1.0 INTRODUCTION

The purpose of the Town of Holden Beach's (Town) East End Shore Protection Project (Proposed Action) is to address ongoing and chronic erosion at the east end of Holden Beach and to thereby protect and secure public infrastructure, roads, homes, businesses and rental properties, beaches, recreational assets, and protective dunes.

1.1 What is the purpose of an Environmental Impact Statement?

According to the Council of Environmental Quality (CEQ), a federal agency must prepare an Environmental Impact Statement (EIS) if it is proposing a major federal action (including federal approval of a non-federal action) significantly affecting the quality of the human environment (CEQ 2007). The Draft Environmental Impact Statement (DEIS) objectively evaluates all reasonable alternatives which substantially meet the stated purpose and need. In addition to the purpose and need and identification of reasonable alternatives, the DEIS will contain the environmental effects of the alternatives and a description of the environment that would be affected by the various alternatives. The environmental analysis should also account for the practicability and feasibility of implementing each potential alternative. The Final Environmental Impact Statement (FEIS) will consider all comments received during the National Environmental Policy Act (NEPA) process, including those from government agencies and the public.

1.2 What is the NEPA EIS process and how does it relate to Holden Beach's proposed project?

The NEPA of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982) is the primary law in the United States (US) that governs environmental review of major construction projects, including beach nourishment projects. The heart of the NEPA process is the early scoping of issues and the development of acceptable and clearly defined alternatives. The impacts of each alternative (including no action) are then determined and measures to mitigate potentially adverse impacts are developed. This sequence must be followed to comply with the NEPA.

The NEPA requires lead agencies to evaluate the environmental impacts associated with federal actions including federally-funded projects or projects that require a federal permit. The lead agency on beach nourishment projects is the United States Army Corps of Engineers (USACE), which is required to implement the NEPA in conjunction with Section 404 Clean Water Act permits issued for these projects. NEPA compliance is required as part of the Section 404 permitting process. Section 404 of the Clean Water Act governs the discharge of dredged or fill material into waters of the US.

The objective of the NEPA is to help the lead agency approve well-planned projects, by selection of a preferred alternative that effectively avoids and minimizes potential adverse environmental impacts. The preferred alternative is defined in the regulations as the "least environmentally damaging practicable alternative." The term practicable in this definition means a project that is feasible and can be done within logistical, engineering, cost, and environmental constraints.

The preferred alternative is selected through a process that involves: (1) obtaining input from the public and the agencies on their issues and concerns (a process called scoping – Appendix A); (2) using the information obtained in public scoping to develop a range of feasible alternatives; (3) assessing existing conditions in the study area; (4) assessing the impacts of the alternatives; (5) selecting a preferred alternative; and (6) identifying measures to avoid, reduce and/or minimize impacts associated with the preferred alternative (mitigation measures).

The NEPA is a complex process that requires extensive planning and coordination among the project proponent, government agencies, and the public. It also involves a thorough identification and review of all environmental issues. The NEPA requires federal agencies to conduct an EIS for major actions that could have significant impacts on the quality of the human environment. Under the NEPA, “environment” includes the natural and physical environment (such as air, water, geography, geology) as well as people’s relationship with the environment (such as health, safety, jobs, schools, housing, and aesthetics). An EIS looks at both short-term and long-term effects and considers possible mitigation measures, if needed.

This EIS document has also been developed in accordance with the requirements of the State Clearinghouse review process under the North Carolina State Environmental Policy Act (NC SEPA, G.S. 113A-1). Upon the development and submittal of the FEIS, additional filing under the NCEPA will not be required. Each alternative presented in this document will be evaluated for its ability to satisfy the stated project goals and objectives, as well as the environmental, economic, and social consequences associated with each alternative.

1.3 How has the public been involved?

The scoping phase of the environmental analysis process was initiated subsequent to the publication of the Notice of Intent (NOI) to prepare an EIS in the Federal Register (FR) on February 24, 2012 (a copy of the NOI is provided in Appendix A). The NOI provided a brief purpose and need statement and identified the Applicant’s proposed action to satisfy the identified need. A Public Notice (PN) was subsequently issued 24 February 2012 by the USACE, Wilmington District (Action ID No. SAW-2011-01914). The PN provided a brief description of the proposed action and information that would allow for the public to submit comment on the proposed action. The PN also identified the date and meeting location for the Public Scoping Meeting.

The Public Scoping Meeting was subsequently held in Holden Beach on 8 March 2012. At the Public Scoping Meeting, the USACE provided a description of the environmental review process and the project engineer, Applied Technology and Management (ATM), provided an overview of the existing conditions and proposed action for the Town's East End Shoreline Protection Project. In an effort to include the input of the public, interested stakeholders, and federal and state agencies, the USACE solicited comments regarding topics to be addressed in this EIS from those individuals in attendance at the meeting via the use of smaller break-out sessions. Meeting notes for the Public Scoping Meeting are provided in Appendix A.

1.4 How have government agencies been involved?

In accordance with NEPA and North Carolina (NC) State legislation requirements [General Statute (GS) 113A-115.1], an early and open public forum process was initiated in early 2012 to determine the scope of issues to be addressed, and for identifying the significant issues related to the Proposed Action. In an effort to include the public and all state and federal agencies in the process, a Project Review Team (PRT) was assembled and meetings held at Holden Beach Town Hall on 6 September 2012 and 30 May 2013. Table 1.1 includes a list of current PRT members.

Table 1.1. Project Review Team members.

