APPENDIX A: FIGURES

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National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 1. Cape Hatteras National Seashore

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

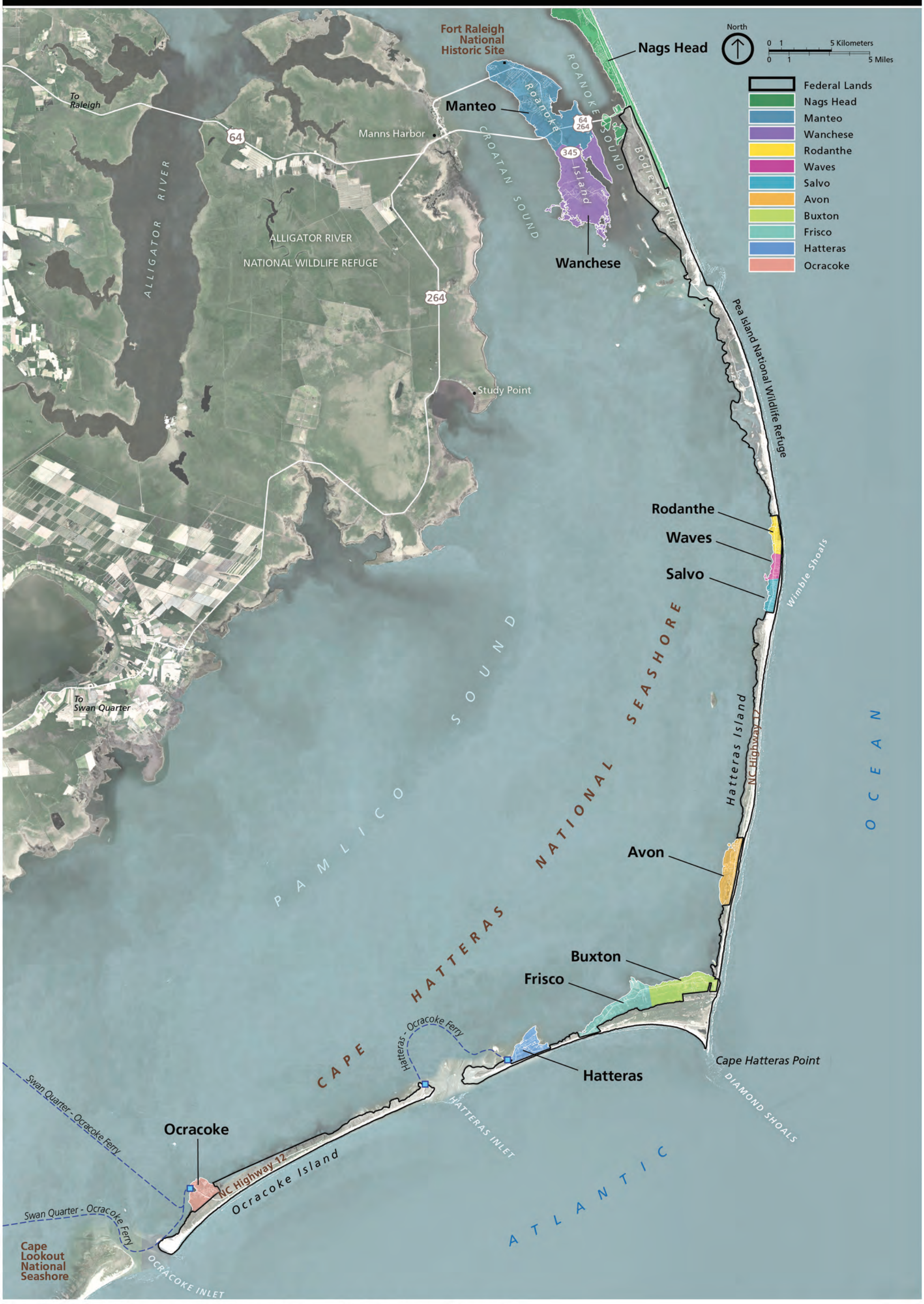

Figure 2. Map of Developed Communities and Federal Land Boundary

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 3. Areas of Likely Sediment Management Activities Under the Proposed Action (North)

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 5 Kilometers

0 1 5 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

OCEAN

ATLANTIC

Avon

Fishing pier

NC Highway 12

Hatteras Island

Haulover Day use area

Buxton

Frisco

Hatteras

Existing Groins

Hatteras - Ocracoke Ferry

Cape Hatteras Point

DIAMOND SHOALS

HATTERAS INLET

Ocracoke

NC Highway 12

Ocracoke Island

Swan Quarter - Ocracoke Ferry

Swan Quarter - Ocracoke Ferry

Cape Lookout National Seashore

OCRACOKE INLET

Figure 4. Areas of Likely Sediment Management Activities Under the Proposed Action (South)

Figure 5. Hopper-style dredge (Image credit: CSE)

Figure 6. Aerial of onshore beach nourishment setup depicting elbow pipe (Image credit: CSE)

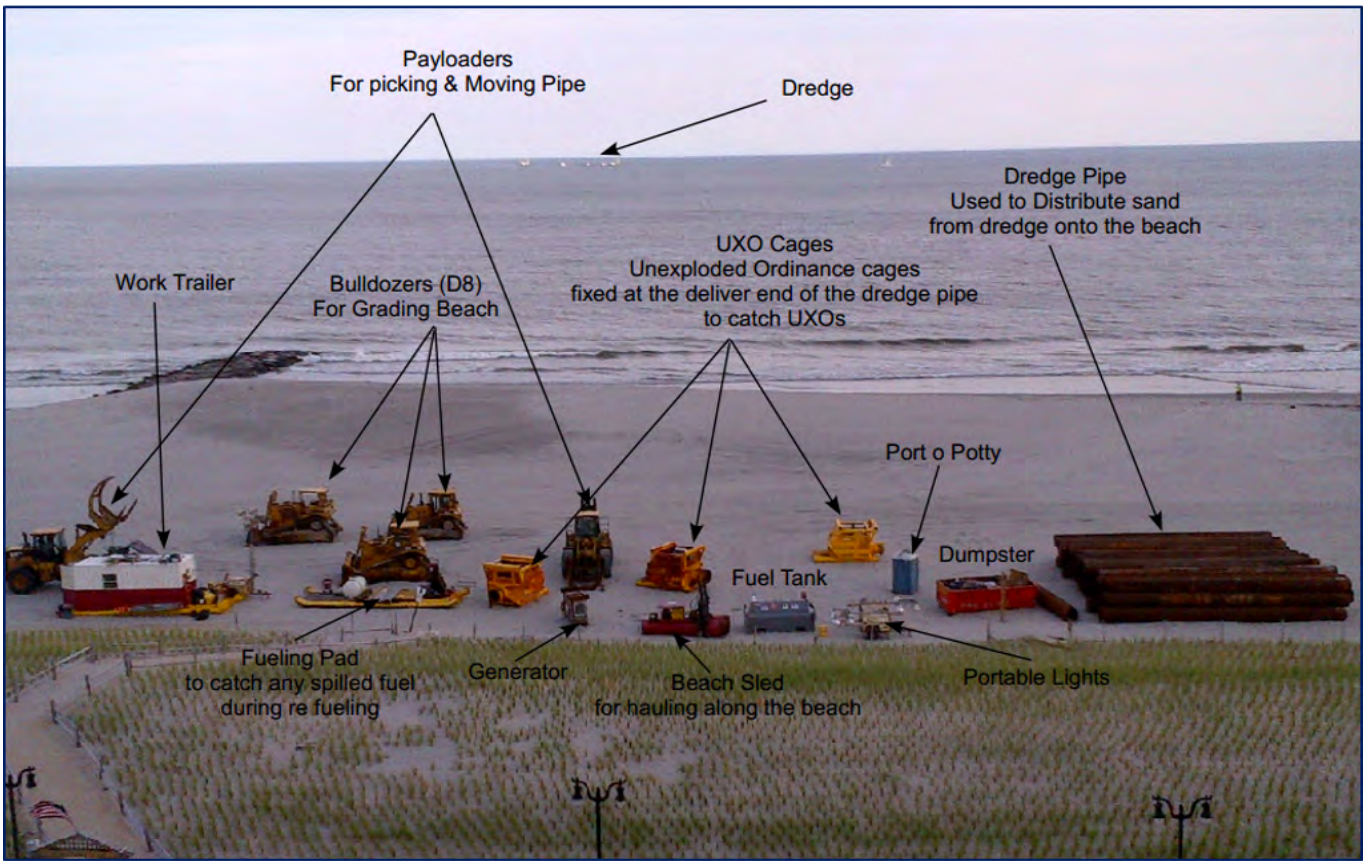

Figure 7. Ground-based perspective of beach nourishment onshore setup (Image credit: CSE)

