US Army Corps
of Engineers
WILMINGTON DISTRICT

ENVIRONMENTAL ASSESSMENT

West Onslow Beach and New River Inlet (Topsail Beach)
and
Surf City and North Topsail Beach
Coastal Storm Damage Reduction Projects

Pender and Onslow Counties, North Carolina

July 2013

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Executive Summary

Project Area/Background. Topsail Island is a 26-mile long barrier island located in Pender and Onslow counties, NC. From south to north, the three communities on the island are the Towns of Topsail Beach, Surf City, and North Topsail Beach. In accordance with Congressional study authorizations, Coastal Storm Damage Reduction (CSDR) opportunities were evaluated for the entire island. A CSDR project for Topsail Beach was originally authorized as the West Onslow Beach and New River Inlet (Topsail Beach) project; a Post-Authorization Change (PAC) report (a General Reevaluation Report (GRR)) recommended a modification to the project as originally authorized. This modified project is near the end of the design phase of work and is currently awaiting re-authorization and appropriation of construction funds. A Feasibility Study for the Surf City and North Topsail Beach (SCNTB) CSDR project has been completed and the design effort for this project is also underway while awaiting authorization and appropriation of construction funds.

The recommended plan for Topsail Beach is a dune (12 ft above National Geodetic Vertical Datum 29 (NGVD 29)) and berm (50 ft wide at 7 ft above NGVD 29) extending along approximately 26,200 ft of shoreline. The total required sediment volume for initial construction and nourishment events spanning the 50 year project life is approximately 13.6 Million Cubic Yards (MCY). The recommended plan for SCNTB consists of a dune (15 ft above NGVD) and berm (50 ft wide at 7 ft above NGVD 29) extending along approximately 52,150 ft of shoreline. The total required sediment volume for initial construction and nourishment events over the 50 year project life is approximately 32.3 MCY.

Initial subsurface investigations were performed during feasibility phase analysis of both the Topsail Beach and SCNTB projects and included a total of 358 borings located offshore of Topsail Island, in Banks Channel behind the town of Topsail Beach, in the connecting channel between the Atlantic Intracoastal Waterway (AIWW) and New Topsail Inlet, and in New Topsail Inlet. A combination of boring data and geophysical surveys were used to identify and define borrow areas for both projects. Based on these initial Study phase investigations, a sufficient volume of compatible material was identified within 16 borrow areas located between 1-5 miles offshore of Topsail Island to meet the 50 year volume requirements for both projects. Compatibility evaluations at the time were completed in accordance with both the pending North Carolina state sediment compatibility standard as well as the Wilmington District's sediment compatibility practice.

During the Study phase of both projects, the North Carolina Coastal Resources Commission (NCRC) was concurrently developing new sediment compatibility standards for sediment placed on the beach in association with dredging for beach nourishment and navigation projects. As a component of their final consistency concurrence letter for the

Topsail Beach CSDR project (dated 7 November 2006), the North Carolina Division of Coastal Management (NCDCM) stated the following:

"The Corps should be advised that the NCCRC is currently developing new sediment compatibility standards. Once these new standards are passed by the NCCRC, and assuming these standards are approved by Office of Ocean and Coastal Resource Management (OCRM) as a federally approved component of the State's coastal management program, these new standards will apply to future beach nourishment projects from that point forward. The Corps is strongly encouraged to closely follow the development of these new standards. The Corps should also incorporate any such standards into the planning process for the proposed project."

The Corps considered the State's new sediment compatibility standards for both projects and was advised by NCDCM at the time that the development of these detailed compatibility standards would not further constrain sediment availability for the projects beyond the Wilmington District's existing compatibility practices. Though the new State sediment compatibility standards have since been passed by the NCCRC (15A NCAC 07H .0312, Technical Standards for Beach Fill Projects), to date they have not been submitted to the National Oceanic and Atmospheric Administration's (NOAA's) OCRM for consideration as a federally approved component of the State's coastal management program. In the absence of this OCRM approval, the State sediment compatibility standards are not required as a component of the Federal consistency determination in accordance with the Coastal Zone Management Act (CZMA) of 1972.

Both Topsail Island projects are currently in the Pre-construction Engineering and Design (PED) phase of work. PED products include preliminary project plans as well as detailed borrow area dredging plans, which usually require a more detailed geotechnical dataset than that collected for feasibility level analyses. Consequently, additional geotechnical investigations of the offshore borrow areas were conducted on a finer sampling grid to support the development of detailed borrow area dredging plans. Although the Feasibility/GRR Study phase geotechnical investigations appeared to indicate that sufficient material was available to meet the 50 year project life requirements for both projects, the additional analyses conducted during PED resulted in a refinement of the borrow area characterizations and a change in the borrow area utilization. Specifically, the inclusion of these additional data sets in the compatibility analyses resulted in a slightly higher amount of fine-grained material, but less than 10% by weight based on the Wilmington District practice, and more granular material than allowed under the State standards within certain borrow areas. The State compatibility standards limit the amount of fine-grained and granular material not to exceed more than 5% over the native beach. As the native beach has been heavily washed, the amount of fine-grained material is approximately 1% and the amount of granular material is less than 5%.

Utilization of the borrow areas as identified during the PED geotechnical investigations and application of the Wilmington District's compatibility practice for beach placement

of sediment is the proposed action of this Environmental Assessment (EA). Although the increased amount of fine-grained sediment identified during PED investigations in certain portions of the borrow areas is higher than the State's sediment compatibility standard allows, use of this material in aggregate would not result in significant beach compatibility concerns and/or impact biological resources to a level of significance beyond what was previously evaluated in the Environmental Impact Statements (EISs) for both projects. Prior to the establishment of the State standard, the Wilmington District successfully constructed multiple CSDR and navigation disposal projects throughout North Carolina utilizing a compatibility threshold of <10% fine-grained sediment passing the #200 sieve. All of the borrow areas located offshore of Topsail Island are considered compatible with respect to this Wilmington District practice. Isolated portions of two borrow areas contain higher granular material than specified in the State standards. The Wilmington District compatibility practice does not specifically evaluate granular material; however, prior to dredging these borrow areas, mitigative efforts will be implemented to avoid and/or screen the material from being placed on the beach. Implementation of the Wilmington District compatibility practice coupled with the mitigation measures to avoid placement of granular material on the beach would result in sufficient borrow area volume for the life of both projects while avoiding adverse impacts to biological resources.

Proposed Action. The proposed action (preferred alternative) is to utilize PED geotechnical data for Topsail Beach and SCNTB CSDR project offshore borrow areas and implement a borrow area utilization plan which relies upon the application of the Wilmington District's compatibility practice for beach placement of sediment. The proposed action would maintain the current borrow area acreage impacts evaluated in the Topsail Beach and SCNTB EISs and avoid the impacts associated with additional offshore investigations for borrow areas and actual dredging and conveyance of sediment from those sites.

This EA evaluates resources in the project area for potential impacts from the proposed action, as well as the no action alternative. Specific resource categories with the potential to be affected by the proposed action include: Water Quality, Surf Zone Fishes, Benthic Resources – Surf Zone, Benthic Resources – Nearshore Ocean, Essential Fish Habitat (Hard Bottoms), Endangered and Threatened Species, Recreational and Aesthetic Resources. This EA determined that, while short term, temporary, and minor impacts would be imposed on several resource areas under the proposed action; there would be no significant adverse impacts.

The proposed action should not significantly affect the quality of the human environment; therefore, an Environmental Impact Statement (EIS) will not be required. If this opinion is upheld following circulation of this EA, a Finding of No Significant Impact (FONSI) will be signed and circulated.

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Acronyms and Abbreviations

ACES	Automated Coastal Engineering System
AIWW	Atlantic Intracoastal Waterway
BA	Biological Assessment
CSDR	Coastal Storm Damage Reduction
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
ESA	Endangered Species Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Army Engineer Regulation
EM	Engineering Manual
FEMA	Federal Emergency Management Agency
FWCA	Fish and Wildlife Coordination Act
FONSI	Finding of No Significant Impact
GRR	General Reevaluation Report
HAPC	Habitat Areas of Particular Concern
MCY	Million Cubic Yards
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act of 1969, as amended
NGVD	National Geodetic Vertical Datum
NC	North Carolina
NCCRC	North Carolina Coastal Resources Commission
NCDCM	North Carolina Division of Coastal Management
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
OCRM	Ocean and Coastal Resource Management

PAC	Post-Authorization Change
PCA	Project Cooperation Agreement
PED	Preconstruction Engineering and Design
PDT	Project Delivery Team
ROD	Record of Decision
SAW	South Atlantic Division, Wilmington District
SCNTB	Surf City and North Topsail Beach
USACE	U.S. Army Corps of Engineers
WRDA	Water Resources Development Act

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1.0 Introduction

1.1 Incorporation by Reference

Specific details for both the West Onslow Beach and New River Inlet (Topsail Beach), North Carolina (NC) and Surf City and North Topsail Beach (SCNTB) Coastal Storm Damage Reduction (CSDR) projects are provided in the following integrated reports:

- *U.S. Army Corps of Engineers, 2009. Final Integrated General Reevaluation Report and Environmental Impact Statement, Shore Protection, West Onslow Beach and New River Inlet (Topsail Beach), NC. February 2009.*

- *U.S. Army Corps of Engineers. 2010. Final Integrated Feasibility Report and Environmental Impact Statement, Coastal Storm Damage Reduction, Surf City and North Topsail Beach, North Carolina. December 2010.*

These two reports contain extensive background information pertaining to project related environmental impacts in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. This EA will include additional information and analyses that will supplement the referenced EISs for both projects with respect to refinements in borrow area utilization; however it will not repeat the detailed information within the EISs incorporated herein by reference. Specific sections from the referenced reports for both projects containing relevant sediment compatibility statements and/or discussions are included in Appendix A.

1.2 Authorizing Legislation

Topsail Beach Coastal Storm Damage Reduction (CSDR) Project. Section 101 of the Water Resources Development Act (WRDA) of 1992 authorized the construction or implementation of the original West Onslow Beach and New River Inlet (Topsail Beach) Shore Protection Project at Topsail Beach, Pender County, North Carolina. However, the Project Cooperation Agreement (PCA) was not executed and the project was then placed in an inactive status. Following multiple storm events, the project was reactivated in 2000 at the request of the Town of Topsail Beach.