Name	Representing	Email
Third Party Preparer		
York, Dawn	Dial Cordy and Associates	dyork@dialcordy.com
Ingle, Rahlff	Dial Cordy and Associates	ringle@dialcordy.com
Dial, Steve	Dial Cordy and Associates	sdial@dialcordy.com
Project Design Team		
Way, Fran	Applied Technology & Management	fway@appliedtm.com
Mason, Tim	Applied Technology & Management	tmason@appliedtm.com
Jenkins, Dr. Mike	Applied Technology & Management	mjenkins@appliedtm.com
Roessler, Todd	Kilpatrick Townsend	troessler@kilpatricktownsend.com
Levitas, Steve	Kilpatrick Townsend	slevitas@kilpatricktownsend.com
Cleary, Dr. Bill	Geologist	wcleary@charter.net
Local Government		
Holden, Alan	Holden Beach Mayor	Holden@atTheBeachNC.com
Hewett, David	Holden Beach, Town Manager	dhewett@hbtownhall.com
Wiggins, Amanda	Holden Beach, Parks and Recreation	recsvs@hbtownhall.com
Lead Federal Agency		
Hughes, Emily	USACE – Wilmington District	Emily.b.hughes@usace.army.mil
Pruitt, Carl	USACE – Wilmington District	Carl.e.pruitt@usace.army.mil
Castens, Pam	USACE – Wilmington District	Pamela.G.Castens@usace.army.mil
Horton, Todd	USACE – Wilmington District	James.T.Horton@usace.army.mil

Table 1.1 (concluded).

State Agencies		
Huggett, Doug	NCDCM	Doug.huggett@ncdenr.gov
Howell, Jonathan	NCDCM	jonathan.howell@ncdenr.gov
Coats, Heather	NCDCM	Heather.coats@ncdenr.gov

Name	Representing	Email
Steenhuis, Joanne	NCDWR	Joanne.Steenhuis@ncdenr.gov
Dunn, Maria	NCWRC	Maria.dunn@ncwildlife.org
Schweitzer, Sara	NCWRC	sara.schweitzer@ncwildlife.org
Godfrey, Matthew	NCWRC	Matthew.godfrey@ncwildlife.org
O'Neal, Jessi	NCDMF	Jessi.Oneal@ncdenr.gov
Deaton, Anne	NCDMF	anne.deaton@ncdenr.gov
Earley, Renee Gledhill-	NCSHPO	renee.gledhill-earley@ncdcr.gov
Federal Agencies		
Rhode, Fritz	NMFS	Fritz.rohde@noaa.gov
Ellis, John	USFWS	John_Ellis@fws.gov
Fox, Becky	EPA	fox.rebecca@epa.gov
Other Stakeholders		
Foster, Steve	Oak Island, Town Manager	sfoster@ci.oak-island.nc.us
Marwitz, Tony	Holden Beach Turtle Patrol	marwitzathbeach@mindspring.com
Giles, Mike	Coastal Federation	capefearcoastkeeper@nccoast.org
Williams, Dr. Allen	Holden Beach Renourishment Association	extractor2@hotmail.com
Varnam, Jackie	Brunswick Catch	nanasemail@atmc.net
Rader, Douglas	Environmental Defense Fund	
Fisher, Andy	Long Bay Artificial Reef Association	agitatorfisher@bellsouth.net

The functions of the team are to: (1) provide input for the development of the EIS, (2) keep the public informed of project development, (3) bring forth unidentified project related concerns, and (4) suggest resource areas within the project area. The PRT is comprised of a broad based team of individuals that includes local, state and federal government officials; local industry; local academia; interested stakeholders, as well as the project design team and third party contractor, Dial Cordy and Associates Inc. (DC&A). The third party contractor's role and responsibilities during the NEPA process are as follows:

- Sign Statement of Responsibilities and CEQ conflict of interest forms;
- Prepare and submit to the USACE a draft NOI;
- Assist the USACE in organizing and executing the NEPA scoping meeting;
- Conduct all necessary literature searches and reviews, fieldwork in support of the EIS technical studies, conduct analyses, including evaluation of impacts, prepare reports;
- Prepare a draft Biological Assessment (BA) that evaluates the effects of the applicant's preferred alternative on federally listed threatened and endangered species known to

occur within the project area and critical habitat, if designated; submit the draft BA to the USACE for review;

- Prepare a draft Essential Fish Habitat (EFH) assessment and submit to the USACE for review;
- Prepare the administrative DEIS, including technical studies and all appendices;
- Prepare and submit an administrative DEIS for Cooperating Agency and USACE District review;
- Prepare and submit a pre-final ("camera-ready") DEIS for USACE review and approval;
- Distribute the public DEIS for a minimum 45- day public review period;
- Organize and execute the DEIS public hearing/meeting;
- Compile all public comments received on the DEIS and prepare draft responses for USACE review;
- Prepare and submit an administrative FEIS; submit for Cooperating Agency(s), USACE District review;
- Prepare and submit a pre-final ("camera-ready") FEIS for USACE review and approval;
- Disseminate the public FEIS; and
- Compile and organize comments received on FEIS and prepare draft responses to comments for USACE review.

Participation in the EIS process by federal, state, and local government agencies and other interested organizations and persons has been encouraged. The USACE will be conducting ongoing consultation efforts with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA), Fish and Wildlife Coordination Act, Marine Mammal Protection Act, and Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA); and with the State Historic Preservation Office (SHPO) under the National Historic Preservation Act.

Specifically, the USACE will consult with the USFWS and NMFS regarding species listed under the ESA via the development of a BA. The NMFS will be consulted regarding essential fish habitat (EFH) via the development of an EFH assessment. Additionally, because this EIS assesses the potential water quality impacts pursuant to Section 401 of the Clean Water Act, coordination efforts are being made with the North Carolina Division of Water Resources (DWR), and a DWR Section 401 water quality certification is required. Furthermore, the USACE has worked closely with the North Carolina Division of Coastal Management (NCDCM) through the development of this EIS to ensure the process complies with all NC SEPA) requirements and to determine consistency with the Coastal Zone Management Act (CZMA). NC SEPA allows the state to defer to a NEPA document that is developed during a joint process with the USACE.

As stated above, representatives of the relevant federal and state agencies, local government, non-profit organizations and individual stakeholders have been involved in the scoping meeting and the subsequent PRT meetings, and their input has been integrated into this EIS document.

