401 Water Quality Certification (WQC), under the CWA of 1977 (PL 95-217), is issued by NCDWR for projects that result in a regulated discharge of dredged material into jurisdictional waters. Pursuant to 33 C.F.R. § 335.7, and meeting the environmental standards established by the CWA Section 404(b)(1) evaluation process, a draft 404(b)(1) analysis is included as Appendix A.

Environmental Consequences.

Alternative 1 - No Action: Under the No Action alternative, the need for dredging within the horseshoe route and Hatteras Ferry Channel would likely increase over time. Dredging within the historic route with Government plant would occur 12 hours per day, approximately 300 days per year. Turbidity within the localized area of the dredge would be constant during daylight hours; however, it is still expected to stay within the 25 NTU criteria since the material dredged would be ≥90% sand and sediments would settle out completely within the hour. The increase to turbidity of the areas requiring dredging, particularly Barney Slough, Sloop Channel North, and Hatteras Ferry Channel, would be localized and temporary due to expected grain-size of the sediment. Effects on water quality with this alternative would be minor, temporary and localized.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: This alternative would also temporarily increase turbidity in the vicinity of dredging and placement areas, but less frequently as this alternative allows for less dredging than the No Action alternative. Sediments in most of the project area are comprised of ≥90% sand, with the exception of Hatteras Basin and a portion of Rollinson Channel from the basin to Mile Marker No. 32. Sand would settle out of suspension quicker than fine-grained sediment and should not exceed State water quality criteria of 25 NTUs. Fine-grained sediment (<90% sand) would only be placed in deep-water and open-water placement areas. The USACE, Engineer Research and Development Center (ERDC) studied turbidity plumes of fine-grained material at a beneficial use of dredged material project site (Gull Island, New Jersey – USACE, Philadelphia District) in September-October 2020. This study showed that turbidity plumes of fine-grained dredged material in nearshore marsh edge locations was localized, extending approximately 50-meters waterward and less than 200-meters alongshore, which was not significantly different

than post-storm or high wind conditions (Fall, et al., 2022, WEDA Journal of Dredging, Volume 20, No. 1). Therefore, USACE has determined that the discharge of fine-grained dredged material into waters of the United States would have minimal, temporary effects to water quality.

Littoral zones, located between proposed beach placement and nearshore placement areas along Ocracoke and Hatteras Island, could receive beach quality sand to protect shorelines from erosion and allow oceanographic processes to redistribute sediment along the shoreline complex. Any water quality impacts (i.e., increased turbidity) from placement via pipeline in these areas would be minor, temporary, and localized.

Sediment sampling would be conducted prior to dredging any new channel areas to determine sediment characteristics to ensure the appropriate placement area(s) are used. Dredging of the expanded and new navigation corridors would not require a Section 401 WQC, since there is no regulated discharge pursuant to the CWA; however, dredged material placement, including sidecasting, would require a Section 401 WQC, since that activity is a regulated discharge. An Individual Section 401 WQC for all placement of dredged material within jurisdictional waters would be obtained from the NCDWR prior to any work taking place under this alternative.

Minor and short-term impacts to water quality could occur any time of year, including spring and summer, when sensitive stages of ecologically and commercially important aquatic species are present and dependent on good water quality. Impacts would expect to occur where these species are abundant and cannot avoid the disturbance of the dredge (i.e., sidecasting in areas of eggs, larvae, SAV). Sidecast material into the direction of an ebb tide is most efficient, and it also helps to carry the material away from shallower areas where most eggs and larvae may be located; therefore, minimal impacts to those eggs and larvae may be expected. This is discussed further under Section 5.6 Fish Resources and Fish Habitat, Environmental Consequences.

<u>Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas</u>: For the proposed alternative, impacts to water quality would be similar to Alternative 2 for all dredging and dredged material placement areas. An Individual Section 401 WQC for all placement of dredged material within jurisdictional waters would be obtained from the NCDWR prior to any work taking place under this alternative.

Regarding water quality, of the three considered alternatives, Alternative 3 would likely require the least amount of dredging over time, and therefore, would be the least impactful alterative with respect to water quality. Dredging and placement for all three alternatives would cause minor, temporary, and localized effects to turbidity and disturbance in the water column, with coarse-grained sediments (i.e., sand) settling out of suspension faster.

5.2.3 Wetlands and Floodplains.
Coastal wetlands in the vicinity of the project area include tidal salt marshes that occur along the shorelines and the island fringes in the area. These marshes are comprised mainly of smooth cordgrass (*Spartina alterniflora*) and are generally more extensive where they are protected from wind and wave action. Intertidal wetlands of the area are very important ecologically due to their high primary productivity, their role as nursery areas for larvae and juveniles of many marine species, and their refuge/forage value to wildlife. In addition, they provide esthetically valuable natural areas.

Executive Order 11988 (Floodplain Management) states that Federal agencies shall avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Federal agencies shall take action to reduce the risk of flood loss, and minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

Under Executive Order 11990 (Protection of Wetlands), Federal policy recognizes that wetlands have unique and significant public values and calls for the protections of wetlands. Policy directives set forth in Executive Order 11990 are: (a) avoid long- and short-term adverse impacts associated with the destruction or modification of wetlands; (b) avoid direct or indirect support of new construction in wetlands; (c) minimize the destruction, loss, or degradation of wetlands; (d) preserve and enhance the natural and beneficial values served by wetlands; and (e) involve the public throughout the wetlands protection decision-making process.

Wetlands and floodplains are not found within the project area, including the dredging footprint or placement areas. There may be fringing wetlands within the pipeline alignment from the dredge to certain placement areas, such as beach placement or nearshore pipeline placement, and any wetlands would be identified and avoided to the maximum extent practicable. Placement of beach quality sand within these areas would reduce risks to shorelines from erosion and changing sea levels. Uplands created by sand placement would not be subject to development. Open water placement areas and deep-water placement will avoid wetlands and vegetated areas.

Environmental Consequences.

Due to the lack of wetlands or floodplains in the proposed dredging and placement areas, no alternatives considered would adversely affect wetlands or floodplains, or alter their function, and work would be in full compliance with Executive Orders 11990 and 11988 following completion of the NEPA process. Likewise, no alternatives considered would result in placement of fill in wetlands or result in hydrologic or salinity changes affecting wetlands.

5.3 Air Quality and Emissions

Section 176(c)(1) of the Clean Air Act (CAA) requires Federal agencies to assure that their actions conform to applicable implementation plans for achieving and maintaining the National Ambient Air Quality Standards for criteria pollutants.

The N.C. Division of Air Quality (NCDAQ) website (https://www.deq.nc.gov/about/divisions/air-quality) indicates that Dare and Hyde Counties are in attainment for fine particles, ozone, and sulfur dioxide pursuant to the National Ambient Air Quality Standards (NAAQS). The Washington Regional Office of the NCDAQ has air quality jurisdiction for the project area.

Environmental Consequences.

Alternative 1 - No Action: The no action alternative would result in the continued maintenance of the existing navigation corridor and channels and is not expected to have an adverse effect on air quality or significantly increase emissions.

Alternative 2 - Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Dredging for this alternative is not expected to result in adverse effects on the air quality or emissions within the project area. Annual dredging volumes are estimated to be 177,000 CYs and take approximately 120+ days a year to complete. These short-term impacts would be like those occurring during routine maintenance dredging in other nearby locations. Accordingly, the long-term air quality conditions would be similar to existing conditions.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Effects to air quality under the proposed action would be less than Alternative 2, as maintenance of best available deep-water channels would be less frequent in the larger navigation corridors. These short-term impacts would be like those occurring during routine maintenance dredging in other nearby locations. Accordingly, the long-term air quality conditions would be like existing conditions, and possibly less due to the need for less dredging and placement of dredged materials because of a larger navigation corridor. This alternative would likely require the least dredging and placement, which would decrease emissions by decreasing the need for diesel- or gas-powered equipment.

5.4 Noise.

Noise levels below the water surface within the project area vary throughout the year and often include state, commercial and recreational boat traffic, in particular daily passenger ferry and vehicle barge transport between the months of May - August. Therefore, marine species within the project area are already accustomed to varying levels of motorized noise year-round.

Dredging operations generally produce low levels of low-frequency sound energy that, although audible over considerable distances from the source, are of short duration (Michel 2013). Sound from a dredge is generated from the drag arm sliding along the bottom, the pumps moving the material, and operation of the ship engine/propeller. The significance of the noise generated by the equipment dissipates with increasing distance from the noise source. The effects of noise from dredging have been determined to have no lethal or injurious effects and minimal behavioral effects; behavioral effects on marine species may occur which may disturb feeding, mating and spawning, especially during warmer months (ERDC 2013).

Environmental Consequences.

Alternative 1 - No Action: If maintenance dredging of the project area channels were continued to be pursued by USACE with no changes to existing operations and maintenance, then increasing amounts of dredging with Government plant would be necessary to keep the channels navigable due to the migration of naturally deep-water outside the current horseshoe navigation corridor and outside the fixed alignment of Hatteras Ferry Channel. Noise levels from Government plant would only occur during daylight hours but would be long-term, which may disturb feeding, mating, spawning, and other behaviors within sea turtles, porpoises, and blue crabs; however, noise would not be significant since these species are expected to avoid the disturbance. Effects would occur within a very localized area around the dredge. The same would be true for pipeline dredging, which would occur less frequently than government plant, but would operate 24 hours per day for several weeks at a time.

Noise levels associated with dredging and placement activities, including use of the three new open-water placement areas and pipeline to the littoral zone, are expected to comply with Chapter 97 of the Dare County North Carolina Code of Ordinances, as well as Chapter 16 Article II of the Hyde County North Carolina Code of Ordnances (counties where the proposed project resides), thereby having little to no effects on the natural environment.

Likewise, the impacts of underwater sound on fish populations are expected to be minor and temporary because duration of exposure to dredging noise would be short-term and species could easily move from the area. Migrating and spawning fish species are expected to pass the dredge unharmed, as had occurred in the James River, Virginia during a pipeline dredge event while Atlantic sturgeon were migrating (Balazik, 2020). Sound from dredging within the Hatteras Inlet area is not expected to impact marine mammals in the area, such as the West Indian manatee or the critically endangered North Atlantic right whale that migrates offshore during the winter months.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: While dredging would elevate noise levels somewhat, under Alternative 2 each dredging event is expected to be of relatively short duration (24-42 days for Government plant and up to 120+ days for hydraulic dredging) and any elevated noise levels would disturb a very

localized area around the dredge. Effects would be similar to the No Action alternative, but noise disturbance would be less as use of Government plant would be limited to 3-4 events per year and could be less if a pipeline dredge is utilized. Alternative 2 would have temporary and localized impacts to noise levels as dredging would be relatively short but could increase over time if the naturally deep-water route were to migrate outside of the corridor, which is likely due to inlet dynamics.

Alternative 3 – (Proposed Project) Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: The amounts and levels of dredging-related noise are expected to be less than those of Alternative 2 and the No-Action Alterative due to less expected dredging and placement needed to maintain the navigable channel within the expanded corridor; therefore impacts related to noise for the Proposed Action would be minor, temporary, and localized.

5.5 Marine and Estuarine Resources.

5.5.1 Nekton.

Nekton collectively refers to aquatic organisms capable of controlling their location through active movement rather than depending upon water currents or gravity for passive movement. Nekton of the nearshore Atlantic Ocean along the northeastern North Carolina coast can be grouped into three categories: estuarine dependent species, permanent resident species, and seasonal migrant species. The most abundant nekton of these waters are the estuarine dependent species that inhabit the estuary as larvae and the ocean as juveniles or adults. This group includes species which spawn offshore, such as the Atlantic croaker (*Micropogon undulatus*), spot (*Leiostomus xanthurus*), Atlantic menhaden (*Brevoortia tyrannus*), flounders (*Paralichthys* spp.), mullets (*Mugil* spp.), anchovies (*Anchoa* spp.), blue crab (*Callinectes sapidus*), and penaeid shrimp (*Penaeus* spp.), as well as species that spawn in the estuary, such as red drum (*Sciaenops ocellatus*) and weakfish (*Cynoscion regalis*). Species that are permanent residents of the nearshore marine waters include the black sea bass (*Centropristis striata*), longspine porgy (*Stenotomus caprinus*), Atlantic bumper (*Chloroscombrus chrysurus*), inshore lizardfish (*Synodus foetens*), and searobins (*Prionotus* spp.). Common warm water migrant species include the bluefish (*Pomatomus saltatrix*), Spanish mackerel (*Scomberomorus maculatus*), king mackerel (*Scomberomorus cavalla*), cobia (*Rachycentron canadum*), and spiny dogfish (*Squalus acanthias*).

The Hatteras Inlet area is a passageway for the larvae of many species of commercially and ecologically important fish. Spawning grounds for many marine fishes are believed to occur on the continental shelf with immigration to estuaries, including Pamlico Sound, during the juvenile stage. The shelter provided by the marshes and shallow water habitats within the project area's estuarine waters serves as nursery habitat where young fish undergo rapid growth before returning to the offshore environment.

Marine mammals also occur in North Carolina's coastal waters. The federally listed North Atlantic right whale (*Eubaleana glacialis*) and humpback whale *(Megaptera novaeangliae*) are winter migrants off the coast. Several other whale and dolphin species normally inhabit deeper waters offshore, while the bottlenose dolphin (*Tursiops truncatus*) and the harbor porpoise (*Phocoena phocoena*) utilize nearshore waters. The bottlenose dolphin is common in the project area. The federally endangered West Indian manatee (*Trichechus manatus*) is a rare, but occasional visitor to the northeastern North Carolina coast.

Five species of federally listed sea turtles are known to nest on the beaches of CAHA and/or occasionally enter Hatteras Inlet. They are the green (*Chelonia mydas*), loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricata)*, Kemp's ridley (*Lepidochelys kempii*), and leatherback (*Dermochelys coriacea*) sea turtles.

Environmental Consequences.

Alternative 1 - No Action: The increased amount of dredging required to maintain the navigation channels, with no changes, may result in negative effects on marine species by disturbing feeding, mating, spawning, and other behaviors. However, this would only occur within the localized area of the dredging and placement areas. The surrounding habitat of the project area would remain unaffected by the work and would be expected to provide sufficient shelter, feeding areas, and spawning grounds for species to thrive. Impacts of the No Action alternative on nekton would be minor.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Each dredging event is expected to be short-term. Pipeline dredging contracts would occur every 3-5 years and last for approximately 120+ days, depending on the amount of shoaling in the channels, while Government plant dredging events would last from 21 to 42 days and would occur multiple times per year, including during summer months, after appropriate agency coordination. Government plant dredging would occur from 1 October to 31 March for Barney Slough, Pamlico Sound, and Sloop Channel South Channels to protect fisheries resources; there is no environmental timeframe for dredging using hydraulic pipeline for all other channels, nor is there an environmental timeframe to dredge Rollinson Channel, Hatteras Ferry Connecting Channel, Hatteras Ferry Channel, and Hatteras Basin using any dredge plant type. Disturbances would be minor and within a very localized area around the dredge and placement areas, of which nekton can avoid. Areas expected to require regular dredging would consist of only short stretches in the Alternative 2 project area, particularly in Sloop Channel North and Barney Slough South/Hatteras Ferry Channel. Therefore, these disturbance events are not expected to adversely impact fish, marine mammals, or marine reptiles in the area.

Alternative 3 - (Proposed Action) Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open-water and two

littoral zone dredged material placement areas: Effects to nekton under the proposed action would be less than Alternative 2, as maintenance of best available deep-water channels would require less dredging and placement of dredged material due to larger navigation corridors.

Sensitive life stages of economically and ecologically important fisheries will be more abundant within the project area during warmer months, however the minor effects on water quality, noise, and species' behaviors are not anticipated to adversely affect populations. As was explained in detail in the 2004 Use of Government Plant to Dredge in Federally Authorized Navigation Projects in North Carolina, due to the small size of dragheads, low suction power and low speed, these dredges are not capable of entraining adult-sized species. Smaller life stages could become entrained if they are on the seafloor within the path of the draghead; however, it is possible they may survive entrainment and relocation with the placed material. Summer dredging with Government plant has been occurring in South Ferry Channel for years with no observable impacts to species, so maintaining the horseshoe route within the environmental timeframes may have minor impacts on nekton but would not result in significant effects on any species.

Under this alternative, only 2.5% of the expanded horseshoe corridor would be dredged to authorized depths. During any given dredging event, an even smaller percentage of the expanded corridor would be dredged to maintain the authorized depth with the ability for the navigation channel to follow natural deep-water within the expanded navigation corridors. Therefore, these disturbance events are not expected to adversely impact fish, marine mammals, or marine reptiles in the area.

5.5.2 Benthos.

Aquatic organisms that live in close association with the bottom, or substrate, of a body of water, are collectively called benthos. Given the susceptibility of the proposed project area to currents and water movement and the subsequent shoaling, the sandy sediments would not be expected to support significant numbers of organisms within benthic communities. Common benthic organisms in these sediments would likely include polychaetes, amphipods, decapods, and mollusks.

Overall, initial dredging (new construction) results in more impacts on benthos than maintenance of existing channels. During dredging, the biggest impact occurs on the sea floor and results in the removal of upper layers of substrate, with the placement of large amounts of dredged material on beaches, in the littoral zone, nearshore placement areas, deep-water placement areas, and open-water areas would result in smothering of benthos. However, removal of benthos and benthic habitat represents a minor resource loss since channel bottoms and dredged material placement areas would become recolonized by benthic organisms within a matter of months (but never fully recover due to the regular maintenance of the channels). Benthic invertebrates exhibit strong seasonality in reproduction, meaning that the seasonal timing of dredging can influence recovery rates; however, not all benthic taxa reproduce most intensively

during the same season, so timing of dredging can select for dominance of different taxa during the recovery process (Michel 2013).

Environmental Consequences.

Alternative 1 - No Action: Dredging to maintain the existing navigation channels without corridor expansion would mean more frequent disturbance to the benthos present within the dredging and placement areas, which would result in localized impacts to benthos in those specific dredging and placement areas since there would be no opportunity for recovery between dredging events; there would be no effect to benthos in those portions of the project area that do not require dredging. Sediment placed during sidecast dredging would scatter in a thin layer and is not likely to smother benthos to a point where it could not recover; however, special purpose hopper dredges would place approximately 300-500 CYs at a time in deep-water placement areas, open-water placement areas, or designated nearshore areas and is likely to cause smothering within the localized placement area. Benthos in nearshore areas would be expected to recover after 6-9 months (Wilbur, 2001). The benthos after other types of placements (i.e., deep-water and open-water areas) could take months to fully recover (Wilber and Clarke, 2007). However, organisms in shallower, more dynamic areas (i.e., nearshore and littoral zone areas) have already adapted to shifting sediment dynamics and may recover faster than other areas. The Hatteras Inlet complex is a dynamic area that channelizes and changes on a monthly basis. Therefore, benthos recovery would likely be measured in weeks to months versus weeks to years.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: The proposed change to the horseshoe route navigation corridor and addition of a corridor for Hatteras Ferry Channel under this alternative would allow for the channels to follow the best available, naturally deep-water at any time; therefore, channel maintenance would be limited to the locations where shoaling occurs within the Alternative 2 expanded corridor. Initial dredging would impact relatively small areas of benthic communities, since identified shoals make up a small percentage of the overall footprint of the horseshoe navigation corridor (2.5%). Effects related to the different dredge types would be like those of the No Action alternative. The affected area would be very small relative to the amount of benthic habitat present on the seafloor; therefore, the ecological significance of temporary benthic losses is considered minor.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement area: The effects of dredging and dredged material placement under the proposed action would be similar to Alternative 2; however, under the proposed action, it is expected that USACE would be required to dredge less often within the expanded horseshoe route corridor and the new Hatteras Ferry Channel corridor as the navigation channel would follow naturally deep-water.

All alternatives would have the same dredging dimensions (100 feet wide and 12 feet deep plus two feet of overdepth) and dredged material placement areas. Periods between dredging events would allow for some benthic recovery; however, the continual sedimentation and shoaling resulting in the need for maintenance dredging is ongoing and therefore the benthic populations in some channel shoals may not fully recover. Therefore, impacts of the proposed action will be similar to Alternative 2 and would not result in significant impacts on benthic invertebrates. Benthic areas in the littoral zone and nearshore areas are likely to recover within weeks as these areas often experience dynamic sediment processes, and placement via pipeline and hopper dredge would distribute sandy sediments, which would settle out quickly.

5.6 Essential Fish Habitat.

The 1996 Congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (Public Law 94-265) set forth new requirements for the National Marine Fisheries Service (NMFS), regional Fishery Management Councils (FMC), and other Federal agencies to identify and protect important marine and anadromous fish habitat. These amendments established procedures for the identification of Essential Fish Habitat (EFH) and a requirement for interagency coordination to further the conservation of federally managed fisheries. An EFH assessment is included in the body of this EA and will be coordinated with NMFS Habitat Conservation Division (HCD) upon its circulation.

The EFH assessment includes fish species managed under MSFCMA that may occur in the vicinity of the proposed project. Categories of EFH and Habitat Areas of Particular Concern (HAPC) for managed species are identified as potentially occurring in southeastern states in the Fishery Management Plan Amendments of the South Atlantic FMC.

Tables 1 and 2 show the categories of EFH habitat located within the project vicinity of Pamlico Sound, Hatteras Inlet, and beach and nearshore placement areas (www.habitat.noaa.gov/apps/efhmapper), as well as species found within the proposed project area. They include Coastal Migratory Pelagics, Snapper Grouper, and Spiny Lobster EFH species of the South Atlantic. These are described below along with HAPCs and other designated managed fishery habitats within the project area.

Table 1. Essential Fish Habitat within the Study Area.

Habitat	**Species**
Pelagic waters	Albacore tuna[1], Atlantic angel shark[1], Atlantic butterfish[2], Atlantic sharpnose shark (Atlantic stock)[1], Bluefin tuna[1], Bluefish[3], Common thresher shark[1], Monkfish (eggs, larvae)[4], Sailfish[1], Sand tiger shark[1], Sargassum[5], Smoothhound shark complex (Atlantic stock)[1], Snapper-grouper[6], Spinner shark[1], Spiny dogfish[7], Summer flounder (larvae)[8], Tiger shark (adult)[1], Wahoo[9], Windowpane flounder (larvae)[10], Yellowfin tuna[1]
Shallow coastal	Atlantic angel shark[1], Atlantic butterfish[2], Blacktip shark (Atlantic stock)[1], Bluefish[3], Coastal migratory pelagics[11], Dusky shark (neonate)[1], Sand tiger shark[1], Sandbar shark[1], Scalloped hammerhead shark[1], Spinner shark[1], Tiger shark (juvenile)[1]
Soft bottom (sand)	Clearnose skate[13], Rock shrimp [12], Scup[14], Slipper lobster [15], Spiny lobster [16], Summer flounder (adult)[16], White shrimp[12]
SAV	Black sea bass[16], Brown shrimp[12], Pink shrimp[12], Scup[14], Slipper lobster[15], Snapper-grouper[6], Spiny lobster[15], Summer flounder (adult)[16], White shrimp[12]
Tidal marsh	Brown shrimp[12], Pink shrimp[12], Rock shrimp[12], White shrimp[12]
Inlets	Dusky shark (neonate)[1], Atlantic Blue Crab

Sources: [1]NOAA Fisheries 2017; [2]MAFMC and NOAA Fisheries 2011; [3]MAFMC and ASMFC 1999; [4]NEFMC 2016; [5]SAFMC 2002; [6]SAFMC 1983; [7]MAFMC 2014; [8]MAFMC 1987; [9]SAFMC 2003; [10]NEFMC 2016; [11]SAFMC 1998; [12]SAFMC 1993; [13]NEFMC 2016; [14]MAFMC 1996; [15]CFMC 1981; [16]MAFMC 1987

Table 2. Essential Fish Habitat Species in Project Area.

Species	Adult	Juvenile	Neonatal	Spawning
Brown shrimp	x	x	x	x
Pink shrimp	x	x	x	x
Royal red shrimp	x	x	x	x
Slipper lobster	x	x	x	x
Spiny lobster	x	x	x	x
White shrimp	x	x	x	x
Albacore Tuna		x		
Atlantic Angel Shark	x	x	x	x
Atlantic Butterfish	x	x		
Atlantic Sharpnose Shark (Atlantic Stock)	x		x	
Blacknose Shark (Atlantic Stock)	x	x		
Blacktip Shark (Atlantic Stock)	x	x		
Bluefin Tuna	x	x		
Bluefish	x	x		
Clearnose Skate		x		
Common Thresher Shark	x	x	x	x
Dusky Shark			x	
Longfin Inshore Squid	x			
Sailfish	x	x	x	
Sand Tiger Shark	x	x	x	
Sandbar Shark	x	x	x	
Scup		x		
Smoothhound Shark Complex (Atlantic Stock)	x	x	x	x
Snapper Grouper	x	x	x	x
Spinner Shark	x	x	x	
Spiny Dogfish	x			
Summer Flounder	x	x	x	
Tiger Shark	x	x	x	
Windowpane Flounder		x		
Yellowfin Tuna		x		

5.6.1 Coastal Migratory Pelagics.

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom, and barrier island ocean-side waters from the surf to the shelf break zone. In addition, all coastal inlets are state-designated nursery habitats of particular importance to coastal migratory pelagics. In North Carolina, this would include all Primary Nursery Areas (PNAs) and all Secondary Nursery Areas (SNAs). For Cobia EFH, this also includes high salinity bays, estuaries, and seagrass habitat. The Gulf Stream is also EFH because it provides a mechanism to disperse coastal migratory pelagic larvae. Essential fish habitat for king and Spanish mackerel, as well as cobia, occurs in the South Atlantic and Mid Atlantic Bights.

5.6.2 Snapper-Grouper.

Essential fish habitat for snapper-grouper species includes coral reefs, live/hard bottom, SAV, artificial reefs, and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (at least 2,000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. Essential fish habitat includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including sargassum, required for larval survival and growth up to and including settlement. In addition, the Gulf Stream is EFH because it provides a mechanism to disperse snapper grouper larvae. For specific life stages of estuarine dependent and nearshore snapper-grouper species, EFH includes areas inshore of the 100-foot contour such as attached macroalgae, submerged rooted vascular plants (seagrasses), estuarine emergent vegetated wetlands (saltmarshes, brackish marsh), tidal creeks, estuarine scrub/shrub (mangrove fringe), oyster reefs and shell banks, unconsolidated bottom (soft sediments), artificial reefs, and coral reefs and live/hard bottom.

5.6.3 Spiny Lobster.

Essential fish habitat for spiny lobster includes nearshore shelf/oceanic waters, shallow subtidal bottom, seagrass habitat, unconsolidated bottom (soft sediments), coral and live/hard bottom habitat, sponges, algal communities (*Laurencia*), and mangrove habitat (prop roots). In addition, the Gulf Stream is EFH because it provides a mechanism to disperse spiny lobster larvae. Essential fish habitat for the spiny lobster fishery in the U.S. Caribbean consists of all waters from mean high water to the outer boundary of the Exclusive Economic Zone (EEZ), which are habitats used by phyllosome larvae, and seagrass, benthic algae, mangrove, coral, and live/hard bottom substrates from mean high water to 100 fathoms depth.

5.6.4 HAPCs.

Additionally, HAPC were reviewed using the EFH Mapper to identify any located in the vicinity of the project area. The HAPC are special habitat areas that are designated by NMFS to further the conservation and enhancement of EFH. The NMFS Mapper shows HAPC present within the inshore areas of Pamlico Sound, Hatteras Inlet, and outer portions of beach and nearshore placement areas (EFH Mapper 2024). These HAPC include species of penaeid shrimp within all coastal inlets, all state-designated nursery

habitats of particular importance to shrimp (in North Carolina this would include all PNAs and all SNAs), and state-identified overwintering areas.

5.6.5 SAV and Shellfish Beds.
Submerged aquatic vegetation and shellfish beds do not occur in areas intended for dredging or dredged material placement. Seagrasses are prolific in Pamlico Sound, specifically areas surrounding portions of Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, and Rollinson Channels. Submerged aquatic vegetation provides food and shelter for multiple species important to the overall system ecology; commercial and recreational fisheries; and other species including shellfish, manatees, and sea turtles. The primary species of SAV found in North Carolina's estuaries are shoal grass, eelgrass, widgeon grass, horned pondweed, wild celery, redhead pondweed, and southern naiad. Although SAV can quickly populate shallow bottom when conditions are conducive, the currents, sand movement, and turbid water in the project area greatly minimize or eliminate the presence of SAV in the proposed project area. Best practices to minimize SAV impacts will be utilized by USACE, including a 100-foot buffer during dredging and placement from October through March, and a 300-foot buffer during dredging and placement from April through September.

DEQ DMF online resources (http://portal.ncdenr.org/web/mf/habitat/SAhttps://ncdenr.maps.arcgis.com/apps/View/index.html?appid=07a17353da014e87ac993b1923ea773c) show identified SAV in large clusters within the soundside areas of the project area. These mapped areas provide maximum historic extent from 1981 – 2021; however, USACE analysis of SAV data over the last 20 years has shown a significant decline in SAV abundance. This may be due to the high erosion rates of the Hatteras and Ocracoke shorelines and the over 2-mile lateral expansion of the inlet. Acres of upland habitat are now subtidal shoals that have covered existing SAV beds, and continuous shifting of sand shoals prevents large colonies from forming.

Figure 11 depicts the presence and locations of SAV from 2019 – 2020 aerial imagery within a half mile of the proposed corridor. The closest mapped SAV around Sloop Channel is located approximately 2,000 feet from the current 100-foot-wide navigation channel. Barney Slough Channel and the proposed Hatteras Ferry Channel corridor are also in proximity to SAV, 850 and 300 feet respectively. Prior to each dredging event, SAV will be identified using the latest aerial photography and GIS imagery. A 100-foot buffer will be implemented around SAV from October through March. No dredging or placement, including sidecasting of dredged material, will occur within 100 feet of identified SAV for any of the three alternatives analyzed. From April through September (growing season), a 300-foot buffer will be implemented in the vicinity of SAV identified to protect them from potential effects of turbidity and sedimentation.