The Energy and Water Development Appropriations Act for Fiscal Year 2001, Public Law 106-377, included funds for the Government to initiate a General Reevaluation Report (GRR) of the authorized West Onslow Beach and New River Inlet (Topsail Beach) Shore Protection Project. A Chief's Report and Record of Decision (ROD) were signed on 28 September 2009 and 23 April 2010 for Topsail Beach, respectively. As the project recommended in the GRR extends the boundaries of the currently authorized project, this updated project requires re-authorization subsequent to appropriation of construction funds.

Surf City North Topsail Beach (SCNTB) Coastal Storm Damage Reduction (CSDR) Project. Study authorization for the SCNTB Feasibility Study was contained in two Congressional resolutions (one for Surf City and one for North Topsail Beach, NC) adopted February 16, 2000, and April 11, 2000. A Chief's Report and ROD accompanying the Final SCNTB Feasibility Report were signed on 30 December 2010 and 13 April 2011 for SCNTB, respectively. The project is currently in the Pre-construction, Engineering, and Design (PED) phase of work while awaiting authorization and appropriation of construction funds.

1.3 Background

The recommended CSDR plan for Topsail Beach consists of a sand dune constructed to an elevation of 12 ft above the NGVD 29, fronted by a 50 ft wide beach berm constructed to an elevation of 7 ft above NGVD 29. This dune and berm feature would extend 23,200 ft, with a 2,000 ft northern transition fill, and a 1,000 ft southern transition fill, for a total length of 26,200 ft. The total required sediment volume for initial construction and nourishment events throughout the 50 year project life is approximately 13.6 MCY. The plan contained in the GRR identified a total of five offshore borrow areas with sufficient compatible sediment to support initial construction and each nourishment event for the 50 year life of the project.

The recommended plan for SCNTB consists of a sand dune constructed to an elevation of 15 ft above the NGVD 29 fronted by a 50 ft-wide beach berm constructed to an elevation of 7 ft above NGVD 29. The berm and dune project extends along a reach of 52,150 ft. The total required sediment volume for initial construction and nourishment events throughout the 50 year project life is approximately 32.3 MCY. The plan contained within the Feasibility Report identified a total of 16 borrow areas offshore of Topsail Island, including excess material from the borrow areas identified for the Topsail Beach project, with sufficient compatible sediment to support initial construction and each nourishment event for the 50 year life of the project

Initial subsurface investigations were performed during both the Topsail Beach and SCNTB Study phases and included a total of 358 borings located offshore of Topsail Island, in the Banks Channel behind the town of Topsail Beach, in the connecting channel between the Atlantic Intracoastal Waterway (AIWW) and New Topsail Inlet, and in New Topsail Inlet. A combination of data from the borings and the geophysical surveys were used to identify and define borrow areas for both projects. Based on these initial investigations, sufficient compatible material was identified to meet the 50 year volume requirements for both projects; however, both reports stated that additional vibracores (500-1,000 ft. spacing) and/or geophysical surveys would be collected during PED to better delineate the borrow area boundaries and material types and support the development of a detailed dredge plan.

The State compatibility standards and the Wilmington District compatibility practice were both evaluated when assessing total borrow area volumes available during the Study

phase for both projects. Based on the feasibility-level data collected within each borrow area, a sufficient amount of compatible material was identified to meet the 50 year volume needs for both projects while considering the State standards and the Wilmington District compatibility practice. Therefore, the Corps documented in the reports for both projects the intent to adhere to the State compatibility standards. References to sediment compatibility were made in the project report documents as a component of the NEPA documentation, Fish and Wildlife Coordination Act (FWCA) recommendations, and the Section 7 Endangered Species Act (ESA) Biological Assessment (BA) (Appendix A). However, both reports clearly stated that more refined geotechnical investigations of the borrow areas would be completed during the PED phase of both projects.

PED level investigations were subsequently completed in 2010 within borrow area A for the Topsail Beach project and in 2011 for the SCNTB project within borrow areas G, H, J, L, O, and P. During PED investigations, the Corps conducted additional geophysical surveys, additional vibracore borings, and completed borrow compatibility analyses in accordance with both the Wilmington compatibility practice and the State compatibility standards. The additional analyses resulted in a refinement in the borrow area characterizations and a change in the borrow area utilization to meet dredge plan requirements. Specifically, the inclusion of these additional data sets in the borrow area compatibility analyses resulted in the identification of a slightly higher percentage of fine-grained and granular material in portions of the borrow areas compared to the native beach. Considering the low percentages of fine-grained material on the native beach, the slight increase in fine-grained sediment within certain borrow areas exceeded the percentage allowed under the State standard.

The refinement of the borrow area characterization and use plans during PED analyses indicated that, using the State's sediment compatibility standards, there would be insufficient sediment volumes to support the 50 year life of both projects. When using the Wilmington District practice for assessing compatibility, there is sufficient borrow area volume for the life of the projects. The incremental change in sediment characteristics following PED data collection would not incur additional adverse impacts beyond the impact threshold evaluated in the original EISs, while providing the sediment volume needed for the 50 year project life. Therefore, the proposed action is to utilize the borrow areas as identified during the PED investigations for the Topsail Beach and SCTNB CSDR projects and apply the Wilmington District's compatibility practice for beach placement of sediment

1.4 North Carolina Sediment Compatibility Standards - Summary

In 2007, the State of North Carolina implemented 15A NCAC 07H.0312 to govern sediment compatibility for beach nourishment projects; however, these new standards have not yet been submitted to the National Oceanic and Atmospheric Administration (NOAA) office of Ocean and Coastal Resource Management (OCRM) for consideration as a federally approved component of the State's coastal management program. In the

absence of this OCRM approval, the NC sediment compatibility standards are not required as a component of the Federal consistency determination in accordance with the Coastal Zone Management Act (CZMA) of 1972. Relevant sections of 15A NCAC 07H.0312 for the purpose of this EA are as follows:

- *"The average percentage by weight of fine-grained sediment (less than 0.0625 mm) in each borrow site shall not exceed the average percentage by weight of fine-grained sediment of the recipient beach characterization plus five (5) percent"*
- *"The average percentage by weight of calcium carbonate (shell) in a borrow site shall not exceed the average percentage by weight of calcium carbonate of the recipient beach characterization plus 15 percent"*
- *"The average percentage by weight of granular sediment in a borrow site shall not exceed the average percentage by weight of coarse-sand sediment of the recipient beach characterization plus five (5) percent."*

1.5 Wilmington District Compatibility Practice - Summary

The Wilmington District has historically met the intent of the State sediment compatibility standards through diligent best professional judgment practices coupled with detailed sediment compatibility analyses, which evaluate the grain size characteristics of the material within the potential borrow area. In order to assure that beach placement material consists predominately of sand, the Wilmington District compatibility practice requires that the borrow area contains sediment with an average weighted fine-grained material content of less than (<) 10% passing the #200 sieve. In addition to grain size analyses, selection of material for beach placement is also determined by evaluating cross sections of the sediment within the proposed borrow area to assure that areas containing incompatible sediment overlying compatible sand are removed from the detailed borrow area dredge plan. These guidelines have historically been utilized by the Wilmington District to assure compatibility for CSDR projects (i.e. Wrightsville, Carolina, Kure, and Ocean Isle beaches) with much success and continue to be used for beach placement of dredged material from navigation channels.

The Wilmington District compatibility practice of <10% fine-grained material passing the #200 sieve is also reflected in the State compatibility standards which allow up to 10% fine-grained material to be placed on the beach in association with dredging navigation maintenance material. Specifically, the rule states the following:

"Sediment completely confined to the permitted dredge depth of a federally or state maintained navigation channel shall be considered compatible if the average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment is less than 10 percent"

1.6 Compatibility Differences – Study Phase vs. PED Phase Investigations

Realizing the coarse sampling grid (5,000 ft spacing) used to collect borrow area boring data during Study phase investigations for both projects, it was noted in both the Topsail Beach and SCNTB reports that additional borings and/or geophysical surveys would be performed during PED to better delineate the borrow area boundaries and characterize material types.

These detailed geotechnical and geophysical investigations of the borrow areas were completed during the PED phase of both projects in 2010 and 2011. Specifically, borings were conducted using 1,000 ft spacing within borrow area A for the Topsail Beach project and borrow areas G, H, J, L, O, and P for the SCNTB project in order to further define borrow area characteristics in support of dredge plan development. These more detailed PED analyses identified slightly higher amounts of fine-grained and granular material within portions of a few borrow areas. Table 1 provides a summary of the borrow area analysis in comparison to the native beach material during the Feasibility Study phase and the PED phase. It is shown in Table 1 that borrow areas A, H, O, and P have finer mean grain size material based on the PED analysis than that of the Study analysis. In addition, borrow areas J and L contain slightly more granular material from the PED analysis than that of the Study analysis.

Table 1. Borrow area evaluation for the Study and PED phases.

	Study Phase				PED Phase			
Borrow Area	Mean (phi)	Mean (mm)	Weight % Fines (passing #230)[1]	Weight % Passing #10[2]	Mean (phi)	Mean (mm)	Weight % Fines (passing #230)[1]	Weight % Passing #10[2]
Topsail Native Beach	2.15	0.23	1.0	--[3]	2.15	0.23	1.0	99.0
A	2.36	0.20	6.6	97.8	2.61	0.16	7.5	96.3
SCNTB Native Beach	2.15	0.23	1.2	98.4	2.15	0.23	1.3	98.1
G	2.05	0.24	5.2	92.1	2.17	0.22	5.1	94.8
H	2.21	0.22	2.6	96.4	2.48	0.18	3.2	98.8
J	2.12	0.23	4.5	96.6	1.92	0.26	3.8	92.7
L	2.05	0.24	6.3	94.1	1.57	0.34	4.8	87.9
O	2.12	0.28	6.2	93.3	2.22	0.21	6.4	95.1
P	2.01	0.25	5.5	91.0	2.32	0.2	8.3	96.4

[1] The #230 sieve = 0.063 mm / 4.0 phi. The #10 sieve = 2.0 mm / -1.0 phi.
[2] The materials retained on the #10 or larger sieves are considered "granular" material.
[3] The granular material was not evaluated during the Study phase for Topsail.