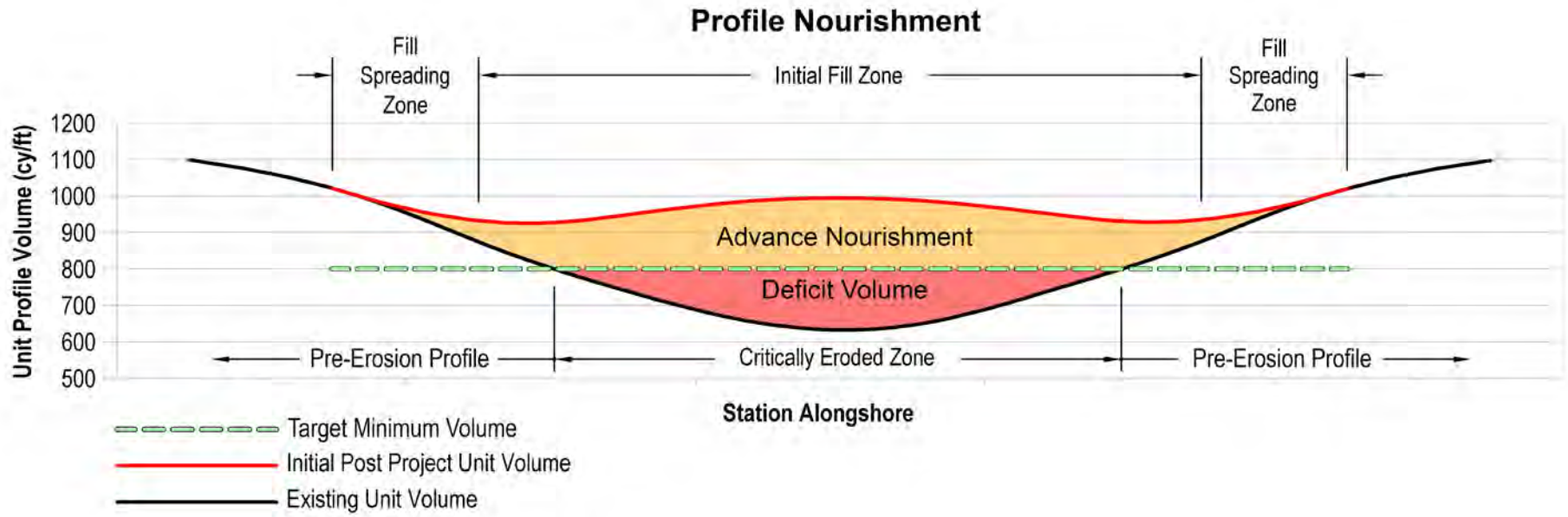

Figure 8. This figure illustrates how profile nourishment is planned. Nourishment volumes are determined by using survey data to calculate the volume needed to reach some minimum ideal beach size (shown with a green dashed line above). By identifying local deficits in beach volume (solid black line), project planners may determine the amount of sand to place at particular portions of the Seashore (solid red line). This method allows planners to compensate for the deficit in beach volume at a site (red shaded region labeled 'Deficit Volume') as well as place excess volumes to compensate for future anticipated erosion (orange shaded region labeled 'Advance Nourishment') (CSE 2015).

Figure 9. Oregon Inlet Aerial Map

SOUTH ATLANTIC COASTAL STUDY (SACS) SAND STUDY

Borrow Area Categories

Category	Confidence	Description
Proven	90%	Resource areas with beach-quality sand whose thickness and lateral extent have been fully determined through design-level geotechnical data and in most cases are permitted.
Potential	70%	Resource areas with beach-quality sand whose existence has been verified through preliminary geotechnical and geophysical data (with vibracores approximately one mile apart). Thickness and/or lateral extent has been preliminarily determined.
Unverified Plus	can vary from 5% - 30%*	Resource areas hypothesized to exist on the basis of geophysical evidence (seismic profiles, bathymetry, or side scan sonar) and at least one geotechnical core or surficial samples verifying beach-quality sand.
Unverified	0%	Resource areas hypothesized to exist on the basis of indirect evidence for the presence of beach-quality sand.
Unusable	0%	Unusable for one or more of the following reasons: 1. All beach-compatible material has been removed from the area prior to the SAND Study, 2. The Sand source is inaccessible due to current conditions. 3. Area was investigated and the presence of non-beach quality material throughout the area was verified.

*Confidence level for Unverified Plus borrow areas varies based on the density of the available geophysical and geotechnical data. This study provides the estimated volumes of Unverified Plus borrow areas, but considers them as non-volume contributing for the summary tables.

Figure 10. South Atlantic Coastal Study Area Sand Study Preliminary Borrow Area Categories (USACE 2020b)

SOUTH ATLANTIC COASTAL STUDY (SACS) SAND STUDY

SAW – Dare County (North), NC

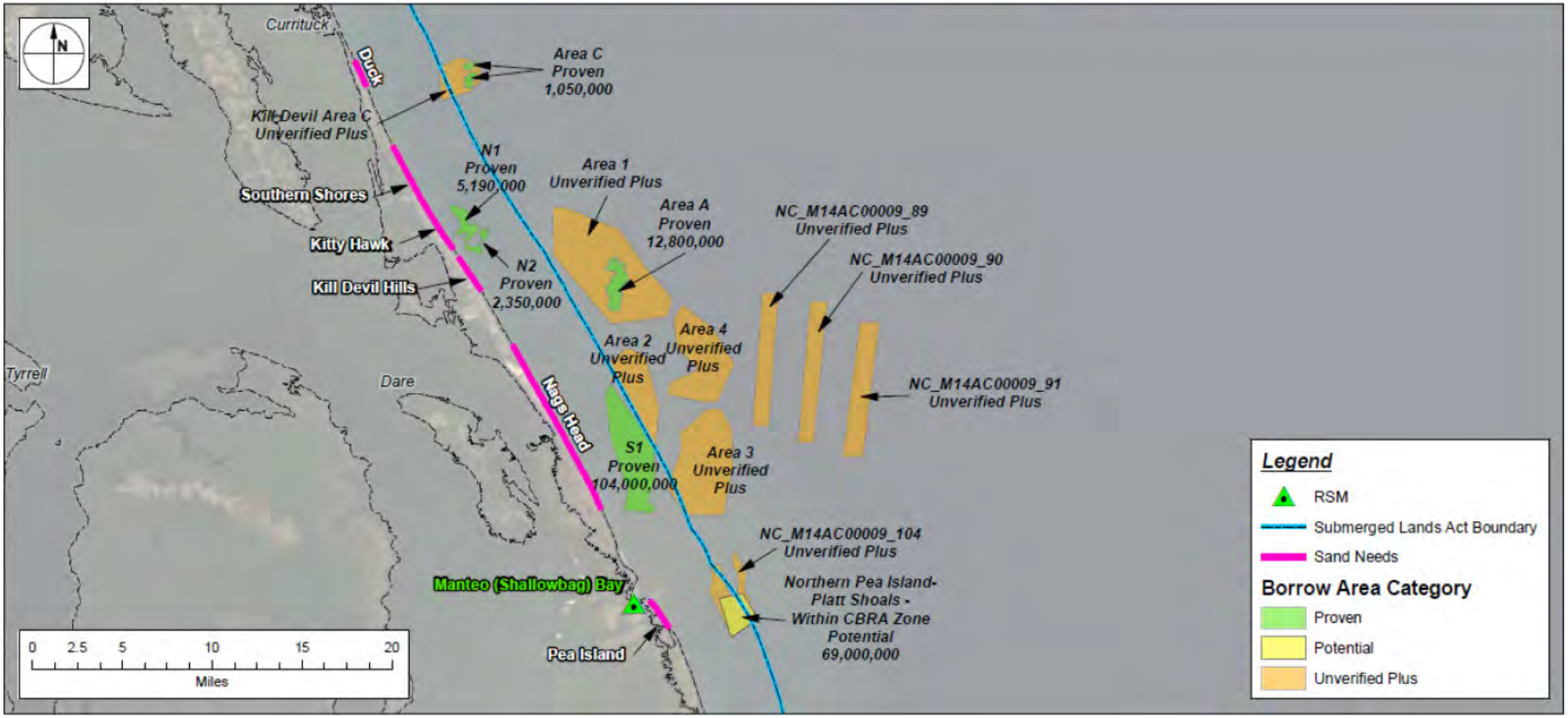

Figure 11. South Atlantic Coastal Study Area Sand Study (SAW) Preliminary Borrow Area Locations – Dare County (North), NC (USACE 2020b)