1.5 What is the Holden Beach East End Shore Protection Project and where is it located?

The Town is positioned to the west of Lockwood Folly Inlet, with Oak Island to the east. Both Holden Beach and Oak Island are located within Brunswick County, NC. The project area is located at 33-54-53.59 North (N), 78-14-35.80 West (W), and encompasses approximately 0.75 miles of Holden Beach ocean and inlet shoreline, starting from the east side of Lockwood Folly Inlet and moving westward near Avenue B and McCray Street, in Brunswick County, North Carolina (Figure 1.1). The study area boundary depicted in Figure 1.1 was developed for the purposes of encompassing all potential alternatives, modeling results and existing natural resources as it relates to the proposed project.

The east end of Holden Beach has and continues to experience consistent, relatively severe erosional conditions (Photos 1 and 2). Figures 1.2 and 1.3 present 2011 NCDCM long-term erosion rate maps of Holden Beach and the west end of Oak Island. The long-term erosion rates through 2011 are slightly less than 2003 rates for eastern Holden Beach due, in part, to recent nourishment activities. The beach and dune system experience chronic and episodic erosion, which has necessitated several erosion control projects during the past decades.

Dune breaching and flooding has also occurred, most recently during Hurricane Hanna in 2008 (Photo 1.3). Since 1993, approximately 27 oceanfront properties (including houses, infrastructure, etc.) on the east end of Holden Beach have been lost to erosion. Figure 1.4 presents a comparison of 1993 and 2008 aerials on the east end, where 27 structures can be identified as lost due to erosion effects. The threat to existing homes and infrastructure as a result of the erosion and shoreline recession has prompted the Town to seek other alternatives for long-term protection of the Town's and its citizens' resources.

Figure 1.1. Study Area Map

Photo 1.1. View of threatened home on the east end of Holden Beach.

Photo taken 25 July 2013.

Photo 1.2. Close-up view of eroded dune on the east end of Holden Beach.

Photo taken 25 July 2013.

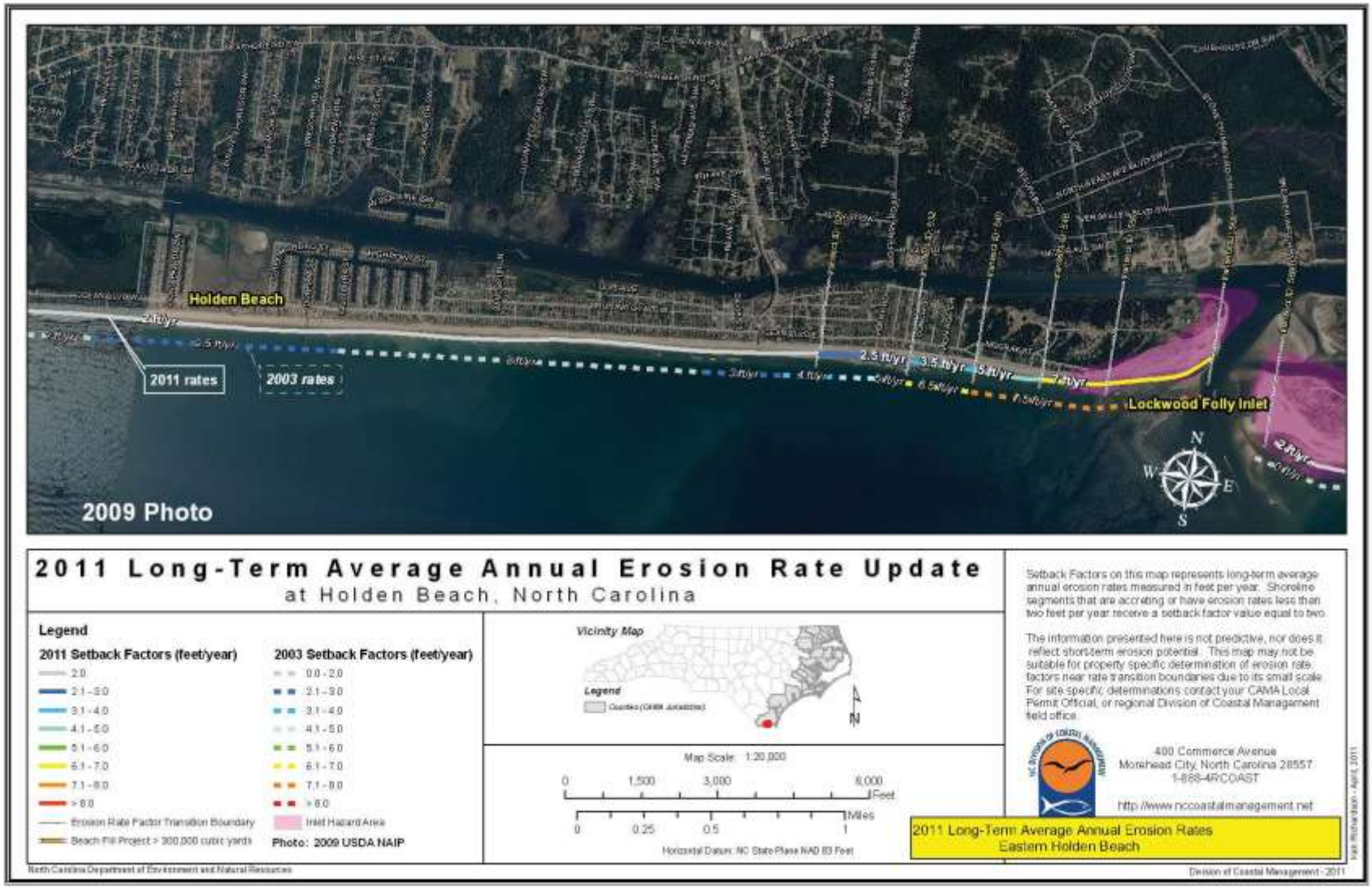

Figure 1.2. **Long-term Average Annual Erosion Rates for East Holden Beach (2003 vs. 2011)**

