US Army Corps
of Engineers
Wilmington District

APPENDICES

Morehead City Harbor
Morehead City, NC

FINAL

Integrated Dredged Material Management Plan
And Environmental Impact Statement

Port of Morehead City, NC

June 2016

Morehead City Harbor
Morehead City, NC
FINAL
Integrated Dredged Material Management Plan (DMMP)
and Environmental Impact Statement (EIS)

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MOREHEAD CITY HARBOR
INTERIM OPERATIONS PLAN
June 2009

MOREHEAD CITY HARBOR, NC O&M
Interim Operations Plan – June 2009

1.0 EXECUTIVE SUMMARY

The Wilmington District is committed to developing and executing a Dredged Material Disposal Plan (DMMP) for the Morehead City Harbor, NC (MHC) Federal navigation project. Work on the DMMP commenced in fiscal year 2009, with completion and implementation of the DMMP currently scheduled for mid fiscal year 2011.

During this three year duration it is the Wilmington District's intent to implement an interim maintenance dredging plan (Interim Operations Plan) for the MHC project. Development of this Interim Operations Plan was performed by utilizing historical shoaling rates, actual maintenance dredging quantities, recent geotechnical data, and current channel and disposal area conditions.

Below is a summary of the Interim Operations Plan. A more detailed description of the plan can be found in Section 2.0 and the attached figures.

	Dredging Area	Disposal/Placement Location	Approx. Quantity
Year-1	Ocean Bar	Fort Macon State Park / Atlantic Beach	1,100,000 cubic yards
Year-2	Ocean Bar	Near-shore Disposal Area	250,000 cubic yards
	Inner Harbor	Brandt Island	700,000 cubic yards
Year-3	Ocean Bar	Near-shore Disposal Area	750,000 cubic yards
	Inner Harbor	Offshore Disposal Area	100,000 cubic yards

Below is a summary of the projected funding for the Interim Operations Plan through 2012 and the DMMP through 2011.

PROJECTED 3-YEAR FUNDING REQUIREMENTS
MOREHEAD CITY HARBOR, NC

ACTIVITY	FY 10	FY 11	FY 12	TOTAL
	($000)	($000)	($000)	($000)
CESAW Labor	250	150	150	550
Hydro Surveys	250	250	250	750
SNELL Operations	100	50	50	200
Contractor Earnings	8,400	5,400	3,300	17,100
3-Year Ops Plan TOTAL	**9,000**	**5,850**	**3,750**	**18,600**
DMMP	500	500		1,000
3-Year Ops Plan and DMMP TOTAL	**$9,500**	**6,350**	**$3,750**	**$19,600**

2. INTERIM OPERATIONS PLAN

It is the Wilmington District's intent to provide unrestricted navigation within authorized project dimensions of the MHC project while striving for the least-cost alternative, consistent with sound engineering practices, and in an environmentally acceptable manner. The District proposes to accomplish this mission through execution of various maintenance dredging contracts on a 3-year dredging cycle. This plan was developed to provide an acceptable means of maintaining MHC harbor on an interim basis while the DMMP is being developed. The final DMMP may or may not be similar to this interim plan.

The Wilmington District has structured the Morehead City Harbor maintenance dredging into a three-year dredging cycle. The Interim Operations Plan was developed with using historical shoaling and dredging quantities, recent geotechnical data, and current channel and disposal area conditions.

The following paragraphs provide a detailed description of the dredging operations planned for 2009 – 2012 (fiscal year 2010 – 2012).

2.1 Operations Plan Year-1

In Year-1, the Wilmington District plans to solicit and execute a single maintenance dredging contract. The contract would commence approximately mid-November 2009 with completion in the mid-May 2010 timeframe (see Figure entitled Year-1).

Order of Work: Approximately 1.1 million cubic yards of dredged material would be removed from the MHC Ocean Bar portion of the project and placed along the shorelines of Fort Macon State Park and Atlantic Beach. Range A would be dredged to the authorized project depths 47-ft plus two feet of allowable overdepth. The Cut-off and portions of Range B will be dredged to the authorized project depth of 45-ft plus two feet of allowable overdepth.

It should be noted that, although Range A is authorized to 47-ft plus two feet of allowable overdepth, in recent years the Wilmington District has maintained this channel to only 45-ft plus two feet of allowable overdepth based on current user traffic needs. However, under this plan in Year-1, the Wilmington District will perform maintenance dredging of Range A to the authorized depth of 47-ft plus two feet of allowable overdepth. The intent of this advanced-maintenance dredging is to maximize the dredging volume in Year-1 and minimize, or possibly eliminate, the need for dredging within the Ocean Bar portions of the project in Year-2.

2.2 Operations Plan Year-2

In Year-2, the Wilmington District plans to solicit and execute an Inner Harbor Maintenance Dredging Contract and a possible Ocean Bar contract if shoaling within the Ocean Bar warrants maintenance dredging.

Maintenance Dredging Contract 1: Approximately 700,000 cubic yards of dredged material would be removed from the MHC Inner Harbor portion of the project and disposed of within the confined disposal area of Brandt Island. The Northwest and West Legs would be dredged to 36-ft plus one foot of allowable overdepth. The East Leg and Range C would be dredged to 46-ft plus one foot of allowable overdepth. It is anticipated that this work would be accomplished with a 16-inch hydraulic pipeline dredge.

Note: maintenance dredging within portions of the MHC Inner Harbor reaches has historically been accomplished every two years. However, Year-2 dredging will require the contractor to remove dredge material to 36-ft plus one foot of allowable overdepth in West and Northwest Legs and 46-ft plus one foot of allowable overdepth in Range C and East Leg. The intent of lowering the project depth by one foot is to decrease the frequency of dredging operations from every two years to every three years. Although a minimal amount of Inner Harbor maintenance dredging may occur in Year-3, the majority will be accomplished in Year-2 and again in Year-5 if necessary.

Maintenance Dredging Contract 2: The amount of maintenance dredging in Range A, Cut-off and Range B is anticipated to be minimal due to the advanced maintenance dredging performed in Year-1. Therefore, the amount of required dredging in Year-2 will likely be a small quantity (250,000 cubic yards or less), or may not warrant any maintenance dredging. In either case, any necessary Ocean Bar dredging in Year-2 would likely be incorporated into the annual Wilmington Harbor Outer Ocean Bar maintenance dredging contract. Evaluation of channel conditions would be based on the 45-ft plus two feet of allowable overdepth (current user traffic draft requirements).

If needed, approximately 250,000 cubic yards of dredged material would be removed from Range A, Cut-off and Range B and placed within the existing nearshore placement area, utilizing the ocean dredged material disposal site (ODMDS) during adverse weather conditions

(see Figure entitled Year-2). This dredging would take place within environmental dredging window of January 1 through March 31, 2011.

2.3 Operations Plan Year-3

In Year-3, the Wilmington District would solicit and execute a single maintenance dredging contract. The contract would commence approximately January 1, 2012 with completion by March 31, 2012. The contract would likely consist of a base contract with a contract option (see Figure entitled Year-3).

Base Contract: Approximately 750,000 cubic yards of dredged material would be removed from the MHC Ocean Bar portion of the project with an Ocean Certified Hopper Dredge and placed within the existing Nearshore Placement Area, utilizing ODMDS during adverse weather conditions. Range A, Cut-off and Range B would be dredged to a depth of 45-ft plus two feet of allowable overdepth.

Potential Contract Option: Based on need, approximately 100,000 cubic yards of dredged material would be removed from portions of the MHC Inner Harbor and disposed of within the ODMDS. The Northwest and West Legs would be dredged to 35-ft plus two foot of allowable overdepth and the East Leg and Range C would be dredged to 45-ft plus two foot of allowable overdepth.

2.4 Potential Continuation of Operations Plan

Completion of the MHC DMMP will provide direction for disposal of dredged material for the at least the next 20 years. The DMMP is scheduled for completion in mid-2011. Under the current schedule, the first possible year to implement dredging operations under the MHC DMMP is FY 2013, as budget submission for FY 2013 is in June of 2011. The Wilmington District will request the appropriate level of funding, in alignment with the MHC DMMP, in June 2011 for FY 2013.

3.0 HISTORICAL MAINTENANCE OPERATIONS

The Wilmington District has provided unrestricted navigation within the MHC Harbor Project through various maintenance dredging techniques and associated disposal locations throughout the life of the project. However, MHC dredging techniques were altered in 2005 following the placement of an unacceptable amount of fine-grained material onto the shoreline of Atlantic Beach and Fort Macon State Park.

3.1 Inner Harbor Channels

From the mid-1970s through 2005, the Wilmington District performed Inner Harbor maintenance dredging on an approximately 2-year dredging cycle. The Inner Harbor material was temporarily stored within Brandt Island. Approximately every 10 years, Brandt Island material was removed, via a 30-inch hydraulic pipeline dredge, and pumped to the shoreline of Fort Macon State Park and Atlantic Beach. Disposal of Brandt Island material onto the shorelines of Fort Macon State Park and Atlantic Beach was intended to mitigate for any erosion caused by channel maintenance. The Brandt Island “pumpouts” occurred in 1986, 1994 and 2005.

3.2 Ocean Bar Channels

During the same timeframe, and until 1995, dredged material from the Ocean Bar portions of the channel, to include Range A, Cut-off and Range B, was removed from the channel and placed into the ODMDS. In 1995, the Wilmington District altered the primary disposal location for the Range A, Cut-off and Range B portions of the project from the ODMDS to the "Near-shore Placement Area." This change in project disposal practices was done, in part, to satisfy new State rules indicating a preference for the retention of beach-quality sand within the littoral system.

3.3 Brandt Island Pump-out – 2005

In 2005, the Wilmington District performed the last "pumpout" of Brandt Island onto the shoreline of Fort Macon State Park and Atlantic Beach. During this operation, a considerable amount of fine-grained material was placed onto the shoreline.

3.4 Geotechnical Investigation – 2006

Following the 2005 pumpout, the Wilmington District performed extensive geotechnical investigation within the MHC project. Based on the results from this sampling effort and the State rules related to beach disposal, the Wilmington District re-classified the Inner Harbor dredged material as non-beach suitable material. Due to this re-classification, further pumpouts are no longer an option.

4.0 COMPLIANCE WITH FEDERAL STANDARD FOR DREDGING

In the first NEPA document for this project, completed in 1976, CESAW stated that it would place beach quality material dredged from the inner harbor by pipeline dredge into Brandt Island. CESAW stated in its FEIS that in order to maintain capacity in the disposal area, and to "stabilize the shoreline that is influenced by the inlet," it would pump Brandt Island out every 8 to 10 years and place the material along 25,000 linear feet of shoreline (essentially the beach at Fort Macon State Park and the Town of Atlantic Beach).

Because pumpout to the beach as described in the FEIS for Morehead City harbor is no longer available as a mechanism to return sand to the beach to offset any impacts of the project, CESAW believes it is appropriate to request sufficient funds for FY 2010, Year 1 of this interim plan, to place beach compatible material dredged from the Ocean Bar onto the beach at Fort Macon State Park and Atlantic Beach.

While nearshore placement is the least cost alternative, it does not comply with CESAW's commitment to offset potential impacts to the adjacent shoreline by placing some MHC material on the beach. The proposed Interim Operations Plan places approximately 1,100,000 cubic yards of material on the beach over a three year period (an average annual amount of 367,000 cubic yards per year). This amount is roughly equal to the average annual amount placed over the 8-year period between Brandt Island pumpouts (312,500 cubic yards per year). Because the authorized MHC plan includes disposal of material on the beach to offset potential impacts,

CESAW believes the Interim Operations Plan is the short-term environmentally acceptable plan until the DMMP is completed.

Historic Shoaling Rates

Purpose: The purpose of the shoaling analysis section of this report is to determine the average amount of material that is shoaling into the navigation channel at Morehead City Harbor on an annual basis. The Morehead City Harbor navigation channel is broken into six major ranges as follows:

- Range A
- Cutoff
- Range B
- Range C / East Leg
- West Leg
- Northwest Leg

These ranges are then separated based on the quality of material contained within each area (Figure 1). Ranges that contain coarse-grained (≥90 percent sand) which is suitable for beach disposal include: Range A out to station 110+00; the Cutoff; Range B; and a portion of Range C/East Leg from the seaward extent through station 17+00. Ranges containing fine-grained (<90 percent sand) material include: Range A from station 110+00 seaward; Range C/East Leg from station 17+00 landward; the West Leg; and the Northwest Leg. Beach compatibility is based on the most recent boring log information taken from each range and is discussed in detail within the Geotechnical Appendix of this report.

Shoaling rates for the given ranges can be used to estimate several future needs with regard to disposal/placement areas, to include ensuring sufficient volume is available for the estimated disposal quantities. Also, the rates can be used to determine disposal island pumpout frequencies as well as estimate quantities available for beach disposal of acceptable sand material.

Historical Data: The basis for the shoaling study is the historical surveys collected and maintained by the Wilmington District Navigation section. The entrance channel, ocean bar, and inner harbor are surveyed on a regular basis to ensure proper depth is maintained. In addition to these condition surveys, the channel is also surveyed just prior to and immediately after dredging events. These historic surveys were collected and imported into a new diagnostic modeling tool as part of a demonstration project by Taylor Engineering (Carvalho and Albada, 2006). The focus of the tool is to provide a useful way to monitor shoal rates within navigation channels. As part of the demonstration project, surveys were processed through 2005. The remainder of the surveys through 2007 were collected and processed by the Wilmington District Coastal Engineering section as part of this shoaling calculation effort.

Assumptions: Several assumptions were made for the calculation of channel shoal rates prior to beginning the work. They are as follows:

- First, the analysis is based on a comparison of bathymetric surveys only. Due to time constraints, a comparison of the surveys to the dredging template was not made.

- Partial surveys were included in the comparison with the assumption that the survey covered all areas within the channel that may have shoaled. Surveys that were very small in coverage area were excluded.
- All comparisons were made within the lateral bounding limits of the channel polygon. Any dredging that may have occurred outside the authorized channel lateral limits was not considered. Dredging volume that occurred within the lateral limits of the authorized channel that was below the authorized depth was included in the analysis.
- Shoaling rates were generally limited to between the years 2000 and 2007 due to funding and time limitations.

Methods and Results: As discussed earlier, the Diagnostic Modeling System ESRI extension was used to compute volumetric changes between surveys. Change values were computed between surveys and categorized four ways: condition survey to before dredge survey; after dredge to before dredge survey; after dredge to condition survey; and before dredge to after dredge survey. In the absence of a valid before or after dredge survey for a given time period, the condition survey closest to the date of the missing survey would be used as a substitute to measure trends.

Once volume differences were computed between survey events they were sorted to group similar survey dates. Survey comparisons between common dates, i.e. two different condition surveys compared to the same before dredge survey, would have their individual shoal rates averaged to produce one shoal rate that represented this time period. Once all shoal rates were computed the average shoal rate for the type of comparison, i.e. after dredge to condition, would be computed. This would ultimately produce three shoal rates, one each for the after dredge to condition, the condition to before dredge, and the after dredge to before dredge. These three rates would then be averaged into what is used as the representative shoal rate for a particular section of the channel. Final shoaling rates for each section of the navigation channel are shown in Table 1.

Historic Dredge Volumes:

Purpose: In an attempt to correlate the newly developed shoaling rates with the amount of material historically dredged from the channel, an average annual dredging rate was developed based on the historic dredge volumes.

Historic Data: The navigation channel and inner harbor was broken into six regions based on historic dredging contracts between 1997 and 2008, as follows:

- Range A
- Cutoff
- Range B
- Range C / East Leg
- West Leg
- Northwest Leg

Unlike shoaling rates developed previously using the actual survey data, these data were not separated into beach quality material and non-beach quality material. This was due to the

limited nature of the available contract data which typically only includes channel quantities for before dredge and after dredge conditions, as well as the overdepth volume. Overdepth volume is material dredged beyond the authorized channel template and is subtracted from the volume calculated based on the before dredge and after dredge surveys. This final pay quantity was used as the basis for developing the average annual dredging rates for historic dredging.

Methods and Results: Actual pay volume quantities were organized into one of the six regions described above by survey date. Due to the variability of the number of dredging events for each reach and the time between surveys, an average was computed for both the dredge volume and duration between events. These average values were then used to compute the average annual dredging rate by dividing the average volume dredged by the average duration between dredging events. A summary of the results is shown in Table 1.

To make comparisons between the shoaling rate and the average annual dredging rate calculations, ranges for the survey based shoaling rates had to be combined into the six ranges used in the dredging rate analysis. The last column in Table 1 shows the substantial difference in the two calculation methods. There are multiple explanations for the differences observed between the two methods. The first reason for the difference is that the average annual dredging rate does not include material dredged from outside the channel template as a result of it being based on pay quantities only. Secondly, material that shoals into the navigation channel during the dredging process is unaccounted for in the pay quantities. The period of time that a contractor occupies a section of the navigation channel for dredging varies, but can range between four to eight weeks for a typical section. Since contracts are typically paid based on material removed between after dredge and before dredge surveys, the contractor must remove the amount specified in the construction contract and shoaling during construction as well. For example, an eight week dredging operation would remove roughly 15 percent of anticipated yearly shoaling which would not be represented in the final quantity. The third reason for shoaling rates to be higher than average annual dredging rates would be that previous dredging events may have not removed all shoaling within the channel. Shoaling that occurs within the channel, but does not restrict navigation may not be removed until such point that it becomes a navigational issue. Also, shoaling has occurred in areas such as the Shackleford Banks spit at the intersection of Range A and the Cutoff where the typical hopper dredging plant is unable to dredge the navigation channel to its full alignment. Lastly, maintenance of the project is frequently limited by funding.

Given these differences, the most reliable tool to predict shoaling volumes within the channel would be the survey based shoaling rates applied over the anticipated period between dredging events.

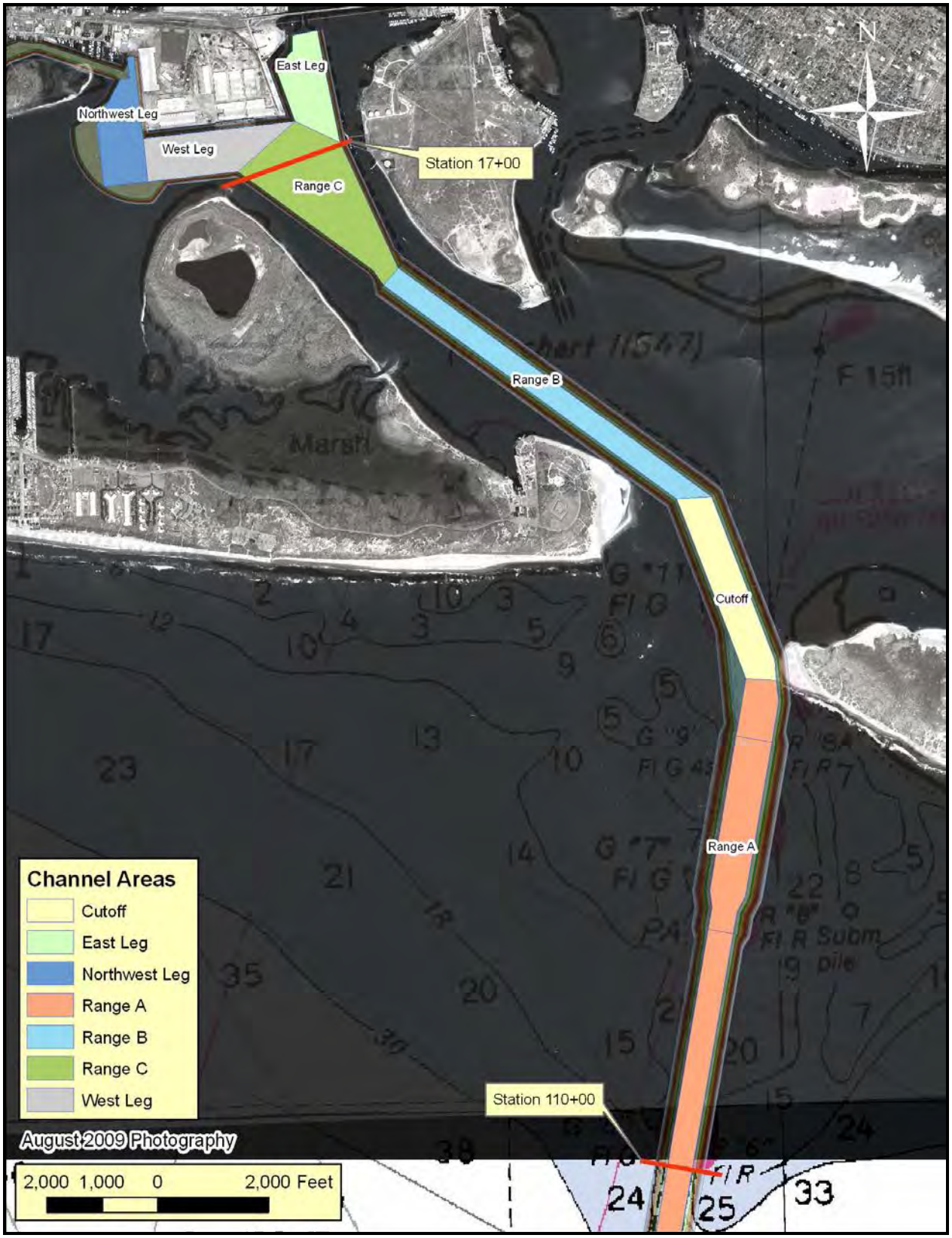

East Leg
Northwest Leg
West Leg
Station 17+00
Range C
Range B
Cutoff
Range A
Station 110+00
Channel Areas
Cutoff
East Leg
Northwest Leg
Range A
Range B
Range C
West Leg
August 2009 Photography
2,000 1,000 0 2,000 Feet
N

Figure 1

	Shoaling Rates Based on Survey Comparison (AD, BD, and Condition Surveys 2000-2007)				Average Annual Dredging Rates (1997 - 2008)		
Range	Representative Shoaling Rate (C.Y./Year)	Shoaling Rate (C.Y./day)	Combined Shoaling Rate (C.Y./Year)	Combined by Range (C.Y./Day)	Representative Dredging Rate (C.Y./Year)	Dredging Rate (C.Y./day)	% Difference
Range A Suitable	630,500	1,727					
Range A Unsuitable	118,500	325	749,000	2,052	547,600	1,500	-26.89%
Range B	170,000	466	170,000	466	45,400	124	-73.29%
Cutoff	324,500	889	324,500	889	182,500	500	-43.76%
Range C Eastleg Suitable	80,500	221					
Range C Eastleg Unsuitable	86,000	236	166,500	456	138,200	379	-17.00%
West Leg	28,000	77	28,000	77	23,200	64	-17.14%
Northwest Leg	80,000	219	80,000	219	60,900	167	-23.88%

Table 1

Reference:

Carvalho, Alexandra, Ph.D. and Edward Albada, P.E., 2006. "Morehead City Harbor DMS Data Manager Application Carteret County, North Carolina", Taylor Engineering, Jacksonville, FL.

APPENDIX B

GEOTECHNICAL ENGINEERING

GEOTECHNICAL ENGINEERING

General.

The project site is located in the lower Atlantic Coastal Plain physiographic province along the central coast of North Carolina. More specifically, the channel passes through Beaufort Inlet between the barrier islands of Shackleford Banks and Bogue Banks and continues inland to the mainland at Morehead City and Beaufort, North Carolina. The channel is flanked by shoals of the ebb-tidal delta seaward of the inlet and by those of the flood-tidal delta landward along Back Sound on the east. Further inland, the channel is flanked by Bogue Sound on the west. The Newport River empties into Morehead City harbor at the head of the channel, i.e., the northern most end of the harbor. The project site encompasses depositional environments that include nearshore littoral settings, an active coastal inlet, barrier islands, and a shallow, back-barrier lagoonal complex of sounds and channels. The prominent geographical feature of the region is Cape Lookout which is composed of a lobate sand body ranging up to 90 feet in thickness and covering an area of approximately 100 square miles. The western edge of the Cape Lookout shoal lies immediately east of the entrance channel. Shackleford Banks is a Holocene age barrier island that is underlain by extensive deposits of inlet-fill sediments along its entire length. Historically, an inlet or inlets have opened and closed along the full length of the island, while displaying an overall westward lateral movement to the present-day Beaufort Inlet location. Back Sound, landward of Shackleford Banks, is underlain by stacked sequences of flood-tidal delta deposits which stratigraphically compliment the inlet-fill sequences under the island. Bogue Banks, to the west of the channel, is underlain by Holocene age shoreface deposits. The barrier sands of the island are prograding seaward over these deposits at present. Bogue Sound, landward of this island, is underlain by a back-barrier lagoonal sequence of sediments having a greater abundance of clays than Back Sound to the east. The entire sequence of barrier/back-barrier sediments in the area represents several transgressive/regressive ocean events that occurred during Pleistocene and Holocene time.

Soils and Geology.

Sediments within the project scope (reach and depth) range from Pliocene to Holocene in age. The Pliocene sediments are from the Yorktown formation and are only found in limited areas, i.e., the turning basin and possibly along portions of Ranges "C" and "B". The top of the Yorktown sediments range between -45 and -50 Mean Sea Level in the inner harbor area and to about -65 msl at Beaufort Inlet. These sediments consist of bluish to greenish-gray, clayey sands and interbedded clay and sandy clay, all of which have abundant fossil debris. Generally, the Yorktown is more indurated than the overlying sediments. The Pleistocene sediments are from the Core Creek Sand. Within the inlet, these sediments are at approximately -50 to -54 feet msl. Beneath Bogue Banks and Shackleford Banks, the Pleistocene varies from -45 msl to -55 msl, respectively. In the landward direction, the top of the, Core Creek Sand rises along dip

such that it is only 15 to 20 feet below mean sea level. Pleistocene deposits from the Beaufort Sand form a ridge along the mainland at the rear of Back and Bogue Sounds, as part of the Core Creek Plain (Pamlico Plain of Stephenson, 1912). This plain is a shallow, seaward dipping surface which lies east and south of the Suffolk Scarp. In general, the Pleistocene sediments in the project area are representative of back-barrier and nearshore or shoreface deposits consisting of interbedded clays, silts and fine sands, and poorly graded fine to medium sands and shelly sands, respectively. Holocene sediments are undifferentiated. They are the uppermost sediments at the site. Within the inner harbor, they consist of some reworked clays and silts but are predominately very fine to fine sands that are derived from Bogue and Back Sounds and the Newport River. Coarser sediments are concentrated in the channels. Holocene deposits at the inlet and entrance channel consist of fine to medium and some coarse sands containing quartz and abundant shell fragments. These deposits are derived from the ongoing reworking of older sediments along the nearshore seabed and the Cape Lookout sand body. Deposits in each of the stratigraphic units are interbedded vertically and interfinger horizontally(facies changes) as the environments of deposition changed across the project area.

Subsurface Investigations.

1972 Harbor Investigation.
Forty (40) Vibracore borings, designated through 40, were completed in 1972 between the ocean bar at the entrance to the channel and the head of the harbor. The borings were performed in Range A, the Cutoff, Range B, Range C, and the East Leg. Grain size analysis was not conducted on these cores. All vibracore borings were made using a 20 foot corer. Borings penetrated sediments from as shallow as -24.2 feet to as deep as -62.4 feet Mean Low Water(mlw). All borings penetrated to a minimum depth of -45 mlw, except No. 33 which stopped at -44.2 mlw. All drill sites were within the channel or harbor prism. The authorized depth of the project at the time the borings were performed was -40 mlw.

1990 Harbor Investigation
In 1990 a subsurface investigation was performed, consisting of 10 borings designated MHC-90-#. Although 18 borings were planned, only 10 borings were actually drilled. These borings were MHC-90-5, 7, 9, 11, 12, 13, 15, 16, 17, and 18. A modified splitspooning technique was used to obtain samples for visual and laboratory analysis. The samples were taken with a 5 foot splitspoon which was driven with a 300 pound hammer. No n value was kept as using this equipment for sampling does not meet the requirement in ASTM for the standard splitspoon test. Sieve analyses were conducted on representative samples to determine if the soils are suitable for disposal on adjoining beaches. Twenty-four of the twenty six samples recovered were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 1”, ¾”, ½”, 3/8”, #4, #10, #20 #40 #60, #100, #200 sieves.

1992 Harbor Investigation
In 1992 a subsurface investigation was performed, consisting of 12 borings designated MH-92-#. The borings were performed in Range B, Range C, and the East Leg. The

borings were performed from the USACE multi-purpose vessel SNELL using a 20-ft vibracore. Fifty four of the sixty seven samples recovered were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 1½", 1", ¾", ½", 3/8", #4, #7, #10, #14 #18 #25 #35 #45 #60 #200, #230 sieves.

2003 Harbor Investigation

In 2003 a subsurface investigation was performed, consisting of 21 borings designated MIH-03- V-#. The borings were performed in Range C, the West Leg, the East Leg, and the Northwest Leg, on shoals to be removed in the next maintenance dredging contract. The borings were performed with the SNELL using a 20-ft vibracore. Samples recovered which were within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200 sieves.

2005 Harbor Investigations

In 2005 a subsurface investigation was performed, consisting of eight borings designated MIH-05-V-#. The borings were performed in Range C, the West Leg, the East Leg, and the Northwest Leg, on shoals to be removed in the next maintenance dredging contract. The borings were performed with the SNELL using a 20 ft vibracore. Samples recovered which were within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200 sieves.

Later in 2005 another subsurface investigation was performed, consisting of 15 borings designated MOB-05-V-#. The borings were performed in Range A, on shoals to be removed in the next maintenance dredging contract. The borings were performed from the SNELL using a 20-ft vibracore. Samples recovered within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200 sieves.

2006 Harbor Investigation

In 2006 a subsurface investigation was performed consisting of 30 borings designated MHC-06-V-#. The borings were performed in Range C, the West Leg, the East Leg, and the Northwest Leg, on shoals to be removed in the next maintenance dredging contract. The borings were performed from the SNELL using a 20-ft vibracore. Samples recovered which were within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200 sieves.

2007 Harbor Investigation

In 2007 a subsurface investigation was performed, consisting of 11 borings designated MHCOB-07 V-#. The borings were performed in Range A, on shoals to be removed in the next maintenance dredging contract. The borings were performed from the SNELL using a 20' vibracore. Samples recovered which were within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size

testing were the 3/4”, 3/8”, #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200, and #230.

2008 Harbor Investigation

Borings designated MHC-08-V-# are vibracore borings performed in 2008. These sixty one borings are located throughout the Morehead City Harbor in Range A, the Cutoff, Range B, Range C, the West Leg, the East Leg, and the Northwest Leg. They represent the most comprehensive set of borings performed to date for the identification of material to be dredged. The samples from these borings were visually classified and all samples within the dredging prism were grain size tested in accordance with ASTM D 422. The sieves used in the grain size testing were the 3/4”, 3/8”, #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200, and #230.

Borings that were performed from the SNELL from 2003 to present were drilled using a 3 7/8 inch diameter, 20 foot long, Alpine vibracore drill machine. The sampler consists of a metal barrel in which a plastic cylinder is inserted. After the plastic tube was inserted, a metal shoe was screwed onto the plastic tube and then the metal barrel. The shoe provided a cutting edge for the sampler and retained the plastic tube. An air-powered vibrator was mounted at the upper-most end of the vibracore barrel, and the vibrator and the vibracore barrel were mounted to a stand. This stand was lowered to the ocean floor by the SNELL’s crane; the vibrator was activated and vibrated the vibracore barrel into the ocean sediment. The sediment sample is retained in the plastic cylinder. All borings were drilled to a depth of 20 feet below the ocean floor, unless vibracore refusal was encountered. Vibracore refusal was defined as a penetration rate of less than 0.1 feet in 10 seconds.

2009 Brandt Island Investigation

A comprehensive subsurface investigation was performed along the proposed dike alignment in 2009. This subsurface investigation is described in detail beginning on page B-14.

HARBOR SEDIMENT

The purpose of thesediment analyses was to characterize the material in Morehead City Harbor for proper disposal. It is important to delineatethe sand properly in order to place this valuable resource in the most appropriate location. The amount of fine grained material in the harbor sediments will determine if the sediment is beach compatible or if it must be placed in the ODMDS or a confined disposal facility.

As described above and shown on Figure B-1, numerous borings have been performed in the Morehead City Harbor over the years. Many of those borings were for purposes other than to determine the suitability of disposal and therefore do not have the grain size testing that would be required to make a disposal decision. This analysis only uses the borings which have enough grain size data to make a determination of proper disposal.

For this analysis, five sets of borings with lab testing were used. These borings were performed between 2005 and 2008.

Borings designated MIH-05-V-# are vibracore borings performed in 2005. These borings are located in Range C. Borings designated MOB-05-V-# are vibracore borings also performed in 2005. These borings are located in Range A. Borings designated MHC-06-# are vibracore borings performed in 2006. These borings are located in Range C. Borings designated MHCOB-07-V-# are vibracore borings performed in 2007. These borings are located in Range A. All samples obtained from these borings within the channel were lab tested.

Borings designated MHC-08-V-# are vibracore borings performed in 2008. These borings are located throughout the Morehead City Harbor from range C to Range A. They represent the most comprehensive set of borings performed to date for the identification of material to be dredged.

Borings were performed from the USACE vessel SNELL using a 3 7/8 inch diameter, 20 foot long, Alpine vibracore drill machine. The SNELL is a 104-foot long multi-purpose vessel with a crane that lifts the vibracore machine. The crane is rated at 70 tons and is capable of lifting up to 35 tons. The sampler consists of a metal barrel in which a plastic cylinder is inserted. After the plastic tube was inserted, a metal shoe was screwed onto the plastic tube and then the metal barrel. The shoe provided a cutting edge for the sampler and retained the plastic tube. An air-powered vibrator was mounted at the upper-most end of the vibracore barrel, and the vibrator and the vibracore barrel were mounted to a stand. This stand was lowered to the ocean floor by the SNELL's crane; the vibrator was activated and vibrated the vibracore barrel into the ocean sediment. The sediment sample is retained in the plastic cylinder. All borings were drilled to a depth of 20 feet below the ocean floor, unless vibracore refusal was encountered. Vibracore refusal was defined as a penetration rate of less than 0.1 feet in 10 seconds.

All samples within the channel limits were tested in accordance with ASTM D 422. The sieves typically used in the testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200, and #230 sieves.

The borings were broken into three categories, green, yellow and red. The "green" borings contain 10% or less fine grained material. The "yellow" borings contain less that 20% fine grained material but more than 10%. Finally the "red" borings contain greater than 20% fine grained material. The percentage of fine grained material was determined from the grain size testing and the percent passing the #200 sieve.

The Harbor areas are grouped based on the amount of sand and fine grained material contained in the sediment to be dredged. There are a few isolated areas which may contain material which is not consistent with the predominate material, but it is believed that these areas are anomalies and do not change the overall material types.

Based on the information available at the present time, there are three distinct areas within the Morehead City Harbor. They are the western portion of the West Leg (West Leg 1), the Northwest Leg, the East Leg, and Range A from station 117+00 out to the end of Range A is the first area. This portion of the harbor consists predominantly of silt, silty sand, sandy silt and some clean sand. The material in this area contains less than 80% sand which is too much fine grained material to meet the beach or nearshore placement requirements and should be placed upland in the Brandt Island confined disposal area or in the ODMDS.

The second area is the eastern portion of the West Leg (West Leg 2), the northern portion of Range C, and Range A from station 117+00 to Station 100+00. This portion of the harbor consists of slightly silty sand, and clean sand. The material in this area contains between 80% and 90% sand and may be placed in the Nearshore East or Nearshore West placement areas, the ODMDS, or upland in the Brandt Island confined disposal area.

The third area is the southern portion of Range C, all of Range B, all of the Cutoff, and Range A out to station 110+00. This portion of the Harbor consists of slightly silty sand, and clean sand. The material in this area contains greater than 90% sand and meets the requirement for beach or nearshore placement. Some of this coarse grained material may be placed in the ODMDS when inclement weather hinders hopper dredge placement in the nearshore areas.

Brandt Island

HISTORY. Brandt Island is approximately 168 acres in size and located south of the existing Port of Morehead City, across the Morehead City Channel. The island has been used as a disposal area since 1955 and is divided from the Bogue Banks barrier island by the narrow Fishing Creek. Immediately to the southeast is a US Coast Guard facility and Fort Macon State Park.

Brandt Island is owned and has previously been used as a sand-recycling site by the NCSPA and dedicated for the purpose of dredged material disposal. Brandt Island has a present capacity of about 3 million cubic yards, which can be increased by about 1 million cubic yards by reworking the dikes every four to five years. In 1986, 1994, and 2005 approximately 3.9 million, 2.5 million, and 2.9 million cubic yards of dredged material were pumped out of Brandt Island and placed on the beaches of Bogue Banks from Fort Macon State Park to Atlantic Beach, respectively.

Brandt Island has historically received material that is both suitable and unsuitable for beach disposal. In 2005 a cross dike was constructed inside Brandt Island at elevation 14 for purposes of segregating the unsuitable material from the suitable beach quality material. As Brandt Island is the only upland facility available for receipt of non- beach quality material, the cell for receipt of unsuitable material has reached capacity for the current dike height. Pump out of the beach quality material remaining in Brandt Island will be difficult due to the amount of non-beach disposal material presently inside the

confined disposal facility. The difficulty will be trying to avoid the non-beach quality material and keeping it from mixing with the beach quality material.

EXISTING DIKE. The existing dike encompasses approximately 64 acres and has a controlling top of dike elevation of approximately 37 feet (Figure B-2). It is assumed that 2 feet of freeboard will be required at all times during disposal operations and water and dredged material will not be allowed above elevation 35 feet within the disposal area. The existing available storage volume below elevation 35 feet is approximately 3 million cubic yards. The existing dredged material capacity is approximately 1.5 million cubic yards assuming a bulking factor of 2. The dredge material capacity is the volume of the in place material in the channel.

ALTERNATIVES. Various alternatives of the Brandt Island Dike were considered for use to confine material disposed of from the Morehead City Harbor. Two alignments of the dike were considered. The first alignment considered is to keep the dike alignment approximately the same as the present dike. The second alignment considered is to expand the dike as much as possible without encroaching on wetlands or private property (Figure B-3).

The proposed dike is assumed to have a 15 foot top width and 3 horizontal to 1 vertical side slopes. The dike alignment will be adjusted as needed to minimize the amount of fill required. The toe of the expanded dike alignment will be fitted to avoid wetlands and private property, and to also allow a construction buffer to allow for a work area adjacent to the toe.

Table B-1, below, shows the amount of fill needed to raise the Brandt Island dike along an existing alignment and Table B-2 shows the fill needed to raise the Brandt Island Dike along the expanded alignment and the total dredged material capacity resulting from each proposed dike raise. It should be noted that numbers below include the current remaining storage volume of 3 million cubic yards.

Existing Dike Alignment		
Dike Height (el)	**Dike Fill Volume (CY)**	**Total Storage Volume (CY) (assumes dike fill comes from interior of diked area)**
42	62,000	3,482,000
47	191,000	3,854,000
52	398,000	4,142,000
55	582,000	4,244,000

Table B-1. Proposed Brandt Island Dike Raises Along the Existing Alignment

Expanded Dike Alignment		
Dike Height (el)	**Dike Fill Volume (CY)**	**Total Storage Volume (CY) (assumes dike fill comes from interior of diked area)**
42	442,000	4,668,000
47	657,000	5,484,000
52	917,000	6,278,000
55	1,088,000	6,749,000

Table B-2. Proposed Brandt Island Dike Raises Along an Expanded Alignment

Four dike heights were investigated to determine if it is economical to raise the existing dike. Dike heights investigated included elevations 42 feet, along with elevations 47, 52, and 55 feet. The amount of fill needed to construct these dike heights along the existing alignment are approximately 64,000 cubic yards (CY), 191,000 CY, 398,000 CY, and 582,000 CY respectively. The storage capacity for each of these heights is approximately 3,482,000 CY, 3,854,000 CY, 4,142,000 CY, and 4,244,000 CY respectively.

The amount of fill needed to construct these dike heights along the expanded alignment are approximately 442,000 CY, 657,000 CY, 917,000 CY, and 1,088,000 CY respectively. The storage capacity for each of these heights for the expanded dike is approximately 4,668,000 CY, 5,484,000 CY, 6,278,000 CY, and 6,749,000 CY respectively.

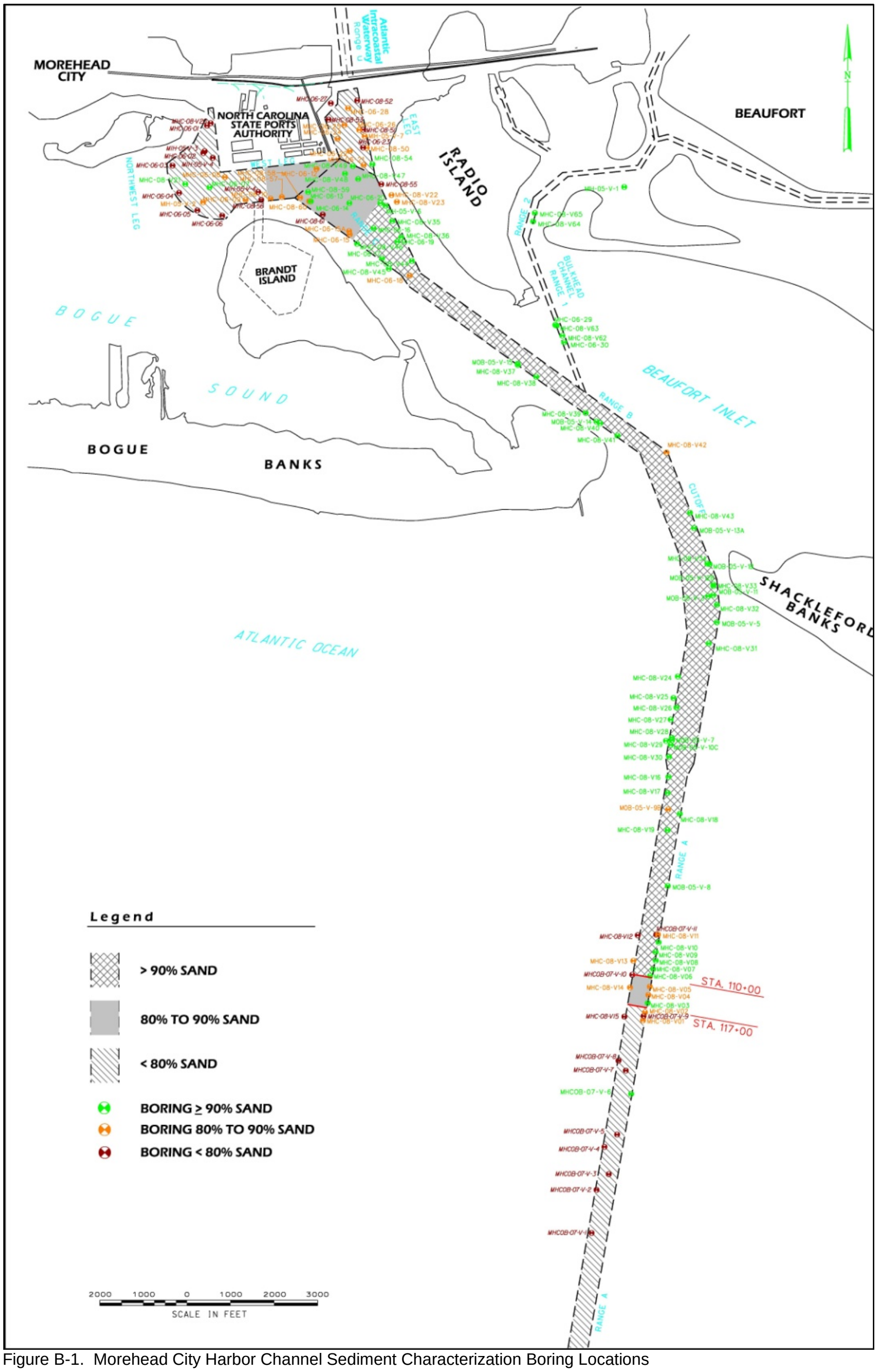


Figure B-1. Morehead City Harbor Channel Sediment Characterization Boring Locations

BRANDT ISLAND DIKE RAISE TO ELEVATION 55' NAVD88
ALONG EXISTING DIKE ALIGNMENT

500 250 0 500 1000
SCALE IN FEET

Figure B-2. Existing Alignment of Brandt Island Dike with Dike Raise to Elevation 55'

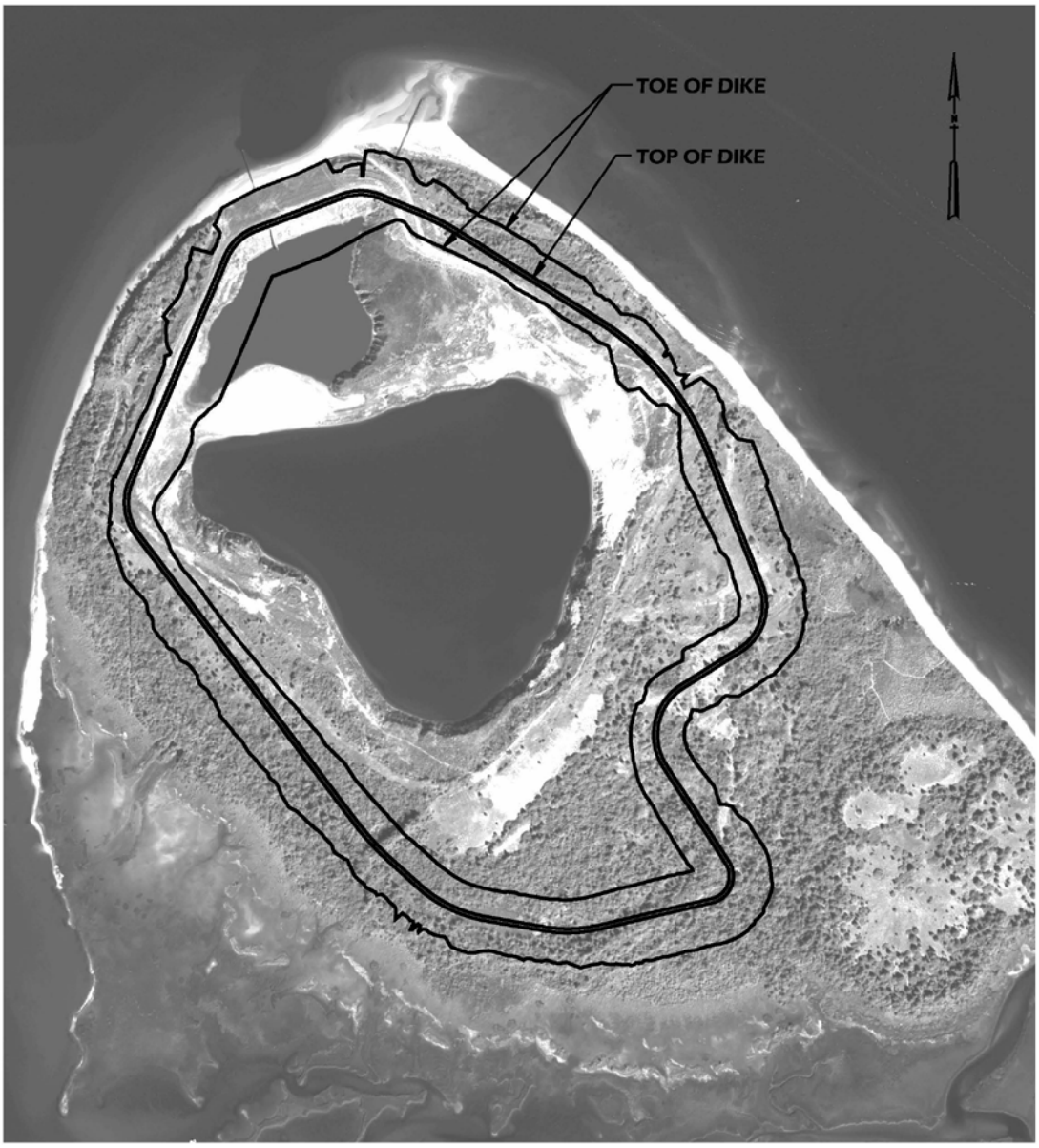


Figure B-3. Proposed Expansion of Brandt Island Dike with Dike Raise to Elevation 55'

SUBSURFACE INVESTIGATION. A comprehensive subsurface investigation was performed along the proposed dike alignment in 2009. The drilling program consisted of performing eighteen Standard Penetration Test (SPT) borings reaching depths of 51 to 78 feet along the proposed dike alignments. The SPT borings were performed using the general methodology outlined in ASTM Standard D 1586 (Figures B-4 and B-5).

The standard penetration test is a widely accepted test method of *in situ* testing of foundation soils (ASTM D 1586). A 2-foot long, 2-inch outside diameter split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitute the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing was done by the drilling AE through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the boring open below the water table by maintaining an excess hydrostatic pressure inside the hole. Representative split-spoon samples from the soils at every 5 feet of drilled depth and from every different stratum are brought to the laboratory in air-tight jars for further evaluation and testing, if necessary. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

The borings were advanced using a CME 45 Mud Bug drilling equipment. Field logs for each boring were prepared by an Ardaman & Associates, Inc., field geologist. These logs included visual classifications of the material encountered during drilling. Soil samples were obtained continuously from the ground surface to the termination depth of the boreholes. The soil samples were visually classified in general accordance with the Unified Soil Classification System (ASTM D 2487). In cohesive and semi-cohesive soils, undisturbed soil samples were secured using three inch diameter thin-walled tube in accordance with ASTM Standard D 1587 (Shelby tube sampler). The Shelby tube was retrieved, plugged and sealed by the field personnel on site. All soil samples recovered during the drilling program were brought back to the Ardaman & Associates, Inc. laboratory in Orlando, Florida for additional classification and testing. All laboratory tests, where applicable, were performed in general accordance with ASTM standards. The laboratory testing program was conducted in our USACE approved laboratory in Orlando, Florida on selected samples from the field exploration. The program included visual classification, moisture content, particle-size distribution and Atterberg limits determinations on selected samples. In addition, twelve consolidation tests, nine unconsolidated undrained triaxial compression (UU) tests, and one laboratory vane shear test were performed on undisturbed soil samples.