SOUTH ATLANTIC COASTAL STUDY (SACS) SAND STUDY

SAW – Dare County (South), NC

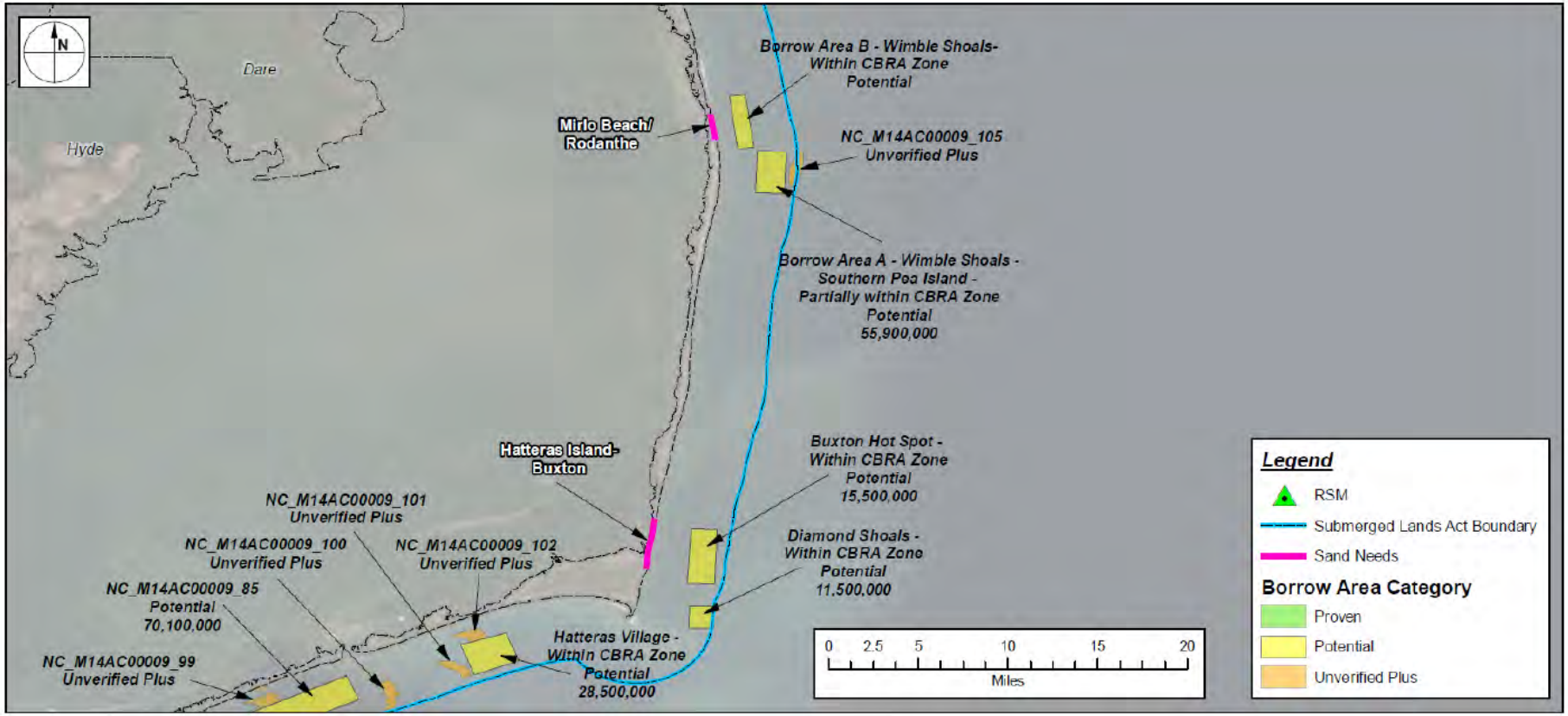

Figure 12. South Atlantic Coastal Study Area Sand Study (SAW) Preliminary Borrow Area Locations – Dare County (South), NC (USACE 2020b)

SOUTH ATLANTIC COASTAL STUDY (SACS) SAND STUDY

SAW – Hyde County, NC

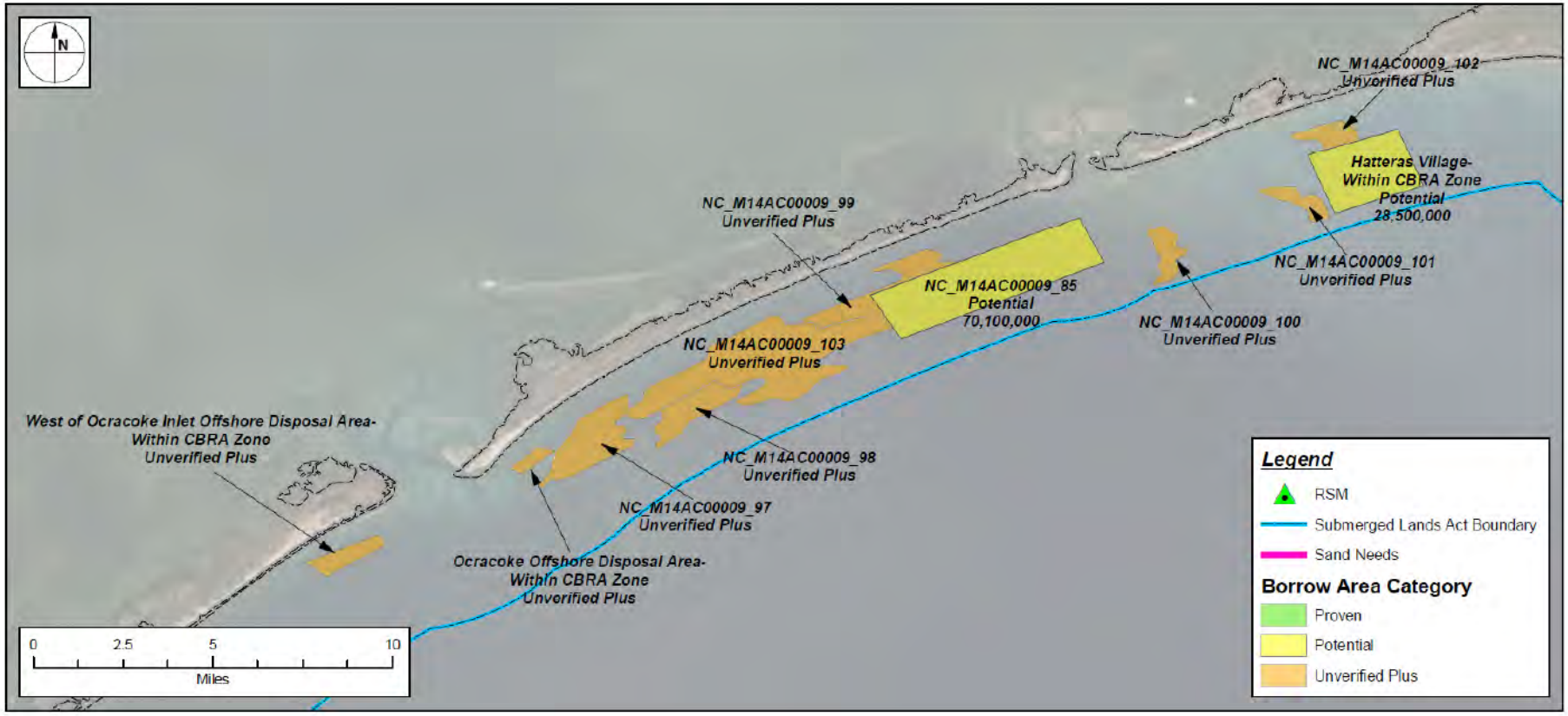

Figure 13. South Atlantic Coastal Study Area Sand Study (SAW) Preliminary Borrow Area Locations – Hyde County, NC (USACE 2020b)