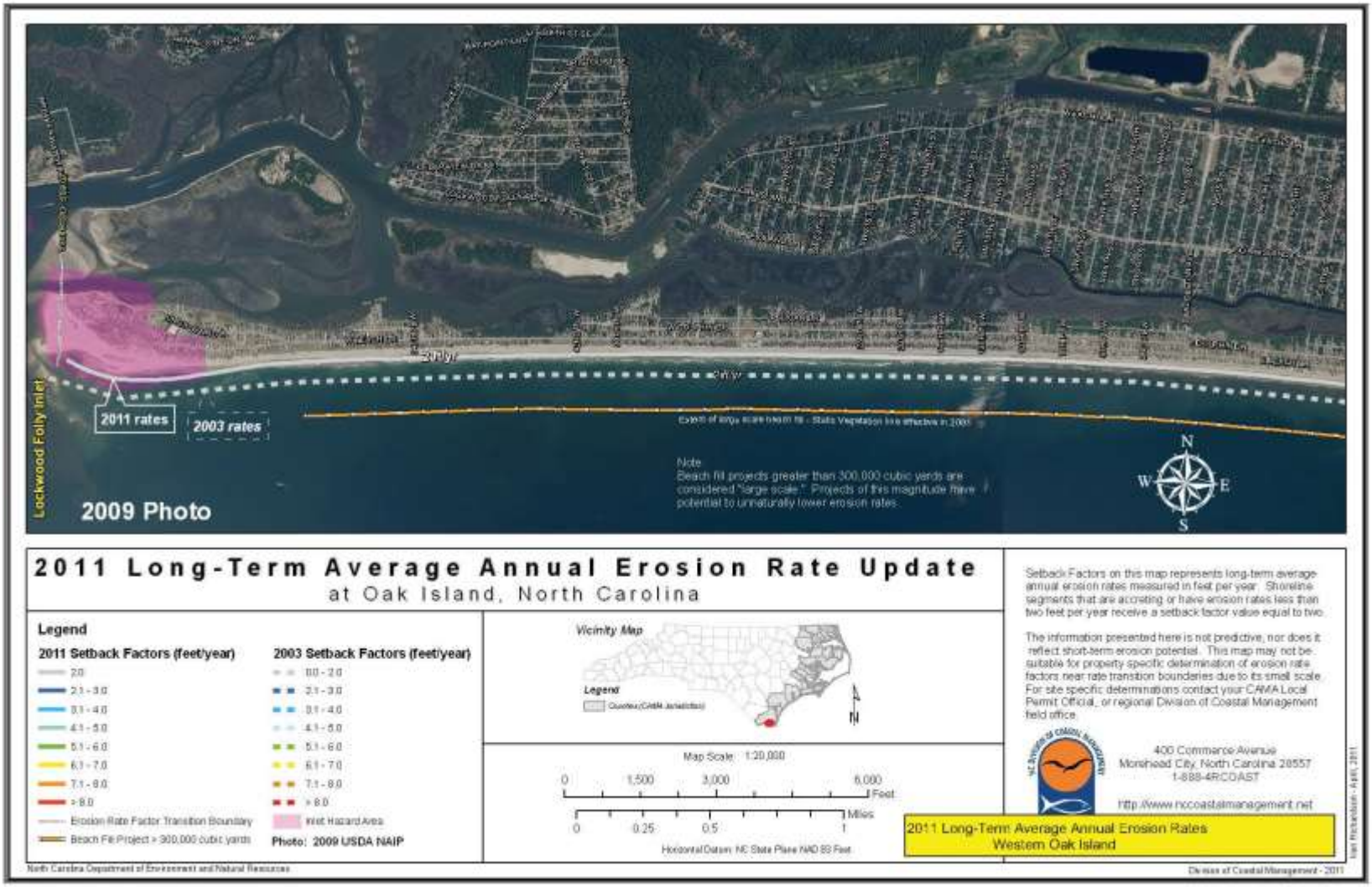

Figure 1.3. **Long-term Average Annual Erosion Rates for West Oak Island (2003 vs. 2011)**

Photo 1.3. Holden Beach East End dune restoration activities following Hurricane Hanna.

Photo credit: ATM 2008

Figure 1.4. Holden Beach East End Dune Restoration Activities Following Hurricane Hanna

Periodic nourishments by both the Town and the USACE have relieved this erosion; however, the intermittent fill placement provides only a short-term benefit for the East End. A more long-term solution is required to help reduce the large fluctuations that occur along the west shoulder of Lockwood Folly Inlet. After careful analysis it has been determined that, in addition to nourishment activities and proactive sand management of Lockwood Folly Inlet, a terminal groin structure on the eastern end of Holden Beach is the Town's locally-preferred alternative to reduce the high erosion losses that have historically occurred in the area and threaten residential structures, Town infrastructure, and recreational assets that are beyond the ability of beach fill placement alone to effectively address.

As described in the North Carolina Terminal Groin Study (Moffatt and Nichol 2010), terminal groins are structures built at the end of littoral cells to reduce shoreline erosion and conserve sand along the end of beach or barrier, usually consisting in part of nourishment sand. They extend into the nearshore zone and act as a dam to the longshore transport of sediment and are usually constructed at the downdrift end of a barrier on the updrift side of a tidal inlet. However, due to wave refraction around the ebb tidal delta, which causes sand to enter the channel from both sides of the inlet, terminal groins have been built on both sides of an inlet. Jetties are built to prevent sand in the littoral zone from entering the inlet channel and to help maintain navigation depths of dredged channels. Although terminal groins trap sand, they are dissimilar to a jetty, because once the terminal groin fills with sediment (beach accretes to the end of the groin, which is referred to as a fillet), additional sand bypasses the structure and enters the nearshore and/or the tidal inlet. The proper design of a terminal groin permits the longshore transport of sand around and over the structure once the beach has accreted to the end of the groin. Commonly, terminal groin construction is done in combination with beach nourishment so that the groin does not capture existing sand reservoirs. During high wave energy events, the beach along the fillet often erodes and the sand is mobilized. Once depositional wave conditions return and the normal longshore transport system is reestablished, the fillet is reconstructed.