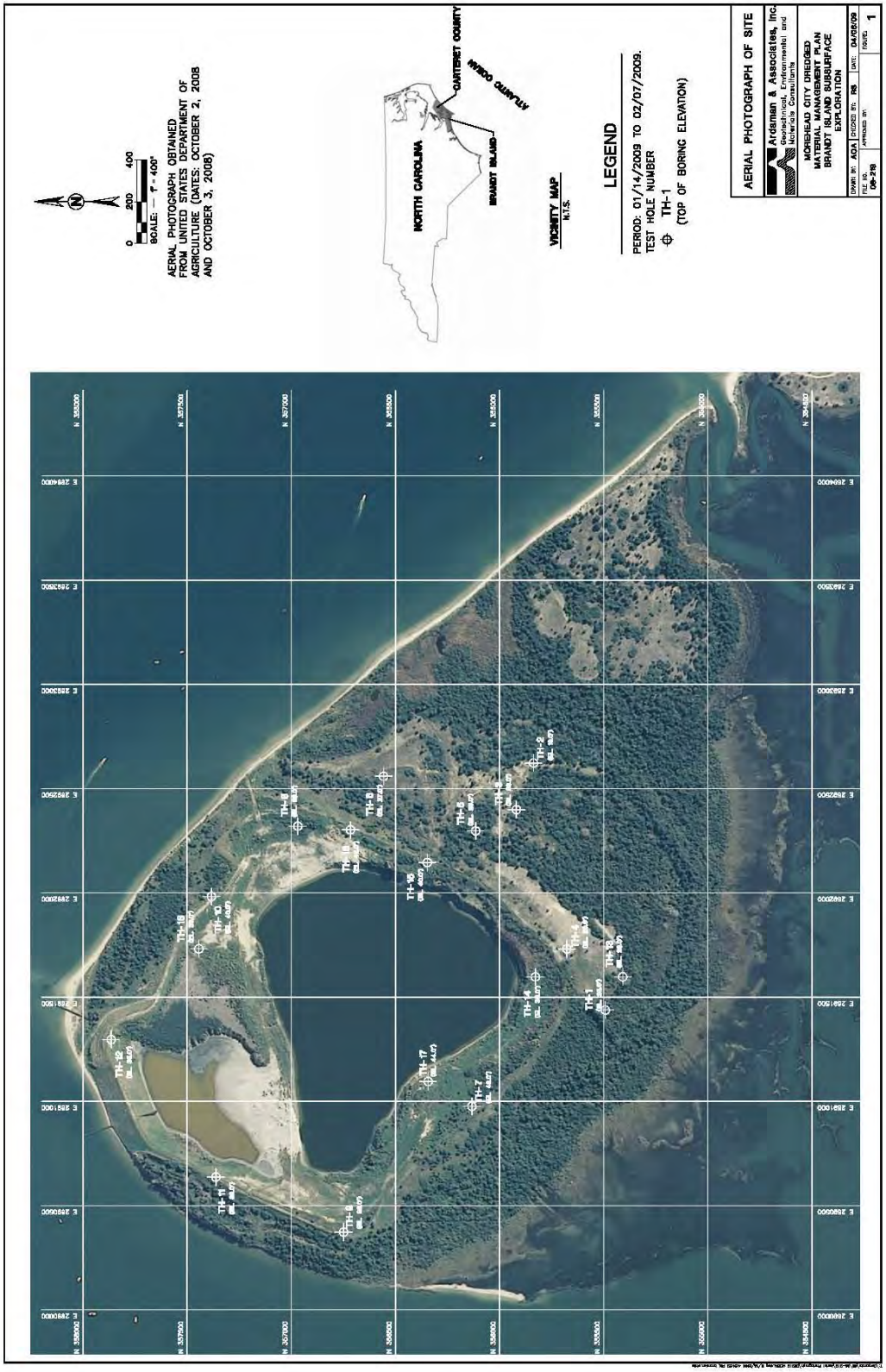


Figure B-4. Brandt Island Soil Boring Locations

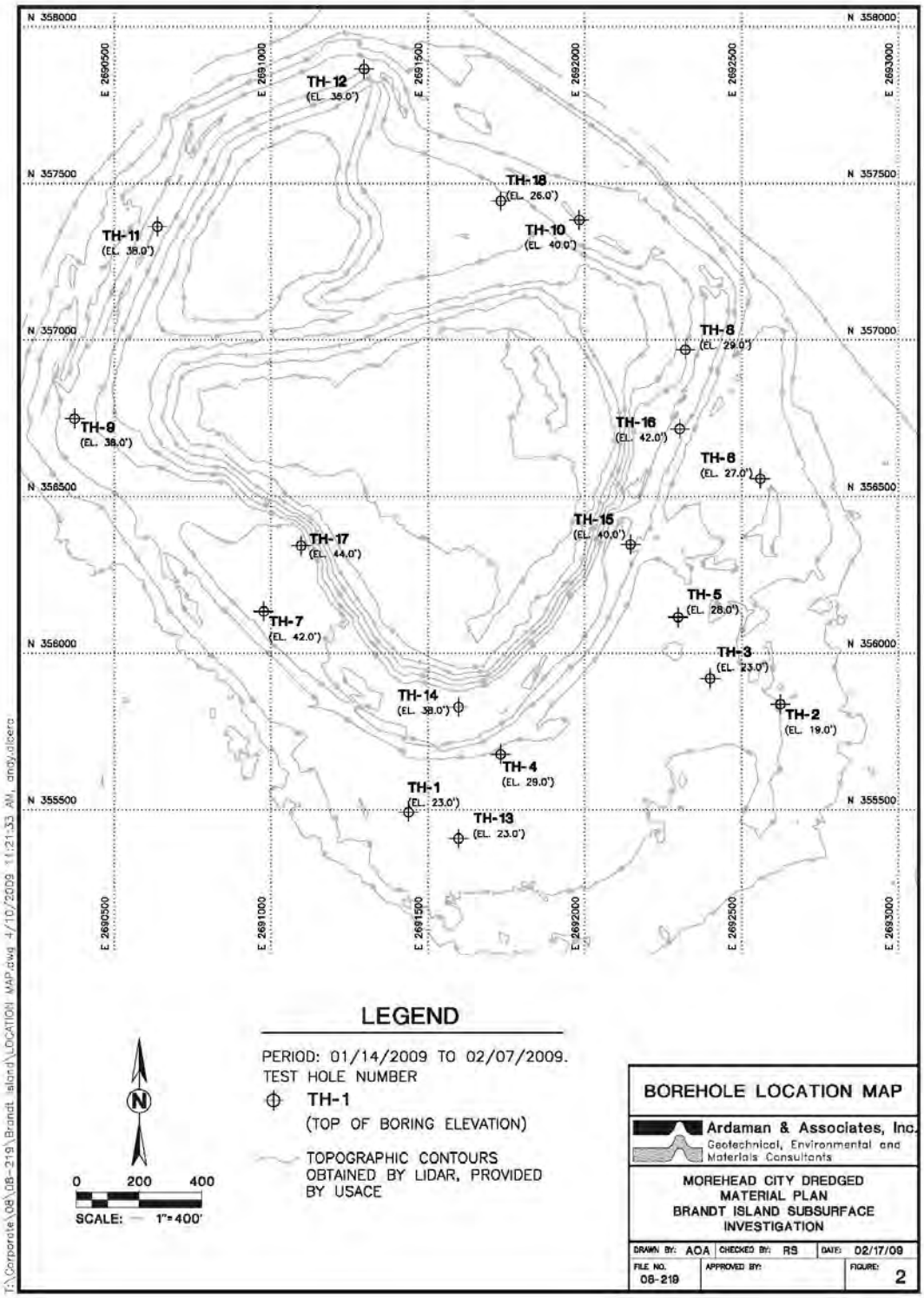


Figure B-5. Soil Boring Locations (with Topographic Contours)

SUBSURFACE CONDITIONS. Based on the boring data, the site consists predominately of sands with interbedded layers of silt. The existing dike material is almost exclusively fine sand. The foundation below the existing dike is predominately sand, but some areas have layers of silt interbedded throughout the foundation. These silt layers vary in thickness and in strength. There are generally three different foundation conditions at the site.

Conditions encountered at each boring location are indicated on the individual boring logs. Based on the results of the borings, the following three general subsurface conditions exist at the site.

The soil profile at borings TH-2, TH-5, TH-15 and TH16 consist of sands (SP), sands with silt (SP-SM) and silty sands (SM) from ground surface to the termination depths of the borings. Clay was not encountered within these borings except for a thin ½ inch (TH-2 at 8.5'), 2 inch (TH-5 at 5.5') and 2 inch (TH-16 at 29.0') thick seams at the locations.

The soil profile at borings TH-3 and TH-12 consist of sands (SP) and sands with silt (SP-SM) from ground surface to the termination depth of the borings except a thin 6 inch thick layer of very soft fat (CH) clay at depths of 22.5 feet (Elevation 1.5 feet MSL) and 21 feet (Elevation 11.0 feet MSL), respectively.

Twelve of the borings (TH-1, TH-4, TH-6 through TH-11, TH-13, TH-14, TH-17, and TH-18) encountered one or more layers in excess of 1 foot thick of very soft (N<2 blows/foot) to soft (N of 2 to 4 blows/foot) lean (CL) to fat (CH) clay or very loose (N < 4 blows /foot) to loose (N of 4 to 10 blows/foot) clayey sand (SC) within a profile otherwise comprised of sands (SP) to silty sands (SM). The clays and clayey sands typically occurred as 1 to 4.5-foot thick layers within the upper portion of the borings above elevation 14 feet (MSL) or typically below elevation -5 feet (MSL) as 1 to 6-foot thick layers.

The depth to groundwater at boreholes TH-2, TH-3, TH-5, TH-6, TH-7, TH-9, TH-11, TH-14, TH-17 and TH-18 was estimated based on visual observation of the moisture content of the jar samples. The depth to groundwater was measured in borings TH-1, TH-4, TH-8, TH-10, TH-12, TH-13, TH-15 and TH-16 at depths in the range of 3.0 to 12.5 feet below existing ground surface. The specific groundwater depths indicated on the boring logs represent the groundwater surface encountered during drilling on the date shown on the logs. It must be noted that fluctuations in groundwater level will occur due to variations in rainfall, tidal fluctuation, and other factors which may vary from the time the test borings were performed

STABILITY ANALYSIS. A stability analysis is a way to quantify, with a factor of safety, the hazard that a sliding or overturning failure will occur. Specific engineering criteria for the stability analysis dictate the minimum factor of safety, which is typically between 1.3 and 1.5 depending on the case.

A stability analysis was performed on the Brandt Island Dike at the crest elevation of 55 feet.

The software used to perform the analysis was the UTEXAS4 program. UTEXAS4 is a general-purpose software program for limit equilibrium slope stability computations. UTEXAS4 computes a factor of safety, F, with respect to shear strength. The method of analysis used to determine the factor of safety for Brandt Island is Spencer's procedure (Spencer 1967, Wright 1970). Spencer's procedure fully satisfies static equilibrium for each slice within the failure area. Both circular and non-circular failure surfaces are analyzed by the UTEXAS4 software program.

The areas of the alignment were grouped into similar foundations based on the soils data. Three foundation areas were determined based on the subsurface investigation results. Soil properties and strengths were assigned to the foundation layers based on the lab testing results from the subsurface investigation and for areas not tested, and good engineering practice. The soil strength properties for the critical section are show in Table B-3. The stability analysis was performed only on the dike height of elevation 55'. As long as this height is stable, it is assumed that all lower dikes will also be stable. The stability analysis was performed using the Spencer method, which is the preferred method of the USACE, per EM 1110-2-1902 Engineering and Design – Slope Stability. Both circular and wedge failures for each of the three foundation groups were analyzed. Based on the stability analysis results, the dike in the area of boring TH-11 has the weakest foundation and ability to support the dike. Based on the UTEXAS4 stability analysis, the minimum factor of safety for the Brandt Island dike is 1.37. This minimum factor of safety exceeds the minimum required in EM 1110-2-1902 Engineering and Design – Slope Stability criteria of 1.3 for the end of construction case and is acceptable for the elevation 55' dike design. Based on the results of the Stability analysis of the Brandt Island Dike, staged construction will not be required. Using good engineering practice the dikes should be raised no more than 5 feet at a time. By raising the dike in 5 foot intervals the settlement and risk of a stability failure will be minimized.

LAYER	SOIL TYPE	LOCATION	C[1] (psf)	ϕ[2]	γ[3] (pcf)
1	Sand	Embankment	0	28	100
2	Sand	Embankment	0	28	100
3	Sand	Embankment	0	30	115
4	Sand	Foundation	0	32	120
5	Sand	Foundation	0	28	115
6	Sand	Foundation	0	32	120
7	Silt	Foundation	800	0	105
8	Sand	Foundation	0	28	110
9	Sand	Foundation	0	30	115
10	Sand	Foundation	0	32	120
11	Silt	Foundation	1300	0	110
12	Sand	Foundation	0	30	115
13	Silt	Foundation	500	0	110
14	Sand	Base	0	32	120

[1]C - Cohesive Strength (psf)
[2]ϕ - Angle of Internal Friction
[3]γ - Unit Weight (pcf)

Table B-3. Soil Strength Properties for the Critical Section

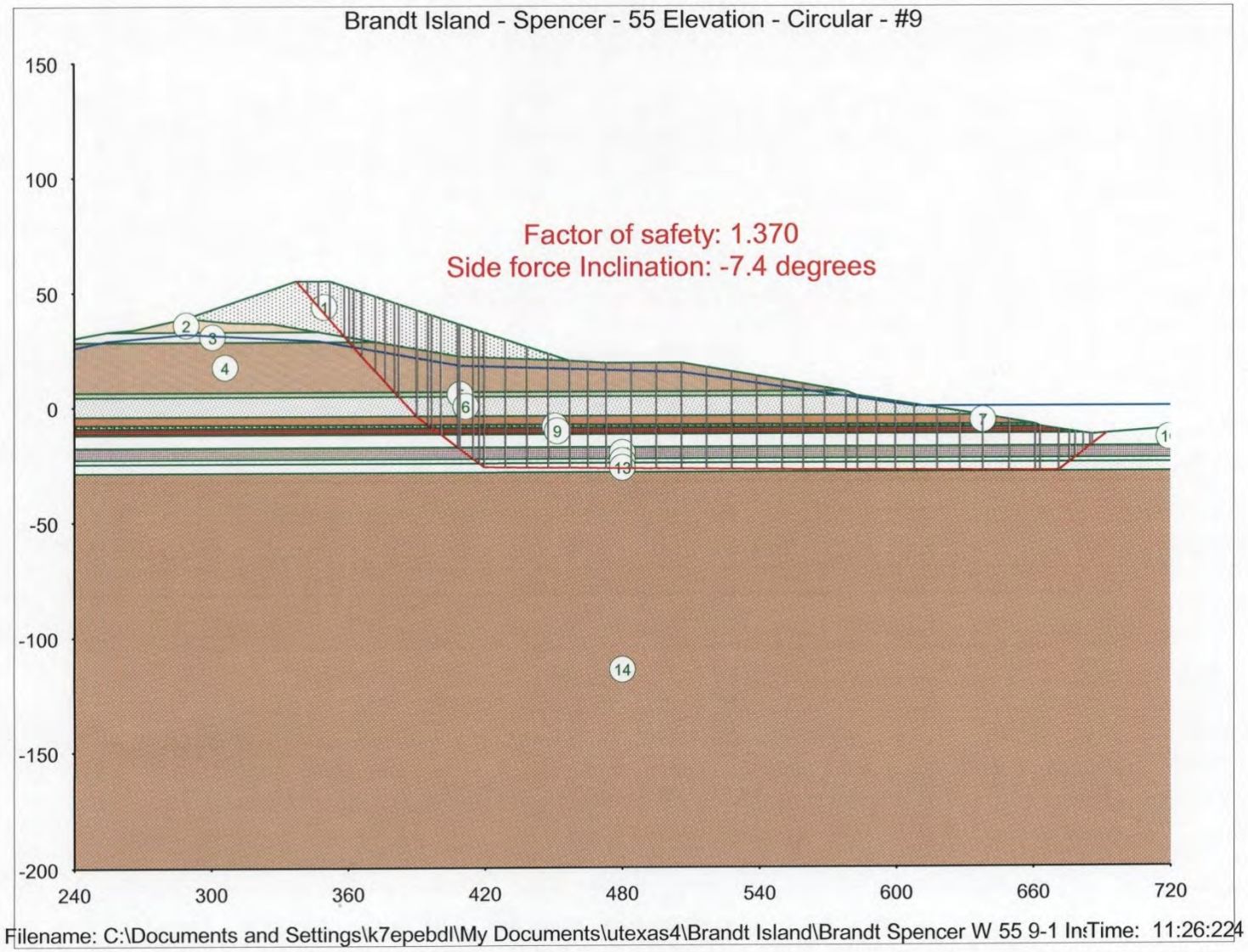


Figure B-6. Stability Analysis Critical Section

New Nearshore Placement Area Soil Analysis

Expansion of the Nearshore West placement area and a new Nearshore East placement area are proposed to provide an additional location for placement of harbor material with up to 20 percent silt/clay. As part of the environmental and cultural investigation performed on the ebb tide delta, 48 sediment grab samples were taken on each ebb tide delta, for a total of 96 samplescollected in August of 2009. The purpose of this sampling effort was to determine the distribution of the silt content of the ebb tide delta. The samples collected were tested for grain size distribution in accordance with ASTM D 422. The sieves typically used in the testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200, and #230 sieves. The shell content of each sieve size fraction of each sample was visually estimated to the nearest 5 percent. The estimated total shell content of each sample was calculated using the visually estimated shell content retained on each sieve, the percent dry mass of the sample retained on the sieve, and calculating the weighted average of the full sample. The qualitative amount of shell was described as trace (< 5 percent), few (5 to 10 percent), little (15 to 25 percent), and some (30 to 45percent) in accordance with ASTM Standard D 2488. The individual sample test results can be found following this main body of this appendix.

The lowest silt/clay content of a sample was 2A which contained 0.4 percent silt/clay, and the highest silt content in a sample was 90A which contained 61.0 percent silt/clay. The silt/clay content is defined as the percentage of material, by weight, passing the #200 sieve. Out of the 96 sites sampled (USACE 2010b), 21.8 percent of the sites contained 10.3 percent to 61.0 percent silt/clay, and 42.7 percent had a low silt/clay content (<2 percent silt/clay). Areas of high silt/clay content (>10 percent and <61.0 percent) were found with one large group of sites occurring principally offshore of Shackleford Banks and several smaller areas offshore of Bogue Banks, in water depths ranging from approximately20 to 49 ft. Areas of low silt/clay content (less than <2 percent silt/clay content) predominantly were found along the ebb tide delta and along the nearshore of Bogue and Shackleford Banks. A grouping of these stations also occurs offshore in approximately40 ft of water. Three large groups of medium silt/clay content (>2 and <10 % silt/clay content) occurred in the mid to nearshore of Shackleford Banks, offshore of the ebb tide delta, and in the mid to nearshore of Bogue Banks.

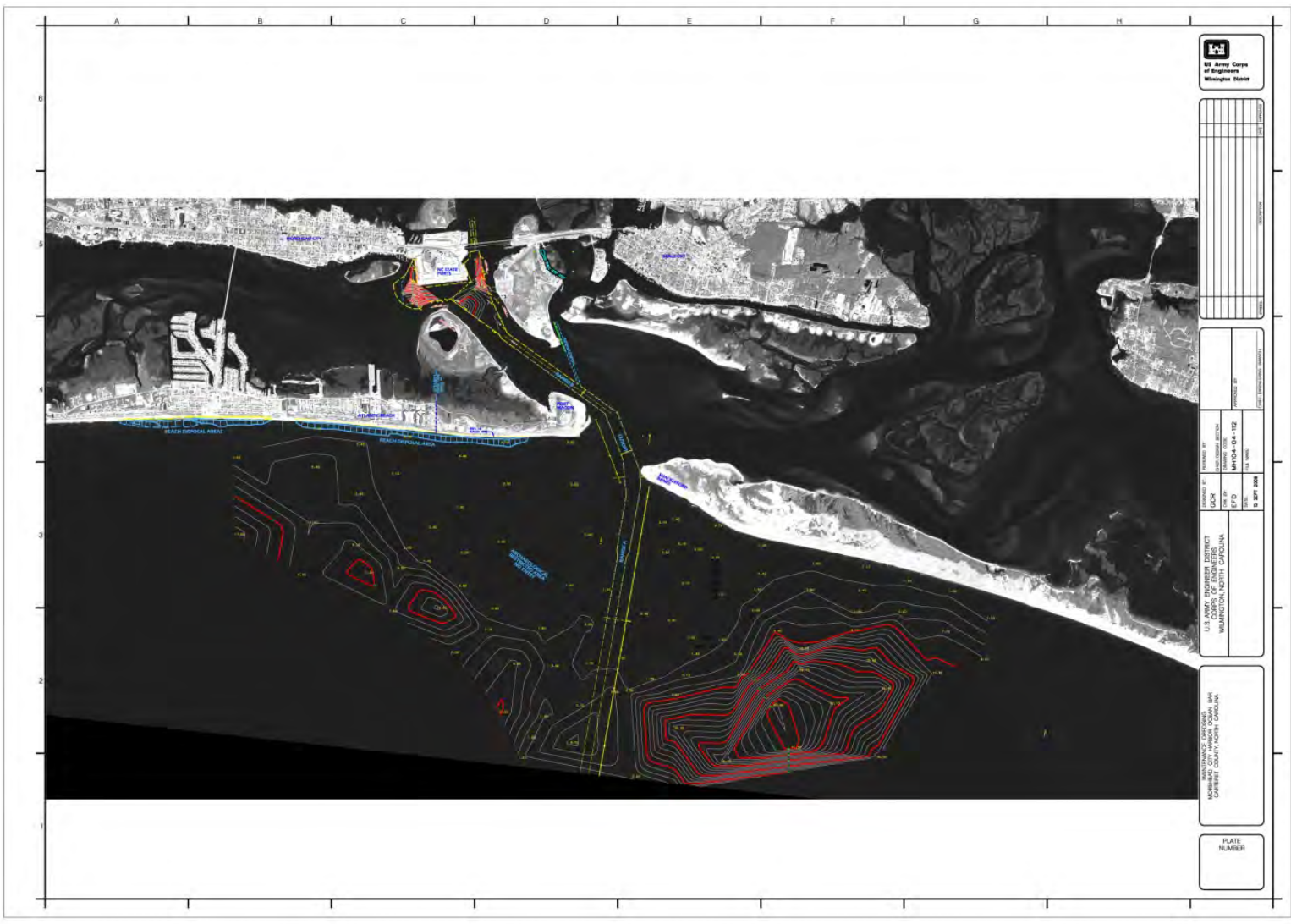


Figure B-7. Nearshore grab sample locations and silt/clay content contours

As shown in Figure B-7, the silt/clay content typically increases from the ebb tide delta to the offshore areas in deeper water depths. The ebb tide delta contains material that is greater than 20 percent silt/clay, and placement of material in this area is expected to redistribute the material to its natural silt/clay content. It is therefore acceptable to place material of 80 percent or greater sand in the nearshore areas.

The primary reasons for the placement of sandy material that is 80 percent or greater sand in both the new nearshore placement areas are as follows:

a. Generally speaking, sediments on the eastern side of the navigation channel have a lower sand content than sediments on the western side, making this side of the channel a more natural fit for sediment with slightly higher silt content.

b. It is the opinion of the USACE, based upon dredging experience, that silt content of dredged material will decrease (and sand content will, as a result, increase) as it is placed in a nearshore area and becomes subject to wave and current action.

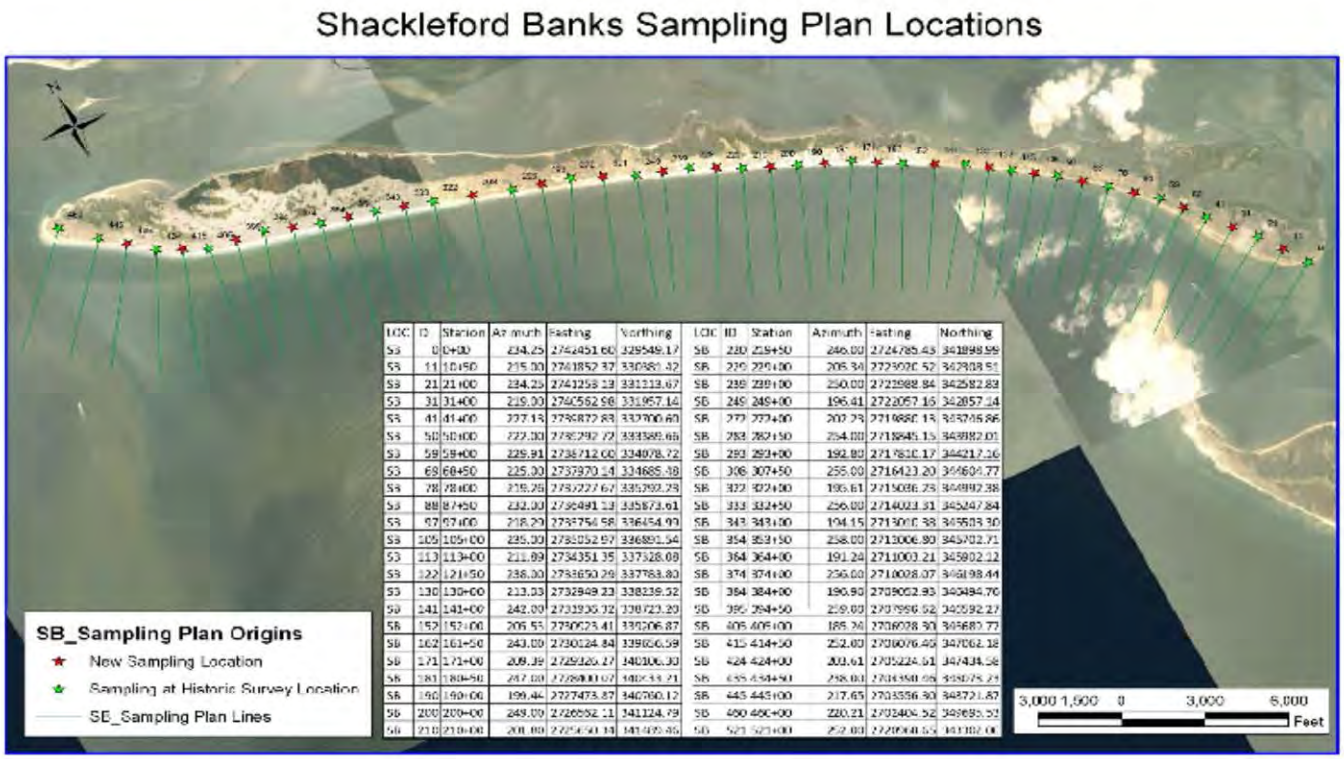
c. From 1995 to the present, the material placed by the USACE in the existing Nearshore West has been at least 90 percent sand. As the USACE monitors material movement on both sides of the channel in the upcoming years, placing only material that is at least 90 percent sand in the Nearshore West will allow for the incorporation of the monitoring that has been conducted from 1995 to the present, and allow meaningful comparisons to be drawn between the two placement areas and their performance. This segregation would also facilitate and more accurate assessment of the health of benthic communities in the vicinity of this placement area.

Creation of a New Disposal Area on Shackleford Banks

The Morehead City Harbor DMMP considered the disposal of maintenance dredged sediment on the beach of Shackleford Banks. Sampling of Shackleford Banks was performed to document the quantitative values of the native beach prior the disposal of dredged material on the beach. An analysis of the material in the Harbor compared to the native material on Shackleford Banks was performed to assure that the Harbor material is acceptable for disposal on the Shackleford Banks beach.

The sampling locations consisted of 46 transects along the entire length of the beach as shown in Figure B-8. The transects were located at each of the historic survey locations. Additional transects were spaced equally between the historic survey locations so that the spacing is approximately 1000 ft between the transects. Fourteen samples were taken along each transect. The sample locations are the dune, dune toe, berm crest, MHW, MSL, MLW, trough, bar crest, -6 MLW, -10 MLW, -12 MLW, -18 MLW, -24 MLW, and -30 MLW as shown on Figure B-9. The sieves used in the grain size testing were the 3/4”, 3/8”, #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120,

#170, #200, and #230 sieves. Grain Size analyses were performed on the the samples taken from Shackleford Banks. The percent shell content of each sample was determined by estimating visually the amount of shell on each sieve. The color of all samples, both moist and dry, was determined by the Munsell Color System. Key criteria were determined through this analysis. The analysis determined the percent coarser than the #4 sieve, the percent coarser than then #10 sieve, the percent finer than then #200 sieve, the percent finer than the #230 sieve, the visual percent shell content of the native beach, and the overfill ratio.



LOC	ID	Station	Azimuth	Easting	Northing	LOC	ID	Station	Azimuth	Easting	Northing
SB	0	0+00	234.25	2742451.60	329549.17	SB	230	229+50	246.00	2724785.43	341898.99
SB	11	10+50	235.00	2741852.37	330980.42	SB	239	239+00	205.34	2723920.52	342308.51
SB	21	21+00	234.29	2741258.13	331113.67	SB	239	239+00	250.00	2722988.84	342582.83
SB	31	31+00	219.00	2740562.98	331957.14	SB	249	249+00	196.41	2722057.16	342857.14
SB	41	41+00	237.15	2739872.83	332700.60	SB	259	259+00	207.79	2721880.15	343746.86
SB	50	50+00	222.00	2739292.72	333389.66	SB	268	268+50	254.00	2721845.15	344882.01
SB	59	59+00	229.91	2738712.00	334078.72	SB	293	293+00	192.80	2717830.17	344217.26
SB	68	68+50	225.00	2737970.14	334685.38	SB	308	307+50	255.00	2716423.20	344604.77
SB	78	78+00	219.26	2737227.67	335292.29	SB	322	322+00	195.61	2715086.25	344892.38
SB	88	87+50	232.00	2736491.13	335873.61	SB	333	332+50	256.00	2714023.31	345247.84
SB	97	97+00	218.29	2735754.58	336454.93	SB	343	343+00	194.15	2713016.38	345603.30
SB	105	105+00	235.00	2735052.97	336891.54	SB	354	353+50	258.00	2713006.80	345702.71
SB	113	113+00	211.89	2734351.35	337328.08	SB	364	364+00	191.24	2711003.21	345802.12
SB	122	121+50	238.00	2733650.29	337763.80	SB	374	374+00	256.00	2710008.07	346198.44
SB	130	130+00	213.03	2732949.23	338239.52	SB	384	384+00	190.90	2709052.93	346484.70
SB	141	141+00	242.00	2732335.32	338723.20	SB	395	394+50	259.00	2707996.52	346592.27
SB	152	152+00	205.55	2730923.41	339206.87	SB	405	405+00	185.26	2706078.90	346680.77
SB	162	161+50	243.00	2730124.84	339606.59	SB	415	414+50	252.00	2706076.40	347062.18
SB	171	171+00	209.39	2729326.27	340006.30	SB	424	424+00	200.61	2705224.61	347434.56
SB	181	180+50	247.00	2728600.07	340433.21	SB	435	434+50	248.00	2703580.06	348078.23
SB	190	190+00	199.44	2727473.87	340760.12	SB	445	445+00	217.65	2703556.90	348721.87
SB	200	200+00	249.00	2726552.11	341124.79	SB	490	490+00	220.21	2703404.52	349695.52
SB	210	210+00	201.00	2725450.14	341499.46	SB	525	525+00	252.00	2720048.55	341102.00

Figure B-8. Shackleford Banks Sample Locations

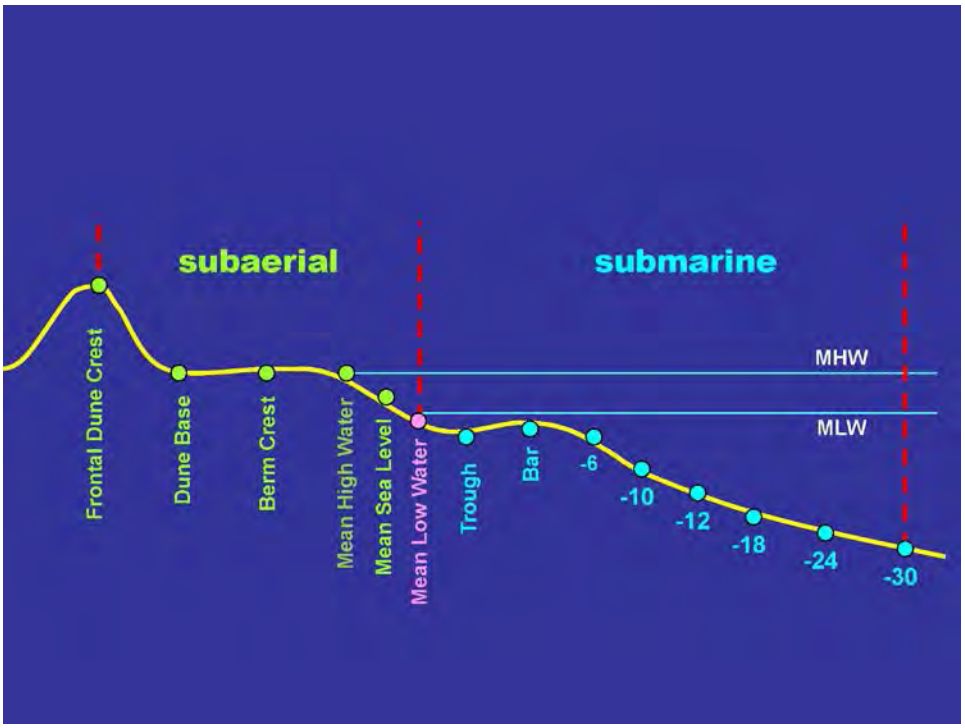


Figure B-9. Shackleford Banks Grab Sample Locations Along Beach Transect

The Shackleford Banks beach was divided into four groupings for the grain size analysis. The four groupings used in the analysis are the dune to a depth of -24 ft offshore (the approximate depth of closure to wave impact); the dune base to -24 ft; the dune base to MLW; and the beach trough to -24 ft. These groups were chosen for comparison to the Harbor material. The group from the dune to -24 is the condition that most matches the criteria for the "native beach." The results of the composite analysis were determined by averaging the samples from each grouping.

Between 2005 and 2008 numerous vibracore borings were performed in the Morehead City Harbor Channel to determine the characteristics of dredged materials considered for beach disposal. The Morehead City Harbor ranges where sediments were collected for beach disposal were Ranges A, B, C, and the Cutoff.

Borings designated MIH-05-V-# and MOB-05-V# were vibracore borings performed in 2005. Borings designated MHC-06- # are vibracore borings performed in 2006. These borings are located in Range C. Borings designated MHCOB-07-V-# are vibracore borings performed in 2007. Borings designated MHC-08-V-# are vibracore borings performed in 2008. These borings are located throughout the Morehead City Harbor Channel from range C to Range A. They represent the most comprehensive set of borings performed to date for the identification of material to be dredged. All borings were drilled to a depth below the dredging depth unless vibracore refusal was

encountered. Vibracore refusal is defined as a penetration rate of less than 0.1 feet in 10 seconds. Sediment samples taken below the project depth were not included in the analyses.

In all, 130 sediment samples were included in the analyses as described below. All samples within the channel limits to overdepth were tested in accordance with ASTM D 422. The sieves typically used in the testing were the 3/4", 3/8", #4, #7, #10, #14, #18, #25, #35, #45, #60, #80, #120, #170, #200, and #230 sieves. Hydrometer analyses were not performed on materials passing the #230 sieve. The results from the analysis of the harbor material were determined by the weighted average of each sample distributed over the length that the samples represents.

The color of the sediment from the Morehead City Harbor channel was not documented to a standard test procedure. However, during the winter of 2010 and 2011, dredged sediment from the Morehead City Outer Harbor was placed on the beaches of Fort Macon State Park to the Town of Atlantic Beach. On April 2011, Wilmington District staff walked the beach disposal areas and determined the color of the sediment by the Munsell Color System. Eighteen (18) transects were sampled from Fort Macon State Park to the circle in the Town of Atlantic Beach. Spacing between transects was about 1,000 feet and 3 dry sediment samples per transect (from the MHW contour, berm crest, and toe of dune) were color coded.

Specific grain size analysis categories and composite approaches are required by the NC Sediment Criteria - Technical Standards for Beach Fill Projects. The categories used in the NC Sediment Criteria are the material less than 0.0625 millimeters, greater than or equal to 0.0625 millimeters and less than 2 millimeters, greater than or equal to 2 millimeters and less than 4.76 millimeters, and greater than or equal to 4.76 millimeters and less than 76 millimeters. The determination of these parameters was performed as part of the analysis to compare the Harbor material to the Shackleford Banks beach material. The criteria were used to determine if the Harbor material was suitable for disposal on Shackleford Banks.

The NC Technical Standards indicate that sediment is compatible for use as beach fill if the following five criteria are met:

a. Fine grained (less than 0.0625 mm) sediment is less than 10 percent,

b. The average percentage of fine grained (less than 0.0625 mm) sediment is less than 5% greater than that of the recipient beach, and

c. The average percentage of calcium carbonate (percent shell) does not exceed 15 percent of the recipient beach.

d. The average percentage by weight of granular sediment (greater than or equal to 2 mm and less than or equal to 4.76 mm) in a borrow site shall not exceed the average

Final Morehead City Harbor DMMP and EIS

percentage by weight of coarse sand sediment of the recipient beach characterization plus 5%.

e. The average percentage by weight of gravel (greater than or equal to 4.76 mm) in a borrow site shall not exceed the average percentage by weight of gravel sized sediment for the recipient beach characterization plus 5 percent.

Based on the analysis of the grain sizes of the sediments of the Morehead City Harbor sediments and the Shackleford Banks sediments, the following is a comparison of the NC Sediment Criteria categories:

a. and b. The Morehead City Harbor sediments contain 3.6 percent fine grained soil compared to Shackleford Banks sediment containing 1.0 percent fine-grained material (passing the #230 sieve (0.063 mm)). The Harbor sediments contain less than 10% fine grain soils and less than 5% greater fine grain sediment compared to the Shackleford Banks sediments. (i.e., 3.6% is less than 6% (1% plus 5% = 6%)).

c. The Morehead City harbor sediment contains 16.0% visual shell. The Shackleford composite (recipient beach) contained 13.9% visual shell. The harbor sediment does not exceed 15% of the recipient beach (i.e., 16.0% is less than 28.9% (13.9% + 15% = 28.9%)).

d. Sediment which is greater (coarser) than or equal to 2 mm and less (finer) than 4.76 mm is the difference between that retained by the # 10 sieve (2.0 mm) and the #4 sieve (4.76 mm). For the Morehead City Harbor sediment the percent passing #4 sieve is 98.1% and passing #10 is 95.4%, a difference of 2.7%. For Shackleford Banks the percent passing the #4 sieve is 96.6% and passing the #10 sieve is 92.5%, a difference of 4.1%. The harbor sediment is LESS THAN 5% of the Shackleford sediment (i.e., 2.7% is less than 9.1% (4.1% plus 5% = 9.1%)).

e. The sieve size of gravel (greater than or equal to 4.76 mm) is greater than the #4 sieve. The Morehead City Harbor sediment percent passing the #4 sieve is 98.1 and Shackleford Banks is 96.6%. That means that the Harbor sediment is 1.9% gravel (100 - 98.1 = 1.9%). Shackleford Banks is 3.4% gravel (100 - 96.6 = 3.4%). Again the harbor sediment is less than 5% of the Shackleford sediment (i.e., 1.9% is less than 8.4% (3.4% plus 5% or 8.4%).

Table B-4 below summarizes information applicable to the NC Sediment Criteria. This table also includes the comparison of the mean and standard deviation of the sediment of the Morehead City Harbor and the sediment of Shackleford Banks. Again the Shackleford Banks Dune to -24 is considered to be the condition that most matches the criteria for the “native beach.”

The mean and standard deviation was calculated in phi units for the Morehead City Harbor sediments and the Shackleford Banks beach sediments. The Morehead City

Harbor sediments' mean was calculated as 1.90 phi (0.27 mm). The Shackleford Banks Beach sediments' mean was calculated as 1.56 phi (0.34 mm). This shows that the Morehead City Harbor sediment is slightly finer than the Shackleford Banks beach sediment. The standard deviation of the Morehead City Harbor sediments is0.84 phi and the standard deviation of the Shackleford Banks sediments is 1.13 phi. See Table B-1.

Based on the sediment analysis, the Morehead City Harbor maintenance material meets the North Carolina compatibility criteria for disposal on Shackleford Banks.

The histogram in Figure B-10 compares the distribution of the four groups of Shackleford Banks sediments to the Morehead City Harbor sediments.

	SAMPLES	MEAN (phi)	STD DEV (phi)	% PASSING #4	%PASSING #10	% PASSING #200	% PASSING #230	% VISUAL SHELL
	-	-	-	-	-	-	-	-
Morehead City Outer Harbor	**130**	**1.90**	**0.84**	**98.1**	**95.4**	**3.6**	**3.6**	**16.0**
Shackleford Banks Native Data DN to -24	**598**	**1.56**	**1.13**	**96.6**	**92.5**	**1.2**	**1.0**	**13.0**
Shackleford Banks Native Data DB to -24	**552**	**1.54**	**1.20**	**96.3**	**91.9**	**1.3**	**1.0**	**13.9**
Shackleford Banks Native Data DB to MLW	**230**	**0.91**	**1.29**	**94.2**	**87.1**	**0.4**	**0.4**	**22.2**
Shackleford Banks Native Data TR to -24	**322**	**2.00**	**0.88**	**97.8**	**95.3**	**1.9**	**1.5**	**8.0**

Table B-4. Grain Size Comparison of NC Sediment Criteria Results

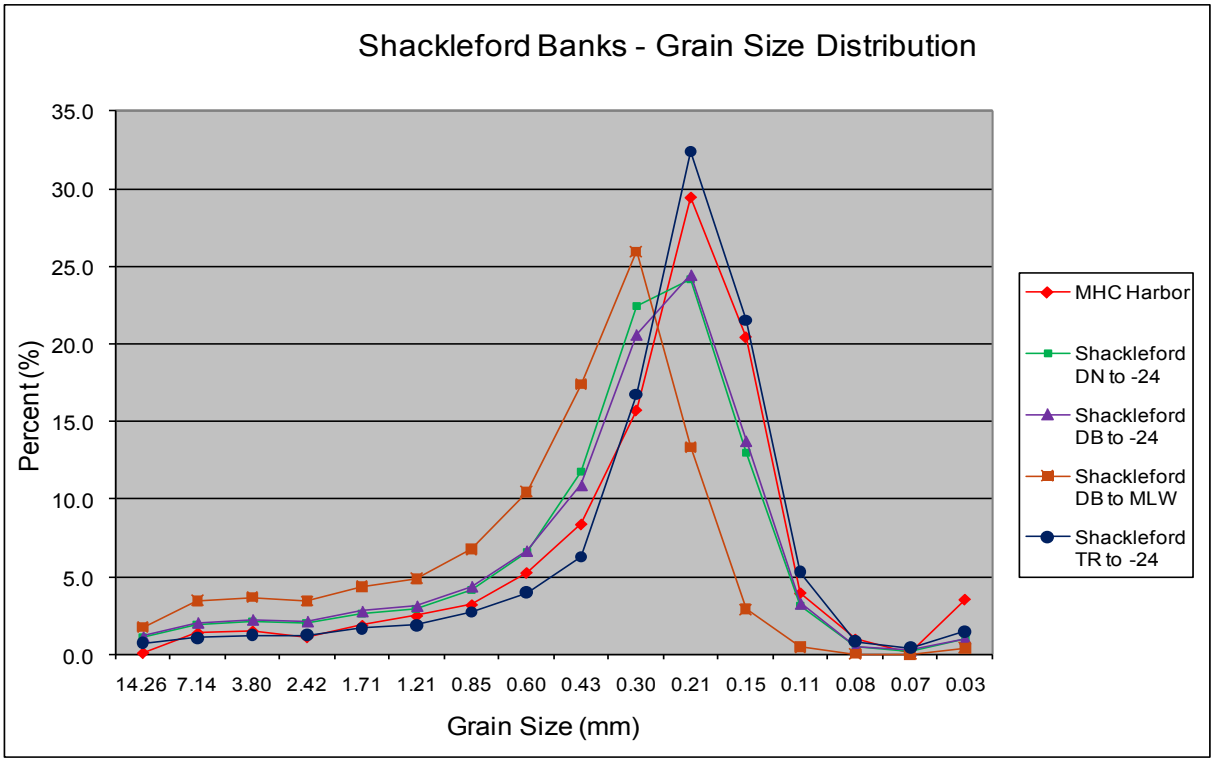


Figure B-10. Grain Size Distribution for Shackleford Banks and Harbor Soils

The suitability of the borrow material for disposal on the beach is based on the overfill ratio. The overfill ratio is computed by numerically comparing the size distribution characteristics of the native beach sand with that in the borrow area and includes an adjustment for the percent of fines in the borrow area. The overfill ratio is primarily based on the assumption that the borrow material will undergo sorting and winnowing once exposed to waves and currents in the littoral zone, with the resulting sorted distribution approaching that of the native sand. Since borrow material will rarely match the native material exactly, the amount of borrow material needed to result in a net cubic yard of beach fill material will generally be greater than one cubic yard. The excess material needed to yield one net cubic yard of material in place on the beach profile is the overfill ratio. The overfill ratio is defined as the ratio of the volume of borrow material needed to yield one net cubic yard of fill material. For example, if 1.5 cubic yards of fill material is needed to yield one net yard in place, the overfill factor would equal 1.5. (SPM)

The overfill criteria developed by James (1975) is the method used in the Automated Coastal Engineering System (ACES). The procedure is also described in the U.S. Army Coastal Engineering Manual (CEM) EM-1110-2-1100 Part V (July 2003).

The Dean's equilibrium method (Dean, 1991) determines the volume of recharged sand of a given grain size to increase the width of dry beach by a given amount. Dean

proposed that beach profiles develop a characteristic parabolic equilibrium profile. (CEDD)

The equilibrium slope method by Pilarczyk, van Overeem and Bakker (1986) bases the recharged profile on the present native profile. However, if the grain size of the fill material is different from the native material, the profile steepness is altered. (CEDD)

The Krumbein and James Method is only applicable if the native material is better sorted than the fill material. If the fill material is better sorted than the native material, this method simply does not apply. Secondly, the Krumbein and James Method assumes that the portion of the fill material retained on the beach after sorting by waves and current will have exactly the same size distribution of the native material. This implies that both the fine and coarse portion of the fill will be lost. This feature is not consistent with the knowledge of sediment transport process as the coarser portion of the fill will likely remain on the beach without being carried away by waves and currents (Dean, 1974; also Dean and Dalrymple, 2002). The overfill ratio by the Krumbein and James Method will tend to be overestimated. Dean (1974) addressed the above shortcomings by assuming that only the finer portion of the fill will be winnowed away by prevailing wave condition leaving the mean diameter of altered distribution of fill material to be at least as large as the mean diameter of native material. Dean defines the overfill ratio as the required replacement volume of fill material to obtain one unit of compatible beach material and uses the 'phi' unit to describe the size of sand particle. (CEDD)

Krumbein and James (1965) established a method for estimating the additional quantity of fill material required if the fill and native sediment are dissimilar. The method involved multiplying the required volume of beach material, assuming a natural grading, by a critical overfill ratio R_{crit} to determine the quantity of fill material over and above that required by the absolute dimensions of the proposed nourishment works. (CEDD)

The overfill ratio for the Shackleford Banks Beach compared to the Morehead City Inner Harbor material was calculated by all 5 methods. The group from the dune to -24 is the most condition that most matches the criteria for the "native beach." For the overfill calculation results, see Table B-5 below. The Equilibrium Profile Method (EPM) is considered to be the most accurate method based on it taking into consideration the shape of the fill and the significant wave height. Based on the EPM, the overfill ratio for is 1.22. Any value of less that 1.5 is considered acceptable for use as beach renourishment. It should be pointed out that this is not a renourishment project, but that the material meets the stringent requirements for sediment to be used for a renourishment project. Following public review of the Draft DMMP, the National Park Service requested the dismissal of the alternative to place dredged material on the Shackleford Banks beach, so no dredged material disposal on Shackleford Banks will take place.

			Overfill Ratio Assumed: Berm Height=6' Berm Width=150' Significant Wave Height=6.2'				
	MEAN (phi)	STD DEV (phi)	ACES	EPM	ESM	Dean Method	K and J Method
Morehead City Outer Harbor	- 1.90	- 0.84	NA	NA	NA	NA	NA
Shackleford Banks Native Data DN to -24	- 1.56	- 1.13	2.353	1.22	1.49	1.1	0.672

ACES - Automated Coastal Engineering System
EPM - Equilibrium Profile Method
ESM - Equilibrium Slope Method
K and J - Krumbein and James Method

Table B-5. Shackleford Banks Overfill Ratios

REFERENCES

JAMES, W.R., "Techniques in Evaluating Suitability of Borrow Material for Beach Nourishment," TM-60, Coastal Engineering Research Center, U. S. Army Engineer Waterways Experiment Station, Vicksburg, Miss., Dec. 1975.

CIRIA (1996). Report 153 – Beach Management Manual. Construction Industry Research and Information Association, United Kingdom, 448p.

Dean, R.G. (1974). Compatibility of Borrow Material for Beach Fills. Proceedings of the 14th International Conference on Coastal Engineering, ASCE, Copenhagen, pp. 1319-1333.

Dean, R.G. (1991). Equilibrium beach profiles : Characteristics and applications. Journal of Coastal Research, Volume 7, No. 1, pp. 53-84.

Dean, R.G. and R.A. Dalrymple (2002). Coastal Processes with Engineering Applications. Cambridge University Press, 475p.

Krumbein, W.C. and James, W.R. (1965). A log-normal size distribution model for estimating stability of beach fill material. Technical Memorandum No. 16, Coastal Research Centre, US Army Corps of Engineers.

Pilarczyk, K.W., Van Overeem, J. and Bakker, W.T. (1986). Design of beach nourishment scheme. Proceedings 20th International Conference on Coastal Engineering, Taiwan.

APPENDIX C

SHOALING ANALYSIS

Historic Shoaling Rates

Purpose: The purpose of the shoaling analysis section of this report is to determine the average amount of material that is shoaling into the navigation channel at Morehead City Harbor on an annual basis. The Morehead City Harbor navigation channel is broken into six major ranges as follows:

- Range A
- Cutoff
- Range B
- Range C / East Leg
- West Leg
- Northwest Leg

These ranges are then separated based on the quality of material contained within each area (figure 1). Ranges that contain coarse-grained (≥90 percent sand) which is suitable for beach disposal include: Range A out to station 110+00; the Cutoff; Range B; and a portion of Range C/East Leg from the seaward extent through station 17+00. Ranges containing fine-grained (<90 percent sand) material include: Range A from station 110+00 seaward; Range C/East Leg from station 17+00 landward; the West Leg; and the Northwest Leg. Beach compatibility is based on the most recent boring log information taken from each range and is discussed in detail within the Geotechnical Appendix of this report.

Shoaling rates for the given ranges can be used to estimate several future needs with regard to disposal/placement areas, to include ensuring sufficient volume is available for the estimated disposal quantities. Also, the rates can be used to determine disposal island pumpout frequencies as well as estimate quantities available for beach disposal of acceptable sand material.

Historical Data: The basis for the shoaling study is the historical surveys collected and maintained by the Wilmington District Navigation section. The entrance channel, ocean bar, and inner harbor are surveyed on a regular basis to ensure proper depth is maintained. In addition to these condition surveys, the channel is also surveyed just prior to and immediately after dredging events. These historic surveys were collected and imported into a new diagnostic modeling tool as part of a demonstration project by Taylor Engineering (Carvalho and Albada, 2006). The focus of the tool is to provide a useful way to monitor shoal rates within navigation channels. As part of the demonstration project, surveys were processed through 2005. The remainder of the surveys through 2007 were collected and processed by the Wilmington District Coastal Engineering section as part of this shoaling calculation effort.

Assumptions: Several assumptions were made for the calculation of channel shoal rates prior to beginning the work. They are as follows:

- First, the analysis is based on a comparison of bathymetric surveys only. Due to time constraints, a comparison of the surveys to the dredging template was not made.
- Partial surveys were included in the comparison with the assumption that the survey covered all areas within the channel that may have shoaled. Surveys that were very small in coverage area were excluded.
- All comparisons were made within the lateral bounding limits of the channel polygon. Any dredging that may have occurred outside the authorized channel lateral limits was not considered. Dredging volume that occurred within the lateral limits of the authorized channel that was below the authorized depth was included in the analysis.
- Shoaling rates were generally limited to between the years 2000 and 2007 due to funding and time limitations.

Methods and Results: As discussed earlier, the Diagnostic Modeling System ESRI extension was used to compute volumetric changes between surveys. Change values were computed between surveys and categorized four ways: condition survey to before dredge survey; after dredge to before dredge survey; after dredge to condition survey; and before dredge to after dredge survey. In the absence of a valid before or after dredge survey for a given time period, the condition survey closest to the date of the missing survey would be used as a substitute to measure trends.