Shellfish beds are not present within the proposed navigation corridors or dredged material placement areas, but they are present within Pamlico Sound. The dominant shellfish species are the American oyster (*Crassostrea virginica*) and the Atlantic hard clam (*Mercenaria mercenaria*). Due to the dynamic conditions present within Hatteras

Inlet and the project area, significant numbers of shellfish would not be expected. There are no NCDMF-listed oyster sanctuaries within the project area.

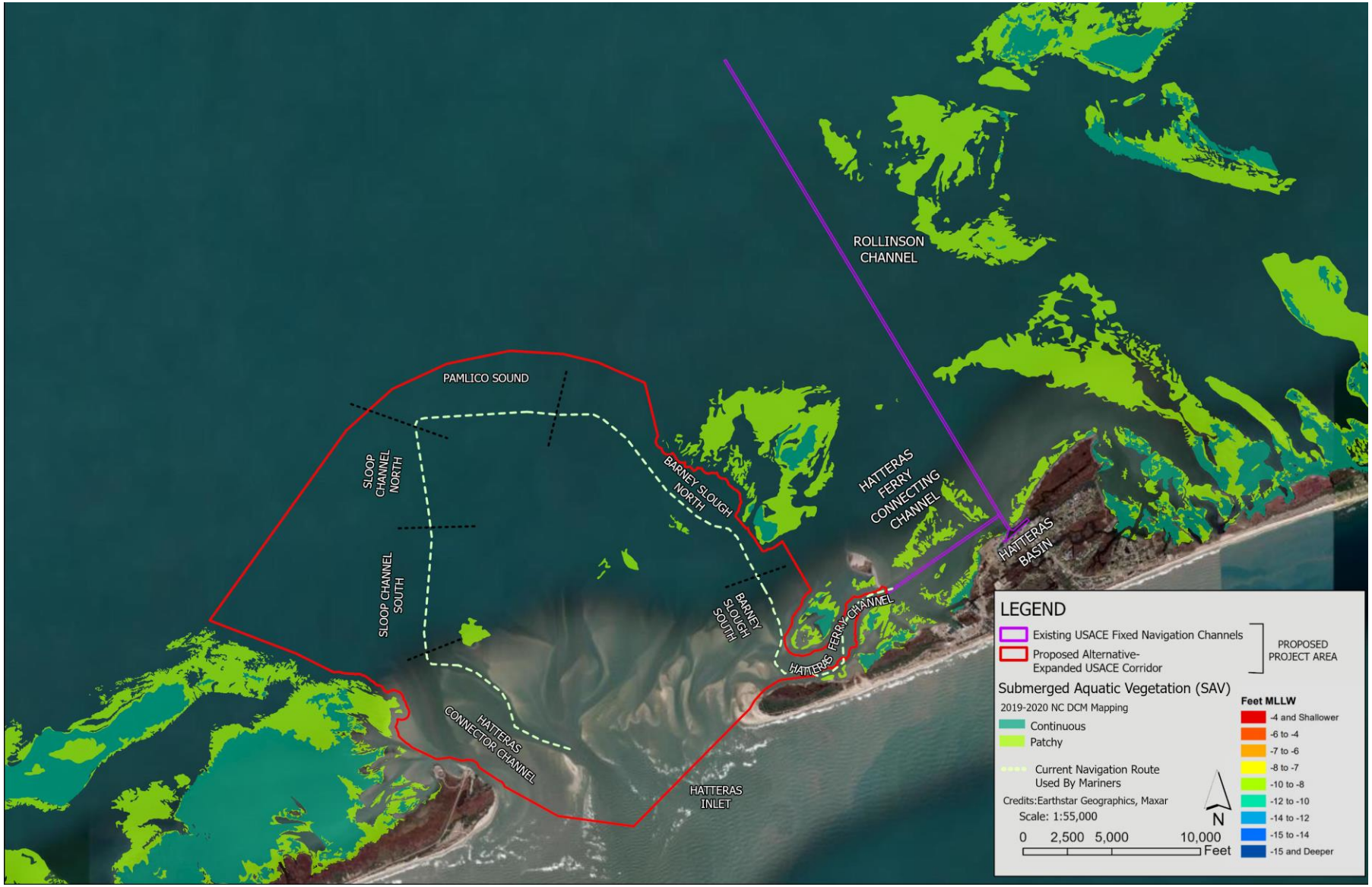


Figure 11. Proposed corridors showing mapped SAV locations from 2019 to 2020 (NCDEQ, 2024).

5.6.6 Primary Nursery Areas.

The State of North Carolina defines Primary Nursery Areas (PNAs) as tidal saltwater, which provides essential habitat for the early development of commercially important fish and shellfish (15 NCAC 3B.1405). It is in these estuarine areas that many fish species undergo initial post-larval development. Primary Nursery Areas are designated by the North Carolina Marine Fisheries Commission (NCMFC). The NCMFC does not classify the project area as PNA.

5.6.7 Crab Spawning Sanctuary.

The Atlantic blue crab spawns in high salinity soft-bottom inlet habitat such as that of Hatteras Inlet. According to An Assessment of Fisheries Species to Inform Time-of-Year Restrictions for North Carolina and South Carolina, spawning occurs during the months of April through September, so female blue crabs are present in the inlet during these months (Wickliffe 2019). New Crab Spawning Sanctuaries were established in April 2020, under the Blue Crab Fishery Management Plan, Amendment 3. During 1 March through 31 October, inlets are now closed to use of trawls, pots, fishing equipment, and mechanical methods for oysters and clams to protect female crabs that congregate in inlet systems to spawn.

Figure 12 shows the designated Hatteras Inlet Area Crab Spawning Sanctuary (CSS), with its described boundaries detailed in 15A NCAC 03R.0110. If blue crabs are abundant within the channel designated as CSS and cannot avoid the dredge they may be entrained or crushed by the draghead of sidecast or special purpose hopper dredges during the months of April through September. Bottom dwellers and feeders within the channels and placement areas would be more abundant during the warmer months of the year, increasing their risks to the effects of dredging and dredged material placement.

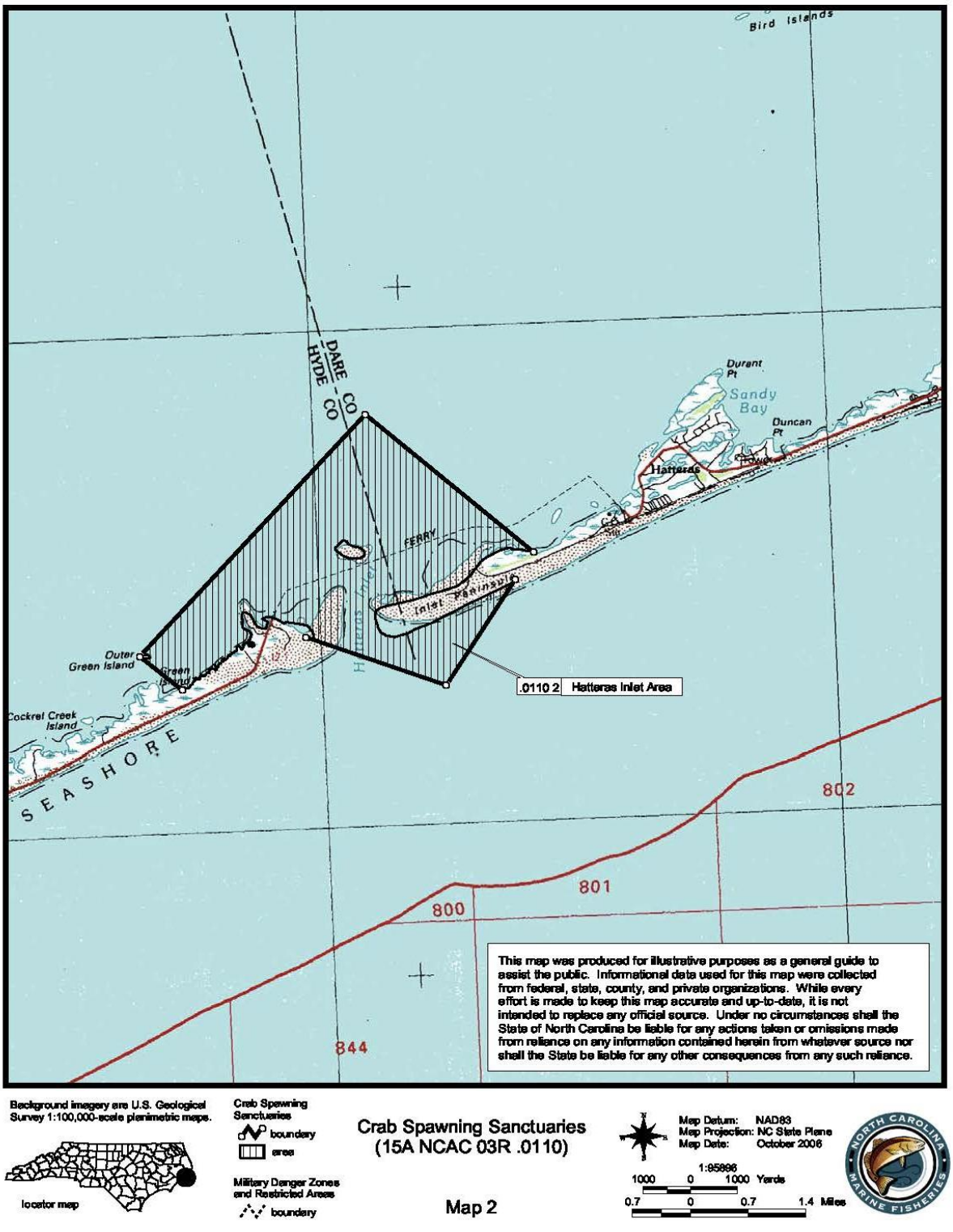


Figure 12. Hatteras Inlet Area Crab Spawning Sanctuary (CSS) (15A NCAC 03R.0110) [https://deq.nc.gov/news/press-releases/2020/04/17/new-blue-crab-management-measures-implemented]

5.6.8 Anadromous Fish Spawning Areas.
Anadromous Fish Spawning Areas (AFSA) are designated and regulated by the MFC and NCWRC. Hatteras Inlet provides anadromous fish access to the Neuse River, Tar/Pamlico River, and Roanoke River AFSAs, which contain spawning areas upstream for species such as Atlantic sturgeon, blueback herring, alewife, hickory shad and striped bass. All inshore areas of Pamlico Sound are designated Striped Bass Management Area (15A NCAC 03R.0201).

Environmental Consequences.

The area of effects from dredging, placement, or water quality changes is expected to be spatially and temporally minimal, based on the dredge equipment used, sand with less than 10% fines that will be dredged, and limited action area. This also includes a discussion about the potential effects of entrainment to benthic species and those in the water column. In the past, agencies have raised concerns about protecting benthic species, especially blue crabs, and these effects were considered based on the time of year of work occurring from the data presented in the Assessment of Fisheries Species to Inform Time-of-Year Restrictions for North Carolina and South Carolina (Wickliffe, 2019). Generally speaking, female blue crabs release their eggs into the water column when present in inlets in warmer months, including in the proposed corridor route. The larvae then travel with currents to ocean environments outside the proposed corridor where they undergo multiple life stages before again passing through the project area as they move within the water column to lower and upper estuary areas where they become benthic. Once reaching the benthic lifestage, male and female crabs forage in back estuary areas well outside the project area. Therefore, the maintenance dredging of the proposed project channels and corridors, even if it occurs during months when spawning may occur, will have limited effects on crabs.

For blue crabs or any other benthic species, water quality changes from dredging sand with less than 10% fines would also minimal and limited to a small area around the dredge where overflow occurs with sand falling out quickly, thereby limiting effects to benthic species, like female crabs. Also, larvae being carried through the inlet would have a limited area of effects that would only be from areas where special hopper dredges were overflowing, sidecasting, or the small area around the suction created by these dredges. All areas would have small temporal and spatial effects to species and habitat, regardless of time of year. Sidecast dredging could affect benthic species and habitat but would be limited due to the lack of seagrasses in the area; also, dredged material would be cast in a way that creates a thin layer of material that most benthic species can survive.

Alternative 1 - No Action: Maintenance of the project route in its current form would have minor impacts on fisheries and localized impacts to EFH, limited to the dredging footprint and placement areas. Commercially and ecologically important fisheries species, including blue crab, are present within the inlet and constant dredging may continually disturb feeding, mating, spawning and migration within the limited area of the channel where dredging is actively occurring or in areas where placement of material

occurs. This is not expected to adversely affect the blue crab population based on effects that may occur during the limited spatial and temporal areas affected by dredging or placement. Overall, the quality of bottom habitat in the channel and sidecast placement areas may decline due to repeated maintenance. Areas adjacent to the channel are expected to recover since many of the areas that shoal frequently are naturally dynamically changing all the time; placement in areas with seagrasses will be avoided to the maximum extent practicable, and sidecast dredging will spread thin layers of material in a localized area immediately adjacent to the channel where benthic species are likely to recolonize between dredging events. During warmer months, smaller, sensitive life stages of some fisheries may become entrained within the dredge (sidecast or special purpose hopper) or harmed by the placement of sidecast material (abrasion or burial), and survival is unknown. As noted, the No Action alternative would have minor impacts on fisheries and minor, localized impacts to EFH, limited to the dredging footprint and placement areas; however, this alternative would require more frequent maintenance dredging as it has become difficult for USACE to maintain the navigable route within the current navigation corridor.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Under Alternative 2, regular maintenance dredging would occur within hot spots in the horseshoe route channels between the months of October and March by pipeline every 3-5 years and by Government plant annually for approximately 2- to 3-week periods due to high shoaling. Submerged aquatic vegetation within the area of effect would be identified and avoided to the maximum extent practicable. Impacts to fisheries and fish habitat during dredging and placement events are anticipated to be minor, as they would be short-term (3 days to 3 weeks for Government plant and up to 120+ days for hydraulic pipeline) and localized. However, the smaller navigation corridor could result in more frequent dredging events, especially during the warmer season, should the naturally deep-water channel shift outside of the authorized corridor.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Dredging and placement activities under Alternative 3 would be expected to have minor, localized, and short-term impacts on fisheries and fish habitat within the project area, similar to the other alternatives. The greatest impacts would occur during warmer months to sessile and slow-moving organisms from entrainment and discharge of sidecast material, creating a potential increase of risk to spawning blue crabs and fish species; however, warm-month dredging is expected to be minimal, if it occurs at all, due to environmental timeframes set on most of the proposed dredged material placement sites (i.e., beaches, bird islands) and for use of Government plant in most of the horseshoe route to protect fisheries resources. All dredging activities would avoid impacts to SAV to the maximum

extent practicable and incorporate buffers of 100- or 300-feet depending on time of year.

Potential impacts of using Government Plant may include:

1. Entrainment into the dredge – Considering the small size of the dragheads (2-feet by 3-feet); the slow velocity of the dredges during operation (1-2 knots); the low suction power (100-110HP) of the dragheads; and the operation of the dredges (pumps on only while dragheads are on the bottom or during flushing), potential entrainment impacts to critical life stages (eggs, larvae) of important fisheries are expected to be minor even within highly productive areas. This has been documented in the 1999 NMFS Government Plant Biological Opinion and the 2020 SARBO.

2. Harm caused by sidecast material – During sidecasting, the effluent/slurry coming from the dredge pipe is approximately 1 part sediment to 3 parts water, as the vessel continues to move at approximately 1-2 knots. The slurry splashes down and the sand immediately begins to fall towards the bottom, dispersing with the current and tides. For these reasons, fisheries in egg and larval stages of development are not expected to become buried. Potential for abrasion from falling sand may occur within the path of discharge, approximately 80 feet from the starboard or port side of the vessel. Different species of fish have different levels of tolerance to harm from abrasion; some are more tolerant at the egg stage than at the larval stage. It is unknown exactly which species/life stage of fish are present and when they are within the area of dredging, or which species is more tolerant than others, making it difficult to know when to avoid actions between April and September. The USACE relies on the expertise of resource agencies to help identify these resources, as well as the timeframes when they are present, and to make recommendations regarding how best to avoid and minimize impacts.

3. Potential burial/sedimentation of SAV – The USACE has committed to a 300-foot buffer around identified SAV while dredging between April – September and a 100-foot buffer when dredging between October – March. Indirect impacts to SAV are not anticipated since beach quality dredged material will settle very quickly. Sidecasting is expected to result in less impacts overall than natural changes that occur due to the dynamic nature of the inlet complex. The Hatteras Plume Study conducted by ERDC in February 2012 concluded that "the plume is not predicted to spread over the SAV beds which are at least 350 feet from the centerline of the discharge". The study looked at the impacts of SAV that were between 350 and 500 feet from the sidecast location and determined there were no impacts to the SAV at those distances.

Spring/summer dredging in Barney Slough and Sloop Channel South would not occur due to concerns for SAV. After assessing shoaling rates, it has been determined that these channel areas can be maintained during colder months. The USACE has committed to monitor SAV growth using aerial imagery before and after dredging events and will provide this information to resource agencies.

4. Sound disturbance from dredging – Pumps, engines and friction associated with dredging creates noise that could potentially disturb fish behaviors during foraging, feeding and mating/spawning. Dredging occurs within the navigation channel where noise is created by passing private and commercial vessels, which can be nearly constant during the daytime in spring/summer. Dredging with Government plant only occurs during daylight hours, allowing quiet time at night when other vessels are less likely to navigate. Therefore, additional noise from dredging is not expected to significantly alter behaviors of important fisheries.

Contract pipeline dredging during the appropriate winter timeframes (16 November – 31 March for beach placement and 1 September – 31 March for bird island placement) every 3-5 years within hot spots will not have adverse effects on fisheries and EFH. Use of Government plant between 1 October and 31 March in Barney Slough, Pamlico Sound, and Sloop Channel South Channels, is not expected to have adverse impacts to EFH, HAPC, or fisheries resources since dredging effects would be minor when considering the affected area compared to the footprint of the Federal channel and areas disturbed by placement.

Overall, the preferred alternative of dredging the proposed project and associated dredged material placement activities is not expected to adversely affect any type of EFH or EFH-related species present within the project area. Included with this EFH assessment are avoidance and minimization measures listed below that USACE has committed to follow:

- All Government plant dredging within Barney Slough, Pamlico Sound, and Sloop Channel South Channels would take place between 1 October – 31 March.

- USACE will maintain a 300-foot buffer around identified SAV while dredging between April – September and a 100-foot buffer when dredging between October – March, including during placement of dredged material within deep-water and open-water placement areas or sidecasting.

- Pipeline dredging, with associated beach and littoral zone placement (16 November – 31 March) and bird island placement (1 September – 31 March), would occur during the relevant timeframes for the protection of nesting birds.

- Prior to each dredging event, SAV in the project area would be identified using the State's online SAV database and recent aerial imagery; SAV will be avoided to the maximum extent practicable.

- Placement onto any of the identified bird islands via control-of-effluent would utilize methodologies that will avoid impacts to adjacent SAV beds to the maximum extent practicable.

- All necessary State and Federal authorizations (CZMA consistency, Section 401/404 permits, etc.) will be obtained prior to work commencing and all conditions will be met.

- USACE will abide by the NMFS 2020 SARBO and relevant PDCs.

- Any changes in the proposed plan will be coordinated in advance with resource agencies.

5.7 Endangered and Threatened Species.
The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531–1543), provides a program for the conservation of threatened and endangered (T&E) plants and animals and the habitats in which they are found. In accordance with Section 7(a)(2) of the ESA, USACE has been in consultation with the USFWS and NMFS to ensure that effects of the proposed project would not jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat of such species.

Federally listed T&E species (aquatic and terrestrial) with the potential to occur in the vicinity of the project area are listed in Table 3. This list includes species that could be present in the area based upon their historical occurrence or potential geographic range. However, the actual occurrence of a species in the area depends upon the availability of suitable habitat, the season of the year relative to a species' temperature tolerance, migratory habits, and other factors.

Table 3. Federally listed Threatened & Endangered species (aquatic and terrestrial).

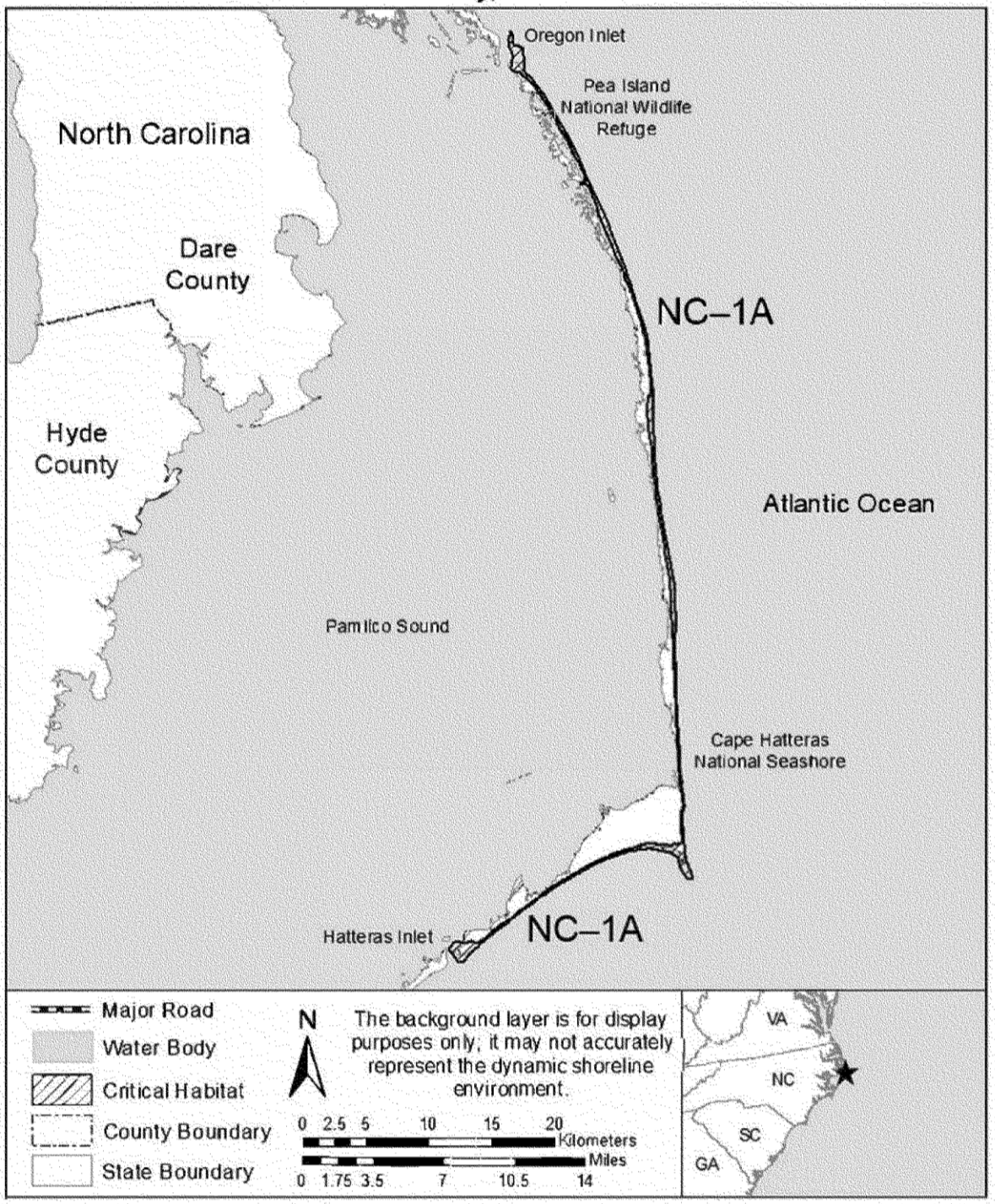
Species	Status (T/E)	USFWS/ NMFS	Species Present in Project Area	Designated Critical Habitat in Project Area
Green sea turtle (*Chelonia mydas*)	T	Both	Yes	Proposed (NMFS)
Loggerhead sea turtle (*Caretta caretta*)	T	Both	Yes	Yes (NMFS)
Leatherback sea turtle (*Dermochelys coriacea*)	E	Both	Rare	No
Hawksbill sea turtle (*Eretmochelys imbricate*)	E	Both	Rare	No
Kemp's ridley sea turtle (*Lepidochelys kempii*)	E	Both	Yes	No
Red knot (*Calidris canutus rufa*)	T	USFWS	Yes	Proposed (USFWS)
Piping plover (*Charadrius melodus*)	E	USFWS	Yes	Yes (USFWS)
Roseate tern (*Sterna dougallii dougallii*)	E	USFWS	Yes	No
Eastern Black Rail (*Laterallus jamaicensis*)	T	USFWS	No	No
Red-cockaded Woodpecker (*Picoides borealis*)	E	USFWS	No	No
West Indian manatee (*Trichechus manatus*)	E	USFWS	Yes	No
Sensitive joint-vetch (*Aeschynomene virginica*)	T	USFWS	No	No
Seabeach amaranth (*Amaranthus pumilus*)	T	USFWS	Yes	No
Monarch Butterfly (*Danaus plexippus*)	T	USFWS	No	No
Red Wolf (*Canis rufus*)	E	USFWS	No	No
Humpback whale (Megaptera novaeangliae)	E	NMFS	No	No
North Atlantic right whale (*Eubalaena glacialis*)	E	NMFS	No	No
Shortnose sturgeon (*Acipenser brevirostrum*)	E	NMFS	Rare	No
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	E	NMFS	Yes	No
Giant manta ray (*Manta birostris*)	T	NMFS	Yes	No
Smalltooth sawfish (*Pistis pectinata*)	E	NMFS	No	No

USFWS.
An updated list of T&E species for the project area within Dare and Hyde Counties, North Carolina was obtained from the USFWS Information, Planning and Conservation System (iPaC) website (http://ecos.fws.gov/ipac/) (Appendix B). The list of species is shown in Table 3, which includes T&E species that could be present in the area based on their historical occurrence or potential geographic range.

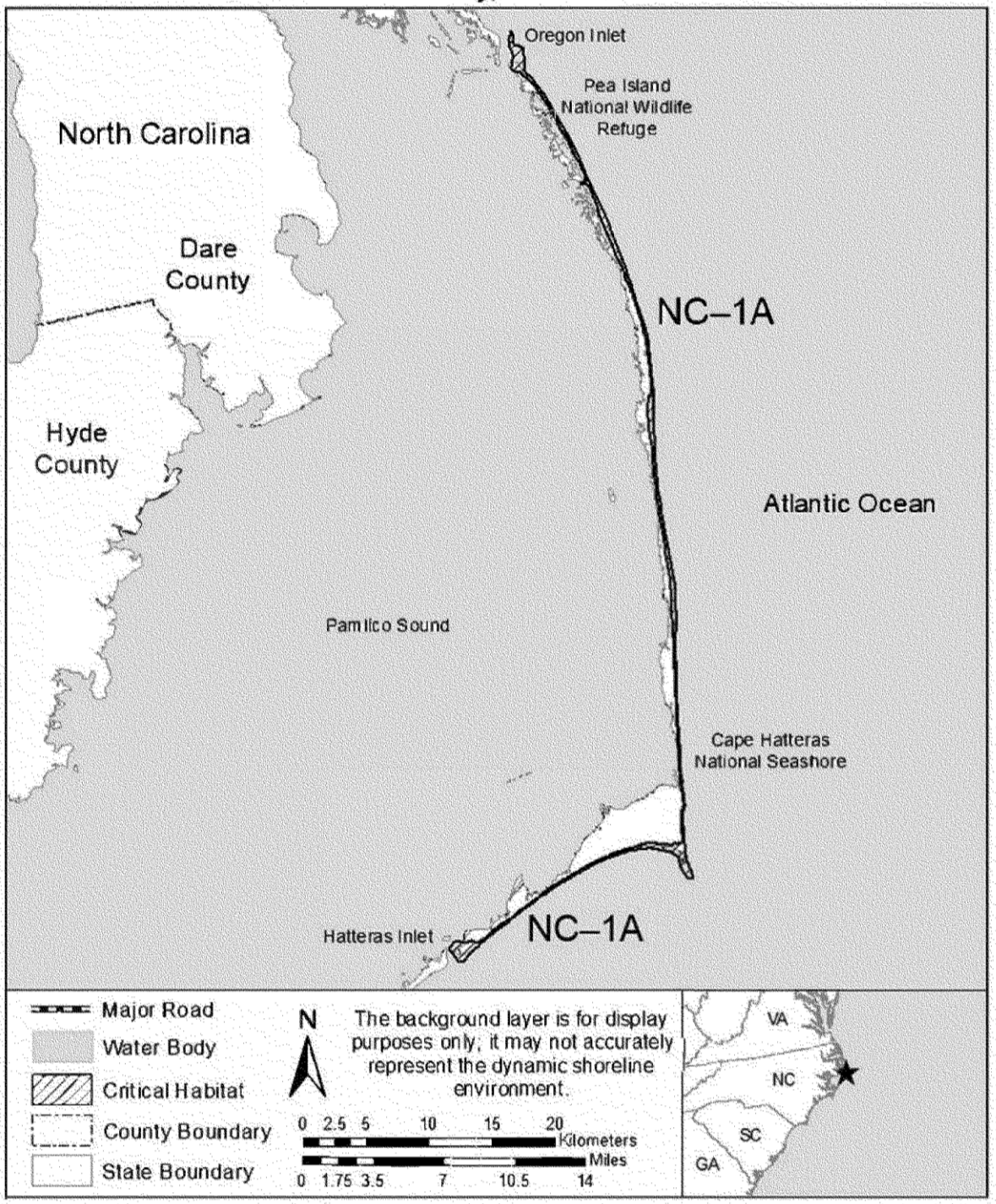
Designated critical habitat (CH) for wintering piping plover is present within the project area on federally managed NPS land on both sides of Hatteras Inlet. The NC-4 Hatteras Island unit includes all emergent sandbars within Hatteras Inlet between Hatteras Island and Ocracoke Island, sandy shoals and beachfronts of Hatteras and Ocracoke Islands including lands owned by the State of North Carolina. Bird islands Cora June and Legged Lump Islands may also provide habitat for this species. DOT island, which is currently under MLLW, may provide habitat if reestablished.

Also, currently under USFWS consideration is proposed CH for the red knot, posted 15 July 2021 (Figure 13). This includes Outer Banks Units NC-1A and NC-1B and encompasses the same lands as the piping plover CH.