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 14. Areas of Likely Sediment Management Activities Under Alternative C

Figure 15. Cape Hatteras Point is an accreting cuspate foreland where sediments are dynamically eroded and deposited. This coastal feature is subject to rapid change, especially during storm events. The left panel faces north, while the right panel faces west. (Image credit: CSE, September 10, 2014)

Figure 16. A view of the oceanfront just south of the Avon Pier. (Image credit: VHB, October 15, 2019)

Figure 17. Aerial image of existing groins near Buxton. (CSE 2019)

Figure 18. Ground photo looking south at two of the groins at the former location of the Cape Hatteras Lighthouse. The structures extend into the ocean from right to left and are constructed of pre-cast concrete sheet piles linked by timber whalers. Some sheets have collapsed or washed out as indicated by the gaps in the structure along the top edge of the image. (Image credit: CSE, November 4, 2013)

Figure 19. Oblique aerial photograph looking north along the Buxton area with the relocated Cape Hatteras Lighthouse at the lower left side of the image and the Village of Avon at the top right corner of the image. White foam lines of breaking waves over the near shore bar parallel the beach. The east-facing shoreline bulges seaward in the middle of the image. This bulge marks the location of three groins fronting the former US Naval Facility and former location of the Cape Hatteras Lighthouse. The salient (bulge) visible to the north (upper right) is Rodanthe and Salvo. (Image credit: USACE–Wilmington District, September 9, 2000)

Figure 20. Utility poles along NC 12 are inundated by sound side waters. (Image credit: VHB, October 15, 2019)

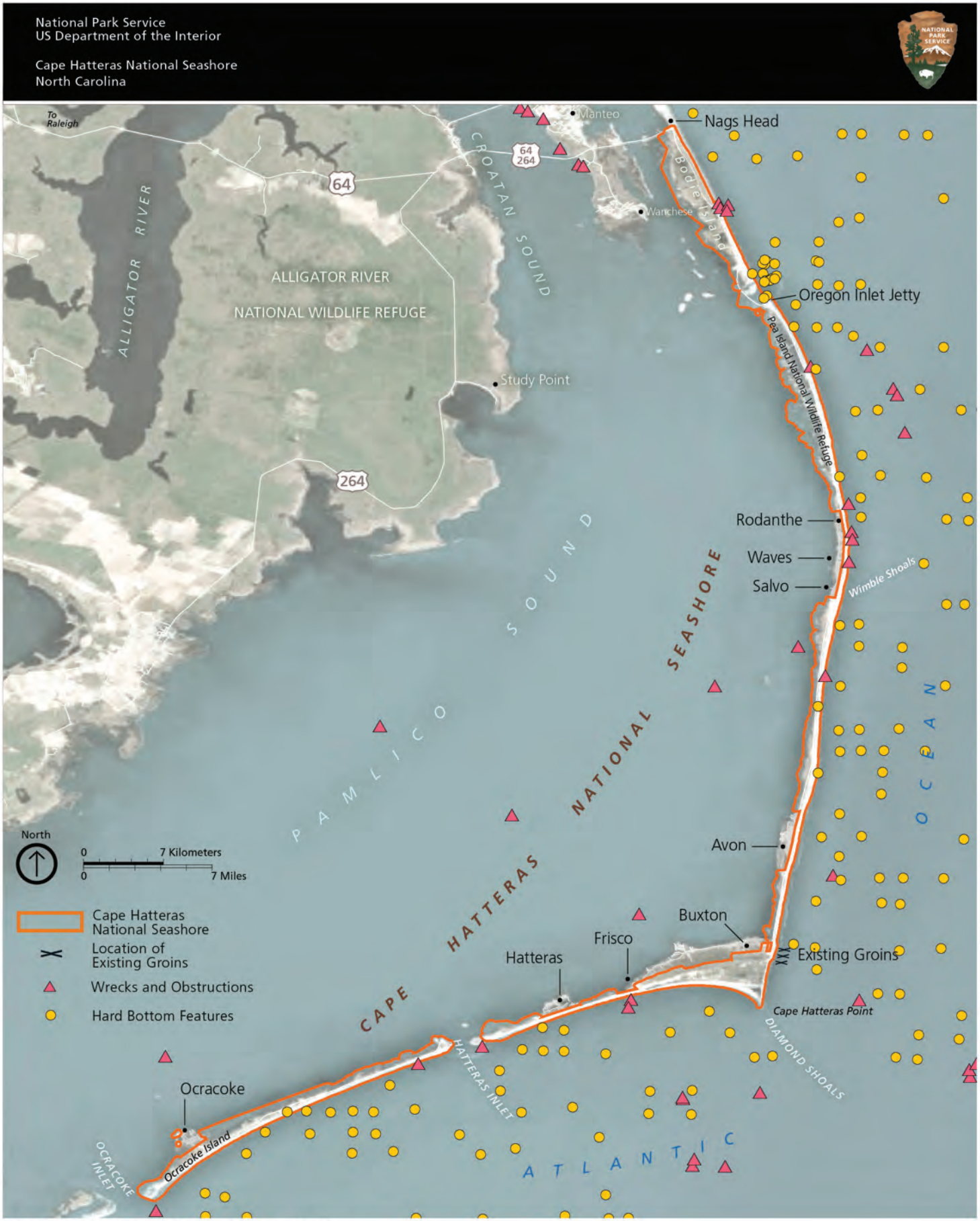

Figure 21. Hard Bottom Features

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 22a. Sea Turtle Nests

Please note that this map only represents NPS nesting data at Pea Island National Wildlife Refuge

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 22b. Sea Turtle Nests

Please note that this map only represents NPS nesting data at Pea Island National Wildlife Refuge

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 22c. Sea Turtle Nests

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 22d. Sea Turtle Nests

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 2 Kilometers

0 2 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Turtle Nest

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

Ocracoke

NC Highway 12

Ocracoke Island

HATTERAS INLET

OCRACOKE INLET

Cape Lookout National Seashore

Figure 22e. Sea Turtle Nests

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 23a. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