The proposed terminal groin and concurrent nourishment project is one component of the town's ongoing comprehensive beach management program, further described in this document.

1.6 What issues were identified as part of scoping?

As part of the Public Scoping and Public Notice process, the USACE received several comment letters regarding the Proposed Action and the environmental review process. Comment letters received during the scoping process are provided in Appendix A. Table 1.2 below summarizes from whom comments were received through scoping, the comments, and identifies the specific section in the EIS where the comment is addressed. The comments are organized by general category. Note that the summary table is not intended to be a comprehensive description, but rather a synopsis of the nature of the comments received during scoping. Refer to comment letters in Appendix A for specific comments received during

scoping. While all comments have been considered in the development of this EIS, not every issue on this list was evaluated in detail.

Table 1.2. Summary of scoping comments provided during the Public Scoping and Public Notice process.

No.	Nature of Comment (Summary)	Agency/Entity	Category	Inclusion in DEIS
1	Damage to downstream beaches (including Sunset Beach and Ocean Isle Beach) and to immediate west of groin	Public	Physical	5.4
2	Costly beach renourishment projects and homeowner lawsuits against Town of Holden Beach	Public	Economic	3.1
3	Uphold ban on groins; should not be a tax payer expense	Public	State Regulation	1.7
4	Reduced tax base and tourism revenue from home and beach access loss; increased dredging at Lockwood Folly	Public	Economic	4.7
5	Impacts to Oak Island estuaries that serve as marine nursery areas	Public	Fisheries	4.5
6	Impacts on designated critical habitat for threatened and endangered Piping Plovers	Public	Species Protection	4.5
7	Concern for who will be financially liable for Oak Island restoration and property owner compensation	Public	Financial	1.7
8	Include comparative Quantitative Modeling of inlet dynamics and beach erosion/accretion	Public	Physical	5.4
9	Investigate non-structural alternatives for erosion control	NCCF	State Regulation	3.1
10	Identify/map/evaluate “404” wetlands, “critical habitat” and imminently threatened structures	NCCF	State Regulation	4.2
11	Plans for construction/maintenance of groin and management of inlet/estuarine/ocean shorelines	NCCF	State Regulation	3.1
12	Identify how property owners and local gov. on both sides of inlet affected by all project alternatives	NCCF	State Regulation	5.4
13	Identify funding sources needed for all stages of project (in absence of state or local funds); Applicant provided cost estimates and assurances of ability to cover all costs	NCCF	Financial/ Economic	3.1
14	Detailed info and modeling on storm impacts and sea level rise on and from groin to structures, property, environment, habitat, tidal flow, fisheries, etc.	NCCF	Physical/ Environmental	5.3
15	Cost-benefit analyses related to storm events and economic impact to fisheries/tourism; determine long-term management costs	NCCF	Financial/ Economic	5.4
16	Incorporation of State Beach and Inlet MP into EIS	NCCF	State Regulation	1.7
17	Determine how project will comply w/Endangered Species Act (groin impacts to piping plover/sea turtles)	NCCF	Species Protection	5.4

Table 1.2. (concluded).

No.	Nature of Comment (Summary)	Agency/Entity	Category	Inclusion in DEIS
18	Provide proof that terminal groin will reduce frequency of required beach re-nourishment	NCCF	Physical	5.4
19	Need for Essential Fish Habitat (EFH) assessment in surf zone including impacts to state-managed fish species	NMFS	Habitat	Individual Document
20	Recommend EIS characterization of larval/juvenile fish use of surf zones and nearshore areas and migration in Lockwood Folly and Shallotte inlets	NMFS	Fisheries	5.4
21	Recommend EIS characterization of ebb and flood tidal flow complexes, longshore sediment transport, and beach sediment erosion, accretion, and granulometry	NMFS	Physical Modeling	5.4
22	Long and short term monitoring and modeling of shoreline erosion/accretion on west end of Oak Island	Town of Oak Island	Physical	6.3
23	Modeling of terminal groin impact on ebb channel alignment and deep vs. shallow draft inlets	Town of Oak Island	Physical	5.4
24	Verify how use of offshore “borrow” site (beach nourishment source) will impact Brunswick County Coastal Storm Damage Reduction Project, Oak Island shoreline, and Lockwood Folly Inlet	Town of Oak Island	Physical/ Economic	5.4
25	Determine potential for recharge and subsequent use of borrow site including sand source and time to recharge	Town of Oak Island	Physical/ Economic	5.4
26	Request field investigation, analysis and modeling of HB groin impact to larval fish transport dynamics in and near Lockwood Folly inlet	DMF	Fisheries	5.4
27	Request field investigation of larval and juvenile fish distribution in inlet and proposed groin locations	DMF	Fisheries	5.4
28	Request monitoring of benthic macroinvertebrates in areas impacted by proposed groins	DMF	Environmental	4.2
29	EIS to include discussions/research relating to all essential and protected fish habitats and larval fish transport in groin areas and inlets	DMF	Habitat/ Fisheries	4.4
30	EIS to include characterizations of fish and invertebrate composition/abundance in inlet and adjacent surf zone	DMF	Fisheries/ Environmental	4.4
31	EIS to include potential impacts to and monitoring plans for benthos in surf/swash zones and nearshore areas	DMF	Environmental	5.4
32	EIS to include potential impacts of proposed groin to wetlands, fish habitat, and commercial/rec fishing	DMF	Habitat/ Fisheries	5.4
33	EIS to include potential impacts from dredging and from beach and nearshore placement and how these impacts can be minimized	DMF	Physical	6.1
34	EIS to include discussions on potential impacts on regional sand budgets	DMF	Economic	5.3

Additional issues and comments raised by the PRT during project development meetings, held on 6 September 2012 and 30 May 2013, are summarized in Table 1.3 below.