Critical Habitat for Rufa Red Knot
NC–1A Outer Banks-Hatteras Island and Shoals;
Dare County, North Carolina



Critical Habitat for Rufa Red Knot
NC–1A Outer Banks-Hatteras Island and Shoals;
Dare County, North Carolina



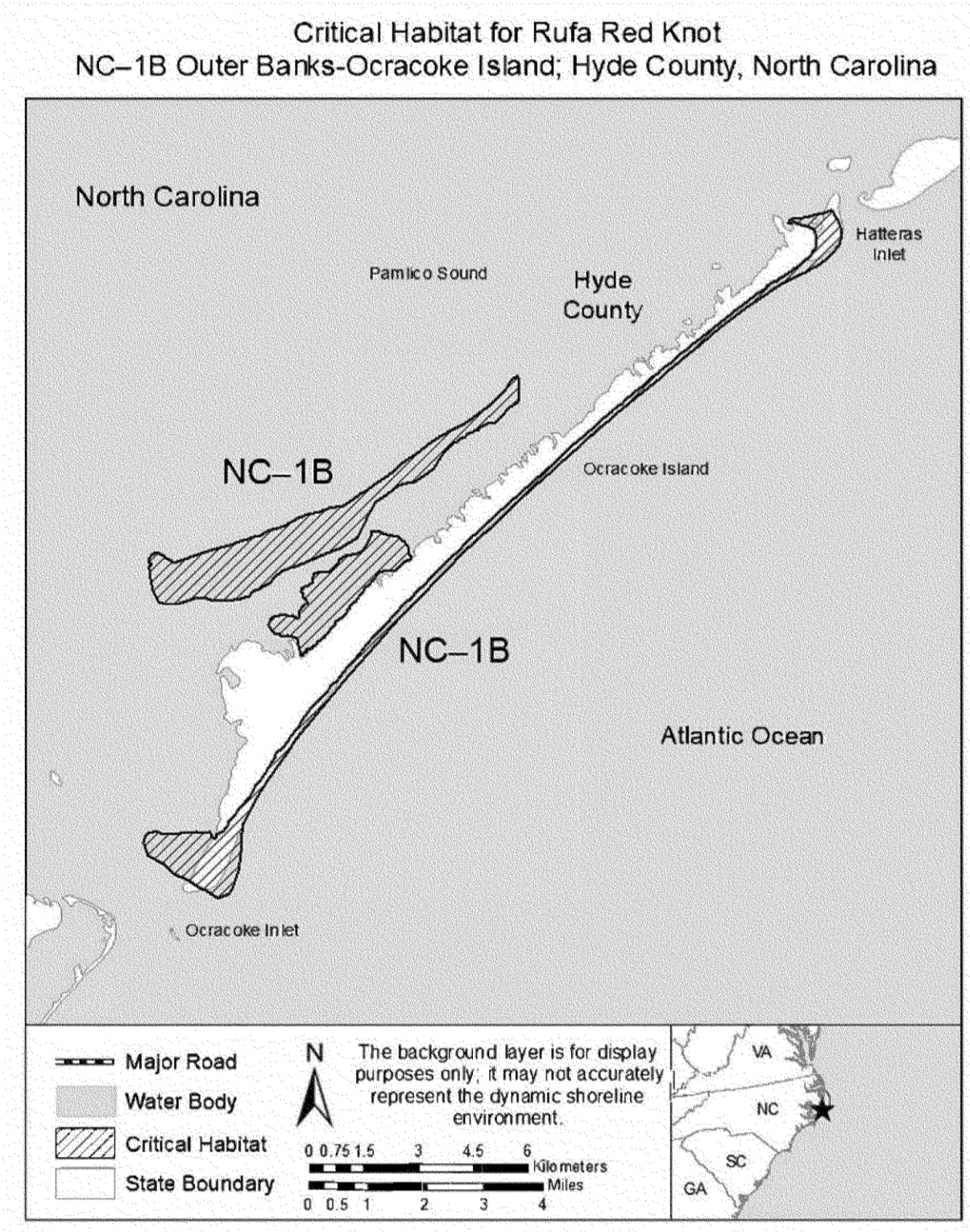


Figure 13. NC-1A and NC-1B, proposed rufa red knot critical habitat
https://www.federalregister.gov/documents/2021/07/15/2021-14406/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-for-rufa-red-knot

Sea turtle nesting may occur on the beachfronts of Ocracoke and Hatteras Islands where beach quality dredged material may be placed; however, placement will occur during 16 November to 31 March to avoid the nesting season. Likewise, control of effluent practices on bird islands would adhere to the shorebird nesting window of 1 September to 31 March, thereby protecting nesting piping plovers and visiting red knots and roseate terns. All conditions and conservation recommendations of the USFWS 2017 North Carolina Coastal Beach Sand Placement Statewide Programmatic Biological Opinion (SPBO) or superseding BO, would be followed, thereby minimizing any adverse impacts to listed sea turtle, bird species, or plant species, or their designated critical habitat. The eastern black rail, red-cockaded woodpecker, red wolf, monarch butterfly, and sensitive joint-vetch are not expected to occur within the project area. The West Indian manatee may be present; however, by following the 2017 USFWS Guidelines for Avoiding Impacts to the West Indian Manatee, no impacts are anticipated. The USFWS and USACE are jointly developing a West Indian manatee Standard Local Operating Procedures for Endangered Species (SLOPES) to address potential project impacts to the manatee. This SLOPES agreement would address dredging and dredged material placement activities impacts on the species. If issued, USACE would utilize the SLOPES to reduce agency-to-agency coordination for the manatee.

The USACE does not anticipate the need for formal consultation with USFWS for this project.

NMFS.
Regarding T&E species under the purview of NMFS, the proposed project activities are covered by the 2020 SARBO issued by NMFS on 30 March 2020 (NMFS 2020). The 2020 SARBO can be located at https://www.fisheries.noaa.gov/content/endangered-species-act-section-7-biological-opinions-southeast. The species and critical habitats under the purview of NMFS are noted in Table 3, above.

The project will comply with all relevant SARBO project design criteria (PDC) requirements. Requirements of the PDCs include training and education of on-site personnel (vessel captain, crew, etc.) of project requirements, and completing work in a manner that will minimize effects to listed species. All work, including equipment, staging areas, and placement of materials, will be done in a manner that does not block access of ESA-listed species from moving around or past construction. Equipment will be staged, placed, and moved in areas and ways that minimize effects to species and resources in the area, to the maximum extent possible. All work that may generate turbidity will be completed in a way that minimizes the risk of turbidity and sedimentation to the maximum extent practicable. Beach placement will be conducted in a manner that minimizes turbidity in nearshore waters by using methods that promote settlement before water returns to the water body (i.e., shore parallel dikes). Turbidity and marine sedimentation will be further controlled using land-based erosion and sediment control measures to the maximum extent practicable. Land-based erosion and sediment control measures will (1) be inspected regularly to remove excess material that could be an entanglement risk, (2) be removed promptly upon project completion, (3) and will not

block entry to or exit from designated critical habitat for ESA-listed species. Lighting associated with beach placement activities will be minimized through reduction, shielding, lowering, and/or use of turtle-friendly lights, to the extent practicable without compromising safety, to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches. The conservation measures will be reevaluated annually and project changes, including time and/or equipment, may be altered, based on new information and experience.

The focus for this EA is the identified corridors, channels, and placement areas to include routes taken to transport dredged material (either by moving dredge or pipeline route). The USACE acknowledges the presence of sea turtles within adjacent waters of the Atlantic Ocean and Pamlico Sound year-round. Atlantic Sturgeon may also be present throughout the year, feeding offshore, along nearshore areas, and moving through Hatteras Inlet during spawning migrations. Whale species are not expected to be within the project area, as water depths would be too shallow; however, crew of the special purpose hopper dredges will be required to watch for possible whale sightings during transit to the nearshore during migration months of November – March.

Since the proposed project activities are covered by the 2020 SARBO, USACE does not anticipate the need for formal consultation with NMFS, Protected Resources Division (PRD) for this project.

Environmental Consequences.

Alternative 1 - No Action: Maintenance of the project route in its current form would have minor impacts on listed marine species present within the Hatteras Inlet area. Although there is a risk of entrainment with hydraulic pipeline, that risk is very low with use of Government plant. Constant noise and turbidity over long periods of time may disturb foraging, mating, migrating and other behaviors of listed species; however, these species are expected to avoid disturbances without harm.

All dredging and placement activities for the No Action alternative would be conducted in accordance with the 2020 SARBO PDCs, thereby leading to a may affect, not likely to adversely affect, determination for swimming sea turtles, sturgeon, manta rays, sawfish, and whales. Likewise, following the terms and conditions of the USFWS 2017 SPBO would result in a may affect, likely to adversely affect, determination for nesting sea turtles, birds, and seabeach amaranth. The guidelines and terms and conditions in the 2017 SPBO (or superseding BO) would protect listed species under the purview of the USFWS, and no further coordination is necessary. The USACE would also continue to adhere to the 2017 USFWS Guidelines for Avoiding Impacts to the West Indian Manatee.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Impacts

relative to Alternative 2 would be similar as the No Action Alternative except that dredging events would be less frequent. Regardless of time of year or type of dredge plant used, maintenance of navigation channels will adhere to all the relevant PDCs of the 2020 SARBO for all dredging and placement activities. Incidental takes, either lethal or non-lethal, are not anticipated, as risk of entrainment, ship strikes, etc. with pipeline and Government plant dredges is very low. Dredging during winter months when the North Atlantic right whale (NARW) is migrating is not anticipated to negatively impact the NARW physically or behaviorally, as Government plant special purpose hopper dredges do not transit far offshore.

The placement of beach quality dredged material and associated construction activities during the 16 November to 31 March timeframe may have minor and temporary impacts on piping plover and red knot foraging, sheltering, and roosting habitat. The proposed work may impact the constituent elements for piping plover nesting and wintering habitat. Bird island placement of dredged material onto bird islands is expected to enhance nesting habitat for all shorebirds, including listed species. Placement of dredged material would occur from 1 September to 31 March to protect nesting birds. All placement activities would follow the terms and conditions and conservation recommendations of the 2017 SPBO (or superseding BO) and the PDCs of the 2020 SARBO and are not expected to adversely affect federally listed species.

Therefore, USACE has determined that Alternative 2 may affect, but is not likely to adversely affect, swimming sea turtles, sturgeon, manta rays, and whales, so long as the 2020 SARBO is followed, and may affect, is likely to adversely affect, nesting sea turtles, piping plover, red knot, roseate tern, and seabeach amaranth, so long as the 2017 SPBO (or superseding BO) is followed. In addition, USACE would adhere to the 2017 USFWS Guidelines for Avoiding Impacts to the West Indian Manatee. No further consultation with either NMFS or USFWS is required.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: As with Alternative 2, the 2017 SPBO (or superseding BO) and 2020 SARBO would be followed, thus reducing risks and impacts to listed species. The reduction in the need to dredge due to a larger navigation corridor would decrease interactions with listed species during all work. As such, any associated behavioral affects are expected to be minor and temporary. Therefore, USACE has determined that Alternative 3 may affect, but is not likely to adversely affect swimming sea turtles, sturgeon, manta rays, and whales, so long as the 2020 SARBO is followed, and may affect, is likely to adversely affect, nesting sea turtles, piping plover, red knot, roseate tern, and seabeach amaranth, so long as the 2017 SPBO (or superseding BO) is followed. In addition, USACE would adhere to the 2017 USFWS Guidelines for Avoiding Impacts to the West Indian Manatee. No further consultation with either NMFS or USFWS is required.

5.8 Cultural Resources.

The North Carolina State Historic Preservation Office's (SHPO) Historic Preservation Office Web (HPOWEB) Map Service was queried to identify known cultural resources in and near the area of potential effects (APE)/project area (North Carolina State Historic Preservation Office 2024). This service provides information for sites listed on the National Register of Historic Places (NRHP), sites designated as Local Landmarks, and other data useful in considering potential impacts to cultural resources but typically does not include submerged resources. According to HPOWEB, there are multiple terrestrial resources in the APE vicinity (Figure 14). To the west, the Hatteras Inlet Lifesaving Station (Site ID HY0672) resource was previously standing but was destroyed by a hurricane in the 1950s. On Hatteras Island, near Hatteras Harbor Marina, and the southern extent of Rollinson Channel, the Burrus Fish House existed until it was destroyed in 1999. In addition to the Burrus Fish House, the Willis House exists on the western side of the Harbor. These properties will not be affected by the proposed action.

Regarding submerged cultural resources within the project's APE, USACE continues to coordinate with SHPO under Environmental Review (ER) number 20-0716. In their 15 August 2024, and 3 September 2024, scoping response letters, SHPO recommends that "an archaeological survey be conducted for those areas not previously assessed to fully determine the extent of maritime archaeological resources in the APE". The horseshoe route depicted by a purple hatched polygon in Figure 15 has been previously coordinated with SHPO regarding compliance with Section 106 of the National Historic Preservation Act (NHPA). Remote sensing surveys were conducted in 2017, 2018, 2019, and 2024 within portions of Hatteras Inlet and Sloop Channel. These surveys were coordinated with SHPO regarding methodologies, findings, and recommendations. Identified sites requiring avoidance and buffering within the horseshoe route are depicted by white hashing in Figure 15. Any proposed dredging outside of the hatched areas, both white and purple, would be surveyed and coordinated with SHPO before dredging is performed.

The SHPO described three known submerged cultural resources near the APE in their 15 August 2024, and 3 September 2024, letters. The first resource is described as a submerged historic vessel in Sloop Channel that must be avoided during dredging activities by implementing a buffer area. This avoidance area is depicted in Figure 16. The second resource is the submerged remains, specifically the piling and foundation, of the Cedar Hammock Life Saving Station. The Cedar Hammock Life Saving Station is located at the eastern tip of Ocracoke Island and is listed on the NRHP. The third resource is the remains of a barge near the northwest end of Hatteras Island. The proposed action is not expected to affect any of these resources.

The USACE and multiple State of North Carolina-affiliated entities (e.g., NCDOT, Dare County) have interest in ensuring safe, efficient navigation in the project area. Remote sensing surveys allowing for future dredging events within the navigation corridor may be conducted by USACE, NCDOT, or other entities. While USACE may independently perform remote sensing surveys in the APE ahead of future dredging to satisfy

obligations under Section 106 of the NHPA, USACE understands that the results of surveys appropriately coordinated with SHPO and conducted by others will be valid in supporting future USACE conducted dredging. For example, multiple avoidance areas depicted in Figure 16 were coordinated with SHPO by Dare County following non-USACE conducted survey events; however, USACE acknowledges these avoidance areas and will be responsible for avoidance of identified cultural resources during USACE-conducted dredging operations.

Additionally, should dredged material placement include any ground disturbing activity (e.g., anchoring pipeline associated with placing dredged material in an upland location), such placement will be coordinated with the SHPO prior to implementation (Figure 16).

Field work related to a USACE-conducted submerged cultural resources assessment survey, including archaeological diver investigations, was recently completed in a previously unsurveyed areas of the APE (Figure 15). Survey areas were selected due to recent shoaling patterns and the anticipated near-term need to dredge within these areas. Survey results will be coordinated with SHPO before dredging occurs in these areas to identify resources requiring avoidance. Similarly, for other proposed dredging areas not previously coordinated with SHPO and/or surveyed, USACE would consult with SHPO regarding potential effects to historic properties and other cultural resources prior to dredging.

Executive Order 11593 states that the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies shall administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people, and, in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

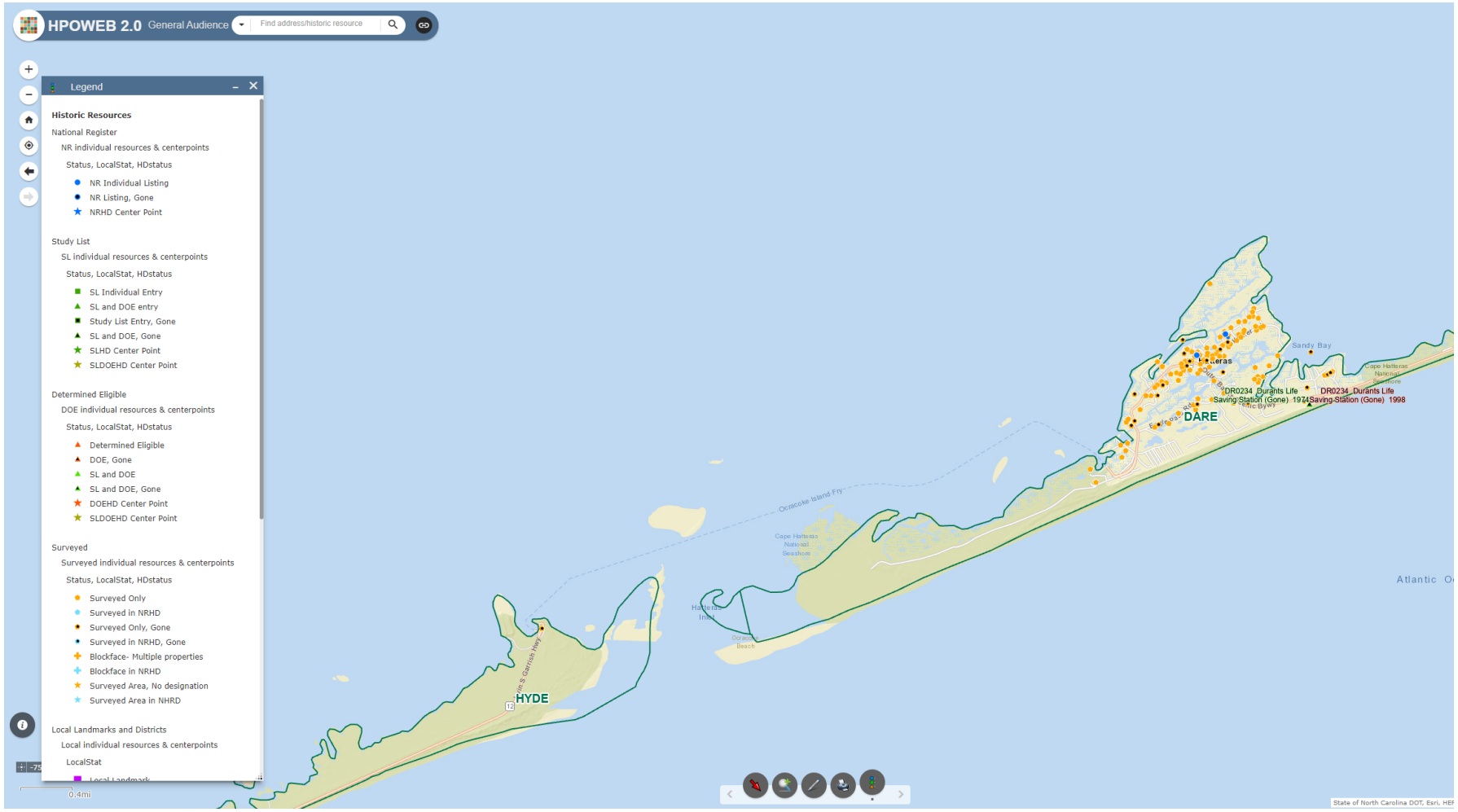


Figure 14. Cultural resources near proposed project area according to HPOWEB.

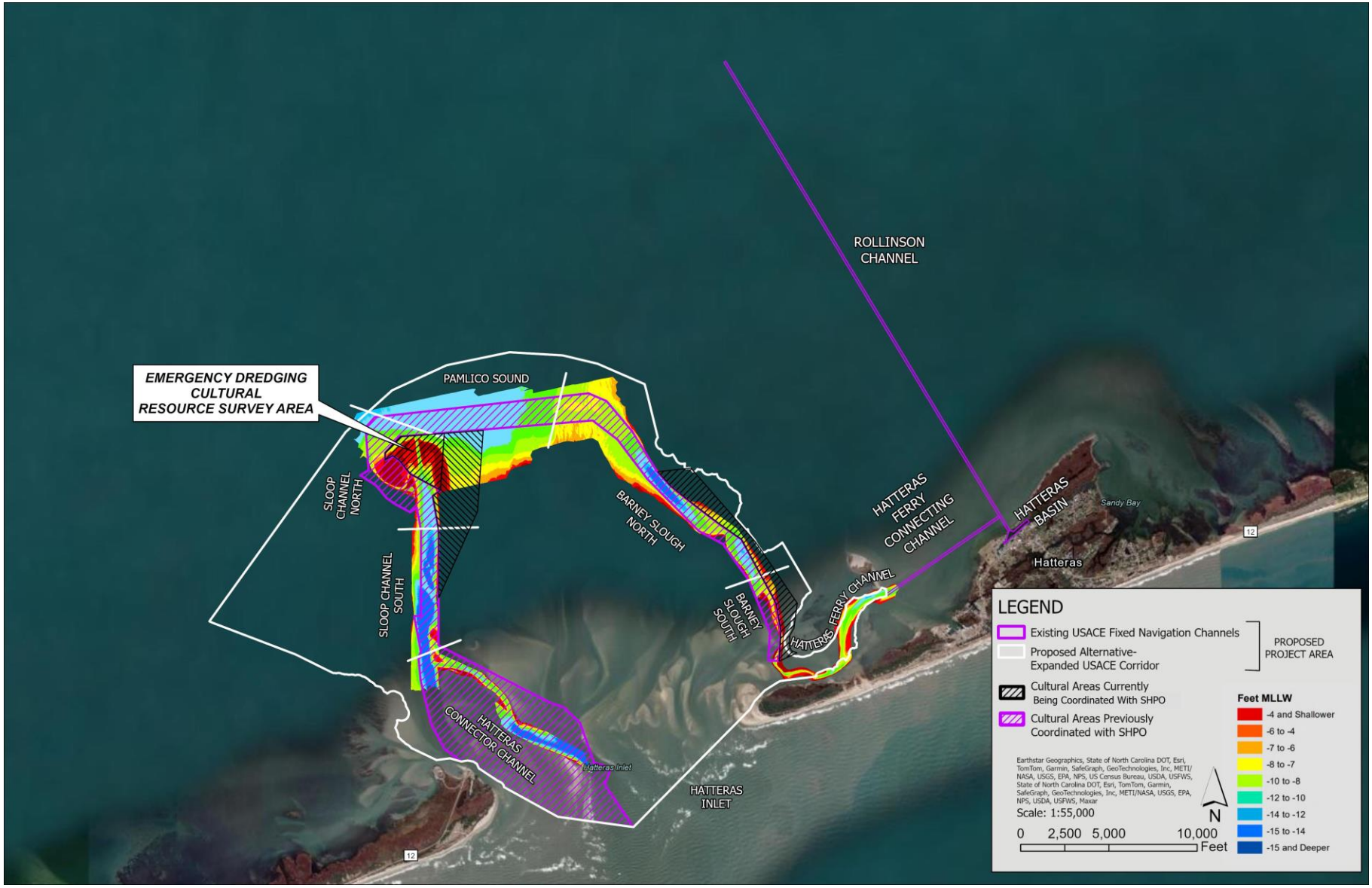


Figure 15. SHPO consultation areas - past and present.

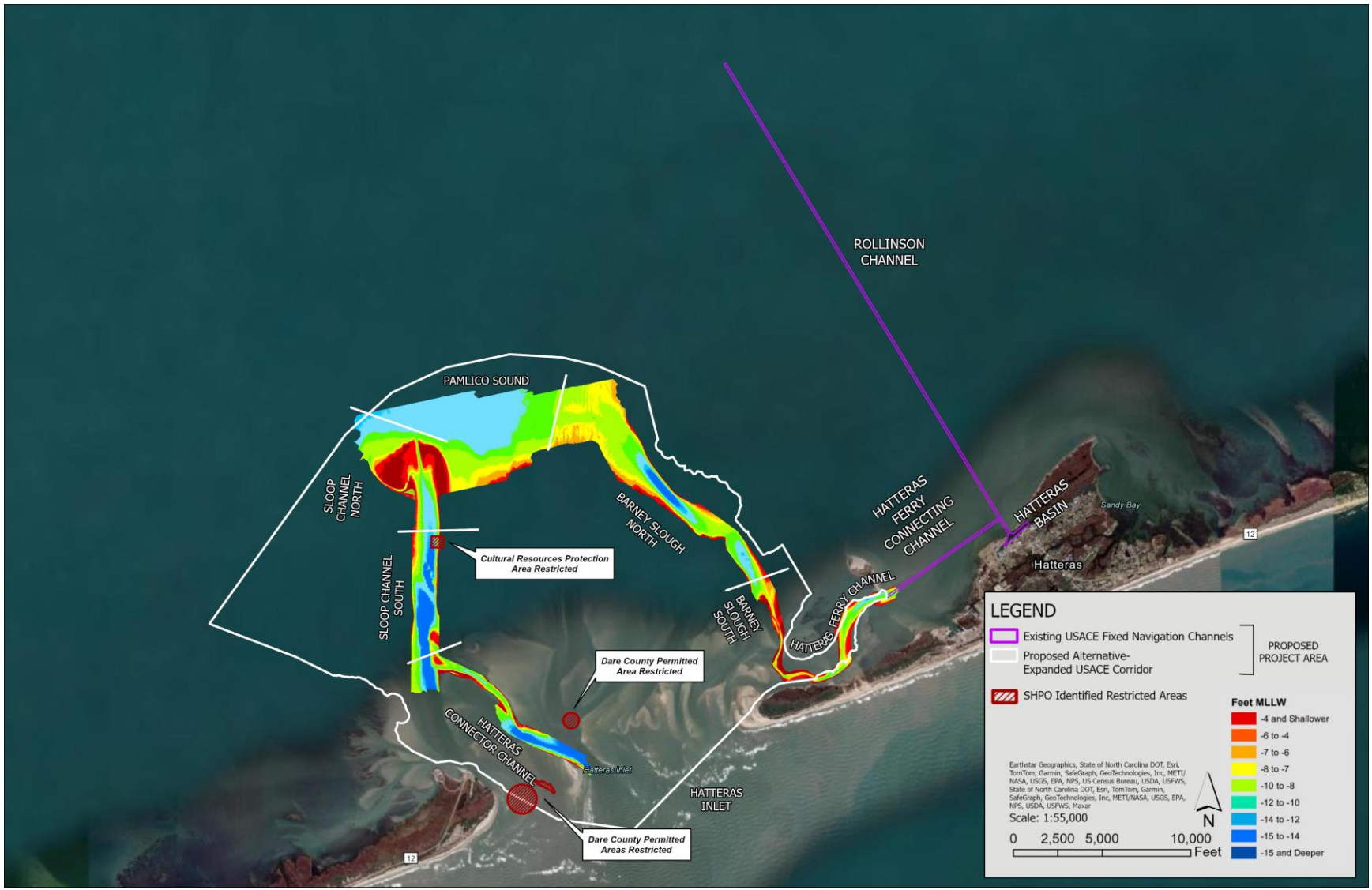


Figure 16. Area of Potential Cultural Effects (with three SHPO-identified restricted areas).

Environmental Consequences.

None of the alternatives considered would adversely affect cultural resources; however, in the event cultural resources, including, but not limited to, cultural artifacts, relics, remains, or objects of antiquity are discovered in the project area, the resource(s) in question will be protected from further disturbance until instructed otherwise based on coordination with SHPO. All alternatives will be in full compliance with Executive Order 11593 following completion of the NEPA process.

5.9 Sea Level Change.

In accordance with ER 1100-2-8162, dated 15 June 2019, relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence. The entirety of the proposed corridor is presently submerged and may be minimally affected by sea level change. The tide gauge used in this analysis, Beaufort, Duke Marine Labs, NC (8656483), is a long-term data gauge with a 55-year data record used to develop mean sea level change trends and was used here to develop “low” and “high” scenarios. Using the historic sea level change rate (“low”), extrapolation produced a sea level change increase of approximately 0.116 feet in the project area from 2025 to the year 2035, while using National Research Council curve 3 (“high”) predicted a sea level change over the same period of approximately 0.387 feet, resulting in a 0.272-foot difference between “low” and “high” scenarios. The 100 year “low” projection (2025 to 2125) estimates an increase of 1.16 feet and a “high” projection of 7.28 feet, resulting in a 6.12-foot difference between “low” and “high” scenarios. Barrier island features, such as beaches and bird island placement areas are likely to experience higher water levels causing beach erosion and the opening of new or changing of alignments of existing inlets during larger storm events. Appendix E of this EA discusses the findings for Hatteras Inlet in respect to changing sea levels over time.

Environmental Consequences.

The three alternatives would not increase the effects of sea level change in the project area; however, all alternatives are likely to be affected by sea level variability in the future due to the project area being on the coast where effects of sea level variability, such as increased storm events, would likely be more dramatic than inland portions of the state. For all three alternatives considered, changing sea levels may change water depths in the coming years, which could reduce required dredging volumes and frequencies if levels were to increase. The portion of the project in the inlet would likely be most affected by changing sea level as this area is more dynamic than the Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, and Rollinson Channel. Placement areas that are close to or above MHW may also be affected by sea level change, resulting in the need for more placement on beaches, nearshore areas, and bird islands to preserve areas for both human and animal populations that rely on these areas.

5.10 Socioeconomics.

The project area includes Pamlico Sound, Hatteras Inlet, and the nearshore Atlantic Ocean, but socio-economic effects of the project can be felt locally throughout Hyde and Dare Counties and statewide. Hatteras Ferry Channel provides important economic and recreational benefits to local communities and the nation as a much-navigated thoroughfare for commercial and recreational activities, as well as delivery of supplies and daily transport. Safety and security provided by the USCG also has an influence on the socioeconomics of the region as well.

5.10.1 Ferry Services.

The NCDOT ferry system is extremely important to Ocracoke and Hatteras Island residents as a major transportation corridor (part of NC Highway 12). Ocracoke Island is only accessible by boat, and water transportation to the island is provided almost exclusively by ferry. Currently, there are no alternatives for travel between the two islands beyond ferry service. This route is essential to daily commutes to school and work, access to mainland supplies and services, medical care, and emergency evacuations. The NC Ferry Division's 2020 Economic Contribution Report show the Hatteras-Ocracoke route supports a total of 3,360 jobs resulting in earned wages of approximately $123 million. This translates to $19.5 million in local and State tax revenue (NC Department of Commerce, 2020). These socioeconomic resources are expected to increase in the future.