Once volume differences were computed between survey events they were sorted to group similar survey dates. Survey comparisons between common dates, i.e. two different condition surveys compared to the same before dredge survey, would have their individual shoal rates averaged to produce one shoal rate that represented this time period. Once all shoal rates were computed the average shoal rate for the type of comparison, i.e. after dredge to condition, would be computed. This would ultimately produce three shoal rates, one each for the after dredge to condition, the condition to before dredge, and the after dredge to before dredge. These three rates would then be averaged into what is used as the representative shoal rate for a particular section of the channel. Final shoaling rates for each section of the navigation channel are shown in Table 1.

Historic Dredge Volumes:

Purpose: In an attempt to correlate the newly developed shoaling rates with the amount of material historically dredged from the channel, an average annual dredging rate was developed based on the historic dredge volumes.

Historic Data: The navigation channel and inner harbor was broken into six regions based on historic dredging contracts between 1997 and 2008, as follows:

- Range A
- Cutoff

- Range B
- Range C / East Leg
- West Leg
- Northwest Leg

Unlike shoaling rates developed previously using the actual survey data, these data were not separated into beach quality material and non-beach quality material. This was due to the limited nature of the available contract data which typically only includes channel quantities for before dredge and after dredge conditions, as well as the overdepth volume. Overdepth volume is material dredged beyond the authorized channel template and is subtracted from the volume calculated based on the before dredge and after dredge surveys. This final pay quantity was used as the basis for developing the average annual dredging rates for historic dredging.

Methods and Results: Actual pay volume quantities were organized into one of the six regions described above by survey date. Due to the variability of the number of dredging events for each reach and the time between surveys, an average was computed for both the dredge volume and duration between events. These average values were then used to compute the average annual dredging rate by dividing the average volume dredged by the average duration between dredging events. A summary of the results is shown in table 1.

To make comparisons between the shoaling rate and the average annual dredging rate calculations, ranges for the survey based shoaling rates had to be combined into the six ranges used in the dredging rate analysis. The last column in table 1 shows the substantial difference in the two calculation methods. There are multiple explanations for the differences observed between the two methods. The first reason for the difference is that the average annual dredging rate does not include material dredged from outside the channel template as a result of it being based on pay quantities only. Secondly, material that shoals into the navigation channel during the dredging process is unaccounted for in the pay quantities. The period of time that a contractor occupies a section of the navigation channel for dredging varies, but can range between four to eight weeks for a typical section. Since contracts are typically paid based on material removed between after dredge and before dredge surveys, the contractor must remove the amount specified in the construction contract and shoaling during construction as well. For example, an eight week dredging operation would remove roughly 17 percent of anticipated yearly shoaling which would not be represented in the final quantity. The third reason for shoaling rates to be higher than average annual dredging rates would be that previous dredging events may have not removed all shoaling within the channel. Shoaling that occurs within the channel, but does not restrict navigation may not be removed until such point that it becomes a navigational issue. Also, shoaling has occurred in areas such as the Shackleford Banks spit at the intersection of Range A and the Cutoff where the typical hopper dredging plant is unable to dredge the navigation channel to its full alignment. Lastly, maintenance of the project is frequently limited by funding.

Given these differences, the most reliable tool to predict shoaling volumes within the channel would be the survey based shoaling rates applied over the anticipated period between dredging events.

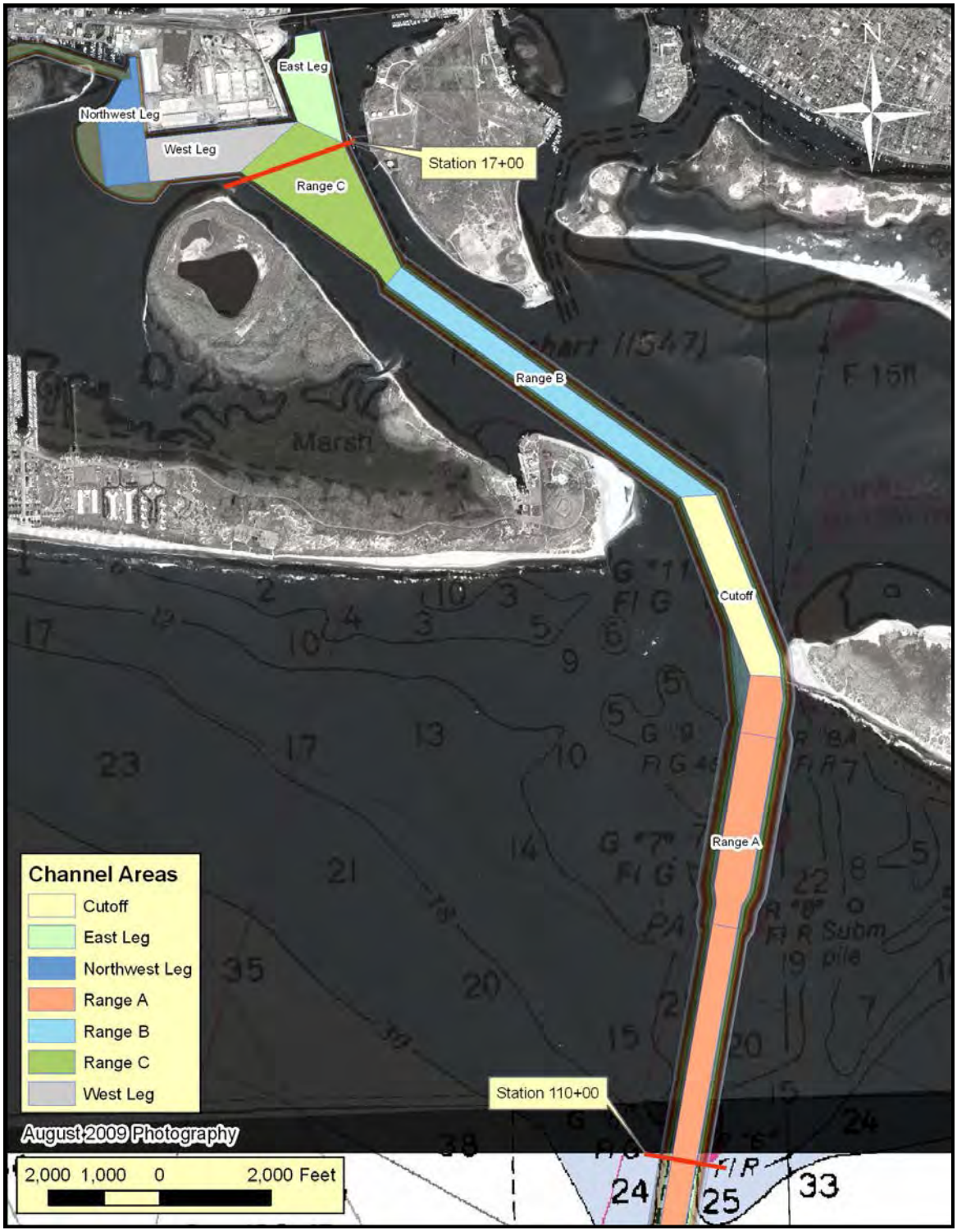


Figure 2

	Shoaling Rates Based on Survey Comparison (AD, BD, and Condition Surveys 2000-2007)				Average Annual Dredging Rates (1997 - 2008)		
Range	Representative Shoaling Rate (C.Y./Year)	Shoaling Rate (C.Y./day)	Combined Shoaling Rate (C.Y./Year)	Combined by Range (C.Y./Day)	Representative Dredging Rate (C.Y./Year)	Dredging Rate (C.Y./day)	% Difference
Range A Suitable	630,500	1,727					
Range A Unsuitable	118,500	325	749,000	2,052	547,600	1,500	-26.89%
Range B	170,000	466	170,000	466	45,400	124	-73.29%
Cutoff	324,500	889	324,500	889	182,500	500	-43.76%
Range C Eastleg Suitable	80,500	221					
Range C Eastleg Unsuitable	86,000	236	166,500	456	138,200	379	-17.00%
West Leg	28,000	77	28,000	77	23,200	64	-17.14%
Northwest Leg	80,000	219	80,000	219	60,900	167	-23.88%

Table 1

Reference:

Carvalho, Alexandra, Ph.D. and Edward Albada, P.E., 2006. “Morehead City Harbor DMS Data Manager Application Carteret County, North Carolina”, Taylor Engineering, Jacksonville, FL.

APPENDIX D

PUBLIC AND AGENCY CORRESPONDENCE

November 26, 2007

Environmental Resources Section

Dear Sir or Madam:

The U.S. Army Corps of Engineers, Wilmington District, is initiating work on the Morehead City Harbor Dredged Material Management Plan (DMMP). The purpose of the DMMP is to address long-term (20-year) management of the dredged material from Morehead City Harbor, (see enclosed map). The DMMP studies will involve data collection, compilation, analyses, evaluations, surveys, mapping, coordination, and management necessary to address the major alternatives and to coordinate a DMMP report. We plan on completing the DMMP process in two years.

At this time we are inviting your participation in project planning through the scoping process and are requesting comments from agencies, interest groups, and the public to identify significant resources, issues of concern, and recommendations for studies considered necessary. Comments received during the scoping process will be considered as we conduct our studies and identify dredged material disposal alternatives and evaluate them from engineering, economic, and environmental perspectives. These items will be addressed in the DMMP and likely in a National Environmental Policy Act (NEPA) document. The document, if necessary will be prepared in accordance with the Council on Environmental Quality and the Corps of Engineers regulations for implementing the National Environmental Policy Act of 1969, as amended. The purpose of the NEPA document is to ensure that the environmental consequences of managing the disposal of dredged material removed from the navigational channels are considered and environmental and project information is available to the public.

A scoping meeting is planned for a later date in Morehead City, North Carolina. We will present the Morehead City Harbor DMMP objectives and elaborate on measures being considered.

Written comments are presently requested to help us identify significant issues that should be addressed during the preparation of the DMMP and any associated NEPA document. Please provide your comments within 45 days from the date of this letter so that they may be considered during our evaluations and decisions process. Early identification of issues will facilitate our ability to address them in our studies. Comments should be addressed as follows:

U.S. Army Corps of Engineers,
Wilmington District
Attention: Mr. Stacy Samuelson (CESAW-TS-PE)
Post Office Box 1890
Wilmington, North Carolina 28402-1890

CESAW-TS-PE/Samuelson

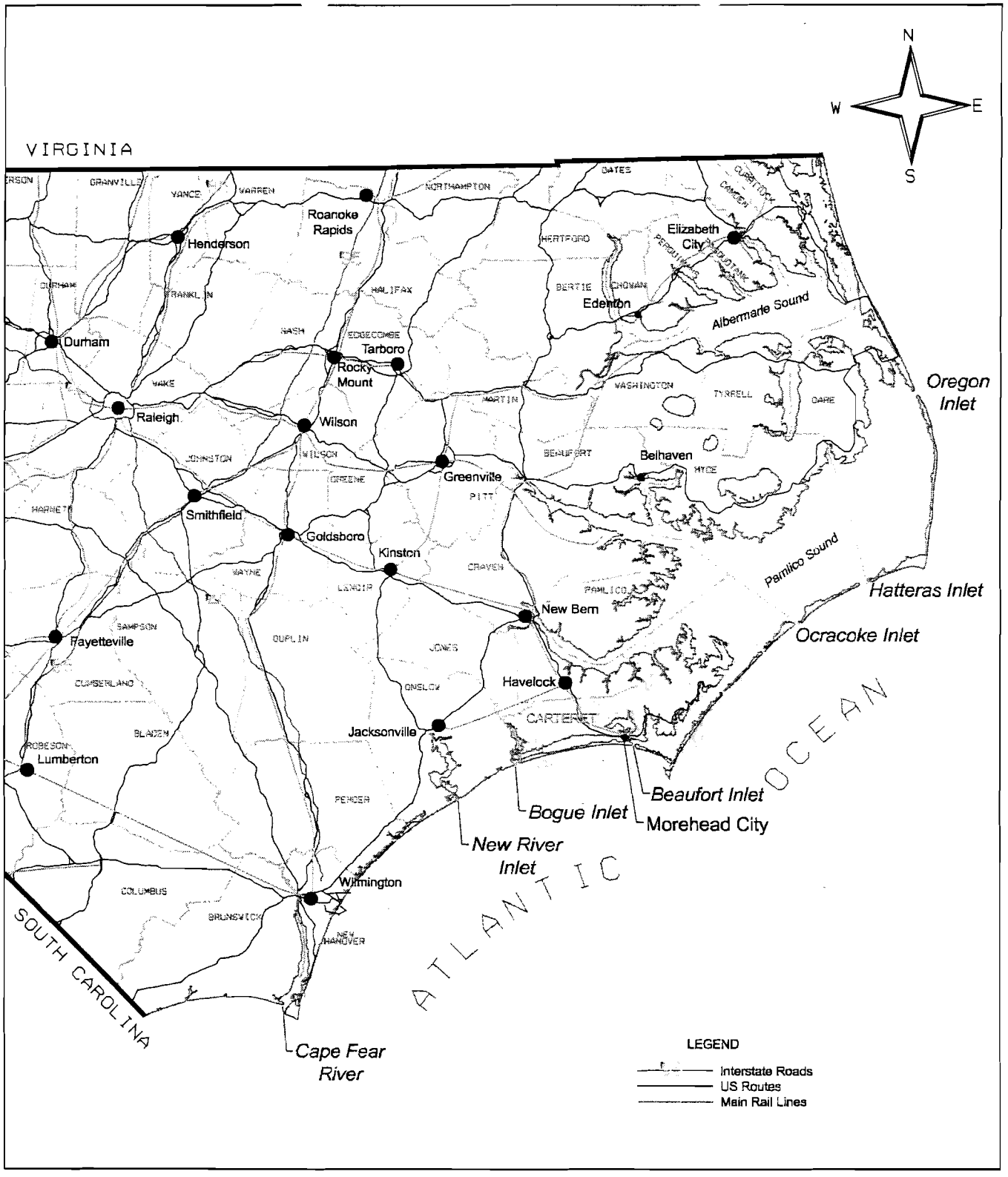
If you have any questions concerning this matter, please call Mr. Stacy Samuelson, Environmental Resources Section, at (910) 251-4480 or email Stacy.D.Samuelson@usace.army.mil. If you would like to be informed of the date and location of the scoping meeting please let Mr. Samuelson know so that we can provide the pertinent information.

Sincerely,

W. Coleman Long
Chief, Planning and Environmental Branch

Enclosure

CESAW-TS-PE/Samuelson
CESAW-TS-PE/Payonk
CESAW-PM-Blount
CESAW-OC/McCorcle
CESAW-TS-P/Long/s
Return to Brenda Willett
Mail
Mailing List will be EIS Standard, Carteret County



0 15 30 MILES

SCALE: 1" = 30 MILES

EXHIBIT 1.1
LOCATION MAP

MOREHEAD CITY VICINITY

North Carolina
Department of Administration

Michael F. Easley, Governor | Britt Cobb, Secretary

November 30, 2007

Mr. W. Coleman Long
U.S. Army - Corp of Engineers
Wilmington District
P.O. Box 1890
Wilmington NC 28402-1890

Dear Mr. Long:

Subject: Scoping - Development of the Morehead City Harbor Dredging Material Management Plan (DMMP) to address long-term (20-year) management of the dredged material from Morehead City Harbor in Carteret County.

The N. C. State Clearinghouse has received the above project for intergovernmental review. This project has been assigned State Application Number 08-E-0000-0157. Please use this number with all inquiries or correspondence with this office.

Review of this project should be completed on or before 01/14/2008 . Should you have any questions, please call (919)807-2425.

Sincerely,

Chrys Baggett

Ms. Chrys Baggett
Environmental Policy Act Coordinator

cc: Mr. Stacy Samuelson

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail: Chrys.Baggett@ncmail.net

Location Address:
116 West Jones Street
Raleigh, North Carolina

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Michael F. Easley, Governor
William G. Ross Jr., Secretary

Dr. Louis B. Daniel III, Director

December 20, 2007

US Army Corps of Engineers
Wilmington District
Attention: Mr. Stacy Samuelson (CESAW-TS-PE)
PO Box 1890
Wilmington, NC 28402-1890

Dear Mr. Samuelson:

The North Carolina Division of Marine Fisheries (DMF) would like to offer the following comments concerning development of the Morehead City Harbor Dredged Material Management Plan (DMMP).

The North Carolina Coastal Habitat Protection Plan (CHPP) which was developed through the efforts of staff from DMF, NC Division of Coastal Management, NC Division of Water Quality, NC Wildlife Resources Commission, and NC Division of Environmental Health and adopted by the NC Marine Fisheries Commission, NC Environmental Management Commission and NC Coastal Resources Commission makes the following recommendations concerning studies necessary for the proper use of dredge material for beach renourishment:

1. Identify more specific minimum and maximum sediment grain sizes to minimize biological impacts to the intertidal beach community.

2. Determine the minimum distance required between undisturbed areas within/bordering the renourishment project to provide adequate sources of intertidal organism for recolonization and food for fish.

3. Determine the time interval between projects to allow full recovery of benthic communities based on project season/duration, compatibility of sediment size and other parameters.

The CHPP also contains the following recommendations concerning beach renourishment projects:

1. Restrict beach nourishment projects to winter months to minimize mortality of infauna and enhance recovery rates of intertidal benthic organisms.

3441 Arendell Street, P.O. Box 769, Morehead City, North Carolina 28557
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2. Conduct adequate monitoring of the effects of beach nourishment on the soft bottom community and associated surf fish populations.

The NC Marine Fisheries Commission has also established the following general policies related to large-scale beach dredge-and-fill projects:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of essential Fish habitat (EFH), with careful detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC, and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternative analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge and-fill projects in North Carolina and adjacent states, and other large–scale coastal engineering projects that are ecologically related.

Thank you for the opportunity to comment on development of the DMMP. Please inform DMF of the date and location of the scoping meeting.

Sincerely,

Michael D. Marshall
Central District Manager

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

DEC 13 2007

Mr. Stacy Samuelson (CESAW-TS-PE)
U.S. Army Corps of Engineers
Wilmington District
P.O. Box 1890
Wilmington, North Carolina 28402-1890

Dear Mr. Samuelson:

This letter is in response to your request for comments to the initiation of work on the Morehead City Harbor Dredged Material Management Plan (DMMP), dated November 26, 2007. The U.S. Environmental Protection Agency (EPA), Region 4 wants to ensure that throughout the development of the DMMP, all matters related to ocean disposal of dredged material and proper management and monitoring of the Morehead City Ocean Dredged Material Disposal Site (ODMDS) are adequately addressed and coordinated with EPA.

Should you have any questions or reach the point where ocean dumping specifics need to be identified, please contact Mr. Gary Collins of my staff at 404/562-9395. I ask that you also inform Mr. Collins of the date and location of the scoping meeting, as well as any other important meetings related to this matter.

Sincerely,

Thomas C. Welborn, Chief
Wetlands, Coastal and Nonpoint Source Branch

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Parks and Recreation

Michael F. Easley, Governor | William G. Ross Jr., Secretary | Lewis R. Ledford, Director

January 28, 2008

U.S. Army Corps of Engineers,
Wilmington District
Attention: Mr. Stacy Samuelson (CESAW-TS-PE)
Post Office Box 1890
Wilmington, North Carolina 28402-1890

Dear Mr. Samuelson:

It is good to hear that the U.S. Corp of Engineers will be completing a Morehead City Harbor Dredged Material Management Plan (DMMP) within the next two years. This type of study is needed, and I hope Fort Macon can have some input into the plan.

As you may know, Fort Macon State Park has started receiving material from the Morehead City Inner Harbor, and it has been placed on the shoreline of Ft. Macon State Park in the vicinity of the bathhouse structures. We hope to continue to receive this placement of material in the future. Please keep me informed of any meetings that are planned for the DMMP.

Sincerely,

Jody Merritt

Jody Merritt, Park Superintendent
Fort Macon State Park
PO Box 127
Atlantic Beach, NC 28512

NORTH CAROLINA STATE PARKS
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Samuelson, Stacy D SAW

From: Bouchard, Jennifer A LT CNRMA [jennifer.bouchard@navy.mil]
Sent: Monday, December 10, 2007 12:12 PM
To: Samuelson, Stacy D SAW
Subject: Morehead City Harbor DMMP

Mr. Samuelson,

Good afternoon, Sir. I have just recently taken over as Officer in Charge, Navy Port Control in Morehead City.
This morning I received an email with the complaint filed against the US Army Corps of Engineers by Carteret County. Of course our concern is the future inability of Navy Ships to enter the harbor safely for Marine on load and off load if the dredging is not able to be conducted. If possible I would like to attend the scoping meeting. Will you send me the date, time, and location of the meeting. Thank you for your assistance.

Very Respectfully,
LTJG Jennifer Bouchard
OIC Navy Port Control Morehead City, NC
113 Arendell St #114 Morehead City, NC 28557
Office: (252) 726-1976 Cell: (252) 241-8498 Fax: (252) 726-7693
NIPR E-mail: jennifer.bouchard@navy.mil
SIPR E-mail: mowreywc@2mawcp.usmc.smil.mil
gutierrezgd@2mawcp.usmc.smil.mil

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service
4405 Bland Road, Suite 205
Raleigh, North Carolina 27609

Phone: (919) 873-2134
Fax: (919) 873-2154
Email: mike.hinton@nc.usda.gov

December 4, 2007

Mr. Stacy Samuelson
CESAW-TS-PE
USACOE-Wilmington District
P. O. Box 1890
Wilmington, NC 28402-1890

Dear Mr. Samuelson:

Thank you for the opportunity to provide comments on Morehead City Harbor Dredged Material Management Plan (DMMP), Carteret County, North Carolina.

The Natural Resources Conservation Service does not have any comments at this time.

If you need additional information, please feel free to contact me at (919) 873-2134.

Sincerely,

Michael J. Hinton
Planning Specialist

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

February 1, 2008

Stacy Samuelson
US Army Corps of Engineers
PO Box 1890
Wilmington, NC 28402-1890

Re: Morehead City Harbor Dredging Materials Management Plan, Morehead City, Carteret County, CH 07-2621

Dear Mr. Samuelson:

Thank you for your letter of November 30, 2007, concerning the above project.

There are numerous National Register-listed properties within the project area described in your scoping letter. These need to be considered for inclusion in your report.

Furthermore, the Dredging and Disposal of Materials from Morehead City Harbor has potential to impact the National Register Historic Property, Queen Anne's Revenge, 31CR314, as well as known and unknown sites in the vicinity. These properties and potential impacts should be considered throughout the planning stage.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

Peter Sandbeck

cc: State Clearinghouse

Rex Edwards
Director of Operations
Port of Morehead City

January 3, 2008

Mr. Stacy Samuelson (CESA W-TS-PE)
Wilmington District, U.S. Army Corps of Engineers
P.O. Box 1890
Wilmington, NC 28402-1890

Dear Mr. Samuelson:

The North Carolina State Ports Authority submits the comments below in response to your letter dated November 26, 2007, requesting comments and recommendations on initiation of a Morehead City Harbor Dredged Material Management Plan (DMMP) and studies considered necessary to identify and evaluate dredged material disposal alternatives. The Authority's position focuses on the economic benefits that the Port provides to the Morehead City community, the State of North Carolina, and the United States, while expressing support for incorporation of beneficial use of dredge materials in the Corps' policy and practices.

1. The Authority is deeply concerned about any action that would prevent dredging projects required to maintain the Morehead City Harbor navigation channel from safely accommodating transit by commercial vessels that use the state Port of Morehead City, vessels that serve the interests of national defense, and other craft used in maritime related business and recreational activities to the benefit of businesses, industry, and the citizens of North Carolina.

2. Failure to maintain full project channel dimensions in Morehead City would seriously jeopardize the Authority's ability to serve our current customer base, as well as hamper our efforts to secure new business. Cargo handling activities at the state Port support nearly 13,000 statewide jobs and $49 million dollars in local and state tax revenues that would be in jeopardy.

3. The Port of Morehead City partners with the Department of Defense, serving as one of the nation's 15 strategic ports for national defense – providing a platform for wartime and peacetime overseas military deployment of military personnel and equipment used to support our national defense efforts.

North Carolina State Ports Authority
113 Arendell Street • Morehead City, NC 28557
Tel: (252) 808-4205 • Fax: (252) 726-1190 • Email: rex_edwards@ncports.com • http://www.ncports.com

4. The Authority supports regional dredged material management. A DMMP and supporting studies are essential tools for demonstrating alternatives, risks, and benefits within a watershed.

5. The Authority fully supports development of a DMMP for Morehead City Harbor and any funding needed to expedite this plan.

6. The Port of Morehead City serves as a gateway to world markets for North Carolina's businesses, industries, and citizens. Products handled at the Port include phosphate used for fertilizers, lumber, natural rubber, scrap metal, and ore used to fabricate fiberglass. These commodities come from or are shipped throughout the world, particularly India, Venezuela, Brazil, China, and Indonesia.

7. Examples of regional and statewide economic benefits are:
   a. Morehead City's longtime and highly valued customer, PCS Phosphate, depends on the Port to sell fertilizer products throughout the world – fertilizer that is mined at the PCS mine in Aurora, NC.
   b. Fencing material is delivered from Morehead City to locations throughout North Carolina (such as Salisbury, Henderson, Elizabeth City, and Weldon) and to the East and Gulf Coast regions. Products handled at the Port of Morehead City impact thousands of North Carolinians who earn their living at plants and mills.
   c. The natural rubber from Indonesia is used at the Bridgestone Firestone plant in Wilson and the Goodyear plant in Fayetteville. The Port of Morehead City is the second-largest port in the nation for natural rubber imports.
   d. The scrap steel imported via Morehead City goes to the Nucor mill in Tunis and is used in recycled steel plates.

8. Examples of local economic impacts associated with maritime industry are:
   a. The Authority directly employs 75 people with an annual payroll in excess of $3.5 million.
   b. Related businesses and service providers such as the International Longshoremen's Association, harbor pilots, tug companies, shipping agents, stevedores, surveyors and marine equipment suppliers provide an estimated 250 additional jobs, salaries and revenues to the local economy.
   c. Approximately 1,000 additional induced jobs that include those who work at the stores, restaurants, hospitals, and schools used by port workers.

9. The Authority supports and advocates beneficial use of dredge material at each of North Carolina's deepwater ports while ensuring full project dimensions at these ports. We have worked successfully with the NC Division of Water Resources and the U.S. Army Corps of Engineers to place maintenance dredge material on Bogue Banks beaches.

10. The Authority supports efforts to alter the law and policies that require "least cost disposal" by the Corps of Engineers to allow the benefits of beach disposal as positive attributes of a Corps of Engineers' maintenance-dredging project.

11. The beneficial use of a limited resource should be a significant decision making factor in the formulation of a DMMP. Placement of beach quality sand on adjacent public beaches and the resulting regional benefits should be Project accountable. Claiming the benefits from a positive use of a dredged material resource should be used in calculating project justification and the cost benefit ratio. Examples of such benefits are:

    a. Federal and State tax base protection;

    b. Tourism industry protection;

    c. Municipal infrastructure protection;

    d. Potential deferral of FEMA outlays; and,

    e. Environmental restoration.

12. The Authority supports efforts to bolster the Corps of Engineers budget to enable beneficial use of dredge material.

Please feel free to contact me at any time with additional questions or concerns.

Sincerely,

Rex Edwards
Director of Operations, Port of Morehead City

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

January 22, 2008

Mr. Stacy Samuelson
Environmental Resources Section
Wilmington District, U. S. Army Corps of Engineers
P. O. Box 1890
Wilmington, North Carolina 28402-1890

Subject: Morehead City Harbor Dredged Material Management Plan

Dear Mr. Samuelson:

This letter provides scoping comments of the U. S. Fish and Wildlife Service (Service) on the proposed Morehead City Harbor Dredged Material Management Plan (DMMP) Project which was briefly outlined in a letter, dated November 26, 2007, from Coleman Long. That letter stated that the Wilmington Corps District (Corps) was initiating work on plans for the long-term (20-years) management of the material dredged from the Morehead City Harbor, Carteret County, North Carolina. The letter also stated that the project would involve data collection, compilation, analyses, evaluations, surveys, mapping, coordination, and management necessary to address the major alternatives and coordinate a DMMP report. Development of the DMMP is expected to be completed in two years.

These comments are submitted in accordance with the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661-667d). The FWCA mandates that wildlife conservation shall receive equal consideration and be coordinated with other factors of water-resource development programs through effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation. The FWCA essentially establishes fish and wildlife conservation as a coequal purpose or objective of federally funded or permitted water resources development projects. Additional comments are provided pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The disposition of dredge material from the Morehead City navigation channel over a 20 year period has the potential to impact important fish and wildlife resources in the project area. However, conservation measures are available to minimize the environmental impacts of both the sediment removal and disposition. The Service recommends the following measures be considered in the development of the DMMP:

1. The plan should include a sampling program to determine the physical characteristics of sediment to be removed. These physical characteristics include sand grain size,

density, shear resistance, color, heavy mineral content, calcium carbonate content, and moisture content.

2. The planning process should identify the range of potential disposal locations. Such sites as area beaches, upland disposal areas, and offshore disposal sites should be described and the fish and wildlife resources using each area should be discussed.

3. Based on the physical characteristics of the sediment to be removed, standards should be established for material which would be placed in the various disposal locations. Careful analysis should be used for directing dredge material to oceanfront beaches. Any material to be used as beach fill 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. Any beach fill should have a color similar to the natural beach. While sediment compatibility standards may be lower for beach disposal operations than for formal beach construction projects, the Service recommends that all material used for beach fill should have a high degree of compatibility. Any beach disposal resulting from the DMMP should use the same standards of sediment compatibility as those applied to civil works beach construction projects.

4. Sediment removal and disposal should be scheduled during the least sensitive period of the year for the organisms dependent on the habitats to be affected. Dredged material disposal on ocean beaches requires consideration of nesting by federally protected sea turtles as well as the use of these areas by the federally threatened piping plover (*Charadrius melodus*) for nesting, overwintering, and migratory stopovers. Due to the potential harm to these federally protect species, the Service has recommended that dredging and disposal be prohibited during the combined period of sea turtle/piping plover reproductive activities, April 1 through November 15.

5. Project planning should consider the life cycle of beach invertebrates in the scheduling of any beach disposal. Peterson et al. (2000) documented invertebrate populations following disposal of dredge spoil from the Atlantic Intracoastal Waterway in Bogue Sound on the beaches of Bogue Banks during March through May 1990. Populations of important beach invertebrates were reduced by 86-99% (compared to control beaches) five to ten weeks following fill placement. The authors conclude that "failure of *Emerita* [mole crabs] and *Donax* [coquina clams] to recover from nourishment by mid summer when they serve as a primary prey base for important surf fishes, ghost crabs, and some shorebirds may be a consequence of the poor match in grain size and high shell content of source sediments and/or extension of the project too far into the warm season" (Peterson et al. 2000, p. 368, abstract). Scheduling beach disposal outside the larval recruitment period of beach invertebrates will ensure better recovery of these species. Peterson et al. (2000, p. 376) recommend that future sand placements should be designed to end before the onset of the warm season (April or May in North Carolina) when *Donax* and *Emerita* return to the intertidal beach. Therefore, planning for the DMMP should seek to end all

beach disposal operations by March 31 or, at the latest, by April 30 to conserve these invertebrates that form an important food resource for shorebirds and coastal fisheries.

6. Project plans should include measures to avoid adverse impacts associated with placement of the sediment pipeline and measures to monitor and mitigate any spills from the pipeline. Any overland sediment pipeline should be aligned to avoid potential shorebird nesting habitat around inlets and sparsely vegetated, undeveloped sandy flats. Overland pipeline routes should be coordinated with state and federal resource agencies to minimize adverse impacts to shorebirds. In-water pipeline placement should avoid all hardbottom areas, submerged aquatic vegetation (SAV), and areas used by shellfish. There should be a plan to monitor pipelines for leaks and an established plan of action to contain any pipeline spills and to remove sediment resulting from a pipeline spill.

7. The Corps should ensure that no hardbottom habitats are affected by sedimentation produced by the project, either as a result of dredging or sediment washing off the beach.

8. While the use of highly compatible fill material for beach fill would minimize turbidity and sedimentation due to runoff from the disposal area, small inclusions of mud and silt pose a risk to nearshore hardbottoms. Project planning should establish a program to monitor the location, areal extent, and major organisms of nearshore hardbottoms prior to implementation of the DMMP. These areas should be surveyed after each beach disposal operation to determine if any adverse sedimentation or changes in the biological community occurred. If it is determined that nearshore hardbottoms are being covered by sediment moving off beach disposal areas, the monitoring program should determine the overall loss of exposed hardbottoms. The DMMP should include a protocol for developing and implementing appropriate mitigation measures for any loss of nearshore hardbottoms. Mitigation measures could include a reduction in the amount of beach fill near vulnerable hardbottoms.

9. Project plans should include measures to ensure that no SAV is adversely affected by either dredging or disposal activities. These measures should include mapping of existing SAV areas prior to implementation of the DMMP and periodic assessment of SAV areas throughout the 20 years of the plan. If dredging or sediment disposal (e.g., runoff of muddy water from a confined disposal facility) results in the loss of SAV, the Corps should coordinate with state and federal resource agencies to develop a mitigation strategy.

10. All beach disposal operations should include surveys for seabeach amaranth (*Amaranthus pumilus*) both before placement and for three years after disposal to avoid direct burial and to monitor recovery of the plant. If data indicate a declining trend in the presence of this federally threatened species, the development of mitigation measures should be part of the DMMP. If beach vitex (*Vitex rotundifolia*), a harmful invasive foreign plant, occurs on any of the beaches to be maintained by disposal operations, the Corps should considering establishing a program to monitor the species and develop efforts to eradicate the plant.

11. Piping plovers are especially susceptible to human disturbance during territory establishment, early nesting attempts, and after the chicks have hatched. Therefore, the work on each beach disposal event should start in less developed areas, such as near an inlet, and progress toward more developed areas over the winter months. For example, a disposal operation starting in December on the eastern end of Bogue Banks should start near the inlet at Fort Macon State Park and move westward toward Atlantic Beach. This order of disposal would result in sediment disposal during late winter and early spring in the more developed parts of the island which are less likely to be used for shorebird nesting.

12. Nesting by sea turtles will benefit from high sediment compatibility standards and work schedules that avoid the nesting season. All beach disposals should occur outside the recognized nesting and incubation season of May 1 through November 15. However, artificial beaches pose additional risks to sea turtle nesting due to: (1) sediment compaction; (2) escarpment formation; and, (3) altered sand temperature which may occur as a result of a change in sediment color. To mitigate sediment compaction, the Service recommends that compaction monitoring should occur after each construction event and for three subsequent years. However, compaction monitoring would not be required if the sediment used to construct the beach is completely washed away. Beach tilling to correct beach compaction should only be performed as a result of an identified compaction problem and not performed routinely in place of compaction monitoring. Similarly, visual surveys for escarpments should be made along the constructed beach immediately after completion of the sediment placement and prior to May 1. Additional surveys should be made for three years following initial construction. Survey results should be submitted to the Service prior to any action being taken. After discussion with the Service, escarpments that interfere with sea turtle nesting or exceed 18 inches in height for a distance of 100 feet should be leveled to the natural beach contour by May 1. The Service should be contacted immediately if new escarpments that interfere with sea turtle nesting or exceed 18 inches in height for a distance of 100 feet form during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests.

13. During any beach disposal operation, the DMMP should include a program for detecting and securing appropriate care for stranded sea turtles. In many beach communities, private conservation groups consisting of state-approved volunteers already provide a means for recovering stranded sea turtles and a protocol for ensuring that care is made available for those turtles that can be retuned to the ocean.

13. While the West Indian manatee is not likely to be in the project area during a work period from mid-November through April 30, protective measures should be in place to safeguard this endangered species. Corps plans call for the implementation of the Service's "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina." These guidelines should provide adequate protection for this species.

14. With regard to all federally protected species, the Corps should prepare a Biological Assessment (BA) in accordance with section 7 of the ESA. The BA should describe the potential impacts of the DMMP on each listed species which is likely to occur in the project area. The BA should discuss the conservation measures for the species that will be part of the plan and provide a determination of the extent to which each species will be affected over the entire course of the project.

15. While routine maintenance dredging can be planned based on historic rates of sediment accumulation, emergency situations may arise as a result of hurricanes or other unpredictable events. In emergency situations which threaten navigation, dredge spoil will be generated and the DMMP should address the disposal of this material. The DMMP should define the conditions that would require emergency dredging. The DMMP should clearly state whether emergency dredging will be initiated solely for navigation purposes or as a result of excessive shoreline recession which threatens structures near the beach. That is, the plan should state whether emergency dredging could be initiated solely on the basis of a need for beach fill when there was no threat to navigation.

A thorough consideration of these issues in the development of the Morehead City Harbor DMMP would reduce the adverse environmental impacts that could arise during the 20 years of the plan. The Service appreciates the opportunity to provide these comments and we look forward to continued involvement with the Corps on this project. Please keep this office informed on progress in the planning process. The Service would like to be informed of any scoping meetings for the plan. Any questions regarding these comments should be directed to Howard Hall at 919-856-4520, ext 27, or by e-mail at < howard_hall@fws.gov >.

Sincerely,

for Pete Benjamin
Field Supervisor

Literature cited

Peterson, C. H., D. H. M. Hickerson, and G. G. Johnson. 2000. Short-term consequences of nourishment and bulldozing on the dominant large invertebrates of a sandy beach. Journal of Coastal Research. 16:368-378.

cc:

Ron Sechler, National Marine Fisheries Service, Beaufort, NC

Fritz Rohde, NC Division of Marine Fisheries, Wilmington, NC
Stephen Rynas, NC Division of Coastal Management, Morehead City, NC
Maria Dunn, NC Wildlife Resources Commission, Washington, NC
Susan Cameron, NC Wildlife Resources Commission, Stella, NC
Matthew Godfrey, Wildlife Resources Commission, Beaufort, NC

North Carolina
Department of Administration

Michael F. Easley, Governor | Britt Cobb, Secretary

January 17, 2008

U.S. Army - Corps of Engineers
Wilmington District
Attention: Mr. Stacy Samuelson (CESAW-TS-PE)
P.O. Box 1890
Wilmington, NC 28402-1890

Dear Mr.Samuelson:

Re: SCH File # 08-E-0000-0157; Scoping; Development of the Morehead City Harbor Dredging Material Management Plan (DMMP) to address long-term (20-year) management of the dredged material from Morehead City Harbor in Carteret County.

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are the comments made by agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Chrys Baggett/576

Ms. Chrys Baggett
Environmental Policy Act Coordinator

Attachments

cc: Region P
Mr. W. Coleman Long, U.S. Army Corps of Engineers

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
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e-mail Chrys.Baggett@ncmail.net

Location Address:
116 West Jones Street
Raleigh, North Carolina

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NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

JAN 2008
RECEIVED
Secretary's Office
DOA

MEMORANDUM

TO: Chrys Baggett
State Clearinghouse

FROM: Melba McGee
Project Review Coordinator

RE: 08-0157 Scoping, Morehead City Harbor Dredged Material Management Plan, Carteret County

DATE: January 15, 2008

The Department of Environment and Natural Resources has reviewed the proposed project. The attached comments are a result of this review. More specific comments will be provided during the environmental review process.

Thank you for the opportunity to respond. If during the preparation of the environmental document, additional information is needed, the applicant is encouraged to notify our respective divisions.

Attachment

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR/

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North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Michael F. Easley, Governor
William G. Ross Jr., Secretary

Dr. Louis B. Daniel III, Director

December 20, 2007

US Army Corps of Engineers
Wilmington District
Attention: Mr. Stacy Samuelson (CESAW-TS-PE)
PO Box 1890
Wilmington, NC 28402-1890

Dear Mr. Samuelson:

The North Carolina Division of Marine Fisheries (DMF) would like to offer the following comments concerning development of the Morehead City Harbor Dredged Material Management Plan (DMMP).

The North Carolina Coastal Habitat Protection Plan (CHPP) which was developed through the efforts of staff from DMF, NC Division of Coastal Management, NC Division of Water Quality, NC Wildlife Resources Commission, and NC Division of Environmental Health and adopted by the NC Marine Fisheries Commission, NC Environmental Management Commission and NC Coastal Resources Commission makes the following recommendations concerning studies necessary for the proper use of dredge material for beach renourishment:

1. Identify more specific minimum and maximum sediment grain sizes to minimize biological impacts to the intertidal beach community.

2. Determine the minimum distance required between undisturbed areas within/bordering the renourishment project to provide adequate sources of intertidal organism for recolonization and food for fish.

3. Determine the time interval between projects to allow full recovery of benthic communities based on project season/duration, compatibility of sediment size and other parameters.

The CHPP also contains the following recommendations concerning beach renourishment projects:

1. Restrict beach nourishment projects to winter months to minimize mortality of infauna and enhance recovery rates of intertidal benthic organisms.

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2. Conduct adequate monitoring of the effects of beach nourishment on the soft bottom community and associated surf fish populations.

The NC Marine Fisheries Commission has also established the following general policies related to large-scale beach dredge-and-fill projects:

1. Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2. Projects should provide detailed analyses of possible impacts to each type of essential Fish habitat (EFH), with careful detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3. Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC, and CHA;

4. Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternative analysis, and minimize impacts that are not;

5. Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6. Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7. Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8. All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9. All assessments should take into account the cumulative impacts associated with other beach dredge and-fill projects in North Carolina and adjacent states, and other large–scale coastal engineering projects that are ecologically related.

Thank you for the opportunity to comment on development of the DMMP. Please inform DMF of the date and location of the scoping meeting.

Sincerely,

Michael D. Marshall

Michael D. Marshall
Central District Manager

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Coastal Management
Michael F. Easley, Governor **James H. Gregson, Director** William G. Ross Jr., Secretary

January 8, 2008

Melba McGee
Environmental Coordinator
Office of Legislative & Intergovernmental Affairs
Department of Environment and Natural Resources
1601 Main Service Center
Raleigh, NC 27699-0001

SUBJECT: Proposed Morehead City Harbor Dredged Material Management Plan, Carteret County, North Carolina (SCH#08-0157, and DCM#20070122)

Dear Ms. McGee:

Thank you for the opportunity to review the letter from the US Army Corps of Engineers (Corps) requesting comments on the environmental issues that should be incorporated into the proposed Morehead City Harbor Dredged Material Management Plan (DMMP). The DMMP proposes to address long-term (20-year) management of the dredged material from Morehead City Harbor. The DMMP studies will involve a variety of activities such as: data collection, analysis, evaluations, mapping, coordination, and management actions necessary to implement the DMMP. Below are the comments by the Division of Coastal Management (DCM).

- The DMMP (proposed project) will require consistency review and concurrence by DCM before the DMMP can be implemented. Since this proposed management plan involves dredging, the State's Dredge and Fill Law, a component of the State's coastal management program, also constitutes some of the relevant enforceable policies. DCM recommends that the DMMP comply with the information requirements of 15 CFR 930.39.
- In developing the DMMP, DCM recommends that 15A NCAC 07H .0312 be consulted regarding the technical standards for beach fill projects. Additionally 15A NCAC 07H .0308(a)(3) requires that sand used for beach nourishment be compatible with existing grain size and type of the receiving beach.
- DCM recommends that the DMMP incorporate the requirements of Section (h2) of the State's Dredge and Fill Law which requires that clean beach quality material dredged from navigational channels or inlet shoal systems be deposited onto ocean beaches.
- DCM recommends that the DMMP incorporate the standard that sand used for beach nourishment shall be taken only from those areas where the resulting environmental impacts will be minimal.
- DCM recommends that the capability of Brandt Island (or any other dredge disposal island) to accept dredged material over the operational life of the DMMP be evaluated.

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- DCM recommends the DMMP review all moratorium periods and equipment operating limitations. For example, side cast dredging is not recommend in areas where SAV beds occur. DCM encourages the DMMP to specify the types of dredging equipment that may be used and to identify periods when dredging operations may not be conducted due to environmental constraints.
- DCM recommends that the disposal of dredged material in offshore locations be segregated by whether the material is beach quality or not beach quality. Segregating the material in this manner could allow for more rapid retrieval of beach quality sand should it be needed.
- DCM and the North Carolina Division of Water Resources (NCDWR) are working on a Comprehensive Beach And Inlet Management Plan (BIMP). DCM recommends that the Corps, in developing the DMMP, collaborate with this effort and incorporate Regional Sediment Management Plan (RSM) findings. It is our understanding that the Corps is authorized under the Water Resources and Development Act (WRDA) passed by Congress in November 2007 to participate in the RSM.
- DCM recommends that the Corps collaborate with DCM, NCDWR, and other relevant State agencies to integrate the DMMP with the State's BIMP.
- It is our understanding the Corps' Wilmington District is working with the Corps' Mobile District in developing an "eCoastal Enterprise GIS Framework". DCM recommends that the feasibility of incorporating the eCoastal Enterprise GIS Framework system to the DMMP be explored.
- Carteret County has developed an online database containing all of their relevant data related to beach nourishment and storm protection (shorelines, aerial photos, monitoring surveys, volume calculations, etc.). DCM recommends that the Corps contact Carteret County to investigate how this information can be incorporated into the DMMP.
- The DMMP consistency review, potentially involves two types of consistency reviews by DCM. The first type of concurrence would be with the management plan itself. The second type of concurrence would involve review of actual dredging and disposal operations. To minimize the number of concurrence reviews, the Corps may make a combined consistency submission. A combined consistency submission would require explicit plans for proposed dredging and disposal operations.
- DCM recognizes that certain dredging operations are conducted for a variety of purposes. As such, the disposal of disposal of beach quality material onto the beach may or may not be within the scope of a proposed dredging operation. Nevertheless, the State's coastal management program encourages the placement of beach quality material onto the beach. To the extent practicable[1] DCM encourages that the Corps comply[2] with the State's coastal management program mandate to place beach quality sand onto the beach.
- To assure the efficient management of dredged material from dredging to disposal, DCM suggests that the DMMP be integrated with "*real-time*" dredging operations. To express this differently, DCM recommends that the DMMP not simply focus on the management of

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1 The term "*consistent to the maximum extent practicable*" is defined in 15 CFR 930.32 and means "*fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal agency.*"

2 In discussing funding issues and compliance with a State's coastal management program 15 CFR 930.32 states "***Federal agencies shall not use a general claim of a lack of funding*** *or insufficient appropriated funds or failure to include the cost of being fully consistent in Federal budget and planning process* ***as a basis for being consistent to the maximum extent practicable with an enforceable policy of a management program****. The only circumstance where a Federal agency may rely on a lack of funding as a limitation on being fully consistent with an enforceable policy is the Presidential exemption described in section 307(c)(1)(B) of the Act (16 USC 1456(c)(1)(B). In Cases where the cost of being consistent with the enforceable policies of a management program was not included in the Federal agency's budget and planning processes,* ***the Federal agency should determine the amount of funds needed and seek additional federal funds.***" (emphasis added)

material following its storage at dredge disposal locations such as Brandt Island. Instead DCM recommends that the DMMP focus on how material that is dredged can be immediately moved to a disposal location, such as a beach, to minimize the necessity for intermediate storage. DCM acknowledges that in certain situations intermediate storage may provide future benefits such as the immediate availability of beach quality sand for emergency beach disposal resulting from an unexpected erosion event.

- Emergency dredging operations have been an ongoing concern. DCM acknowledges that the ocean environment is complex and unpredictable, and that storm events can trigger the unexpected need for emergency dredging. Nevertheless, many proposals for emergency dredging have been the result of operational issues such as unavailability of equipment, equipment breakdowns, and funding constraints. DCM suggests that the DMMP incorporate separate operational protocols for dealing with emergency dredging resulting from storm events and protocols concerning operational (equipment) issues that affect planned dredging operations.

Should you wish to discuss any of these recommendations further, please feel free to contact me at 252-808-2808. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Stephen Rynas, AICP
Federal Consistency Coordinator

cc: Jim Gregson, Division of Coastal Management
Doug Huggett, Division of Coastal Management
Tere Barrett, Division of Coastal Management
Jeff Warren, Division of Coastal Management

MEMORANDUM

DIVISION OF WATER QUALITY

TO: **Melba McGee, Environmental Coordinator**

FROM: **Joanne Steenhuis, Senior Environmental Specialist** JHS 12/5/07

THROUGH: **Edward Beck, Surface Water Protection Regional Supervisor** EB

DATE: **December 5, 2007**

SUBJECT: **Morehead City Harbor Dredged Material Management Plan (DMMP)**

PROJECT: **Morehead City Harbor Dredged Material Management Plan (DMMP)**
20-year management plan
Project No. 08-0157

COUNTY: **Carteret County**

The Wilmington Regional Office has reviewed the initiation letter for the scoping process for the Morehead City Harbor 20 year dredged material management plan. This Office is concerned with any potential contaminants that may be stirred into the water column during this process and the location or placement of the material for disposal (potential wetland fill).

Thank You

State of North Carolina
Department of Environment and Natural Resources

Reviewing Office: Wilco

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Project Number: 08-0157 Due Date: 1/4/08

After review of this project it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters.	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual.	30 days (90 days)
☐	NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)
☐	Water Use Permit	Pre-application technical conference usually necessary	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100 thru 2Q.0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q.0113).	90 days
☐	Permit to construct & operate Transportation Facility as per 15 A NCAC (2D.0800, 2Q.0601)	Application must be submitted at least 90 days prior to construction or modification of the source.	90 days
☐	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
☐	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5950.		
☐	Complex Source Permit required under 15 A NCAC 2D.0800		
☐	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) At least 30 days before beginning activity. A fee of **$65** for the first acre or any part of an acre. An express review option is available with additional fees.		20 days (30 days)
☐	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		(30 days)
☐	Mining Permit	On-site inspection usual. Surety bond filed with ENR Bond amount varies with type mine and number of acres of affected land. Any are mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	North Carolina Burning permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days	1 day (N/A)
☐	Special Ground Clearance Burning Permit - 22 counties in coastal N.C. with organic soils	On-site inspection by N.C. Division Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
☐	Oil Refining Facilities	N/A	90-120 days (N/A)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction. certify construction is according to ENR approved plans. May also require permit under mosquito control program. And a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A	30 days (60 days)

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with ENR running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to ENR rules and regulations.	10 days N/A
☐	Geophysical Exploration Permit	Application filed with ENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
☐	State Lakes Construction Permit	Application fees based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property.	15-20 days N/A
☒	401 Water Quality Certification	N/A	60 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	55 days (150 days)
☐	CAMA Permit for MINOR development	$50.00 fee must accompany application	22 days (25 days)
☐	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687 Raleigh, NC 27611		
☐	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☐	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☐	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
☐	Tar Pamlico or Neuse Riparian Buffer Rules required.		

* Other comments (attach additional pages as necessary, being certain to cite comment authority)

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☐ **Asheville Regional Office**
2090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

☐ **Fayetteville Regional Office**
225 North Green Street, Suite 714
Fayetteville, NC 28301-5043
(910) 433-3300

☐ **Mooresville Regional Office**
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

☐ **Raleigh Regional Office**
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200

☐ **Washington Regional Office**
943 Washington Square Mall
Washington, NC 27889

☒ **Wilmington Regional Office**
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☐ **Winston-Salem Regional Office**
585 Waughtown Street
Winston-Salem, NC 27107
(336) 771-5000

Water Quality Certification No. 3888

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER 16 (RETURN WATER FROM UPLAND CONTAINED DISPOSAL AREAS) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3888 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to waters and wetlands as described in 33 CFR 330 Appendix A (B) (16) and the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The category of activities shall include the discharge of return water from an upland, contained dredge disposal area.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

a) Proposed fill or modification of wetlands or waters, including streams; or
b) Any stream relocation; or
c) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
d) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

   No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no

violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at http://portal.ncdenr.org/web/wq/ws/su/npdessw#tab-w .