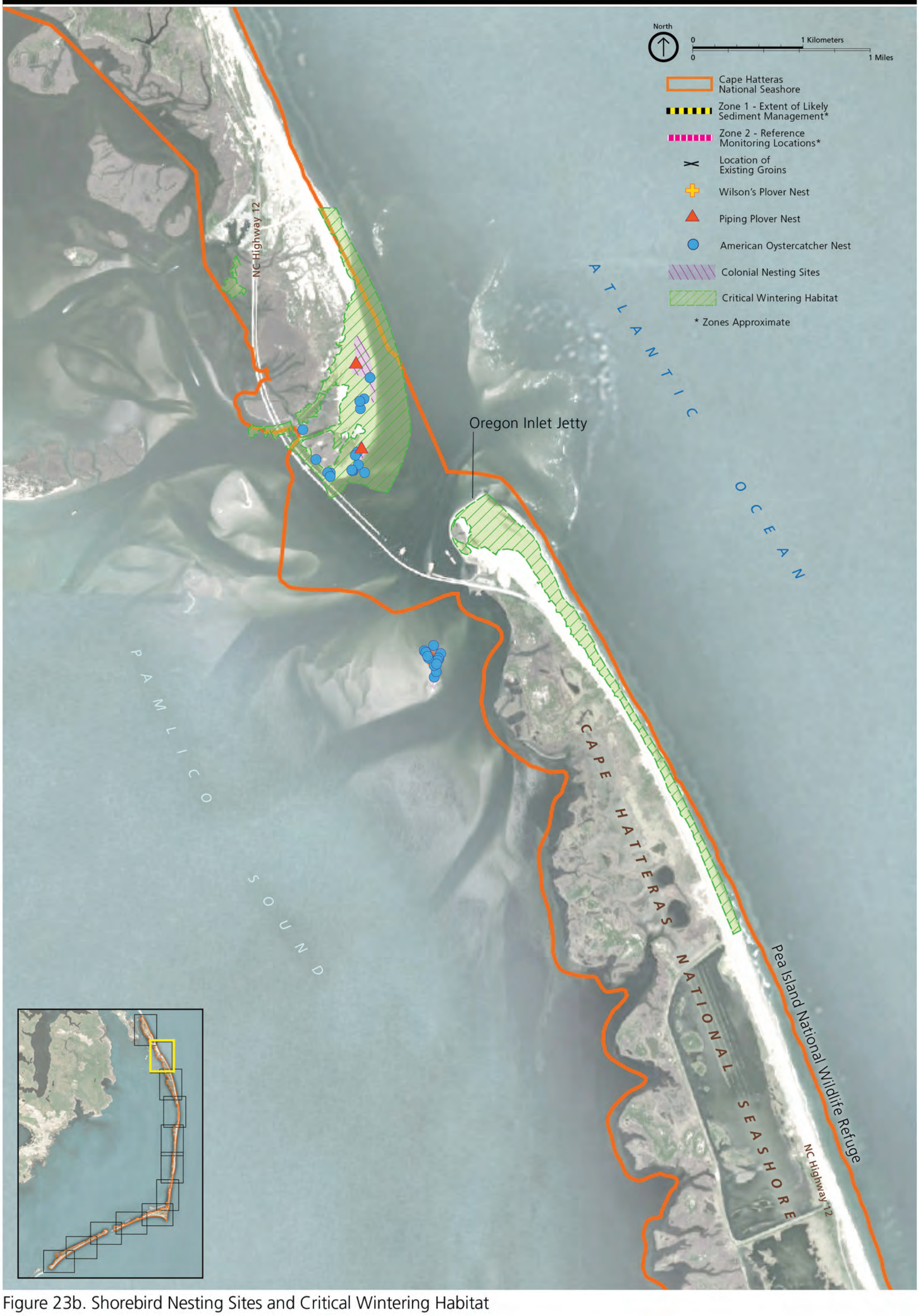

Figure 23b. Shorebird Nesting Sites and Critical Wintering Habitat

Please note that this map only represents NPS nesting data at Pea Island National Wildlife Refuge

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 Kilometers

0 1 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

NC Highway 12

Pea Island National Wildlife Refuge

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

PAMLICO SOUND

NC Highway 12

Figure 23c. Shorebird Nesting Sites and Critical Wintering Habitat

Please note that this map only represents NPS nesting data
at Pea Island National Wildlife Refuge

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 Kilometers

0 1 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

NC Highway 12

Mirlo Beach

Rodanthe

Waves

Salvo

Salvo
Day use area

NC Highway 12

Wimble Shoals

Figure 23d. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 Kilometers

0 1 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

NC Highway 12

Hatteras Island

NC Highway 12

Figure 23e. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 Kilometers

0 1 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

NC Highway 12

Avon

Fishing pier

Figure 23f. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 1 Kilometers

0 1 Miles

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

ATLANTIC OCEAN

NC Highway 12

Haulover
Day use area

Buxton

NC Highway 12

Existing Groins

Figure 23g. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 23h. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

North

0 2 Kilometers

0 2 Miles

PAMLICO SOUND

CAPE HATTERAS NATIONAL SEASHORE

Frisco

Hatteras

NC Highway 12

Hatteras Island

ATLANTIC OCEAN

Cape Hatteras National Seashore

Zone 1 - Extent of Likely Sediment Management*

Zone 2 - Reference Monitoring Locations*

Location of Existing Groins

Wilson's Plover Nest

Piping Plover Nest

American Oystercatcher Nest

Colonial Nesting Sites

Critical Wintering Habitat

* Zones Approximate

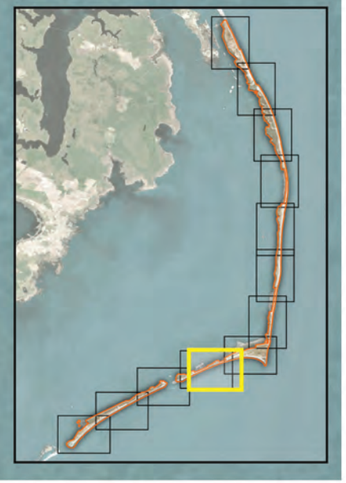

Figure 23i. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 23j. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 23k. Shorebird Nesting Sites and Critical Wintering Habitat

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 23l. Shorebird Nesting Sites and Critical Wintering Habitat

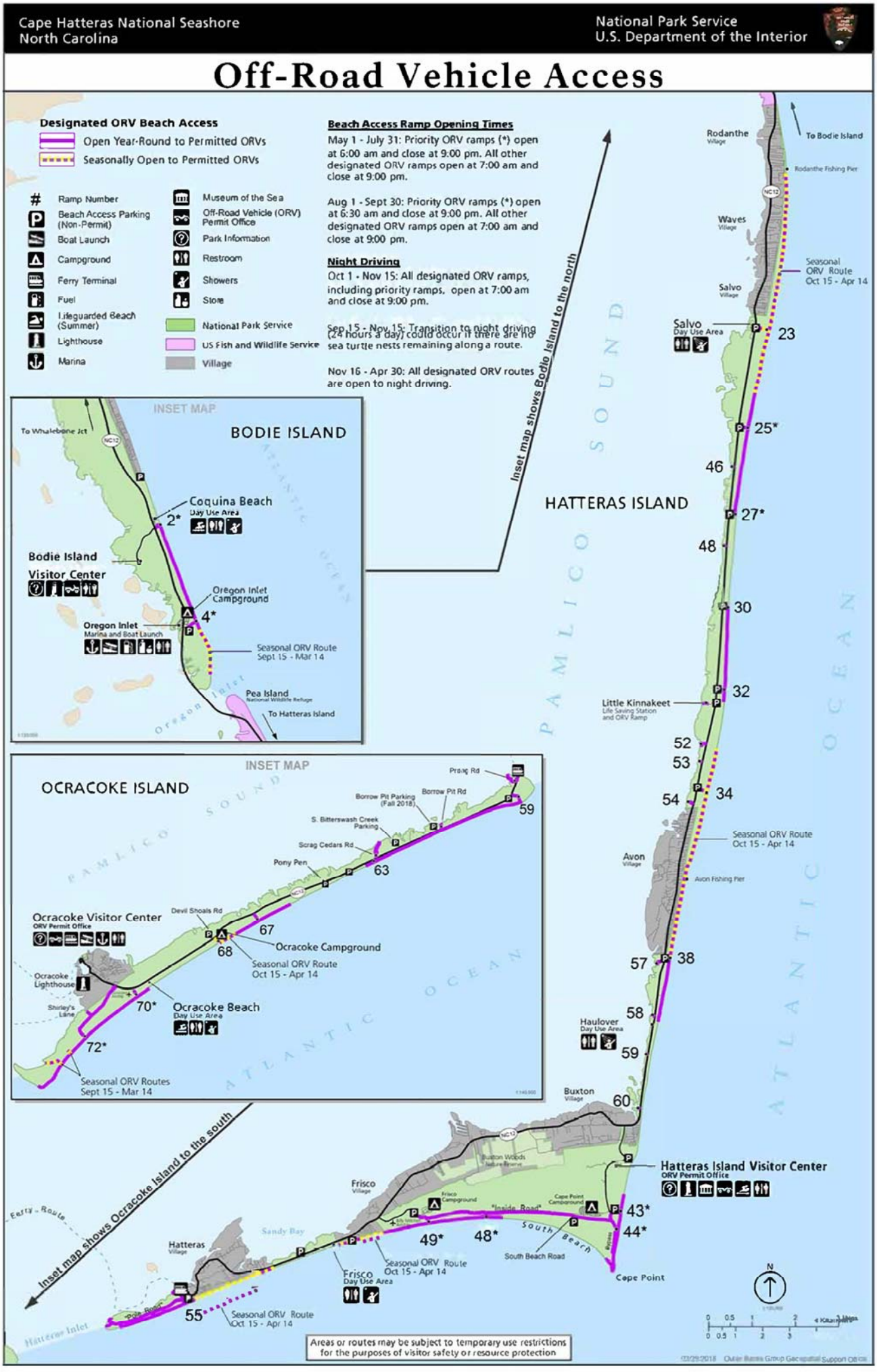

Figure 24. Off-Road Vehicle Access

Figure 25. Considerable beachfront erosion affects private property (Image credit: VHB, October 15, 2019)