Since the horseshoe route was first utilized in 2013, 6 to 7 ferry vessels requiring 5- to 6-foot drafts are in constant operation during daylight hours at peak season transporting people, goods, and services. From 2017-2021, vessels have transported an average of 600,000 people and 240,000 vehicles, but those numbers have declined each year due to navigation issues. Ferry transits have been reduced from 72 per day to 60 per day to allow for safe passage through Sloop Channel.

5.10.2 Tourism.

A scenic setting near the proposed project is provided by oceanside and soundside beaches, which attract millions of visitors per year from around the country. The marine environment offers boating, fishing, and a multitude of seasonal recreational opportunities for residents and visitors, providing significant socioeconomic benefits. Hotels, rental homes, restaurants, and other related businesses depend on the transport of visitors by ferry, mainly between the months of May and August. During the peak season, the population of Ocracoke and Hatteras Islands triples, boosting overall business output.

5.10.3 Recreational and Commercial Fishing.

Recreational and commercial fishermen extensively utilize the nearshore marine and estuarine waters of the Hatteras Inlet area primarily between May and October, but also on a year-round basis. The USACE maintains navigation channels in Pamlico Sound and Hatteras Inlet that are actively fished, or provide passage to other waters, including the Atlantic Ocean. Species that bring in the highest annual revenue include summer and southern flounder, blue crab, brown shrimp, yellowfin tuna, and swordfish.

Commercial seafood landings in Hatteras total $3.3 million, with a total economic impact of almost $10 million. For-hire fishing vessels in Hatteras, which routinely go offshore, generate approximately $8.4 million in revenue, and the total economic impact of off-boat spending by passengers on for-hire fishing vessels total almost $100 million.

The area supports at least eight fishing tournaments between May and October each year, which helps contribute to an overall business output of $414 million for the Outer Banks. Fishing tournaments within the Hatteras Inlet area take place inshore, onshore (surf fishing), nearshore, and offshore (deep sea fishing). Offshore fishing tournaments in Hatteras currently generate approximately $500,000 in economic impacts a year. These tournaments have experienced an almost 30% reduction in boats participating due to shoaling conditions in Hatteras Inlet.

5.10.4 U.S. Coast Guard.

The territory that USCG Station Hatteras Inlet covers is over 2,350 nautical miles of Atlantic Ocean, approximately one-third of Pamlico Sound, as well as Hatteras and Ocracoke Inlets. The station operates four vessels, which require minimum depths of 4 feet and 6 feet to perform search and rescue operations (approximately 20 to 40 rescues per year). The number of rescues is highest during peak season.

Environmental Consequences.

Alternative 1 - No Action: Attempts to keep the current horseshoe route open with frequent dredging may not be successful in maintaining the fully authorized width and depth of the channel, either due to lack of funding, dredge availability, or storm events. Ultimately, this could raise the cost of goods and have a widespread effect on the regional economy. Both the NCDOT Ferry Division and Dare County would have to fund any dredging and maintenance efforts of the horseshoe route, and ultimately those expenses would be a burden to local taxpayers. The Hatteras to Ocracoke ferry transported 875,000 passengers in 2010, but by 2019, the number of passengers had fallen to 524,000. This is a direct result of having to light load ferries and limit the number of vehicles and passengers to ensure safe passage between the islands. The No Action alternative could result in significant adverse effects to the regional economy, by adversely affecting tourism, the ferry system (transport of goods and services between the islands), fishing tournaments, commercial and recreational fishing, and USCG rescue efforts. It has become increasingly challenging for USACE to maintain the navigation channel within the horseshoe route as shifting shoals have pushed the channel outside of the authorized corridor in multiple areas.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Dredging within an expanded horseshoe route corridor and a new Hatteras Ferry Channel corridor could be a significant improvement to the ferry service, tourism, fishing and the USCG, as the need for dredging would decrease, compared to the No Action

alternative. Urgent and/or emergency dredging events during the months of April – September may occur, however the time needed for USACE to coordinate with resource agencies may have an adverse effect (strandings, delays, safety concerns etc.) during a time when immediate dredging is needed most.

With this alternative, the USCG may experience a significant decline in the ability to perform rescues due to limited access to the inlet from increased shoaling, which in turn would require more frequent dredging events to provide a navigable channel. Likewise, delays to ferry services during peak months would occur because of time needed to organize dredging events and coordinate with resource agencies, as well as perform the work needed to clear the channel areas.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: The project area provides important economic benefits to the nation as a much-navigated thoroughfare for commerce. Year-round navigability of the channel would require dredging periodically throughout the year in various areas, and expanding the horseshoe route corridor and creating a new navigation corridor at Hatteras Ferry Channel would allow USACE to follow naturally deep-water and address shoaling with the least amount of disruption to mariners. Proactive dredging would allow for dredging of the hot spot areas prior to them becoming a hazard; therefore, the proposed action would benefit the regional economy by ensuring consistently safe, reliable navigation for the ferry service, USCG, and all recreational and commercial mariners attempting to navigate between Ocracoke and Hatteras Islands.

5.11 Social Effects

A consideration of impacts to vulnerable groups and communities is required per Section 111(b)(3) of the Water Resources Development Act (WRDA) of 2020 (Public Law 116-260) and directs USACE to identify and address any disproportionately high and adverse human health or environmental effects of Federal actions to minority and/or low-income populations and to those populations challenged with environmental hazards.

While the proposed project area does not overlap with any human settlements, impacts to surrounding communities are required to be discussed and considered as a part of this assessment document. Hatteras and Ocracoke Island both include low-income and vulnerable populations. These low-income populations affected by flooding and energy burden center on the communities of Buxton and Hatteras in Dare County and the community of Ocracoke in Hyde County. According to the Housing and Urban Development (HUD) income database, the entirety of Ocracoke Island is encompassed within Land Tract 37095920100, while the entirety of Hatteras Island is encompassed within Land Tract 37055970502 (https://hudgis-hud.opendata.arcgis.com/datasets/low-to-moderate-income-population-by-block-group/explore?location=35.211282%2C-75.736013%2C13.39). Both tracts possess low-income populations that are being negatively affected by flooding, high energy burden, and legacy pollution from a

Formerly Used Defense Site (FUDS) known as the Buxton Naval Facility. Additional information from the U.S. Census Bureau (https://data.census.gov) and the EPAs Envirofacts database (https://enviro.epa.gov/) indicate that these issues are located outside of the project area.

Environmental Consequences.

Alternative 1 - No Action: Under the No Action alternative, no low-income communities would be adversely impacted by implementation of the existing project as none are within the project area. However, there are two low-income areas on Hatteras and Ocracoke Islands that could see impacts due to a lack of ferry access if the issue of grounding continues due to high shoaling within the currently authorized corridor and channels. The ferry is an important mode of transportation and is accessible to both low-income areas as an efficient way to travel between islands. The No Action alterative would impact accessible transportation, more so than Alternative 2 and the Proposed Alternative.

Alternative 2 – Only expand the horseshoe route navigation corridor at Barney Slough and Sloop Channel North, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: Alterative 2 would expand the allowable dredging corridor within the horseshoe route and create a new corridor at Hatteras Ferry Channel, which would allow USACE to follow the best available deep-water channel. Compared to the No Action alternative, the ferry service and other vessels may have less grounding and delaying events as less dredging would be required, allowing better access for low-income community residents traveling between islands; however, the need to dredge under this alternative may increase due to a smaller navigation corridor in the horseshoe route. The placement areas under this alterative would have no impact on low-income communities. The only upland placement site, located on Ocracoke Island, is not adjacent to any community housing sites or settlements.

Alternative 3 (Proposed Project) - Expand the horseshoe route navigation corridor, create a navigation corridor at Hatteras Ferry Channel, add three open water and two littoral zone dredged material placement areas: The proposed alterative would have no adverse impact on low-income communities as none are within the project area. As with Alternative 2, low-income populations on the surrounding barrier islands may benefit from having increased access to the ferry and other water transportation methods as the proposed alternative would allow for USACE to maintain a channel between islands that follows best available natural deep-water, decreasing the amount of dredging and potential grounding incidents. The larger navigation corridor within the horseshoe route would require less dredging as there would be a much larger area to follow best available deep-water. The placement areas under this alterative would have no impact on low-income communities. The only upland placement site, located on Ocracoke Island, is not adjacent to any community housing sites or settlements.

5.12 Environmental Consequences Comparison of Alternatives.
Table 4 below provides a summary and comparison of environmental consequences to the physical and natural environment for the alternatives considered.

Table 4. Comparison of Environmental Consequences.

Project Area Resource	Alternative 1: No Action Maintain Horseshoe Route	Alternative 2: Expand Portions of Horseshoe Route	Alternative 3: Expand Entire Horseshoe Route (proposed action)
Sediments	Minor and localized effects due to temporary suspension of finer sediments in water column; due to increasing amounts of dredging with the natural channel shift, the no action alternative would require more dredging, and more sedimentation with time. Placement would have minor and temporary effects.	Minor and localized effects due to temporary suspension of finer sediments in water column; less sedimentation than the no action but could see increases over time if natural channel deviates from expanded corridor. Placement would have minor and temporary effects.	Minor and localized effects due to temporary suspension of finer sediments in water column; least amount of sedimentation in water column due to less frequent dredging events following the natural deep-water path throughout the corridors. Placement would have minor and temporary effects.
Hydrology	Minor and localized effects from increased dredging and placement affecting suspended particles in water column. Placement would have minor and temporary effects.	Minor and localized effects from increased dredging and placement affecting suspended particles in water column; less so than no action alterative due to less dredging. Placement would have minor and temporary effects.	Minor and localized effects from dredging and placement affecting suspended particles in water column; will affect hydrology the least of the three alternatives due to the need for the least dredging. Placement would have minor and temporary effects.

Project Area Resource	Alternative 1: No Action Maintain Horseshoe Route	Alternative 2: Expand Portions of Horseshoe Route	Alternative 3: Expand Entire Horseshoe Route (proposed action)
Water Quality	Temporary and minor effects via turbidity increases at dredging and placement locations; will be more affected as dredging increases with the natural channel shifting out of the no action corridor in inlet. Placement would have minor and temporary effects.	Temporary and minor effects via turbidity increases at dredging and placement locations; less effects than no action but would still increase if natural channel shifts away from Alt 2 corridor. Placement would have minor and temporary effects.	Temporary and minor effects via turbidity increases at dredging and placement locations; least amount of disturbance of the three alterative with less dredging and placement required. Placement would have minor and temporary effects.
Wetlands & Floodplains	No effects; no wetlands or floodplains in project area. Placement would have minor and temporary effects to floodplains.	No effects; no wetlands or floodplains in project area. Placement would have minor and temporary effects to floodplains.	No effects; no wetlands or floodplains in project area. Placement would have minor and temporary effects to floodplains.
Air Quality	Minor emissions due to dredging and dredged material placement but would increase with additional dredging needs due to shoaling in inlet.	Minor emissions due to dredging and dredged material placement; however, expected to be less than No Action as need for dredging would be lessened.	Minor emissions due to dredging and placement; however, impacts expected to be less for the proposed alternative as need for dredging would be lessened due to following the natural deep-water path in a larger corridor.

Project Area Resource	Alternative 1: No Action Maintain Horseshoe Route	Alternative 2: Expand Portions of Horseshoe Route	Alternative 3: Expand Entire Horseshoe Route (proposed action)
Noise	Minor increases in surface and marine noise due to dredging and dredged material placement; effects will be more frequent with increased dredging and placement.	Temporary, minor, and localized effects within the project area; however, expected to be less than No Action as need for dredging and placement would be lessened.	Temporary, minor, and localized effects within the project area; however, impacts expected to be less for the proposed alternative as need for dredging and placement would be lessened due to the larger deep-water corridor.
Nekton	Minor effects to organisms due to dredging and dredged material placement; effects will increase as more dredging outside of natural deepest water is required.	Temporary, minor, and localized effects within the project area; however, expected to be less than No Action as need for dredging and placement would be lessened.	Temporary, minor, and localized effects within the project area; however, impacts expected to be less for the proposed alternative as need for dredging and placement would be lessened due to the larger deep-water corridor.
Benthos	Minor effects to benthic area in inlet and channels due to dredging and dredged material placement; impacts may increase with increasing amounts of dredging.	Temporary, minor, and localized effects within the project area; however, expected to be less than No Action as need for dredging and placement would be lessened.	Temporary, minor, and localized effects within the project area; however, impacts expected to be less for the proposed alternative as need for dredging and placement would be lessened due to the larger deep-water corridor.

Project Area Resource	Alternative 1: No Action Maintain Horseshoe Route	Alternative 2: Expand Portions of Horseshoe Route	Alternative 3: Expand Entire Horseshoe Route (proposed action)
Fisheries & Fish Habitat	Minor effects to fish population and habitat due to dredging and dredged material placement; impacts may increase with increased sedimentation due to dredging and placement.	Temporary and minor effects at dredging and placement locations in terms of turbidity increases and egg/larval entrainment/burial.	Temporary, minor, and localized effects within the project area; however, impacts expected to be less for the proposed alternative as need for dredging and placement would be lessened due to the larger deep-water corridor.
T&E Species	May affect, not likely to adversely affect NMFS species; may affect, likely to adversely affect, USFWS species within current route. MANLAA for manatee under 2017 Guidelines.	Same as No Action.	Same as No Action.
Cultural Resources	No effects to cultural resources as current (No Action) project area has been surveyed for cultural resources.	No effects to identified cultural resources; however, areas of new dredging within proposed corridors would be surveyed prior to any dredging to satisfy SHPO requirements, and any resources found would be protected in accordance with the NHPA.	No effects to identified cultural resources; however, areas of new dredging within proposed corridors would be surveyed prior to any dredging to satisfy SHPO requirements, and any resources found would be protected in accordance with the NHPA.

Project Area Resource	Alternative 1: No Action Maintain Horseshoe Route	Alternative 2: Expand Portions of Horseshoe Route	Alternative 3: Expand Entire Horseshoe Route (proposed action)
Sea Level Change	No sea level change effects as project area is currently submerged. If sea levels were to rise, it would decrease need for dredging as depth would increase.	Same as No Action.	Same as No Action.
Socio-economics	May adversely affect ferry service, tourism, fishing, and USCG as passenger vessels have been grounded in the current channel as shoaling has increased.	Improvements to the ferry service, tourism, fishing, and USCG relative to the No Action alternative; however, with smaller corridor, frequent dredging and placement would still occur.	Significant improvements to ferry service, tourism, fishing, and USCG relative to both alternatives due to a consistent more reliable navigation channel within a larger corridor.
Social Effects	Minor effects could occur to low-income communities on both islands that rely on the ferry service. The frequent grounding of vessels and need for dredging and placement in the existing conditions impacts the local communities daily.	Minor effects could occur to low-income communities on both islands that rely on the ferry service; however, the proposed corridors under this alternative are smaller than Alternative 3 and would require more frequent dredging and placement.	No effects are expected to occur to low-income communities under this alternative due to a larger corridor that would contain the best available naturally deep-water channel, thus requiring far less dredging than either of the other two alternatives.

6.0 STATUS OF ENVIRONMENTAL COMPLIANCE.

6.1 National Environmental Policy Act (NEPA).

This EA has been prepared in accordance with the NEPA, the Council on Environmental Quality regulations (40 Code of Federal Regulations (CFR) parts 1500-1508,1515-1518), Phase II Final Rule, effective July 2024, and ER 200-2-2. To ensure the EA included an assessment of impacts on all significant resources in the project

area, USACE circulated a scoping letter by email dated 26 July 2024, to State and Federal resource agencies and members of the public for a 30-day comment period. A formal scoping meeting was conducted virtually on 26 August 2024, and attended by the USFWS, NMFS, NPS, North Carolina Division of Coastal Management (NCDCM), NCDMF, NCWRC, NCDOT, and Dare and Hyde County representatives. Questions and concerns expressed by county representatives during the meeting included funding issues, beach placement locations being extended, corridor width, bird islands, and adherence to both dredge windows and SAV limits. Many resource agencies wrote memorandums in response to USACEs scoping with comments concerning placement areas, vessel safety, SAV avoidance measures, underwater archeological resource protection, marine resources, sediment sampling and sedimentation.

The Draft EA has been released for a 30-day public review and comment. All identified agency and stakeholder concerns will be considered and addressed during the development of the Final EA.

Pursuant to NEPA, a new EA will be prepared if there are significant changes proposed to the project or new circumstances or information relevant to the environmental impacts of the proposed action are brought to USACEs attention.

6.2 North Carolina Coastal Zone Management Program.
The actions addressed in this EA for the proposed action will take place in the designated coastal zone of the State of North Carolina. Pursuant to the Federal Coastal Zone Management Act (CZMA) of 1972, as amended (P.L. 92-583), Federal activities are required to be consistent, to the maximum extent practicable, with the federally approved coastal management program of the state in which their activities would be occurring.

The USACE has submitted a Federal consistency determination to the N.C. Division of Coastal Management in accordance with Section 307(c)(l) of the Federal Coastal Zone Management Act of 1972, as amended. The NCDCM requests 60 days for review and response.

Section 1102(a) states that “clean, beach quality material from navigation channels within the active nearshore, beach, or inlet shoal systems must not be removed permanently from the active nearshore, beach, or inlet shoal system unless no practicable alternative exists. Preferably, this dredged material will be disposed of on the ocean beach or shallow active nearshore area where environmentally acceptable and compatible with other uses of the beach.” When considering a project’s compliance with Section 1102, NCDCM has stated that the section should be read in concert with NCAC 7H.0208(2)(G), which does provide some flexibility for publicly funded projects, allowing them to be considered by review agencies on a case-by-case basis with respect to dredged material placement. Placement of dredged material will be done in accordance with this regulation with the majority of the clean, beach quality material

(i.e., ≥90% sand) being placed within approved nearshore placement areas, on bird islands, or on beaches.

6.2.1 Areas of Environmental Concern (AECs).
The proposed action would take place in or near areas designated under the NC Coastal Management Program as AECs (15A NCAC 7H.0100). Specifically, the activities will occur in three AECs: Estuarine Waters, Ocean Hazard, and Public Trust Area. The following determination has been made regarding the consistency of the proposed action with the State's management objective for the AECs that may be affected:

Estuarine Waters: Estuarine Waters are the State's oceans, sounds, tidal rivers, and their tributaries, which stretch across coastal North Carolina and link to the other parts of the estuarine system: public trust areas, coastal wetlands, and coastal shorelines. For regulatory purposes, the inland, or upstream, boundary of estuarine waters is the same line used to separate the jurisdictions of the NCDMF and NCWRC. However, many of the fish and shellfish that spend part of their lives in estuaries move between estuarine and inland waters.

The proposed action would not adversely impact estuarine waters, since dredging and placement would be temporary, and effects would be minor.

Ocean Hazard: The Ocean Hazard System is made up of oceanfront lands and inlets that connect the ocean to the sounds. Hatteras Inlet is within the designated Ocean Hazard System.

The proposed action would not adversely affect oceanfront lands or inlets since no new or additional work is proposed within the Ocean Hazard area.

Public Trust Areas: These areas include waters of the Atlantic Ocean and the lands thereunder from the mean high-water mark to the 3-nautical mile limit of state jurisdiction. The nearshore placement areas located off Ocracoke and Hatteras Islands are within these Public Trust Areas. Acceptable uses include those that are consistent with protection of the public rights for navigation and recreation, as well as conservation and management to safeguard and perpetuate the biological, economic, and aesthetic value of these areas. The activities that comprise the proposed action are not intended to adversely impact public rights for navigation and recreation and are consistent with conservation of the biological, physical, and aesthetic values of public trust areas.

6.2.2 Other State Policies.
The following State policies found in the North Carolina Coastal Management Program document are also applicable to the proposed action in terms of nearshore placement of sand.

Shoreline Erosion Response Policies: North Carolina Administrative Code 7M - Section .0200 addresses beneficial use of dredged material as feasible alternatives to the loss or massive relocation of oceanfront development when public beaches and public or private properties are threatened by erosion; when beneficial use is determined to be socially and economically feasible and causes no significant adverse environmental impacts; and the project is consistent with state policies for shoreline erosion response and State use standards for Ocean Hazard and Public Trust Areas AECs.

Policies on Beneficial Use of Materials from the Excavation or Maintenance of Navigation Channels: North Carolina Administrative Code 7M - Section .1101 states that it is the policy of the state that material resulting from the excavation or maintenance of navigation channels be used in a beneficial way wherever practicable. Policy statement .1102 (a) indicates that "clean, beach quality material dredged from navigation channels within the active nearshore, beach, or inlet shoal systems must not be removed permanently from the active nearshore, beach, or inlet shoal system unless no practicable alternative exists. Preferably, this dredged material will be placed on the ocean beach or shallow active nearshore area where environmentally acceptable and compatible with other uses of the beach."

6.3 Clean Water Act.

Section 401: Pursuant to Section 401 of the CWA of 1977 (P.L. 95- 217), as amended, a WQC is required for the proposed action for all dredged material placement activities associated with dredging of USACE channels. Implementation of the proposed project would require separate Individual WQCs, which will be obtained prior to placement of dredged material, and all conditions of the WQCs will be met. For discharges of dredged material, an Individual WQC would be required for placement of dredged material on beaches, bird islands via control-of-effluent, in the nearshore and littoral zones, open-water and deep-water placement, and sidecasting. The Individual Section 401 WQC will be obtained prior to any work commencing and all conditions of the WQC will be followed to minimize water quality impacts to the environment.

Section 404: Pursuant to Section 404 of the CWA (33 C.F.R. § 335.7), the impacts associated with the discharge of dredged or fill material into waters of the United States are discussed in the Section 404(b)(1) (P.L. 95-217) Final Guidelines Analysis in Appendix A. Discharges associated with dredging are considered incidental fallback and therefore, are not considered as a discharge addressed under the Section 404(b)(1) Guidelines Analysis. There are no practicable alternatives that would have a less adverse effect on the aquatic environment; therefore, the proposed action is the least environmentally damaging practicable alternative (LEDPA).

The preferred alternative will comply with Sections 401 and 404 of the CWA and all conditions of these permits will be met.

6.4 Endangered Species Act (ESA).
The ESA of 1973, as amended (16 U.S.C. 1531–1543), provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. In accordance with Section 7(a)(2) of the ESA, and under the purview of the USFWS and NMFS, USACE will ensure that effects of the proposed project would not jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat of such species. The proposed project would operate under the 2017 USFWS SPBO for Sand Placement Activities (or superseding BO), which lays out the terms and conditions and conservation recommendations for beach placement activities for the protection of nesting sea turtles, piping plovers, red knots, roseate terns, and seabeach amaranth.

The 2020 SARBO includes requirements for yearly reporting to NMFS for agency review and evaluation of all projects to make sure no threatened and endangered species are being negatively impacted. Also, monthly calls between agencies (USACE SAD/BOEM/NMFS) are ongoing to discuss the progress of existing projects, completed projects, new work, and risk to threatened and endangered species and the environment associated with all known dredging work covered by the 2020 SARBO. The adaptable framework of the risk analysis includes regular coordination with various Federal and State resource agencies and considers dredging risk to all species, including those listed as threatened and endangered. The risk analysis also allows for planning to consider threatened and endangered species that are considered critically endangered and how to avoid any negative impacts to these species that could occur within the project area.

All work done for the proposed project will comply with the 2020 SARBO (https://www.fisheries.noaa.gov/content/endangered-species-act-section-7-biological-opinions-southeast).

6.5 Magnuson-Stevens Fishery Conservation and Management Act.
The 1996 Congressional amendments to the MSFCMA (PL 94-265) set forth requirements for NMFS, regional FMCs, and other Federal agencies to identify and protect important marine and anadromous fish habitat. These amendments established procedures for the identification of EFH and a requirement for interagency coordination to further the conservation of federally managed fisheries.

Coordination with NMFS-HCD of the EFH assessment (included in this draft EA) will be complete with release of the final EA. Please reference Section 5.6 of this EA for the EFH assessment.

6.6 Public Laws and Executive Orders.

Table 5 lists the compliance status of all executive orders considered for the proposed project. Further descriptions of proposed project compliance with executive orders are below.

Table 5. The Relationship of the Proposed Action to Federal Laws and Policies.

Title of Public Law	**US CODE**	***Compliance Status**
Abandoned Shipwreck Act of 1987	43 USC 2101	Full Compliance
Anadromous Fish Conservation Act of 1965, As Amended	16 USC 757 et seq.	Full Compliance
Antiquities Act of 1906, As Amended	16 USC 431	Full Compliance
Archeological and Historic Preservation Act of 1974, As Amended	16 USC 469	Full Compliance
Archeological Resources Protection Act of 1979, As Amended	16 USC 470	Full Compliance
Clean Air Act of 1972, As Amended	42 USC 7401 et seq.	Ongoing
Clean Water Act of 1972, As Amended	33 USC 1251 et seq.	Ongoing
Coastal Zone Management Act of 1972, As Amended	16 USC 1451 et seq.	Ongoing
Endangered Species Act of 1973	16 USC 1531	Full Compliance
Estuary Program Act of 1968	16 USC 1221 et seq.	Full Compliance
Equal Opportunity	42 USC 2000d	Full Compliance
Farmland Protection Policy Act	7 USC 4201 et seq.	Full Compliance
Fish and Wildlife Coordination Act of 1958, As Amended	16 USC 661	Full Compliance
Historic and Archeological Data Preservation	16 USC 469	Full Compliance
Historic Sites Act of 1935	16 USC 461	Full Compliance
Magnuson Fishery Conservation and Management Act – Essential Fish Habitat	16 USC 1801	Ongoing
National Environmental Policy Act of 1969, As Amended	42 USC 4321 et seq.	Ongoing
National Historic Preservation Act of 1966, As Amended	16 USC 470	Ongoing
National Historic Preservation Act Amendments of 1980	16 USC 469a	Ongoing
Native American Religious Freedom Act of 1978	42 USC 1996	Full Compliance

Table 5 (Continued). The Relationship of the Proposed Action to Federal Laws and Policies.

Executive Orders		***Compliance Status**
Protection and Enhancement of Environmental Quality	11514	Full Compliance
Protection and Enhancement of the Cultural Environment	11593/13148	Full Compliance
Floodplain Management	11988	Full Compliance
Protection of Wetlands	11990	Full Compliance
Implementation of the North American Free Trade Agreement	12889	Full Compliance
Invasive Species	13112	Full Compliance

**Full compliance once the NEPA process is complete.*

The proposed action will not adversely affect natural and cultural resources and will be in full compliance with Executive Orders stated above following completion of the NEPA process.

6.7 Park Service Special Use Permit National.

The NPS has identified areas of beachfront within CAHA as eligible for receiving sand for purposes of habitat restoration and enhancement through the process of obtaining an SUP. The NPS completed the Sediment Management Framework EIS in 2021 that will facilitate and expedite the SUP process for sand placement on CAHA beaches. Figure 18 shows the extent of placement areas on Ocracoke and Hatteras Islands approved by the NPS.

Additional activities may also require an SUP, including the placement of dredged material within NCDOTs upland confined placement facility, dredging of any channels within CAHA boundaries, and certain works within the park. Location of the pipeline to place dredged material into the littoral zone off CAHA beaches would also require an SUP. Should this option of dredged material placement be chosen, an SUP would be obtained prior to the work taking place. All conditions of any SUP would be followed.

Figure 17. Placement areas on Ocracoke and Hatteras Islands (shown in yellow and black) as approved by the NPS (from the 2021 Sediment Management Framework EIS).

6.8 Coordination of This Document.
Prior to the release of the Draft EA, a virtual scoping presentation was held on 26 August 2024, to gather State and Federal agency comments regarding the proposed project.

The proposed action and the environmental impacts of the proposed action are thoroughly addressed in this Draft EA. The Draft EA has been made available to an extensive list of local, State, and Federal regulatory agencies, elected officials, and members of the public for a 30-day review and comment period. A list of recipients is included as Appendix C of this document.

The Draft EA may also be accessed on the Wilmington District Website at: http://www.saw.usace.army.mil/Missions/Navigation/Dredging/.

7.0 ENVIRONMENTAL COMMITMENTS.

To proceed with the proposed alternative of dredging and placement with government plant and contracted dredges within an expanded horseshoe route navigation corridor, a new navigation corridor at the Hatteras Ferry Channel corridor, along with maintaining Hatteras Ferry Connecting Channel and Rollinson Channel as authorized, USACE will follow the environmental commitments listed below:

- Agency notification will occur approximately two weeks prior should dredging occur between 1 April – 30 September.

- Beach and littoral zone placement would occur during the relevant environmental timeframe of 16 November through 31 March, while bird island placement would occur from 1 September through 31 March.

- Prior to each dredging event, SAV in the project area will be identified and avoided; no dredging or sidecasting of material will occur within 100 feet of identified SAV during the 1 October to 31 March timeframe and within 300 feet of SAV from 1 April to 31 September.

- An SUP would be obtained from the NPS prior to commencement of work within park boundaries.

- The USACE will abide by the USFWS 2017 SPBO for Sand Placement Activities (or superseding BO) and the 2017 Manatee Guidelines.

- The USACE will abide by the NMFS 2020 SARBO and relevant PDCs.

- Any changes in the proposed plan will be coordinated with resources agencies.

- All dredging and placement events will be outlined and documented in the HIMP document, including permitting, dredge type and party, amount, and other relevant information, and distributed to State and Federal agencies on an annual basis. The draft HIMP, associated matrix, and addressed stakeholder comments are attached as Appendix D. The HIMP will be updated and finalized once the NEPA process is complete for this project, including integrating comments from both the HIMP and this EA.

8.0 CONCLUSION.

Based on findings described in this Draft EA, it is in the Federal interest to implement the proposed alternative to allow dredging to occur throughout an expanded navigation corridor within the horseshoe route and the creation of a new navigation corridor at the Hatteras Ferry Channel to follow best available deep-water, allowing for less overall dredging and emergency dredging actions, while also maintaining the Hatteras Ferry Connecting Channel and Rollinson Channel as previously authorized. Overall, the impacts associated with Government plant dredges are less than those of the contracted dredges, and volumes of material to be dredged are limited to small areas of shoaling. Furthermore, dredged material would consist of beach quality sand that settles out of suspension quickly, thus limiting turbidity within the water column. Maintenance dredging of hot spots within the proposed project area may result in minor, short-term, and localized impacts to water quality, noise, benthic organisms, important fisheries, and federally listed species and their critical habitat.