1.7 Comparison of the Application of the NC Sediment Criteria and the Wilmington District Compatibility Practice for the Topsail and SCNTB Borrow Areas

A compatibility analysis for a CSDR project relies on the laboratory analysis of the sediment grain size and calcium carbonate content for the borrow area. For both the Topsail and SCNTB projects, samples of subsurface sediment from vibracores were used to define these material characteristics. Each boring and corresponding laboratory tested samples were compared to the composite native beach characteristics for grain size and calcium carbonate. Figure 1 shows the location of the borings diagrammed in Figure 2; these borings are marked with a green line. A fence diagram is provided in Figure 2 to show borrow area evaluation comparing State compatibility standards and Wilmington District compatibility practice. After the individual vibracore boring evaluations were complete, the borrow area was composited to determine the overall compatibility of the borrow area. In the case of borrow area A, the composite compatibility analysis using the Wilmington District compatibility practice allowed for the use of material which was slightly more fine-grained than that allowed by the state criteria. This is the result of the native beaches containing such low amounts of fine-grained material (in some cases less than 1%) that beach compatible material containing 6 to 10 percent fine-grained material would not have been available for use under the State compatibility standards.

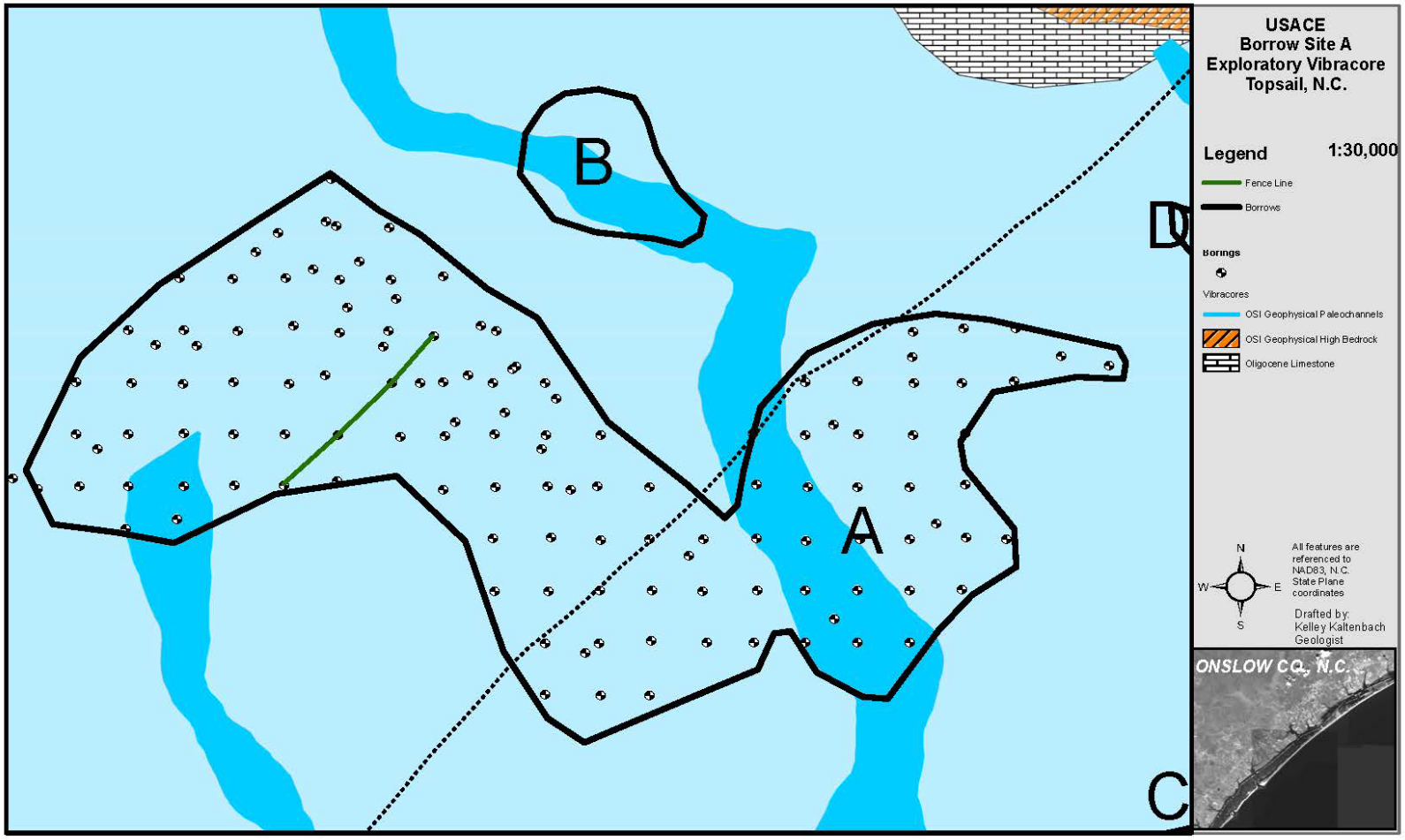

Figure 1. Borrow source for West Onslow Beach and New River Inlet (Topsail Beach) CSDR project. (*Green line denotes boring locations referenced in the fence diagram identified in Figure 2)

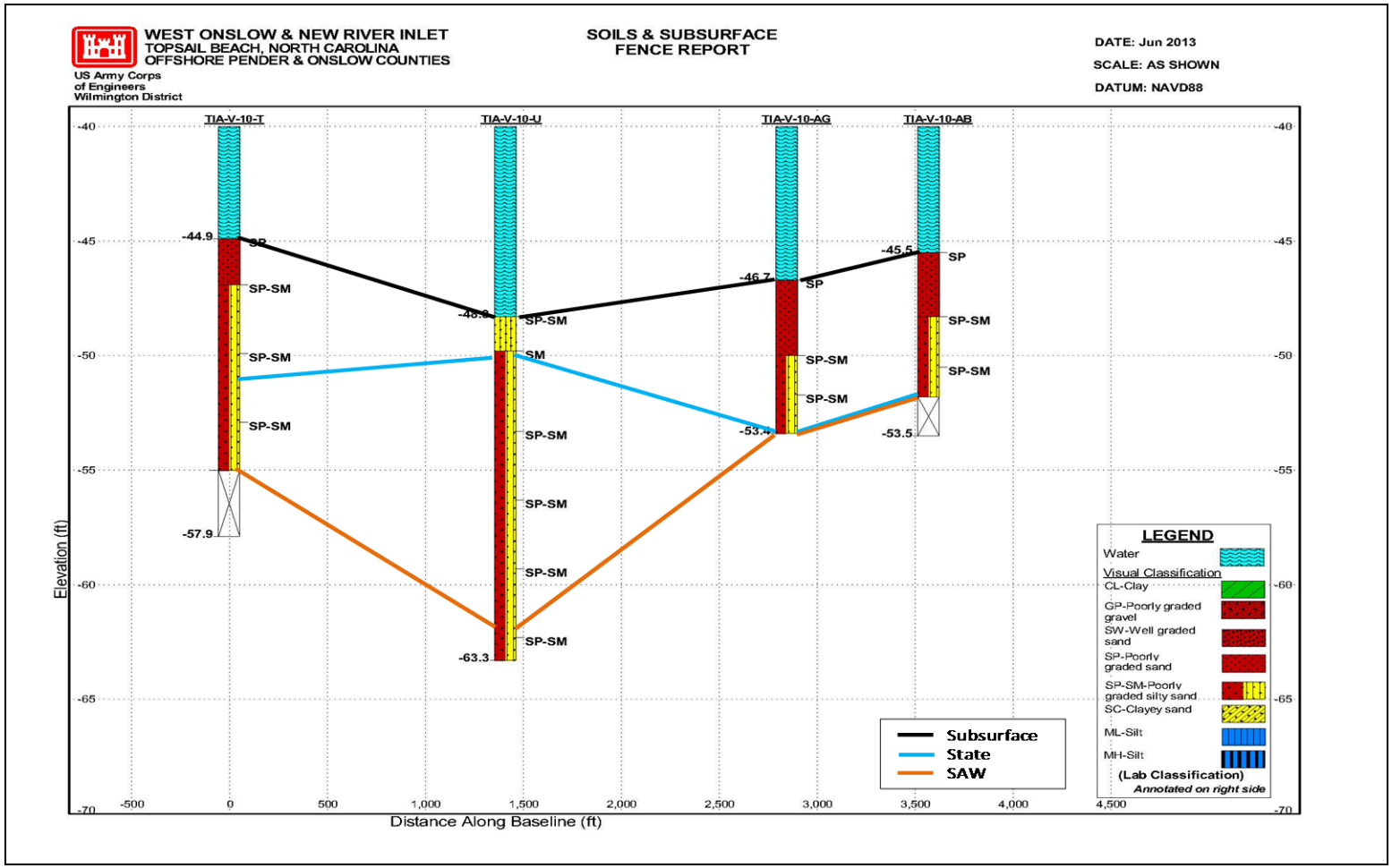

Figure 2. Example fence diagram showing a comparison of the selected material usable depths using the State compatibility standard and the Wilmington District (SAW) compatibility practice. (Note: In this diagram, material between the blue and orange lines would be unavailable using the State compatibility standard, but beach compatible based upon the SAW compatibility practice).

Table 2 and Table 3 show the composite native beach data and the composite data for borrow areas identified for use for both the Topsail Beach and SCNTB projects, including all additional data obtained during PED investigations. The tables each include a comparison of the composite data following the State compatibility standard and the Wilmington District (SAW) compatibility practice, as discussed in Sections 1.4 and 1.5. These tables both provide the mean native beach grain size and standard deviation as well as the mean borrow area grain size and standard deviation. Also included in the tables are the weighted composite for the fine-grained and granular material for the native beach and the borrow areas.

The Topsail Beach CSDR project borrow area A (Figure 3) contains sufficient compatible material for initial construction and each nourishment event following the Wilmington District compatibility practice. However, the Wilmington District composite compatibility includes approximately 1.5% more fine-grained sediment than what is considered compatible under the state criteria (i.e. native = 1%; 1% native + 5% allowable over the native = 6% total allowable). Allowing this small incremental increase of fine-grained sediment (Total = 7.5%) following the Wilmington District compatibility practice retains approximately 23 MCY[1] of compatible material. Adherence to the State compatibility standards would otherwise require portions of the borrow area to be removed from the composite analysis to assure the percent of fine-grained material does not exceed 6%, resulting in the equivalent loss of 7 MCY[1] from borrow area A.