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

5. Construction Moratoriums and Coordination

The timing of the dredging and discharge shall be addressed by the applicant in the Pre-construction Notification Application, in order to lessen impact on aquatic organisms and their reproduction. This timing shall comply with dredging windows established by the NC Wildlife Resources Commission, NC Division of Marine Fisheries, and/or the US Fish and Wildlife Service.

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

6. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

7. Riparian Area Protection (Buffer) Rules

Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

8. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.

9. The discharge shall not contain levels of toxic pollutants that would result in a violation of state water quality and wetland standards.

10. The terminal end of the pipeline from the dredge into the retention area shall be positioned at a maximum distance from spillways to allow adequate settling of suspended solids and a sufficient distance from any part of the dike so as to preclude dike erosion by the pipeline discharge. Effluent shall be released waterward of emergent marsh or tidal flats when located within these systems.

11. A water control structure shall be installed at the intake end of the effluent leading from the retention area in order to insure maximum settling of suspended solids and control of discharge volumes.

12. The flow from the diked retention area shall be contained by pipe, metal or wooden trough, or similar device to a point waterward of any emergent vegetation along the shoreline unless it can be clearly shown by the applicant that a different design will result in less environmental impact.

13. Sufficient freeboard shall be maintained within the diked disposal area during the dredging operation to assure the integrity of the dike structure and the containment of the dredged material.

14. Native forested vegetation shall be re-established in any construction access or other temporary impact area within the next growing season following construction of a project.

15. Hydraulic dredging in piedmont and mountain lakes (as well as some locations in the coastal plain when specified by the Division) which utilize an upland diked disposal basin with a return pipe for the return water shall utilize the "two basin" design, or have written approval from the Division to vary from this design.

16. The concentration of settleable solids in the effluent being discharged from the diked disposal area shall be no greater than 0.1 ml/l.

17. The appropriate turbidity water quality standard shall not be exceeded or be above ambient background levels (whichever is more stringent) beyond an appropriate mixing zone if one is established for a project by the Division.

18. The disposal area dikes shall be stabilized with vegetative cover within one (1) day after construction to minimize erosion.

19. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.

20. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.

21. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.

22. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.

23. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.

24. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.

25. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date March 19, 2012

DIVISION OF WATER QUALITY

By

Max Matthews for

Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3888 issued March 19, 2012, replaces WQC 3700 issued November 1, 2007; WQC Number 3629 issued March 19, 2007; WQC Number 3363 issued March 18, 2002; WQC Number 3105 issued February 11, 1997; WQC Number 2668 issued January 21, 1992; and WQC Number 1273 issued November 10, 1978. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.

Water Quality Certification No. 3908

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS REGIONAL GENERAL PERMIT 198000048 INVOLVING DISPOSAL OF DREDGED MATERIAL ON OCEAN BEACHES WITHIN NORTH CAROLINA

Water Quality Certification Number 3908 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality Regulations in 15 NCAC 02H .0500 and 15 NCAC 02B .0200 for the discharge of fill material to waters and wetland areas which are waters of the United States as described in the Wilmington District's Regional (General) Permit Number 198000048.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):

a) Any proposed fill, dredging, excavation or other modification of waters or wetlands; or
b) Any stream relocation; or
c) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
d) Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.

Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

   No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

4. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at http://portal.ncdenr.org/web/wq/ws/su/npdessw#tab-w .

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

5. The discharge shall not contain levels of toxic pollutants that would result in a violation of state water quality and wetland standards.

6. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.

7. Construction Moratoriums and Coordination

   If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

   All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

   Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

8. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.

9. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.

10. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.

11. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.

12. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.

13. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.

14. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By

Matt Matter for

Charles Wakild, P.E.

Director

History Note: Water Quality Certification (WQC) Number 3908 issued March 19, 2012 replaces WQC 3703 issued November 1, 2007; WQC 3640 issued March 2007; WQC 3493 issued December 2004; and WQC 3372 issued March 18, 2002. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.

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SLevitas@KilpatrickStockton.com

April 1, 2008

Via First Class Mail and Electronic-Mail

U.S. Army Corps of Engineers
Wilmington District
Attention: Stacy Samuelson (CESAW-TS-PE)
Post Office Box 1890
Wilmington, NC 28402-1890

Re: Comments Regarding Morehead City Harbor Dredged Material Management Plan

Dear Mr. Samuelson:

I am writing on behalf of Carteret County, North Carolina, in response to the United States Army Corps of Engineers' (the "Corps") request for comments regarding the scope of the Dredged Material Management Plan ("DMMP") for the Morehead City Harbor Project ("MCHP"). Carteret County believes that the DMMP should (i) ensure that maintenance dredging activities are performed in an environmentally acceptable manner, (ii) use sound engineering techniques, and (iii) address all dredged material disposal alternatives for the MCHP.

The Corps' current dredged material management practices for the MCHP are not in compliance with federal and state law. As the Corps has recognized, placement of beach-quality dredged material offshore is "neither environmentally acceptable, nor engineeringly sound," "poor management of a limited resource" and "is not consistent with North Carolina's Coastal Zone Management Act regulations." Further, with respect to the placement of dredged material in the nearshore berm, contrary to the Corps' expectation, the material has exhibited little landward movement. The Corps, therefore, must completely re-evaluate its dredged material management practices associated with the MCHP.

The DMMP for the MCHP should be developed using procedures that identify, evaluate, screen and recommend dredged material management alternatives to ensure that such activities are conducted in an environmentally sensitive manner. Specific dredged

material management alternatives that must be evaluated include: (i) Brandt Island, (ii) beach disposal and replenishment, (iii) the nearshore berm, and (iv) the Ocean Dredged Material Disposal Site ("ODMDS"). Without fully evaluating each of these alternatives and their environmental impacts and benefits, the DMMP will be inadequate.

The DMMP should focus on new or innovative techniques or policies to meet the Corps' goals of increased beneficial use of dredged material and regional sediment management. The DMMP should encourage and give priority to innovative, non-traditional options that maximize the beneficial use of dredged material. Thus, in identifying dredged material management alternatives to be considered in the DMMP, practices that manage dredged material in a beneficial manner should be the preferred alternatives. Consistent with federal and North Carolina law, such practices include use of dredged material for beach replenishment and disposal in the active nearshore zone at appropriate depths that allow active transport of such material. The following rankings should be used to indicate the preference of each option:

1. Preferred Option. Options that beneficially use dredged material with positive impacts to the environment, including the beaches of Carteret County.

2. Least Preferred Option. Options that have either a low potential for beneficial use and/or potential for unacceptable impacts to the environment, including the beaches of Carteret County.

3. Non-Preferred Option. Options that have potentially unacceptable impacts to the environment or are technically infeasible or are inconsistent with federal or state law.

In evaluating the various dredged material management alternatives, cost may not be a factor in this selection process. Federal law clearly provides that cost or lack of funds is not a basis for failure to be consistent to the maximum extent practical with a state's enforceable policies under the Coastal Zone Management Act ("CZMA"). *See City of Sausalito v. O'Neil*, 386 F.3d 1186, 1223 (9th Cir. 2004)) ("lack of funds is explicitly forbidden as a criterion for finding consistency under 15 C.F.R. § 930.32(a)(3)"); 16 U.S.C. § 1456(c)(1)(B) ("[N]o such exemption shall be granted on the basis of a lack of appropriations unless the President has specifically requested such appropriations and Congress has failed to make them available."); 15 CFR § 930.32(a)(3) ("The only circumstance where a federal agency may rely on a lack of funding as a limitation on being fully consistent with an enforceable policy is the Presidential exemption."). North Carolina's approved Coastal Management Program ("CMP") includes a requirement that beach quality dredged material from navigation channels be used in a beneficial manner wherever practicable and be retained in littoral system to the maximum extent practicable. 15A NCAC §§ 07M.1101 and 07M.1102.

The development of the DMMP should consider federal, state, local and private interests. The DMMP should strive to have regional support from all the stakeholders and incorporate the findings of various other studies that may affect the recommended alternative.

Development of a DMMP, however, is not the end of the process. The potential environmental impacts and benefits of each of the dredged material management alternatives must be fully evaluated in accordance with the National Environmental Policy Act ("NEPA"). Such an analysis would provide widespread public review of the potential impacts of these alternative dredged material management practices. In addition, pursuant to the CZMA, a new consistency determination must be prepared for the recommended alternative. Finally, the DMMP should also be updated periodically to identify any changed conditions.

Carteret County looks forward to working with the Corps to develop an environmentally sound DMMP that not only protects the beaches of Carteret County, but also meets the needs of the Port of Morehead City.

With best wishes,

Sincerely yours,

KILPATRICK STOCKTON LLP

Steven J. Levitas

cc: Greg "Rudi" Rudolph
William "Buck" Fugate
The Honorable Douglas Harris

Samuelson, Stacy D SAW

From: Samuelson, Stacy D SAW

Sent: Friday, February 13, 2009 1:20 PM

To: Angela Mangiameli; 'Assistant County Manager'; 'Atlantic Beach Town Manager'; Bouchard, Jennifer A LT CNRMA; camerons@coastalnet.com; cyndi.karoly@ncmail.net; David Allen (allend@coastalnet.com); 'Don Hoss'; doug.huggett@ncmail.net; 'Gary Collins - EPA'; 'Greg Rudolph'; 'Gregory Case - Deputy Sector Commander USCG'; howard_hall@fws.gov; 'Janice Allen'; 'Jean Preston'; 'Jerry Schill'; joanne.steenhuis@ncmail.net; Jody Merritt (jody.merritt@ncmail.net); smtp-Sutherland, John; 'Katrina Marshall'; 'Linda Brickhouse'; Maria Dunn (maria.dunn@ncwildlife.org); 'Mark Ramsing'; Matthew Godfrey (godfreym@coastalnet.com); 'Mayor Morehead City'; Michael Marshall (mike.marshall@ncmail.net); smtp-Rikard, Michael; 'Morehead City Manager'; 'Pat McElraft'; 'Pete Benjamin - USFWS'; Rich Carpenter; 'Richard Lawrence'; 'Rick Luettich'; 'Roessler, Todd'; smtp-Sechler, Ron; smtp-Winslow, Sara; Stephen Rynas (stephen.rynas@ncmail.net); Todd Walton (todd_walton@ncports.com); 'Town Manager Beaufort'; 'Town Manager Emerald Isle'; 'Town Manager Swansboro'; 'Town of Atlantic Beach CAMA'; 'Tracy Barnes'; Trish Murphey (trish.murphey@ncmail.net); Walker Golder

Subject: FW: Morehead City Harbor Project Dredged Material Management Plan Meeting March 4, 2009

All,

My apologies for sending this twice, but it was brought to my attention that the subject line had the wrong date for the meeting. The meeting date is Wednesday March 4, 2009. Sorry about any confusion this may have caused.

Stacy Samuelson
Biologist
Environmental Resources Section
U.S. Army Corps of Engineers, Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403
910-251-4480
910-251-4744(fax)

From: Samuelson, Stacy D SAW
Sent: Friday, February 13, 2009 12:06 PM
To: Angela Mangiameli; 'Assistant County Manager'; 'Atlantic Beach Town Manager'; Bouchard, Jennifer A LT CNRMA; camerons@coastalnet.com; cyndi.karoly@ncmail.net; David Allen (allend@coastalnet.com); 'Don Hoss'; doug.huggett@ncmail.net; 'Gary Collins - EPA'; 'Greg Rudolph'; 'Gregory Case - Deputy Sector Commander USCG'; howard_hall@fws.gov; 'Janice Allen'; 'Jean Preston'; 'Jerry Schill'; joanne.steenhuis@ncmail.net; Jody Merritt (jody.merritt@ncmail.net); smtp-Sutherland, John; 'Katrina Marshall'; 'Linda Brickhouse'; Maria Dunn (maria.dunn@ncwildlife.org); 'Mark Ramsing'; Matthew Godfrey (godfreym@coastalnet.com); 'Mayor Morehead City'; Michael Marshall (mike.marshall@ncmail.net); smtp-Rikard, Michael; 'Morehead City Manager'; 'Pat McElraft'; 'Pete Benjamin - USFWS'; Rich Carpenter; 'Richard Lawrence'; 'Rick Luettich'; 'Roessler, Todd'; smtp-Sechler, Ron; smtp-Winslow, Sara; Stephen Rynas (stephen.rynas@ncmail.net); Todd Walton (todd_walton@ncports.com); 'Town Manager Beaufort'; 'Town Manager Emerald Isle'; 'Town Manager Swansboro'; 'Town of Atlantic Beach CAMA'; 'Tracy Barnes'; Trish Murphey (trish.murphey@ncmail.net); Walker Golder
Cc: Owens, Jennifer L SAW; Payonk, Philip M SAW; Frabotta, Christopher C SAW; McCorcle, Justin P SAW
Subject: Morehead City Harbor Project Dredged Material Management Plan Meeting Feb. 25, 2009

All,

As you may be aware, the U.S. Army Corps of Engineers, Wilmington District, is initiating the process to develop the "Morehead City Harbor Dredged Material Management Plan". The 20-year plan will identify how dredge material, originating from the Morehead City Harbor Federal navigation project, will be managed in a least cost, environmentally acceptable and engineeringly sound manner.

The Wilmington District has performed a substantial amount of preliminary work, including: geotechnical sampling and analysis, determination of shoaling and dredging rates, etc. which should help with the identification of alternatives. This preliminary work will be utilized to develop and evaluate "disposal alternatives" for the plan.

We would like to meet with our Local, State and Federal agency partners to discuss the following:

- Provide a status briefing of the completed work and the ongoing work.
- Provide the major milestones of the project schedule.
- Request input from Local, State and Federal agencies on identification of potential alternatives.
- Request input from Local, State and Federal agencies on constraints or preferences that may affect choice of alternatives.

We have scheduled a meeting to discuss these items. Below is the proposed time and location:

Time / Date: 1300 - 1500 / 4 March 2009 (Wednesday)

Location: Carteret County Commissioners Boardroom, Courthouse Square, Beaufort, NC 28516

Please respond to Mr. Stacy Samuelson (stacy.d.samuelson@usace.army.mil) by 25 February 2009 if you plan to attend or have questions. Please forward this announcement to any additional interested parties as you see fit. Thank you in advance for your participation in this project.

V/R,

Mr. Stacy Samuelson
Biologist
Environmental Resources Section
U.S. Army Corps of Engineers, Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403
910-251-4480
910-251-4744(fax)

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

July 31, 2009

Environmental Resources Section

Mr. Russell J. Wilson, Superintendent
Cape Lookout National Seashore
131 Charles Street
Harkers Island, North Carolina 28531

Dear Mr. Wilson:

The purpose of this letter is to request the position of your agency regarding the disposal of sediment associated with dredging of the navigation channels of the Morehead City Harbor Project (MCHP), which lies adjacent to Shackleford Banks, part of the Cape Lookout National Seashore (CALO), in Carteret County, North Carolina. Specifically, this agency is preparing a 20-year Dredged Material Management Plan (DMMP) to identify disposal locations that are cost-effective, engineeringly sound, and environmentally acceptable for material dredged from the project. We are now in the alternatives formulation phase of the DMMP process, and are considering a wide range of alternatives for dredged material disposal, some of which involve the placement of material on or near the beaches of Shackleford Banks. Before this agency advances any of these alternatives to a final grouping of probable or likely disposal locations, we would like to solicit the opinion of your agency regarding the compatibility of such disposal alternatives with the purposes of the National Seashore. Additionally, we would like to obtain from you a basic understanding of the criteria, data, or objectives that your agency would like to see considered as we evaluate alternatives, particularly those that may involve placement of material on or near the National Seashore.

The MHCP has been a continuously maintained Federal navigation project since 1911. Currently, the Corps of Engineers maintains a system of navigation channels that leads from the deep water of the Atlantic Ocean to the State Port of Morehead City and beyond. The project, as outlined in the enclosure 1, contains material with a range of grain sizes from 50 percent to 90 percent sand. The Corps is considering a wide range of disposal options for this material, including the beaches of Bogue and Shackleford Banks, the nearshore areas adjacent to both islands, and confined upland disposal areas that currently exist or may be developed. A goal of the dredged material disposal project is to, where practicable, counteract the erosive effects of channel maintenance, a major element of which is the deflation of the ebb tide delta of Beaufort Inlet.

Recent Corps analysis of Beaufort Inlet surveys indicates that between 1974 and 2009, the inlet's ebb tide delta has deflated by approximately 13,400,000 cubic yards (cy). As the enclosed elevation difference plot shows at enclosure 2, some of the most dramatic changes in depth have occurred on the smaller eastern side of the delta, adjacent to Shackleford Banks. As a result,

the Corps is exploring the creation of a new nearshore disposal area for dredged material on the eastern side of the delta, with the expectation that such placement may counteract delta deflation. The proposed location for the disposal area is included as enclosure 3 to this letter, and measures approximately 413 acres adjacent to the western side of the island. The amounts of material placed, proposed grain size, and disposal interval are yet to be determined. Some further clarification of this proposed area, and the material proposed to be disposed in it, will be available following our sampling effort that will characterize the existing ebb tide delta substrate and benthos across a large portion of the delta.

In its initial Environmental Impact Statement for deepening of the MCHP in 1976, the Corps approached CALO regarding the potential for placement of material on Shackleford Banks to counteract anticipated erosion. At that time, your agency indicated that it did not desire dredged material disposal on Shackleford Banks. We would appreciate your current opinion on dredged material disposal on Shackelford Banks. As shown in enclosure 4, the Corps is currently developing an alternative that includes an area that begins approximately one mile east of Beaufort Inlet and terminates six miles east of the inlet. This area is within the westerly transport zone identified in the Corps' Section 111 report from June 2001. Proposed berm width and timing of placement is yet to be determined. If CALO prefers not to accept disposal of dredged material on Shackelford Banks, we would appreciate a written response to that effect, as development of this alternative may be resource intensive.

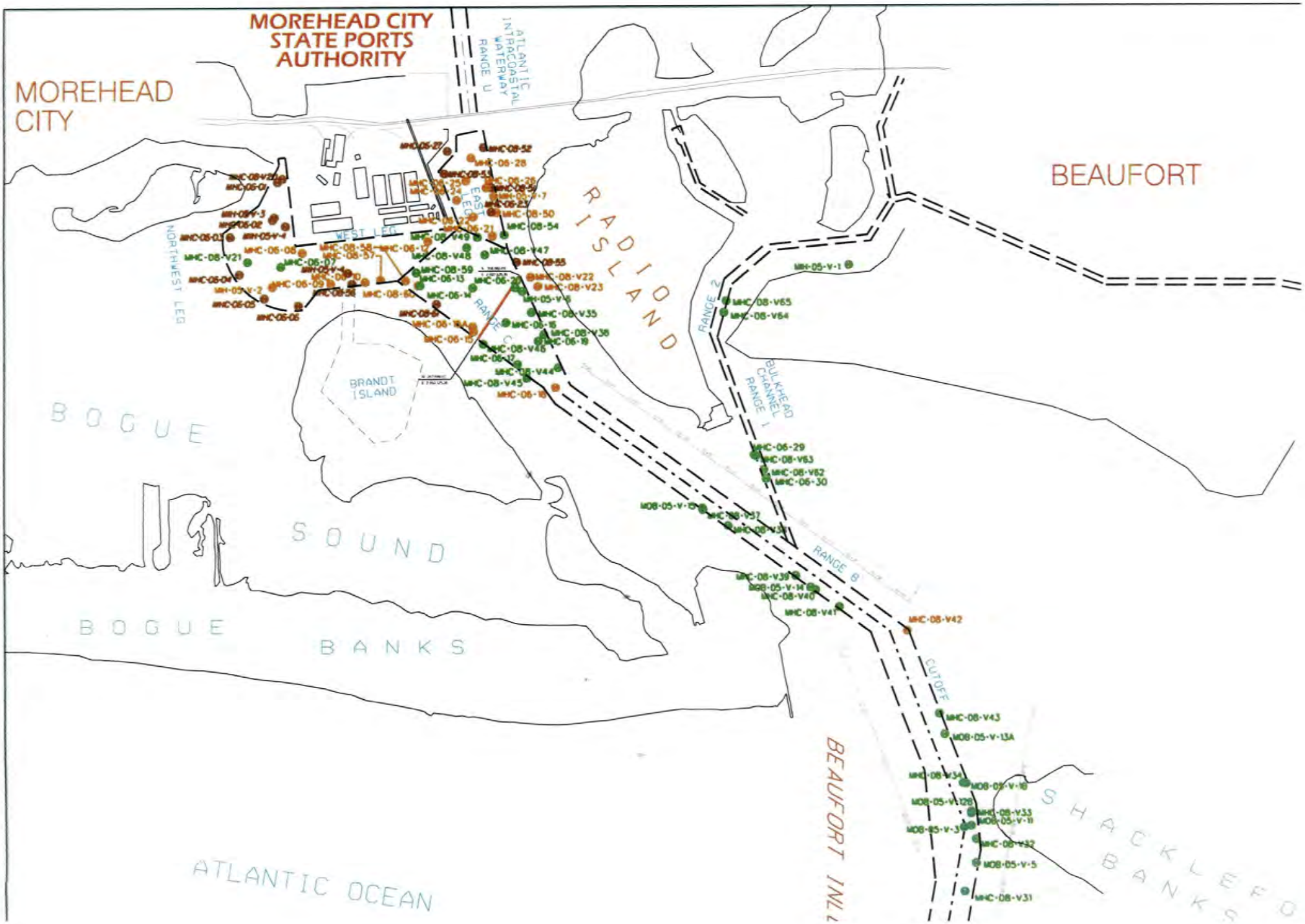
We would also like to obtain from you a basic understanding of the criteria, data, or objectives that your agency would like to see considered as we evaluate alternatives, particularly those that may involve placement of material on or near the National Seashore. We invite your active participation in this ongoing process, and invite you to attend our regular monthly meetings on the DMMP. For more information, or to clarify any matter herein, please contact Ms. Jenny Owens at (910) 251-4757. Thank you for your consideration, and I await your response.

Sincerely,

W. Coleman Long
Chief, Planning and Environmental Branch

Copy Furnished w/encl:

Mr. Michael Rikard
Cape Lookout National Seashore
131 Charles Street
Harkers Island, North Carolina 28531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BOGUE
SOUND
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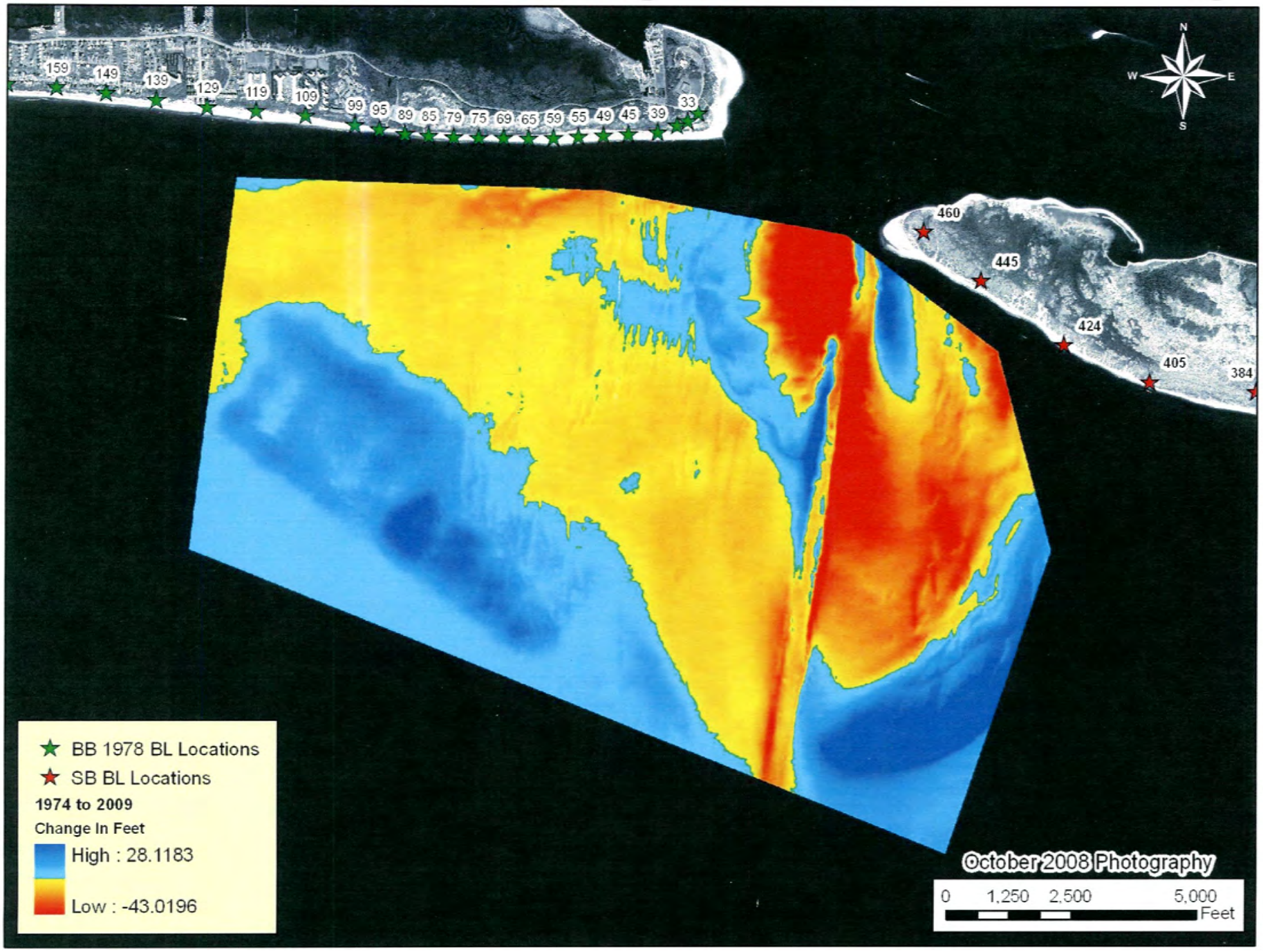
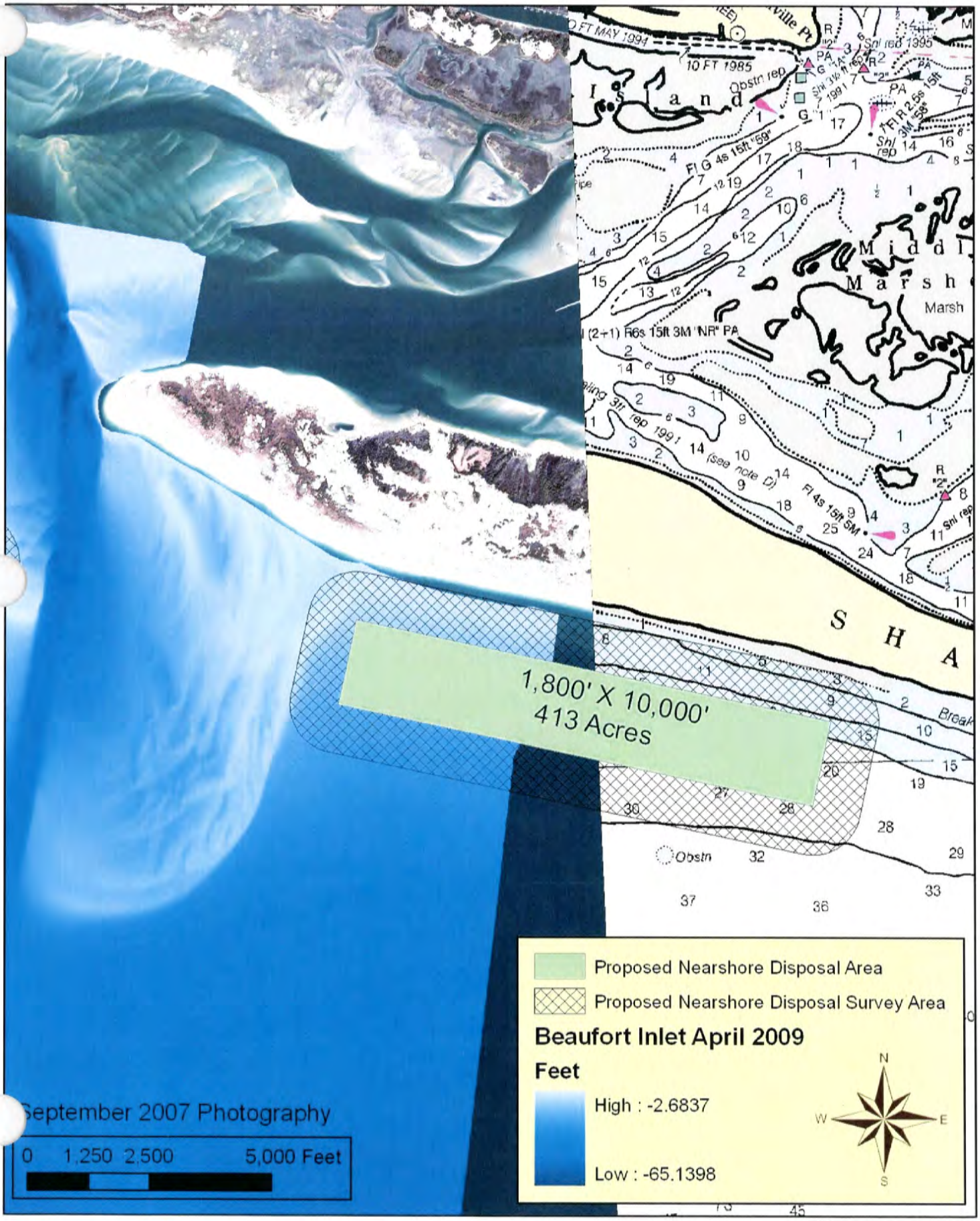
RANGE 8
CUTOFF
BEAUFORT INL
SHACKLEFO
BANKS
ATLANTIC OCEAN

1974 to 2009 Elevation Difference Plot



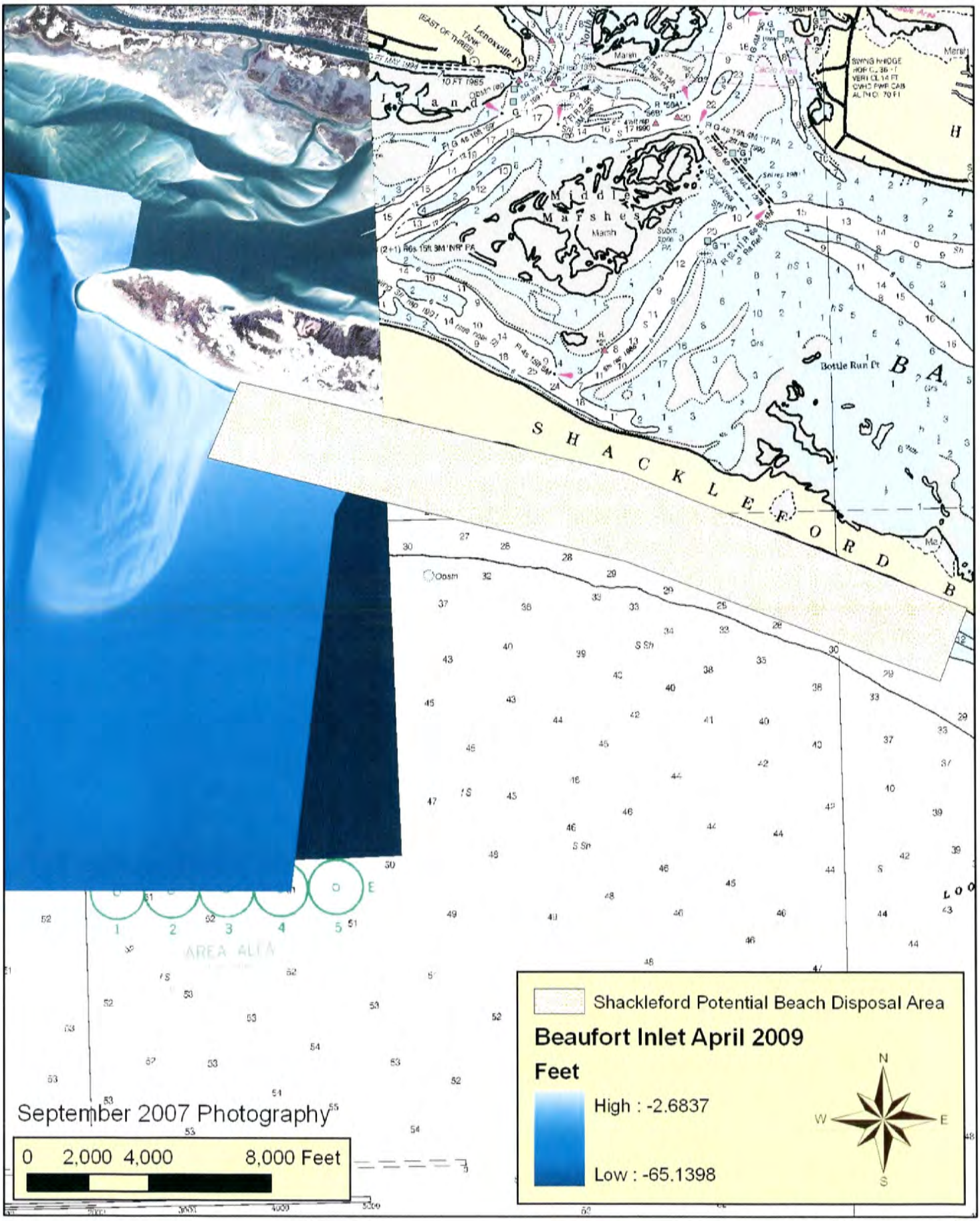
Enclosure 2

Proposed Nearshore Disposal Location



Enclosure 3

Potential Beach Disposal Location



Enclosure 4

IN REPLY REFER TO:

United States Department of the Interior

National Park Service
Cape Lookout National Seashore
131 Charles Street
Harkers Island, North Carolina 28531

A3815

September 24, 2009

Mr. W. Coleman Long
Chief, Planning and Environmental Branch
Department of the Army
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Dear Mr. Long:

Thank you for your letter of July 31, 2009, requesting information about the compatibility of sediment disposal with the purposes of Cape Lookout National Seashore (CALO). You also asked for the criteria, data, and objectives that the National Park Service (NPS) would like to see considered in the U.S. Army Corps of Engineers' evaluation of alternatives in the Morehead City Harbor Project Dredged Material Management Plan (MCHP DMMP).

We have addressed your two requests below. We are also requesting additional information from you about this project.

Compatibility with NPS Purposes

As you know, CALO is a unit of the National Park System. It is the policy of the National Park Service to protect natural processes in park units, such as shoreline change. Generally, the NPS disfavors any interference with those processes by actions such as sediment disposal (NPS Management Policies 2006, § 4.8.1 and § 4.8.1.1). Sediment disposal and other types of shoreline process interference are only permitted within national park units when:
Directed by Congress,
Necessary in emergencies that threaten human life and property,
There is no other feasible way to protect park natural resources, cultural resources, or park facilities, or necessary to restore or mitigate the impacts of human-caused activities.

Therefore, to be compatible with the park's purposes, any sediment disposal within CALO must meet one or more of the above requirements. This determination must be based on the results of scientific research, as required by 16 U.S.C. § 5936. Additionally, any sediment disposal within CALO would need to be carried out in accordance with a plan that is acceptable to the NPS and consistent with the park's purposes (see 16 U.S.C. § 459g-5), and a way that ensures that park resources and values remain unimpaired (see 16 U.S.C. § 1).

TAKE PRIDE IN AMERICA

This NPS shoreline policy was applied at CALO in 2006 with the nourishment of the park beach in front of the historic buildings associated with the Cape Lookout Lighthouse. This beach was nourished to mitigate the erosion caused by the maintenance of Barden Inlet and to protect these important cultural resources.

Criteria, Data, and Objectives to be Considered in the MCHP DMMP Alternatives

The above-described NPS policy and mandates will serve as the criteria against which the NPS would compare any DMMP alternative that includes sediment disposal in the Seashore. Initially, data will be required to assess whether placement of dredged material within CALO meets one or more of the above criteria. If the initial investigation indicates that this alternative does meet one or more of the NPS criteria, then further research will be required to consider potential impacts to the natural and cultural resources in the park and provide information for NPS decision-making.

DMMP alternatives that include the disposal of non-beach-quality sediment near the park boundary may likewise result in impacts to park resources. Specifically, the NPS is concerned about the chemical and physical compatibility of such sediment with the existing sediment within the park. On the other hand, the NPS would be willing to consider the nearshore disposal of beach-quality sediment if it were designed to replenish the eroded ebb shoal and/or the deflated offshore profile. Therefore, the DMMP should include information about the source(s), the chemical and physical composition, and the quantity of any sediment proposed for disposal in the nearshore areas along Shackleford Banks, and the intended purpose and justification for placing it there.

Additionally, the DMMP should include information about the intended dimensions and location of the navigation channel through Beaufort Inlet and whether the maintenance of this channel would result in the dredging of areas within park boundaries. The DMMP should note that any such dredging would need to proceed in accordance with NPS mandates for the protection of park resources.

All DMMP alternatives should consider data including, but not limited to, historic and existing beach and nearshore morphology; historic and existing alongshore sediment transport rates and directions; characterization of the nearshore macroinvertebrate communities in the potential disposal areas; and characterization of potential dredge material to ensure that the sediments are free of contaminants and are compatible in grain-size, composition and color with existing beach and nearshore sediments. Establishment of pre-project conditions and post-project monitoring should be included in each alternative. Each alternative must be presented in sufficient detail in the DMMP and the associated compliance documentation to enable CALO to fully assess the beneficial and adverse impacts of that alternative on the park.

The objective that should be considered in all MCHP DMMP alternatives is the conservation of park resources and values unimpaired for the enjoyment of current and future generations.

I hope that this letter satisfactorily responds to your July 31, 2009 requests. If you have any questions, please do not hesitate to contact me at 252-728-2250 ext. 3014.

Sincerely,

Russel J. Wilson,
Superintendent

KILPATRICK
STOCKTON LLP
Attorneys at Law

Suite 400 3737 Glenwood Avenue
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t 919 420 1700 f 919 420 1800
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Steven J. Levitas
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slevitas@kilpatrickstockton.com

October 1, 2009

Via First Class Mail and Electronic Mail

U.S. Army Corps of Engineers
Wilmington District
Attention: Stacy Samuelson
Post Office Box 1890
Wilmington, NC 28402-1890

Re: Comments Regarding the Interim Operations Plan and the Dredged Material Management Plan, Morehead City Harbor, North Carolina

Dear Mr. Samuelson:

I am writing on behalf of Carteret County, North Carolina to provide comments regarding the Interim Operations Plan (the "IOP") and the Dredged Material Management Plan ("DMMP") for the Morehead City Harbor Project ("MCHP"). We appreciate the Corps' willingness to allow Carteret County to participate on the Project Delivery Team and its openness during the development of the DMMP. Carteret County, however, has several concerns related to the development of the DMMP, which are summarized below.

1. The material disposed in the existing nearshore berm has exhibited little to no movement, and if the Corps intends to use this area after the IOP, a new consistency determination is required.

Initially, in approximately 1992, the Corps proposed to locate the nearshore disposal area along the -18-foot depth contour. The Corps' own analysis indicated that dredged material disposed in water depth of -25-feet or greater will not exhibit significant movement. Despite this conclusion, in approximately 1994, the Corps proposed that the nearshore berm be located west of Beaufort Inlet between the -25 and -30-foot contours. In fact, when disposing dredged material in the nearshore berm, the Corps has placed such material between approximately the -26 and -40-foot contours. The Corps has acknowledged, as reflected in the following excerpts from Corps documents, that this material has exhibited little to no movement.

- "[B]athymetric surveys suggest that aside from flattening slightly over the past several years, [the nearshore berm] remains generally stable, even though several severe weather events have impacted the area. Bruce Ebersole suggested that the maximum depth of active transport may be 20 feet MLW or less, so that the peaks of

the mound are pushed over but the bulk of the mound remains essentially stable." Draft Corps Proposal and Scope of Work – Analysis of Material Movement Nearshore Placement Area, December 10, 2001.

- Dredged material placed in the nearshore berm has exhibited "very little movement." Final Section 111 Report, June 2001, p. 48.

- "The MHC ocean bar dredging job has material placement in the nearshore disposal area, which does not move toward the beach." Internal Corps Email dated October 18, 2005.

- "In fact, this area is the same area where we've been placing material in the nearshore for years that has not moved. (We even have a letter from several years ago from NC DCM asking us why our nearshore berm is not moving.)." Internal Corps Email dated February 24, 2006.

As previously stated, Carteret County does not object to the disposal of dredged material in the existing nearshore berm during implementation of the IOP provided it is limited to a *one-time event* and is superseded by a permanent DMMP that complies with the CZMA and other applicable requirements.

2. In developing the DMMP, the Corps should evaluate the existing and proposed nearshore disposal areas to determine the benefits, if any, of such disposal practices on the ebb tidal delta and adjacent beaches.

It is Carteret County's understanding that the Corps is evaluating a proposal to expand the existing nearshore disposal area off of Bogue Banks and to create a new nearshore disposal area off of Shackleford Banks. The Corps has shown the approximate location of these nearshore disposal areas, but has not defined the specific coordinates or water depths. Nonetheless, based on the approximate location of the proposed nearshore disposal areas, these areas appear be in water depths less than -25 feet MLW. Carteret County supports the Corps efforts to dispose of material in the nearshore disposal area in depths less than -25 feet MLW.

During the development of the DMMP, the Corps should evaluate the movement of dredged material in the existing nearshore disposal area and perform modeling and other tests to predict the potential for movement of dredged material in the expanded and new nearshore disposal areas. In response to concerns raised by the State of North Carolina and Carteret County, in late 2001, the Corps proposed evaluating the existing nearshore disposal area and a shallow water test disposal area. The proposed study included the following tasks:

- Evaluation of the nearshore placement area, inlet and shoreline;

- Wave climate and wave transformation;

- Circulation modeling;
- Sediment transport modeling;
- Field data monitoring;
- Shallow water test mound;
- Recommendations of future placement techniques and locations; and
- Communication of study results and recommendations.

Due to the high cost of the proposal and limited funds, the Corps did not pursue this study. The Corps should use its past experience as a guide in evaluating the existing nearshore disposal area and proposed expansion and creation of new disposal areas during development of the DMMP.

3. Disposal of dredged material in the nearshore berm should not take the place of disposal of beach-quality dredged material directly on the beach and in the proper location.

As the Corps has recognized, it is appropriate to dispose of beach-quality dredged material directly on the beach. *See* Corps, Environmental Assessment, Morehead City Harbor Section 933 Project, May 2003, p. E-3 ("When beach quality sand is dredged from navigation projects, it has become common practice of the USACE to make this resource available to beach communities, to the maximum extent practicable. Placement of this sand on beaches merely represents return of material, which eroded from beaches, and is, therefore, replenishment with native material."). However, not only must such material be placed directly on the beaches, this material must also be placed in the proper location.

During the first year of the IOP, the Corps has proposed to place dredged material directly on the beach. The Corps, however, has proposed to place the vast majority of this material east of the nodal point, which will provide little or no benefit to beaches west of the nodal point. The Corps has recognized that as a result of the MCHP, "waves now have the potential to transport greater volumes of littoral sediment into Beaufort Inlet compared to the pre-project case" and "[e]ssentially all of the material placed on the Fort Macon shoreline in 1978 and 1994 appeared to be transported directly into Beaufort Inlet within a few years following disposal." Corps, Final Section 111 Report, pp. 29, 42-45. Further, one of the factors that the Corps uses to evaluate its dredged material management practices under the Federal Standard is "minimizing losses into the entrance channel." Internal Corps Email, Oct. 16, 2002. Thus, not only does placement of dredged material east of the nodal point provide little or no benefit to the beaches west of the nodal point, it is also inconsistent with the Corps' interpretation of its own regulations.

The Corps should evaluate a number of potential impacts that the MCHP may be causing west of the nodal point. As discussed above, the MCHP has increased the potential for sand to be transported back to Beaufort Inlet; therefore, there is likely less sand available for beaches west of the nodal point compared to pre-project conditions. Not only is there less sand available in the system, research indicates that the MCHP has the potential to increase wave energy and erosion rates during major storm events as far west as eight (8) miles west of Beaufort Inlet. Past wave transformation analyses conducted by the Corps have not focused on individual storm events. Model results from Olsen Associates, Inc. suggest several points alongshore in the vicinity of Pine Knoll Shores where small reversals and erosional hot-spots are indicated. During development of the DMMP, the Corps should evaluate whether the MCHP has the potential to impact erosion rates of areas west of the nodal point during major storm events.[1] Finally, the Corps has acknowledged that the nearshore off of Pine Knoll Shores is steeper than off of Atlantic Beach, which may result in shoreline impacts. Internal Corps Email, Oct. 16, 2002. ("A 50-ft berm would also provide minimal benefit for Pine Knoll Shores. Because the nearshore is so steep, the unit volume required for constructing a 50-ft berm is more than twice that required for a similar berm width for most of Atlantic Beach."); Internal Corps Document, Mike Wutkowski, Feb. 2002 ("There is an import[ant] issue here beyond [whether] or not the disposal berm is moving. (There has been no study on whether the berm has moved.) ERDC has pointed out that the effects of dredging may still be coming. The process is the ocean bar deflates, the offshore deepens and the shoreline adjusts to the deepening. The locals have asked bout this. . . . Headquarters said they are unconcerned about offshore effects. We should get this in writing and be sure they understand that it may indicate a shoreline impact.").

Carteret County has previously provided comments expressing its concerns that more dredged material should be placed west of the nodal point. Carteret County, however, does not object to the disposal of dredged material on the beach in its proposed location during implementation of the IOP provided it is limited to a *one-time event* and is superseded by a permanent DMMP that adequately evaluates the impacts of the MCHP west of the nodal point. Further, the Corps should use placement of sand directly on the beaches of Bogue Banks during the first year of the IOP as an opportunity to evaluate the movement of dredged material placed in this location. In addition to monitoring beach profiles before and after placement of the dredged material, the Corps should collect additional data on sediment movement by performing a tracer study.

4. The Corps should establish specific disposal controls, conditions and requirements for the potential disposal of non-beach quality dredged material in the ODMDS to avoid or minimize potential impacts to beach-quality dredged material previously disposed in the ODMDS.

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[1] When conducting wave transformation analyses, the model grid within the surf zone should be finer in the cross-shore direction to accurately predict where waves are breaking.

Carteret County addresses this issue in comments provided to the Corps regarding the draft Site Management and Monitoring Plan ("SMMP") in a letter dated September 29, 2009. A copy of this letter is attached.

Thank you again for the opportunity to provide these comments. Carteret County looks forward to working with the Corps to ensure that they are appropriately addressed in the DMMP.

With best wishes,

Sincerely yours,

KILPATRICK STOCKTON LLP

Attachment

Steven J. Levitas

cc: Greg "Rudi" Rudolph
William "Buck" Fugate
Justin McCorcle
Chris Frabotta
Coleman Long

REC'D 12/3/1.

United States Department of the Interior

NATIONAL PARK SERVICE
Southeast Regional Office
Atlanta Federal Center
1924 Building
100 Alabama St., SW.
Atlanta, Georgia 30303

IN REPLY REFER TO:
SER-PC

DEC 0 2 2010

W. Coleman Long
Chief, Planning and Environmental Branch
Department of the Army
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Dear Mr. Long:

The U.S. Army Corps of Engineers (USACE) has inquired whether the National Park Service (NPS) wishes the USACE to expand the scope of its Morehead City Harbor Project Dredged Material Management Plan (MCHP DMMP) to include an additional alternative that may benefit Cape Lookout National Seashore (Seashore). Specifically, the USACE has proposed an alternative that would allow the placement of dredged material at eroding areas of the Shackleford Banks section of the Seashore. The placement of dredged material would mitigate impacts of the MCHP on Shackleford Banks by filling in the steepened beach profiles in the central and western portion of this area. After a review of policy as it relates to Shackleford Banks, the NPS has determined that such an alternative, appropriately implemented, would be consistent with bureau policy and should be included in the DMMP and associated environmental impact statement (EIS).

The NPS is pleased that the USACE has recognized this opportunity to mitigate ongoing impacts associated with maintenance dredging of the MCHP. The management policies of the NPS provide that natural resources are to be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities. Accordingly, NPS typically will not interfere in natural biological or physical processes to conduct active management. However, an exception to this policy is recognized when intervention is necessary to restore natural resource functioning that has been disrupted by past or ongoing human activities. This exception can even apply in those areas, such as Shackleford Banks, that are proposed for designation as wilderness.

Shackleford Banks has been managed to preserve its wilderness resources and values since January 14, 1986. On that date, NPS Director William Penn Mott, Jr., signed a wilderness recommendation proposing that Congress designate 2,990 acres of the island as wilderness. Because Shackleford Banks is proposed wilderness, active manipulation of the island's environment is not normally permitted. However, our management policies allow for intervention in wilderness areas to the extent necessary to correct past mistakes, the impacts of human use, and influences outside of wilderness boundaries.

TAKE PRIDE® IN AMERICA

The NPS has special expertise with respect to the project's potential environmental impacts at the Seashore, and for this reason, we ask that NPS be named a federal cooperating agency on this project. As a cooperating agency, we can offer early review and comment on EIS draft sections in areas of NPS mandates, as well as help prepare those portions of the document, such as the Minimum Requirements Analysis for Wilderness (MRA), that lie particularly within our knowledge and expertise. The NPS manages wilderness in such a way as to maintain its natural, untrammeled and undeveloped qualities, while providing opportunities for solitude and a primitive and unconfined type of recreation. The MRA process is designed to identify those tools and measures that will accomplish the objectives of the project while minimizing impacts on wilderness resources and values.

In addition to taking the foregoing steps, the NPS proposes to assist the USACE in development of the EIS in the following manner:

- Assist in the development and/or review of any monitoring plans or adaptive management plans that might be required
- Provide comments on working drafts of the EIS documents
- Respond to other USACE requests for information
- Participate in public meetings, as appropriate

The NPS's cooperating agency status and level of involvement would not preclude our independent review and comment responsibilities under Section 102(2)(C) of the National Environmental Policy Act. Similarly, our being a cooperating agency would not imply that NPS would necessarily concur with all aspects of the USACE's EIS.

If the proposed alternative were to become the USACE's selected alternative, no actual deposition of sediment could take place at Shackleford Banks until NPS had signed a decision document authorizing such deposition. Assuming no material disagreements among our respective agencies with respect to environmental impacts, the NPS's standard practice would be to adopt relevant parts of the DMMP EIS to provide the necessary compliance for this decision document.

The proposed alternative represents a significant opportunity to address ongoing erosion issues at Shackleford Banks and protect vitally important natural and wilderness resources for future generations. We appreciate your coordination with us and look forward to working with the USACE on this important project.

The primary NPS contact for the overall EIS and NEPA-related issues will be Michael Rikard ((252) 728-2250 x3012). The NPS technical contact for dredging and beach placement related issues will be Jodi Eshleman ((215) 597-1782).

Sincerely,

For David Vela
Regional Director
Southeast Region

cc: Russell J. Wilson, Superintendent, Cape Lookout National Seashore

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF:

February 15, 2011

Environmental Resources Section

Mr. David Vela, Regional Director
National Park Service, Southeast Regional Office
Atlanta Federal Center, 1924 Building
100 Alabama St., SW.
Atlanta, Georgia 30303

Dear Mr. Vela:

In response to National Park Service (NPS) letter dated December 2, 2010, the U.S. Army Corps of Engineers, Wilmington District (USACE) formally names the National Park Service as a Federal cooperating agency on the Morehead City Harbor Dredged Material Management Plan and integrated Environmental Impact Statement (DMMP/EIS). The NPS has special expertise with respect to the project's potential environmental impacts at Shackleford Banks, which will be invaluable for our successful completion of the DMMP/EIS. We appreciate your willingness to serve as a cooperating agency in the preparation of this plan; this letter serves as an outline of each agency's responsibilities in the planning process.