Shoaling in the project vicinity occurs throughout the year, so the assumption is this pattern would continue and dredging would be required regularly throughout the year. The larger corridor provides more flexibility to follow best available, naturally deep-water, which shifts often in the inlet complex, allowing USACE to decrease the frequency and quantity of dredging and placing material, while also being able to maintain a safe navigable route.

The overall benefit of the proposed action is that it will allow USACE the flexibility to dredge in a proactive manner and provide a safer, more navigable channel for ferries, commercial and recreational vessels, and the USCG. Dredging as needed to follow natural deep-water areas will keep supplies flowing, increase the local and national economy, and support the life-safety mission of the USCG. Proactive dredging is favored over reactive dredging for many reasons, and with environmental commitments in place, dredging as needed would have widespread benefits. The USACE has a duty to the public to provide safe travel through navigable waters, which the proposed project will ensure.

9.0 POINT OF CONTACT.

Mr. John Policarpo, CESAW-ECP-PE, U.S. Army Engineer District, Wilmington, 69 Darlington Avenue, Wilmington, North Carolina 28403-1343. Telephone (910) 251-4700, email john.n.policarpo@usace.army.mil.

10.0 REFERENCES.

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US Army Corps
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Wilmington District

Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation Project

Draft Environmental Assessment

Appendix A: Draft Clean Water Act

Section 404(b)(1) Analysis

March 2025

Hatteras to Hatteras Inlet Channel Realignment Changes,
Rollinson Channel Navigation Project
Dare and Hyde Counties, North Carolina

Preliminary Evaluation of Section 404(b)(1) Guidelines 40 CFR 230

This evaluation covers the placement of all dredged material into waters of the United States, including wetlands, required for the operations and maintenance of the Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation project, Dare and Hyde Counties, North Carolina. The proposed project is the Least Environmentally Damaging Practicable Alternative and consists of the maintenance dredging of the horseshoe route, Hatteras Ferry Channel, Hatteras Ferry Connecting Channel, Hatteras Basin, and Rollinson Channel utilizing hydraulic pipeline or Government plant (sidecaster or special purpose hopper dredges). Dredged material would be placed on either Hatteras and Ocracoke Island beaches (within National Park Service boundaries), on bird islands (Cora June, DOT, or Legged Lump Islands), in the littoral zone via pipeline, in the nearshore via hopper dredge, within deep-water placement areas, an upland confined placement facility (return water discharge), sidecasting, and three open-water placement areas.

Increased turbidity would occur during placement activities; however, most sediments within the Federal navigation channels would be comprised of ≥90% sand and therefore would not be likely to produce significant turbidity or other water quality impacts, as sand would settle out of suspension quickly. Hatteras Basin and a small area of Rollinson Channel north from Hatteras Basin to approximately Mile Marker No. 32 contains <90% sand. Fine-grained dredged material would be placed in open-water or deep-water areas; there are no upland confined placement facilities within a reasonable distance (3-5 miles) from this channel segment to place fine-grained dredged material. Discharges of fine-grained dredged material would be temporary and short-term with localized effects to water quality. The USACE, Engineer Research and Development Center (ERDC) studied turbidity plumes of fine-grained material at a beneficial use of

dredged material project site (Gull Island, New Jersey – USACE, Philadelphia District) in September-October 2020. This study showed that turbidity plumes of fine-grained dredged material in nearshore marsh edge locations was localized, extending approximately 50-meters waterward and less than 200-meters alongshore, which was not significantly different than post-storm or high wind conditions (Fall, et al., 2022, WEDA Journal of Dredging, Volume 20, No. 1). Therefore, USACE has determined that the discharge of fine-grained dredged material into waters of the United States would have minimal, temporary effects to water quality.

Discharges associated with dredging activities within navigation channels is considered incidental fallback to the dredging operation, and therefore, are not being considered as being a discharge under the Clean Water Act and are not addressed under the Section 404(b)(1) Guidelines Analysis. Beach placement would occur within the environmental timeframe of 16 November to 31 March and bird island placement would occur from 1 September to 31 March. Each contracted hydraulic pipeline dredging event would occur on a 3- to 5-year basis depending on shoaling and available funding, while the use of Government plant would occur on an as-needed basis between pipeline events, also depending on dredging needs and available funding.

Pursuant to Section 401 of the Clean Water Act of 1977 (P.L. 95- 217), as amended, an Individual Water Quality Certification is required for the proposed project and will be obtained before any work is started. All conditions of the water quality certification would be implemented to minimize adverse impacts to water quality.

References

Impact of strategic, unconfined, dredged material placement on turbidity within a shallow back bay system: observations from seven mile island innovation laboratory, NJ, Fall, K., Perkey, D., Tedesco, L., and Chasten, M. Western Dredging Association, Journal of Dredging, Vol. 20, No. 1, September 2022.

Section 404 Public Notice No. CESAW-ECP-PE

1. Review of Compliance (230.10(a)-(d)) **Preliminary 1/** **Final 2/**

A review of the NEPA Document indicates that:

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and NEPA document); YES ☒ NO☐ YES ☐ NO☐

b. The activity does not:
1) Violate applicable State water quality standards or effluent standards prohibited under Section 307 of the CWA;
2) Jeopardize the existence of federally listed endangered or threatened species or their habitat; and
3) Violate requirements of any federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies); YES☒ NO☐* YES☐ NO☐

c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2); YES☒ NO☐ YES☐ NO☐

d Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5). YES☒ NO☐* YES☐ NO☐

Proceed to Section 2

2.Technical Evaluation Factors (Subparts C-F)	N/A	Not Significant	Significant
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
(1) Substrate impacts.		X	
(2) Suspended particulates/turbidity impacts		X	
(3) Water column impacts.		X	
(4) Alteration of current patterns and water circulation.		X	
(5) Alteration of normal water fluctuations/hydroperiod.	X		
(6) Alteration of salinity gradients.	X		
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
(1) Effect on threatened/endangered species and their habitat.		X	
(2) Effect on the aquatic food web.		X	
(3) Effect on other wildlife (mammals birds, reptiles, and amphibians).		X	
c. Special Aquatic Sites (Subpart E)			
(1) Sanctuaries and refuges.	X		
(2) Wetlands.	X		
(3) Mud flats.	X		
(4) Vegetated shallows.		X	
(5) Coral reefs.	X		
(6) Riffle and pool complexes.	X		
d. Human Use Characteristics (Subpart F)			
(1) Effects on municipal and private water supplies.	X		
(2) Recreational and commercial fisheries impacts		X	
(3) Effects on water-related recreation.		X	
(4) Aesthetic impacts.		X	
(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.		X	

Proceed to Section 3

3. Evaluation of Dredged or Fill Material (Subpart G) 3/

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

(1) Physical characteristics ☒

(2) Hydrography in relation to known or anticipated sources of contaminants ☐

(3) Results from previous testing of the material or similar material in the vicinity of the project ☒

(4) Known, significant sources of persistent pesticides from land runoff or percolation ☐

(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances ☐

(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources ☒

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities. ☐

(8) Other sources (specify). ☐

List appropriate references.

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to result in degradation of the disposal site. YES ☒ NO ☐*

Proceed to Section 4

4. Disposal Site Determinations (230.11(f)).

a. The following factors as appropriate, have been considered in evaluating the disposal site.

(1) Depth of water at disposal site. ☒

(2) Current velocity, direction, and variability at disposal site ☒

(3) Degree of turbulence. ☒

(4) Water column stratification ☒

(5) Discharge vessel speed and direction ☒

(6) Rate of discharge ☒

(7) Dredged material characteristics (constituents, amount and type of material, settling velocities). ☒

(8) Number of discharges per unit of time. ☒

(9) Other factors affecting rates and patterns of mixing (specify)

List appropriate references.

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable. YES ☒ NO ☐*

5. Actions to Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77, to ensure minimal adverse effects of the proposed discharge. YES ☒ NO ☐*

Return to section 1 for final stage of compliance review.

6. Factual Determinations (230.11).

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

b. Water circulation, fluctuation, and salinity (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5). YES ☒ NO ☐*

d Contaminant availability (review sections 2a, 3, and 4). YES ☒ NO ☐*

e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5). YES ☒ NO ☐*

f. Disposal site (review sections 2, 4, and 5). YES ☒ NO ☐*

g. Cumulative impact on the aquatic ecosystem. YES ☒ NO ☐*

h. Secondary impacts on the aquatic ecosystem. YES ☒ NO ☐*

7. Findings.

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines. . ……. . . . . ☒

b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions:. . . . . ☐

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reasons(s):

(1) There is a less damaging practicable alternative. . . . . ☐
(2) The proposed discharge will result in significant degradation of the aquatic ecosystem. … . . . . ☐
(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem. . . . . ☐

_____ Date: _____

Brad A. Morgan
Colonel, U.S. Army
District Engineer

*A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

1/ Negative responses to three or more of the compliance criteria at this stage indicate that the proposed projects may not be evaluated using this "short form procedure." Care should be used in assessing pertinent portions of the technical information of items 2 a-d, before completing the final review of compliance.

2/ Negative response to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form evaluation process is inappropriate."

3/ If the dredged or fill material cannot be excluded from individual testing, the "short-form" evaluation process is inappropriate.

US Army Corps of Engineers ®
Wilmington District

Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation Project

Draft Environmental Assessment

Appendix B: Updated List of ESA Listed Species (IPAC)

March 2025

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
3916 Sunset Ridge Rd
Raleigh, NC 27607
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To: 02/10/2025 16:39:26 UTC
Project Code: 2025-0006334
Project Name: Hatteras Inlet Navigation Project

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.*). If your project area contains suitable habitat for any of the federally-listed species on this species list, the proposed action has the potential to adversely affect those species. If suitable habitat is present, surveys should be conducted to determine the species' presence or absence within the project area. The use of this species list and/or North Carolina Natural Heritage program data should not be substituted for actual field surveys.

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

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

species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

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

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, 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 https://www.fws.gov/program/migratory-bird-permit/what-we-do.

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
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Marine Mammals
- Coastal Barriers

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:

Raleigh Ecological Services Field Office
3916 Sunset Ridge Rd
Raleigh, NC 27607
(919) 856-4520

PROJECT SUMMARY

Project Code: 2025-0006334
Project Name: Hatteras Inlet Navigation Project
Project Type: Navigation Channel Improvement
Project Description: This project realigns the federal navigation channel through Hatteras inlet, between the inlet and Hatteras island peninsula, and through Rollinson Channel into Pamlico Sound. The proposed corridor would allow for the deepest water channel to be utilized, as the inlet and surrounding areas are dynamic. The channels, per federal regulation, would be 100 feet wide, and 10 + 2 feet of over depth deep. This project proposes dredging maintenance of these channels, as well as placement on beaches, bird islands, nearshore, and open water placement areas. The need for this project stems from the increasing amount of shoaling from the current channels, causing vessel incidents and decreased safety for mariners. This would allow USACE to dredge the least in the deepest areas of the corridor. The project is expected to commence in 2025, and will follow require environmental windows.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.25481755,-75.76090462867376,14z

Counties: Dare and Hyde counties, North Carolina

ENDANGERED SPECIES ACT SPECIES

There is a total of 17 threatened, endangered, or candidate species on this species list.

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

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

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

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

MAMMALS

NAME	STATUS
Red Wolf *Canis rufus* Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/37	Endangered
Red Wolf *Canis rufus* Population: U.S.A. (portions of NC and TN) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/37	Experimental Population, Non-Essential
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker *Dryobates borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Roseate Tern *Sterna dougallii dougallii* Population: Northeast U.S. nesting population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species.	Similarity of Appearance (Threatened)

NAME	STATUS
Species profile: https://ecos.fws.gov/ecp/species/776	
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
Hawksbill Sea Turtle *Eretmochelys imbricata* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3656	Endangered
Kemp's Ridley Sea Turtle *Lepidochelys kempii* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/5523	Endangered
Leatherback Sea Turtle *Dermochelys coriacea* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1493	Endangered
Loggerhead Sea Turtle *Caretta caretta* Population: Northwest Atlantic Ocean DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1110	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Seabeach Amaranth *Amaranthus pumilus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8549	Threatened
Sensitive Joint-vetch *Aeschynomene virginica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/855	Threatened

CRITICAL HABITATS

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Piping Plover *Charadrius melodus* https://ecos.fws.gov/ecp/species/6039#crithab	Final
Rufa Red Knot *Calidris canutus rufa* https://ecos.fws.gov/ecp/species/1864#crithab	Proposed

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For

assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

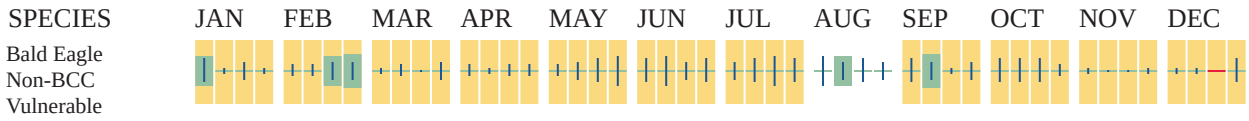
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

NAME	BREEDING SEASON
Audubon's Shearwater *Puffinus lherminieri* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9635	Breeds Mar 1 to Aug 5
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black Scoter *Melanitta nigra* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10413	Breeds elsewhere
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Brown Pelican *Pelecanus occidentalis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/6034	Breeds Jan 15 to Sep 30
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Chuck-will's-widow *Antrostomus carolinensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9604	Breeds May 10 to Jul 10
Coastal (waynes) Black-throated Green Warbler *Setophaga virens waynei* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11879	Breeds May 1 to Aug 15
Common Eider *Somateria mollissima* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10457	Breeds Jun 1 to Sep 30

NAME	BREEDING SEASON
Common Loon *gavia immer* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4464	Breeds Apr 15 to Oct 31
Cory's Shearwater *Calonectris diomedea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10452	Breeds elsewhere
Double-crested Cormorant *phalacrocorax auritus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/3478	Breeds Apr 20 to Aug 31
Dovekie *Alle alle* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/6041	Breeds elsewhere
Great Shearwater *Puffinus gravis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/9634	Breeds elsewhere
Gull-billed Tern *Gelochelidon nilotica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
King Rail *Rallus elegans* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Least Tern *Sternula antillarum antillarum* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11919	Breeds Apr 25 to Sep 5
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

NAME	BREEDING SEASON
Long-tailed Duck *Clangula hyemalis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/7238	Breeds elsewhere
Manx Shearwater *Puffinus puffinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10465	Breeds Apr 15 to Oct 31
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Painted Bunting *Passerina ciris* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9511	Breeds Apr 25 to Aug 15
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Pomarine Jaeger *Stercorarius pomarinus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10458	Breeds elsewhere
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Purple Sandpiper *Calidris maritima* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9574	Breeds elsewhere
Razorbill *Alca torda* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10461	Breeds Jun 15 to Sep 10

NAME	BREEDING SEASON
Red-breasted Merganser *Mergus serrator* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10693	Breeds elsewhere
Red-necked Phalarope *Phalaropus lobatus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10467	Breeds elsewhere
Red-throated Loon *Gavia stellata* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/9589	Breeds elsewhere
Ring-billed Gull *Larus delawarensis* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10468	Breeds elsewhere
Roseate Tern *Sterna dougallii* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10661	Breeds May 10 to Aug 31
Royal Tern *Thalasseus maximus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10471	Breeds Apr 15 to Aug 31
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Saltmarsh Sparrow *Ammospiza caudacuta* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9719	Breeds May 15 to Sep 5
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere

NAME	BREEDING SEASON
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Sooty Shearwater *Ardenna grisea* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10417	Breeds elsewhere
Sooty Tern *Onychoprion fuscatus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10695	Breeds Mar 10 to Jul 31
Surf Scoter *Melanitta perspicillata* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10463	Breeds elsewhere
Whimbrel *Numenius phaeopus hudsonicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
White-winged Scoter *Melanitta fusca* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10462	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wilson's Plover *Charadrius wilsonia* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9722	Breeds Apr 1 to Aug 20
Wilson's Storm-petrel *Oceanites oceanicus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/10416	Breeds elsewhere

NAME	BREEDING SEASON
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

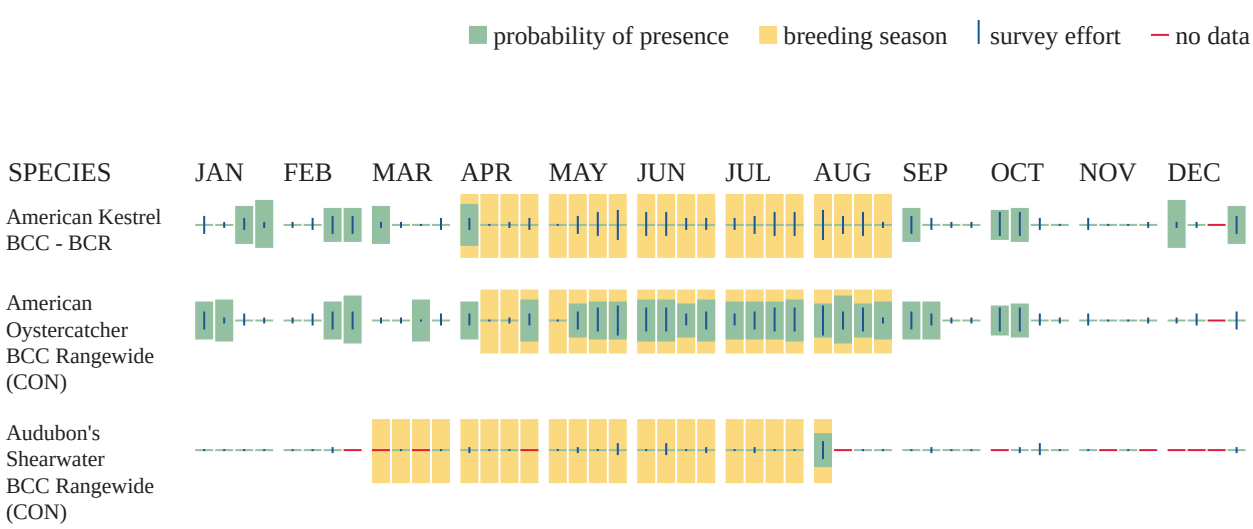
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

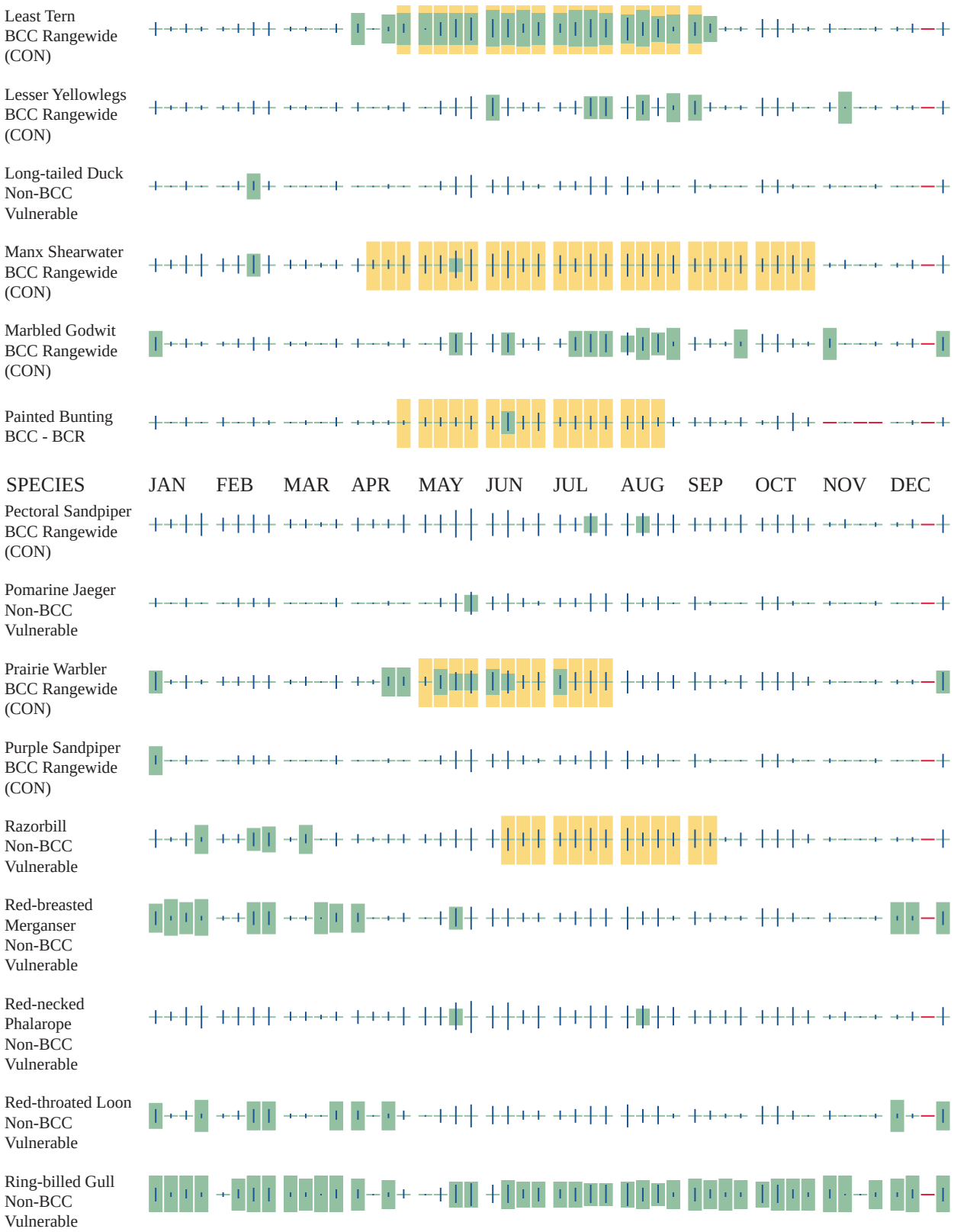
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.




Bald Eagle
Non-BCC
Vulnerable
Black Scoter
Non-BCC
Vulnerable
Black Skimmer
BCC Rangewide
(CON)
Brown Pelican
Non-BCC
Vulnerable
Chimney Swift
BCC Rangewide
(CON)
Chuck-will's-widow
BCC - BCR
Coastal (waynes)
Black-throated
Green Warbler
BCC - BCR
Common Eider
Non-BCC
Vulnerable
Common Loon
Non-BCC
Vulnerable
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Cory's Shearwater
BCC Rangewide
(CON)
Double-crested
Cormorant
Non-BCC
Vulnerable
Dovekie
Non-BCC
Vulnerable
Great Shearwater
Non-BCC
Vulnerable
Gull-billed Tern
BCC Rangewide
(CON)
King Rail
BCC Rangewide
(CON)


Least Tern
BCC Rangewide
(CON)
Lesser Yellowlegs
BCC Rangewide
(CON)
Long-tailed Duck
Non-BCC
Vulnerable
Manx Shearwater
BCC Rangewide
(CON)
Marbled Godwit
BCC Rangewide
(CON)
Painted Bunting
BCC - BCR
SPECIES
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Pectoral Sandpiper
BCC Rangewide
(CON)
Pomarine Jaeger
Non-BCC
Vulnerable
Prairie Warbler
BCC Rangewide
(CON)
Purple Sandpiper
BCC Rangewide
(CON)
Razorbill
Non-BCC
Vulnerable
Red-breasted
Merganser
Non-BCC
Vulnerable
Red-necked
Phalarope
Non-BCC
Vulnerable
Red-throated Loon
Non-BCC
Vulnerable
Ring-billed Gull
Non-BCC
Vulnerable


Roseate Tern
Non-BCC
Vulnerable
Royal Tern
Non-BCC
Vulnerable
Ruddy Turnstone
BCC - BCR
SPECIES
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JUN
JUL
AUG
SEP
OCT
NOV
DEC
Saltmarsh Sparrow
BCC Rangewide
(CON)
Semipalmated
Sandpiper
BCC - BCR
Short-billed
Dowitcher
BCC Rangewide
(CON)
Sooty Shearwater
Non-BCC
Vulnerable
Sooty Tern
Non-BCC
Vulnerable
Surf Scoter
Non-BCC
Vulnerable
Whimbrel
BCC - BCR
White-winged
Scoter
Non-BCC
Vulnerable
Willet
BCC Rangewide
(CON)
Wilson's Plover
BCC Rangewide
(CON)
Wilson's Storm-
petrel
Non-BCC
Vulnerable
Wood Thrush
BCC Rangewide
(CON)

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

COASTAL BARRIERS

Projects within the John H. Chafee Coastal Barrier Resources System (CBRS) may be subject to the restrictions on Federal expenditures and financial assistance and the consultation requirements of the Coastal Barrier Resources Act (CBRA) (16 U.S.C. 3501 et seq.). For more information, please contact the local Ecological Services Field Office or visit the CBRA Consultations website. The CBRA website provides tools such as a flow chart to help determine whether consultation is required and a template to facilitate the consultation process.

OTHERWISE PROTECTED AREA (OPA)

OPAs are denoted with a "P" at the end of the unit number. The only prohibition within OPAs is on Federal flood insurance. ***CBRA consultation is not required for projects within OPAs.*** *However, agencies providing disaster assistance that is contingent upon a requirement to purchase flood insurance after the fact are advised to disclose the OPA designation and information on the restrictions on Federal flood insurance to the recipient prior to the commitments of funds.*

UNIT	NAME	TYPE	SYSTEM UNIT ESTABLISHMENT DATE	FLOOD INSURANCE PROHIBITION DATE
NC-03P	Cape Hatteras	OPA	N/A	11/16/1991

MARINE MAMMALS

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

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1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. 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.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: https://ecos.fws.gov/ecp/species/4469

IPAC USER CONTACT INFORMATION

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Phone: 5408422779

US Army Corps of Engineers ®
Wilmington District

Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation Project

Draft Environmental Assessment

Appendix C: List of Draft EA Recipients

March 2025

US Senator	Thom Tillis (Harrison_Walker@tillis.senate.gov)
US Senator	Ted Budd (Charlie_hobbs@budd.senate.gov)
US Representative	Keith Kidwell (Keith.Kidwell@ncleg.gov); admin assistant (Joy.Albright@ncleg.gov)
US Congressman	Gregory Murphy (Raymond.Celeste@mail.house.gov)
NC Senator	Norman Sanderson (Norman.Sanderson@ncleg.gov); admin assistant (Diane.Cook@ncleg.gov)
NC Audubon	Lindsay Addison (Lindsay.Addison@audubon.org)
NC Coastal Federation	Kerri Allen (kerria@nccoast.org)
NC Coastal Federation	Ana Zivanovic-Nenadovic (anaz@nccoast.org)
NC Coastal Federation	Manley Fuller (manley@nccoast.org)
NC Coastal Federation	Braxton Davis (braxtond@nccoast.org)
Southern Environmental Law Center	Ramona McGee (rmcgee@selcnc.org)
Outer Banks Visitors Bureau	Lee Nettles (information@outerbanks.org)
Ocracoke Preservation Society	Andrea Powers Tolson (admin@ocracokepreservationsociety.org)
Ocracoke Tourism Development Authority	Helena Stevens (info@visitocracokenc.com)
Atlantic States Marine Fisheries Commission	Toni Kerns (tkerns@asmfc.org)
Environmental Protection Agency (EPA)	Ntale Kajumba (kajumba.ntale@epa.gov)
N.C. Division of Coastal Management (NCDCM)	Tancred Miller (tancred.miller@deq.nc.gov)
N.C. Division of Coastal Management (NCDCM)	Daniel Govoni (daniel.govoni@deq.nc.gov)
N.C. Division of Marine Fisheries (NCDMF)	Kimberlee Harding (Kimberlee.Harding@deq.nc.gov)
N.C. Division of Marine Fisheries (NCDMF)	Jimmy Harrison (James.Harrison@deq.nc.gov)
N.C. Division of Water Resources (NCDWR)	Robert Tankard (robert.tankard@deq.nc.gov)
N.C. Wildlife Resources Commission (NCWRC)	Maria Dunn (maria.dunn@ncwildlife.org)
National Marine Fisheries Service (NMFS)	Andy Herndon (andrew.herndon@noaa.gov)
National Marine Fisheries Service (NMFS)	Dr. Pace Wilber (pace.wilber@noaa.gov)
National Marine Fisheries Service (NMFS)	Anne Deaton (anne.deaton@noaa.gov)
National Marine Fisheries Service (NMFS)	Fritz Rhode (fritz.rhode@noaa.gov)
National Park Service, CAHA	David Hallac (david_hallac@nps.gov)

National Park Service, CAHA	Robin Snyder (Robin_Snyder@nps.gov)
N.C. State Historical Preservation Officer	Renee Gledhill-Earley (renee.gledhill-earley@dncr.nc.gov)
NC State Historical Arch	Chris Southerly (chris.southerly@dncr.nc.gov)
NC State Historical Arch	Stephen Atkinson (stephen.atkinson@dncr.nc.gov)
U.S. Fish and Wildlife Service	Pete Benjamin (pete_benjamin@fws.gov)
U.S. Fish and Wildlife Service	John Ellis (john_ellis@fws.gov)
U.S. Fish and Wildlife Service	Kathy Matthews (kathryn_matthews@fws.gov)
USACE, Wilmington Regulatory	James Lastinger (James.C.Lastinger@usace.army.mil)
USACE, Wilmington Regulatory	Josh Pelletier (Josh.R.Pelletier@usace.army.mil)
United Keetoowah Band of Cherokee Indians	
Eastern Band of Cherokee Indians	
Cherokee Nation	
U.S. Coast Guard	Lt. Greg Kennerley (Gregory.M.Kennerley@uscg.mil)
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US Army Corps of Engineers ®
Wilmington District

Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation Project

Draft Environmental Assessment

Appendix D: Draft Hatteras Inlet

Management Plan (HIMP)

March 2025

US Army Corps of Engineers ®
Wilmington District

DRAFT HATTERAS INLET MANAGEMENT PLAN

Wilmington District – U.S. Army Corps of Engineers

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Cover Photo: Hatteras Inlet Locations in 1993 and 2023 (Google Earth imagery)

1.0 Introduction

The purpose of the Hatteras Inlet Management Plan (HIMP) is to summarize and track maintenance of the Federal navigation channels in the vicinity of Hatteras Inlet. The channels addressed in the HIMP, from east to west, are Rollinson Channel, Hatteras Basin, Hatteras Ferry Channel, Barney Slough, Pamlico Sound Portion, Sloop Channel, and the Hatteras Connector Channel (formerly known as South Ferry Channel) (Figure 1). The HIMP is a living document that includes two components, a spreadsheet and a supporting text document. The spreadsheet will be updated annually and will track all maintenance dredging activities by the U.S. Army Corps of Engineers (USACE), Dare County, and the North Carolina Department of Transportation's Ferry Division (NCDOT). The supporting text document will be updated as needed and describes all the channels included in the HIMP as well as a summary of previously completed environmental documents. The USACE will ensure the HIMP is updated annually; Dare County and NCDOT will provide USACE with all required information for the annual HIMP update.