Table 1.3. Summary of issues raised during the Project Review Team meetings.

Nature of Comment (Summary)	Agency	Resolution	Meeting Date
Physical monitoring thresholds and responsibility of determination of exceedance	NCDCM	Adaptive Monitoring Plan	6 September 2012
Monitoring of coastal resources should include biological resources	NCWRC	Present Mitigation Measures in Chapter 6	6 September 2012
Current structures/houses identified as imminently threatened	FWS/USACE	Structure loss analyzed in Chapter 5	6 September 2012
Sediment compatibility analysis of AIWW Crossing at Lockwood Folly Inlet	USACE	Vibracores collected; data included in Chapter 3	6 September 2012
Sustainability of 400-foot bend widener as primary source of material for proposed project	NCDCM	Historical analysis of borrow area usage	6 September 2012
Differences between No Action Alternative and Abandon/Relocate	FWS	Description provided in Chapter 3	6 September 2012
Modeling results of the various groin alternatives	USACE/NCDCM	Review of modeling results in Chapter 5	6 September 2012
Maintenance costs of terminal groin	NCDCM	Terminal groin construction discussed in Chapter 3	6 September 2012
Basis of Study Area boundary	Dr. Bill Cleary	Study area boundary captures all resources	6 September 2012
Distribution of the Draft Engineering Report	USACE	Engineering Report provided as Appendix F	30 May 2013
Lockwood Folly Inlet channel variability	Dr. Bill Cleary	Review of model in Chapter 5	30 May 2013
Gross shoal changes	Dr. Bill Cleary	Modeling used to analyze transport trends	30 May 2013
Timing of modeling runs	NC Coastal Federation	Model runs for each alternative spanned 4 years	30 May 2013
T-head component of proposed groin design	NCDCM	Amended legislation provides for T-head component	30 May 2013
Effects on Oak Island during model runs of each alternative	USACE	Analyzed in model and discussed in Chapter 5	30 May 2013
Discussion of 50-year USACE project	NCDCM	Reviewed in Alternatives Analysis in Chapter 3	30 May 2013
Recreational Impacts	Dunescape POA	Analyzed in Chapter 5	30 May 2013

1.7 What laws are involved?

The following section includes a description of applicable federal and state laws associated with the Holden Beach East End Shoreline Protection Project. This DEIS document has been prepared to satisfy NEPA requirements in accordance with state and federal law.

National Environmental Policy Act of 1969

The NEPA of 1969, as amended [42 USC 4321; 40 Code of Federal Regulations (CFR) 1500.1], set forth requirements for agencies of the federal government in Title I and established the CEQ in Title II. The NEPA requires federal agencies to consider the effects of all actions on the environment, consider alternatives that reduce impacts, and prepare detailed statements for public and federal agency review where significant impacts may occur. Agencies are required to solicit and respond to comments from the public, affected interests and relevant government agencies on the impacts of proposed actions before and after environmental documentation are developed. Documentation consists of an Environmental Assessment (EA) or an EIS. A NEPA document is required when a project includes federal action including the need for federal permits, the use of federal funding, or if the action is to take place on federal lands.

Section 10 of the Rivers and Harbors Act of 1899

Pursuant to Section 10 of the Rivers and Harbors Act of 1899, certain structures or work in or affecting navigable waters of the US will be regulated under the purview of the USACE (33 CFR 322.1). The Act states that “it shall not be lawful to excavate or fill…..alter or modify the course, location, condition, or capacity of, any port roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the US unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War...” (USACE 2006). The geographic jurisdiction of the Rivers and Harbors Act includes all navigable waters of the US which are defined (33 CFR Part 329) as, "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce." This jurisdiction extends seaward to include all ocean waters within a zone three nautical miles from the coastline (the "territorial seas").

Clean Water Act of 1972

Section 404 of the Clean Water Act (CWA) established a permit program under the purview of the USACE, to regulate the discharge of dredged and fill material into waters of the US, including wetlands and regulating quality standards for surface waters. These waters consisting of, but not limited to, “all waters which are currently used or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide” [33CFR328.3(a)(1)]. This program is jointly administered by Environmental Protection Agency (EPA) and the USACE [US Environmental Protection Agency

(USEPA) 2006]. Section 404 requires a permit before dredged or fill material may be discharged into waters of the US, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities). The USACE is the federal agency responsible for issuing 404 permits (USEPA 2013).

Section 401 of the CWA includes the delegation of federal authority to the State of NC to issue a 401 Water Quality Certification. The 401 Water Quality Certification is applicable to all projects that require a federal permit (i.e., Section 404 Permit) for discharge of dredge material into waters and wetlands of the US. The 401 Water Quality Certification Program is administered by the NC Division of Water Resources (NCDWR) to prevent the degradation of waters in the state and to prevent any violations of the state water quality standards. A 401 Water Quality Certification is required for any federally permitted or licensed activity that may result in a discharge to waters of the US. Issuance of a 401 certification certifies that a given project will not degrade Waters of the State or violate state water quality standards [North Carolina Division of Water Quality (NCDWQ) 2013].

Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.)

The ESA of 1973 provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The ESA replaced the Endangered Species Conservation Act of 1969; it has been amended several times.

The lead federal agencies for implementing ESA are the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The USFWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. Coordination with the USFWS and NOAA NMFS includes consultation under Section 7 of the ESA, as amended.