The borrow areas identified for the SCNTB CSDR project (i.e. G, H, J, L, O, and P) contain less than 10% fine-grained material passing the #200 sieve and most are also within the more stringent State sediment compatibility standards (i.e. less than 5% over the native passing the #230 sieve), with the exception of borrow areas O and P. Based on the State sediment compatibility standards, these borrow areas are acceptable if the composite fine-grained sediment is equal to or less than 6.3% (Table 3 and Figure 3). Implementation of the Wilmington District compatibility practice when conducting the composite analysis for borrow area O resulted in the total sediment volume being included in the total composite and 0.1% more fine-grained sediment than allowed under the State compatibility standard. However, this difference is considered negligible and will not be further discussed in this EA. Borrow Area P has slightly more fine-grained sediment (i.e. 2% more) when evaluated under the Wilmington compatibility practice with a composite value of 8.3%. Based on the reduced material quantities from within borrow area A (~7 MCY), which contained 1.3% more fines passing the #230 sieve, it is expected that the reduction in the quantity of material for borrow area P is substantial.

[1] Volume is for the entire borrow and does not account for the additional volume reduction as a result of designated dredge cuts.

The incremental increase in fine-grained sediment within borrow areas A, O, and P is considered by the Wilmington District to be compatible for beach placement, since previous experience with beach nourishment projects (i.e. Wrightsville, Carolina, Kure, and Ocean Isle Beaches) has shown that high quality beaches can be constructed using sand with up to 10% fines (up to 10% by weight passing the #200 sieve) with no adverse environmental impacts.

Table 2. Mean sampling data from the native beach and Borrow Area A for the Topsail Beach CSDR project. (* the State criteria do not consider the % passing the #200 sieve[1])

Data	Native Beach	Borrow Area A	
		State[2]	SAW[3]
Mean (phi)	2.15	2.44	2.61
Mean (mm)	0.23	0.18	0.16
Std Dev (phi)	0.7	0.7	0.6
Std Dev (mm)	0.6	0.6	0.7
*Weight % Fines (passing #200)	1.0	--	8.3
Weight % Fines (passing #230)	1.0	5.9	7.5
Visual % Shell	11	8	6
Weight % Granular (passing #10)	99	94.9	96.3

Table 3. Mean sampling data from the native beach and borrow areas for the SCNTB CSDR project. (* the State criteria do not consider the % passing the #200 sieve[1])

Data	Native Beach	Borrow Area G		Borrow Area H		Borrow Area J		Borrow Area L		Borrow Area O		Borrow Area P	
		State[2]	SAW[3]	State[2]	SAW[3]	State[2]	SAW[3]	State[2]	SAW[3]	State[2]	SAW[3]	State[2]	SAW[3]
Mean (phi)	2.15	2.26	2.17	2.45	2.48	2.01	1.92	1.63	1.57	2.18	2.22	2.05	2.32
Mean (mm)	0.23	0.21	0.22	0.18	0.18	0.25	0.26	0.32	0.34	0.22	0.21	0.24	0.20
Std Dev (phi)	0.7	0.7	0.9	0.5	0.4	0.9	0.9	1.3	1.4	0.8	0.7	0.8	0.7
Std Dev (mm)	0.6	0.6	0.5	0.7	0.8	0.5	0.5	0.4	0.4	0.6	0.6	0.6	0.6
*Weight % Fines (passing #200)	1.3	--	5.4	--	3.4	--	4.0	--	5.0	--	6.7	--	8.6
Weight % Fines (passing #230)	**1.3**	**4.5**	**5.1**	**3.1**	**3.2**	**3.5**	**3.8**	**3.8**	**4.8**	**5.5**	**6.4**	**6.1**	**8.3**
Visual % Shell	9.4	3.8	3.4	2.8	2.2	8.7	7.9	12.3	11.8	5.3	3.4	4.2	3
Weight % Granular (passing #10)	98.1	96.2	94.8	98.6	98.8	94.6	92.7	90	87.9	94.8	95.1	93.8	96.4

[1] The #200 sieve = 0.074 mm / 3.75 phi and the #230 sieve = 0.063 mm / 4.0 phi. The #10 sieve = 2.0 mm / -1.0 phi.
[2] This column meets the State compatibility standards.
[3] This column contains sediment recommendations following the Wilmington District (SAW) compatibility practice.

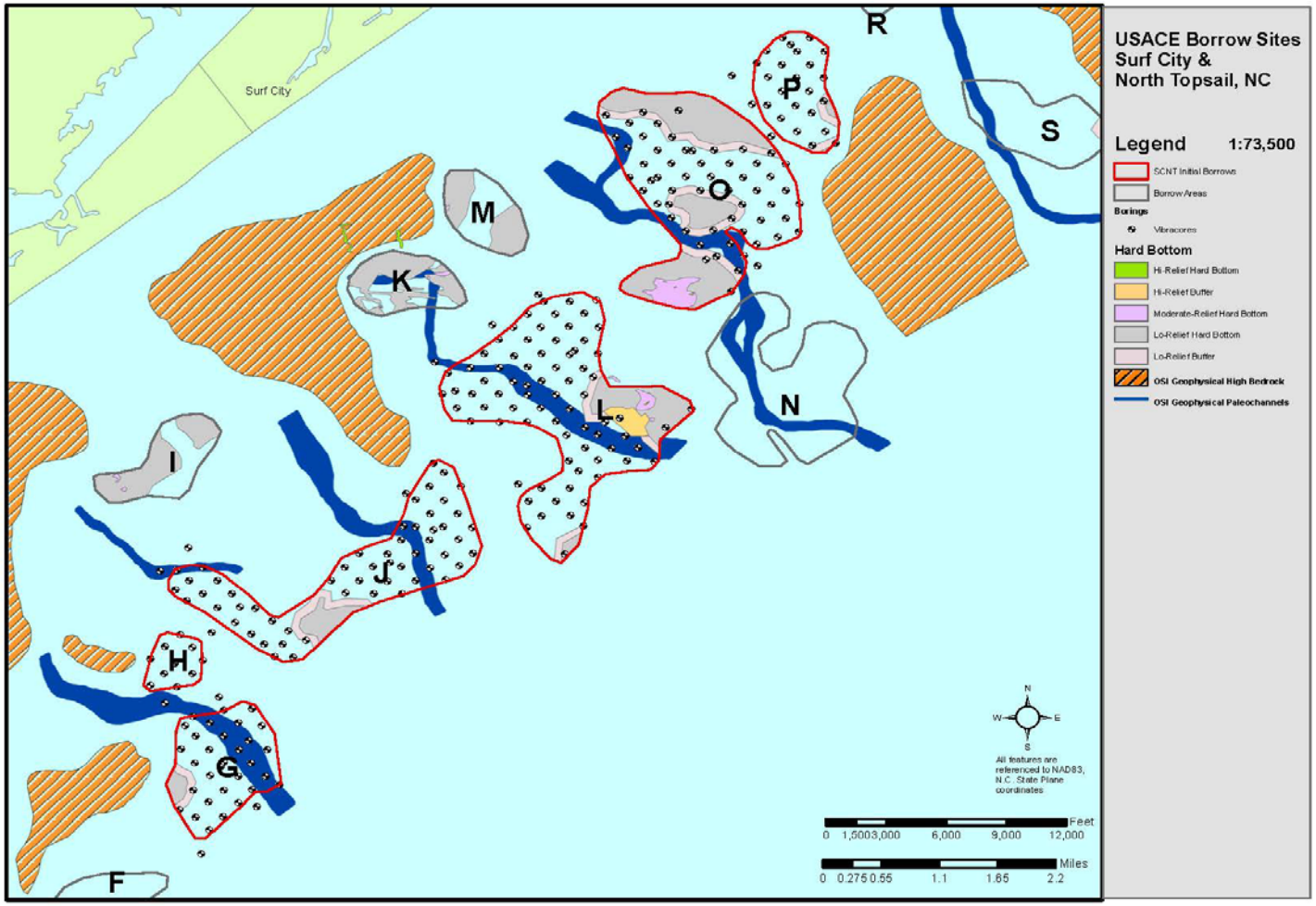

Figure 3. Borrow sources for the SCNTB CSDR project.

Based on the data provided in Table 2 and Table 3, none of the identified borrow areas exceed acceptable levels of calcium carbonate (shell) under the State standards. Locations within the borrow areas that showed thick layers of shell hash during the PED investigations were removed from the composite analysis and were not included as a part of the borrow area use plan. However, two of the borrow areas for the SCNTB CSDR project have more granular material than what is considered compatible under the State standards (Table 3). In borrow area J there is 0.4% more granular material[1] when conducting the borrow area composite analysis assuming the Wilmington District compatibility practice. The slight increase of granular material over that prescribed by the State standard for borrow area J is considered negligible and will not be further evaluated as a component of this EA. Borrow Area L contains 5.2% more granular material for the Wilmington District compatibility practice borrow composite than the State standard. Based on the laboratory sample data for the vibracore borings it is known that a large percentage of the granular material within this borrow area consists of residual shell hash (i.e. the percent of the visually estimated shell is generally 100% for most of the sieves used above the #10 sieve (2-19 mm)). There are potentially areas within borrow area L that contain shell hash that were not located through the vibracore sampling and will be managed accordingly, as discussed in Section 1.8.

1.8 Commitments for Borrow Area or Sediment Management

As discussed in the referenced Topsail Beach and SCNTB EISs, an environmental goal for both projects is to avoid and minimize adverse impacts to the maximum extent practicable. To achieve this goal with respect to sediment compatibility, borrow area contingency plans were prepared and documented to avoid placing incompatible material on the beach. These plans primarily include moving the dredge to another site within the dredged borrow area or to another borrow area in the event that incompatible material is encountered. The following language is from the "Borrow Area Contingency Plan" sections 7.04.1.7 and 7.04.4 of the Topsail and SCNTB reports respectively:

"*Furthermore, dredging production rates are specific to each dredge and its operation and can be quantified. The recommended construction plan identified in Section 7.04.1.4 discusses the use of a hydraulic cutterhead pipeline dredge during initial construction and the use of hopper dredges during each periodic nourishment event. For hydraulic cutterhead pipeline dredges, once production rates are known for a given contract, a prediction can be made of the dredging time and volume of material between the instantaneous dredge location and the next known boring location of suitable material. Thus, a qualitative and quantitative assessment can be made of whether this volume of potentially incompatible material is significant relative to the overall project. Results from these calculations will be used by appropriate United States Army Corps of*

[1] Based on the State standard of 5% more than the native beach, which is equal to 93.1%.