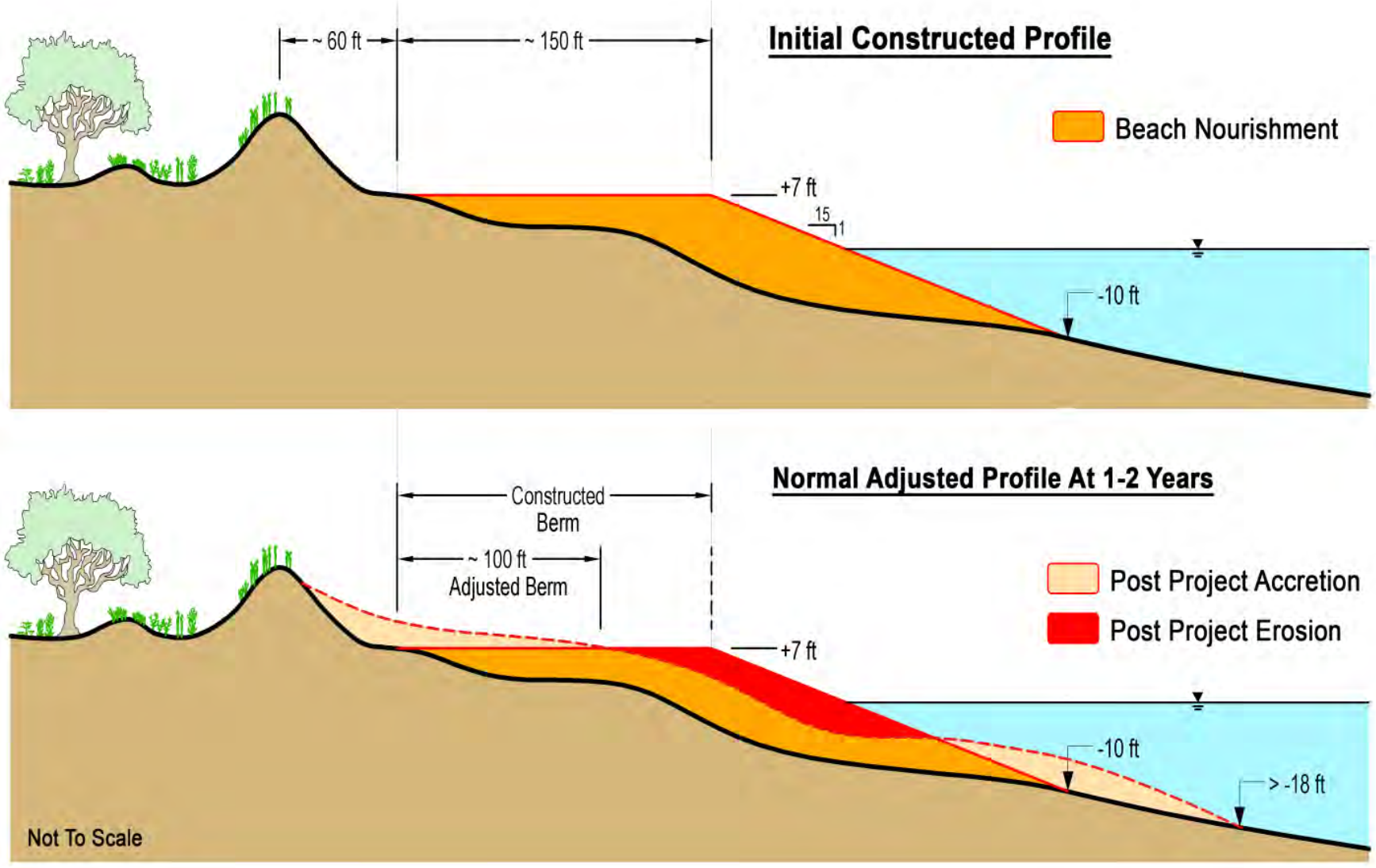

Figure 26. Idealized Initial Nourishment Profile for Sand Placement Seaward of the Foredune and Upper Beach (CSE 2015)

National Park Service
US Department of the Interior

Cape Hatteras National Seashore
North Carolina

Figure 27. Submerged Aquatic Vegetation

APPENDIX B:
STATE AND FEDERAL
PERMITS, LICENSES, AND APPROVALS

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STATE AND FEDERAL PERMITS, LICENSES, AND APPROVALS

This framework/EIS would provide environmental compliance necessary for the issuance of a SUP by the NPS. In order to implement a project under this framework/EIS, project proponents or applicants would be required to submit a SUP application to the NPS outlining project-specific details, adherence to project design criteria (as defined in the 2020 SARBO), and mitigation measures required by the NPS and other agencies. The NPS maintains the discretion to approve or deny future SUP applications. In addition to a permit from the NPS, the project proponent or applicant may also be required to obtain permits from the other federal agencies and the State of North Carolina before project approval.

Sediment management activities may require work within waters of the US and would therefore likely be subject to permitting under Section 401 and 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. These actions would be subject to individual permits (not general permits).[9] USACE procedures for issuing Section 404 and Section 10 permits require compliance with NEPA and many of the same related compliance and approvals to which NPS is subject. If dune nourishment and sand relocation take place as a standalone action (i.e., does not require dredging), perhaps following storm events, and sediment is trucked in from a borrow site, it may fall outside of the jurisdiction of the USACE and may not require subsequent permitting or NEPA compliance.

Clean Water Act (Section 401)

In North Carolina, North Carolina Division of Water Resources (NCDWR) administers the Clean Water Act Section 401 Certification. This permit is required for any federally permitted or licensed activity that may result in a discharge to waters of the US. This permit certifies that the project would not degrade state waters or violate state water quality standards. The NCDWR must review the proposed project and issue a 401 Certification prior to state or federal permits for construction involving discharge to waters of the US (NCDEQ 2019b). This certification would be granted during the Section 404 permit process for each individual project. Because it will require a project-specific review, certification would take place separately from the NPS NEPA process, by the project proponent.

Clean Water Act (Section 404)

The USACE is responsible for issuing Section 404 permits, which are required for the discharge of fill materials into streams, wetlands, and other waters of the US. Elements of a proposed project may impact waters of the US as defined by the Clean Water Act and would therefore be subject to review and permitting by USACE. A Section 404 permit cannot be granted until:

- A Section 401 certification is obtained or waived;
- The action complies with Section 404(b)(1) as the least environmentally damaging practicable alternative;
- A Coastal Area Management Act (CAMA) permit is received from the state;
- Consultation with the SHPO under the National Historic Preservation Act is complete;

[9] The USACE authorizes activities under either general or individual permits. General permits apply to activities the USACE has determined are substantially similar in nature and cause minimal environmental impact, individually and cumulatively. The USACE performs an expedited review for projects falling within these general permit categories. If a project does not fall under the criteria for a general permit, project sponsors must submit an application for an individual permit.

- Consultation with the FWS under the ESA is complete;
- Consultation with the NMFS under the ESA, the MMPA, and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is complete; and
- NEPA analysis is complete.