The USACE proposes to undertake the following activities to maximize this interagency cooperation:

- Invite the NPS to all relevant coordination meetings;
- Consult with the NPS on any relevant technical studies that will be required for the DMMP/EIS;
- Organize joint field reviews with appropriate NPS staff;
- Provide NPS with pertinent project information, including study results and a detailed project schedule that will identify project milestones;
- Encourage NPS to use the above documents, or other documents which it chooses to provide, to express its views on subjects within its jurisdiction or expertise; and
- Include information in the project environmental documents that cooperating agencies will need to discharge their National Environmental Policy Act (NEPA) responsibilities and any other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

As outlined in the letter of December 2, 2010, we understand that, as a cooperating agency, the NPS will provide early review and comment on EIS draft sections in areas of NPS mandates, and will help prepare those portions of the document, such as the Minimum Requirements Analysis for Wilderness (MRA), that lie particularly within the agency's knowledge and expertise. In addition, the NPS will assist the USACE in development of the DMMP/EIS in the following manner:

- Provide assistance and guidance in the development and/or review of any monitoring plans or adaptive management plans that might be required;
- Provide comments on working drafts of the DMMP/EIS documents within agreed-upon timeframes;
- Respond to other USACE requests for information in a timely manner; and
- Participate in public meetings, as appropriate.

It is understood that the NPS's cooperating agency status and level of involvement will not preclude its independent review and comment responsibilities under Section 102(2)(C) of the National Environmental Policy Act. Similarly, it is understood that being a cooperating agency does not imply that NPS will necessarily concur with all aspects of the Corps' DMMP/EIS. It is our goal, however, to seek concurrence between our agencies on all matters of importance to our respective agencies.

The NPS has the right to expect that the DMMP/EIS will enable it to discharge its jurisdictional responsibilities. If the proposed alternative for beach placement of material on Shackleford Banks was to become the Corps' selected alternative, no actual deposition of sediment would take place at Shackleford Banks until NPS signs a decision document authorizing such deposition. We expect that at the end of the National Environmental Policy Act (NEPA) process, the NPS will adopt relevant parts of the DMMP/EIS to provide the necessary compliance for this decision document. The Corps intends to utilize the DMMP/EIS, in its entirety, and the subsequent record of decision as our decision making documents.

We look forward to working with you on this important project. If you have any questions or would like to discuss in more detail the project or our agencies' respective roles and responsibilities during the preparation of the DMMP/EIS, please contact Ms. Jenny Owens, Environmental Resources Section, at 910-251-4757.

Sincerely,

Elden Gatwood

Elden Gatwood
Chief, Planning and Environmental Branch

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

November 26, 2013

Mr. Hugh Heine
Planning and Environmental Branch
Wilmington District, U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403

Subject: Draft Integrated Dredged Material Management Plan (DMMP) and Environmental Impact Statement (EIS)
Morehead City Harbor Project
Carteret County, NC

This is in response to your letter continuing informal consultation and requesting comments to the U.S. Army Corps of Engineers' (Corps) Draft Integrated Dredged Material Management Plan (DMMP) and Environmental Impact Statement (EIS) for Morehead City Harbor (October, 2013), and the draft Biological Assessment (BA) (Appendix J of the Draft DMMP/EIS). The Corps provided the draft documents by letter October 23, 2013. The U.S. Fish and Wildlife Service (Service) has reviewed the Draft DMMP/EIS and draft BA, and has the following comments for your consideration. These comments are submitted in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

Project Area, Proposed Activities, and Anticipated Impacts

The project area is Morehead City Harbor channel, Bogue Banks Beaches, Shackleford Banks, and the adjacent Atlantic Ocean. Waters of the Atlantic Ocean and Beaufort Inlet are classified as SB. According to the Draft DMMP/EIS, the purpose of this project is to provide disposal capacity for the Morehead City navigation project for the next 20 years by recommending the following: continued use of Brandt Island without expansion; disposal of dredged material on the beaches of Fort Macon State Park, Atlantic Beach, Pine Knoll Shores, and Shackleford Banks; expansion of the Nearshore West placement area off Bogue Banks; a new Nearshore East placement area off Shackleford Banks; and continued use of the USEPA's designated Ocean Dredged Material Disposal Site (ODMDS). Disposal of dredged material on the beaches is proposed as often as every three years, although the National Park Service (NPS) will have the option to decline disposal of sand on Shackleford Banks during the life of the DMMP.

Federally Protected Species

The Corps has requested our concurrence with its determination of May Affect, Not Likely to Adversely Affect for the following species under the authority of the Service: West Indian Manatee (*Trichechus manatus*), red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), seabeach amaranth (*Amaranthus pumilus*), and the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback sea turtles (*Dermochelys coriacea*). In addition, the Corps has determined that the project is not likely to adversely modify designated critical habitat of the piping plover and proposed critical habitat of the loggerhead sea turtle. The Draft DMMP/EIS and BA contain the following information and commitments made by the Corps:

1. The Service previously issued a Biological Opinion (BO) for the Morehead City Harbor on December 7, 1989, and amended the BO on April 19, 1993 and July 22, 2003. The Corps has committed to comply with the terms and conditions of the 1989 BO, as amended in 1993 and 2003.

2. On Bogue Banks, the construction window is proposed to be from November 16 to April 30, while on Shackleford Banks, the construction window is proposed to be from November 16 to March 31 (if a pipeline dredge is used; if a hopper dredge is used, the construction window will be January 1 to March 31). Limiting beach nourishment to these timeframes will minimize adverse impacts to the West Indian manatee, piping plover, seabeach amaranth, nesting sea turtles, and benthic and invertebrate species which are the main food source for piping plovers and red knots.

3. More than sufficient information was provided in the DMMP/EIS and BA to determine that the sediment to be disposed upon Bogue Banks and Shackleford Banks is compatible with respect to color and with respect to meeting the North Carolina Sediment Criteria Rule (15A NCAC 07H .0312: Technical Standards for Beach Fill Projects).

4. The Environmental Commitments in Section 6.15 (page 296) of the DMMP/EIS and page J-66 of the BA include monitoring and grading of beach escarpments (when necessary).

5. The Environmental Commitments in Section 6.15 (page 296) of the DMMP/EIS and Page J-66 of the BA include monitoring for seabeach amaranth on Bogue Banks (monitoring on Shackleford Banks is expected to be conducted by Cape Lookout National Seashore).

6. Page J-66 of the BA includes a commitment to implement the precautionary measures for avoiding impacts to manatees, as detailed in "Guidelines for Avoiding Impacts to the West Indian Manatee in North Carolina Waters."

Service Concerns

1. Although the Service remains concerned that beaches may be nourished as often as every three years (based upon channel and harbor management concerns rather than a need to nourish the beach), we recognize that the Bogue Banks Beaches may need the sand every three years. It is also our understanding that in the appropriate project years, the NPS will have the option to decline disposal of sand on Shackleford Banks. Adhering to the winter construction window and the use of compatible sand will minimize the impacts to the benthic infauna to the extent possible.

2. We recommend that the Corps commit to visual surveys to be conducted each morning in the area of work for that day, to determine if piping plovers or red knots are present. If plovers or red knots are present in the work area, careful movement of equipment in the early morning hours should allow those individuals to move out of the area. With these measures, potential impacts to wintering piping plovers and red knots are likely to be avoided, to the maximum extent practicable.

With the conservation measures proposed in the DMMP/EIS and BA and those requested by the Service in Item #2 above, the Service would concur that the proposed project may affect, but is not likely to adversely affect the West Indian manatee, piping plover, red knot, seabeach amaranth, and all three sea turtle species. The proposed project may modify, but is not likely to adversely modify, designated wintering critical habitat of the piping plover in the project area and proposed critical habitat for the loggerhead sea turtle. Therefore, the requirements of section 7 (a)(2) of the ESA have been satisfied for this project. However, the Corps' obligations under the ESA must be reconsidered if: (1) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Thank you for the opportunity to comment on this project. If you have any questions concerning these comments, please contact Kathy Matthews at (919) 856-4520, Ext. 27, or by e-mail at <kathryn_matthews@fws.gov>.

Sincerely,

Pete Benjamin
Field Supervisor

cc:

Fritz Rohde, NOAA Fisheries
Gary Collins, USEPA
Dan Holliman, USEPA
Maria Dunn, NCWRC, Washington, NC
Doug Huggett, NC Division of Coastal Management, Morehead City, NC
Jessi Baker, NC Division of Marine Fisheries, Wilmington, NC
Matthew Godfrey, NCWRC, Beaufort, NC

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Spring Street, S.W., Suite 1144
Atlanta, Georgia 30303

ER 13/0696
9043.1

December 4, 2013

Ms. Jenny Owens
CESAW-TS-PE
U.S. Army Engineer District
69 Darlington Avenue
Wilmington, North Carolina 28403

Re: Comments and Recommendations on the Draft Environmental Impact Statement (DEIS) for the Morehead City Harbor Project and Dredged Material Management Plan (DMMP) in Carteret County, NC

Dear Ms. Owens:

The U.S. Department of the Interior (Department) has reviewed the Draft DMMP/EIS and Biological Assessment (BA) and has the following comments for your consideration. These comments are submitted in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543). We offer the following comments.

Project Area, Proposed Activities, and Anticipated Impacts

The project area is Morehead City Harbor channel, Bogue Banks Beaches, Shackleford Banks, and the adjacent Atlantic Ocean. Waters of the Atlantic Ocean and Beaufort Inlet are classified as SB (salt water and suitable for primary recreation). According to the Draft DMMP/EIS, the purpose of this project is to provide disposal capacity for the Morehead City navigation project for the next 20 years by recommending the following: continued use of Brandt Island without expansion; disposal of dredged material on the beaches of Fort Macon State Park, Atlantic Beach, Pine Knoll Shores, and Shackleford Banks; expansion of the Nearshore West placement area off Bogue Banks; a new Nearshore East placement area off Shackleford Banks; and continued use of the Environmental Protection Agency's (EPA) designated Ocean Dredged Material Disposal Site (ODMDS). Disposal of dredged material on the beaches is proposed as often as every three years, although the National Park Service (NPS) will have the option to decline disposal of sand on Shackleford Banks during the life of the DMMP.

Federally Protected Species

The Corps has requested our concurrence with its determination of May Affect, Not Likely to Adversely Affect for the following species under the authority of the US Fish and Wildlife Service (Service): West Indian Manatee (*Trichechus manatus*), red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), seabeach amaranth (*Amaranthus pumilus*), and the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback sea turtles (*Dermochelys coriacea*). In addition, the Corps has determined that the project is not likely to adversely modify designated critical habitat of the piping plover and proposed critical habitat of the loggerhead sea turtle. The Draft DMMP/EIS and BA contain the following information and commitments made by the Corps:

(1) The Service previously issued a Biological Opinion (BO) for the Morehead City Harbor on December 7, 1989, and amended the BO on April 19, 1993 and July 22, 2003. The Corps has committed to comply with the terms and conditions of the 1989 BO, as amended in 1993 and 2003.

(2) On Bogue Banks, the construction window is proposed to be from November 16 to April 30, while on Shackleford Banks, the construction window is proposed to be from November 16 to March 31 (if a pipeline dredge is used; if a hopper dredge is used, the construction window will be January 1 to March 31). Limiting beach nourishment to these timeframes will minimize adverse impacts to the West Indian manatee, piping plover, seabeach amaranth, nesting sea turtles, and benthic and invertebrate species which are the main food source for piping plovers and red knots.

(3) More than sufficient information was provided in the DMMP/EIS and BA to determine that the sediment to be disposed upon Bogue Banks and Shackleford Banks is compatible with respect to color and with respect to meeting the North Carolina Sediment Criteria Rule (15A NCAC 07H .0312: Technical Standards for Beach Fill Projects).

(4) The Environmental Commitments in Section 6.15 (page 296) of the DMMP/EIS and page J-66 of the BA includes monitoring and grading of beach escarpments (when necessary).

(5) The Environmental Commitments in Section 6.15 (page 296) of the DMMP/EIS and Page J-66 of the BA include monitoring for seabeach amaranth on Bogue Banks (monitoring on Shackleford Banks is expected to be conducted by Cape Lookout National Seashore).

(6) Page J-66 of the BA includes a commitment to implement the precautionary measures for avoiding impacts to manatees, as detailed in "Guidelines for Avoiding Impacts to the West Indian Manatee in North Carolina Waters."

The Department Concerns

(1) Although the Department remains concerned that beaches may be nourished as often as every three years (based upon channel and harbor management concerns rather than a

need to nourish the beach), we recognize that the Bogue Banks Beaches may need the sand every three years. It is also our understanding that in the appropriate project years, the National Park Service (NPS) will have the option to decline disposal of sand on Shackleford Banks. Adhering to the winter construction window and the use of compatible sand will minimize the impacts to the benthic infauna to the extent possible.

(2) We recommend that the Corps commit to visual surveys to be conducted each morning in the area of work for that day, to determine if piping plovers or red knots are present. If plovers or red knots are present in the work area, careful movement of equipment in the early morning hours should allow those individuals to move out of the area. With these measures, potential impacts to wintering piping plovers and red knots are likely to be avoided, to the maximum extent practicable.

With the conservation measures proposed in the DMMP/EIS and BA and those requested by the Department in Item #2 above, we would concur that the proposed project may affect, but is not likely to adversely affect the West Indian manatee, piping plover, red knot, seabeach amaranth, and all three sea turtle species. The proposed project may modify, but is not likely to adversely modify, designated wintering critical habitat of the piping plover in the project area and proposed critical habitat for the loggerhead sea turtle. Therefore, the requirements of Section 7 (a)(2) of the ESA have been satisfied for this project. However, the Corps' obligations under the ESA must be reconsidered if: (1) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Thank you for the opportunity to comment on this project. If you have any questions concerning these comments, please contact Kathy Matthews at (919) 856-4520, Ext. 27 or via email at kathryn_matthews@fws.gov. I can be reached on (404) 331-4524 or via email at joyce_stanley@ios.doi.gov

Sincerely,

Joyce Stanley, MPA
Regional Environmental Protection Specialist

cc: Christine Willis – FWS
Gary Lecain - USGS
Anita Barnett – NPS
Tommy Broussard – BOEM
Robin Ferguson - OSMRE
OEPC – WASH

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Pat McCrory
Governor

Braxton C. Davis
Director

John E. Skvarla, III
Secretary

October 31, 2013

Elden Gatwood, Chief
Planning and Environmental Branch
Wilmington District, US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403-1343

SUBJECT: Status of Consistency Submission Concerning the Morehead Harbor Dredged Material Management Plan, Morehead City, Carteret County, North Carolina (DCM#20130116)

Dear Mr. Gatwood:

We received your consistency submission on October 25, 2013 concerning the Integrated Dredged Material Management Plan (DMMP) for Morehead Harbor, Morehead City, Carteret County, North Carolina. On October 30, 2013 we initiated the public review period. The proposed activity has been distributed to State agencies that would have a regulatory interest in the proposed activity for review and comment. The public review period will close on November 22, 2013. We intend to make a decision regarding whether the proposed activity would be consistent with the State's coastal program soon after. Please be aware that as we continue to review this submission that we may request additional information.

The State of North Carolina has sixty (60) days from the receipt of the consistency submission to either "*concur*" or "*object*" to your consistency determination unless an extension is agreed to. The sixtieth day is December 24, 2013. The State is entitled to an extension of up to fifteen (15) days if additional review time is necessary. Furthermore, final Federal agency action cannot be taken sooner than ninety (90) days from the State's receipt of the consistency determination unless State concurrence is obtained. Please feel free to contact me at 252-808-2808 x209 should you have any questions. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Stephen Rynas, AICP
Federal Consistency Coordinator

Cc: Doug Huggett, Division of Coastal Management
Roy Brownlow, Division of Coastal Management
Hugh Heine, US Army Corps of Engineers

400 Commerce Ave., Morehead City, NC 28557-3421
Phone: 252-808-2808 \ FAX: 252-247-3330 Internet: www.nccoastalmanagement.net

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North Carolina
Department of Administration

Pat McCrory, Governor

Bill Daughtridge, Jr., Secretary

December 5, 2013

Mr. Hugh Heine
U.S. Army Corps of Engineers
Wilmington District
CESAW-TS-PE
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Re: SCH File # 14-E-0000-0191; DEIS; Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material

Dear Mr. Heine:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are the comments made by agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Crystal Best

Crystal Best
State Environmental Review Clearinghouse

Attachments

cc: Region P

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail state.clearinghouse@doa.nc.gov

Location Address:
116 West Jones Street
Raleigh, North Carolina

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North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

MEMORANDUM

TO: Crystal Best
State Clearinghouse

FROM: Lyn Hardison
Division of Environmental Assistance and Customer Service
Permit Assistance & Project Review Coordinator

RE: 14-0191
Draft Environmental Impact Statement
Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material
Carteret County

Date: December 3, 2013

The Department of Environment and Natural Resources has reviewed the proposal for the referenced project. The staff of Shellfish Sanitation & Recreational Water Quality of the Division of Marine Fisheries has provided some guidance for the applicant consideration. These comments are attached.

The Department appreciates the cooperative efforts the applicant has with our agencies and we encourage these efforts to continue as they move forward with the project.

Thank you for the opportunity to respond.

Attachment

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
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North Carolina Department of Environment and Natural Resoruces
Division of Coastal Management

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Secretary

MEMORANDUM

10/30/2013

TO: Joanne Steenhuis (401 Water Quality)
Division of Water Resources
127 Cardinal Drive Extension
Wilmington, NC 28405-5406

Comments Due: 11/22/2013
Project: 20130116

FROM: Stephen Rynas, AICP; Federal Conistency Coordinator

SUBJECT: ACOE - Morehead City Harbor Integrated Dredged Material Management Plan

APPLICANT: Army Corps of Engineers (ACOE)

LOCATION: Morehead City Harbor, Cateret County, North Carolina

PROJECT DESCRIPTION:

The DMMP will address dredging requirements, disposal capabilities, environmental compliance requirements, and the potential for beneficial use of dredged material. The DMMP is planned to operate for a 20-year period beginning in 2013 and extending through 2032. ***NOTE: There will be TWO simultaneous independent State reviews. One environmental, the other consistency. This is the consistency review request.

This document is being circulated for CONSISTENCY review and comment by the response date above. If the proposed project does not conform to your regulatory requirements, please identify the measures that would be necessary to bring the proposed project into conformance. Your response will assist us in determining whether the proposed project would be consistent with the States's Coastal Management Program. Please inform me of any corrections, additions, or deletions. If you have any additional questions regarding the proposed project you may contact me at stephen.rynas@ncdenr.gov or 252-808-2808 x209.

REPLY:

_X_ No Comment THE proposed PROJECT LOOKS TO BE CONSISTENT w/ THE 401 JHS 11-8-13

_____ This agency supports the project as proposed.

_____ Comments to this project are attached.

_____ This agency objects to the project as proposed.

SIGNED: [signature] DATE: 11-08-13

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RETURN COMPLETED FORM TO:

Stephen Rynas, Federal Consistency Coordinator
North Carolina Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28557-3421

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BY:

400 Commerce Ave., Morehead City, NC 28557-3421
Phone: 252-808-2808 \ FAX: 252-247-3330 Internet: www.nccoastalmanagement.net

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NCDENR
North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries
Dr. Louis B. Daniel III
Director

Pat McCrory
Governor

John E. Skvarla, III
Secretary

MEMORANDUM November 12, 2013

TO: Lyn Hardison
Federal Consistency Coordinator

FROM: Shannon Jenkins
Environmental Program Supervisor

THROUGH: Patti Fowler
Shellfish Sanitation & Recreational Water Quality Section Chief

SUBJECT: Morehead City DMMP – Draft EIS
Carteret County

According to the Dredged Material Management Plan presented in the draft EIS, placement of dredged materials along the beaches of Bogue Banks may occur within a window extending from November 16th to April 30th. The placement of dredged materials along a swimming beach has the potential to cause a localized increase in bacteria concentrations within the waters surrounding the project. Thus, the placement of these dredged materials along the beach any time after March 31st may necessitate that a swimming advisory be issued, notifying the public of the risks associated with swimming in the area. In conjunction with this swimming advisory, notification signs will be placed throughout the project area. Swimming advisories can be avoided by scheduling these types of projects between November 1st and March 31st of a given year, which falls outside of the swimming season.

3441 Arendell Street, P.O. Box 769, Morehead City, North Carolina 28557
Phone: 252-726-7021 \ FAX: 252-726-0254 \ internet: portal.ncdenr.org/web/mf

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Department of Environment and Natural Resources
Project Review Form

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DCM-MHC

Project Number: 14-0191 **County: Carteret** **Date Received: 10/31/2013**

Due Date: 11/27/2013

Project Description: **Draft Environmental Impact Statement - Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material**

Please refer to 11-0268

This Project is being reviewed as indicated below:

Regional Office	Regional Office Area	In-House Review	
___ Asheville	___ Air	___ Air Quality	✓ Coastal Management
___ Fayetteville	✓ DWR-Surface Water	✓ Parks & Recreation	✓ DCM-Marine Fisheries
___ Mooresville	___ DWR-Aquifer	___ Waste Mgmt	___ Military Affairs
___ Raleigh	✓ DEMLR (LQ & SW)	___ Water Resources Mgmt	✓ DMF-Shellfish Sanitation
___ Washington	___ UST	___ DWR-Public Water FYI	✓ Wildlife Maria Dunn
✓ Wilmington	___ DWR-Public Water	___ DWR-Water Quality Program	___ Wildlife - DOT
___ Winston-Salem		___ DWR-Transportation Unit	

Manager Sign-Off/Region:	Date:	In-House Reviewer/Agency:
[signature]	11/5/2013	Coastal Management

Response (check all applicable)

___ No objection to project as proposed.
___ Insufficient information to complete review
___ No Comment
✓ Other (specify or attach comments)

No Comment at this time. Comments will be made through the consistency review process.

Return to Lyn

If you have any questions, please contact:

Lyn Hardison at lyn.hardison@ncdenr.gov or (252) 948-3842
943 Washington Square Mall Washington NC 27889
Courier No. 16-04-01

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: CARTERET

H06: IMPOUNDMENTS AND NAVIGATION DREDGING

STATE NUMBER: 14-E-0000-0191
DATE RECEIVED: 10/29/2013
AGENCY RESPONSE: 11/27/2013
REVIEW CLOSED: 12/02/2013

MS ELIZABETH HEATH
CLEARINGHOUSE COORDINATOR
DEPT OF AGRICULTURE
1001 MSC - AGRICULTURE BLDG
RALEIGH NC

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DEPT OF TRANSPORTATION
EASTERN CAROLINA COUNCIL

PROJECT INFORMATION

APPLICANT: U.S. Army Corps of Engineers
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material - placement areas such as Brandt Island; Bogue Banks; nearshore placement areas off Shackleford Banks and Bogue Banks.

CROSS-REFERENCE NUMBER: 11-E-0000-0268

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: Elizabeth H. Heath DATE: 11/21/13

Mazia Sarder

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: CARTERET

H06: IMPOUNDMENTS AND NAVIGATION DREDGING

STATE NUMBER: 14-E-0000-0191
DATE RECEIVED: 10/29/2013
AGENCY RESPONSE: 11/27/2013
REVIEW CLOSED: 12/02/2013

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

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PROJECT INFORMATION

APPLICANT: U.S. Army Corps of Engineers
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material - placement areas such as Brandt Island; Bogue Banks; nearshore placement areas off Shackleford Banks and Bogue Banks.

CROSS-REFERENCE NUMBER: 11-E-0000-0268

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If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☒ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: _____ DATE: 11/12/2013

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NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: CARTERET

H06: IMPOUNDMENTS AND NAVIGATION DREDGING

STATE NUMBER: 14-E-0000-0191
DATE RECEIVED: 10/29/2013
AGENCY RESPONSE: 11/27/2013
REVIEW CLOSED: 12/02/2013

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MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF CULTURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
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APPLICANT: U.S. Army Corps of Engineers
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material - placement areas such as Brandt Island; Bogue Banks; nearshore placement areas off Shackleford Banks and Bogue Banks.

CROSS-REFERENCE NUMBER: 11-E-0000-0268

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: Renee Gledhill-Earley DATE: 11.7.13

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz
Kevin Cherry

Office of Archives and History
Deputy Secretary

NOV 2013

November 5, 2013

Hugh Heine
US Army Corps of Engineers, Wilmington District
Environmental Resources Section CESAW-TS-PE
69 Darlington Avenue
Wilmington, NC 28403-1343

Re: Draft Integrated Dredged Material Management Plan and Environmental Impact Statement for Morehead City Harbor, Morehead City, Carteret County, ER 13-2624

Dear Mr. Heine:

We have reviewed the above named draft DMMP and EIS for the Morehead City Harbor. The document adequately addresses the concerns and provisions involving the protection of archaeological resources within the project area. Given the provisions to eliminate physical and possible chemical damage to the shipwrecks we would consider the plan to be a benefit to cultural resources, particularly those measures involving a reduction or reversal of the ebb tide delta deflation.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

cc: Stephen Rynas, Division of Coastal Management
State Clearinghouse

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: CARTERET

H06: IMPOUNDMENTS AND NAVIGATION DREDGING

STATE NUMBER: 14-E-0000-0191
DATE RECEIVED: 10/29/2013
AGENCY RESPONSE: 11/27/2013
REVIEW CLOSED: 12/02/2013

MS CAROLYN PENNY
CLEARINGHOUSE COORDINATOR
CC&PS - DIV OF EMERGENCY MANAGEMENT
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EASTERN CAROLINA COUNCIL

PROJECT INFORMATION

APPLICANT: U.S. Army Corps of Engineers
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Development of a Dredged Material Management Plan (DMMP) for the Federally-authorized Morehead City Harbor navigation channel to handle placement of compatible sand on Shackleford Banks and other proposed dredge material - placement areas such as Brandt Island; Bogue Banks; nearshore placement areas off Shackleford Banks and Bogue Banks.

CROSS-REFERENCE NUMBER: 11-E-0000-0268

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: _____ DATE: 11/7/13

North Carolina Department of Public Safety

Emergency Management

Pat McCrory, Governor
Frank L. Perry, Secretary

Michael A. Sprayberry, Director

November 7, 2013

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N.C. Department of Administration
1301 Mail Service Center
Raleigh, North Carolina 27699-1301

Subject: Intergovernmental Review State Number: 14-E-0000-0191
Dredged Material Plan for Morehead Harbor

As requested by the North Carolina State Clearinghouse, the North Carolina Department of Crime Control and Public Safety Division of Emergency Management Office of Geospatial and Technology Management (GTM) reviewed the proposed project listed above and offer the following comments:

1) All federal agencies are required to follow the guidelines of Executive Order 11988, signed May 24, 1977. Any work within the Special Flood Hazard Area, based on the current Flood Insurance Rate Map, should follow these guidelines in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains. The guidelines address an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps are summarized below.

    a. Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year).

    b. Conduct early public review, including public notice.

    c. Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.

    d. Identify impacts of the proposed action.

    e. If impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate.

    f. Reevaluate alternatives.

    g. Present the findings and a public explanation.

    h. Implement the action.

MAILING ADDRESS:
4218 Mail Service Center
Raleigh NC 27699-4218
www.ncem.org

GTM OFFICE LOCATION:
4105 Reedy Creek Road
Raleigh, NC 27607
Telephone: (919) 825-2341
Fax: (919) 825-0408

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2) 44 CFR 60.3.e prohibits man-made alteration of sand dunes and mangrove stands within Zones V1-30, VE, and V on the community's FIRM which would increase potential flood damage. Grading activity within one of these zones shall be accompanied by a hydraulic study to assure there will be no increase in flood damage potential.

If you have any questions, please contact Dan Brubaker, P.E., CFM, the NC NFIP Engineer at (919) 825-2300, by email at dan.brubaker@ncdps.gov or at the address shown on the footer of this document.

Sincerely,

Kenneth W. Ashe, P.E., CFM
Assistant Director
Geospatial and Technology Management Office

cc: John Gerber, NFIP State Coordinator
Dan Brubaker, NFIP Engineer

Dear Sir;

This note is for the wild horses on the bank. Please, please do not put or do anything to those islands that may disturb all the horses.

They have survived many years, just as they are. Leave them that way. That is their lives not ours. The only thing we could do would be to destroy it. Leave them alone please. God meant for it to stay just like it is.

Sincerely

Mrs. Linda CARRAWAY

LINDA CARRAWAY
253 WHITE OAK DR
NEWPORT, NC 28570

January 5, 2014
465 Golden Ash Mews
Gaithersburg, MD 20878-5642

US Army Corps of Engineers, Wilmington District
Attention Mr. Hugh Heine, Environmental Resources Section
69 Darlington Avenue
Wilmington, NC 28403

Dear Mr. Heine,

I am a property owner in Pine Knoll Shores, NC.

My wife and I have learned of the Corps' intention to dispose of sand dredged from the Morehead Harbor on Shackleford Banks rather than Fort Macon or Atlantic Beach. This is a major change in disposal location and we oppose it. It starves the east end of our island of needed replenishment and damages Shackleford's pristine beach to no apparent purpose.

Best regards,

Barney Gorin

Joseph Tarascio
P.O Box 507
Atlantic Beach, N.C. 28557

01/11/2014

US Army Corps of Engineers Wilmington District
ATTN: Mr. Hugh Heine Environmental Resources Section
69 Darlington Avenue
Wilmington, N.C. 28403

RE: Placing Sand on Shackleford Banks

I am (was) unable to attend the hearing on January 15th. Please let this letter serve as my comments regarding the EIS on the plan to place 50% of the available sand from dredging on Shackleford Banks. Since the scope allowed for comments has been limited , I'll try to conform my comments to meet that narrow criteria.

There is a strong case that dredging the Port channel is a big contributor to the erosion issues along Bogue and Shackleford Banks. The re-introduction of the sand removed from the system is but compensation for the atrophy that the dredging causes. Some of the public comments made by members of the ACE are disingenuous by characterizing re-nourishment as a "favor".

My suggestion addresses how ACE could provide sand to help Shackleford Banks in a more appropriate manner. It requires a change in the way the sand gathered in some of the maintenance operations is dispersed. Why not determine where the seasonal currents will carry it and release all of the sand going to Shackleford Banks from the hopper barges inshore. This would be a less invasive method of nourishing Shackleford where heavy equipment and large pipes might be less appropriate. This would allow Shackleford to replenish in a more natural manner.

Respectfully Submitted,

Joseph Tarascio

Jeffrey R Van Buren
213 Larkin St.
Morehead City, NC 28557
January 13, 2014

US Army Corps of Engineers, Wilmington District
Attn: Mr. Hugh Heine, Environmental Resources Section
69 Darlington Avenue
Wilmington, North Carolina 28403

Re: Spoil plan for Port of Morehead City and Beaufort Inlet - EIS - Public Comment

Dear Mr. Heine,

I am a lifetime resident of Morehead City and have boated the Beaufort inlet for over 50 years. I also graduated from Florida Institute of Technology, Melbourne Fla. studying Oceanographic Technology. Additionally I was employed in the 1970's at the North Carolina Division of Marine Fisheries, Dept of Natural and Economic Resources in the R&D and Artificial Reef sections. I have navigated the coastal waters both inland sounds and on the Outer Banks from Virginia south to Little River Inlet (NC-SC line), therefore one might say that I have some degree of expertise or first had experience in navigating and observing the waters and inlets of North Carolina, and specifically, Beaufort Inlet.

As we all know and observe, inlets are created and inlets can fill in, and Inlets can migrate both slowly and rapidly in one direction or another depending on the prevailing currents and the amount of storms or the amount of calm weather. We can observe this ebb and flow of beach materials along our ocean front areas, and of course, hurricanes can reek havoc on these ever changing inlets and beachscapes.

Beaufort Inlet - West side: Beaufort inlet used to be maybe 800 ft or so west of where it presently is. A rectangular cement and rubble sectional groin (maybe late 1800 circa) was in the water in the early 1960's. A large granite jetty and series of groins were built about that time to protect the Ft Macon road and east tip of the island from the ongoing erosion at the time. Subsequently, dredging of the inlet deposited sand along the east end of the island and east of the said jetty and now the beach extends some 500 ft plus to the east of the jetty and southward to which the jetties are all but covered up. This has provided a large margin of protection for the Fort Macon State Park and east end of the island.

East side - Beaufort inlet used to be maybe a thousand feet or so east of its present position. Granite jetties both at the National Park dock on Shackelford Island and another hundreds of feet away in the sand dunes to the west were constructed long ago (maybe in the early 1040's) to attenuate erosion at that time. Since that time sands have accreted and extended the east shore of the inlet several thousand feet to the west where it was located for many years and as it was a few years ago.

Navigational range markers for the ship channel were put in that area which developed dunes and flats and beachscape. Some ship channel markers were indeed located on the tip of the island as the channel was located close nearby.

However in the past several years rapid erosion has occurred there. Due to increased shoaling on the inside bar and recent hurricane, the currents have changed resulting in swift currents along the tip of the island and hurricane erosion on the beach front. On the beach front the ocean dune line is literally falling into the water on the tip and several areas along Shackelford eastward to the cape. On the west tip of Shackelford strong currents have eroded and continue to do so, and have removed a thousand feet or more off the end of the island. Channel markers have long disappeared. The range markers some of which were falling into the water had to be relocated, and today they are continuing to be in the same state of jeopardy, with one of the base line lights now in the water by a hundred feet or so. Secondary range markers are now in jeopardy. The inlet is moving again.

Where does one believe the eroded material from the beach front has migrated to? Where does one believe the rapidly eroding material from the west end of Shackelford is migrating to? Rapid currents have removed and relocated the sand into a long thick shallow bar that was and continues to grow and threaten to occlude the ship channel to the west. Recent dredging this summer was done to help this problem, but the erosion and movement of sand continues. I have never seen such rapid erosion in this previously somewhat stable area in my life time.

Dredging this entrance to Beaufort Inlet on an ongoing basis will be necessary to keep the channel open if conditions continue. Some folks have read your plan which reportedly includes putting some spoils back on the west end of Shackelford. Yes, in terms of "best practices" (cost) it might be less of a distance to transport, yet it would seem to me, considering the present rate of erosion, that you would be dredging more often and the same material repeatedly. Depositing the spoils westward on Atlantic Beach would cost a bit more yet the material would not be re-entering the channel for you to dredge over and over again. Historically, these good sands (clean) have been disposed of on the westward beaches of the communities of Bogue Banks, and they are welcomed to receive these disposed materials for ocean front protection.

Therefore, one might recommend that in your disposal plan, that <u>muddy</u> sediments from the inner harbor be disposed of at the present <u>off shore</u> spoil disposal sites, and that the <u>clean</u> sands from the oceanfront inlet be disposed of along Bogue Banks beaches as has been done in the past.

The inlet appears to be moving to the east, and it just doesn't make sense to fight mother nature and to incur more frequent recurring costs.

Sincerely,

Jeff Van Buren

307 Joan Court
Beaufort, N.C. 28607
January 13, 2014

U.S. Army Corps of Engineers
Attn: Hugh Heine
Environmental Resources Section
Wilmington District
69 Darlington Avenue
Wilmington, N.C. 28403

Reference: Shackelford Banks

Dear Mr Heine:

My wife and I are very much opposed to placing dredge spoils on Shackelford Banks in Carteret County, N. C. What you describe as "beach quality sand" if it is dredged from the Morehead City Basin is totally wrong in it's description. Such materials are contaminated with volatile organic compounds (VOC's) from leaking ships and from petroleum product transfers from ships. I recall a few years ago when such deposits were made on Atlantic Beach from the Morehead City Basin and we were walking that beach and the smells of VOC's was very obnoxious. Being a retired geologist with previous oil field experience in Oklahoma and Louisiana, I am very familiar with VOC's.

Sincerely,
Richard Berryman, PG#0341
Penni Berryman
Richard & Penni Berryman

January 14, 2014

Email to: Hugh.Heine@usace.army.mil

United States Army Corps of Engineers, Wilmington District
Attention: Hugh Heine (CESAW-TS-PE)
69 Darlington Ave
Wilmington, NC 28403

Re: 20-Year Dredged Material Management Plan
Morehead City Harbor

Dear Mr Heine:

Placing dredged material on Shackleford Banks will spoil the island's natural beauty, fishing, surfing, and who knows how many wildlife species would be affected. This unprecedented disruption of the undeveloped Shackleford Banks ecosystem is a bad idea for several reasons:

- Shackleford Banks is an undisturbed ecosystem that should be allowed to remain in a natural state.
- Disposal of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting.
- The federal plan would reduce by almost half the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses, including the most visited state park.
- While erosion is occurring at the western tip of Shackleford Banks due to the navigation project, the affected area is limited and there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island.
- The most critical area of erosion at Shackleford Banks is the western tip. However, if dredged material is placed in this area, it will be rapidly transported back into the channel. The federal agencies are therefore not even proposing to place dredged material in this area. Instead, they propose to place the material in the middle of island, where there is not a significant erosion problem and where the dredged material will do little to mitigate the area that the navigation project has most significantly impacted (western tip).

For the reasons discussed above, I do not favor any disposal of dredged material at or offshore of Shackleford Banks and strongly oppose the preferred alternative set forth in the draft DMMP.

Keep Shack Wild; Keep Bogue Banks in Business!

Sincerely,

Ronald K. Church
109 Pine Needle Drive
Angier, NC 27501

c: NC Senator Kay Hagan
NC Senator Richard Burr
NC Governor Pat McCrory

Town of Emerald Isle

Mayor
Eddie Barber

Mayor Pro-Tem
Floyd Messer, Jr.

Board of Commissioners
Nita Hedreen
Tom Hoover, Jr.
John Wootten
Maripat Wright

Visit our web site at www.emeraldisle-nc.org !

Town Manager
Frank A. Rush, Jr.
frush@emeraldisle-nc.org

Mailing Address
7500 Emerald Drive
Emerald Isle, NC 28594

Physical Address
7509 Emerald Drive

Voice 252-354-3424
Fax 252-354-5068

RESOLUTION OPPOSING MOREHEAD CITY HARBOR DREDGED MATERIALS MANAGEMENT PLAN

Whereas, on October 23, 2013, following five years of development, the United States Army Corps of Engineers (the "Corps") and the National Park Service ("NPS") released the draft Dredged Material Management Plan ("DMMP") and Environmental Impact Statement ("EIS") for the Morehead City Harbor Project; and

Whereas, the preferred alternative in the draft DMMP includes, for the first time, placement of dredged material on the beaches of Shackleford Banks and in a nearshore area off the coast of Shackleford Banks; and

Whereas, placement of sand on Shackleford Banks not only provides little to no benefit to Shackleford Banks, it also would disturb the natural conditions of Shackleford Banks, which is managed as a wilderness area; and

Whereas, this plan would also greatly reduce the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses; and

Whereas, for the past century, the Corps has administered a federally-authorized navigation project commonly known as the Morehead City Harbor Project ("MCHP"); and

Whereas, the MCHP involves the Corps' regular dredging of Beaufort Inlet and the disposal of dredged material; and

Whereas, the Corps has dumped the vast majority of the dredged material offshore – essentially removing it from the active nearshore zone or littoral system (generally considered to extend from the upper beach to the seaward edge of the nearshore zone where sediment is actively transported by waves and currents); and

Whereas, this practice has caused a number of significant, adverse impacts to Bogue Banks, including accelerated beach erosion caused by removal of sand from the Bogue Banks littoral system, which jeopardizes homes, commercial development, infrastructure, and Fort Macon, an important historic landmark and the most visited state park in North Carolina; and

Whereas, in December 2007, Carteret County filed a lawsuit against the Corps alleging its dredged material management practices associated with the MCHP violated the National Environmental Policy Act and the Coastal Zone Management Act; and

Whereas, the County sought to require the Corps to: (i) eliminate placement of beach-quality dredged material in the offshore disposal area; (ii) move the nearshore disposal area into shallower water where sand would be kept in the littoral system; (iii) place a greater quantity of beach-quality dredged material on the beaches of Bogue Banks; and (iv) place a sufficient quantity of dredged material west of the nodal point at Bogue Banks to offset impacts of the MCHP; and

Whereas, in December 2008, the County entered into a settlement agreement with the Corps in which the Corps agreed to reevaluate its dredged material management practices and prepare a new DMMP for the MCHP; and

Whereas, two years into the DMMP process and thirty-five years after rejecting the Corps' proposal to place dredged material on Shackleford Banks, NPS indicated that the alternative of placing dredged material on Shackleford Banks is consistent with the NPS' Management Policy and should not be eliminated from the DMMP on that basis; and

Whereas, Shackleford Banks is part of the Cape Lookout National Seashore.; and

Whereas, it is the only major North Carolina barrier island managed as wilderness area and vehicles are prohibited on the island; and

Whereas, the primary consequence of wilderness designation is that it prohibits future development, use of mechanized equipment, and other man-made intrusions on the natural environment; and

Whereas, although NPS policy permits mitigation of certain adverse impacts to wilderness areas, mitigation is only permitted to the extent caused by external forces – in this case, the navigation project; and

Whereas, despite this limitation, the Corps failed to determine the amount of material lost at Shackleford Banks as a result of the navigation project; and

Whereas, placement of material at Shackleford Banks is inconsistent with NPS policy, and no material should be placed at Shackleford Banks until the Corps determines the amount of sediment lost as a result of the navigation project; and

Whereas, while Shackleford Banks does experience a loss of sand due to the MCHP, there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island; and

Whereas, due to concerns of rapid shoaling, dredged material will not be placed in the most critical area of erosion on the western end of Shackleford Banks; and

Whereas, while sand placed in the westerly transport zone will be transported back towards the inlet, this sand will be rapidly lost to the channel without construction of a terminal structure, exacerbating shoaling issues in this section of the channel; and

Whereas, the Corps failed to analyze the potential impact of placing sand on Shackleford and in the nearshore area off the coast of Shackleford on the unique surf break associated with Shackleford Banks; and

Whereas, while providing no meaningful benefit to Shackleford Banks, the placement of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting; and

Whereas, in a letter dated May 31, 2011, the North Carolina Division of Marine Fisheries ("DMF") expressed concerns regarding placement of dredged material on Shackleford Banks' beaches. "Since Shackleford Banks is an undisturbed island, serving as valuable habitat to fish and rare species, and there is no development to protect by using the beach renourishment shoreline stabilization techniques, DMF sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area." and

Whereas, diverting a substantial portion of the limited dredged material to Shackleford Banks will severely reduce the benefits of the DMMP to Bogue Banks; and

Whereas, under the Corps' preferred alternative, the sand available for renourishment of Bogue Banks would be reduced by almost half, and much of the sand placed on Bogue Banks will be placed east of the nodal point; and

Whereas, as confirmed by the Corps' own studies, any sand placed east of the nodal point is rapidly transported back to the inlet; and

Whereas, it is critical for a sufficient quantity of sand to be placed west of the nodal point where it will benefit Atlantic Beach and other communities to the west; and

Whereas, because of the proposed renourishment at Shackleford Banks, there is less sand available to be placed on Bogue Banks, especially west of the nodal point; and

Whereas, the beaches of Bogue Banks will receive less sand under the draft DMMP than has been placed historically and therefore will be more vulnerable to background and storm-induced erosion than in the past; and

Whereas, the Corps and NPS failed to provide specific authorization to allow non-federal sponsors to pay for the additional cost of placing sand on the beaches of Bogue Banks, including west Atlantic Beach and Pine Knoll Shores, rather than dumping the sand offshore as provided in Years 2 and 3 of the draft DMMP despite being requested to do so;

Now, therefore, be it resolved that the Town of Emerald Isle does not favor any renourishment of Shackleford Banks and is strongly opposed to the preferred alternative set forth in the draft DMMP. Placing dredged material on Shackleford Banks will: (i) provide little to no benefit to Shackleford Banks; (ii) disturb the natural conditions of Shackleford Banks, which is managed as wilderness area; and (iii) provide less sand for Bogue Banks where it is needed to provide protection for infrastructure and development and provide for recreation.

Be it further resolved that the placement of dredged material at Shackleford Banks would adversely impact Shackleford Banks and Bogue Banks and the Town of Emerald Isle will continue to work with the Corps, NPS, and elected officials to ensure that the preferred alternative is not adopted in the final DMMP.

Adopted this the 14th day of January, 2014.

Eddie Barber, Mayor

ATTEST:

Rhonda Ferebee, Town Clerk. CMC

SEAL

January 14, 2014

Margaret Wiggins
2023 Fairview Road
Raleigh, NC 27608

Hugh Heine (CESAW-TS-PE)
69 Darlington Avenue
Wilmington, NC 28403

Dear Mr. Heine,
I am writing to oppose the language in the Draft Material Management Plan for Morehead harbor that allows placing dredged material on and offshore from Shackleford Banks. The noise and exhaust from the heavy equipment needed to place and spread dredged material on the island would spoil one of the last "almost wild" places along North Carolina's coast. I am asking you to place the dredged material somewhere else. Surely other options are available including at least one, Bogue Banks, where the dredged material is welcome.

Thanks for the opportunity to provide input and I trust that a sound decision will be made in this case.

Sincerely yours,

Margaret Wiggins

Margaret Wiggins

January 14, 2014

Gary Wiggins
2023 Fairview Road
Raleigh, NC 27608

Hugh Heine (CESAW-TS-PE)
69 Darlington Avenue
Wilmington, NC 28403

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Sincerely yours,

Gary Wiggins

Gary Wiggins

January 14, 2014

Email to: Hugh.Heine@usace.army.mil

United States Army Corps of Engineers, Wilmington District
Attention: Hugh Heine (CESAW-TS-PE)
69 Darlington Ave
Wilmington, NC 28403

Re: 20-Year Dredged Material Management Plan
Morehead City Harbor

Dear Mr Heine:

Placing dredged material on Shackleford Banks will spoil the island's natural beauty, fishing, surfing, and who knows how many wildlife species would be affected. This unprecedented disruption of the undeveloped Shackleford Banks ecosystem is a bad idea for several reasons:

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- The most critical area of erosion at Shackleford Banks is the western tip. However, if dredged material is placed in this area, it will be rapidly transported back into the channel. The federal agencies are therefore not even proposing to place dredged material in this area. Instead, they propose to place the material in the middle of island, where there is not a significant erosion problem and where the dredged material will do little to mitigate the area that the navigation project has most significantly impacted (western tip).

For the reasons discussed above, I do not favor any disposal of dredged material at or offshore of Shackleford Banks and strongly oppose the preferred alternative set forth in the draft DMMP.

Keep Shack Wild; Keep Bogue Banks in Business!

Sincerely,

Ronald K. Church
109 Pine Needle Drive
Angier, NC 27501

c: NC Senator Kay Hagan
NC Senator Richard Burr
NC Governor Pat McCrory

Date: January 15, 2014

Subject: Comments regarding the Morehead City Harbor / Beaufort Inlet "Integrated Dredged Material Management Plan and Environmental Impact Statement".

To: U.S. Army Corps of Engineers, Wilmington District
ATTN: Mr. Hugh Heine hugh.heine@usace.army.mil
Environmental Resources Section
69 Darlington Avenue
Wilmington, NC 28403 (910) 251-4070

Excluding National Park Service (NPS) properties and the waters 150 ft from the sound-side, all other areas within the Morehead City Harbor Dredged Material Management Plan (DMMP) are lands, sediments, and waters (*out to three ocean nautical miles*) of the State of North Carolina. The management of these State controlled and privately owned lands, sediments, and waters are critical to the health and sustainability of coastal properties. We fully recognize the Federal Government's role in permitting oversight of North Carolina coastal lands and waters, but not the control of these State owned sediments.

The major objection to the current draft DMMP is placement of NC sediments onto NPS Federally controlled lands or waters. These comments are based upon the following areas of concern:

1 --- The dredged materials within NC controlled lands and waters are the sediments of NC. Why is the proposed DMMP taking State sediments and placing them on Federal properties? The State of NC should be the entity to fully grant usage of these sediments to be utilized on Federal properties, and if so, should be fully compensated for the taking of these State sediments.

2 --- Formerly, dredged State sediments were being taken by the Federal Government, dumped +2 - 3 miles off-shore into Federal waters and/or completely out of NC's littoral / riparian coastal shoreline system. Recent Federal court actions in ~2007-2008 ordered arbitration of this practice which mandated 100% of suitable dredged sediments to be placed onto Bogue Banks. Has this court ordered arbitration been legally modified or nullified by the DMMP, NPS, USACOE, or the court?

3 --- The Federal Government and NPS have sand sediments available in federally controlled waters and lands. If sediment is needed on Shackleford Banks, why has the DMMP and NPS not using or explored the usage of these available sediments for usage on Shackleford Banks, rather than utilizing State sediments from the DMMP?

4 --- Based upon the draft DMMP and January 15, 2014 informational meeting, it appears only empirical estimates have been done by the USACOE, NPS, and the DMMP. No detailed evaluations, quantitative studies, or modeling has been completed to document actual sediment movement, sediment volume loss / gain, current flows, or actual erosion / accretion processes. This is required by NEPA – CMZ policies in order to document environmental impacts, best use of these sediments, or need for a shoreline renourishment project. When or will these quantitative studies be done by the NPS and the DMMP?

5 --- Based upon a review of 1880's nautical charts, available historic to current aerial photography, and using Fort Macon as a benchmark, Beaufort Inlet has fluctuated from ~4000 ft to ~9000 ft wide over this time period. It appears the western end of Shackleford Banks is not eroding, but rather this portion of the Banks has accreted into Beaufort Inlet with periodic slumping of this area into Beaufort Inlet after dredging operations. Long-shore processes will continue to move coastal sediment from the north to south, and east to west, thus relocating

DMMP sediments onto Shackleford Banks will hasten the migration of sediments back into the dredged Beaufort Inlet, shorten the time between dredging operations, and increase channel maintenance costs. These conditions need to be thoroughly addressed and answered before placing more sediment onto Shackleford Banks, especially in the proposed locations?

6 --- Shackleford Banks was originally made part of the Cape Lookout National Seashore by Congress in March-1966 (PL 89-366) to:

"..... **preserve** for public use and enjoyment of an area in the State of North Carolina possessing outstanding natural and recreational values...". The following are additional pertinent points and documents:

A -- Shackleford Banks was proposed to be designated as a Wilderness Area, and is currently being managed as a Wilderness Area by NPS policies to maintain its natural characteristics and functions.

B -- The 1916 NPS Organic Act (16 U.S.C.&1 et seq) and the 1970 / 1978 NP System General Authorities Act both apply to Shackleford Banks which is to conserve and preserve the natural characteristics, and to prohibit activities that cause degradation of the values and purposes of the park units. NPS describes "natural condition" as the condition of resources that would occur in the absence of human dominance over the landscape.

C -- Shackleford Banks is a unit of United Nations Educational, Scientific, and Cultural Organization (UNESCO) Carolinian-South Atlantic Biosphere Reserve to study and evaluate unique land, wildlife, and cultural resources.

Considering the above laws, policies, designations, and distinctive / unique characteristics, why does the DMMP and NPS propose to place intrusive dredging operations and artificially transplanted sediment onto Shackleford Banks, with its subsequent impacts to the environment in opposition to established laws, policies, and practices?

7 --- All riparian properties, including Shackleford Banks, are subject to long-term / short-term erosion, accretion, avulsion events impacting such properties. Established real estate law dictates the legal rights and options for such properties. In a volatile inlet zone it would seem more appropriate for the NPS and USACOE to consider a long-term solution for inlet stabilization such as terminal groin structures to control premature channel shoaling and the growth of Shackleford Banks into Beaufort Inlet. Has this been considered by the NPS, USACOE, DMMP?