Engineers (USACE) personnel to determine whether the cutterhead dredge should continue in the dredge's present location or relocate. During periodic nourishment events, hopper dredges will utilize pump out facilities for each dredged hopper load. Considering hopper dredges have a maximum capacity per load and are self propelled, potential incompatible material can feasibly be managed by the Corps.

Federal and state environmental agencies will be notified if, and how much, potentially incompatible material is encountered during dredging operations. If necessary, the Wilmington District will make the decision on a suitable contingency measure which may include moving the dredge to another site within the borrow area or to one of the other designated borrow areas, depending on availability of sediment, and will notify the agencies of this contingency measure."

As discussed in Section 1.7, portions of borrow areas J and L contain higher percentages of granular material (i.e. shell hash). Referenced contingency plans will be in place to avoid and/or remove areas of unacceptable granular material. Specifically, the construction management process outlined above will be implemented to monitor for incompatible material in the dredge (i.e. hopper dredge) and/or on the beach and direct the dredge to relocate if necessary.

In addition to the dredging contingency plans to avoid incompatible material, paragraph 3(i) of 15A NCAC 07H.0312 states that "(dredging) techniques that take incompatible sediment within a borrow site or combination of sites and make it compatible with that of the recipient beach characterization shall be evaluated on a case-by-case basis by the Division of Coastal Management." For the purpose of this assessment, the following additional "dredging techniques" associated with the Topsail Beach and SCNTB projects will be implemented which will result in a reduction of fine-grained sediment placed on the beach and avoidance/removal of high percentages of granular material being placed on the beach.

- **Coarsening of sediment:** The physical activity of dredging sediment from a borrow area and creating a slurry of sediment and water for pipeline transport and placement on the beach results in a loss of fine-grained sediment into the water column and/or surf zone and the settling of coarse material within the dredge (i.e. hopper dredge) and on the beach. Consequently, the in situ percentages of fine-grained material in the borrow area are higher than what is actually placed on the beach.
- **Screening of granular material:** Portions of borrow areas J and L have slightly higher percentages of granular material (shell hash) than considered compatible under the State standards and the Wilmington District practice. If granular material is believed to be a persistent problem and opportunities to relocate the dredge to a different area are unsuccessful, screens will be placed at the end of the outflow pipe on the beach to catch and sieve granular material from the project area beaches. Physical removal of this material from the beach and/or discharge pipe through implementation of screening measures can be used to sieve out the

larger fractions while allowing for the course compatible sand to be placed on the beach. This mitigative technique will be implemented if incompatible material is encountered during dredging to allow for compatible sediment to be dredged and placed for dune and berm construction. If material is placed on the beach and is deemed incompatible, it will be tilled, sifted, removed, and properly disposed of. All shell material will be properly disposed of in previously approved disposal facilities.

2.0 Purpose and Need for the Proposed Project

Purpose. The purpose for the West Onslow Beach and New River Inlet (Topsail Beach) and SCNTB CSDR projects is to reduce damages resulting from beach erosion and waves along the ocean shoreline of the study area. To accomplish this, a dune and berm system will be constructed on Topsail Island beach segments. Sand for the beachfill would be delivered from offshore borrow areas by hydraulic dredging methodologies.

Need. Based on the Study phase geotechnical investigations, it appeared that sufficient sediment was available to meet the 50 year project life. More complete geotechnical investigations of the borrow areas have since been conducted during the PED phase for both projects. The additional analyses resulted in a refinement in the borrow area characterizations. A borrow area utilization plan needs to be developed which provides compatible beach material for a 50 year project life.

3.0 Alternatives

This chapter presents a description of the alternatives considered and how those alternatives would meet the overall purpose and need for the proposed action.

3.1 Proposed Action - Wilmington District Compatibility Practice (Preferred Alternative)

The proposed action (preferred alternative) is to review the PED geotechnical data for Topsail Beach and SCNTB CSDR project offshore borrow areas and implement a borrow area utilization plan which includes the Wilmington District's compatibility practice for beach placement of sediment. Specifically, this includes, but is not limited to, implementation of: (1) a visual classification and laboratory analysis of vibracore sediment samples, (2) use of the federal guidelines for calculating overfill ratios (Section V-4-1.e.(2)i. of the U.S. Army Corps of Engineers Engineer Manual (EM) 1110-2-1100, part V, titled Coastal Engineering Manual) and (3) an average weighted fine-grained sediment content of less than 10% passing the #200 sieve. The proposed action would provide approximately 13.6 MCY for Topsail Beach and approximately 14.6 MCY for SCNTB of compatible dredged material for placement on the beach in order to meet the 50 year project life of both projects. A combination of dredging operational techniques (i.e. coarsening of material through losses of fine-grained sediment during dredging and placement activities), construction management measures (i.e. quality control monitoring,

coordination, and contingency planning), and screening measures (i.e. physical removal of incompatible granular material) will be implemented to assure that sediment placed on the beach is "compatible" with the native sediment. The proposed action would maintain the current borrow area acreage impacts evaluated in the Topsail Beach and SCNTB EISs and avoid the impacts associated with additional offshore investigations for borrow areas and actual dredging and conveyance of sediment from those sites.

3.2 No Action

Under the no action Alternative, no changes would be made to the preliminary borrow area utilization plans identified in the Topsail Beach and SCNTB EISs. The authorized borrow areas would be utilized in compliance with the State sediment compatibility standards. The borrow areas would be used until all identified beach compatible material is exhausted. This alternative would not provide sediment volumes to support the 50 year project life of both projects. Although the no action alternative does not meet the purpose and need for this action, it was retained for comparison with the proposed plan and therefore, discussed in Section 4 of this EA.

A NEPA document would be prepared to assess additional offshore borrow area alternatives which contain compatible sediment in accordance with the State compatibility standard. Inshore and/or upland borrow area alternatives would not be considered as they had already been eliminated in the EISs based on detailed technical criteria. The NEPA document would evaluate the incremental impacts of this change.

4.0 Affected Environment and Environmental Consequences

Descriptions of affected environment for both the West Onslow Beach and New River Inlet (Topsail Beach), NC and SCNTB CSDR projects are provided in the following integrated reports:

- *U.S. Army Corps of Engineers, 2009. Final Integrated General Reevaluation Report and Environmental Impact Statement, Shore Protection, West Onslow Beach and New River Inlet (Topsail Beach), NC. February 2009.*

- *U.S. Army Corps of Engineers. 2010. Final Integrated Feasibility Report and Environmental Impact Statement, Coastal Storm Damage Reduction, Surf City and North Topsail Beach, North Carolina. December 2010.*

This section describes the resource categories which may experience an incremental change in impact from what was previously evaluated in the original EISs, as well as the environmental effects associated with the alternatives presented in Section 3.0.

Summary of General Water Quality Impacts

During construction for both alternatives, there would be elevated turbidity and suspended solids in the immediate area of hydraulic dredging and beach placement of sediment when compared to the existing non-storm conditions of the surf zone. Potential impacts of the proposed action associated with increased fine-grained sediment percentages are primarily confined to the water column and may include increased turbidity in the offshore dredging location, in the surf zone, and in the immediate area of sand deposition. Significant increases in turbidity are not expected to occur outside the immediate placement area (turbidity increases of 25 Nephelometric Turbidity Units (NTU's) or less are not considered significant). Monitoring studies done on the impacts of offshore dredging indicate that sediments suspended within the water column during offshore dredging are generally localized and rapidly dissipate when dredging ceases (Naqvi and Pullen 1983, Bowen and Marsh 1988, Van Dolah et al. 1992). The incremental change in fine-grained sediment associated with the proposed action would not change the conclusion that the impacts should be temporary and minor and are not expected to exceed the impact threshold evaluated in the original EISs.

The following sections describe potential impacts associated with each alternative relative to specific resource categories:

4.1 Surf Zone Fishes

Impacts of the Proposed Action

The proposed action would result in slight increase in the percentage of fine-grained sediment placed on the beach from what was previously evaluated in the original EISs. However, this increase would not exceed the 10% fine-grained sediment threshold established under the Wilmington District compatibility practice from which multiple successful CSDR and navigation projects have been previously constructed with no known long term adverse impacts to surf zone fishes.

As previously discussed in the referenced EISs, placement of "beach quality" sand on the beach could result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for various surf zone fish species. Feeding activities of these species may be interrupted in the immediate area of beach sand placement; however, these adaptive mobile species are expected to temporarily relocate to other areas as the project proceeds along the beach and only a small area is impacted at any given time, and once complete, organisms can recruit into the nourished area. Turbidity concentrations and suspended sediments in the surf zone increase relative to increasing percentages of fine-grained sediment during beach placement operations. However, the opportunistic behavior of these organisms within the dynamic surf zone environment enables them to adapt to short-term disturbances. The incremental increase in fine-grained material up to 10% is not expected to adversely impact surf zone fishes and their prey sources beyond the impact threshold evaluated in the original EISs.

Impacts of the No Action Alternative

No change to previous impacts previously discussed in the referenced EISs. Placement of "beach quality" sand on the beach could result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for various surf zone fish species. Feeding activities of these species may be interrupted in the immediate area of beach sand placement; however, these adaptive mobile species are expected to temporarily relocate to other areas as the project proceeds along the beach and only a small area is impacted at any given time, and once complete, organisms can recruit into the nourished area. Turbidity concentrations and suspended sediments in the surf zone increase relative to increasing percentages of fine-grained sediment during beach placement operations. However, the opportunistic behavior of these organisms within the dynamic surf zone environment enables them to adapt to short-term disturbances.

Under the No Action Alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. Additional investigations for compatible borrow material would be pursued further offshore. Borrow sources located further offshore could increase the amount of time required to complete a nourishment event.

4.2 Benthic Resources – Surf zone

Impacts of the Proposed Action

The proposed action may have short term negative impacts on intertidal macrofauna through increased turbidity in the surf zone during placement or changes in the sand grain size or beach profile. However, as previously discussed in the referenced EISs, recovery of these opportunistic infauna species occurs quickly (i.e. 1-4 years) depending on sediment compatibility (Hayden and Dolan, 1974; Reilly and Bellis, 1978; Saloman and Naughton, 1984; Nelson, 1989; Van Dolah *et al*., 1992; Van Dolah *et al*., 1993; Hackney *et al*., 1996; Jutte, P.C. *et al*., 1999; Peterson *et al*., 2000). Though the proposed action would result in an increase in allowable fine-grained material up to 10%, the incremental increase in the percentage of fine-grained sediment compared to the no action alternative is negligible with respect to recovery rates. While the proposed action will impact intertidal macrofauna within the immediate vicinity of the placement area, these effects will be localized, short-term, and reversible and would not exceed the "compatibility" context of the published literature or the impact threshold evaluated in the original EISs.