Permit issuance may be conditioned on the completion of a Biological Opinion (BO) by FWS on activities that are proposed to occur when and where protected species may be present. The permit may also be subject to existing BOs issued by the NMFS. Section 404 permitting would occur after the NPS NEPA process is complete and will require a project-specific NEPA process led by the USACE. USACE will conduct project specific consultation with the SHPO, FWS, and NMFS under the laws listed above.

Coastal Zone Management Act

The federal Coastal Zone Management Act (CZMA) requires federal actions that have reasonably foreseeable effects on coastal resources to be consistent with the state's approved coastal management program (NOAA 2019c). This act, administered by the National Oceanic and Atmospheric Administration (NOAA), directs the management of the nation's coastal resources, with the goal to "preserve, protect, develop and where possible, to restore or enhance the resources of the nation's coastal zone." For federal agency activities in which the federal agency is funding the federal action that affect coastal uses or resources, the federal agency would provide the state—in this case NCDCM—with a federal consistency determination (NOAA 2019d). Following this, the state will issue a decision within 60 days of receipt on whether to concur with the determination (NOAA 2018). Obtaining concurrence of a federal consistency determination is anticipated to take place during this NPS NEPA process.

North Carolina Coastal Area Management Act

In addition to reviewing federal consistency determinations under the CZMA, the NCDCM administers the state's CAMA process and must review a project prior to issuance of a major CAMA permit. NCDCM requires a permit application and supporting documents under NEPA in parallel with a federal permit application. A project proponent may be required to obtain a CAMA permit for an activity that triggers a NCDCM review. The North Carolina Department of Environmental Quality (NCDEQ) is the overall coordinating state agency responsible for soliciting review and comment on the proposed action from relevant state resource agencies or divisions of NCDEQ, including the NCDCM, Division of Marine Fisheries, NCDWR, and Wildlife Resources Commission (NCWRC). North Carolina permitting and consultation would occur concurrently with the Section 404 permitting process for each individual project. In addition to individual projects submitted for review, NPS will submit the Sediment Management Framework EIS to the NCDCM for review and concurrence.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act is administered by USACE, and approval is required for the construction of any structure in or over navigable waters of the US. This rule also regulates the placement or removal of structures, dredge work, disposal of dredged material, filling and excavation, and any other disturbance of soils/sediments or modification of a navigable waterway. It further regulates any permanent or semi-permanent obstacle or obstruction (USACE 2019). Similar to Section 404 permits, a Section 10 permit cannot be granted until:

- A Section 401 certification is obtained or waived;
- A CAMA permit is received from the state; and
- A NEPA analysis is complete.

Section 10 permitting would occur for individual projects before the issuance of a SUP, where appropriate, after the NPS NEPA process. Actions in Section 10 waters may require a project-specific NEPA process overseen by the USACE. Similarly, if actions would take place in proximity to federal navigation channels, compliance with 33 USC, Section 408 would be required and would be coordinated through USACE.

Outer Continental Shelf Lands Act

The Secretary of Interior is responsible for the administration of mineral exploration and development of the OCS. Under Section 8(k) of the OCSLA, dredging of sediment resources within the OCS requires authorization by BOEM. PublicLaw 102-426 (43 United States Code [USC] 1337[k][2]), enacted October 31, 1994, gave BOEM the authority to negotiate, on a noncompetitive basis, the rights to OCS sand, gravel, and shell resources for shore protection projects; beach or wetlands restoration projects; or for use in construction projects funded in whole or part by or authorized by the federal government.

Prior to dredging offshore sand resources in federal waters, project proponents would obtain a lease from BOEM in accordance with BOEM procedures/requirements. BOEM published regulations on October 3, 2017 that define the process used by the Marine Minerals Program for issuing negotiated, noncompetitive agreements for sand, gravel, and shell resources on the OCS (https://www.boem.gov/82-FR-45962/).

Marine Mammal Protection Act and Magnuson-Stevens Fishery Conservation and Management Act

As a condition of any federal permits, the project proponent, through the USACE, must consult with NMFS under the MMPA and the Magnuson-Stevens Act. The MMPA is the primary law governing marine fisheries management in the federal waters. The MMPA places a moratorium on the taking of marine mammals (with certain exceptions) (NOAA 2019e). In the MMPA, take is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill" a species protected by the MMPA. Consultation may be required if a federal agency authorizes, funds, or undertakes part or all of a proposed activity (i.e., if a project requires a federal permit, then the federal agency issuing the permit must consult with NOAA Fisheries). Consultation would occur concurrently with NMFS Section 7 consultation during Section 404 permitting for each individual project proposed. It may also occur during the NPS NEPA process.

The Sustainable Fisheries Act of 1996 identified the contribution of habitat loss and degradation on fishery declines and amended the Magnuson-Stevens Act to create a program to protect EFH. The Magnuson-Stevens Act (Section 305[b][2]) mandates that all federal agencies consider the potential impacts of their activities on EFH, and NMFS is required to provide EFH conservation recommendations when an activity is expected to adversely impact EFH (NOAA 2007). Consultation under the Magnuson-Stevens Act would occur during the Section 404 permitting process for each individual project and may occur during the NPS NEPA process. NPS will provide the appropriate offices of NMFS with notification of the Sediment Management Framework EIS and will outline how future compliance would be addressed as part of follow-on Section 404 permitting for individual projects, where detailed project specifics would allow a more complete analysis.

Endangered Species Act

Section 7 of the ESA requires that any federal agency taking a discretionary action which may affect a listed endangered or threatened species, or that may result in the adverse modification of critical habitat, must consult with FWS or NMFS (NOAA 2019f; FWS 2019b). During this consultation FWS/NMFS and the agency would determine whether the project may adversely affect a listed species. If there is a likelihood to adversely affect a listed species or critical habit, the FWS/NMFS would develop a BO to determine if the action alternatives would jeopardize the existence of the species or adversely modify its critical habitat. If the project will not jeopardize the species or adversely modify its critical habitat and any resultant take of listed species will not violate Section 7(a)(2) of the ESA, the service(s) issues an Incidental Take Statement. Completion of Section 7 consultation and issuance of an Incidental Take Statement, if required, is a prerequisite for a decision by USACE to issue a Section 404 permit.

The NPS engaged in preliminary conversations with the FWS in June 2019. FWS indicated that the North Carolina Statewide Programmatic Biological Opinion would not apply to the action alternatives under development by the NPS. FWS suggested a Biological Assessment could be submitted that addresses all areas of likely sediment management actives identified and the season in which projects would be most likely to occur. The NPS engaged in preliminary conversations with the NMFS in June 2019. NMFS indicated that the SARBO would cover dredging, beach nourishment, and sand mining proposed under this NEPA process. USACE would be the responsible entity for coordinating consultation with NMFS for project specific actions.

North Carolina Wildlife Resources Commission

The North Carolina Wildlife Resources Commission (NCWRC) is the state agency responsible for conservation and sustainability of the state's fish and wildlife resources through research, scientific management, wise use, and public input. Cooperative management relationships among federal and state agencies with regard to the management of the nation's fish and wildlife resources is called for in 43 CFR Part 24. It also encourages consultation with state agencies on certain management actions to promote mutual objectives. The NCWRC is a cooperating agency assisting with development of this framework/EIS, and future actions that may affect state-listed species would be subject to their review.

National Historic Preservation Act

As a condition of any federal and state permits for the proposed project, the project proponent, through the USACE and/or BOEM, must consult with the North Carolina SHPO and North Carolina Office of State Archaeology regarding potential cultural resources that may be present or impacted by the project (including components such as dredging within the borrow area, pipeline conveyance of sediment to the beach, and placement of sediment on the shoreline) under Section 106 of the National Historic Preservation Act. This ensures that the federal agency taking action considers the effect of the action on historic properties or resources that are eligible for listing or are listed on the National Register of Historic Places. If necessary, cultural resource clearance surveys and mitigative buffers would be contemplated during individual project permitting. Project-specific consultation with the SHPO would take place during individual permitting. NPS has preliminarily determined that there would be no adverse effect to historic properties within the identified areas of frequent erosion. The NPS will provide the SHPO with notification of the proposed sediment management framework being considered and will outline how

future compliance would be addressed as part of follow-on Section 404 permitting for individual projects, where detailed project specifics would allow a more complete analysis.