The USACE committed to develop the HIMP as a result of coordination with resource agencies during completion of the Hatteras to Hatteras Inlet Channel Realignment, Rollinson Channel Navigation Project, Environmental Assessment and Finding of No Significant Impact, November 2022 (EA/FONSI). Specifically, an inlet management plan was recommended by the National Marine Fisheries Service, Habitat Conservation Division (NMFS-HCD) during consultation under the Magnuson-Stevens Fishery Conservation and Management Act on September 1, 2022, and other agencies concurred. As documented in the EA/FONSI and NMFS-HCD letter, USACE agrees to lead an interagency effort to develop the HIMP that USACE, Dare County, and NCDOT can use to keep track of all dredging activities in the navigation channels, and provide to resource agencies annually. Elements of the HIMP include the identification of all dredging and placement locations; identification of all potential dredge types utilized; Best Management Practices (BMPs) to minimize impacts to submerged aquatic vegetation (SAV), spawning sanctuaries, and fisheries; and any special authorizations, such as urgent or emergency dredging requests.

Although the 2022 Hatteras to Hatteras Inlet Channel Realignment EA/FONSI did not include Rollinson Channel, the Hatteras Basin, or Hatteras Ferry Channel Ranges, these areas **are** included in the HIMP, as noted above and shown in Figure 1. These channels are closely linked to the Hatteras Inlet channels addressed in the EA/FONSI, are often maintained in conjunction with those channels and often use the same dredging methods and placement sites; therefore, USACE decided it's appropriate to include them in the HIMP.

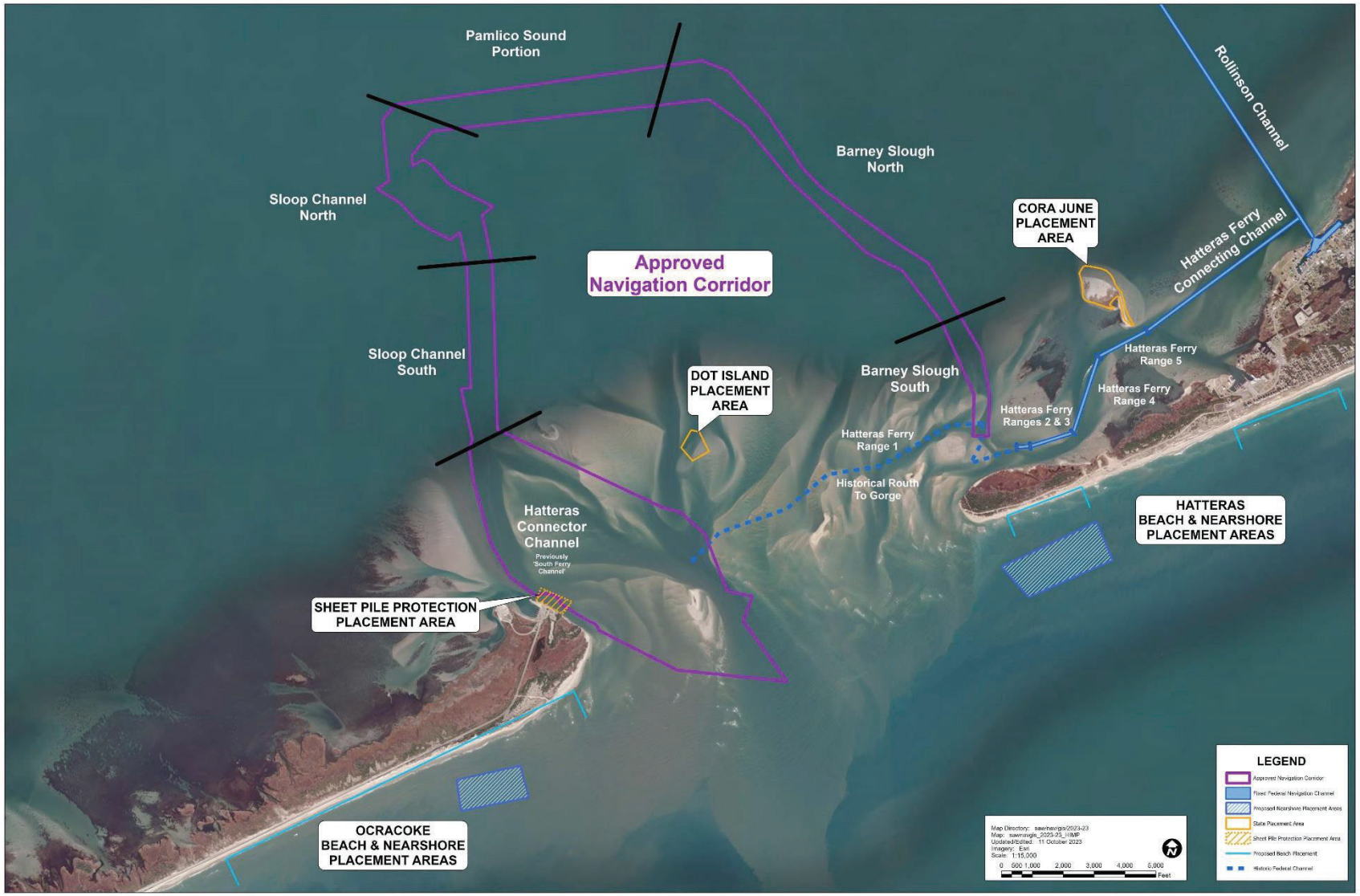


Figure 1: Federal Channels and Placement Locations for the Hatteras Inlet Area

2.0 Rollinson and Hatteras Ferry Channels

2.1 Rollinson Channel and Hatteras Ferry Connecting Channel

2.1.1 Background: Rollinson Channel was initially authorized as a channel from Pamlico Sound to Hatteras Basin by the River and Harbor Act of August 30, 1935. The channel had initial dimensions of 6 feet deep, 100 feet wide, and 5 miles long; the channel depth was increased to 12 feet in House Document 457/87/2 on October 23, 1962. In that same House Document, the intersecting Hatteras Ferry Connecting Channel was authorized at 100 feet wide, 10 feet deep, and 4 miles long. Dredged material placement sites included a temporary upland placement site adjacent to the west side of Hatteras Basin and a permanent placement site west of the Hatteras Ferry Terminal behind the dunes. Maintenance dredging of Rollinson Channel occurred ten times from first construction in 1937 through 1969, via hydraulic pipeline dredging, with dredged material placed in open water adjacent to the channel.

The USACE developed an Environmental Impact Statement (EIS) entitled, Final Environmental Statement, Maintenance of the Navigation Projects on Sounds of North Carolina, July 1976, to cover the maintenance dredging of Rollinson Channel, Hatteras Ferry Connecting Channel, and Hatteras Basin. The EIS discussed the maintenance of Rollinson Channel via hydraulic pipeline dredging with placement of dredged material in shallow, relatively well-protected areas (sandbag diked islands above the mean high-water line). However, these in-water sandbag diked dredged material placement areas were never constructed.

The Hatteras Ferry Connecting Channel (formerly known as the Channel to Hatteras Inlet) was constructed in 1966. The channel has been maintained twice from its construction to 1976, with an average of 89,000 cubic yards (CY) removed. Dredging was conducted via hydraulic pipeline with placement of material in open water areas adjacent to the channel and in upland diked facilities on Hatteras Island. The EIS projected that maintenance dredging would be required every four years for 50 years starting in 1976. The EIS stated that dredged material would be placed in open water areas diked by sandbags on shoaled areas adjacent to the channel, as well as upland diked facilities. However, as noted above, these in-water placement islands were never constructed. The 1976 EIS authorized any dredging between Mile 3.5 and the inlet gorge be conducted by Government owned sidecast dredges; however, this section of channel has eroded due to widening of the inlet and this no longer applies.

In December 1996, USACE developed the Environmental Assessment (EA) for Maintenance Dredging of Rodanthe, Avon, and Rollinson Channels, with a subsequent Finding of No Significant Impact (FONSI) signed in February 1997. This EA/FONSI allowed for maintenance dredging of the Rollinson Channel with placement of suitable dredged material on nearby oceanfront beaches on Hatteras Island, while dredged material not suitable for beach placement would be placed in upland diked facilities. From 1969 until the development of the 1996 EA, the channel was maintained an additional five times via hydraulic pipeline, with the last being in 1988 (up to that time).

Material dredged from Hatteras Harbor out to Channel Marker No. 32 contains high percentages of fine-grained sediment not suitable for beach placement. This material was proposed to be placed in a 9.5-acre upland diked facility on the west side of Hatteras Harbor (described in more detail in the Hatteras Harbor section below). Beach quality sand material would be placed on beaches from around Frisco, North Carolina, west to just short of Hatteras Inlet, for a stretch of approximately 5.85 miles.

2.1.2 Channel Dredging Specifics: Rollinson Channel is maintained at a width of 100 feet and to a depth of 12 feet with 2 feet of allowable overdepth, via hydraulic pipeline dredge. Rollinson Channel can be dredged at any time of year. Dredged material consists of sand from Station (STA) 0 to STA 15 and a mix of sand/silt from STA 15 to STA 255. Dredged material would be placed on Cora June bird island or National Park Service (NPS) beaches, so long as all NPS requirements are met. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on Cora June bird island would require coordination with the North Carolina Wildlife Resources Commission (NCWRC) prior to any work being done. Placement of dredged material on NPS beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles. Any placement of dredged material on NPS beaches would require a Special Use Permit (SUP) from NPS prior to conducting any work.

Hatteras Ferry Connecting Channel is maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth via hydraulic pipeline dredge. Hatteras Ferry Connecting Channel can be dredged at any time of year. Dredged material from this channel consists of sand within the entire corridor. Dredged material would be placed on Cora June bird island or NPS beaches. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on Cora June bird island would require coordination with NCWRC prior to any work being done. Placement of dredged material on NPS beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles. Any placement of dredged material on NPS beaches requires an SUP from NPS prior to conducting any work.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain the Rollinson and Hatteras Ferry Connecting Channels to their authorized dimensions. In between the pipeline dredging events, maintenance dredging using Government plant will be required. For Rollinson Channel, it is expected that approximately 8,000 to 10,000 CY of material would be dredged from the channel during each dredging event; for Hatteras Ferry Connecting Channel, it is expected that approximately 10,000 to 30,000 CY of material would be dredged from the channel during these dredging events. For both channels, dredging would take anywhere from 4 to 10 days per year, depending on the amount of material to be dredged and the placement location.

Using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV beds are currently less than 100 feet from both sides of

Rollinson Channel outside of Hatteras Harbor (Figure 2). Additional SAV beds are located on both sides of the channel within Pamlico Sound. Both sides of the Hatteras Ferry Connecting Channel are also surrounded by SAV beds. To avoid impacts to SAV during placement activities, USACE will maintain a 100-foot buffer to SAV beds during the months of October through March and a 300-foot buffer from April through September.

Figure 2: Rollinson and Hatteras Ferry Connector Channels and Adjacent SAV Beds

2.2 Hatteras Harbor

2.2.1 Background: The basin at Hatteras was authorized to a depth of 6 feet on March 2, 1945, in House Document 236/76/1. It was later authorized to 12 feet on October 23, 1962, in House Document 4557/87/2. Maintenance dredging of Hatteras Harbor is covered under the Final Environmental Statement, Maintenance of the Navigation Projects on Sounds of North Carolina, July 1976. The basin was first dredged in 1957 and had been maintained three times up to completion of the 1976 EIS. Dredging was conducted via hydraulic pipeline with dredged material placed in an upland diked facility adjacent to the west end of the basin. In the 1976 EIS, it was estimated that the basin would require dredging every 3.5 years for the subsequent 50 years. Future maintenance dredging would continue to utilize hydraulic pipeline with dredged material placement in a privately-owned upland diked facility measuring 18 acres in size. After this facility meets capacity, underwater diked areas in Pamlico Sound would be constructed. Currently the upland diked facility on the west side of the harbor is no longer present, as the area has been developed with housing between 2002 and 2006

(based on available aerial imagery, Google Earth imagery). None of the open water diked placement areas were ever constructed.

2.2.2 Basin Dredging Specifics: Hatteras Basin has not been dredged since prior to the development of the 1976 EIS. Sediment in the basin consists of very fine-grained material, mostly silts and silty-sand. If the basin were to be dredged in the future, it would be done so using a contracted hydraulic pipeline. Placement of dredged material would be in a confined upland placement site; however, at this time, an upland placement site is not available. Currently, it is unknown the quantity of material that would be dredged from the basin should the need arise. In addition, although unknown, the dredged material may need to be tested for contaminants prior to placement due to the confinement of the basin, poor flushing, and heavy vessel use, which could lead to petroleum and paint contaminants in the sediment.

2.3 Hatteras Ferry Channel (a.k.a. Channel from Hatteras to Hatteras Inlet Gorge/Channel to Hatteras Inlet)

2.3.1 Background: The Channel to Hatteras Inlet was authorized at 10 feet deep, 100 feet wide, and 4 miles long, in House Document 457/87/2, on October 23, 1962. The USACE developed an EIS entitled, Final Environmental Statement, Maintenance of the Navigation Projects on Sounds of North Carolina, July 1976, to cover the maintenance dredging of the Channel to Hatteras Inlet. This channel was constructed in 1966 and had been maintenance dredged via hydraulic pipeline twice up to completion of the 1976 EIS. The dredged material was placed adjacent to the channel in open water and diked upland facilities on Hatteras Island. In the 1976 EIS, it was projected that the channel would require maintenance dredging 12.5 times over the ensuing 50 years, with dredged material placed in open water diked (sandbags) areas on shoaled areas of Pamlico Sound or diked upland facilities within NPS property. However, these open-water, diked placement areas were never constructed. Any dredging from Mile 3.5 to the inlet gorge would be performed by sidecast dredging.

In February/March 2000, USACE developed an EA and a signed FONSI entitled, Maintenance of Rollinson Channel, Hatteras to Hatteras Inlet Channel Section, for what was then known as Ranges 2, 3, and 4 (currently Hatteras Ferry Channel Range 1) (Figure 1). This EA/FONSI addressed dredging of those former channel ranges via hydraulic pipeline with placement of dredged material on oceanfront beaches on Ocracoke Island. The designated placement site began at a point approximately 5,000 feet south of Hatteras Inlet, in the inlet's 2000 location, and extended south approximately 3,000 feet. In FY 2000, approximately 100,000 CY of dredged material from former Ranges 2, 3, and 4, were placed on Ocracoke Island beaches. Environmental commitments made in the 2000 EA/FONSI include: a dredged material placement window on Ocracoke Island beaches from November 16 through April 30, of any given year, to minimize project impacts to nesting sea turtles; obtaining an SUP prior to placement of any dredged material within NPS boundaries; dredged material placed on beaches would consist of 90-percent or greater sand; the beach placement

area would be included in the District's ongoing seabeach amaranth surveys; and all work would be coordinated with the NPS.

In March 2004, USACE completed the Environmental Assessment, Use of Government Plant to Dredge in Federally Authorized Navigation Projects in North Carolina. This EA addressed the use of Government owned dredge plant, specifically sidecast and/or special purpose hopper dredges, to dredge small, isolated, regularly occurring shoals within federally authorized navigation projects. Before the development of this EA, these shoaled areas were included in regularly occurring (every 2 to 3 years) contract dredge events or, if needed, an emergency declaration. However, emergency declarations could occur at any time throughout any of USACEs federally maintained navigation channels, and they would require time consuming coordination efforts across multiple State and Federal agencies. Therefore, pursuing the use of Government plant was a proactive measure in maintaining Federal channels at any time of year. The EA included an 18,200-foot-long portion of the Hatteras to Hatteras Inlet Channel (from the State Ferry Channel to the former inlet location), dredged using sidecast or special purpose hopper dredges, with placement of dredged material in open water or nearshore placement areas offshore of Hatteras and Ocracoke Islands, respectively. The FONSI for the EA was signed in September 2004; however, the project had changed due to agency concerns. Agency comments required the removal of sidecast dredging in the area to protect SAV adjacent to the channel. Therefore, the FONSI authorized only the use of special purpose hopper dredges in the noted channel reaches with placement of dredged material in nearshore locations off Hatteras and Ocracoke Islands.

In November 2013, USACE developed the Environmental Assessment, Side Cast Maintenance Dredging of a Portion of Hatteras-to-Hatteras Inlet Channel, Pamlico Sound, North Carolina, with signature of the FONSI in February 2014. This EA addressed the ability to sidecast dredge using Government plant in a portion of the Hatteras to Hatteras Inlet channel, specifically a section of Range 2 and natural deep water previously known as Range 1, which has since been abandoned as Hatteras Inlet widened (Figure 3). The lack of SAV adjacent to these channel reaches allowed for the use of sidecast dredging.

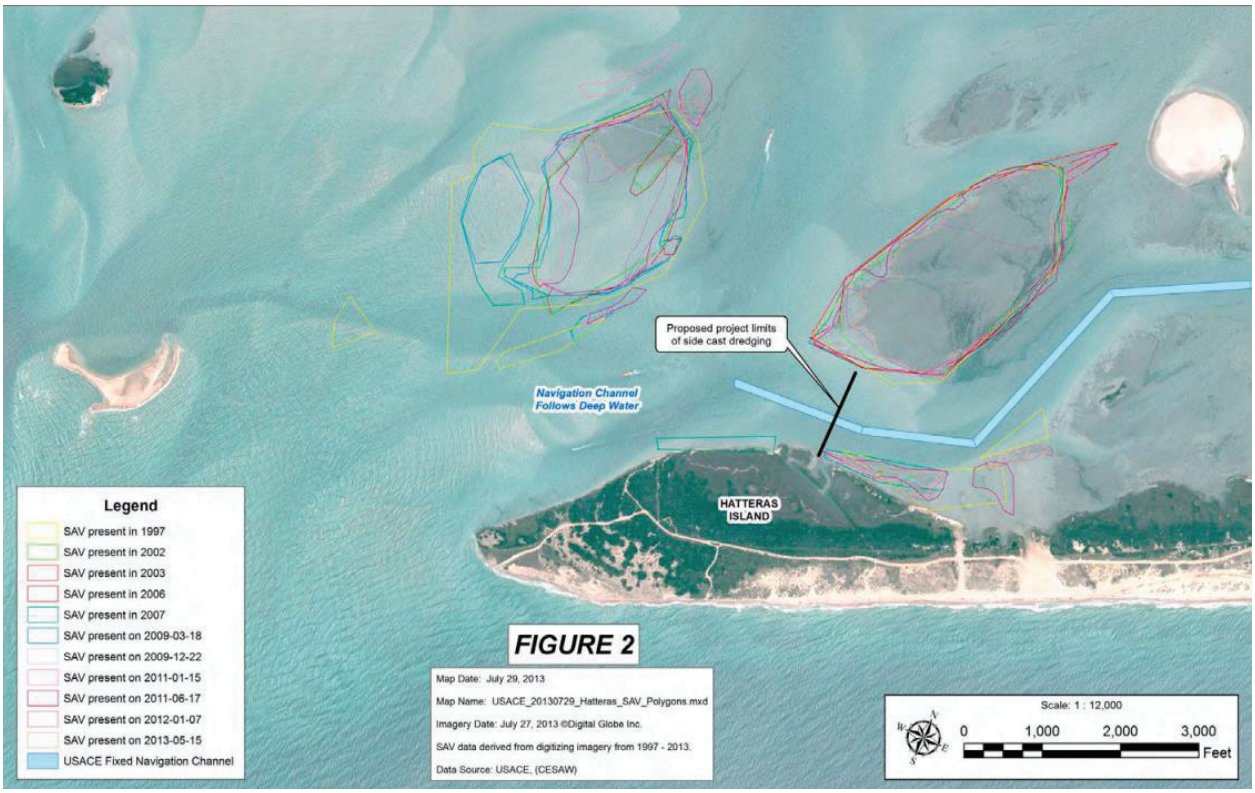


Figure 3: Hatteras to Hatteras Inlet Channel Portion to be Dredged Using Sidecast (2014 EA/FONSI)

2.3.2 Channel Dredging Specifics: The Ranges (2 through 5) within the Hatteras Ferry Channel are maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth. These ranges would be maintained via hydraulic pipeline dredge or Government owned special purpose hopper dredge; the use of sidecast dredges within these ranges is prohibited per the 2004 Federal Consistency due to the presence of SAV beds. Dredged material from this channel consists of beach quality sand. Dredged material would be placed on Cora June bird island or NPS beaches via hydraulic pipeline or nearshore off Hatteras or Ocracoke Islands via special purpose hopper dredge. These channel ranges may be dredged at any time of year. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. If dredged material was placed on NPS beaches, it would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Hatteras Ferry Channel Ranges 2 through 5 to their authorized dimensions. In between the pipeline dredging events, maintenance dredging will be required using Government plant. Government owned special purpose hopper dredge would be used annually in Ranges 4 and 5 and 1 to 2 times per year in Ranges 2 and 3. It is expected that approximately 10,000 to 50,000 CY of material would be dredged from Ranges 4 and 5 during a particular dredging event, while approximately 5,000 to 15,000 CY of material would be removed from Ranges 2 and 3 during a particular dredging event. Dredging would take anywhere from 7 to 14 days per year for any of the ranges,

depending on the amount of material to be dredged, type of dredge used, and the placement location.

Using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV beds are adjacent to both sides of all channel ranges (Figure 4). To avoid impacts to SAV during placement activities on adjacent bird islands, USACE will note the location of all SAV beds and provide guidance to the contractor as required.

Figure 4: Hatteras Ferry Channel Ranges 2 through 5 and Adjacent SAV Beds

Hatteras Ferry Channel Range 1 has been difficult to maintain due to widening of Hatteras Inlet and erosion of the west end of Hatteras Island. However, the channel is authorized to be maintained at a width of 100 feet and a depth of 10 feet with 2 feet of allowable overdepth. Should the channel ever need to be maintained again, a hydraulic pipeline dredge would be contracted every 3 to 5 years or Government owned sidecast dredge would be used 4 to 6 times per year. It is expected that approximately 20,000 to 50,000 CY of material would be dredged from the channel during a particular dredging event using Government plant. Dredging using Government plant would take anywhere from 30 to 60 days per year, depending on the amount of material to be dredged.

No SAV currently exists in this area, which is why the 2013/2014 EA/FONSI was developed to allow the use of Government owned sidecast dredges in this location. However, prior to any sidecast dredging, USACE would notify the appropriate State and Federal resource agencies.

3.0 Hatteras to Hatteras Inlet Channel Realignment, Rollinson Channel

In November 2022, USACE completed the Environmental Assessment, Hatteras to Hatteras Channel Realignment, Rollinson Channel Navigation Project, Hyde and Dare Counties, North Carolina, and signed the associated FONSI. This EA assessed project impacts to realign the navigation route between Hatteras and Ocracoke Islands (known as the horseshoe route) on the inside of Hatteras Inlet and abandon the direct route from island to island of the Hatteras to Hatteras Inlet Channel (Hatteras Ferry Channel Range 1 and a portion of Range 2) as discussed above. The horseshoe route consists of the following channel reaches (from Hatteras Island to Ocracoke Island): Barney Slough South, Barney Slough North, Pamlico Sound, Sloop Channel North, Sloop Channel South, Hatteras Connector (formerly known as the South Ferry Channel) (Figure 5). The horseshoe route will follow the best natural deep-water option but will have a width of 100 feet and a maintained depth of 10 feet with 2 feet of allowable overdepth; because the channel will follow natural deep-water, the depth may exceed 10 feet, but USACE would never dredge below this depth. Maintenance dredging of the horseshoe route would be accomplished using hydraulic pipeline or shallow draft Government plant, either sidecast or special purpose hopper dredges. A contracted pipeline dredge will occur every 3-5 years (depending on shoaling and available funding), while Government plant would be used between contracts or for any urgent dredging need. The type of dredge plant used will depend on the location of the shoaling, quantity and depth of shoaled material, plant availability, and available funding. Dredged material placement areas would include oceanfront beaches and nearshore areas off Hatteras and Ocracoke Islands, Cora June and DOT bird islands, adjacent open water areas, and a scour hole adjacent to the Ocracoke Ferry Terminal (Sheetpile Protection Area). Each channel is discussed in further detail below.

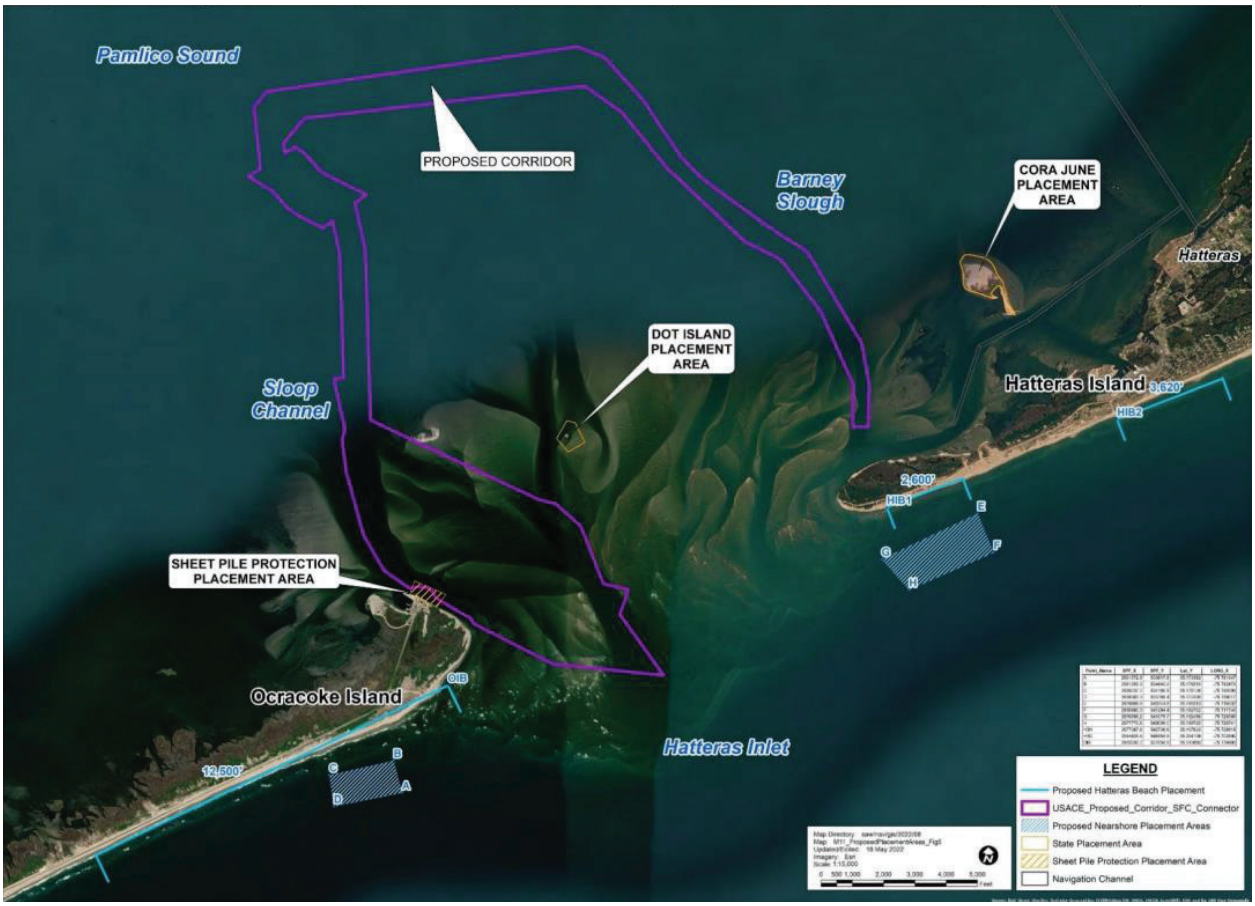


Figure 5: Horseshoe Route and Placement Options

3.1 Barney Slough South Channel

Barney Slough is the local name for the natural deep-water channel that developed on the backside of Hatteras Island running north-south connecting the Hatteras to Hatteras Inlet Channel with deep water of Pamlico Sound. Barney Slough South Channel begins around red-light Buoy 16 and ends approximately at green-light Buoy 11 (Figure 6). Shoaling in Barney Slough South is prevalent around Buoy 12A.