Impacts of the No Action Alternative

No change to previous impacts previously discussed in the referenced EISs. Under the no action alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. Additional investigations for compatible borrow material would be pursued further offshore. Borrow sources located further offshore could increase the amount of time required to complete a nourishment event and may indirectly impact benthic intertidal macrofauna by extending the construction schedule.

4.3 Benthic Resources—Nearshore Ocean

Impacts of the Proposed Action

Under the proposed action, there would be no change in impacts to the post dredging environment in the borrow areas. Impacts to the benthic populations of the borrow area associated with hydraulic dredging related turbidity will be localized and temporary and would not exceed the impact threshold considered in the referenced EISs.

Impacts of the No Action Alternative

Under the no action alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. In order to provide sufficient material to support the remaining nourishment events, additional borrow area investigations would likely be pursued further offshore resulting in an increase in the cumulative acreage of direct benthic resource impacts for both projects.

4.4 Essential Fish Habitat

Potential project effects on EFH species and their habitats have been previously evaluated in the referenced EISs for both projects which determined that the proposed action of dredging and beach fill construction would not have a significant adverse effect on such resources. Compliance obligations related to EFH provisions of the 1996 congressional amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (P.L. 94-265) have been satisfied through these previous consultations for both projects. Additionally, previously coordinated mitigative conditions, as well as those discussed in this document, will be implemented to minimize physical and biological impacts to EFH and to assure that any adverse effects are short term and localized on an individual and cumulative effects basis. Realizing that hard bottom communities occur within the project area and are designated Habitat Areas of Particular Concern (HAPC), additional evaluation of impacts relative to each alternative are provided below.

Hard Bottoms

While hard bottoms are most abundant in southern portions of North Carolina, they occur along the entire NC coast. Based on multiple surveys conducted offshore of Topsail Island, hard bottom communities are primarily located offshore of Surf City and North Topsail Beaches. According to Cleary (2003), the environment offshore of the SCNTB project area is characterized by undulating, relatively flat, hard-bottom platform punctuated by scattered, low-relief, hard-bottom scarps (moldic limestone and siltstone) and sediment-filled depressions. Side scan sonar and diver ground truth data were used to identify and delineate low, moderate, and high relief hard bottom features within the proposed borrow areas. Mitigative buffers were established in the SCNTB EIS to avoid direct and indirect impacts to these resources and include a 500-meter, hard-bottom buffer around high- and moderate-relief hard bottom and a 122-m (400-ft.) buffer around low-relief hard bottom. Detailed hard bottom discussions for both projects are included within the referenced EISs.

Impacts of the Proposed Action

Hydraulic dredging operations have two types of sedimentation and turbidity sources including: (1) suspension of sediment at the cutterhead and/or draghead and (2) suspension of sediment associated with hopper dredge overflow as fine-grained suspended sediments within the slurry are washed overboard through *overflow* ports. The extent of the sediment plumes produced depends on the type of dredge, how it is operated, currents, and the nature of the sediments in the dredged area. Dredging of sandy sediments minimizes the amount of turbidity and sedimentation associated with the dredging operation and reduces the suspension time and advection distance of overflow sediments. The proposed action would slightly increase the percentage of fine-grained sediment; however, the material would still be 90% sand. It is not expected that the minor increase in fine-grained sediment would result in an incremental increase in dispersion distance that would require additional buffers to avoid adverse effects to hard bottom resources. Based on the existing survey data collected of the hard bottom resources within the project are, the species present are adapted to high sedimentation rates in the natural environment. The potential increase in turbidity and sedimentation associated with the proposed action is considered negligible and would not exceed the impact threshold evaluated in the referenced EISs.

Impacts of the No Action Alternative

Under the no action alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. Additional borrow area investigations would be pursued further offshore with a high likelihood of encountering additional moderate and high relief hard bottom communities requiring additional surveys, coordination, and development of mitigative buffers.

4.5 Endangered and Threatened Species

Impacts of the Proposed Action

Potential project effects on threatened and endangered species in accordance with Section 7 of the ESA of 1973 have been previously evaluated in the referenced EISs for both projects. Implementation of the proposed action would not affect listed species or critical habitat in a manner or to an extent not considered in the previous consultation; therefore, reinitiation of consultation is not required.

Impacts of the No Action Alternative

Under the no action alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. Additional investigations for compatible borrow material, in accordance with the State compatibility standards, would be pursued further offshore. The use of additional offshore borrow material could increase the amount of time required to complete a nourishment event due to longer haul distances. The hopper

dredging window for both projects is during the colder water months from 1 December to 31 March to avoid and/or minimize sea turtle entrainment risk. Increased haul distances could require additional time to complete a nourishment event; thus, increasing the risk of sea turtle entrainment.

4.6 Recreation and Aesthetic Resources

Impacts of the Proposed Action

Under the proposed action, there would be no change in impacts to the recreation and aesthetic quality of the project areas. As discussed in Sections 4.1 and 4.2, localized and temporary impacts to fish and benthic invertebrates within the surf zone may occur; which could indirectly impact recreational fishing. However these effects would not be significant as they would only occur during construction would be limited to the area where material is being placed on the beach. Such localized temporary impact can easily be avoided by anglers in the area. As previously discussed, though the proposed action would result in slight increases in the amount fine material dredged from the borrow site, the in-place fill material on the beach would be coarser and would not be aesthetically discernible by recreational users.

Impacts of the No Action Alternative

Under the no action alternative, available borrow area resources would be exhausted prior to the 50 year life of both projects. Additional investigations for compatible borrow material, in accordance with the State criteria, would be pursued further offshore. The use of additional offshore borrow material could increase the amount of time required to complete a nourishment event due to longer haul distances. The hopper dredging window for both projects is during the colder water months from 1 December to 31 March, outside of the peak recreation season, to avoid and/or minimize resource impacts. Increased haul distances could require additional time to complete a nourishment event; thus, adding risk of additional recreation impacts.

4.7 Environmental Impact Comparison of Alternatives

Table 4. Summary and comparison of impacts to each resource category relative to the preferred and no action alternatives.

Resource	Proposed Action	No Action Alternative
Water Quality	• Localized short term increase in turbidity within the offshore dredging location, in the surf zone, and in the immediate area of sand deposition. • The percentage of increase in fine-grained sediment is negligible and impacts are not expected to exceed the threshold evaluated in the original EISs.	• Localized short term increase in turbidity within the offshore dredging location, in the surf zone, and in the immediate area of sand deposition. • Additional borrow areas would likely be pursued further offshore resulting in the potential cumulative increase in total area of dredging related turbidity within the water column offshore.
Surf Zone Fishes	• Localized short term turbidity disturbance confined to the beach placement location during construction. • The percentage of increase in fine-grained sediment is negligible and impacts are not expected to exceed the threshold evaluated in the original EISs.	• Localized short term turbidity disturbance confined to the beach placement location during construction. • Additional borrow areas would likely be pursued further offshore resulting in the potential increase in construction duration and risk of extending into the peak recruitment and abundance periods of surf zone fishes.

Resource	Proposed Action	No Action Alternative
Benthic Resources – Surf Zone	• Localized, short-term, and reversible impacts to benthic intertidal macrofauna from direct burial, increased turbidity in the surf zone, or changes in the sand grain size or beach profile. • The percentage of increase in fine-grained sediment is negligible and impacts are not expected to exceed the threshold evaluated in the original EISs.	• Localized, short-term, and reversible impacts to benthic intertidal macrofauna from direct burial, increased turbidity in the surf zone, or changes in the sand grain size or beach profile. • Additional borrow areas would likely be pursued further offshore resulting in the potential increase in construction duration and risk of extending into the peak recruitment and abundance periods of intertidal macrofauna.
Benthic Resources - Nearshore Ocean	• Localized and temporary turbidity impacts would not exceed the impact threshold considered in the referenced EISs.	• Localized and temporary turbidity impacts. • Additional borrow areas would likely be pursued further offshore resulting in the potential increase in cumulative acreage of direct benthic resource impacts.
EFH – Hard Bottoms	• The percentage of increase in fine-grained sediment is negligible and would not result in an incremental effect not previously evaluated or result in an increase in sediment dispersion that would require a reevaluation of buffer distances.	• Additional borrow areas would likely be pursued further offshore with a high likelihood of encountering additional moderate and high relief hard bottom communities requiring additional surveys, coordination, and development of mitigative buffers.

Resource	Proposed Action	No Action Alternative
Endangered and Threatened Species	• Implementation of the proposed action would not affect listed species or critical habitat in a manner or to an extent not considered in the previous consultation; therefore, reinitiation of consultation is not required.	• Additional borrow areas would likely be pursued further offshore. Increased haul distances could require additional time to complete a nourishment event; thus, increasing the risk of sea turtle entrainment.
Recreation and Aesthetic Resources	• The percentage of increase in fine-grained sediment is negligible and would not result in a discernible increase in impacts to recreational and aesthetic resources.	• Additional borrow areas would likely be pursued further offshore. Increased haul distances could require additional time to complete a nourishment event and extend into the peak recreation season.

4.8 Unavoidable Adverse Impacts of the Proposed Action

Construction of the proposed action would not result in incremental impacts of significance beyond those evaluated as a component of the referenced EISs for both projects. Impacts would be short term and immediately confined to the actual dredging and placement locations. Implementation of previously developed contingency plans as well as the additional measures discussed in Section 1.8 would further minimize the risk of environmental impacts.

4.9 Cumulative Impacts

Cumulative effects have been defined by the CEQ in 40 CFR 1508.7 as: "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." The cumulative impacts of the Topsail Beach and SCNTB projects were discussed in the referenced EISs. The cumulative impacts associated with the proposed action would not be of significance beyond what was evaluated within the original cumulative effects analysis for both projects. However, under the no action alternative there would be cumulative impacts associated with the incremental increase in the total acreage of borrow areas impacted offshore and the potential increase in total construction time to complete both projects.