A Draft BA of the proposed action has been prepared by the third party contractor, DC&A, in consultation with the USFWS and NOAA in accordance with 50 CFR §402.12. Previous Section 7 consultations exist for the federally-authorized and maintained Lockwood Folly Inlet and Lockwood Folly Atlantic Intracoastal Waterway (AIWW) Crossing. A biological opinion will be developed as a result of formal consultation and is defined as the document that states the opinion of the federal agency as to whether a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat.

National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.)

The National Historic Preservation Act (NHPA) is legislation intended to preserve historical and archaeological sites in the US. The act created the National Register of Historic Places, the list of National Historic Landmarks, and the SHPOs.

Senate Bill 3035, the NHPA, was signed into law on October 15, 1966. Several amendments have been made since. Among other things, the act requires federal agencies to evaluate the impact of all federally funded or permitted projects on historic properties (buildings, archaeological sites, etc.) through a process known as *Section 106 Review*.

Archival research, field work and coordination with the NC SHPO, have been conducted in accordance with the NHPA of 1966 (Public Law 89-665), NEPA (Public Law 11-190), Executive Order 11593, the Advisory Council on Historic Preservation Procedures for the protection of historic and cultural properties (36 CFR Part 800) and the updated guidelines described in 36 CFR 64 and 36 CFR 66.

The NC Office of State Archaeology (OSA) protects endangered archaeological sites on private or public lands through enforcement of the NC Archaeological Resources Protection Act (G.S. 70, article 2), the NC Archaeological Records Program (G.S. 70, article 4), and the "Abandoned Shipwreck Law" (G.S. 121, article 3).

Magnuson-Stevens Fishery Conservation and Management Act of 1996

The Magnuson Fishery Conservation and Management Act of 1976, amended MSFCMA in October 1996, and also referred to as the Sustainable Fisheries Act, was enacted by the US Congress to protect marine fish stocks and their habitat, prevent and stop overfishing and minimize bycatch. The Magnuson-Stevens Reauthorization Act of 2006 established new requirements to end and prevent overfishing through the use of annual catch limit and accountability measures. The Act also specified additional requirements for the role of scientific advice in this process, specifically through the Councils' Scientific and Statistical Committees.

The MSFCMA, implemented through NOAA Fisheries, created eight regional fishery management councils to manage fisheries and promote conservation and established procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fisheries management plan (NOAA 2013). Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The EFH guidelines outline the process for federal agencies, NOAA Fisheries and the South Atlantic Fishery Management Council (SAFMC) to satisfy the EFH consultation requirement of the MSFCMA. As part of the EFH consultation process, the guidelines require federal agencies to prepare a written EFH Assessment describing the effects of a proposed action on EFH. The EFH Assessment is a separate document from this EIS and was prepared in accordance with the EFH guidelines set forth in the MSFCMA.

Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq.)

The Fish and Wildlife Coordination Act of 1958, as amended, mandates that federal and state agencies cooperate "to protect, rear, stock, and increase the supply of game and fur-bearing animals….[and] study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife." The Act also requires consultation with the Bureau of Fisheries,

USFWS and state fish and wildlife agencies where the “waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified” by any agency under federal permit or license.

Additional amendments to the Act have “permitted lands valuable to the Migratory Bird Management Program to be made available to the state agency exercising control over wildlife resources (USFWS 2006a).

Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act was enacted to protect marine mammals that were subject to potential danger of extinction or depletion as a result of human activities, the Act requires measures be taken to ensure these species or stocks do not fall below their optimum sustainable population level. Furthermore, the Act requires measures be taken to replenish these species or stocks as they have been determined to provide international importance.

Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act is the primary legislation protecting native birds in the US. This legislation makes it unlawful to pursue, hunt, take, capture, kill, offer for sale, purchase or offer for shipment any bird, or the parts, eggs, or nest protected under several migratory bird treaties, except as permitted under federal regulation (USFWS 2013)

Coastal Zone Management Act of 1972

Enacted by Congress in 1972, the CZMA does not require, but encourages that each state preserve, protect, restore, or enhance natural coastal resources including; wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife that utilize these resources. Since this Act is voluntary, any state that implements a coastal management program as defined in this Act will receive federal financial aid.

The NCDCM has developed and enforces a coastal management plan with the rules and policies that supports the ideals and concepts of the CZMA. The NCDCM enforces this Act using the rules and policies of the Coastal Area Management Act (CAMA) of 1974 (enabled and delegated in 1972; adopted and implemented in 1974).

North Carolina State Environmental Policy Act (As Amended)

The NC SEPA of 1971 requires state agencies to review and report the environmental effects of all activities that involve an action by a state agency, an expenditure of public monies or private use of public land, and that may have a potential negative environmental effect on natural resources, public health and safety, natural beauty, or historical or cultural elements of the state. This EIS has been developed in accordance with the requirements of the State Clearinghouse review process under NC SEPA, based upon the agreement between the NCDCM and the

USACE. Upon the development and submittal of the FEIS, additional filing under NC SEPA will not be required. Clearinghouse distribution under the federal NEPA process will satisfy the requirements of NC SEPA.

North Carolina Coastal Area Management Act of 1974

The NC Coastal Area Management Act (CAMA) (§ 113A-100) was implemented to preserve the physical, aesthetic, cultural and recreational values, including the management of land and water resources in NC's twenty coastal counties. Under CAMA, permits are necessary for development type projects proposing work in any Areas of Environmental Concern (AEC) established by the Coastal Resources Commission (CRC). AEC include areas of natural importance such as 1) estuarine and ocean systems, 2) ocean hazard system, 3) public water supplies, and 4) natural and cultural resource areas. Under CAMA, the proposed work cannot cause significant damage to one or more of the historic, cultural, scientific, environmental or scenic values or natural systems identified in the AECs listed. In addition, significant cumulative effects cannot result from a development project (NCDCM 2003). A CAMA permit is required for development within any AEC.