US Coast Guard

If any actions are approved and permitted which involve dredging in navigable waters of the US, the project proponent would be required to contact the US Coast Guard (USCG) so that a Notice to Mariners is published prior to mobilization of equipment or any operations. The Notice to Mariners would identify the equipment and potential obstructions that may be in the action area and the dates of the action (CSE 2015). The NPS will provide the USCG with notification of the proposed sediment management framework EIS when it is available for review.

FWS

This EIS is intended to cover compliance necessary for the issuance of a SUP by the FWS for emergency situations for the protection of NC 12 at the Pea Island NWR portion of the Seashore. Proposed uses or projects at Pea Island NWR require a SUP from FWS. Before the refuge manager issues a permit, a use must be found appropriate and compatible with the purposes for which the refuge was established. If a use is found appropriate through the Finding of Appropriateness process, a Compatibility Determination will be completed. A Compatibility Determination is a written determination signed and dated by the refuge manager and Regional Chief of Refuges, signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. An opportunity for public review and comment is required for all Compatibility Determinations. If a use is found compatible and NEPA compliance has been completed, then a SUP with conditions will be issued.

Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) of 1982, and subsequent amendments, established the John H. Chafee Coastal Barrier Resources System (CBRS). The CBRS consists of relatively undeveloped coastal barriers and other areas located along the coasts of the Atlantic Ocean, Gulf of Mexico, Great Lakes, US Virgin Islands, and Puerto Rico. The Seashore includes two units protected by CBRA: L03 and NC03P. The NC03P unit encompasses the majority of the Seashore and is considered an Otherwise Protected Area where no consultation is required under the CBRA. The L03 unit encompasses two small areas on the sound side near Buxton and Avon. No actions are currently proposed within L03. In the event a project is proposed within this area, the project proponent would be required to consult with FWS and receive a CBRA consistency determination.

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APPENDIX C:
RECENT SEDIMENT MANAGEMENT AT PEA ISLAND NATIONAL WILDLIFE REFUGE

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RECENT SEDIMENT MANAGEMENT AT PEA ISLAND NATIONAL WILDLIFE REFUGE

Pea Island NWR was established in 1938 as a refuge and breeding ground for migratory birds and other wildlife by Executive Order. The Refuge is located within Cape Hatteras National Seashore, which was established in 1953, and stretches 70 miles from Bodie Island to Ocracoke Island (figure 1). NC 12 is a 148.0-mile-long primary state highway which links the peninsulas and islands of the northern Outer Banks region. The Service has a long history of working closely with NCDOT on transportation projects and maintenance activities for NC 12. In December 2010, the Federal Highway Administration (FHWA) issued a Record of Decision (ROD) for TIP Project B-2500, which includes the replacement of the Bonner Bridge and a long-term solution for NC Highway 12 on Pea Island NWR between Oregon Inlet and Rodanthe. The Service participated in FHWA's planning process as a member of the Merger Team and supported the preferred alternative in a letter from the Deputy Assistant Secretary for Fish and Wildlife and Parks. The Selected Alternative for Project B-2500 is the Parallel Bridge Corridor with NC 12 Transportation Management Plan (NC 12 TMP), which includes actions for maintaining and protecting NC 12 using a variety of tools, including sediment management. A component of the NC 12 TMP is a detailed Coastal Monitoring Program that is designed to assist the agencies in deciding when the planning efforts for future phases of the Project B-2500 should begin. The Coastal Monitoring Program includes detailed annual monitoring reports that summarize data collected by the N.C. Department of Transportation (NCDOT) and other agencies. The 2010 ROD describes the following environmental documents generated over the history of the replacement project through December 2010. Subsequent environmental documentation prepared for the project includes:

1. 2013 ROD for NC 12 – Pea Island Long Term Improvements Bonner Bridge Replacement Project Phase IIa (B-2500A)
2. 2013 Phase IIa Environmental Assessment
3. 2013 Phase IIb Environmental Assessment
4. 2015 Phase IIa Construction Consultation
5. 2016 Phase IIB Revised Environmental Assessment
6. 2016 ROD for NC 12 – Rodanthe Breach Long-Term Improvements Bonner Bridge Replacement Project Phase IIb
7. 2017 Alternatives Study Report for NC 12 – Pea Island Long-Term Improvements Bonner Bridge Replacement Project Phase IIb

As part of the Coastal Monitoring Program, researchers from North Carolina State University (NCSU) assist NCDOT by assessing areas of highway vulnerability (e.g., breaches, overwash events) on the Refuge. Following storms or episodes of ocean overwash, NCDOT may identify short-term solutions through beach nourishment to protect the highway until a longer-term solution can be developed and built. NPS staff are preparing for future requests for beach nourishment from NCDOT by completing a Comprehensive Sediment Management Plan and DEIS for the entire 70-mile stretch of Cape Hatteras National Seashore. NCDOT has identified areas of vulnerability on the 13-mile long Refuge, the two most vulnerable of which are the Canal Zone and the S-Curves (figure 2).

In 2014, in response to severe beach erosion caused by Hurricane Sandy, NCDOT determined that interim protection for NC 12 in the S-Curves was essential for maintaining the

transportation infrastructure at a functional level until the Phase IIb Bridge north of Rodanthe is completed. NCDOT secured emergency relief funds from the FHWA and requested a Special Use Permit from the Refuge for S-Curves Beach Nourishment Interim Protection for NC 12. The Service completed a finding of appropriateness and a compatibility determination for a one-time beach nourishment project conditional upon full compliance with all terms and provisions of the Special Use Permit, including an unconditional commitment to the Refuge monitoring program requirements. This action was to serve as a temporary solution during Phase IIb Rodanthe bridge design and construction activities. Construction is currently underway with an estimated project completion date of early 2021. Monitoring following the project concluded that material deposited during the beach nourishment actions had eroded within three years of completion of the project (Overton et al. 2019, Corbett and Walsh 2017).

Through NCDOT and the Coastal Monitoring Program, sand surveys have been conducted quarterly for the entire ocean shoreline of the Refuge since 2012. These data allow the Service and partners to track biological and physical attributes of the Refuge beach and monitor environmental effects of any activity such as beach nourishment. Additionally, a study by East Carolina University evaluated longer-term change in morphology equilibrium and habitat restoration between two juxtaposed treatment (nourished beach) and control (natural beach) areas. This effort only spanned the first two years after sand placement (Corbett and Walsh 2017). Recently, additional funding from the Service and the US Army Corps of Engineers was secured for a comprehensive, long-term, comparative study of the existing Pea Island NWR nourishment and control areas to further evaluate changes in sediment character, shoreface morphology, biological abundance, and spatial and temporal variations of native species including nesting birds and sea turtles on timescales spanning several years. This project provides an opportunity to evaluate impacts six-plus years post-nourishment, and do so within a relatively isolated (from anthropogenic influence) region within the protected Refuge. The expanding data series of sand composition, mineralogy, and invertebrate communities will continue to inform Refuge management decisions and serve as a pre-treatment dataset for future requests such as sand bypassing and beach nourishment. Collectively, these studies suggest that beach nourishment is not an effective method for long-term wildlife habitat enhancement.

The Service also has a long history of working with the US Army Corps of Engineers (Corps) with sand bypassing activities associated with the dredging of Oregon Inlet to maintain the navigation channel. As a result of concerns related to a proposed jetty system in Oregon Inlet, the CEQ reviewed environmental compliance from the Service, NPS, Corps, and the National Oceanic and Atmospheric Administration. The resolution resulted in the channel maintenance of Oregon Inlet through dredging and deposition of dredge spoil on Pea Island NWR. Refuge compatibility was assessed and the first special use permit for these activities was issued in 2002. Subsequent sand bypassing requests have been managed similarly through special use permits and conditions including details about compatible dredged materials, timing of activities, patterns of sand placement (e.g., node-internode dimensions), and monitoring plans.

As the nation's principal conservation agency, the Department of the Interior has responsibilities for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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