5.0 Compliance with Environmental Requirements

The incremental changes documented in this EA associated with the proposed action will not change environmental compliance determinations made in the EISs for both the Topsail Beach and SCNTB projects relative to pertinent Executive Orders and Federal, State, and local requirements. Though no significant changes are expected, compliance with the North Carolina Coastal Management Program warrants additional discussion considering that pertinent issues relative to the State sediment compatibility standards.

5.1 North Carolina Coastal Management Program

The proposed action will be conducted in the designated coastal zone of the State of North Carolina. Pursuant to the federal CZMA of 1972, as amended (PL 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 will occur. By letters dated November 7, 2006 (CD06-0S4; DCM#20060059) and April 16, 2010 (CD10-017; DCM#20100006) the NCDCM concurred that the proposed Federal activities are consistent, to the maximum extent practicable, with the enforceable policies of North Carolina's coastal management program for both the Topsail Beach and SCNTB projects respectively. All conditions of these consistency determinations will be followed.

The Topsail Beach consistency determination notes the following:

"Should the proposed action be modified, a revised consistency determination could be necessary. This might take the form of either a supplemental consistency determination pursuant to 15CFR 930.46 or a new consistency determination pursuant to 15CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered by the proposed development, a supplemental consistency certification may be required."

As previously discussed, though the State compatibility standards have since been passed by the NCCRC they have not been submitted to the NOAA's OCRM for consideration as a federally approved component of the State's coastal management program. In the absence of this OCRM approval, the State sediment compatibility standards are not required as a component of the Federal consistency determination in accordance with the CZMA. Additionally, though this EA evaluates the potential incremental impacts of utilizing a borrow area plan which adheres to the Wilmington District compatibility practice the incremental impacts do not exceed the impact threshold discussed in the referenced EISs for both the Topsail Beach and SCNTB projects. The projects remain as they were previously described. The Corps does not consider this to be a project modification and; therefore, does not believe that a supplemental or new consistency determination is warranted.

6.0 Agency and Public Involvement

The EA is being circulated for a 30-day review and comment period to the agencies and individuals listed below:

Federal Agencies

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Interior
U.S. Fish and Wildlife Service
Federal Highway Administration
Federal Emergency Management Agency
US Coast Guard Marine Safety Office
Advisory Council on Historic Preservation
DOI, Office of Environmental Policy & Compliance
US Department of Housing & Urban Development
US Forest Service
Bureau of Ocean Energy Management
National Marine Fisheries Service - Southeast Regional Office
National Marine Fisheries Service – Habitat Conservation Division

State Agencies

NC Department of Environment and Natural Resources
NC Wildlife Resources Commission
NC Division of Coastal Management
NC Coastal Land Trust
NC Department of Transportation
NC Department of Cultural Resources
NC Fisheries Association
NC Department of Administration - State Environmental Review Clearinghouse
NC Commission of Indian Affairs
NC Shellfish Sanitation

Elected Officials

Town of Topsail Beach, NC
Town of Surf City, NC
Town of North Topsail Beach, NC

Local Agencies/Entities

County Administrators
County Emergency Management Offices

County Health Departments
City Managers
County Managers
Local Newspapers and Postmasters
Local Libraries
Local CAMA officers
Local Commissioners

Universities

University of NC at Wilmington
Duke University
Cape Fear Community College

Conservation Groups

Environmental Defense Fund
National Wildlife Federation
Karen Beasley Sea Turtle Hospital
The Wilderness Society
National Audubon Society
North Carolina Coastal Federation
The Nature Conservancy

7.0 Point of Contact

Any comments or questions regarding this EA should be addressed to:

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8.0 Finding

The Proposed action would not significantly impact the quality of the human environment. If this opinion is upheld following circulation and review of this EA, a Finding of No Significant Impact (FONSI) will be signed and circulated.

9.0 Preparers

This document was prepared and reviewed by the US Army Corps of Engineers Wilmington District.

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15A NCAC 07H .0312, Technical Standards for Beach Fill Projects (http://www.nccoastalmanagement.net/Rules/7H%200312.pdf)

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APPENDIX A

West Onslow Beach and New River Inlet (Topsail Beach) and Surf City and North Topsail Beach Coastal Storm Damage Reduction Projects

A Summary of Report Sections Referencing the North Carolina State Sediment Compatibility Standards

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1.0 Introduction

A comprehensive review of all Final report documents and appendices for both the Topsail Beach and Surf City and North Topsail Beach (SCNTB) Coastal Storm Damage Reduction (CSDR) projects was conducted. All sections containing reference to sediment compatibility and the North Carolina (NC) state sediment compatibility standards were copied and organized in this appendix relative to the project, report section, and appendix titles. References to sediment compatibility commitments were made as a component of the NEPA documentation, USFWS Fish and Wildlife Coordination Act (FWCA) recommendations, and the Section 7 Endangered Species Act Biological Assessment.

2.0 Topsail Beach and SCNTB Report Sections Referencing Sediment Compatibility

Topsail Beach CSDR Project

U.S. Army Corps of Engineers, 2009. Final Integrated General Reevaluation Report and Environmental Impact Statement, Shore Protection, West Onslow Beach and New River Inlet (Topsail Beach), NC. February 2009.

- **5.06.3 Borrow site comparisons (pg.104)**

A sediment compatibility analysis was performed for all potential borrow areas for this project. The analysis compared the grain size of the "native beach" or the "reference beach" with the material in the potential borrow area. The overfill ratio is the primary indicator of the compatibility of the borrow material to the beach material, with a value of 1.00 indicating that one cubic yard of borrow material is needed to match one cubic yard of beach material. The procedure for calculating the overfill ratio for borrow areas in relation to the reference beach was performed in accordance with the U.S. Army Corps of Engineers Coastal and Hydraulics Laboratory Automated Coastal Engineering System (ACES) software version 4.01**.**

- **8.03.3.3 Sediment Compatibility (pg. 200)**

The compatibility analysis compared the grain size of the "native beach" or the "reference beach" with the material in the proposed borrow areas. The overfill ratio is the primary indicator of the compatibility of the borrow material to the beach material, with a value of 1.00 indicating that one cubic yard of borrow material is needed to match one cubic yard of beach material. The procedure for calculating the overfill ratio for borrow areas in relation to the reference beach was performed in accordance with the

U.S. Army Corps of Engineers Coastal and Hydraulics Laboratory Automated Coastal Engineering System (ACES) software version 4.01. This procedure is discussed in section V-4-1.e.(2)i. of the U.S. Army Corps of Engineers Engineer Manual (EM) 1110-2-1100, part V, titled Coastal Engineering Manual. As stated in this manual, an overfill ratio of 1.00 to 1.05 is considered optimum for sediment compatibility. However, obtaining this level of compatibility is not always possible due to limitations in available borrow sites. The overfill ratios for all of the potential borrow areas for the Topsail Beach project are shown in Table 7.1. Table 7.1 also illustrates the average silt content (#200 sieve) was less than 10% for all borrow areas.

- **11.03 Fish & Wildlife Coordination (pg. 243)**

5. USFWS Recommendation: If beach construction is ultimately undertaken, the fill material should have a high degree of compatibility with the native beach. The North Carolina Sediment Criteria Rule, contained in the Technical Standards for Beach Fill Projects (15A NCAC 07H .0312), should be used in regard to grain size and percent weigh of calcium carbonate. In addition, compatibility should be established for other important characteristics such as organic content, heavy mineral content, and color.

Corps Response: The proposed borrow area sediments for this project will comply with grain size and percent weight requirements specified in 15A NCAC 07H .0312, Technical Standards for Beach Fill Projects. However, there are no Federal or State requirements for compatibility in regards to organic content, heavy mineral content, or color. Therefore, a compatibility analysis for these items will not be conducted.

6. USFWS Recommendation: If beach construction is ultimately undertaken, there should be a plan to monitor the quality of the fill material as it placed on the beach. There should be an effective procedure for stopping operations if inappropriate material is being pumped onto the beach. Since such real time protective measures may not be completely effective, there should also be a plan for inspecting the constructed beach for areas of incompatible material and removing such material before the start of the nest sea turtle nesting season.

Corps Response: See Section 7.04.1.7 of the final report titled, "Borrow Area Contingency Plan." This section thoroughly discusses the Corps intent to perform rigorous boring analyses of proposed borrow areas in order to minimize the risk of placing incompatible material on the beach as well as contingency measures for cutterhead pipeline and hopper dredge operations if incompatible material is unexpectedly encountered. Throughout the duration of construction operations, the Corps employs full time construction inspection personnel to perform on-sight inspections of the project operations to assure quality control and compliance with contract specifications.

- **Appendix I – Biological Assessment**

Based on geophysical analyses and sediment compatibility analyses from identified borings (Appendix C), the dredged material to be placed on the beaches averages > 90 percent sand. Most of the remaining material consists of fine grain particles (silt and clay), which will not remain on the beach. These fines may temporarily lead to a darkening of the beach. If this darkening persisted it could raise the temperature of nests in the area, and potentially change the sex ratio of the hatchlings. If sand compaction in the nourishment area exceeds 500 cone penetrometer units (CPUs), tilling will be performed, and scarps over 18 inches and 100 ft. or longer will be graded.

- **Appendix T – Comments and Responses**

3.30.12 NCDCM Comment: Only beach quality sand shall be used for beach nourishment purposes. Should the dredging operations encounter sand deemed non-compatible with native grain size or sorting characteristics of the native beach, the dredge operator shall immediately cease operation and contact the NCDCM. Dredge operations will resume only after resolution of the issue of sand compatibility.

Corps Response: All borrow areas will be characterized to comply with the new Coastal Resources Commission sediment compatibility rules. As discussed in Section 8, Environmental Effects, the use of compatible beach fill material will have minimal resources impacts. Section 7.04.1.7, Borrow Area Contingency Plan, describes the process to comply with the compatibility rules.

3.30.13 NCDCM Comment: The Corps should be advised that the Coastal Resources Commission (CRC) is currently developing new sediment compatibility standards. Once these new standards are passed by the CRC, and assuming these standards are approved by OCRM as a federally approved component of the State's coastal management program, these new standards will apply to future beach nourishment projects from that point forward. The Corps is strongly encouraged to closely follow the development of these new standards. The Corps should also incorporate any such standards into the planning process for the proposed project.

Corps Response: Agree. Proposed borrow area sediments meet the new CRC compatibility standards.