8 --- Recognizing the USACOE must use least-cost measures as part of the DMMP, and Carteret County / State's willingness to cost-share deposition of Federally dredged sediments, it seems appropriate to:

A – Continue the practice of placing usable sediment onto Bogue Banks;

B – Create back-barrier, near-shore dredge spoil islands with unsuitable sediments for wildlife habitat, marsh creation, mollusk habitat, water filtration, estuarine shoreline stabilization, and etc;

C – Eliminate the costly off-shore transport of any State sediment which is vital to near-shore sediment supply and stabilization.

Has this been fully evaluated, considered, and presented within the DMMP as to a costs / benefits?

9 --- It is quite refreshing to see within the DMMP and at the January 15, 2014 informational meeting that the USACOE and NPS both fully acknowledge and document that the dredging of Beaufort Inlet has detrimental impacts to Bogue Banks through increased erosion and disruption / displacement of the normal down-drift, long-shore current, coastal sediment supply. This was the entire basis of the legal arbitration between Carteret County and the USACOE in 2007 – 2008 regarding dredging impacts to Bogue Banks, which the USACOE denied was occurring. These impacts need to remain and prominently presented within the DMMP.

Larry F. Baldwin, CPSS/Sc Larry@nc-20.com
NC-20, P.O. Box 278, Harkers Island, NC 28531
(910) 471-0504 [m]

BEVIN W. WALL
ATTORNEY AT LAW
7025 Hwy 70 - Ocean Way Plaza, Suite F
P.O. Drawer 310
Newport, N.C. 28570-0310

Phone: (252) 223-4411
Fax: (252) 223-5104
Email: bevinwallattorney@gmail.com

January 15, 2014

US Army Corps of Engineers, Wilmington District
ATTN: Mr. Hugh Heine, Env. Resources Section
69 Darlington Ave.
Wilmington, NC 28403

RE: Comment on Morehead City Harbor DMMP & EIS, Public Notice dated 12-6-2013

Dear Mr. Heine,

I was unable to attend the meeting at Duke Marine lab due to a conflict.

I and my family are frequent visitors to and users of Shackleford Banks.

I am totally opposed to any sand or dredged materials being dumped on or adjacent to Shackleford Banks. The channel erosion on the west end of the island is minimal and does not cause any ecological harm, no structures are in danger, the land that is being eroded is not natural to the island, and erosion is negligible as relates to the entire island. We have seen through experience that sand placed in or adjacent to an inlet rapidly disappears. It is not needed or wanted there.

Since the 1990s I have been a land owner on Bogue Banks and on the mainland facing the ICW in the middle of Bogue Banks. I have been significantly supporting, with my tax dollars, renourishment efforts. It is utter insanity to suggest that available sand not be dumped at stress points on Bogue Banks. The towns along the middle and western portion of Bogue Banks need this sand, have expended multiple efforts to keep and keep sand, and all citizens in the County have paid to have interim dredging occur. **The tax base of our county and the livelihoods of many of our citizens depend on protecting the shoreline and beaches of Bogue Banks.**

For the reasons discussed above, **I strongly oppose any disposal of dredged material at or offshore of Shackleford Banks and strongly oppose the preferred alternative set forth in the draft DMMP.**

Sincerely yours,

Bevin W. Wall
Attorney at Law

My name is Brian Kramer, Town Manager for the Town of Pine Knoll Shores.

Pine Knoll Shores does not support the Dredged Material Management Plan as written. The Plan

- will place unneeded sand on Shackelford Banks ;
- fails to address the problem at the western tip of Shackleford Banks;
- fails to mitigate the adverse effects of Port dredging on Bogue Banks's beaches;
- fails to ensure that the sand that *is* placed on Bogue Banks is far enough to the west to avoid it rapidly migrating back into the channel.

Another major shortfall of the Plan is the inability of Pine Knoll Shores to have the opportunity to participate as a Non-Federal Partner in a future project. This omission from the DMMP needs to be corrected.

Section 3.2 and Section 9 of the Plan states:

> *It is the policy of USACE that all dredged material management studies include an assessment of potential beneficial uses for environmental purposes including fish and wildlife habitat creation, ecosystem restoration and* ***enhancement and/or hurricane and storm damage reduction****. This DMMP attempts to maximize beneficial uses of dredged material within the requirements of the federal standard.*

The Plan does not come close to maximizing hurricane/storm damage reduction. In fact it is not even addressed. Sand is not being placed in the most beneficial location to protect life and property.

Further, in the criteria used as outlined on page 128, it is clear that you violated your own planning principle and did not even consider hurricane storm damage reduction in your decision making process. Potential impacts from the project on the beaches and ebb tide delta, and the potential to provide wildlife habitat and ecosystem restoration were considered.....but there is no mention whatsoever of hurricane storm

damage reduction. Also, there is no mention of protection of property from storms. This is wrong.

(Ref only---do not read)
5 *– Beneficial use that successfully offsets potential impacts from the navigation project (beaches and ebb tide delta).*
4 *– Beneficial use that reduces potential impacts from the navigation project (beaches and ebb tide delta), but to a lesser degree than those rated 5.*
3 *– Beneficial use that does not reduce impacts from the navigation channel, but which has the potential to provide wildlife habitat and ecosystem restoration and/or enhancement*
2 *– Marginal beneficial use*
1 *– Not a beneficial use*

The 339 page document has one small paragraph in Section 5.12 on Socioeconomics. I quote "Implementation of the proposed plan would not result in any adverse effects to any socioeconomic resources." Simply inaccurate. There is $6.5 billion of real value on Bogue Banks. You are simply ignoring this when you fail to allow for PKS or any other municipality to partner in a future project.

There is no opportunity for Pine Knoll Shores to request a partnership, as was the County's understanding throughout the planning process, in a beach renourishment project coincident with port dredging operations. Specifically, during years 2 and 3 of the Plan, we want to have the opportunity to consider a local project for this sand rather than simply depositing it off shore.

Engineering Regulation 1105-2-100, which is referenced in the Plan as the reference for the guiding principles of the Plan, states:

Federal water resources planning is to be responsive to State and local concerns.

Barring PKS from voluntary participation, at no additional cost to the ACE, in future projects, violates this principle. We do not participate simply by attending meetings---we participate by partnering with the ACE. This will not happen in this Plan.

Pine Knoll Shores requests that the DMMP be rewritten so as to include clear provisions for the municipalities on Bogue Banks to participate as Non-Federal partners on future projects.

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Yahoo Mail for Mobile
Send Feedback

To hugh.heinee@usace.army.mil

question re. DMMP

Dear Sir:

I am a resident of Sands Villa Resort, Inc. in Atlantic Beach. Every few years part of the dredging material is used to replenish our beach, I was wondering if the change in placement of the dredging material will affect the amount of sand our beach will receive?

The meeting I attended yesterday was well done and the information was presented in a concise and understandable manner. The handouts were especially helpful.

Thank You,
Betty Knish
email:
1400 E. Fort Macon Rd. #519
Atlantic Beach, NC 28512

Send

Saved at 8:46 AM

January 16, 2014

Sir:
The email address given on page 10 of the handout comes back as an invalid address. (hugh.heine@usace.army.mil) so I'm sending this to you via snail-mail.

Thank You
Betty Knish

Comments for Morehead City Harbor DMMP
15 January 2014

NAME (PLEASE PRINT)	CONTACT INFORMATION
Sandra Gaskill Jan-19-2014	567 Bayview Drive Harkers Island, NC 28531 252-728-2089

my husband Elbert & I were born and raised on Harkers Island as was my Dad., Stacy M. Davis of 90 yrs. This has been the only home we have ever known. We live on the east end of Harkers Island across from the horsepen on Shackleford Banks. Some of our ancesters lived on banks, until a hurricane forced them to move to Harkers Island. During hurricane Hazel 1954, many of the shackleford horses were washed to shore on H.I. many died. In the 1950's, 60's the light poles, that were used to run electricity to Cape Lookout, were in the sand dunes, and now are in the ocean.

In 2012 & 2013 we have seen many changes that have taken place, the erosion of sand on the east, west & ocean side. There has been a loss of three to four hundred feet of shoreline.

Shackleford Banks is not going to remain in a natural state, If sand is not placed down the beach, on the east or west side. It will continue to erode with hurricanes and march storms.

Shackleford Banks is Harkers Island, Lennoxville, and Beaufort's safe Haven from the ocean during Hurricanes.

Please help make it possible for shackleford Banks to receive it's part of dredged material in the middle, on the ocean side, where significant erosion has taken place.

I want to save shackleford Banks, so my children and grandchildren can enjoy the love and history, that our family and many other locals, have so long enjoyed.

Sincerely,
Sandra Gaskill

Candy Borreson
1909 East Fort Macon Road
Atlantic Beach, NC 27285

January 20, 2014

Mr. Hugh Heine
Biologist
US Army Corps of Engineers
69 Darlington Ave.
Wilmington, NC 28403-1343

Dear Mr. Heine,

I writing to ask you to please reconsider your plan to change how the dredged sands around Bogue Sound are distributed. We want all the sand that you can give us in Atlantic Beach.

I've been a visitor to the Fort Macon and Atlantic Beach area since 1977 and a homeowner in Atlantic Bach for over 20 years. Over these many years, I've witnessed first hand the beneficial effects of renourishing the beaches in that area with the dredged sand.

The renourishment of Ft. Macon and Atlantic Beach has a very positive economic impact on that area as those beaches are the life blood of the area.

Why cut back such a mutually beneficial program? Ft. Macon and Atlantic Beach beaches can use all the sand you can pump onto them. Rather than having unknown environmental impacts, it has a very positive and proven economic benefit.

The current program of renourishment is an on-going need for those beaches. It's welcomed and much appreciated by residents and visitors alike. Please don't try to fix something that's not broken.

Sincerely,

Candy Borreson

January 21, 2014

Keep Shack Wild!

In August, 2012, my Best Friend and her grand-daughter (from the West) visited me in Morehead City.

On our Special Day, we took a ferry to Shackleford Banks. I shell collected on the ocean side. Young Indica made Friends and played in the sound water.

What a memorable day!

Keep Shack Wild!

Barbara Bergman - 81 yrs young
3905 Guardian Av I-38
Morehead City, NC 28557

January 23, 2014

U.S. Army Corps of Engineers, Wilmington District
Attn: Hugh Heine (CESAW-TS-PE)
69 Darlington Avenue
Wilmington, North Carolina 28403

Via e-mail: hugh.heine@usace.atmy.mil

Dear Mr. Heine:

The Board of Directors of the Carteret County Chamber of Commerce opposes the draft Dredged Material Management Plan (DMMP) and Environmental Impact Statement for the Morehead City Harbor Project, as set forth as a "preferred alternative" by the U.S. Army Corps of Engineers and the National Park Service.

Specifically, the Chamber·Board opposes the plan for the nourishment of Shackleford Banks. Placing dredged material on Shackleford Banks will:

- Not result in any meaningful benefit to Shackleford Banks, which is a natural wilderness area within Cape Lookout National Seashore.
- Provide less sand for Bogue Banks where it is needed to provide storm protection for infrastructure and development at Fort Macon Beach, Atlantic Beach and other municipalities along Bogue Banks. Therefore, the entire island would be more vulnerable to storm-induced erosion.
- Imperil beach quality for visitors and residents alike, harming the local tourism economy and prope1iy values.

Here is the essence of the Chamber's position to "Support Critical Navigation Maintenance Dredging and Sand Management," as contained in our Legislative Agenda:

> "Navigation maintenance dredging projects in the state's shallow-draft inlets, including Bogue Inlet, and maintenance of the Atlantic Intracoastal Waterway are being neglected.
>
> "The western tip of Shackleford Bank(s is migrating into the footprint of Beaufort Inlet and the Morehead City Harbor Federal Navigation Project, causing rapid shoaling of the channel that is the lifeline for the Port of Morehead City and the local recreational and commercial boating community. The U.S. Army Corps of Engineers is responsible for the maintenance of the navigation thoroughfare.

Carteret County Chamber of Commerce· 801 Arendell St., Suite I, Morehead City, NC 28557
(252) 726-6350 ·(800) 622-6278 · Fax (252) 726-3505 www.nccoastchamber.com ·
cart.coc@nccoastchamber.com

"While the U.S. Army Corps of Engineers must adequately maintain the channel for safe passage of commerce, the Corps has an obligation to place beach-quality dredged sand along the beaches of Bogue Banks in appropriate volumes when and where appropriate to sustain and enhance the tourism industry, real estate values and other economies that benefit Carteret County as a whole."

The Chamber Board contends that dive1ting dredged material to Shackleford Banks is contrary to the long-standing and historical practice of placing the sand on Bogue Banks. Fmthe1more, the nourishment of Shackleford Banks would greatly reduce the amount of sand available for beach nourishment along Bogue Banks (a reduction of nearly 50 percent), where it is needed to protect valuable public and private investments.

The Chamber Board supports the position of the Carteret County Board of Commissioners and the Carteret County Beach Commission that the placement of dredged material on Shackleford Banks has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due to the use of heavy mechanized equipment, the addition of sand and nighttime lighting.

Furthermore, the North Carolina Division of Marine Fisheries stated on May 31, 2011, that Shackleford Banks provides "valuable habitat to fish and rare species…and sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

In conclusion, the Chamber Board believes the draft DMMP is not in the best interest of the citizens of Carteret County and the countless vacationers who come to Bogue Banks and visit Cape Lookout National Seashore and expect us to "Keep Shack Wild." The draft DMMP needs to be rewritten to remove the "preferred alternative" of placing dredged material at Shackleford Banks.

Sincerely yours,

William R. Rogerson
Chair, Board of Directors

Joe Exum,Founder Executive Director
Bogue Banks Environmental Stewardship Corporation
P.O. Box 475
Snow Hill,N.C. 28580

To: Bob Keistler, Project Manager
Wilmington District
U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

From: Joe Exum, Executive Director
Bogue Banks Environment Stewardship Corporation(BBESC)

Date: December 23, 2013

Subject: Request for public comments on Corps Action Proposed Dredge Material Management Plan (DMMP) and Environmental Impact Study (EIS) for Morehead City Harbor

Introductory Remarks:

Bogue Banks suffers from a sand deficit that is caused by maintaining Beaufort Inlet at 47 feet. The natural depth of Beaufort Inlet is 18 feet. Sand removed from Beaufort Inlet is deposited in the Offshore Dredged Material Disposal Site (ODMDS) removing the sand from the littoral system feeding Bogue Banks. Following the 1993 Morehead City Harbor Project deepening Beaufort Inlet to 47' and broadening the inlet from 100' to 450',beach avulsion to Bogue Inlet was so severe the primary dune was threatened by seasonal erosion patterns. Homeowners resorted to bulldozing. Christmas trees and sand fencing in fruitless efforts to stabilize the dry beach. When Hurricane Gordon brushed the eastern coast of North Carolina in November of 1994, the primary vegetation line from Pine Knoll Shores thru Emerald Isle was destroyed and the primary dune was threatened. (1995-96 pictures of primary dune erosion at Pine Knoll Shores Maritime Place enclosed.) This comment will address the legal, environmental, and economic impact of the 20 year Dredged Material Management Plan (DMMP) for Morehead Harbor.

EnvironmentalImpact:

> *"…the impact of sediment removal…tends to be diffused throughout the impacted area. Since this diffusion process can extend over miles of shoreline, the erosive impact of the sediment removed from the navigation channel and its deposition outside the active littoral zone is difficult to detect in the short term…Years of research by USAGE and practical knowledge gained from the operation of the numerous coastal navigation projects dictate this material must be conserved…the removal of a cubic yard of littoral sediment from a tidal entrance or inlet with deposition outside the active littoral zone of the beach will ultimately cause a cubic yard deficit somewhere within the sand sharing system…The impact of the removal of littoral sediment from the active littoral zone through channel maintenance is identified as a major cause of man-induced erosion."* May 2000 *Wilmington Harbor Environmental Assessment*

> *The environmental effects are entirely negative and include substantia/Joss of aquatic and terrestrial habitat, significant risk of groundwater contamination, air pollution, water pollution,*

destruction and degradation of historic sites and structures, and alteration of the character of a region with an economy based on tourism and recreation. All six municipalities of southeastern Brunswick County in the vicinity of the proposed terminal have adopted resolutions opposing the project. Statements of opposition have been issued by the U.S. Congressman for the district and four local environmental organizations. - Risingwater report to Governor Perdue's Logistics Task Force on the NCIT

The 20 year DMMP proposes to deepen and widen Beaufort Inlet to accommodate Panamax shipping. According to the conclusions provided Governor Perdue's Logistics Task Force, Beaufort Inlet must be taken to a depth of 54 feet. The State Ports Authority anticipates 4400 truck visits daily to the Port. Furthermore, according to the DMMP:

> *Coarse-grained material would be disposed of on the beaches of Fort Macon State Park, Atlantic Beach, and Shackleford Banks or in the Nearshore Placement Areas to replenish the deflated ebb tide delta. Additionally, the proposed plan is fully consistent with the State's Coastal Management Program, which states that clean, beach quality material from navigation channels within the active nearshore, beach, or inlet shoal systems must not be removed permanently from the active nearshore, beach or inlet shoal system unless no practicable alternative exists (15A NCAC 07M.1102 (Section 1102)(a)).*

This statement is in direct conflict with then Director of the Department of Coastal Management (DCM), Donna Moffit, letter dated August of 2001 in which she put the USAGE on notice that sand deposited on the near shore berm is outside the active littoral system and therefore *USAGE was not in compliance* with the North Carolina Coastal Zone Management Plan. The ebb tide delta was deflated following the 1993 deepening of Beaufort Inlet to 47'. The USAGE fails to explain how deepening the inlet to 54' would not accelerate the inlet hydraulics set in place in 1993.

Based upon the dry beach avulsion following the accelerated excavation of Beaufort Inlet in 1993, increasing the rate of excavation from present levels will result in catastrophic consequences to the entire length of Bogue Banks. Accelerated excavation without accelerated sand transfers will result in accelerated sand deficits threatening turtle nesting, 1000 year old sand ridges, maritime forests, ghost crabs, mole crabs, Piping Plover as well as Maritime wildlife habitats and the food chain that depends upon dry beaches.

Economic Impact

The DMMP proposal provides cost/benefit analysis in compliance with the National Economic Development Act. The USAGE has relied upon optimistic economic forecasts similar to 1993 in which justification required 50 year depreciation rates for long-term capital investments. The DMMP also relies heavily upon the future impact of Panamax shipping on world trade to justify the revenue projections in the 20-year DMMP. The costs associated with the North Carolina International Terminal (NCIT) report and the DMMP are difficult to reconcile or extrapolate. In the NCIT report USAGE estimated the cost of the NCIT dredging at $1.2 billion, infrastructure at $1.84 billion, costs of maintenance dredging to the state of North Carolina at $720 million. The projections made in 1993 to justify taking Beaufort Inlet to 47' have never materialized. A more objective cost/benefit analysis for the impact of Panamax shipping on the NCIT was done for the environmental group Save the Cape by Risingwater Associates for the NCIT. That report concluded:

- *The revenues received by state ports from container handling charges exceed operating costs, but are not adequate to offset capital costs, particularly the cost of channel dredging. All ports serving North Carolina, in-state and out, are heavily subsidized by state and Federal funding of capital improvements.*

- *It is difficult to find any need of North Carolina importers and exporters that would be met by additional investment in port facilffies in North Carolina other than incremental improvements to increase efficiency. A project for a deepwater port in North Carolina to compete with the ports in neighboring states would serve onlv State vanitv.*

Even the optimistic forecast by the USACE produce razor thin profit margins requiring least cost disposal of dredged material. Least cost disposal is estimated at $2.50 per cubic yard. There is no plan to dispose of these materials beyond "*stakeholders"* adjacent to the channel. To transfer the dredged material along the 23 mile length of Bogue Banks will cost in excess of $8 per cubic yard.

The cost of dredging North Carolina Ports (Wilmington and Morehead combined) as a percentage of gross revenues reveals a fundamentally flawed plan to allocate state and federal revenues. The total revenues for North Carolina ports in 2012 approximated $33 million. The cost of maintenance dredging was $12.5 million. This does not include 50 year dredging amortization costs for Wilmington estimated at $33 million annually. In summary, the revenues generated by North Carolina Ports do not exceed the cost of maintenance dredging. The following table was created from Risingwater report.

	Virginia	S.Carolina	Georgia	N.Carolina
Annual Revenues	$203,485	$111,744	$227,796	$ 33,318
Income	($ 7,718)	$ 8,372	$ 9,261	($2,080)
Long Term Debt	$533,053	$ 95,561	$107,003	$102,684
Dredging Costs	$ 13,946	$ 16,065	$18,462	$ 12,547
Dredging Costs/Revenues	6.85%	14.38%	8.10%	37.66%
Estimated Capacity	2049	2039	2034	2034

Legal Impact

Dickinson, Millender, and Applegate v USACE, are court cases establishing the doctrine of *inverse taking of property by erosion*. That erosion is a continuing process which occurs during channel changes causing permanent loss of property is not disputed by USACE. In effect, the USACE is choosing not to condemn the adjacent beaches avoiding just compensation for what in actuality is a taking. In the Applegate case the USACE promised a sand transfer plant to avoid condemning adjacent beaches. The USACE never delivered on their promise. The USACE settled out of court and was required to provide Captiva homeowners sand transfers as far as 20 miles from the inlet created by the USACE.

Conclusions

In reading the 20-year DMMP, one would conclude Bogue Banks is a static situation and little has changed since the 1993 Morehead Harbor proposal deepening Beaufort Inlet. That may be true for Shackleford Banks and Bear Island, but Bogue Banks has become a dynamic group of townships. In 1967, the entire Island from Salter Path to Bogue Inlet was purchased for $367,000. Today, property taxes provide Carteret County and her townships in excess of $80 million annually. The tourism industry provides similar benefits to the county and the state of North Carolina. Although the USACE acknowledged culpability in permanent

loss of property in previous channel changes, the 20-year DMMP does not count the loss of Bogue Banks property owners in their cos\/benefit analysis. Indeed, the USACE does not even promise sand transfers to prevent the catastrophic consequences of their actions. The avulsion resulting from taking Beaufort Inlet to 54' will be catastrophic, permanent and an inverse taking of property by erosion.

In summary, the most optimistic projections for terminal revenues barely exceed real costs and are ***less than*** today's $80 million property tax revenues. If the costs of maintenance dredging and terminal infrastructure accommodating Panamax shipping approach the cost estimates for the NCIT, costs predictions for the 20-year DMMP are wildly optimistic. The 20-year DMMP is a reckless proposal and sets the USACE on a collision course with the legal precedents set by Dickinson, Millender, and Applegate. Serving state vanity is economically unsustainable for a state and nation already making difficult budgetary choices.

January 21, 2014

U.S. Army Corps of Engineers, Wilmington District
Attn: Mr. Hugh Heine, Environmental Resources Section
69 Darlington Ave.
Wilmington, NC 28403

Dear Mr. Heine,

I am writing in opposition to the 20-year Dredge Material Management Plan associated with dredging operations in Beaufort Inlet and the proposal to allow dredged material to be placed on Shackleford Banks.

As a homeowner in Atlantic Beach, N.C., this plan would bring harm to Bogue Banks and would be a breach of the 2008 out-of-court settlement between Carteret County and the U.S. Army Corps of Engineers.

The argument that the plan merely wants to give the National Park Service the "option" to accept sand at Shackleford is ludicrous. Once that "option" is extended, the dumping will begin and both Shackleford and Atlantic Beach will be compromised. No correlation can be made between putting dredged material on Shackleford and the use of dredged material at other national parks. The dredged material placed at Cape Lookout Lighthouse in 2006 was needed to protect the structure, and the dredged material placed at Cape Hatteras National Seashore after Hurricane Isabel in 2003 was needed to fill a breach. Shackleford does not need the sand. It has survived and thrived for a century without any human interference, and it attracts visitors who prize it for its wild and pristine nature.

The Corps needs to adhere to its commitment to Atlantic Beach and the rest of Bogue Banks. Altering the dredging plan will cause significant economic damage to these communities and, in turn, will cause environmental damage to Shackleford. This plan is a lose-lose proposition for both Atlantic Beach and Shackleford Banks and should be abandoned.

Please send any response to the following address: 105 Kemp Road East, Greensboro, NC 27410.

Sincerely,

Susan S. Robinson

Susan S. Robinson
1002 Ocean Ridge Road
Atlantic Beach, NC 28512

January 21, 2014

U.S. Army Corps of Engineers, Wilmington District
Attn: Hugh Heine (CESAW-TS-PE)
69 Darlington Avenue
Wilmington, North Carolina 28403

Via e-mail: hugh.heine@usace.army.mil

Dear Mr. Heine:

The Board of Governors of the Southwinds Homeowners' Association opposes the draft Dredged Material Management Plan (DMMP) and Environmental Impact Statement for the Morehead City Harbor Project, as set forth as a "preferred alternative" by the U.S. Army Corps of Engineers and the National Park Service.

Specifically, the Board of Governors opposes the plan for the nourishment of Shackleford Banks. Placing dredged material on Shackleford Banks will:

- Not result in any meaningful benefit to Shackleford Banks, which is a natural wilderness area within Cape Lookout National Seashore.

- Provide less sand for Bogue Banks where it is needed to provide storm protection for infrastructure and development at Fort Macon Beach, Atlantic Beach and other municipalities along Bogue Banks. Therefore, the entire island would be more vulnerable to storm-induced erosion.

- Imperil beach quality for visitors and residents alike, harming the local tourism economy and property values.

Here is the essence of the Board's position to "Support Critical Navigation Maintenance Dredging and Sand Management," as contained in our Legislative Agenda:

> "Navigation maintenance dredging projects in the state's shallow-draft inlets, including Bogue Inlet, and maintenance of the Atlantic Intracoastal Waterway are being neglected.

"The western tip of Shackleford Banks is migrating into the footprint of Beaufort Inlet and the Morehead City Harbor Federal Navigation Project, causing rapid shoaling of the channel that is the lifeline for the Port of Morehead City and the local recreational and commercial boating community. The U.S. Army Corps of Engineers is responsible for the maintenance of the navigation thoroughfare.

"While the U.S. Army Corps of Engineers must adequately maintain the channel for safe passage of commerce, the Corps has an obligation to place beach-quality dredged sand along the beaches of Bogue Banks in appropriate volumes when and where appropriate to sustain and enhance the tourism industry, real estate values and other economies that benefit Carteret County as a whole."

Southwinds' Board of Governors contends that diverting dredged material to Shackleford Banks is contrary to the long-standing and historical practice of placing the sand on Bogue Banks. Furthermore, the nourishment of Shackleford Banks would greatly reduce the amount of sand available for beach nourishment along Bogue Banks (a reduction of nearly 50 percent), where it is needed to protect valuable public and private investments.

Southwinds' Board of Governors supports the position of the Carteret County Board of Commissioners and the Carteret County Beach Commission that the placement of dredged material on Shackleford Banks has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due to the use of heavy mechanized equipment, the addition of sand and nighttime lighting.

Furthermore, the North Carolina Division of Marine Fisheries stated on May 31, 2011, that Shackleford Banks provides "valuable habitat to fish and rare species…and sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

In conclusion, the Board of Governors believes the draft DMMP is not in the best interest of the citizens of Carteret County, the countless vacationers and Southwinds' owners who come to Bogue Banks and visit Cape Lookout National Seashore and expect us to "Keep Shack Wild." The draft DMMP needs to be rewritten to remove the "preferred alternative" of placing dredged material at Shackleford Banks.

Sincerely yours,

Buddy Hartley

Buddy Hartley
President, Board of Governors

RESOLUTION 14-01-03

RESOLUTION OPPOSING THE U.S. ARMY CORPS OF ENGINEERS AND NATIONAL PARK SERVICES' DRAFT DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT FOR THE MOREHEAD CITY HARBOR PROJECT

WHEREAS, on October 23, 2013, following five years of development, the United States Army Corps of Engineers (the "Corps") and the National Park Service ("NPS") recently released the draft Dredged Material Management Plan ("DMMP") and Environmental Impact Statement ("EIS") for the Morehead City Harbor Project; and

WHEREAS, the preferred alternative in the draft DMMP includes, for the first time, placement of dredged material on the beaches of Shackleford Banks and in a nearshore area off the coast of Shackleford Banks; and

WHEREAS, placement of sand on Shackleford Banks not only provides little to no benefit to Shackleford Banks, it also would disturb the natural conditions of Shackleford Banks, which is managed as a wilderness area; and

WHEREAS, this plan would also greatly reduce the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses; and

WHEREAS, for the past century, the Corps has administered a federally-authorized navigation project commonly known as the Morehead City Harbor Project ("MCHP"); and

WHEREAS, the MCHP involves the Corps' regular dredging of Beaufort Inlet and the disposal of dredged material; and

WHEREAS, the Corps has dumped the vast majority of the dredged material offshore – essentially removing it from the active nearshore zone or littoral system (generally considered to extend from the upper beach to the seaward edge of the nearshore zone where sediment is actively transported by waves and currents); and

WHEREAS, this practice has caused a number of significant, adverse impacts to Bogue Banks, including accelerated beach erosion caused by removal of sand from the Bogue Banks littoral system, which jeopardizes homes, commercial development, infrastructure, and Fort Macon, an important historic landmark and the most visited state park in North Carolina; and

WHEREAS, in December 2007, Carteret County filed a lawsuit against the Corps alleging its dredged material management practices associated with the MCHP violated the National Environmental Policy Act and the Coastal Zone Management Act; and

WHEREAS, the County sought to require the Corps to: (i) eliminate placement of beach-quality dredged material in the offshore disposal area; (ii) move the nearshore disposal area into shallower water where sand would be kept in the littoral system; (iii) place a greater quantity of beach-quality dredged material on the beaches of Bogue Banks; and (iv) place a sufficient quantity of dredged material west of the nodal point at Bogue Banks to offset impacts of the MCHP; and

WHEREAS, in December 2008, the County entered into a settlement agreement with the Corps in which the Corps agreed to reevaluate its dredged material management practices and prepare a new DMMP for the MCHP; and

WHEREAS, two years into the DMMP process and thirty-five years after rejecting the Corps' proposal to place dredged material on Shackleford Banks, NPS indicated that the alternative of placing dredged material on Shackleford Banks is consistent with the NPS' Management Policy and should not be eliminated from the DMMP on that basis; and

WHEREAS, Shackleford Banks is part of the Cape Lookout National Seashore.; and

WHEREAS, it is the only major North Carolina barrier island managed as wilderness area and vehicles are prohibited on the island; and

WHEREAS, the primary consequence of wilderness designation is that it prohibits future development, use of mechanized equipment, and other man-made intrusions on the natural environment; and

WHEREAS, although NPS policy permits mitigation of certain adverse impacts to wilderness areas, mitigation is only permitted to the extent caused by external forces – in this case, the navigation project; and

WHEREAS, despite this limitation, the Corps failed to determine the amount of material lost at Shackleford Banks as a result of the navigation project; and

WHEREAS, placement of material at Shackleford Banks is inconsistent with NPS policy, and no material should be placed at Shackleford Banks until the Corps determines the amount of sediment lost as a result of the navigation project; and

WHEREAS, while Shackleford Banks does experience a loss of sand due to the MCHP, there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island; and

WHEREAS, due to concerns of rapid shoaling, dredged material will not be placed in the most critical area of erosion on the western end of Shackleford Banks; and

WHEREAS, while sand placed in the westerly transport zone will be transported back towards the inlet, this sand will be rapidly lost to the channel without construction of a terminal structure, exacerbating shoaling issues in this section of the channel; and

WHEREAS, the Corps failed to analyze the potential impact of placing sand on Shackleford and in the nearshore area off the coast of Shackleford on the unique surf break associated with Shackleford Banks; and

WHEREAS, while providing no meaningful benefit to Shackleford Banks, the placement of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting; and

WHEREAS, in a letter dated May 31, 2011, the North Carolina Division of Marine Fisheries ("DMF") expressed concerns regarding placement of dredged material on Shackleford Banks' beaches. "Since Shackleford Banks is an undisturbed island, serving as valuable habitat to fish and rare species, and there is no development to protect by using the beach renourishment shoreline stabilization techniques, DMF sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area." and

WHEREAS, diverting a substantial portion of the limited dredged material to Shackleford Banks will severely reduce the benefits of the DMMP to Bogue Banks; and

WHEREAS, under the Corps' preferred alternative, the sand available for renourishment of Bogue Banks would be reduced by almost half, and much of the sand placed on Bogue Banks will be placed east of the nodal point; and

WHEREAS, as confirmed by the Corps' own studies, any sand placed east of the nodal point is rapidly transported back to the inlet; and

WHEREAS, it is critical for a sufficient quantity of sand to be placed west of the nodal point where it will benefit Atlantic Beach and other communities to the west; and

WHEREAS, because of the proposed renourishment at Shackleford Banks, there is less sand available to be placed on Bogue Banks, especially west of the nodal point; and

WHEREAS, the beaches of Bogue Banks will receive less sand under the draft DMMP than has been placed historically and therefore will be more vulnerable to background and storm-induced erosion than in the past; and

WHEREAS, the Corps and NPS failed to provide specific authorization to allow non-federal sponsors to pay for the additional cost of placing sand on the beaches of Bogue Banks, including west Atlantic Beach and Pine Knoll Shores, rather than dumping the sand offshore as provided in Years 2 and 3 of the draft DMMP despite being requested to do so.

NOW, THEREFORE, BE IT RESOLVED the Town of Atlantic Beach does not favor any renourishment of Shackleford Banks and is strongly opposed to the preferred alternative set forth in the draft DMMP. Placing dredged material on Shackleford Banks will: (i) provide little to no benefit to Shackleford Banks; (ii) disturb the natural conditions of Shackleford Banks, which is

managed as wilderness area; and (iii) provide less sand for Bogue Banks where it is needed to provide protection for infrastructure and development and provide for recreation.

BE IT FURTHER RESOLVED the placement of dredged material at Shackleford Banks would adversely impact Shackleford Banks and Bogue Banks and the Town of Atlantic Beach will continue to work with the Corps and NPS and elected officials to ensure that the preferred alternative is not adopted in the final DMMP.

Adopted this 27th day of January, 2014.

TOWN OF ATLANTIC BEACH

A. B. Cooper III - Mayor

ATTEST:

Katrina Tyer - Town Clerk

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

February 3, 2014

Mr. Hugh Heine
Planning and Environmental Branch
U.S. Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403

Subject: EPA NEPA Review Comments on Wilmington District's DEIS "Morehead City Harbor Integrated Dredge Material Management Plan, Port of Morehead City"; CEQ #20130308

Dear Mr. Heine:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject U.S. Army Corps of Engineers' (Corps) Draft Environmental Impact Statement (DEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. It is our understanding that the Corps initiated this Dredge Material Management Plan (DMMP) and subsequent DEIS for Morehead City Harbor to addresses dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, and potential for beneficial use of dredged material and indicators of continued economic justification. We also understand that the intent of the plan is to provide sufficient disposal capacity for the 20-year period beginning in 2015 and extending through 2034.[1]

The plan proposed under the DMMP includes the following:

- Continued use of Brandt Island without expansion
- Disposal of coarse-grained material on the beaches of Fort Macon State Park
- Disposal of coarse-grained material on the beaches of Atlantic Beach,
- Disposal of coarse-grained material on the beaches of Shackleford Banks
- Expansion of the nearshore west placement area
- New nearshore east placement area
- Continued use of the USEPA designated Ocean Dredge Material Disposal Site (ODMDS)

[1] p. XS-1

Based on our analysis of the above referenced proposed action, EPA rates this DEIS as **"EC-2" i.e., EPA has "Environmental Concerns and Request Additional Information"** in the Final EIS (FEIS). The EPA's rating system criteria can be found online at: http://www.epa.gov/oecaerth/nepa/comments/ratings.html.

Our primary concerns associated with the proposed action are related to consideration of sea level rise and storm surge impacts when modeling for disposal sites, determination of sand compatibility, and ensuring compliance with State water quality standards. Overall we support the Corps preferred alternative since it will allow for beneficial use of dredge material and minimize disposal activities in the approved ODMDS. Detailed comments are enclosed with this letter which more clearly identifies our concerns and comments. We request that a dedicated section of the FEIS include specific responses to our comments.

EPA appreciates the opportunity to review the DEIS. Should the Corps have questions regarding our comments, please feel free to contact Dan Holliman of my staff at 404/562-9531 or holliman.daniel@epa.gov.

Sincerely,

Heinz J. Mueller
Chief, NEPA Program Office
Office of Environmental Accountability

Attached: Detailed Comments

U.S. EPA DETAILED COMMENTS ON THE MOREHEAD CITY HARBOR INTEGRATED DREDGE MATERIAL MANAGEMENT PLAN, PORT OF MOREHEAD CITY NORTH CAROLINA FOR THE U.S. ARMY CORPS OF ENGINEERS WILMINGTON DISTRICT

BACKGROUND:

The Morehead City Harbor Integrated Dredge Material Management Plan (DMMP) for the Port of Morehead City North Carolina and Draft Environmental Impact Statement (DEIS) was prepared by the U.S. Army Corps of Engineers (Corps) Wilmington District to ensure that sufficient confined disposal facilities will be available for the next 20 years and that maintenance dredging will be performed in an environmental and economical acceptable manner. The DMMP is required to be developed for federal navigation projects when a preliminary assessment indicates insufficient capacity to accommodate maintenance dredging for at least the next twenty years. The DMMP is required to address dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, and potential for beneficial use of dredged material and indicators of continued economic justification.[1]

The study area for the DMMP/EIS include Morehead City Harbor navigation channels, the adjacent mainland area, the beaches of Bogue Banks and Shackleford Banks, the nearshore Atlantic Ocean off of Bogue Banks and Shackleford Banks, the Morehead City Ocean Dredged Material Disposal Site (ODMDS), and the existing disposal sites of Brandt Island, Marsh Island and Radio Island.[2]

It is our understanding that "the integrated DMMP and Environmental Impact Statement (DMMP/EIS) evaluates the return of sand lost from Shackleford Banks due to maintenance of the navigation channel, to the beaches of Shackleford Banks, which is part of the Cape Lookout National Seashore (CALO). The DMMP/EIS will be used by both Wilmington District and National Park Service (NPS) to evaluate the decision to place sand on Shackleford Banks. The NPS and the Corps have formally agreed to be Federal cooperating agencies on the Morehead City Harbor DMMP/EIS."[3]

ALTERNATIVES PROPOSED:

Two Alternatives were carried forward in the DMMP/EIS:

1) No Action (avg. annual cost $6.4 million)
2) Proposed Measures (avg. annual cost $11.9 million)
    a. Brandt Island Upland Disposal Site – **In Use**
    b. Place coarse-grained material (≥90% sand) on Bogue Banks – **In Use**
    c. Morehead City Ocean Dredged Material Disposal Site (ODMDS) – **In Use**

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[1] p. XS-1
[2] Cited directly from XS-1
[3] Cited directly from XS-1

d. Expand nearshore (ebb tide delta) placement area west of Beaufort Inlet – **Proposed**
e. Create nearshore (ebb tide delta) placement area east of Beaufort Inlet – **Proposed**
f. Place coarse-grained material (≥90% sand) on Shackleford Banks - **Proposed**
g. Place Inner Harbor material ≥80% sand in nearshore placement areas – **Possible Future Option**
h. Expand and raise Brandt Island dike – **Possible Future Option**[4]

The primary difference in cost from the no action to the proposed plan is due to the difference in volumes between minimum tolerances and the full channel maintenance envisioned by this DMMP. In addition, the no action plan does not include disposal of material on Shackleford Banks or in the ebb tide delta east of the Inlet.[5]

EPA COMMENTS:

NEPA Efficiency
EPA agrees with the Corps approach of including the proposed action at Shackleford Banks in the DMMP/EIS to minimize redundancy of a separate study and NEPA document.

Public Involvement and Comprehensive Nature of DMMP
EPA believes the DMMP development process and the use of a Project Delivery Team (PDT), which included state and federal resource agencies, interest groups, and stakeholders was an efficient strategy to involve all interested parties in the decision process for the DMMP. We also believe that the DMMP process for Morehead City Harbor has been a very comprehensive process that has resulted in the evaluation of over 100 dredging and disposal options.[6]

Alternatives Considered But Not Carried Forward
EPA appreciates that multiple alternatives were considered (but not carried forward) and discussed in the EIS. A clear description of the alternatives was provided in the EIS along with a description of the issues associated with the alternative and the reasoning for not carrying forward alternatives.

Characterization of Sand
Section 4.1 provides a discussion of sand characterization in the project area. EPA notes that methods employed for sampling and testing (characterizing) the sand at Shackleford Banks and Bogue Banks appears to be consistent (ASTM D422 Method and ASTM D 2487). However, we do have concern that samples taken at Bogue Banks were taken 9 years prior to samples taken at Shackleford Banks. Since these areas are altered systems with sand being moved and disposed

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[4] Table 3-26
[5] p. 116 of DMMP/EIS
[6] p. xs-4

of in non-natural processes, one would expect that samples taken 9 years apart may not be comparable. EPA recommends the FEIS include a discussion in the FEIS on why sampling effort was separated by several years and the potential impact on the overall analysis.

Section 5.1.2 – The majority of this section is focused on the sand grain size analysis for sand on Shackleford Banks (subaerial and submarine) however the same level of discussion is not provided for the beaches of Bogue Banks. EPA recommends a similar discussion be provided in the FEIS related to dredge material and the suitability for the beaches of Bogue Banks in this section.

Storm Surge

The sea level modeling presented in the DEIS doesn't appear to include storm-surge impacts upon the project and any associated impacts on disposal sites (i.e., proposed nearshore and beach placement areas) or shoaling rates, e.g., impacts to channel dredging frequency. Because sea level is not expected to gently rise independent of frequent and high energy storms North Carolina is known for, EPA recommends the sea level rise analysis include the appropriate storm surge modeling.

Some examples of historical storm activity in North Carolina include:

- One hundred and five tropical storms and hurricanes impacted North Carolina during the 20th century. Sixty four hurricanes made landfall between 1900 and 1999. The two decades in the 1940s and 1950s represent an active period followed by a relatively inactive period during the 1960s and 1970s. This was followed by two decades (1980s and 1990s) of frequent hurricane landfall in North Carolina.[7]
- While nor'easters are not as strong as tropical storms, they still have far reaching impacts as they are regional in extent, tend to move slow allowing the sea to build up over several days to pound the coast line through multiple tidal cycles. Up to 35 of these extra-tropical storms can occur every year during the fall to early spring. [8]

Sea Level Rise Historic Loss Rate Calculations

EPA recommends the historic loss rate calculations[9] used to replace sediments lost in the proposed disposal areas appropriately reflect erosion rates associated with seal level rise and storm surges.

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[7] S. R. Riggs, S. J. Culver, et al., North Carolina's Coasts in Crises: a vision for the future, Department of Geological Sciences, Thomas Harriot College of Arts and Sciences, Institute for Coastal Science and Policy, East Carolina University. Available at http://www.geology.ecu.edu/NCCoastsinCrisis.pdf

[8] S. R. Riggs, S. J. Culver, et al., North Carolina's Coasts in Crises: a vision for the future, Department of Geological Sciences, Thomas Harriot College of Arts and Sciences, Institute for Coastal Science and Policy, East Carolina University. Available at http://www.geology.ecu.edu/NCCoastsinCrisis.pdf

[9] Section 3.2.4.2, p. 83.

Nearshore East New Disposal Site

According to the DEIS, the net flow within this region of Shackleford Banks is westerly, toward the Inlet. It is stated in the DEIS that "Material placed within this area should move toward the west and nourish the eastern side of the ebb tide delta."[10] Placing sand in the Shackleford Banks nearshore disposal area east of the channel seems counterintuitive. The DEIS figures[11] appear to show accretion occurrences in the channel, which could be from sediment sources lying to the east of the channel since the net flow in this region is westerly, toward the channel. Consequently, the EIS should explain whether dredged material placed east of the channel will accrete in the channel requiring additional maintenance dredging.

Erosion Hot Spot

EPA recommends the EIS address why an erosion hot spot located just west of the northern most visible portion of the navigation channel and has experienced extensive vertical erosion up to 38 feet has not been considered for disposal of appropriate dredged material quality. It is unclear whether this erosional feature is associated with the erosion of the down drift beaches. The beaches the Corps is proposing placing sediments ≥90% sand, i.e., Figure 3-12.[12] EPA recommends additional discussion be added to the FEIS related to the pros/cons/issues related to disposal in this area.

Volume of Dredged Material Types

The Corps has categorized zones of the channel it maintains based on sediment types. However, it is unclear the volumes of each sediment type it anticipates dredging on annual or every 3-year cycle for the life of the DMMP. This has been done for the Interim Operations Plan,[13] which is a three-year plan, not a 20-year plan as is the proposed action. Consequently, it appears unclear how much material will be placed in nearshore areas and on beaches based upon the schedule provided.[14]

- EPA notes the DEIS statement, *The quantity of material to be placed in this new nearshore area over the three year cycle of the proposed DMMP is expected to be the equivalent of the historic loss rate for the area over the three year cycle which is 339,000 cubic yards of sand (113,000 cy per year).*[15] The amount to be placed is not the same as the amount expected to be dredged of this type material.

Bathymetric Changes

The time series Figures 3-12 (1974 - 1998),[16] 3-13 (1998 - 2005),[17] and 3-14 (2005 - 2009)[18] are

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[10] Section 3.2.4.2, p. 84.
[11] Figures 3-13 (p. 67), 3-14 (p. 68), and 3-16 (p. 73).
[12] Gigure 3-12; p. 66.
[13] Section 2.1, pp. 15 – 16.
[14] The schedule per section 3.4.2, figures 3-38 through 3-40, pp. 140 – 142.
[15] Section 3.2.4.2, p. 83.
[16] P. 66.
[17] P. 67.

very helpful to understanding bathymetric changes associated with longshore drift, more so than the time-averaged Figure 3-15 (1974 – 2009).[19]

- These time series may be capturing a cycle of accretion and erosion. The definition of such a cycle could prove useful for determining the appropriate times to deposit dredged material to keep it in the littoral system and to minimize accretion in the channel. EPA notes these figures are based upon a collection of a mere four surveys[20] and may not truly reflect ongoing conditions.
- EPA recommends the proposed monitoring plan provide sufficient data to potentially modify and assess ongoing operations and its impacts to the nearshore disposal site and associated impacts to the channel associated with dredged material placement into the proposed new Shackleford Banks nearshore disposal site.

Sand Compatibility

EPA appreciates the discussion provided in the DEIS relating to the NC Technical Standards for Beach Fill Projects (15A NCAC 07H .0312). EPA also notes that "Within the NC Technical Standards, characterization of the recipient beach is not required for the disposal of sediment directly from and completely confined to a federally or state maintained navigation channel."[21] However, the Corps used sampling methods similar to the NC Technical Standards when sampling Shackleford Banks beach.

The Corps indicates that the Morehead City Harbor material will be compatible for placement on Shackleford Banks based on the criteria in the NC Technical Standards (p.225-226). However, the same analysis does not appear to be conducted for Bogue Banks beaches. Please clarify.

Funding for Future Proposed Measures

Funding for projects that are being considered under the DMMP that are not currently proposed but may be future options should be discussed (Projects f-h under Proposed Measures Above). Will the funding be 100% State or Federal? Also, EPA recommends that the likelihood of funding for future project options be discussed in the FEIS.

State 401 Certifications

EPA is supportive of the conditions outlined in the issued State 401 certifications for the subject project (Appendix D). Ensuring that the proposed activities are not causing or contributing to violations of State Water Quality Standards should be a principal focus when determining appropriate BMPs and monitoring.

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[18] P. 68.
[19] P. 69.
[20] Section 3.2.4.1.
[21] p. 224 of DEIS

Wilderness Character of Shackleford Banks

EPA recommends adding examples of past NPS activities in designated wilderness areas that are comparable to the actions proposed at Shackleford Banks in the DEIS.

Cumulative Impacts Analysis

Appendix K - EPA notes that a Cumulative Impact Analysis (CIA) was provided in Appendix K of the DEIS. Based on our review, it appears that several similar actions (federal and non federal) projects have been identified in the CIA. EPA finds this information particularly relevant to this discussion for the proposed actions in the Morehead City Harbor DMMP DEIS and recommends that a summary of the CIA be included in the main body of the FEIS. Table K-2 provides a clear description of federal and non-federal beach nourishment projects in North Carolina and we believe this type of information would be well suited to be part of the main DMMP/EIS document. EPA recommends adding a summary of Appendix K to the main document of the FEIS.

Editorial Comments

- **Page 1** – 1st sentence – acronym for Corps is missing.
- **Figure 1-1** – DMMP Final Phase – Years should be updated
- **Figure 1-3** – Non-federal berthing areas should be more clearly defined in this figure
- **Table 2-3** – Units need to be added to this table (dollars?)
- **Table 2-5** – The reason for the increase in barge traffic should be discussed in the text of the EIS
- **Pages 26-27** – Please clarify maximum vessel draft for Morehead City Harbor (38.5 or 44ft)
- **Chapter 3** – EPA notes that a significant portion of this chapter is dedicated to discussion of sand loss at Bogue Banks and Shackleford Banks, however it may be more appropriate for this discussion to be in Chapter 2 – Existing Conditions.
- **Section 3.1** – No action plan description – recommend better explanation of why the no action is not a sustainable plan
- **Section 3.2.2** – Recommend expansion of discussion on why disposal of material on Shackleford Banks was previously not consistent with NPS Management Policies
- **Section 3.2.5.2 and Section 3.2.5.3** - The DEIS is confusing regarding when the Brandt Island disposal site will reach its capacity. EPA recommends clarification in the FEIS. For Example:
    - In one section the DEIS states *Once Brandt Island reaches capacity in 2028 ....*[22]
    - Another section states *Brandt Island is not expected to reach capacity for at least the next 20 years.*[23] (which is defined in another section as 2034[24])

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[22] Section 3.2.5.2, p. 89.

[23] Section 3.2.5.3, p. 91.

[24] *This DMMP will ensure sufficient disposal capacity for the 20-year period beginning in 2015 and extending through 2034.* ES. P. xs-1.

- **Figure 3-9** – The station symbol should be added to the legend
- **Figure 3- 19** - West Throat Area, is the only one in the time series that depicts *net loss* in the color blue. The other figures use the color red. Is this a typo?
- **Page 115** – It's a little unclear why construction of a terminal groin would be inconsistent with NPS management policies when disposal of dredge material on Shackleford Banks would be consistent with this policy. Recommend clarification.
- **Page 144** – Environmental Considerations – What about water quality? We recommend water quality be added as a consideration here.
- **Figure 4-5** – Does this mean that Morehead City Harbor dredge material is best suited from the trough to -24ft? Please clarify.
- **Table 5-1** – EPA recommends adding categories that separate positive and negative consequences to this table in the FEIS.

Monday, February 3, 2014

U.S. Army Corps of Engineers, Wilmington District
ATTN: Mr. Hugh Heine, Environmental Resources Section
69 Darlington Avenue
Wilmington, NC 28403
hugh.heine@usace.army.mil

Re: Comments on the Morehead City Harbor Draft Integrated Dredged Material Management Plan and Environmental Impact Statement

Via electronic mail

Dear Mr. Heine,

Thank you for the opportunity to comment on the Morehead City Harbor Draft Integrated Dredged Material Management Plan and Environmental Impact Statement (DMMP/EIS). This letter is being submitted on behalf of the Surfrider Foundation Bogue Banks Chapter ("Surfrider"). Surfrider Foundation is a grassroots environmental organization dedicated to the protection and enjoyment of oceans, waves and beaches.