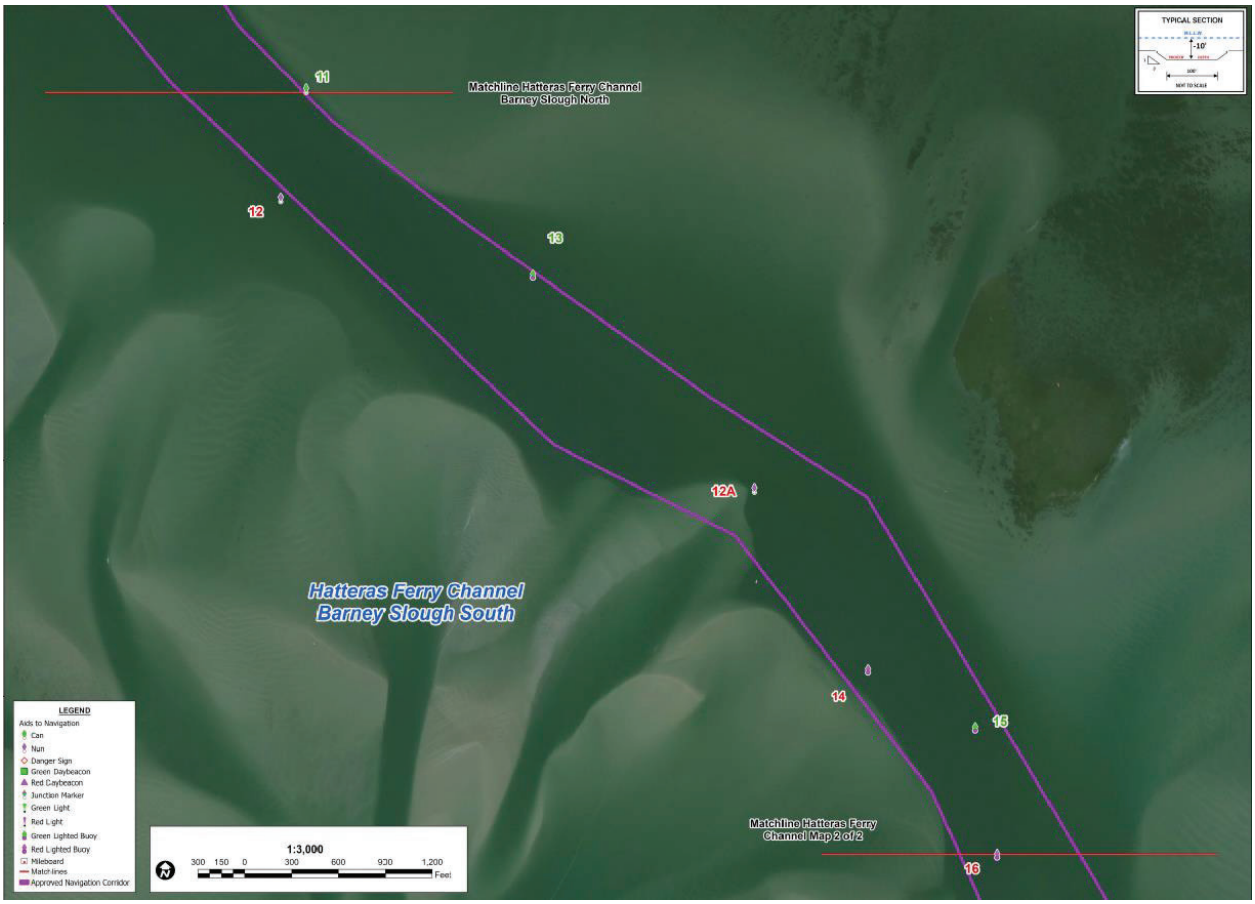
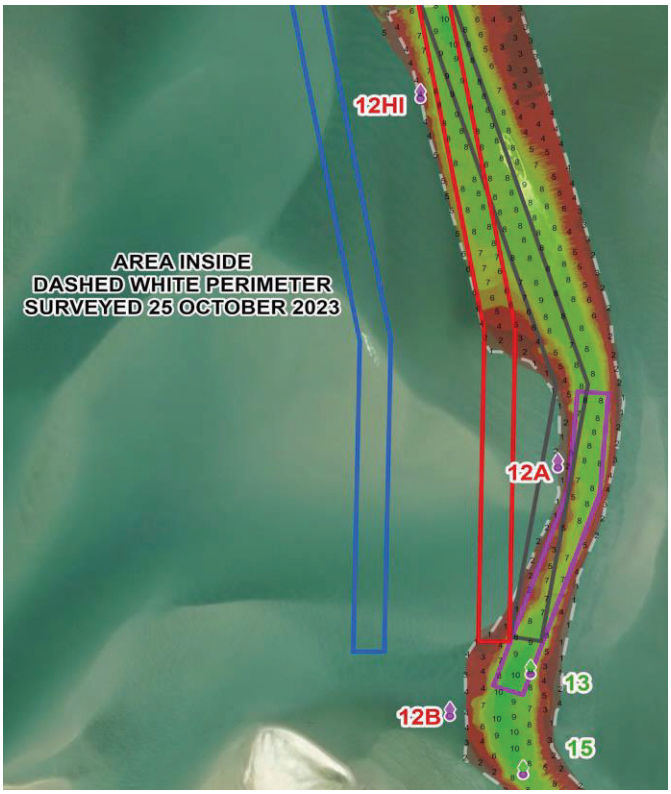


Figure 6: Limits of Barney Slough South from South (bottom) to North (top)

Barney Slough South would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on Cora June and/or DOT bird islands or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Hatteras and/or Ocracoke Islands or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and a depth of 10 feet with 2 feet of allowable overdepth. A Government plant dredging window from October 1 through March 31 is in place to protect fisheries resources. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on NPS beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles.

The channel through the southern portion of Barney Slough South (between Buoys 12A and 12B) has continued to migrate eastward over time. The naturally deep-water slough has shifted approximately 700 feet to the east from its location in 2015 to its 2023 location (Figure 7). The migration of this portion of Barney Slough South has led the natural deep-water channel to move outside of the authorized dredging corridor. The continued migration of this portion of the channel has led to three urgent dredging requests to State and Federal agencies in less than a year. The first request was in

August 2022 to dredge approximately 4,028 CY of material via Government plant (Murden) around Buoys 14, 15, 17, and 19, with placement of dredged material in nearshore areas off Hatteras and Ocracoke Islands. In February 2023, USACE requested an urgent dredging event to remove approximately 15,000 CY of material near Buoys 12A, 14, 16, and 17A, using Government plant (Murden) with placement of dredged material in deep scour holes within Barney Slough near Buoys 12 and 15. The third urgent dredging request was made in July 2023 to dredge approximately 11,000 CY of material, using Government plant (sidecaster Merritt), near Buoys 12A, 12B, and 13.



The feature in blue depicts the channel location in 2015, 2020 channel location in red, 2022 channel location in green, and 2023 channel location in purple.

Due to the dynamic nature of the area, the channel has migrated approximately 700 feet east between 2015 and 2023.

Figure 7: Migration of Barney Slough South to the East from 2015 to 2023

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Barney Slough South to its authorized dimensions and Government plant would be used 4 to 6 times per year between pipeline events. It is expected that approximately 20,000 to 60,000 CY of material would be dredged from the channel during a particular dredge event using Government plant. Dredging using Government plant would take anywhere from 30 to 60 days per year depending on the amount of material to be dredged, the type of dredge used, and the placement location.

Using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV are located within approximately 400 feet to the eastern edge of the navigation corridor near Buoy 12A; however, this portion of the channel has migrated outside of the authorized navigation corridor. To avoid impacts to SAV,

USACE has agreed to maintain a 100-foot buffer during the months of October through March and a 300-foot buffer from April through September.

3.2 Barney Slough North Channel

Barney Slough North Channel begins around green-light Buoy 11 and ends where it intersects with the Pamlico Sound Channel around red-light Buoy WR8 (Figure 8). Barney Slough North currently follows deep water.

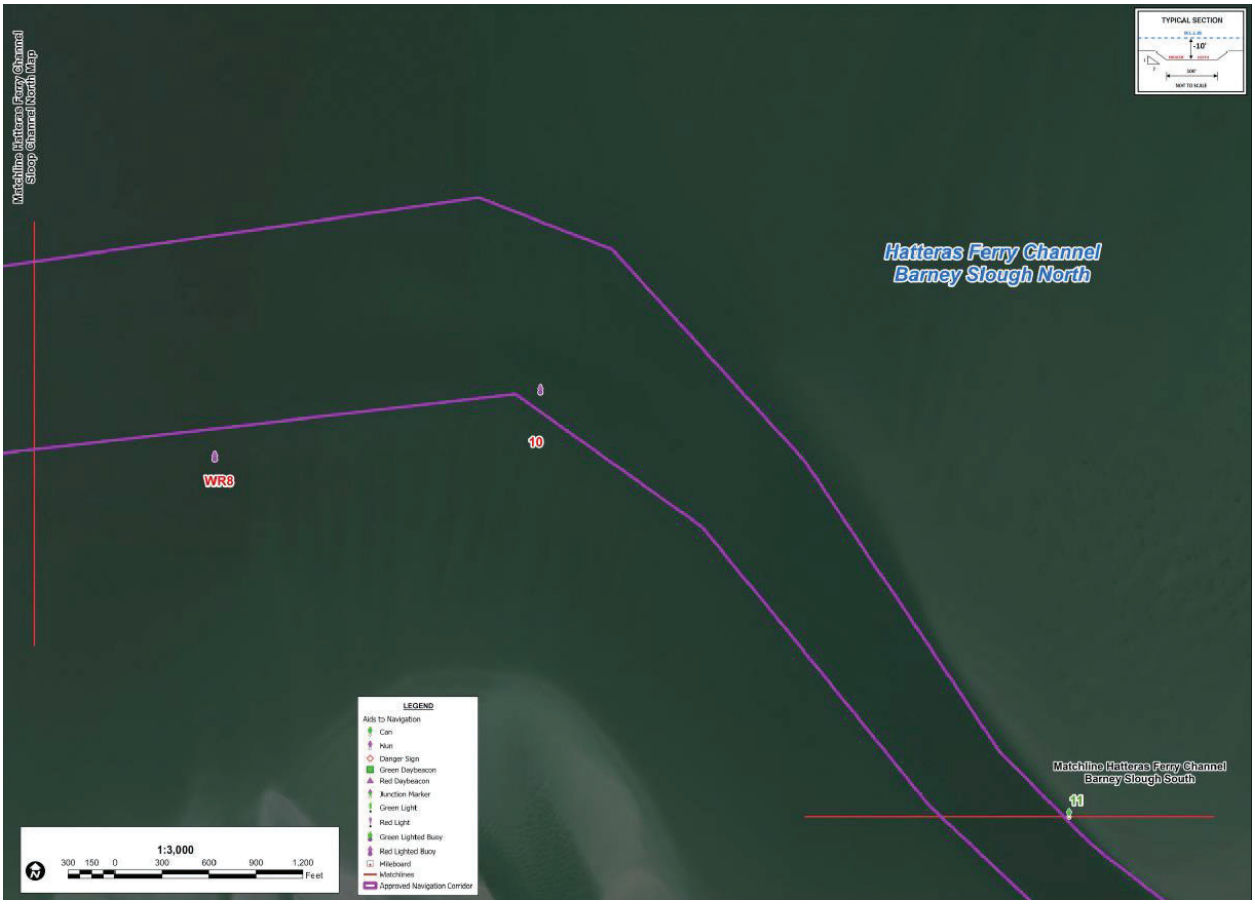


Figure 8: Limits of Barney Slough North from South (bottom right) to West (top left)

Barney Slough North would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on Cora June and/or DOT bird islands or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Hatteras or Ocracoke Islands or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth. A Government plant dredging window from October 1 through March 31 is in place to protect fisheries resources. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on NPS beaches would

occur from November 16 through March 31 to protect nesting shorebirds and sea turtles.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Barney Slough North to its authorized dimensions and Government plant would be used 1 to 2 times per year between pipeline events. It is expected that approximately 2,000 to 10,000 CY of material would be dredged from the channel during a particular dredge event using Government plant. Dredging using Government plant would take anywhere from 2 to 8 days per year depending on the amount of material to be dredged, the type of dredge used, and the placement location.

Using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV is located approximately 620 feet east and approximately 350 feet west of the navigation corridor. To avoid impacts to SAV, USACE has agreed to maintain a 100-foot buffer during the months of October through March and a 300-foot buffer from April through September.

3.3 Pamlico Sound Channel

The Pamlico Sound Channel runs across the top of the “horseshoe route” and follows natural deep water, which has typically required the least maintenance. The Pamlico Sound Channel would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on Cora June and/or DOT bird islands or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Hatteras or Ocracoke Islands or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth. A Government plant dredging window from October 1 through March 31 is in place to protect fisheries resources. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on NPS beaches, should it occur, would be from November 16 through March 31 to protect nesting shorebirds and sea turtles.

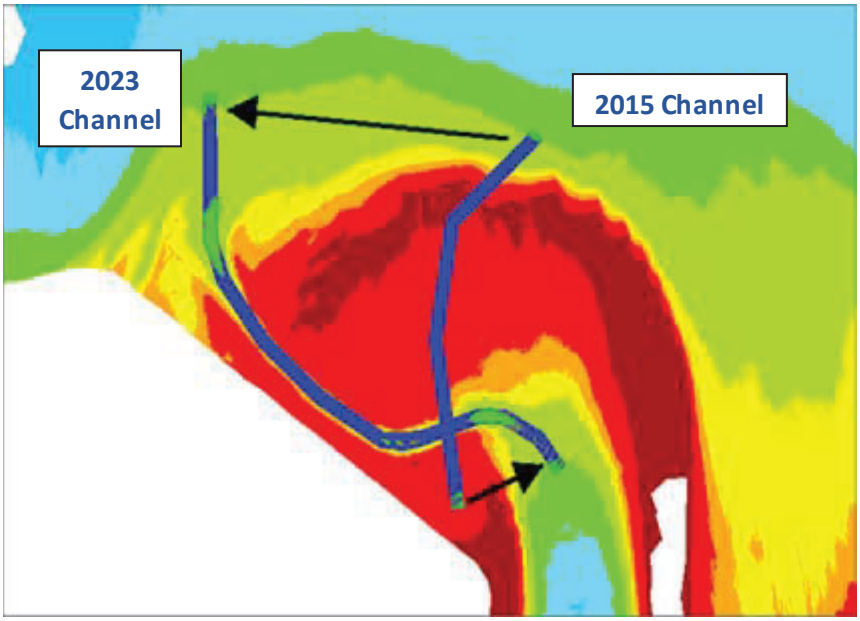
A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Pamlico Sound Channel and Government plant would be used 1 to 2 times per year between pipeline events. It is expected that approximately 2,000 to 5,000 CY of material would be dredged from the channel during a particular dredging event using Government plant. Dredging using Government plant would take anywhere from 2 to 8 days per year, depending on the amount of material to be dredged, the type of dredge used, and the placement location.

Water in Pamlico Sound is naturally deeper than in other sections of the corridor; therefore, using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), USACE has noted that there is no mapped SAV within a half-mile proximity of the channel corridor. As a result, no impacts to SAV from dredging or placement are anticipated in this channel reach. However, should SAV be present

during data review prior to dredging, a 100-foot buffer from October through March and a 300-foot buffer from April through September will be maintained.

3.4 Sloop Channel North Channel

The navigable channel through the northern section of Sloop Channel has changed dramatically over the past 8 years. This section of waterway is highly dynamic due to strong currents flowing between Pamlico Sound and Hatteras Inlet. Between 2015 and 2021, the channel had rotated approximately 45 degrees, so that the northern end of the channel cut is now approximately 2,400 feet westward of its 2015 alignment, and the southern end of the cut is now about 800 feet to the east of its 2015 location (Figure 9). The current channel cut is in the same location as in 2021 and is approximately 100 feet wide with maximum depths between 7 to 8 feet. It cuts through a significant shoal, where depths on either side of the channel are 5 feet or less. The navigable cut through the northern portion of Sloop Channel only exists due to the continuous operations of the ferries as they navigate through this area. Due to its highly fragile state, one major storm event could completely close off the channel to any vessel traffic. The shoal has been reshaped during numerous storm events, which is one reason the channel is anticipated to be difficult to maintain without the ability to dredge any time of year.



The feature in blue depicts the channel migration from its 2015 alignment to its current location.

Colors represent depths:
Darker blue – 14 ft or deeper
Light blue – 12 to 13 ft deep
Green – 10 to 11 ft deep
Light green – 8 to 9 ft deep
Yellow – 7 ft deep
Orange – 6 ft deep
Red – 4 to 5 ft deep
Dark Red – less than 4 ft deep

Figure 9: Location of Sloop Channel North in 2015 and currently in 2023.

Sloop Channel North would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on DOT bird island or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Ocracoke Island or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable

overdepth. Due to the high frequency of shoaling and the need to ensure the channel remains navigable, there is no Government plant dredging window for Sloop Channel North. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. If placement of dredged material on NPS beaches occurs, it would be from November 16 through March 31 to protect nesting shorebirds and sea turtles.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Sloop Channel North to its authorized dimensions and Government plant would be used 4 to 6 times per year between pipeline events. It is expected that approximately 10,000 to 60,000 CY of material would be dredged from the channel during a particular dredging event using Government plant. A dredging event using Government plant would take anywhere from 4 to 30 days per year depending on the amount of material to be dredged, the type of dredge used, and the placement location of the material.

Using up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV is not present within a half mile of either side of the authorized navigation corridor. While there is shallow water (< 6 feet) on the eastern side of the corridor, the area is so dynamic, with sand shifting frequently, it does not allow for growth of SAV, or if SAV has taken hold in the area, it is covered or erodes relatively quickly due to shifting sands (Albemarle-Pamlico National Estuary Partnership metric report, *Extent of Submerged Aquatic Vegetation, High-Salinity Estuarine Waters, 2021*). Although impacts to SAV from dredging are not anticipated in this channel reach, USACE will continue to review aerial imagery and data for SAV in the area prior to dredging and, if present, will maintain a 100-foot buffer during the months of October through March and a 300-foot buffer from April through September.

3.5 Sloop Channel South Channel

The navigable channel through the southern section of Sloop Channel has remained relatively stable and has followed natural deep-water (> 14 feet). Sloop Channel South would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on DOT bird island or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Ocracoke Island or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth. A Government plant dredging window from October 1 through March 31 is in place to protect fisheries resources. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged material on NPS beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Sloop Channel South to its authorized dimensions and Government plant

would be used 1 to 4 times per year between pipeline events. It is expected that approximately 10,000 to 80,000 CY of material would be dredged from the channel during a particular dredge event using Government plant. A dredge event using Government plant would take anywhere from 4 to 12 days per year depending on the amount of material to be dredged, the type of dredge used, and the placement location of the material.

Using the most up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV is located adjacent to the southern portion of Sloop Channel South, approximately 800 feet east of the authorized navigation corridor. To avoid impacts to SAV, USACE will review the most recent aerial imagery prior to dredging and maintain a 100-foot buffer during the months of October through March and a 300-foot buffer from April through September.

3.6 Hatteras Connector Channel (formerly South Ferry Channel)

The navigable channel known as the Hatteras Connector Channel (formerly known as South Ferry Channel), provides access from the Hatteras Inlet gorge to Sloop Channel near Ocracoke Island. The naturally deep channel is highly dynamic due to its location within the mouth of the inlet, with strong currents flowing between Pamlico Sound and the Atlantic Ocean. Several routes from Sloop Channel to the inlet gorge have existed, hence the wide corridor to provide options for best channel location.

Dredging utilizing both Government sidecast and special purpose hopper dredges has been routinely performed since May 2017. Dare County obtained permits to maintain Hatteras Connector Channel and from 2017 through 2021 there have been a total of 16 dredging events. To date, Dare County has funded USACE to complete these dredging events. Dredge quantities removed each year had ranged from approximately 15,000 CY in 2018 to 104,000 CY in 2020. The average quantity removed per year between 2017 and 2021 was approximately 62,000 CY; however, those events only included reaching maintainable depths of 7 to 8 feet. Dredging using sidecasting has been the predominant method for removing material in this area, since controlling depths of the channel have remained fairly shallow and inaccessible by Government owned special purpose hopper dredges, but sidecasting is also more efficient in moving dredged material, which results in fewer number of dredging days required.

Hatteras Connector Channel would be maintained via hydraulic pipeline dredge or Government plant. Dredged material from this channel consists of sand within the entire corridor. Dredged material placement would be on DOT bird island or NPS beaches via hydraulic pipeline, open water areas via sidecast dredge, or nearshore off Ocracoke Island or Ferry Landing scour holes via special purpose hopper dredge. The channel would be maintained at a width of 100 feet and to a depth of 10 feet with 2 feet of allowable overdepth. Due to the high frequency of shoaling and the need to ensure the channel remains navigable, there is no Government plant dredging window for Hatteras Connector Channel. Placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds. Placement of dredged

material on NPS beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles.

A contracted hydraulic pipeline will be used approximately every 3 to 5 years to maintain Hatteras Connector Channel to its authorized dimensions and Government plant would be used 4 to 6 times per year between pipeline events. It is expected that approximately 15,000 to 70,000 CY of material would be dredged from the channel during a particular dredge event using Government plant. A dredge event using Government plant would take anywhere from 12 to 24 days per year, depending on the amount of material to be dredged, the type of dredge used, and the placement location of the material.

Using the most up-to-date aerial imagery (October 2023) and State GIS layers (NCDEQ Online GIS, SAV), mapped SAV is approximately 1,200 feet west of the western edge of the authorized navigation corridor and approximately 400 feet to the northeast of the eastern edge of the authorized navigation corridor. To avoid impacts to SAV, USACE will review the most recent aerial imagery prior to dredging and maintain a 100-foot buffer during the months of October through March and a 300-foot buffer from April through September.

4.0 Environmental Commitments

For all dredging work in any channel discussed herein, USACE will abide by the U.S. Fish and Wildlife Service's (USFWS) 2017 West Indian manatee guidelines and the NMFS 2020 South Atlantic Regional Biological Opinion (SARBO) Project Design Criteria (PDCs) to protect swimming sea turtles, sturgeon species, giant manta ray, and the North Atlantic right whale. For placement of beach quality dredged material on beaches, USACE would adhere to the USFWS 2017 Statewide Programmatic Beach Placement Biological Opinion to protect federally listed shorebirds, nesting sea turtles, and seabeach amaranth. In addition, any work within NPS property would require an SUP to be obtained from NPS prior to work being conducted. To avoid impacts to SAV during placement activities, USACE will maintain a 100-foot buffer to SAV beds during the months of October through March and a 300-foot buffer from April through September.

Specific environmental commitments made for Hatteras Ferry Channel Ranges 2 through 5 include a prohibition on the use of Government owned sidecast dredges and notification to the NC Division of Environmental Health's Shellfish Sanitation and Recreational Water Quality Section so that appropriate shellfish harvesting closures and swimming advisories can be put in place. On May 27, 2004, the work was determined to be consistent with the NCDCM Coastal Management Program.

Specific environmental commitments made for Hatteras Ferry Range 1 and a portion of Range 2 include the use of sidecast dredges in these channels only after determining that other dredge methods are not feasible; coordination with State and Federal resource agencies prior to sidecast dredging; and coordinate with the U.S. Coast Guard

(USCG) in advance to relocate any Aids to Navigation (ATONs). On January 23, 2014, the work was determined to be consistent with the NCDCM Coastal Management Program.

For the Hatteras to Hatteras Inlet Channel, Rollinson Channel Realignment, USACE will adhere to an environmental window for dredging using any Government plant from October 1 through March 31 for all channels except Sloop Channel North and Hatteras Connector Channel; notifying resource agencies at least two weeks prior to any dredging between April 1 and September 30; placement of dredged material on bird islands would occur from September 1 through March 31 to protect nesting shorebirds; placement of dredged material on NPS oceanfront beaches would occur from November 16 through March 31 to protect nesting shorebirds and sea turtles; prior to each dredging event, SAV will be identified using the most recent aerial imagery and a 100-foot buffer will be maintained during the months of October through March and a 300-foot buffer will be maintained from April through September. Although not a commitment stated in the EA, any placement of dredged material on bird islands would be coordinated with NCWRC.

An Individual WQC (No. 005186) for all placement methods except control-of-effluent and beach placement of dredged material was issued for the project (expiration date of September 19, 2027). General Water Quality Certification No. 4500 for Emergency Activities on Ocean Beaches, which covers placement of dredged material on beaches, is valid until January 3, 2027. General Water Quality Certification No. 4152 for Control-of-Effluent Disposal has not been reauthorized; therefore, there is no valid WQC for control-of-effluent placement on bird islands. However, the NCWRC is the holder of all associated permits (Sections 404 and 401 Clean Water Act permits, and Coastal Area Management Act (CAMA) permits) for both Cora June and DOT bird islands. Currently, permits for DOT bird island are pending; however, the only permit for Cora June that is currently valid is the CAMA permit. Until all permits are acquired for either DOT and/or Cora June bird islands, placement via control-of-effluent on these islands is not an option. On February 14, 2022, the work was determined to be consistent with the NCDCM Coastal Management Program; a modified consistency concurrence to include a new deep-water route connecting Sloop Channel South to the South Ferry Channel was received on September 16, 2022.

5.0 References

Field, D., Kenworthy, J., Carpenter, D., Albermarle-Pamlico National Estuary Partnership, *Extent of Submerged Aquatic Vegetation, High-Salinity Estuarine Waters, 2021* (extension://efaidnbmnnnibpcajpcglclefindmkaj/https://files.nc.gov/apnep/documents/files/APNEP_High_Salinity_SAV_Extent_Report.pdf).

North Carolina Department of Environmental Quality Online GIS, Submerged Aquatic Vegetation. NC SAV Mosaic 1981 to 2021 | NC SAV Mosaic 1981 to 2021 | NC DEQ GIS Data (arcgis.com)

HIMP Matrix

Hatteras Inlet Management Plan (HIMP)												
Channel Name & Corridor Width Range	**Dimensions (depth + overdepth x width)**	**Target Frequency/Yr.**	**Expected Quantity of Sediment/event**	**Avg Dredging Days/Yr.**	**Dredging Authorized Party**	**Dredge Type**	**Dredge plant**	**Sediment Type**	**Dredged Material Placement Location**	**Permits/Approvals (includes work windows)**	**Avoidance/Minimization Commitments***	**Special Authorizations**
Rollinson Channel	12' + 2' x 100'	Once every 3-5 years	8,000-10,000 CY	4-10	USACE	Cutter Suction (Pipeline)	Contract Dredge	Sta 0 - 15 = Beach Quality Sand Sta 15 - 255 = Silt/Sand	- Cora June Island - NPS beaches (including wave uprush zones)	- Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Open-water placement: 1 NOV - 31 JAN	- Coordinate any Placement on Bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - Identify SAV in area prior to dredging and provide data to agencies	None
Rollinson Channel	12' + 2' x 100'	1 - 2	5,000-25,000 CY	4-30	Dare County/NCDOT	Hopper	Miss Katie or similar	Sta 0 - 15 = Beach Quality Sand Sta 15 - 255 = Silt/Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Nearshore Placement off Ocracoke and Hatteras Islands	-Regular dredging limited to 1 OCT - 31 MAR -Coordination with resource agencies required if dredging between 1 APR - 30 SEP - Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement- - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Hatteras Basin	12' + 2' x 250' x 2,500'	As Needed	Unknown	Unknown	USACE	Cutter Suction (Pipeline)	N/A	Sily, silty-sand	Unknown upland confined placement area	None	None	None
Hatteras Basin					Dare County/NCDOT							
Hatteras Ferry Connecting Channel	10' + 2' x 100'	Once every 3-5 years	10,000 -30,000 CY	4-10	USACE	Cutter Suction (Pipeline)	Contract Dredge	Beach Quality Sand	- Cora June Island - NPS beaches (Hatteras)	- Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change)	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA	None
Hatteras Ferry Connecting Channel	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging limited to 1 OCT - 31 MAR - Coordination with resource agencies required if dredging between 1 APR - 30 SEP -Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None

Hatteras Ferry Ranges 4 - 5	10' + 2' x 100'	Pipeline: Once every 3-5 years Hopper: Annually	10,000 - 50,000 CY	7-14	USACE	Hopper or Cutter Suction (Pipeline)	MURDEN, CURRITUCK, or Contract	Beach Quality Sand	- Hatteras Nearshore - Ocracoke Nearshore - Cora June Island - NPS beaches (Hatteras) - NPS beaches (Ocracoke wave uprush zone)	- Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency, Dredging of Rollinson Channel, 11 MAR 1997 - Federal Consistency, Rollinson Channel Maintenace, Beach placement on Ocracoke Island, 20 MAR 2000 - Federal Consistency, Use of Government Plant to Dredge in Federally Authorized Navigation Projects in NC, 27 MAY 2004	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - GOV Plant discharges in closed shellfish harvesting areas must be coordinated w/ NCDEQ Shellfish Sanitation & Recreational Water Quality Section prior to dredging - No sidecast dredging permitted (2004 Federal Consistency)	- Urgent dredging authorized for Range 4 on 31 AUG 2022 (3,037 CY) via GOV Plant (MURDEN)
Hatteras Ferry Ranges 4 - 5	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper	Miss Katie or similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging from 1 JAN to 31 DEC - Coordination with resource agencies required if dredging between 1 APR - 30 SEP -Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area dredged material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Hatteras Ferry Ranges 2 - 3	10' + 2' x 100'	Pipeline: Once every 3-5 years Hopper: 1-2	5,000 -15,000 CY	7-14	USACE	Hopper or Cutter Suction (Pipeline)	MURDEN, CURRITUCK, or Contract	Beach Quality Sand	- Hatteras Nearshore - Ocracoke Nearshore - Cora June Island - NPS beaches (Hatteras) - NPS beaches (Ocracoke wave uprush zone)	- Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency, Dredging of Rollinson Channel, 11 MAR 1997 - Federal Consistency, Rollinson Channel Maintenace, Beach placement on Ocracoke Island, 20 MAR 2000 - Federal Consistency, Use of Government Plant to Dredge in Federally Authorized Navigation Projects in NC, 27 MAY 2004	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - GOV Plant discharges in closed shellfish harvesting areas must be coordinated w/ NCDEQ Shellfish Sanitation & Recreational Water Quality Section prior to dredging - No sidecast dredging permitted (2004 Federal Consistency)	- Urgent dredging authorized for Ranges 2 & 3 on 10 MAR 2023 (19,831 CY) via GOV Plant (MURDEN)
Hatteras Ferry Ranges 2 - 3	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging can occur from 1 JAN to 31 DEC - Coordination with resource agencies required if dredging between 1 APR - 30 SEP -Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Hatteras Ferry Range 1	10' + 2' x 100'	Pipeline: Once every 3-5 years Sidecast: 4-6	20,000 - 50,000 CY	30-60	USACE	Sidecast or Cutter Suction (Pipeline)	MERRITT or Contract	Beach Quality Sand	- Sidecast - Cora June Island	- Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency, Use of Government Plant to Dredge in Federally Authorized Navigation Projects in NC, 27 MAY 2004 - Federal Consistency dated 23 JAN 2014	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - GOV Plant discharges in closed shellfish harvesting areas must be coordinated w/ NCDEQ Shellfish Sanitation & Recreational Water Quality Section prior to dredging - Notify State & Federal agencies prior to sidecast dredging	None
Hatteras Ferry Range 1	N/A	N/A	N/A	N/A	Dare County/NCDOT	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Barney Slough South	10' + 2' x 100'	Pipeline: Once every 3-5 years Sidecast: 4-6	20,000 - 60,000 CY	30-60	USACE	Sidecast or Cutter Suction (Pipeline)	MERRITT or Contract	Beach Quality Sand	- Sidecast - Cora June Island - DOT Island - Hatteras/Ocracoke Nearshore - NPS Beaches - Ferry Landing Scour Hole	- Dredging: 1 OCT - 31 MAR - Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - SAV - 300' buffer	- Urgent dredging authorized on 31 AUG 2022 (4,028 CY) via GOV Plant (MURDEN) - Urgent dredging authorized on 10 MAR 2023 (22,431 CY) via GOV Plant (MURDEN) -Urgent dredging authorized 18 JUL 2023 (10,904 CY) via sidecast (MERRITT)
Barney Slough South	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper or Sidecast	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging limited to 1 OCT - 31 MAR -Coordination with resource agencies required if dredging between 1 APR - 30 SEP -Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Barney Slough North	10' + 2' x 100'	Pipeline: Once every 3-5 years Sidecast: 1-2	2,000-10,000 CY	2 – 8	USACE	Sidecast or Cutter Suction (Pipeline)	MERRITT or Contract	Beach Quality Sand	- Sidecast - Cora June Island - DOT Island - Hatteras/Ocracoke Nearshore - NPS Beaches - Ferry Landing Scour Hole	- Dredging: 1 OCT - 31 MAR - Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA	None
Barney Slough North	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper or Sidecast	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Hatteras Inlet Flood Channel Open Water placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging limited to 1 OCT - 31 MAR - Coordination with resource agencies required if dredging between 1 APR - 30 SEP -Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Pamlico Sound Portion	10' + 2' x 100'	Pipeline: Once every 3-5 years Sidecast: 1-2	2,000-5,000 CY	2 – 8	USACE	Sidecast or Cutter Suction (Pipeline)	MERRITT or Contract	Beach Quality Sand	- Sidecast - Cora June Island - DOT Island - Hatteras/Ocracoke Nearshore - NPS Beaches - Ferry Landing Scour Hole	- Dredging: 1 OCT - 31 MAR - Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA	None