3.31.7 Environmental Defense Comment: As the Corps is well aware, the Coastal Resources Commission is in the process of finalizing proposed sediment compatibility standards for beach fill projects. This project would be subject to those rules should it move forward and we assume that the standards for fine material, coarse material and carbonate content' are being kept in mind as further characterization of borrow areas occurs.

Corps Response: Noted. The Corps evaluated the potential borrow areas for this project in accordance with the most recent CRC proposed sediment compatibility standards dated March 24, 2006. The current proposed borrow areas meet these standards and will be further evaluated to comply with the CRC proposed characterization standard for borrow sites as stated in section 7.04.1.6.

3.31.8 Environmental Defense Comment: Finally, we are supportive of the Corps effort to develop a borrow area contingency plan, and look forward to evaluating this in the final EIS. Presumably this would include mitigation in the event of unexpectedly encountering incompatible material.

Corps Response: Noted. The project will comply with the new Coastal Resources Commission sediment compatibility rules. Beach fill material quality will be achieved through characterization of the borrow material with an intense array of borings with horizontal spacing of 500 feet to 1,000 feet. Mitigation, if required, will be in accordance with Coastal Resources Commission recommendations.

North Carolina Division of Coastal Management (NCDCM) – Letter dated 7 November 2006

Subject: *CD06-0S4 - Consistency Concurrence for Proposed Shore Protection Project at Topsail Beach, Onslow and Pender Counties, North Carolina (DCM#20060059)*

- Only beach quality sand shall be used for beach nourishment purposes. Should the dredging operations encounter sand deemed non-compatible with native grain size or sorting characteristics of the native beach, the dredge operator shall immediately cease operation and contact the NCDCM. Dredge operations will resume only after resolution of the issue of sand compatibility.

- The Corps should be advised that the Coastal Resources Commission (CRC) is currently developing new sediment compatibility standards. Once these new standards are passed by the CRC, and assuming these standards are approved by OCRM as a federally approved component of the State's coastal management program, these new standards will apply to future beach nourishment projects from that point forward. The Corps is strongly encouraged to closely follow the development of these new standards. The Corps should also incorporate any such standards into the planning process for the proposed project.

- Should the proposed action be modified, a revised consistency determination could be necessary. This might take the form of either a supplemental consistency determination pursuant to 15CFR 930.46. or a new consistency determination pursuant to 15CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered by the proposed development, a supplemental consistency certification may be required. If you have any questions, please contact Stephen Rynas at 252-808-2808.

Surf City and North Topsail Beach CSDR Project

U.S. Army Corps of Engineers. 2010. Final Integrated Feasibility Report and Environmental Impact Statement, Coastal Storm Damage Reduction, Surf City and North Topsail Beach, North Carolina. December 2010.

- **7.03.6 Environmental Monitoring and Other Commitments (pg. 120)**

Table 7.2

(1) Only beach compatible sediment (i.e., in accordance with North Carolina Sediment Criteria Rule Language) would be placed on the beach as a component of this project (Sections 10.06.1 and 11.02)

- **7.04.1 Borrow Area Material Compatibility (pg. 130)**

North Carolina implemented new beach fill standards in 2007, which require compatibility of the native beach with borrow sources in regards to the percentage of silt (< 0.062 mm), granular sediment, (< 4.76 mm and ≥ 2.0 mm), gravel (≥ 4.76 mm), and calcium carbonate. The state still needs to gain approval from NOAA to add the new standards to their Coastal Zone Management Program. If NOAA approves the changes, then the new criteria would need to be met in order for the project to be consistent with the Coastal Zone Management Act. A visual estimate of shell content can be used in lieu of carbonate weight percent for samples collected before the effective date of beach fill rules that applies to the Surf City/North Topsail Beach project. The standards require that percent silt, granular sediment, and gravel in borrow material not exceed the amount found in the native beach plus 5 percent, and the percent carbonate in borrow material not exceed the amount found in the native beach plus 15 percent. Those characteristics for the native beach and borrow material are given in Table 7.4. The analysis for the native beach material indicates the silt, granular sediment, and gravel content are 1.2, 1.1, and 0.5 percent, respectively. The visual shell content for the native beach is 9 percent. After incorporating the tolerance permitted by the beach fill standards, the silt, granular sediment, gravel, and shell content permitted for borrow areas to be used for Surf City/North Topsail Beach are 6.2, 6.1, 5.5, and 24 percent, respectively. As shown in Table 7.4, all the borrow areas comply with the beach fill standards regarding the percentage of silt with the exception of borrow areas A (6.6 percent) and L (6.3 percent). Both of those borrow areas exceed the standard slightly by 0.4 and 0.1 percent, respectively. All the borrow areas comply with the beach fill standards regarding the percentage of granular sediment with the exception of borrow areas F (7.0 percent) and S (6.6 percent), which exceed the standard by 0.9 and 0.5 percent, respectively. All the borrow areas comply with the beach fill standards regarding the percentage of gravel sediment with the exception of borrow areas F (8.5 percent) and P (6.6 percent), which

exceed the standard by 3.0 and 1.1 percent, respectively. All the borrow areas comply with the beach fill standards regarding the percentage of shell content (carbonate). The borrow areas in which the standards are exceeded for the various characteristic (A, F, L, S, and P) have been retained because all borrow areas would be further characterized during the design phase of the project. Additional vibracores would be performed to comply with the beach fill standards of 1 core/acre or 1,000 foot spacing. Vibracores would be performed to produce a density of 1,000 foot spacing in a borrow area before its use as a borrow source.

Contingency measure if incompatible material is encountered

Federal and state environmental agencies would be notified if, and how much, potentially incompatible material is encountered during dredging operations. If necessary, the Wilmington District would make the decision on a suitable contingency measure that could include moving the dredge to another site in the borrow area or to another borrow area, depending on availability of sediment, and would notify the agencies of the contingency measure.

- **8.01.6 Benthic Resources – Beach and Surf Zone (pg. 164)**

To assure compatibility of nourishment material with native sediment characteristics and minimize impacts to benthic invertebrates from the placement of *incompatible* sediment, all sediment identified for use for the project would meet the *Technical Standards for Beach fill Projects* (15A NCAC 07H.0312) identified in the NCDCM rule language.

- **8.01.8.2 Impacts on Hard Bottoms (pg. 173)**

Hopper Dredge—Sedimentation and Turbidity

The distance that sediment plumes can extend depends on the type of dredge, how it is operated, currents, and the nature of the sediments in the dredged area. As discussed in Section 7.03.6, only beach-compatible, sandy sediments would be used for this project in accordance with the North Carolina sediment compatibility rules. Dredging of sandy sediments would minimize the amount of turbidity and sedimentation associated with the dredging operation and would reduce the suspension time and advection distance of overflow sediments.

- **8.03.3.3 Sediment Compatibility (pg. 200)**

The compatibility analysis compared the grain size of the *native beach* or the *reference beach* with the material in the proposed borrow areas. The overfill ratio is the primary indicator of the compatibility of the borrow material to the beach material, with a value of 1.00 indicating that one cubic yard of borrow material is needed to match one cubic yard of beach material. An overfill ratio of up to 1.5 is generally considered acceptable as a

match of compatibility. The procedure for calculating the overfill ratio for borrow areas in relation to the reference beach was performed in accordance with the Corps Coastal and Hydraulics Laboratory Automated Coastal Engineering System (ACES) software version 4.01.

- **11.03 Fish and Wildlife Coordination (pg. 243)**

5. USFWS Recommendation: If beach construction is ultimately undertaken, the fill material should have a high degree of compatibility with the native beach. The North Carolina Sediment Criteria Rule, contained in the Technical Standards for Beach fill Projects (15A NCAC 07H .0312), should be used in regard to grain size and percent weight of calcium carbonate. In addition, compatibility should be established for other important characteristics such as organic content, heavy mineral content, and color.

Corps Response: The proposed borrow area sediments for this project would comply with grain size and percent weight requirements specified in 15A NCAC 07H .0312, *Technical Standards for Beach fill Projects*. The technical standards require compatibility of the native beach with borrow sources in regards to the percentage of silt, granular sediment, gravel, and calcium carbonate (or shell content for projects initiated before implementation of the rules). However, no federal or state requirements exist for compatibility in regards to organic content, heavy mineral content, or color. Therefore, a compatibility analysis for those items would not be conducted. The standards require that percent silt, granular sediment, and gravel in borrow material not exceed the amount found in the native beach plus 5 percent and the percent carbonate in borrow material not exceed the amount found in the native beach plus 15 percent. The silt, granular sediment, gravel content, and visual shell content for the Surf City/North Topsail Beach project are 1.2, 1.1, 0.5, and 9 percent respectively. Incorporating the tolerance permitted by the beach fill standards results in the following criteria: silt (6.2 percent), granular sediment (6.1 percent), gravel (5.5 percent), and calcium carbonate (24 percent). On the basis of current vibracore data, borrow areas A, F, L, S, and P exceed the standards for various characteristics. However, during the PED phase of the project additional borings or geophysical surveys would be performed to better delineate the borrow area boundaries and material types, with respect to the state sediment criteria rule, to ensure compatibility of beach fill material before placement. Because that additional analysis was included during PED, the borrow areas have been retained for further characterization. Before initial construction and each nourishment event, all material dredged for placement on the beach would comply with the sediment criteria rule.

- **Appendix T – Public Comments and USACE Responses**

NC State Consistency Concurrence

5. COMMENT SOURCE: Public/State Consistency

COMMENT: Only beach quality sand shall be used for this project. Should the dredging operations encounter sand deemed non-compatible with native grain size or sorting characteristics of the native beach, the dredge operator shall immediately cease operation and contact the DCM. Dredge operations will resume only after resolution of the issue of sand compatibility is achieved.

RESPONSE: Concur. Table 7.1 (Project Commitments) incorporates these commitments for assurance of sediment compatibility.

North Carolina Division of Coastal Management (NCDCM) – Letter dated April 16, 2010
Subject: *CD10-017- Consistency Concurrence for Proposed Implementation of the Integrated Feasibility Report and EIS Regarding Coastal Storm Damage Reduction at Surf City and North Topsail Beach, Onslow and Pender Counties, NC (DCM#20100006)*

- Only beach quality sand shall be used for this project. Should the dredging operations encounter sand deemed non-compatible with the native grain size or sorting characteristics of the native beach, the dredge operator shall immediately cease operation and contact the DCM. Dredge operations will resume only after the issue of sand compatibility is resolved.