North Carolina Dredge and Fill Law

Under CAMA (§ 113-229), the NCDCM regulates projects that involve excavation or filling in any estuarine waters, tidelands, marshlands, or state-owned lakes. An applicant proposing work in such lands must obtain a permit from both the NC Department of Environment and Natural Resources (NCDENR) and the USACE (NCDCM 2006a). Permits will be granted for dredge or fill projects that are not expected to prevent use of the water by the public; take away from the value or enjoyment of the land of adjoining property owners; adversely impact water supplies, or public health, safety, and welfare; or adversely affect wildlife or fisheries.

North Carolina Surface Water Quality Standards

The NCDWQ Surface Waters and Wetlands Standards [NC Administrative Code (NCAC) 15A NCAC 02B .0100 & .0200] was implemented for assigning and regulating water quality standards for waters in the State of NC. The water column in the Holden Beach East End project area is classified as both SA waters and Outstanding Resource Waters (ORWs). Class SA waters are surface waters suitable for shellfishing for market purposes. Waters designated as Class SA have specific water quality standards that must be met, as well as the water quality standards assigned to both Class SB and SC waters. ORWs include waters of exceptional water quality.

Waters designated as ORW and/or Class SA waters are also classified as High Quality Waters (HQW) (NCDWQ 2003). Based on the above classifications, water quality standards applicable to the project area include: 1) turbidity in the receiving water shall not exceed 25 Nephelometric Turbidity Units (NTU), 2) changes in salinity due to hydrological modifications shall not result in the removal of the functions of a Primary Nursery Area (PNA), 3) temperature “shall not be

increased above the natural water temperature by more than 0.8 Degree (°) Centigrade (C) [1.44° Fahrenheit (F)] during the months of June, July, or August nor more than 2.2°C (3.96°F) during other months, and in no cases to exceed 32°C due to the discharge of heated liquids, 4) dissolved oxygen cannot decrease below 5.0 mg/l, except in "poorly flushed tidally influenced streams or embayments, or estuarine bottom waters" which may have decreased values from natural causes and 5) pH levels "shall be normal for the waters in the area, which generally range between 6.8 and 8.5 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions" (NCDWQ 2006).

Ownership of Lands

According to NCAC (15A NCAC 07H .0207), public trust areas include all waters of the "Atlantic Ocean and the lands thereunder from the mean high water (MHW) mark to the seaward limit of state jurisdiction" (approximately 3 miles offshore). The position of the MHW boundary is continually altered by physical processes influencing the deposition and/or loss of material in the nearshore zone. The proposed action will include the placement of beach-compatible sand in the littoral zone updrift of the structure. This will include both the existing dry beach and the intertidal and subtidal areas below the current MHW line. This area has been nourished several times since 2002 (see Figure 2.1). With regard to the ocean shoreline, NC GS §§ 146-6(f) provides that "the title to land in or immediately along the Atlantic Ocean raised above the mean high water mark by publicly financed projects which involve hydraulic dredging or other deposition of spoil materials or sand vest in the state." The placement of structure below the MHW in public trust bottom will require an easement from the NC State Property Office.

Limitations on Erosion Control Structures, North Carolina General Statute § 113A-115.1

In June 2011, the General Assembly of NC ratified Senate Bill 110 (*An Act To Authorize The Permitting And Construction Of Up To Four Terminal Groins at Inlets Under Certain Conditions*). The Act authorized the CRC to permit the construction of a terminal groin under a terminal groin pilot project provided the applicant demonstrated that specific criteria outlined in the bill were met.

This law establishes limitations of erosion control structures along the ocean shoreline. The "ocean shoreline" is defined as "the Atlantic Ocean, the oceanfront beaches, and frontal dunes." Furthermore, the term "ocean shoreline" includes "an ocean inlet and lands adjacent to an ocean inlet but does not include that portion of any inlet and lands adjacent to the inlet that exhibits characteristics of estuarine shorelines." This statute defines such a structure as "breakwater, bulkhead, groin, jetty, revetment, seawall, or any similar structure." Terminal groins, or specifically a groin that is constructed at the end of a littoral cell or on the updrift side of an inlet to prevent sediment passage into the channel beyond, are included under this statute, as of the passing of Senate Bill 110. Senate Bill 110 allows a total of four terminal groins within the state as long as the applicant meets a suite of requirements. These requirements include the preparation of an EIS, proof of financial assurance to cover post

construction monitoring and mitigation (if warranted), and notification to adjacent property owners amongst other requirements.

In July 2013, the General Assembly ratified Senate Bill 151 (*An Act to Amend Marine Fisheries Laws; Amend the Laws Governing the Construction of Terminal Groins; and Clarify that Cities May Enforce Ordinances within the State's Public Trust Areas*). Under the new legislation and in addition to requirements of Part 4 of Article 7 of Chapter 113A of the General Statutes, an applicant seeking authorization to construct a terminal groin must submit all of the following: (i) information to demonstrate that structures or infrastructure are threatened by erosion; (ii) an EIS that satisfies the requirements of G.S. 113A-4 (note that an EIS prepared pursuant to NEPA, 42 U.S.C. § 4321, et seq., shall satisfy this requirement); (iii) a list of property owners and local governments that may be affected by the construction of the groin and proof of notification to these owners and local governments of the application for construction of the terminal groin and its accompanying beach fill project; (iv) a plan for the construction and maintenance of the groin and its accompanying beach fill prepared by a professional engineer licensed to practice in NC; (v) a plan for the management of the inlet and the estuarine and ocean shorelines immediately adjacent to and under the influence of the inlet; (vi) proof of financial assurance sufficient to implement long-term maintenance and monitoring, implementation of mitigation measures, and modification or removal of the groin. The legislation includes various requirements that must be met prior to issuance of a CAMA Major Permit for a terminal groin. In addition, the legislation states that the CRC may issue no more than four permits for such structures. Refer to Appendix B for a copy of the entire SB 151 legislation.

The applicant and its coastal engineer, ATM, have provided information in response to these requirements (refer to Appendix C).