Pamlico Sound Portion	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper or Sidecast	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Hatteras Inlet Flood Chennel Open Water placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging limited to 1 OCT - 31 MAR - Coordination with resource agencies required if dredging between 1 APR - 30 SEP - Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Sloop Channel North	10' + 2' x 100'	Pipeline: Once every 3-5 years Sidecast or Hopper: 4-6	10,000-60,000 CY	4 – 30	USACE	Hopper or Sidecast	MERRITT, MURDEN, & CURRITUCK	Beach Quality Sand	- Ferry landing scour hole - NPS Beaches - DOT Island -Hatteras/Ocracoke Nearshore - Sidecast	- Dredging: Any time of year but aim to limit to 20 days in the APR-SEP timeframe - Bird Island Placement: 1 SEP - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Coordinate any placement on bird islands w/ NCWRC - Must receive SUP from NPS prior to any work in CAHA - SAV image monitoring before/after (USACE)	None
Sloop Channel North	10' + 2' depth 200' width (Dare) 225' (NCDOT	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper or Sidecast	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Sheet Pile Protection Placement Area - Hatteras Inlet Flood Chennel Open Water placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging can occur from 1 JAN to 31 DEC - Coordination with resource agencies required if dredging between 1 APR - 30 SEP - Coordination with NPS required to place material in Sheet Pile Protection Placement Area - Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None
Sloop Channel South	10' + 2' x 100'	1 – 4	10,000 -80,000 CY	4 – 12	USACE	Hopper or Sidecast	MERRITT, MURDEN, & CURRITUCK	Beach Quality Sand	- Ferry landing scour hole - Hatteras/Ocracoke Nearshore - Sidecast	- Dredging: 1 OCT - 31 MAR - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Must receive SUP from NPS prior to any work in CAHA	None
Sloop Channel South	10' + 2' x 100'	As needed to supplement USACE maintenance efforts	Operations will supplement USACE maintenance efforts. Collectively dredging is not expected to exceed quantities anticipated by the USACE above.	Operations will supplement USACE maintenance efforts. Collectively, "Dredging Days/Yr." are not expected to exceed USACE totals above	Dare County/NCDOT	Hopper or Sidecast	Miss Katie or Similar	Beach Quality Sand	- Open Water Placement Areas in Pamlico Sound - Barney Slough Deep Water Placement Area - Sheet Pile Protection Placement Area - Hatteras Inlet Flood Chennel Open Water placement Area - Nearshore placement off Ocracoke and Hatteras Islands	- Regular dredging limited to 1 OCT - 31 MAR - Coordination with resource agencies required if dredging between 1 APR - 30 SEP - Coordination with NPS required to place material in Sheet Pile Protection Placement Area - Dare County to provide annual letter report on dredging conducted in the channel under its authorization to include # of days dredged, volume, and area in which material was placed.	- Maintain 100 ft. buffer around SAV and Shellfish between 1 OCT and 31 MAR for dredging and placement - Maintain 300 ft. buffer around SAV and Shellfish between 1 APR and 30 SEP for dredging and placement - Conduct SAV and Shellfish Surveys prior to initial placement in open water areas to ensure buffer commitments are maintained - Conduct annual bathymetric surveys of open water placement areas in Pamlico Sound to provide information on long-term physical impacts to surrounding bathymetry.	None

Hatteras Connector Channel (previously South Ferry Channel)	10' + 2' x 100'	4 – 6	15,000 -70,000 CY	12 – 24	USACE	Hopper or Sidecast	MERRITT, MURDEN, & CURRITUCK	Beach Quality Sand	- Ferry landing scour hole - Hatteras/Ocracoke Nearshore - Sidecast	- Dredging: Any time of year but aim to limit to 28 days in the APR-SEP timeframe - NPS Beach Placement: 16 NOV - 31 MAR (must check w/ NPS on dates as they may change) - Federal Consistency 14 FEB 2022 w/ revised Federal Consistency 16 SEP 2022 - WQC (#5186) 19 SEP 2022, General WQCs #4500 on 30 SEP 2019 (Valid until 31 DEC 2026)	- Must receive SUP from NPS prior to any work in CAHA - SAV - redirect sidecast dredging in North - SAV image monitoring before/after (USACE)	None

US Army Corps of Engineers ®
Wilmington District

Hatteras to Hatteras Inlet Channel Realignment Changes, Rollinson Channel Navigation Project

Draft Environmental Assessment

Appendix E: Sea Level Change Assessment

March 2025

Hatteras Inlet – Sea Level Change Assessment– APPENDIX E

Sea Level Change

Hatteras Inlet, like many coastal areas, is vulnerable to sea level change, which poses significant risks to its environment, infrastructure, and communities. Historically, sea levels have been changing along the North Carolina Coast and future projections estimate a wide range of future sea levels. These estimates are influenced by factors such as glacial melt and thermal expansion of seawater due to the projected continued global temperature increase. Increased sea levels contribute to higher high tides, which can lead to more frequent flooding, particularly during storm surges. Rising seas exacerbate coastal erosion, threatening beaches, homes, and infrastructure, and potentially changing the coastal dynamics of Hatteras Inlet.

Sea level change (SLC) at Hatteras Inlet was evaluated following the guidelines presented in USACE Engineer Pamphlet EP 1100-2-1 “Procedures to Evaluate Sea Level Change: Impacts, Responses and Adaptation” (30 Jun 2019). The purpose of the EP was to provide instructional and procedural guidance to analyze and adapt to the direct and indirect physical and ecological effects of projected sea level change on USACE projects and systems of projects needed to implement Engineer Regulation (ER) 1100-2-8162.

ER 1100-2-8162 “Incorporating Sea Level Change in Civil Works Programs” (15 June 2019) provides both a methodology and a procedure for determining a range of SLC estimates based on both global and local historic sea level change rates. Three estimates are required by the guidance, a Low (Baseline) estimate representing the minimum expected SLC, an Intermediate estimate, and a High estimate representing the maximum expected SLC. The guidance will be used to evaluate the future sea levels and their impacts to Hatteras Inlet during 50-year and 100-year periods.

The first step in evaluating sea level change was to identify a nearby NOAA water level gauge with a sufficiently long data record. The analysis was based on the NOAA tide gauge located in Beaufort, Duke Marine Lab, NC (Station #8656483). This gauge was selected because it is the closest compliant and active tidal gauge to Hatteras Inlet. It has a historic record of 1964 to present, which includes a 3-month data gap in 1964 and a 55-month data gap from June 1968 to January 1973. It is located approximately 62 miles southwest of Hatteras Inlet (NOAA 2024b), so it is worth noting that the tide and SLC projections may differ slightly at the project location. Datum information for this gauge is shown in Figure 1 and Table 1.

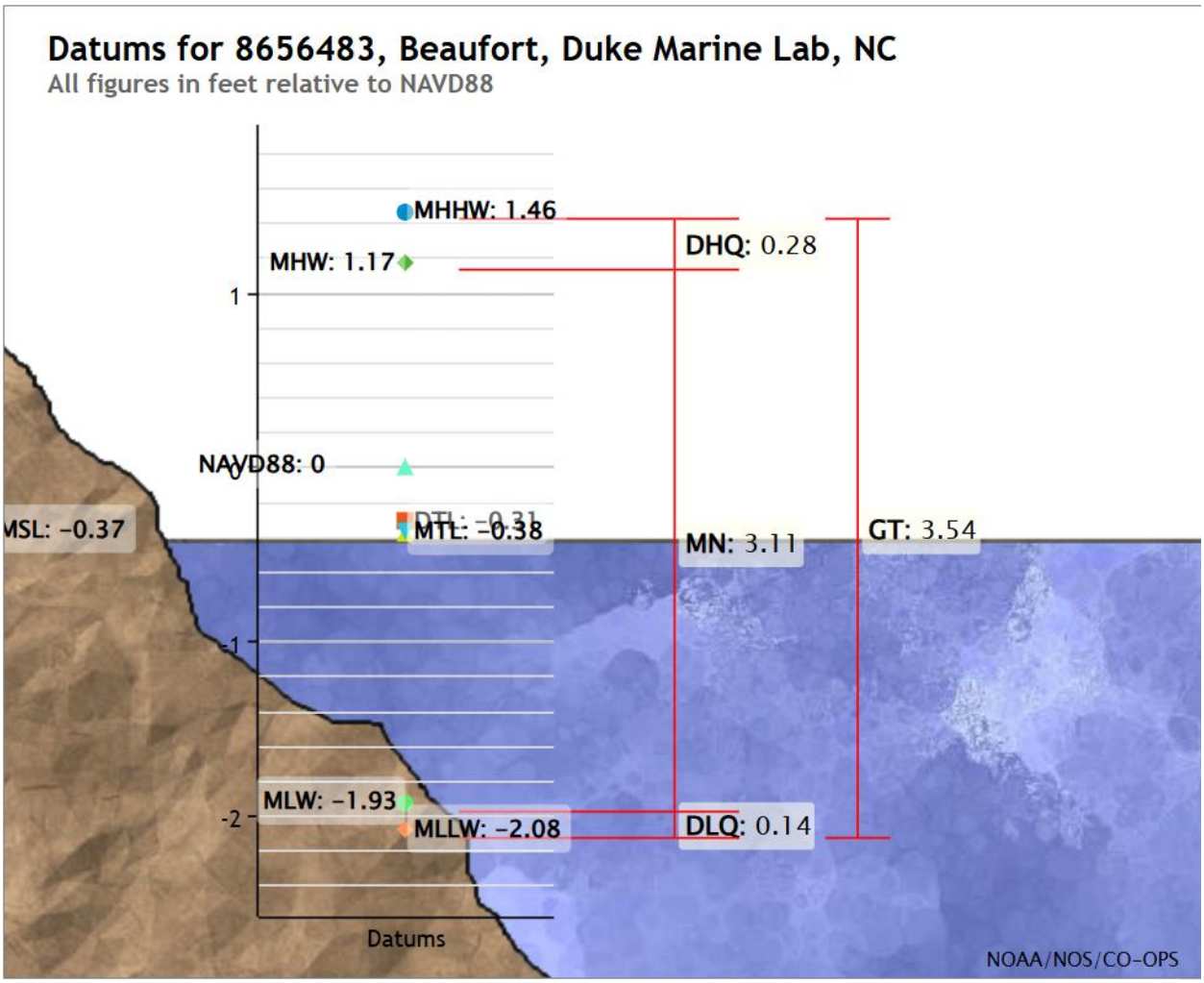


Figure 1. Datum Information for NOAA Gauge 8656483

Table 1. Datums for NOAA Gauge 8656483

Datum	Value (ft)	Description
MHHW	1.46	Mean Higher-High Water
MHW	1.17	Mean High Water
MTL	-0.38	Mean Tide Level
MSL	-0.37	Mean Sea Level
DTL	-0.31	Mean Diurnal Tide Level
MLW	-1.93	Mean Low Water
MLLW	-2.08	Mean Lower-Low Water
NAVD88	0.00	North American Vertical Datum of 1988
STND	-3.92	Station Datum
GT	3.54	Great Diurnal Range

MN	3.11	Mean Range of Tide
DHQ	0.28	Mean Diurnal High Water Inequality
DLQ	0.14	Mean Diurnal Low Water Inequality
HWI	0.41	Greenwich High Water Interval (in hours)
LWI	6.57	Greenwich Low Water Interval (in hours)
Max Tide	5.09	Highest Observed Tide
Max Tide Date & Time	09/14/2018 05:42	Highest Observed Tide Date & Time
Min Tide	-4.54	Lowest Observed Tide
Min Tide Date & Time	03/08/2004 07:06	Lowest Observed Tide Date & Time
HAT	2.61	Highest Astronomical Tide
HAT Date & Time	10/27/2011 12:36	HAT Date and Time
LAT	-3.12	Lowest Astronomical Tide
LAT Date & Time	01/31/2014 06:30	LAT Date and Time

From Figure 2, the linear relative sea level trend for this gauge is 3.55 mm/yr (0.0116 ft/yr) with a 95% confidence interval of +/- 0.34 mm/yr (0.0011 ft/yr) based on monthly mean sea level data. For the 50-year analysis of 2025 to 2075 this is equivalent to an increase of 0.178 m (0.582 ft) in sea level. For the 100-year analysis of 2025 to 2125 this is equivalent to an increase of 0.355 m (1.165 ft). Regional sea level trends for stations on the central east coast are shown in Figure 3. Stations directly to the north of the project location show a higher sea level trend, while stations directly to the south show a lower sea level trend.

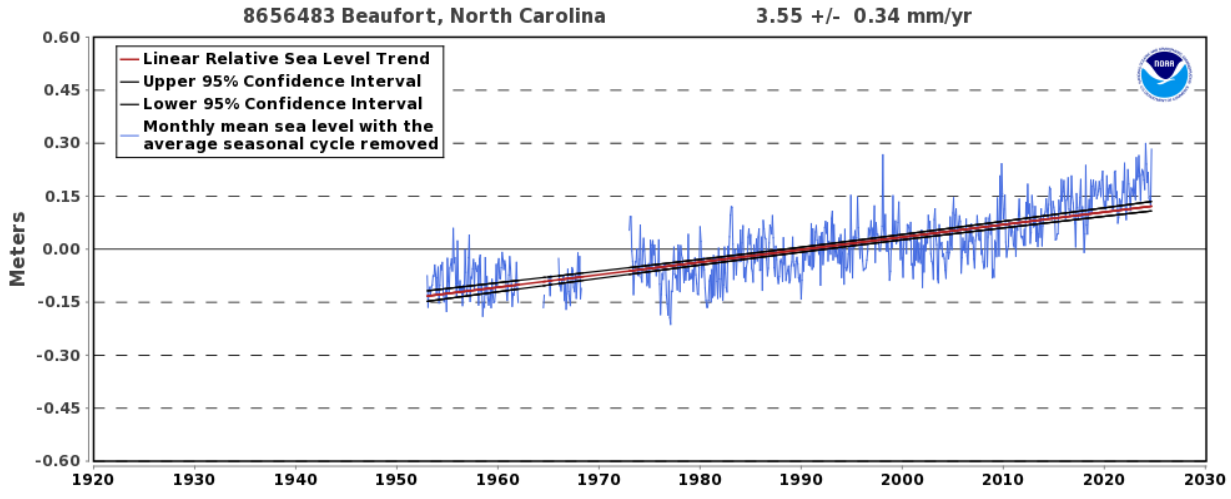


Figure 2. Relative Sea Level Trend, NOAA Gauge 8656483

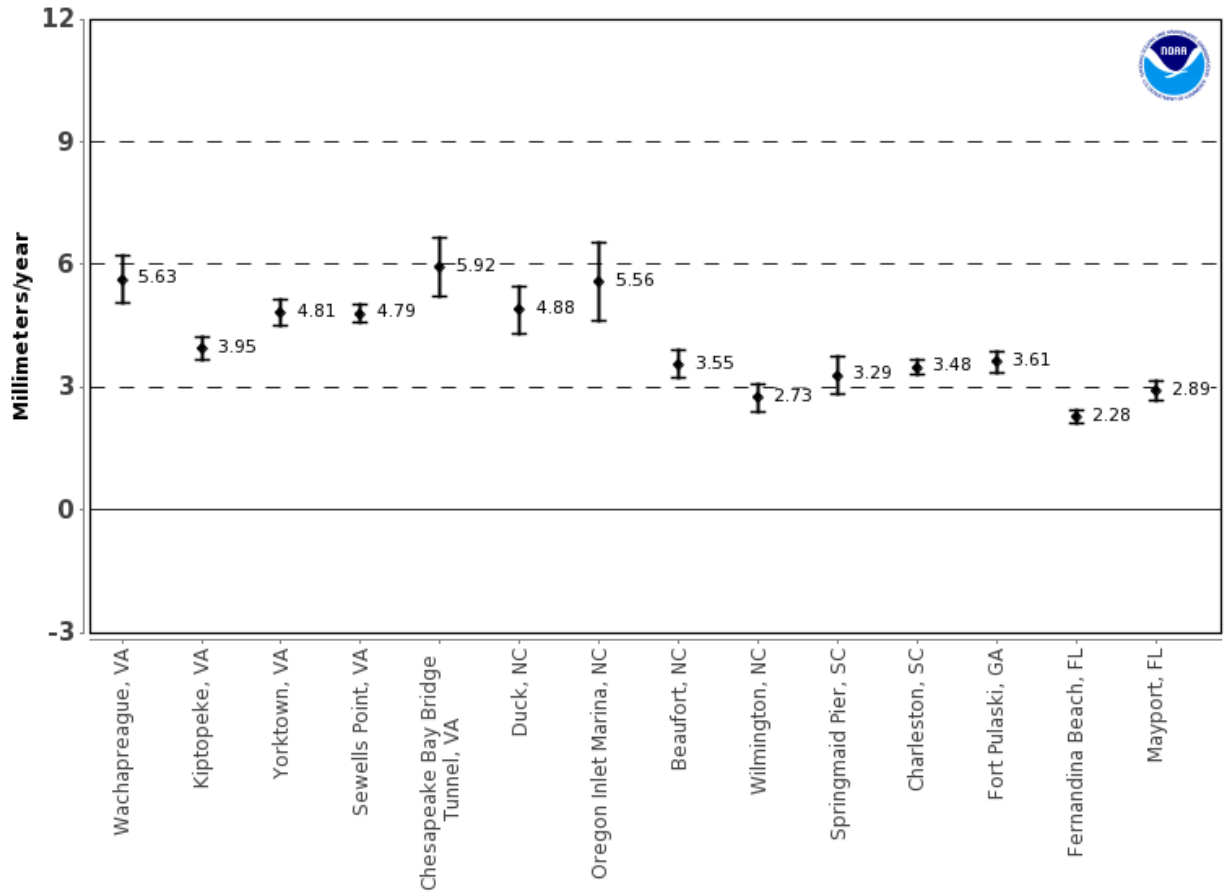


Figure 3. Regional Sea Level Trends

The second step in evaluating SLC was to assess future trends, mainly in potential changes in sea level based on each of the three USACE projection. The USACE online Sea Level Analysis Tool (SLAT) was used to determine the current rate of SLC observed and the projected future trends in the rate of SLC. A link to the tool is provided below. Extreme water levels (EWL) incorporated into the tool are based on statistical probabilities using recorded historic monthly extreme water level values. The SLAT is used to compare actual mean sea level (MSL) values and trends for specific NOAA tide gauges with the USACE SLC scenarios as described in ER 1100-2-8162 and Engineering Pamphlet (EP) 1100-2-1. The SLAT calculates the USACE Low, Intermediate, and High sea level change scenarios based on global and local change effects. Historical MSL is represented by either 19-year or 5-year midpoint moving averages. Guidance in using the SLAT and technical background is provided in USACE “Sea Level Analysis Tool (SLAT) – Technical Documentation”.

https://climate.sec.usace.army.mil/slat/technicaldocumentation/

The SLAT was used to evaluate the NOAA gauge data from Beaufort, NC. The regionally corrected rate of 3.55 mm/yr (0.14 in/yr) was used as the rate of SLC and was sourced from Technical Report NOS CO-OPS 065 (Zervas et al., 2013) and accounts for vertical land motion. This regional rate is also the Low USACE estimated SLC rate. Figure 4 presents the results of the SLAT focused on trends between 1992 to 2025. The purple line represents the 5-year moving average and the heavy yellow line represents the 19-year moving average. The 19-year average is useful in that this represents the moon's metonic cycle and the tidal datum epoch. These estimates are referenced to the midpoint of the latest National Tidal Datum epoch, 1992. The reader is referred to ER 1100-2-8162 for a detailed explanation of the procedure, equations employed, and variables included to account for the eustatic change as well as site specific uplift or subsidence to develop corrected rates. The dashed red line is the High SLC prediction, the dashed blue line is the Intermediate and the dashed cyan line is the Low rate prediction. From Figure 4, it can be noted that both the 19-year moving average and the 5-year moving average are above the intermediate projection and are both sloping upward.

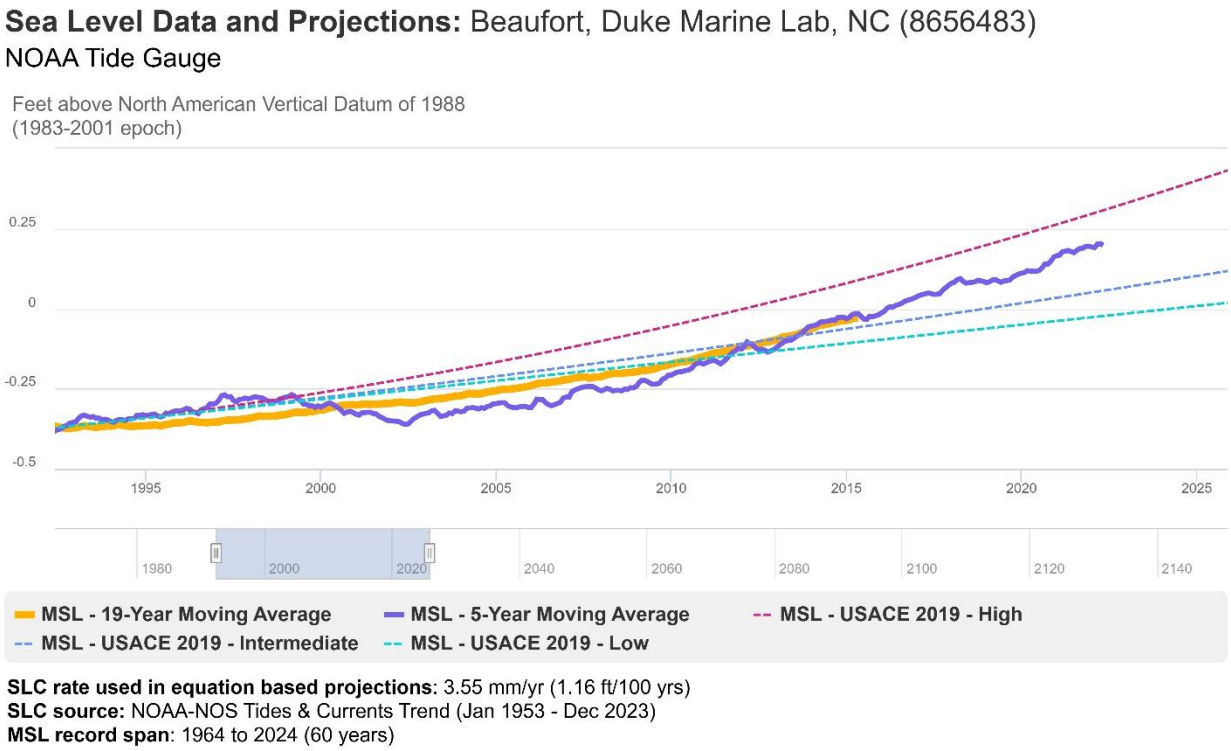


Figure 4. Beaufort NOAA Gauge #86611070 SLC with 19-Year and 5-Year Moving Average

The future USACE sea level predictions for Hatteras Inlet based on the Beaufort gauge are provided in Table 2. For the 2025 to 2075 period, the predicted Low rate sea level change

(regional rate) is +0.58 ft, the Intermediate SLC was +1.09 ft, and the High SLC was +2.71 ft. For the 2025 to 2125 period, the predicted Low rate sea level change is +1.16 ft, the Intermediate SLC was +2.63 feet and the High SLC was +7.28 ft. The future SLC curves are shown in Figure 5 and Table 2.

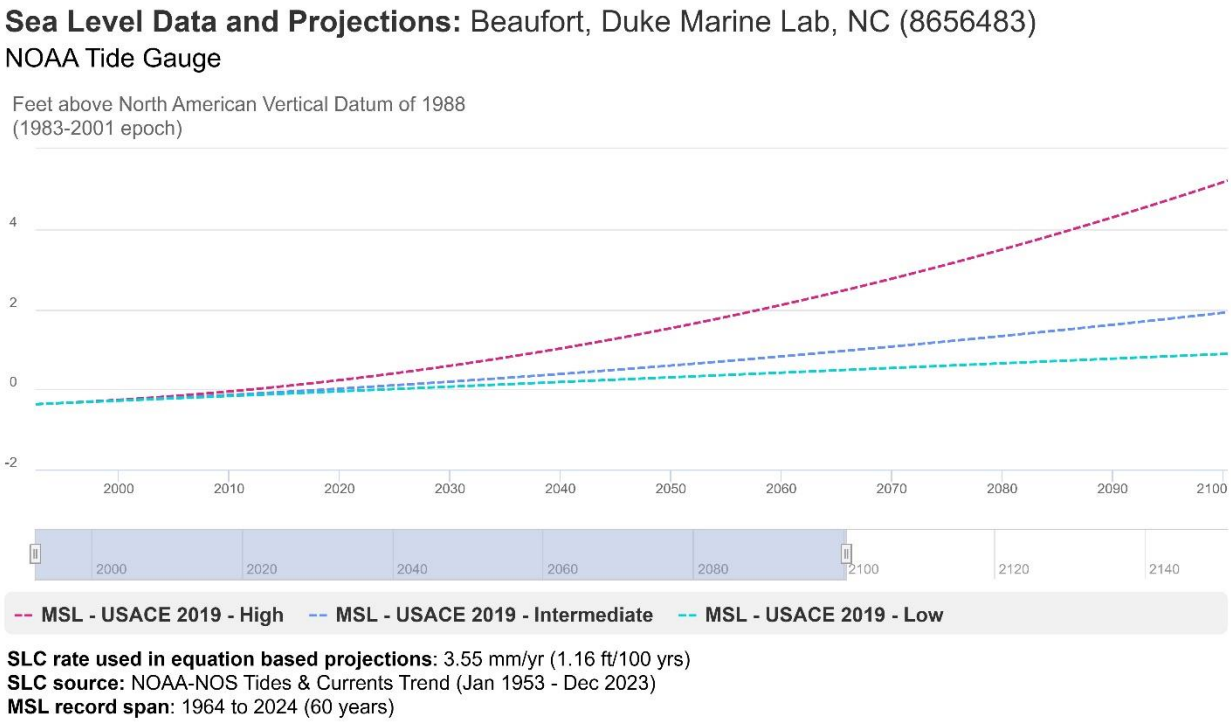


Figure 5. Beaufort, Duke Marine Lab Gauge USACE Sea Level Change Projections, 1992 to 2100.

Table 2. USACE 50-Year and 100-Year Sea Level Change Estimates (ft, NAVD88)

Year	Low	Intermediate	High
2024	0.00	0.09	0.36
2025	0.01	0.10	0.40
2035	0.13	0.29	0.79
2045	0.24	0.49	1.26
2055	0.36	0.71	1.81
2065	0.47	0.94	2.42
2075	0.59	1.20	3.11
2085	0.71	1.47	3.88
2095	0.82	1.76	4.72
2105	0.94	2.07	5.63

2115	1.06	2.39	6.62
2125	1.17	2.73	7.68
50-Year Increase	**0.58**	**1.09**	**2.71**
100-Year Increase	**1.16**	**2.63**	**7.28**

Although the projections can range significantly in the predicted magnitude of sea level change, they all agree that the sea level will increase as time progresses. This should be taken into consideration when designing and implementing long term coastal projects. Barrier island features, such as beaches and bird island placement areas addressed in this EA, are likely to experience higher water levels causing beach erosion and opening of new or changing of alignments of existing inlets during larger storm events.

1 References

---. (2013). *Incorporating Sea Level Change in Civil Works Programs Engineering Regulation 1100-2-8162.* Washington, DC: U.S. Army Corps of Engineers.

---. (2014). *Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation Engineering Technical Letter 1100-2-1.* Washington, DC: U.S. Army Corps of Engineers.

USACE. (2023). *Sea Level Analysis Tool (SLAT)*. Retrieved from USACE Climate Preparedness and Resilience: https://climate.sec.usace.army.mil/slat/