While Surfrider recognizes the importance of dredging the navigation channel to maintain the viability of the harbor, the plan to place dredge spoils on Shackleford Banks raises significant concerns regarding the impacts that this proposed activity may have on the natural physical processes, natural resources, wildlife, and recreational users of this unique barrier island ecosystem. In its current form, the draft DMMP/EIS does not sufficiently address these issues and we cannot fully support its implementation.

To further elaborate on issues of concern, Surfrider offers comments on the following sections of the draft DMMP/EIS for consideration:

2.1 – Existing Conditions
3.2.2 – Beach Disposal

- The DMMP/EIS proposes Alternative 2k – placement of coarse-grained material on Shackleford Banks – as part of the suite of alternatives for placement of dredge spoils. In figure 3-10, the DMMP/EIS shows the area proposed to receive these spoils as a 3.65 mile stretch of beach between stations 229 (on the eastern end) and 424 (on the western

end). In addition to achieving the objective of the project, implementation of this alternative is also considered in the DMMP/EIS to serve secondarily as a beneficial use. The beneficial use in this instance is to remediate erosion on Shackleford Banks.

- The DMMP/EIS clearly identifies that erosion is occurring on the west end of Shackleford Banks[1] and cites that it is caused by a combination of natural processes and ongoing/historical dredging. There is also mention of erosion occurring on the southern shore of the island.

- As previously described, to achieve this beneficial use, the DMMP/EIS proposes to place dredge spoils on the southern shore of the western half of Shackleford Banks. This location; however, is eastward of the area described to have the greatest volume of erosion. The DMMP/EIS described that this eastward offset is "necessary to reduce rapid shoaling of the material directly back into the navigation channel while still providing sufficient beach length to place the necessary quantities."[2] However, no study is cited to substantiate these intended effects. Lacking this important information, it is unclear whether or not it will be beneficial or effective to place the sediment eastward of the erosion "hotspot". Surfrider suggests that further sediment transport studies be referenced or conducted to determine how the proposed action will effectively alleviate erosion on Shackleford Banks.

- The DMMP/EIS also describes the amount of fill that is expected to be placed. In Table 3-27, as much as 516,000 cubic yards of sediment could be placed on Shackleford Banks during the initial placement. The document describes that subsequent disposal events would only be 166,450 cubic yards – equal to the yearly volumetric erosion rate.[3] As for where the sediment will be placed, for each disposal event, only about a third to half of the 3.65 mile disposal area on Shackleford Banks would be impacted with disposal of Harbor sediment.[4] Again, no studies are cited in the DMMP/EIS that can be used to extrapolate how much sediment would effectively respond to the erosion occurring (or, in this same vein, how much sediment might be unnecessary or not "beneficial" to respond to erosion), nor are there studies referenced to provide a rationale for the frequency of placement.

- It is unclear exactly why this erosion is being viewed as a problem and, therefore, why Alternative 2k is viewed to be a beneficial use. Erosion is a natural process that need not be impeded in a natural undeveloped setting. In this instance, there is no development present that is threatened by the erosion occurring. In the absence of a problem, Surfrider argues that the current management strategy employed by the National Parks Service, which allows erosion to occur and continue unabated, should continue.

4.5 – Marine and Estuarine Resources
4.7 – Terrestrial Resources

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[1] p 46, 51, 191
[2] p 53
[3] p 54
[4] p 256

Shackleford Banks and its surrounding waters provide a unique habitat for a diversity of animals including foraging and roosting grounds for shore birds,[5] nesting beaches for sea turtles,[6] nursery areas for fishes,[7] and habitat for marine invertebrates.[8] Surfrider is concerned about the cumulative long-term impacts that beach disposal will have on these organisms and does not agree that the DMMP/EIS provides sufficient science-based evidence quantifying the degree of impact that sand placement will have on the ecosystem. Our specific concerns regarding this activity are outlined below:

- The DMMP/EIS states that "the characteristics of the dredged material dictate where disposal of that material will be permitted"[9] and that "sediments used to replace natural beach sand should match the natural beach as closely as possible in order to minimize environmental effects". However, it goes on to state that "while the scientific literature agrees with this statement in principle, *there is little data available to quantify what similarity (or difference) is ecologically significant*".[10] Surfrider agrees that there is insufficient data to determine how varied grain size of beach disposal sands will affect communities of organisms in the disposal area and would argue that such data needs to be provided before determining that the impacts to these organisms would be insignificant.

- The DMMP/EIS states that "beach disposal and/or nourishment of sediment may have negative effects on intertidal macrofauna through direct burial, increased turbidity in the surf zone, or changes in the sand grain size or beach profile" and that "opportunistic infauna species (e.g. *Emerita* and *Donax*) found in the nourished areas are subject to direct mortality from burial" with recovery often occurring "within one year".[11] It also states that "in NC, post-nourishment studies have documented similar reductions in abundance of coquina clams (*Donax spp*.), mole crabs (*E. talpoida*), and amphipods (*Haustroriid spp*.) immediately following disposal with recovery times persisting between one and three seasons after project construction depending on sediment compatibility".[12] These organisms are important prey species for numerous birds and fish species. Although the DMMP cites previous studies from other locales, within and outside North Carolina, indicating that short-term recovery is rapid after pumping operation ceases, Surfrider does not think sufficient evidence has been presented regarding the long-term impacts that sand placement will have on these organisms and the food webs that they support on Shackleford Banks. Therefore, the DMMP/EIS cannot accurately conclude that impacts to these organisms will be insignificant.

- The DMMP/EIS states that nourishment on Shackleford Banks would be expected to move along the beach at a rate slow enough that "surf-feeding fishes and shorebirds can move to other areas that are not affected";[13] however, no citation of a scientific study is provided to support this claim. It also states that "the surf zone represents HAPC for

[5] p 195, 285
[6] p 260
[7] p 178
[8] p 177
[9] p 221
[10] p 223
[11] p 236
[12] p 236
[13] p 237

some species, including adult bluefish and red drum, which feed extensively in that portion of the ocean" and that "disposal operations along the beach can result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for those and other species. Therefore, feeding activities of the species could be interrupted in the immediate area of sand disposal".[14] Surfrider is concerned about the long-term impacts that sand placement activities will have on the foraging behavior and health of fishes and shorebirds, and posits that additional studies are needed before drawing a conclusion that the project will not significantly impact these species.

4.10 – Esthetic and Recreational Resources

- The DMMP/EIS will affect the surf break, which attracts significant numbers of visitors to the area. These visitors use ferry services, dine at restaurants, stay at local hotels, and are patrons of the numerous family-owned small businesses in the area. Although the DMMP/EIS identifies the surf break as a significant recreational resource and cites the uniqueness of the surf break ("one of the best and most unique surfing spots on the east coast"[15]), the DMMP/EIS fails to consider whether and to what extent the proposed project will impact the surf break and, if impacted, how they will be mitigated.

- The act of placing hundreds of thousands of cubic yards of sediment on an undeveloped natural barrier island that's managed like a wilderness area, not to mention the use of an imposing amount of equipment on the beach during pumping activities,[16] is certainly a significant impact to the esthetics of Shackleford Banks, which people come from all over the world to see.

The surrounding coastline, such as Bogue Banks, has already been altered in drastic ways, further emphasizing the importance of preserving what little natural areas remain like Shackleford Banks. It is the closest example that our community has of what a natural barrier island should look like and there is no critical need to place fill on this National Seashore. In fact, altering the island in such an artificial way would set a bad precedent for managing our natural coastlines. We request that you carefully consider the concerns outlined here and look forward to reviewing a revised DMMP/EIS that addresses these issues.

Sincerely,

Ron Butler, Chair
Surfrider Foundation Bogue Banks Chapter
213 Anita Forte Drive
Cape Carteret, NC 28584
surfriderboguebanks@gmail.com

[14] p 241
[15] p 208
[16] p 272

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

February 18, 2014 F/SER47:FR/pw

(Sent via Electronic Mail)

Colonel Steven A. Baker, Commander
U.S. Army Corps of Engineers Wilmington District
69 Darlington Avenue
Wilmington, North Carolina 28403-1398

Attention: Hugh Heine

Dear Colonel Baker:

NOAA's National Marine Fisheries Service (NMFS) reviewed the *Morehead City Harbor Draft Integrated Dredged Material Management Plan (DMMP) and Environmental Impact Statement* (Draft EIS), dated October 2013, prepared by the U.S. Army Corps of Engineers (USACE) Wilmington District; DEIS Sections 4.5.7 and 5.5.7 constitute the essential fish habitat (EFH) assessment. USACE developed the DMMP to prepare adequate dredged material disposal capacity for the Morehead City Harbor Federal Navigation Project for at least 20 years. Disposal options in the DMMP include continued use of the Brandt Island upland disposal area for inner harbor material, placement on Bogue Banks (specifically Fort Macon State Park and Atlantic Beach) of outer harbor material greater than 90 percent sand, and the Morehead City Offshore Designated Material Disposal Site for outer entrance channel material. New disposal options in the DMMP include an expanded nearshore placement area west of Beaufort Inlet (1209 acres), a new nearshore placement area east of Beaufort Inlet (1094 acres), and beach placement on Shackelford Banks for material greater than 90 percent sand. A goal of placing material east and west of Beaufort Inlet is to repair the ebb tide delta and reduce erosion to nearby beaches. Shackelford Banks is within the Cape Lookout National Seashore, and the National Park Service would have the option of declining disposal on this beach during any maintenance dredging event. Not currently proposed in the DMMP but identified as potential future options are nearshore placement of inner harbor material and raising the dikes at Brandt Island. The methods of dredging include bucket to barge, pipeline, and hopper, and the DMMP does not propose any changes to existing environmental windows (which are based on dredging method and disposal location), but notes a new additional environmental window would be needed should nearshore placement of inner harbor material be pursued. DEIS Section 5.5.7 concludes implementation of the proposed DMMP is not expected to cause significant adverse impacts to EFH or federally managed fishery species and any impacts that do occur would be minor on an individual and cumulative effects basis. As the nation's federal trustee for the conservation and management of marine, estuarine, and diadromous fishery resources, the following comments and recommendations are provided pursuant to the authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Essential Fish Habitat
Draft EIS Section 4.5.7 describes EFH and federally managed fishery species in the Morehead City Harbor area. These descriptions do not require augmentation to complete the EFH consultation.

Impacts to Essential Fish Habitat
Draft EIS Section 5.5.7 examines impacts to EFH from implementation of the DMMP, and these discussions are supplemented by DEIS Appendix I, which models mortality to fish larvae from entrainment by hydraulic dredges at Beaufort Inlet.

The Final EIS would benefit from an expanded discussion of environmental windows. Relevant literature includes Reine et al. (1998), National Research Council (2002), Suedel et al. (2008), and Evans et al. (2011). Collectively, these papers outline a process for optimizing use of environmental windows to protect organisms from dredging projects. Draft EIS Section 3.2.5.5 indicates no changes to existing environmental windows are proposed, however, a new environmental window may be necessary should nearshore placement of inner harbor material be pursued and discussion are underway with the North Carolina Division of Coastal Management regarding an environmental window for bucket to barge dredging of inner harbor material. NMFS is unlikely to support nearshore placement of material with a high concentrations of fine material and supports an environmental window for bucket to barge dredging of inner harbor material. Exposure to high concentrations of suspended sediments may, depending on exposure duration, decrease larval feeding rate, damage the epidermis of larval fishes, and increase larval mortality (Wilber and Clarke 2001). Mechanical (bucket to barge) dredging yields higher concentrations of suspended sediments than either hopper or pipeline dredges, and mechanical dredges can cause this impact throughout the water column. Further, this method of dredging has been observed to produce large amounts of suspended sediments in the confined area of the Morehead City Inner Harbor, especially in the Northwest, West, and East legs.

The Final EIS would benefit from an expanded discussion of the impacts of beach disposal on fishes. The negative impacts beach disposal has on benthic organisms living in the surf zone is well documented (Petersen and Bishop 2005). The Draft EIS provides examples of these impacts and varying rates of recovery on disposal beaches. There is no record of any dredged material disposal on Shackleford Banks. Manning et al. (2013) conducted research on Shackelford Backs and Bogue Banks and state "Beyond the immediate mass mortality of invertebrate prey caused by >1 m of sediment disposition during beach filling, coarse shell fragments and other large particles persist as a press disturbance for years after the nourishment ends, and elevated silts/clays can become resuspended by erosive wind events in repeated pulse disturbances for at least months afterwards, in each case reflecting demonstrable long-term degradation of sandy-beach foraging habitat for surf fish." This paper notes beach sediments on Shackelford Banks consist of approximately 90% fine/very fine sand and medium sand while beach sediment on nourished areas of Bogue Banks had significantly higher percentages of medium sand, coarse sand, very coarse sand, and gravel. They also note the density of *Donax* clams decreases linearly with increasing sediment size and concentration of shell-derived material.

Finally, the Draft EIS does not examine the effects of placing dredged material on the Beaufort Inlet ebb tide delta on the fishes, crabs, and shrimp that use the delta for foraging, predator avoidance, and staging before moving into the estuary. This is the most significant omission in Draft EIS Section 5, Environmental Consequences of the Recommended Plan and the No Action Alternative. While this section includes discussions of impacts to benthic communities (Sections 5.5.2 and 5.5.3) and surf zone fishes (Section 5.5.4), neither of these sections addresses the ebb tidal delta, which is a Habitat Area of Particular Concern because the delta is part of the inlet. Further, NMFS expects more careful consideration of these impacts to result in the DMMP including biological monitoring of the delta to ensure disposal at this location to protect nearby shoreline has the least impact on fishery species using the inlet to access spawning and nursery areas.

EFH Conservation Recommendations
NMFS finds the proposed project would adversely affect EFH and federally-managed fishery species. Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely impact EFH. Based on this requirement, NMFS provides the following:

EFH Conservation Recommendations

1. No bucket to barge dredging from April 1 to July 31 shall occur in the Northwest, West, and East legs of the Inner Harbor
2. Inner Harbor material shall not be placed in open water, nearshore disposal areas.
3. Disposal on Shackleford Banks shall be done only when other alternatives are not practicable and when closely monitored to evaluate physical benefits and biological impacts.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulations at 50 CFR 600.920(k), requires the Wilmington District to provide a written response to the EFH recommendation within 30 days of receipt. If it is not possible to provide a substantive response within 30 days, in accordance with the "findings" with the Wilmington District, an interim response should be provided to NMFS. A detail response must then be provided prior to final approval of the action. The Wilmington District's detailed response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the Wilmington District's response is inconsistent with the EFH conservation recommendations, the District must provide a substantive discussion justifying the reasons for not following the recommendation. The detail response should be received by the NMFS at least ten days prior to final approval of the action.

Thank you for the opportunity to provide these comments. Related questions or comments should be directed to the attention of Mr. Fritz Rohde at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 838-0828.

Sincerely,

Pace Wilber

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc:

COE, Hugh.Heine@usace.army.mil
USFWS, Pete_Benjamin@fws.gov
NCDCM, Doug.Huggett@ncmail.net
NCDCM, Jessi.Baker@ncdener.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Fritz.Rohde@noaa.gov

Literature Cited

Evans, NT, KH Ford, BC Chase, and JJ Sheppard. 2011. *Recommended Time of Year Restrictions (TOYs) for Coastal Alteration Projects to Protect Marine Fisheries Resources in Massachusetts*. Massachusetts Division of Marine Fisheries, Technical Report TR-47, New Bedford, MA.

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IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Cape Lookout National Seashore
131 Charles Street
Harkers Island, North Carolina 28531

1.A.2.

June 11, 2014

Colonel Steven A. Baker, Commander and District Engineer
Wilmington District
U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403

Dear Colonel Baker:

Thank you for your patience as we work through the public comments and other input we have received related to the Morehead City Dredged Material Management Plan / Draft Environmental Impact Statement. As you know, there has been a significant concern expressed about the placement of sand on Shackleford Banks within Cape Lookout National Seashore. After reviewing the public feedback and various internal discussions, the National Park Service (NPS) requests dismissal of the alternative to place dredged material on the beach during the time span of this proposed Dredged Material Management Plan for the following reasons:

- While recent surveys have shown that the offshore profiles along Shackleford Banks have experienced a loss in sediment volume, the database is rather limited. The amount of sediment volume loss that has resulted from maintenance activities of the Morehead City Harbor Channel, rather than natural processes, has also not been able to be determined.
- This request for dismissal is consistent with NPS policy. NPS agrees with USACE that the sediment budget and shoreline processes along Shackleford Banks are not completely "natural" because of the navigation channel. Therefore, to date we have followed the NPS Management Policies that direct us to analyze alternatives for restoration or mitigation of human-impacted shoreline processes. Participation in the DMMP/EIS was fully consistent with these policies. However, the problem in this case is that we are not sure if beach placement as described in the DMMP would truly restore or mitigate the impacts of the channel because of the nature of the dredged material, the quantities proposed, the long-term sea level rise in this area, and the processes of this particular island. In this case, the placement of the dredged material under the DMMP may not restore natural conditions or mitigate the impacts of the channel; instead it may make the situation worse.

- NPS would prefer to have a larger database of profile surveys to determine if the sediment volume loss of approximately 166,450 cubic yards per year, as calculated from 5 surveys from 2000 to 2010 continues in this trend, or is possibly accelerating.
- Continued monitoring of the beach profiles would assist the NPS with its assessment of the degree to which beach placement of sediment would impact natural resources and processes so that management decisions may be as fully informed as possible.
- Shackleford Banks is proposed wilderness and management intervention should only be taken when there is knowledge that will result in mitigating past mistakes, impacts of human use and influences outside the proposed wilderness boundary and where the gains from mitigation outweigh the effects of sand placement.

The NPS does support placement of sediment in the nearshore area of Shackleford Banks. The NPS would prefer that the placement occur in water depths of less than 25 feet or less for the following reasons:

- The grain size and sorting characteristics of the Morehead City Outer Harbor Channel most closely match the natural beach characteristics of the submarine portion (below mean Low Water to -24 ft) of the beach at Shackleford Banks.
- The close match of the sediment characteristics of the natural substrate sediment and the channel sediment proposed for placement would minimize any adverse environmental effects.
- Sediment placed in less than 24 ft of water could be entrained into the littoral system and migrate to the west and may contribute to the stability of the eastern side of the ebb tide delta. The additional sediment in the nearshore area and ebb tide delta may also serve to slow or decrease the sediment volume loss in the Shackleford Banks nearshore profiles over time.
- Nearshore placement would not result in the direct impacts to natural resources associated with beach placement and would not impact visitor use and enjoyment.

Again we appreciate your patience as we worked through this complex project. We are ready to assist you to address the modifications to the document or responses to comments that may be required to finalize the project. We greatly appreciate the cooperation you and your staff have provided us over during this planning effort. If you have any questions, please contact me at (252) 728-2250, extension 3014.

Sincerely,

Patrick M. Kenney
Superintendent

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

F/SER31:KBD
SER-2013-12398

JUL 22 2014

Chief, Planning and Environmental Branch
Department of the Army
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Ref.: Morehead City Harbor Draft Integrated Dredged Material Management Plan and Environmental Impact Statement, Morehead City, North Carolina

Dear Sir or Madam:

This letter is in response to your October 23, 2013, letter requesting National Marine Fisheries Service (NMFS) concurrence with your project-effect determinations pursuant to Section 7 of the Endangered Species Act (ESA) for the proposed 20-year Dredged Materials Management Plan (DMMP) for Morehead City Harbor. You determined the proposed project would not adversely modify the proposed critical habitat designation within LOGG-N-03 for the loggerhead sea turtle Northwest Atlantic Distinct Population Segment (NWA DPS). This request for consultation only concerns the critical habitat designation for the loggerhead sea turtle NWA DPS. All other project effects to protected species are covered under the 1997 South Atlantic Regional Biological Opinion (SARBO). Our findings on the project's potential effects are based on the project description in this response. Changes to the proposed action may negate our findings and may require reinitiation of consultation.

The USACE submitted a Biological Assessment (BA) for the Morehead City Harbor DMMP dated October 2013 addressing effects of maintenance dredging and disposal operations on proposed critical habitat. The proposed action is the establishment of a DMMP for maintaining the Morehead City Harbor for 20 years by continued use of the upland Brandt Island Diked Disposal Area, disposal of dredged material on the beaches of Fort Macon State Park, Atlantic Beach, Pine Knoll Shores, and Shackleford Banks, expansion of the Nearshore West placement area off Bogue Banks, a new placement area (Nearshore East) off Shackleford Banks, and continued use of the Environmental Protection Agency (EPA)-designated Morehead City Ocean Dredged Material Disposal Site (ODMDS), which is located just beyond 3 nautical miles offshore.

The plan chosen by the Wilmington District consists of utilizing a combination of dredging methods, which may include hopper, cutterhead, or mechanical dredging. Inner Harbor maintenance dredging has historically been accomplished by hydraulic pipeline dredge every 2-3 years, with dredged material placed in either the disposal area at Brandt Island of on the beaches of Bogue Banks and then more recently onto Fort Macon State Park and Atlantic Beach. The Outer Harbor and Outer Entrance Channel maintenance dredging have historically been accomplished by hopper or pipeline dredge on an annual basis. Dredged material from the Outer Harbor has been placed on Brandt Island or more recently in the approved nearshore placement area west of Beaufort Inlet or on area beaches. Fine-grained dredged material from the Outer Entrance Channel is typically disposed of in the southwest corner of the ODMDS to separate it from the coarse-grained material in the northern half of the ODMDS. The coarse-grained material may be used later for beach nourishments.

Figure 1. Morehead City Harbor nearshore project area

Maintenance dredging by the USACE will be conducted under the 1997 SARBO until the new SARBO is finalized. According to the Wilmington District, the 2008 South Atlantic Regional Biological Assessment (SARBA) addressed federal, federally-permitted, or federally-sponsored dredging activities that include hopper, cutterhead, mechanical, bed leveling, and side casting in the coastal waters and navigational channels. The USACE cites a SARBA scoping meeting that took place at the NMFS Southeast Regional Office in stating that the USACE and NMFS agreed that all dredging activities in the South Atlantic would continue to work under the 1997 SARBO until the new SARBO was developed and finalized. As a part of this agreement, all dredging actions associated with the proposed project will work under and implement the Reasonable and Prudent Measures, Terms and Conditions, and Incidental Take Statement of the 1997 SARBO.

The nearshore portion of the project area is located within proposed critical habitat for the NWA DPS of the loggerhead sea turtle (LOGG-N-03). LOGG-N-03 contains nearshore reproductive habitat and consists of the nearshore ocean area from Beaufort Inlet to Bogue Inlet and seaward 1.6 km (1 mile). Nearshore reproductive habitat includes habitat for the hatchling swim frenzy and for females during the inter-nesting period from the shoreline (mean high water seaward 1 mile). This nearshore zone is a vulnerable, pivotal transitional habitat area for hatchling transit to open waters, and for nesting females to transit back and forth between open waters and nesting beaches during their multiple nesting attempts throughout the nesting season.

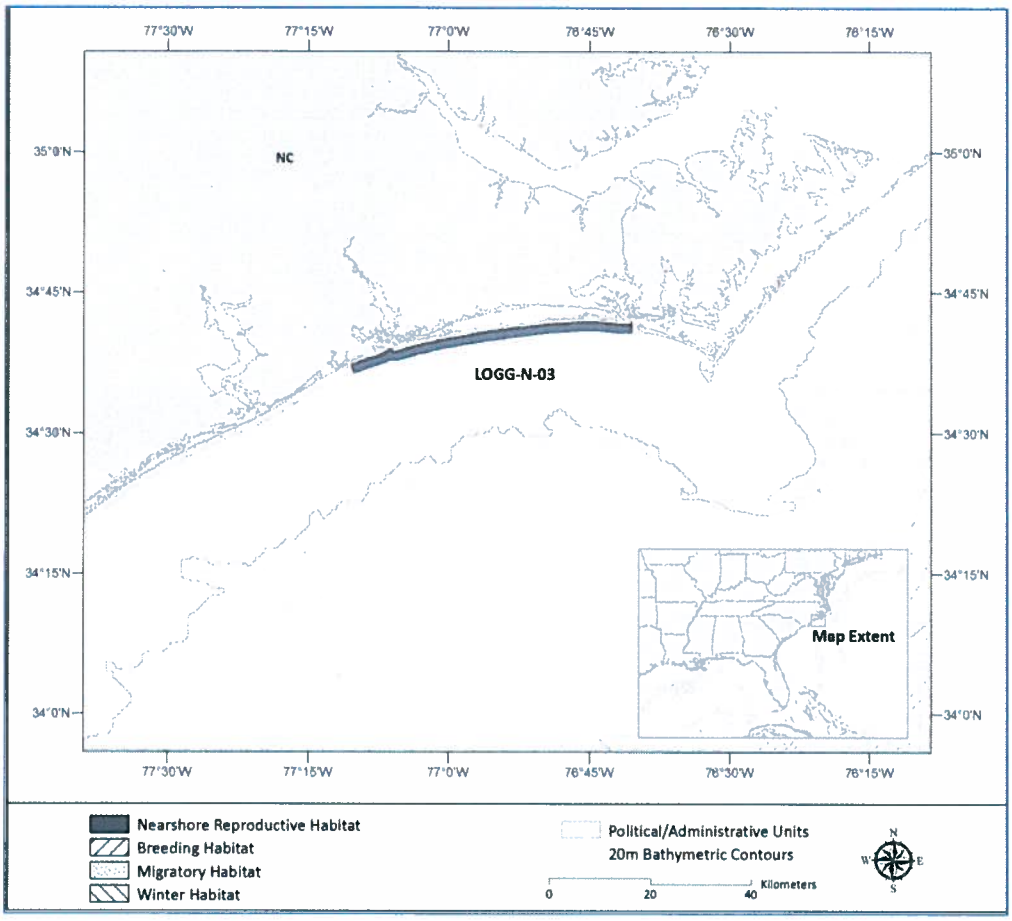


Figure 2. LOGG-N-03 nearshore reproductive habitat for NWA DPS of loggerhead sea turtles

The habitat characteristics of this nearshore zone are important in female nest site selection and successful repeat nesting. In addition to nesting beach suitability and proximity to nearshore oceanic currents needed for hatchling transport, habitat suitable for transit between the beach and open waters by the adult female turtle is necessary. Nesting females typically favor beach approaches with few obstructions or physical impediments such as reefs or shallow water rocks, which may make the entrance to nearshore waters more difficult or even injure the female as she attempts to reach the surf zone. The essential features of the nearshore reproductive habitat include the following: (1) nearshore waters directly off the highest density nesting beaches as identified in 78 FR 18000 (March 25, 2013) to 1.6 km offshore; (2) waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water; and (3) waters with minimal man-made structures that could promote predators (i.e., nearshore predator concentration caused by submerged and emergent offshore structures), disrupt wave patterns necessary for orientation, and/or create excessive longshore currents. Based on the description of these essential features, there do not seem to be any project impacts that would prevent sea turtles from having full use of the nearshore reproductive habitat.

In summary, we have analyzed the potential effects of the action and conclude that the proposed project would not adversely modify the proposed critical habitat for the NWA DPS of loggerhead sea turtles. Dredging activities are covered by the SARBO, and slow-moving dredge vessels transiting back and forth to the ODMDS do not pose a collision risk to sea turtles. This concludes your consultation responsibilities under the ESA for species and their critical habitats under NMFS's purview. Consultation must be reinitiated if new information reveals effects of the action not previously considered, or the

identified action is subsequently modified in a manner that causes an effect to the critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We look forward to further cooperation with you on other projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Kay Davy, Consultation Biologist, by email at Kay.Davy@noaa.gov, or by phone at (727) 415-9271.

Sincerely,

Phil Steele

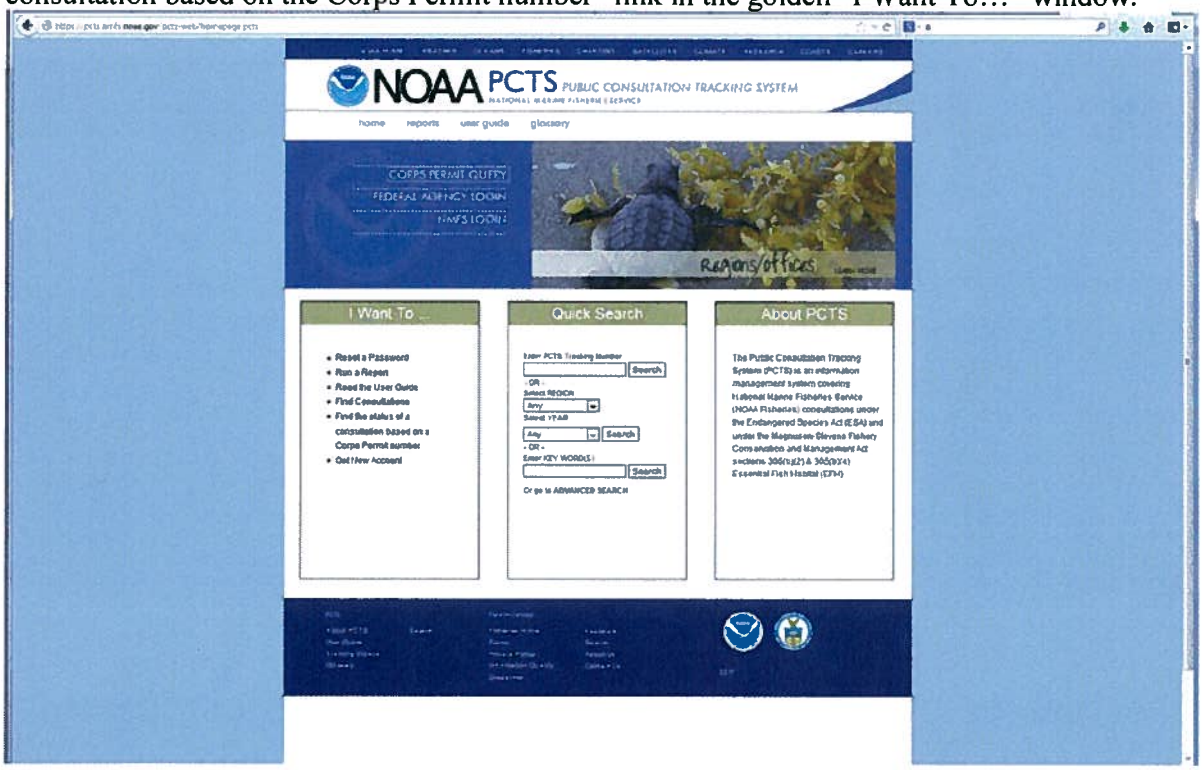
for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure
File: 1514-22.F.1

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 6-11-2013)

Public Consultation Tracking System (PCTS) Guidance: PCTS is a Web-based query system at **https://pcts.nmfs.noaa.gov/** that allows all federal agencies (e.g., U.S. Army Corps of Engineers - USACE), project managers, permit applicants, consultants, and the general public to find the current status of NMFS's Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations which are being conducted (or have been completed) pursuant to ESA Section 7 and the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) Sections 305(b)2 and 305(b)(4). Basic information including access to documents is available to all.

The PCTS Home Page is shown below. For USACE-permitted projects, the easiest and quickest way to look up a project's status, or review completed ESA/EFH consultations, is to click on either the "Corps Permit Query" link (top left); or, below it, click the "Find the status of a consultation based on the Corps Permit number" link in the golden "I Want To…" window.



Then, from the "Corps District Office" list pick the appropriate USACE district. In the "Corps Permit #" box, type in the 9-digit USACE permit number identifier, with no hyphens or letters. Simply enter the year and the permit number, joined together, using preceding zeros if necessary after the year to obtain the necessary 9-digit (no more, no less) number. For example, the USACE Jacksonville District's issued permit number SAJ-2013-0235 (LP-CMW) must be typed in as 201300235 for PCTS to run a proper search and provide complete and accurate results. For querying permit applications submitted for ESA/EFH consultation by other USACE districts, the procedure is the same. For example, an inquiry on Mobile District's permit MVN201301412 is entered as 201301412 after selecting the Mobile District from the "Corps District Office" list. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov or (727) 551-5773.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to Section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA Section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA Section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.

APPENDIX E

EXPLANATION OF VERTICAL DATUM

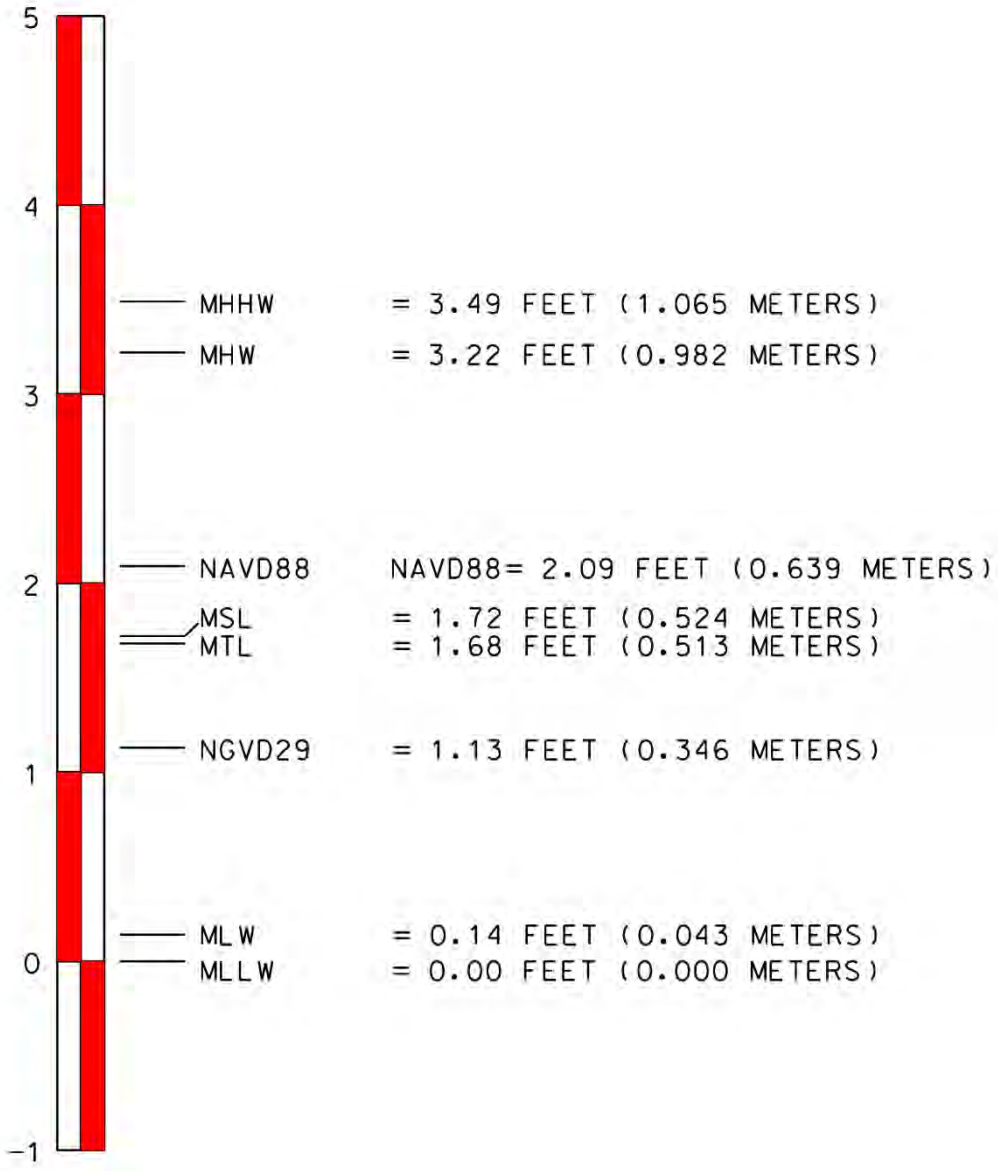
VERTICAL DATUM

A vertical datum is used for measuring the elevations of points on the earth's surface. Vertical data are either tidal, based on sea levels, gravimetric, based on a geoid, or geodetic, based on the same ellipsoid models of the earth used for computing horizontal datums.

In common usage, elevations are often cited in height above sea level; this is a widely used tidal datum. Because ocean tides cause water levels to change constantly, the sea level is generally taken to be some average of the tide heights. Mean lower low water — the average of the lowest points of a semi-diurnal tide reached on each day during a measuring period of several years — is the datum used for measuring water depths on some nautical charts, for example; this is called the chart datum. While the use of sea-level as a datum is useful for geologically *recent* topographic features, sea level has not stayed constant throughout geological time, so is less useful when measuring very long-term processes.

A geodetic vertical datum takes some specific zero point, and computes elevations based on the geodetic model being used, without further reference to sea levels. Usually, the starting reference point is a tide gauge, so at that point the geodetic and tidal datums might match, but due to sea level variations, the two scales may not match elsewhere. One example of a geoid datum is NAVD88, used in North America, which is referenced to a point in Quebec, Canada.

The graphic below shows the relationship between the various vertical datums for the Morehead City Harbor, NC tidal bench mark.



Elevation Information, Station ID #8656502, Morehead City Harbor, NC

APPENDIX F

MOREHEAD CITY HARBOR
MONITORING PLAN

MOREHEAD CITY HARBOR MONITORING PLAN

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

APRIL 2016

MOREHEAD CITY MONITORING PLAN

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Morehead City Harbor Monitoring Plan

Introduction: The Dredged Material Management Plan (DMMP) developed for the Morehead City Harbor and Navigation channel includes periodic disposal of littoral material removed from inner harbor and the ocean entrance channel. Disposal of this material may occur in several locations including placement on the beach along Bogue Banks, placement in the nearshore disposal areas within the ebb tide delta, placement in the Ocean Dredged Material Disposal Site (ODMDS), or Brandt Island. Placement of material along Bogue Banks will occur within the region shown on Figure 1, approximately covering a 10 mile section of the eastern end of the island between stations 59 and 107. Specific placement locations within this area shall be determined at the time of the dredging operation to minimize environmental impacts and maximize benefits while minimizing cost. Figure 2 displays the locations where placement within the nearshore environment will occur. These locations include the existing and new nearshore placement areas on the west (Bogue) side of the ebb tide delta and the new nearshore placement area on the east (Shackleford) side of the ebb tide delta. Also included in Figure 2 is the ODMDS location, which is used for disposal of non-beach quality material, as well as disposal of dredged material where weather conditions are unfavorable for placement in the nearshore area.

The maintenance material disposal plan for the Morehead City Harbor and entrance channel was based on the present understanding of sediment transport/beach response patterns in the vicinity of Beaufort Inlet. Due to the highly variable nature of littoral processes and the uncertainty associated with the occurrence and impact of severe coastal storms; the response of the adjacent beaches, shoaling patterns in the entrance channel, and changes in the ebb tide delta (including the nearshore placement areas) will be observed through a routine monitoring program. The results of this monitoring program will be used to make necessary adjustments in the beach placement location and volumetric distribution for the littoral material removed from the navigation channel and harbor. In addition, the data collected as part of the monitoring program will be used to feed numerical models. These models, when developed, will provide a more complete picture of the system processes. Also, they will enable evaluation of different “what if” scenarios to determine the effects of future actions within the system such as dredging or sand placement. The use of these modeling tools in combination with the results gathered from the monitoring plan would allow for the best management of the system.

With regard to the history of the shorelines along Bogue and Shackleford Banks, the behavior of these beaches has been documented by various engineering reports conducted by the Corps of Engineers, State of North Carolina, and private consultants. In addition, Carteret County has been monitoring the shoreline of Bogue Banks through repetitive beach profile surveys since 1999 and the shoreline of Shackleford Banks since 2005. The Corps of Engineers will use these existing shoreline data sets in combination with other historic survey data to compare the behavior of the shoreline following the implementation of the DMMP. Accordingly, the results of the comparison of the

monitoring data with the data gathered prior to the DMMP implementation can be used to modify the sand distribution in future placement operations.

Monitoring Program: The monitoring program will focus on the response of four main areas in the vicinity of the Morehead City navigation project. The first is the adjacent beach evolution and how these changes compare with the historic changes along the beaches adjacent to Beaufort Inlet. Second, the monitoring will cover the changes within the ebb tide delta and compare with previous inlet surveys to measure morphologic changes. Third, detailed monitoring of the nearshore placement areas will be gathered to aid in determining the location of successive placements within the nearshore areas. The fourth area of concentration will be an analysis of the ODMDS.

A) Bogue Banks Monitoring Plan.

i. **Extent of Coverage.** The beach profile stations used will be the locations established by Carteret County as part of their local monitoring program. The profiles will begin at profile 53 just east of the Emerald Isle town limits and extend through profile 116 located at the far eastern end of the island. The profiles are spaced approximately 800 to 1000 feet apart and include approximately 63 stations covering nearly 53,000 feet of the island.

ii. **Onshore Profiles.** Surveys of the onshore portion of the beach profiles will occur two times a year and will cover the area from the landward limit of the profile line (generally the back toe of the dune) seaward to wading depth (-3 to -5 feet NAVD88). One survey will be conducted in the spring (May or June) and the other in the fall (November or December).

iii. **Offshore Profiles.** Offshore profile surveys will be conducted two times a year and be scheduled to be gathered within 5 days of the corresponding onshore profiles. The offshore profile surveys will extend seaward variable distances to a depth of -40 feet NAVD88. Offshore profiles within the inlet (Profiles 113 through 116) shall extend to the west prism line of the navigation channel.

iv. **Aerial Photographs.** Color rectified photography shall be collected on an annual basis near the time of the spring profile survey. Collection may be through satellite imagery or through dedicated flights of the island. The nominal scale of the photography will be 1 inch equals 200 feet.

B) Shackleford Banks Monitoring Plan.

i. **Extent of Coverage.** Beach profile stations for Shackleford Banks were established by the Corps of Engineers and adopted by Carteret County for use in their monitoring program. These locations will be used for the collection of monitoring surveys as part of the monitoring plan. The existing stations are variably spaced at between 1500 and 2500 feet. The coverage will include the entire island comprised of approximately 46,000 feet which is monitored over 24 profile lines.

ii. **Onshore Profiles.** Surveys of the onshore portion of the beach profiles will occur one time a year and will cover the area from the landward limit of the profile line (generally the back toe of the dune) seaward to wading depth (-3 to -5 feet NAVD88). The survey will be conducted in the spring (May or June) and be scheduled concurrently with the spring survey on Bogue Banks.

iii. **Offshore Profiles.** Offshore profile surveys will be conducted one time a year and be scheduled for collection within 5 days of the corresponding onshore profiles. The offshore profile surveys will extend seaward variable distances to a depth of -40 feet NAVD88.

v. **Aerial Photographs.** Color rectified photography shall be collected on an annual basis near the time of the spring profile survey. Collection may be through satellite imagery or through dedicated flights of the island. The nominal scale of the photography will be 1 inch equals 200 feet.

C) Nearshore and Ebb Tide Delta Monitoring Plan.

i. **Ebb Tide Delta.** Current surveys of the ebb tide delta indicate that the delta is deflating on both sides of the navigation channel. Monitoring future changes in the ebb tide delta will be accomplished by surveying the entire delta once every three years. The proposed aerial extent of the delta survey coverage is indicated on Figure 3, which includes the nearshore placement area, as well as a portion of the ODMDS.

ii. **Nearshore Placement Areas.** Figure 2 displays the nearshore placement areas and their surrounding monitoring zones that will be surveyed on a periodic basis to capture the evolution of the material within the cells. Surveys of the actual placement area and a 1,000' buffer within this authorized placement zone will be taken just prior to placing material within the placement area, as

well as just after placement has occurred. At a minimum, a survey will be made annually corresponding to the time of the spring profile surveys on the adjacent beaches. Monitoring surveys of the area will be used to modify future placement designs.

iii. **Ocean Dredged Material Disposal Site.** Monitoring of the ODMDS will be accomplished through a combination of the ebb tide delta surveys and specific site surveys. Site specific surveys will be gathered through the Morehead City ODMDS Site Management and Monitoring Plan (SMMP) (USACE, 2009). Surveys obtained through the SMMP will be gathered just prior to placement of material within the ODMDS as well as just after placement is complete.

D) Wave and Current Measurements.

i. **Directional Wave Measurements.** In addition to the extensive surveying discussed above, a wave gauge is included as an integral part of the monitoring program. The initial location of the gauge will be just offshore of Atlantic Beach in approximately 20 feet of water. After 6 months of data collection at the initial deployment location, the gauge will be moved just offshore of Shackleford Banks at a depth of 20 feet to collect another six months of data. The bottom-mounted gauge will consist of a combination of an Acoustic Doppler Current Profiler (ADCP) meter and pressure gauge. This combination is capable of producing measurements of wave height, period, direction, and currents over the water column. These measurements will in turn be used to compute potential sediment transport rates necessary for the proper placement of maintenance material along the beaches.

E) Nearshore Benthic and Sediment Analysis. Sediment grab samples were gathered in September 2009 throughout the Beaufort Inlet ebb tide delta including the existing and proposed nearshore placement areas. A total of 96 samples (Figure 4) were obtained with the purpose of characterizing the existing benthic macro invertebrate species as well as documenting the distribution of sediment grain sizes within the ebb tide delta. In an effort to monitor impacts of placement within the new and proposed nearshore placement areas, future monitoring of the area will be compared with this baseline information. As part of the monitoring program, these 96 sample locations should be should be re-sampled and analyzed following future placement activity. Benthic analysis should be completed on a biennial basis to measure changes that may be related to placement activities.

Sediment samples should be obtained immediately following the initial disposal operation, followed by monthly sampling for six months to follow the evolution of material within the nearshore placement area. Adjustments in future disposal operations will be made based in part on both the results of sediment changes as compared with the baseline data as well as changes in the benthic species. Sediment monitoring should be conducted for each new disposal operation within the nearshore where material is placed in a location not previously used.

F) Data Collection and Monitoring Report. Raw data collected as a result of the monitoring plan will be made available to any interested party as it becomes available. A report summarizing the monitoring activity will be prepared annually and will include an analysis of the observed changes and trends along the adjacent beaches and a comparison to expected or historical trends. The report will also include an assessment of the shoaling patterns in the entrance channel, changes in the ebb tide delta, and an analysis of the wave measurements. This report will also be provided to Carteret County, the Towns of Atlantic Beach, Pine Knoll Shores, Indian Beach and any other interested party. Each annual report will summarize the data collected during the year and will incorporate data contained in previous monitoring reports.

Numerical Modeling: In addition to the data collection and analysis of the monitoring plan, it is intended to develop a collection of numerical models to be used to simulate the coastal hydrodynamics and sedimentation within and around Beaufort Inlet. This work may be combined with the efforts of the Regional Sediment Management (RSM) program being implemented through the U.S. Army Corps of Engineers, Wilmington District. The RSM program is working toward development of a regional understanding of the sediment processes along the coast of North Carolina. By combining the results of the regional sediment budget developed under the RSM program with the project specific modeling of Beaufort Inlet, the management of the resources within and around Beaufort Inlet should be improved.

A) Regional Circulation Model. Regional water levels and currents during normal and storm conditions will be simulated using the Advanced CIRCulation model, ADCIRC, (Luettich, et al. 1991). ADCIRC is a hydrodynamic numerical model that simulates water surface elevations and currents from astronomic tidal forcing, wind and barometric pressure fields.

B) Coastal Modeling System. The Coastal Modeling System (CMS) (Buttolph et al. 2006) was developed by the Coastal Inlet Research Program (CIRP) at the U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi. The purpose of the model development was to calculate navigation channel and morphologic change within an inlet complex and its connection to processes on adjacent beaches. The modeling system consists of three main components which operate through the Surface water Modeling System (SMS) interface.

1. **CMS- WAVE** is a steady-state, finite difference, spectral model that simulates depth and current-induced wave refraction and shoaling, depth and steepness-induced wave breaking, diffraction, and wave growth.
2. **CMS-FLOW** is a two-dimensional, finite difference numerical approximation of the depth-integrated continuity and momentum equations. The model will produce high resolution time and space varying water levels, velocity fields, sediment transport rates, and bathymetric changes.
3. **CMS-PTM** is the Particle Tracking Model which is forced by a combination of the CMS-WAVE and CMS-Flow models. The PTM can be used to isolate and track specific sources of sediment, monitor sediment sources impacting inlets, predict potential turbidity impacts, and track and predict sediment fate.

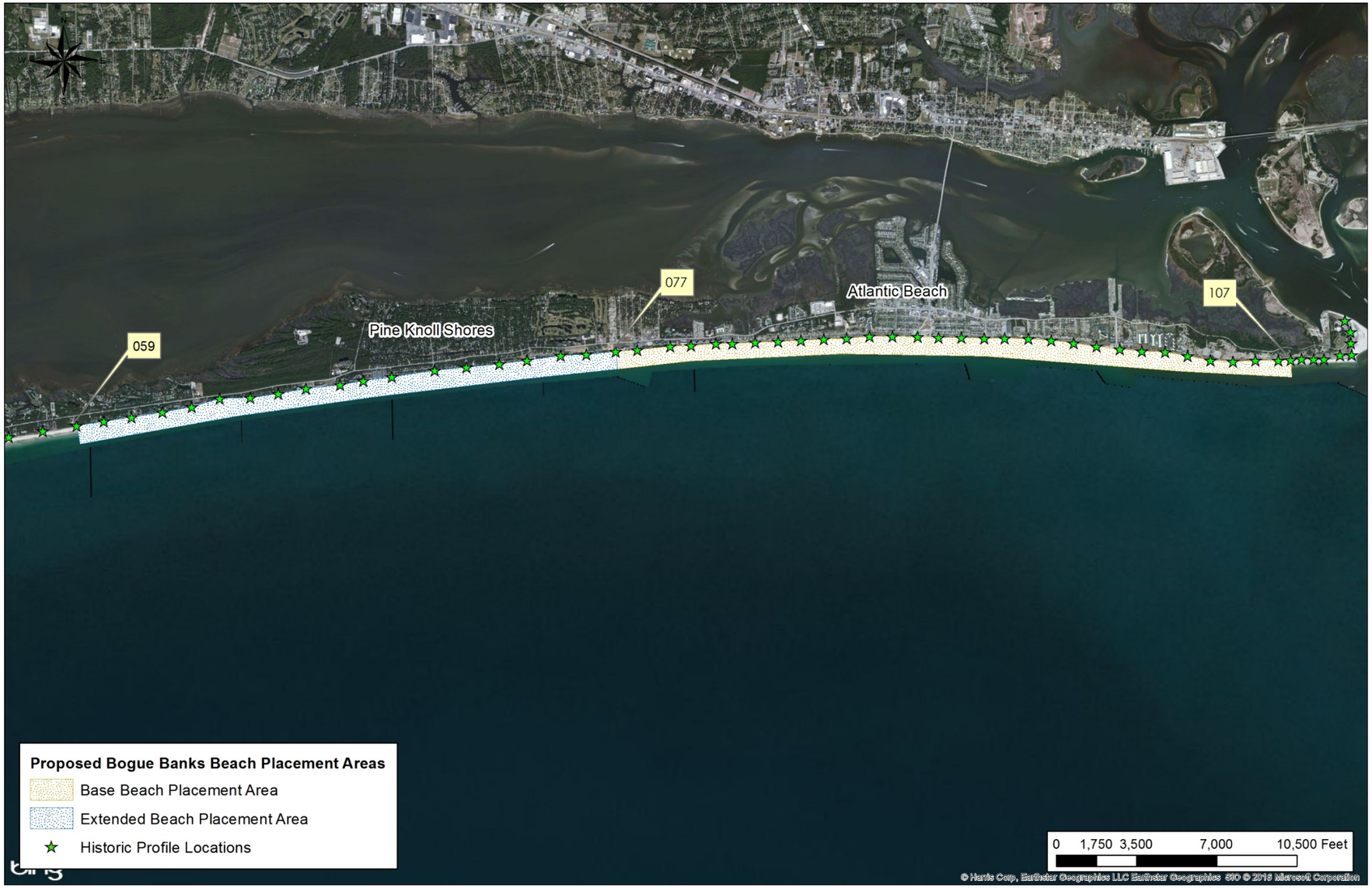

Figure 1. **Bogue Banks Potential Placement Zone**

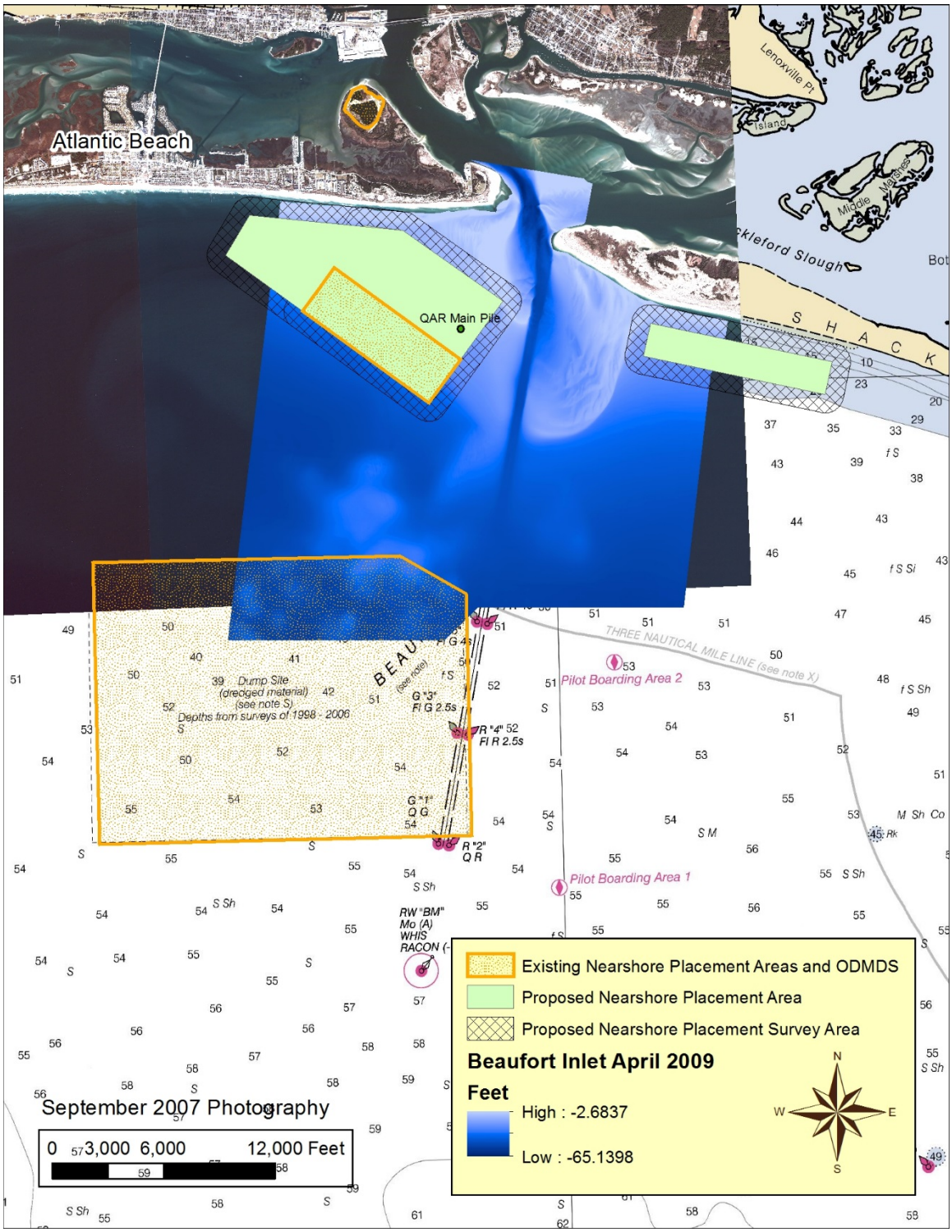

Figure 2. Nearshore Placement Areas and ODMDS

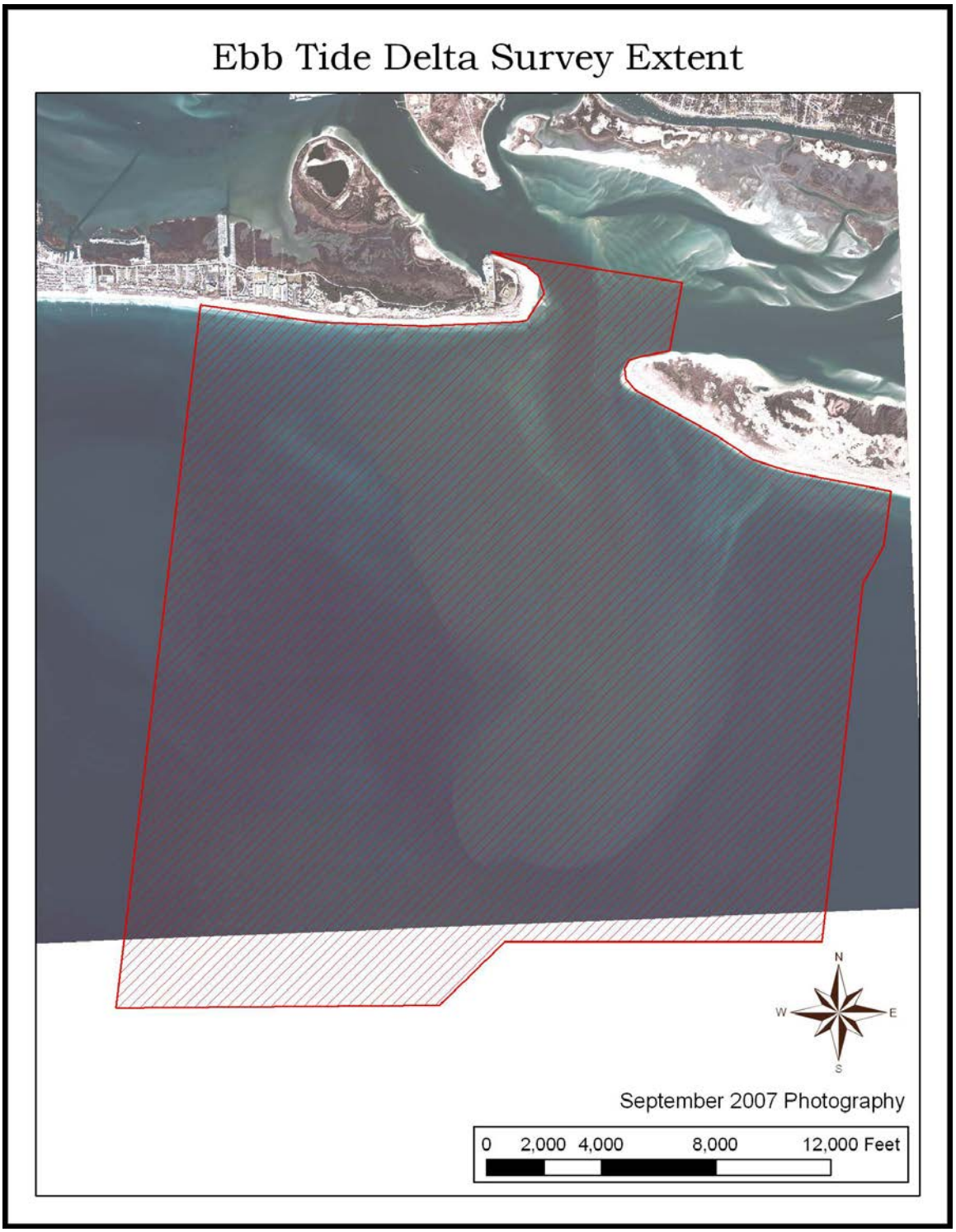

Figure 3. Ebb Tide Delta Survey Extent

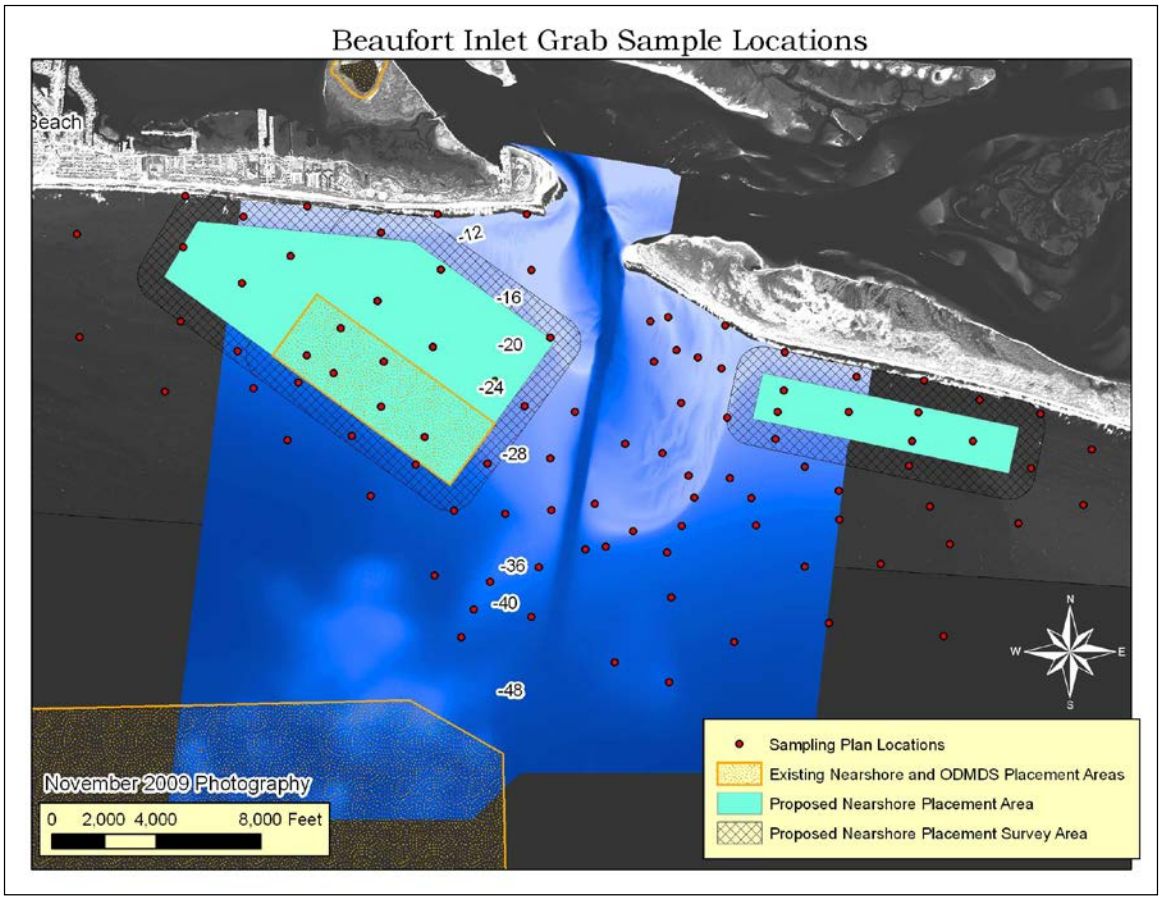

Figure 4. Beaufort Inlet Grab Sample Locations

References

Buttolph, A.M., C.W. Reed, `N.C. Kraus, N. Ono, M. Larson, B. Camenen, H. Hanson, T. Wamsley, and A.K. Zundel. (2006). "Two-dimensional depth-averaged circulation model CMS-M2D: Version 3.0, Report 2: Sediment transport and morphology change." Coastal and Hydraulics Laboratory Technical Report ERDC/CHL TR-06-09. Vickburg, MS: U.S. Army Engineer Research and Development Center.

Luettich, R.A., Westerink, J.J., and Scheffner, N.W. (1991). "ADCIRC: An Advanced Three-dimensional Circulation Model for Shelves, Coasts, and Estuaries; Report 1: Theory and Methodology of ADCIRC-2DDI and 3DL. TR DRP-92-6." USAE Waterways Experiment Station, Vicksburg, MS.

USACE (2009). "Morehead City Ocean Dredged Material Disposal Site; Site Management and Monitoring Plan" U.S. Army Corps of Engineers, Wilmington District. April 2009.

APPENDIX G

COST ESTIMATES
FINAL MOREHEAD CITY HARBOR DMMP

Appendix G: Cost Engineering
Final Morehead City Harbor
DMMP Morehead City
NORTH CAROLINA

1. The Cost Engineering Appendix was prepared to identify the Current Working Estimate (CWE) for the least cost, environmentally acceptable, and engineeringly sound disposal of maintenance dredged material from Morehead City Harbor and entrance channel for 20 years.

Alternatives evaluated resulted in a selected plan that occurs over a 3-year cycle and then is repeated every 3 years over 20 years from 2016 to 2035. The 3-year cycle is to maintain design depths in the entrance channel and harbor for safe navigation as shown in Figure 3-44.

-YEAR 1: Contract #1 - Dredge 1,200,000 cy from South Range B, Cutoff channel thru North Range A to Station 110+00 to Bogue Banks Beaches – See Figure 3-41. Dredge window to place sand on beach NOV 16 thru APR 30.

-YEAR 2: Contract #1 - Dredge 346,000 cy from South Range C and North Range B and 650,000 cy from South Range B, Cutoff channel thru N. Range A to Station 110+00 with placement of sand to nearshore ebb tide delta west/east of the channel. – See Figure 3-42. Hopper dredging allowed JAN 1 – MAR 31.

- YEAR 3: Contract #1 - Dredge 514,000 cy from Inner Harbor (Northwest, West and East Leg) and North Range C with placement to Brandt Island. * - See Figure 3-43. *(After 4 cycles of 514,000 cy (~2.1 mil cy), Brandt Island will be full of material and it can no longer be used for disposal. Harbor material from Inner Harbor and North Range C will then be dredged for 2 cycles by mechanical excavator or clamshell bucket, loaded into scows for hauling and placed into the ODMDS.) No overflow of scows/hoppers in NWest or West Leg. Window to allow dredging currently AUG 1 – MAR 31.

- Contract #2 - Also under a second contract acquisition in Year 3, Dredge 810,000 cy from South Range B, Cutoff channel thru N. Range A to Station 110+00 with placement of material to nearshore east/west; and, dredge 344,000 cy from station 110+00 to 125+00 with placement into Ocean Dredged Material Disposal Site (ODMDS). Hopper dredging allowed JAN 1 – MAR 31 and pipeline to scows usually allowed NOV 15 - AUG 1.

The 3-year cycle period total is approximately 3,900,000 cy.

2. CWE costs, October 2014 price level, and schedule for the selected three year plan are $30,620,000 for YEARS 2016 to 2027 ($38,887,000 with 27% contingency) and $32,101,000 for YEARS 2028 to 2036 ($40,768,000 with 27%

27% contingency). **YEARS 2028 – 2036 costs are greater than earlier years because of bucket/barge to ODMDS instead of pipeline to Brandt Island.

The CWE's, without contingency, are also shown in the Microcomputer Aided Cost Estimating System (MCACES) summary sheets. MCACES is the format used to display costs within Corps of Engineers report documents.

3. The Cost Estimates were prepared under guidance given in the Corps of Engineers Regulation ER 1110-2-1302, CIVIL WORKS COST ENGINEERING and Engineering Instructions, ETL 1110-2-573, CONSTRUCTION COST ESTIMATES.

4. Viable DMMP alternatives considered, and reviewed through previous approval process, are identified in Section 3 of the DMMP Main Report. A multitude of dredging alternatives for each reach of the Morehead City Harbor was considered. The Harbor was divided into 5 reaches or sections from the Inner Harbor through the outer Ocean Bar. Disposal or placement locations and annual quantities for each reach and various methods of dredging are identified in Section 3 of the main report.

The reaches represent similar material characteristics within each reach to identify appropriate disposal locations. The 5 separate reaches/sections were identified as follows:

a. Northwest Leg, West Leg(1) and East Leg – typically less than 80% sand
b. West Leg(2) and N. Range C–typically material between 80% and 90% sand
c. South Range C and N. Range B – material greater than 90% sand
d. South Range B, Cutoff channel thru N. Range A to Station 110+00 – material greater than 90% sand
e. South Range A Station 110+00 thru 125+00 – typically less than 80% sand

Unit prices and mobilization-demobilization costs were developed for all alternatives using CEDEP (Corps of Engineers Dredge Estimating Program) and review of historical methods and pricing where conditions were similar.

5. Dredging quantities were developed by Coastal Engineering Section and are typical annual shoaling quantities of material to be dredged based on historical shoaling evaluations. Year 2 and Year 3 are multiples of the annual quantities. Because of shoaling patterns and dredging techniques there will be varying quantity changes each contract year.

6. Unit prices, quantities, and mob/demob with dredging methods for each alternative were evaluated.

7. Other alternatives associated within the DMMP and dredging scenarios included evaluation of dike raises at Brandt Island, clean out of Brandt Island for additional capacity, potential construction of bird islands, versus bucket/barge material to ODMDS. These costs were not part of the selected plan except the bucket/barge to ODMDS.

The evaluation of the latter years, 15 thru 20, indicated it would be more beneficial to dredge material from Inner Harbor (Northeast, East/West thru North Range C) and haul material to the ODMDS, rather than building dikes and continuing to pipeline dredge material into Brandt Island. This comparable scenario will continue to be reviewed and updated throughout the DMMP project life.

8. An abbreviated risk analysis was developed for the final selected plan as shown in

The result was a 27% contingency (for 80% confidence level) should be included for the selected plan. The 27% contingency reflects the greatest risks would be: Project Scope growth from lack of yearly funding; External Risks from bidding environment or market conditions for dredging, as well as fuel fluctuations/increases; and overall Construction Elements such as quantity increases and anticipated productivity.

9. A TOTAL PROJECT COST SUMMARY (TPCS) for each year of the selected plan during the 20 year period is included for anticipated funding needs and escalated to midpoint of construction.

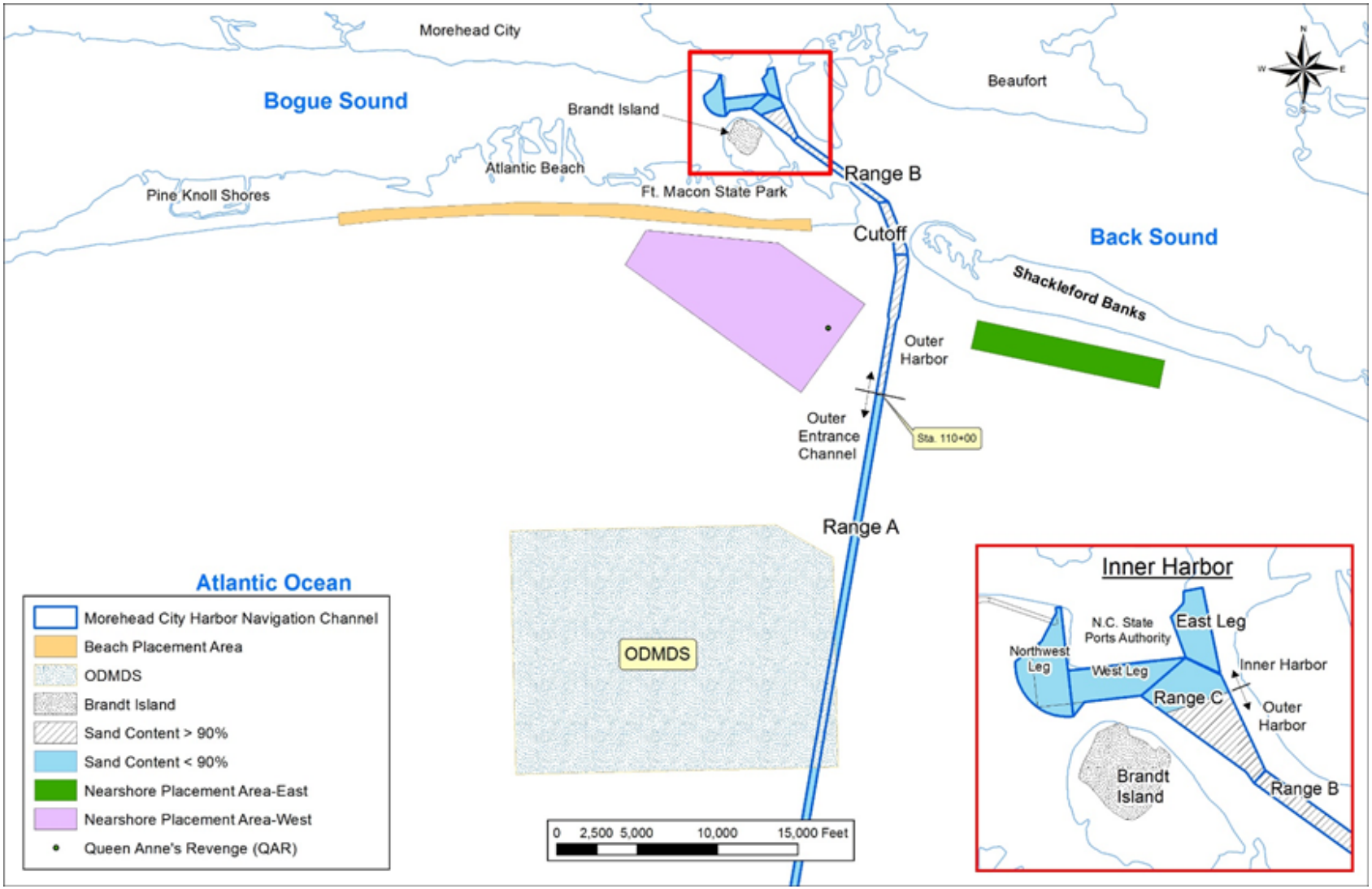

Figure 3-44. Summary of all Dredging and Disposal Locations

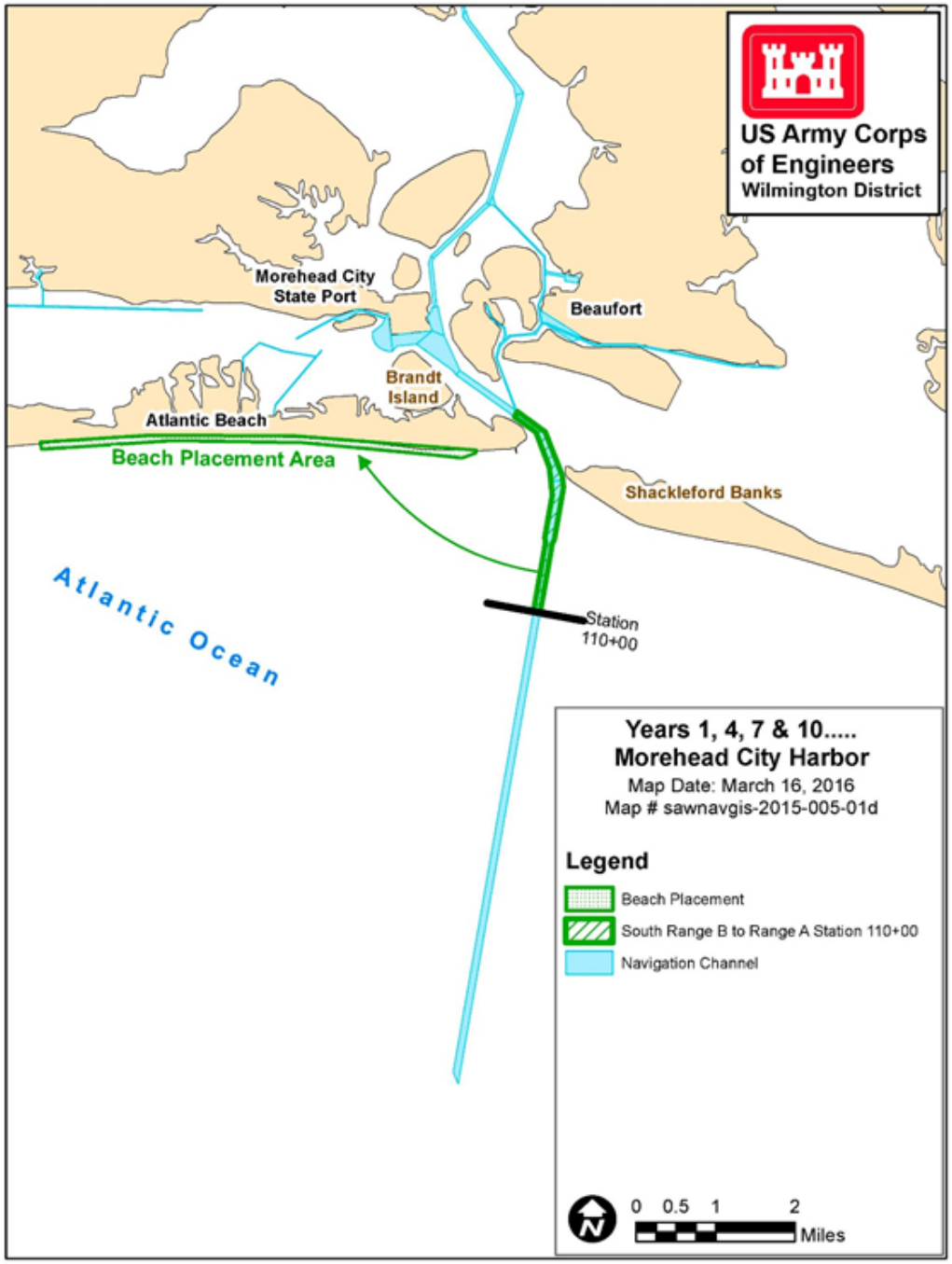

Figure 3-41. Proposed Base Plan – Years 1,4,7,10…….

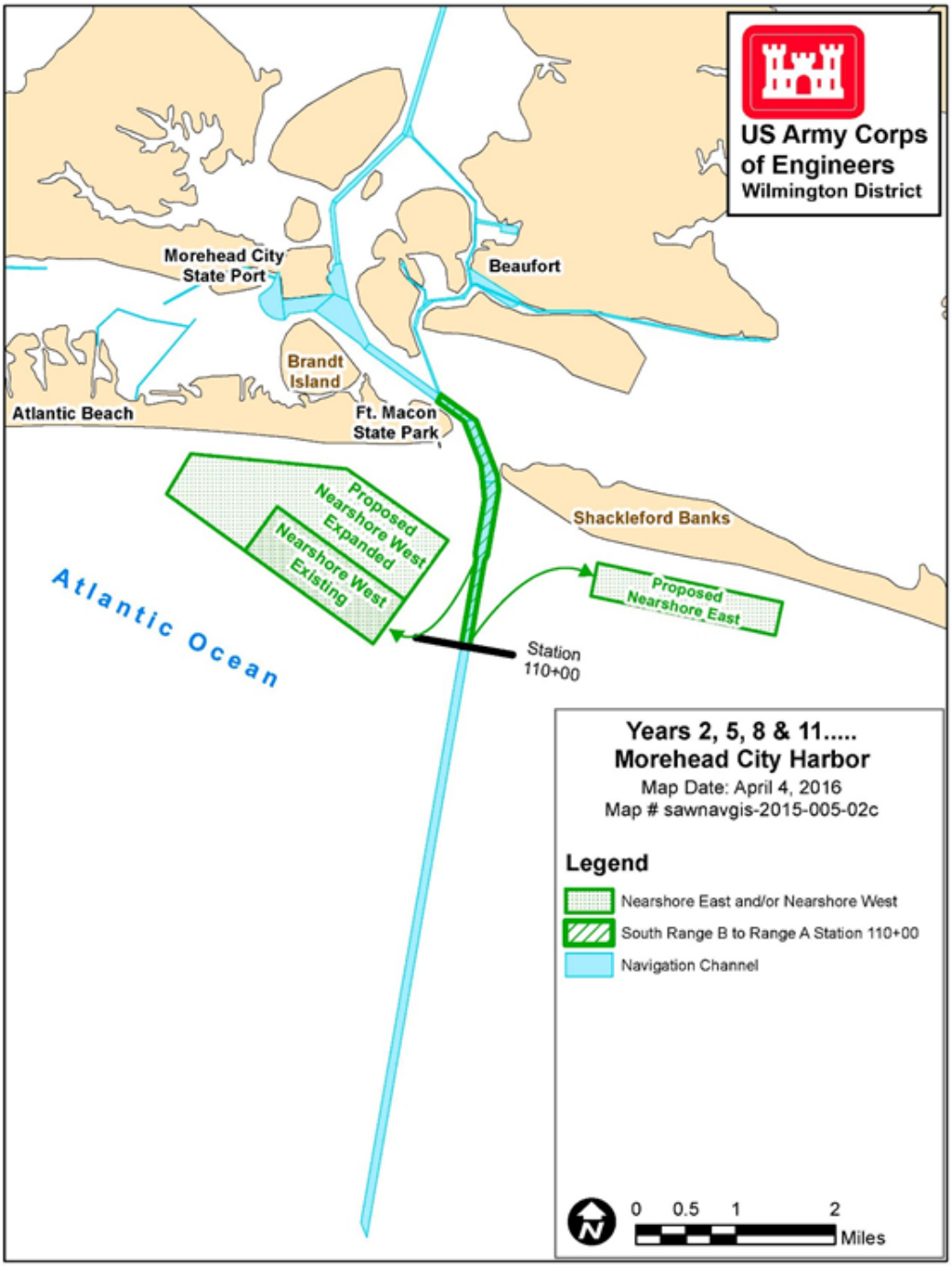

Figure 3-42. Proposed Base Plan – Years 2, 5, 8, 11…..

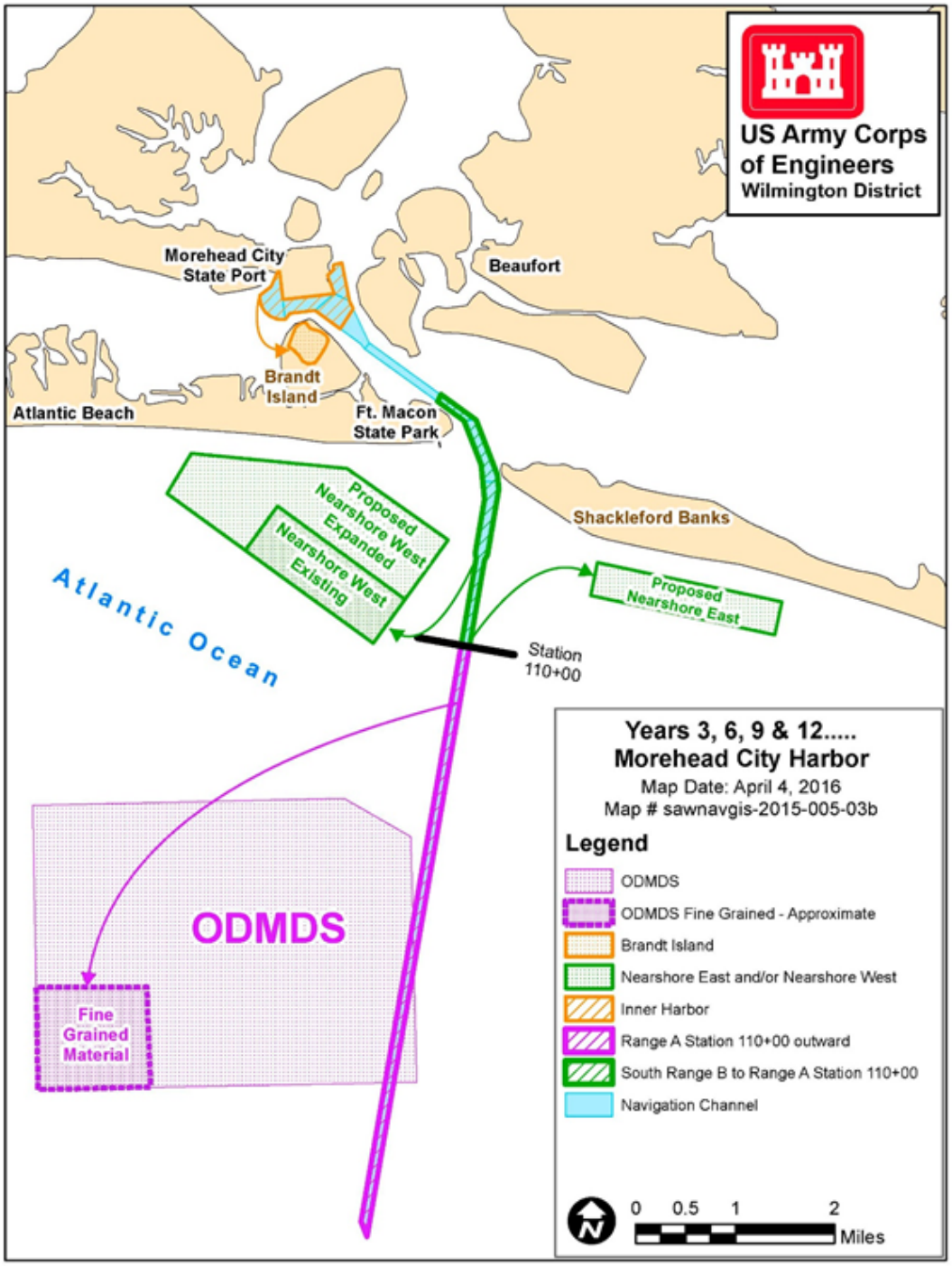

Figure 3-43. Proposed Base Plan – Years 3,6,9,12……

MHC DMMP FEB-26-2015-YEARS 2016-2035_final-JULY 23 2015
MOREHEAD CITY DMMP - CURRENT WORKING ESTIMATE (CWE) YEARS 2016 to 2035
ATTACHMENT 2

Estimated by	CESAW-TS-EE
Designed by	USACE - WILMINGTON DISTRICT
Prepared by	John C. Caldwell
Preparation Date	7/23/2015
Effective Date of Pricing	10/1/2014
Estimated Construction Time	Days

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Description	Page
Project Notes	**i**
Project Cost Summary Report	**1**
12 MHC DMMP - - - - - - - 2016- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - - -2017 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1
12 MHC DMMP - - - - - - - - 2018- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	1
12 MHC DMMP - - - - - - - 2019- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - -2020 - - - - - - - - - - - - - - CYCLE - YEAR 2 ----------	1
12 MHC DMMP - - - - - - - - 2021- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	1
12 MHC DMMP - - - - - - - 2022- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - -2023 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1
12 MHC DMMP - - - - - - - - 2024- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	1
12 MHC DMMP - - - - - - - 2025- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - - -2026 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1
12 MHC DMMP - - - - - - - - 2027- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	1
12 MHC DMMP - - - - - - - 2028- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - - -2029 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1
12 MHC DMMP - - - - - 2030- - - - - - - - -CYCLE YEAR 3 -------Begin 2030 cycle to ODMDS	1
12 MHC DMMP - - - - - - - 2031- - - - - - - - - - - - - - CYCLE - YEAR 1 ----------	1
12 MHC DMMP - - - - - - - -2032 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1
12 MHC DMMP - - - - - - - -2033- - - - - - - - - - - - - -CYCLE YEAR 3 ----------	1
12 MHC DMMP - - - - - - - 2034- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	1
12 MHC DMMP - - - - - - - -2035 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	1

Date	Author	Note
2/27/2015	Caldwell	See narrative in Cost Appendix for full details.

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**207,676,911**	**0**	**207,676,911**
12 MHC DMMP - - - - - - - 2016- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP - - - - - - - - -2017 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - - - - - - - - 2018- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	**1**	**LS**	**9,621,998**	**0**	**9,621,998**
12 MHC DMMP - - - - - - - 2019- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP - - - - - - - -2020 - - - - - - - - - - - - - - CYCLE - YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - - - - - - - - 2021- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	**1**	**LS**	**9,621,998**	**0**	**9,621,998**
12 MHC DMMP - - - - - - - 2022- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP - - - - - - - -2023 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - - - - - - - - 2024- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	**1**	**LS**	**9,621,998**	**0**	**9,621,998**
12 MHC DMMP - - - - - - - 2025- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP -- - - - - - - -2026 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - - - - - - - - 2027- - - - - - - - - - - - - - -CYCLE YEAR 3 ----------	**1**	**LS**	**9,621,998**	**0**	**9,621,998**
12 MHC DMMP - -- - - - - 2028- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP -- - - - - - - - --2029 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - - - - - 2030- - - -- - - - -CYCLE YEAR 3 -------Begin 2030 cycle to ODMDS	**1**	**LS**	**11,103,297**	**0**	**11,103,297**
12 MHC DMMP - - - - - - - 2031- - - - - - - - - - - - - - CYCLE - YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP - - - - - - - -2032 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**
12 MHC DMMP - -- - - - - -2033- - - - - - - - - - - - - -CYCLE YEAR 3 ----------	**1**	**LS**	**11,103,297**	**0**	**11,103,297**
12 MHC DMMP - -- - - - - 2034- - - - - - - - - - - - - - -CYCLE YEAR 1 ----------	**1**	**LS**	**14,834,500**	**0**	**14,834,500**
12 MHC DMMP - - - - - - - -2035 - - - - - - - - - - - - - - -CYCLE YEAR 2 ----------	**1**	**LS**	**6,162,975**	**0**	**6,162,975**

COST SCHEDULE RISK ANALYSIS

MOREHEAD CITY HARBOR DMMP
OCTOBER 1, 2014 Price Level
Morehead City
NORTH CAROLINA

1. A risk analysis was performed using the abbreviated risk analysis provided by the COST MCX. Per ER 1110-1-1300, 26 Mar 93, Section 9.d.(3): "…The cost engineer has the responsibility for application of contingencies to properly weight the uncertainties associated with each major construction cost item or feature in coordination with input with other members of the project development team."

Therefore, the cost engineer, along with the PDT, shall be responsible for developing this worksheet.

2. The risk elements considered in the Risk Register were:

PROJECT SCOPE GROWTH,
ACQUISITION STRATEGY,
CONSTRUCTION ELEMENTS,
QUANTITIES,
SPECIALTY EQUIPMENT,
COST ESTIMATE ASSUMPTIONS, AND
EXTERNAL PROJECT RISKS.

3. The selected plan costs represent the least cost, environmentally acceptable disposal of maintenance dredged material from Morehead City Harbor and entrance channel for 20 years. The selected plan occurs over a 3-year cycle and then is repeated every 3 years over 20 years from 2016 to 2035.

The project costs shown in the risk analysis, $ 30,620,000, represents one 3 year cycle period. Unit prices and mobilization-demobilization costs were developed using CEDEP (Corps of Engineers Dredge Estimating Program) and review of historical methods and pricing for the O&M dredging at Morehead City Harbor Harbor.

4. The result of the abbreviated risk analysis was a 27% contingency (for 80% confidence level) to be included for the selected plan. The 27% contingency reflects the greatest risks would be: Project Scope growth from lack of yearly funding; External Risks from bidding environment or market conditions for dredging, as well as fuel fluctuations/increases; and overall Construction Elements such as quantity increases and anticipated productivity.

Abbreviated Risk Analysis

Project Name & Location: **MOREHEAD CITY HARBOR - DMMP**
Project Development Stage/Alternative: **Feasibility (Recommended Plan)**
Risk Category: **Low Risk: Typical Construction, Simple**

District: **SOUTH ATLANTIC**
Alternative: **3-YEAR FINAL Recommended Plan**
Meeting Date: **2/15/2015**

Total Estimated Construction Contract Cost = **$ 29,165,100**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	12 NAVIGATION, PORTS AND HARBORS	Pipeline Dredge INNER to Brandt Island --- MCACES Year 3 and then ODMDS years 2029 &	$ 2,810,100		17.82%	$ 500,846	$ 3,310,946
2		Hopper Dredge ENTRANCE to Nearshore - MCACES Years 2 and 3	$ 9,423,000		26.68%	$ 2,514,067	$ 11,937,067
3		Pipeline Dredge ENTRANCE to Beaches -- MCACES Year 1	$ 13,850,000		33.73%	$ 4,672,289	$ 18,522,289
4		Hopper Dredge Outer Entrance to ODMDS -- MCACES Year 3	$ 1,726,000		17.82%	$ 307,626	$ 2,033,626
5		Physical Monitoring and Surveys (3-years)	$ 1,356,000		14.71%	$ 199,516	$ 1,555,516
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other (less than 10% of construction costs)	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 834,273		8.72%	$ 72,784	$ 907,057
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 620,100		8.72%	$ 54,099	$ 674,199
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 29,165,100	28.10%	$ 8,194,345	$ 37,359,445	
Total Planning, Engineering & Design	$ 834,273	8.72%	$ 72,784	$ 907,057	
Total Construction Management	$ 620,100	8.72%	$ 54,099	$ 674,199	
Total	**$ 30,619,473**	**27%**	**$ 8,321,228**	**$ 38,940,701**	
		Base	**50%**	**80%**	
	Range Estimate ($000's)	$30,619k	$35,612k	$38,941k	

* 50% based on base is at 50% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. P2 111642

SAW – Morehead City Dredge Material Management Program (DMMP) – 2016 to 2035

The Morehead City DMMP, as presented by Wilmington District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

On August 28, 2015, the Cost MCX certifies the estimated total project cost from year 2016 to 2035

FY 2016	Price Level:	$267,868,000 O&M
Fully Funded Amount:		$332,519,000 O&M

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.

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For: Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District

US Army Corps of Engineers®

PROJECT: Morehead City Harbor DMMP
LOCATION: Morehead City, North Carolina

DISTRICT: SAW Wilmington
POC: CHIEF, COST ENGINEERING, STEPHEN ROMAN, P.E., PMP

PREPARED: 5/12/2015

ESTIMATE PREPARED: APRIL 22, 2015	PRICE LEVEL OCT 1, 2014			BASE COST			FIRST COST	Spent Thru:				
Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	COST ($K)	CNTG ($K)	TOTAL [FY15 $] ($K)	($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
PROJECT COST TOTALS:	$207,678	$56,073	27.0%	**$263,751**	$210,919	$56,948	**$267,868**	0		$261,821	$70,692	**$332,513**
FY 2016												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2016Q2	0.4%	$15,124	$4,084	**$19,208**
FY 2017												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,234	$1,683	$7,917	2017Q2	2.3%	$6,380	$1,723	**$8,102**
FY 2018												
CONTRACT COST TOTALS:	$9,622	$2,598	27.0%	**$12,220**	$9,776	$2,640	$12,416	2018Q2	4.5%	$10,218	$2,759	**$12,977**
FY 2019												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2019Q2	6.6%	$16,053	$4,334	**$20,387**
FY 2020												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,264	$1,691	$7,955	2020Q2	9.3%	$6,847	$1,849	**$8,696**
FY 2021												
CONTRACT COST TOTALS:	$9,622	$2,598	27.0%	**$12,220**	$9,776	$2,640	$12,416	2021Q2	11.7%	$10,916	$2,947	**$13,863**
FY 2022												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2022Q2	13.6%	$17,108	$4,619	**$21,727**
FY 2023												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**7,828**	$6,264	$1,691	$7,955	2023Q2	17.0%	$7,327	$1,978	**$9,305**
FY 2024												
CONTRACT COST TOTALS:	$9,622	$2,598	27.0%	**$12,220**	$9,776	$2,640	$12,416	2024Q2	19.4%	$11,672	$3,151	**$14,823**
FY 2025												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2025Q2	21.1%	$18,241	$4,925	**$23,167**
FY 2026												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,264	$1,691	$7,955	2026Q2	25.3%	$7,849	$2,119	**$9,969**
FY 2027												
CONTRACT COST TOTALS:	$9,622	$2,598	27.0%	**$12,220**	$9,776	$2,640	$12,416	2027Q2	27.8%	$12,495	$3,374	**$15,868**
FY 2028												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2028Q2	29.2%	$19,467	$5,256	**$24,723**
FY 2029												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,264	$1,691	$7,955	2029Q2	34.5%	$8,423	$2,274	**$10,697**
FY 2030												
CONTRACT COST TOTALS:	$11,104	$2,998	27.0%	**$14,102**	$11,279	$3,045	$14,324	2030Q2	36.2%	$15,365	$4,149	**$19,514**
FY 2031												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2031Q2	38.1%	$20,797	$5,615	**$26,413**
FY 2032												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,264	$1,691	$7,955	2032Q2	44.6%	$9,058	$2,446	**$11,503**
FY 2033												
CONTRACT COST TOTALS:	$11,104	$2,998	27.0%	**$14,102**	$11,279	$3,045	$14,324	2033Q2	46.1%	$16,474	$4,448	**$20,922**
FY 2034												
CONTRACT COST TOTALS:	$14,834	$4,005	27.0%	**$18,839**	$15,063	$4,067	$19,130	2034Q2	47.7%	$22,246	$6,006	**$28,252**
FY 2035												
CONTRACT COST TOTALS:	$6,164	$1,664	27.0%	**$7,828**	$6,264	$1,691	$7,955	2035Q2	55.8%	$9,762	$2,636	**$12,397**
										$0	$0	

APPENDIX H

EVALUATION OF SECTION 404(b)(1) (PUBLIC LAW 95-217) GUIDELINES 40 CFR 230

An evaluation of the placement of dredged and/or fill material into waters of the United States includes the standard form.

MOREHEAD CITY HARBOR DMMP
CARTERET COUNTY, NORTH CAROLINA

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

This evaluation covers the placement of all fill material into waters and wetlands of the United States required for the maintenance of the Morehead City Harbor, Carteret County, North Carolina. The proposed DMMP plans to place harbor maintenance sediment in the upland diked facility on Brandt Island (includes a return of effluent pipeline to the inner harbor), the ocean beaches of Bogue Banks, the nearshore areas off Bogue and Shackleford Banks, and the US EPA approved ODMDS. Please note, prior to any construction the required Section 401 Water Quality Certificates from the NC Division of Water Quality will be obtained for the Morehead City Harbor DMMP and all conditions/restrictions will be complied with.

Section 404 Public Notice No. CESAW-TS-PE-

		Preliminary 1/	**Final 2/**
1.	Review of Compliance (230.10(a)-(d)) A review of the NEPA Document indicates that:		
a.	The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and NEPA document);	YES ☒ NO☐	YES ☐ NO☐
b.	The activity does not: 1) violate applicable State water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of federally listed endangered or threatened species or their habitat; and 3) violate requirements of any federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	YES☒ NO☐*	YES☐ NO☐
c.	The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2);	YES☒ NO☐	YES☐ NO☐
d	Appropriate and practicable steps have been taken to minimize potential adverse		

impacts of the discharge on the aquatic ecosystem (if no, see section 5). YES☒ NO☐* YES☐ NO☐

Proceed to Section 2

*, 1, 2/ See page 6.

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

Remarks: Where a check is placed under the significant category, preparer add explanation below.

Proceed to Section 3

*See page 6.

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

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

(1) Physical characteristics	☒
(2) Hydrography in relation to known or anticipated sources of contaminants	☒
(3) Results from previous testing of the material or similar material in the vicinity of the project	☒
(4) Known, significant sources of persistent pesticides from land runoff or percolation	☐
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	☐
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	☒
(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	☐
(8) Other sources (specify).	☐

List appropriate references.

Reference: Final Environmental Impact Statement, Morehead City Harbor DMMP, Carteret County, North Carolina, dated .

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

Proceed to Section 4

*, 3/, see page 6.

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

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

(1) Depth of water at disposal site. ☒

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

(3) Degree of turbulence. ☒

(4) Water column stratification ☒

(5) Discharge vessel speed and direction ☒

(6) Rate of discharge ☒

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

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

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

List appropriate references.

Reference: Final Environmental Impact Statement, Morehead City Harbor DMMP, Carteret County, North Carolina

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

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

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

See FEIS.

Return to section 1 for final stage of compliance review. See also note 3/, page 3.
*See page 6.

6. Factual Determinations (230.11).

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

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

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

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

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

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

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

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

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

7. Findings.

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

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

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

(1)There is a less damaging practicable alternative . . . . . ☐

(2)The proposed discharge will result in significant degradation of the aquatic ecosystem . . . .☐

*See page 6.

(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem. . . . . ☐

8.

Kevin P. Landers Sr.
Colonel, U.S. Army
District Commander

Date: 30 Sept 2015

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

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

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

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

APPENDIX I

ASSESSMENT OF POTENTIAL LARVAL ENTRAINMENT MORTALITY DUE TO HYDRAULIC DREDGING OF BEAUFORT INLET

Assessment of potential larval entrainment mortality due to hydraulic dredging of Beaufort Inlet

Lawrence R. Settle
NOAA/NOS
National Centers for Coastal Ocean Science
Center for Coastal Fisheries and Habitat Research
101 Pivers Island Road
Beaufort, NC 28516

The larval fish distribution, abundance, seasonality, transport and ingress at Beaufort Inlet has been extensively studied, particularly during the fall-winter period coinciding with the permitted dredging window (see references below). The concentration of fish larvae (all species combined) typically ranges from 0.5 to 5 larvae m^{-3}. The concentration (i.e. abundance) of larvae varies both spatially and temporally over a range of scales. It is therefore important to recognize that not all larvae in the inlet would be vulnerable to entrainment. Larvae are not equally distributed in the inlet as the flow has considerable asymmetry. During flood the bulk of the transport is on the eastern side of the inlet and most larvae enter on that side. Ebb flows containing larvae that were not retained in the estuary are strongest on the west side of the inlet. In addition, many larvae exhibit a vertical migration strategy that facilitates tidal stream transport. That is, larvae are up in the water column during flood and descend to near the bottom during ebb. Such behavior helps to prevent larvae from being flushed back out the inlet.

One can estimate the potential larval entrainment mortality due to hydraulic dredging of Beaufort Inlet using a simple mathematical model that incorporates the following:

C = concentration of larvae
= 0.5 to 5.0 larvae m^{-3}

M = proportion of larvae dying by natural causes every six hours
= 0.0125 (i.e. 5 % d^{-1}) to 0.025 (i.e. 10 % d^{-1})

V = volume of water entrained by dredge (24 h operation)
= 173,299 m^3 d^{-1} (USACE)

$\mathbf{P_s}$ = spring tidal prism
= 1.42 E8 m^3 (Jarrett, 1976)

$\mathbf{P_n}$ = neap tidal prism
= 1.32 E8 m^3 (Logan, 1995)

$\mathbf{P_b}$ = proportion of larvae in the bottom of the water column
= 0.1 to 1.0
$\mathbf{P_c}$ = proportion of larvae in the navigation channel
= 0.1 to 1.0

$\mathbf{P_r}$ = proportion of larvae retained inside to estuary during ebb phase
= 0.1 to 1.0

$\mathbf{E_s}$ = proportion of daily spring tidal volume entrained by dredge
= $V / 2 P_s d^{-1}$
= 0.0006

E_n = proportion of daily neap tidal volume entrained by dredge
= $V / 2 P_n d^{-1}$
= 0.0007

L_s = initial number of larvae within a spring tidal prism
= $C * P_s$

L_n = initial number of larvae within a neap tidal prism
= $C * P_n$

K_{sf} = number of larvae entrained during a single spring tide flood phase
= $(L_s - (L_s * M * 2)) * P_b * P_c * E_s$

K_{se} = number of larvae entrained during a single spring tide ebb phase
= $(L_s - (L_s * M * 2) - K_{sf}) * P_b * P_c * P_r * E_s$

K_{nf} = number of larvae entrained during neap tide flood phase
=$(L_n - (L_n * M * 2)) * P_b * P_c * E_n$
K_{ne} = number of larvae entrained during neap tide ebb phase
= $(L_n - (L_n * M * 2) - K_{nf}) * P_b * P_c * P_r * E_n$

K_s = absolute larval entrainment mortality d^{-1} during spring tide
= $(K_{sf} + K_{se}) * 2$

Z_s = percent larval entrainment mortality d^{-1} during spring tide
= $(K_s/L_s*2)*100$

K_n = absolute larval entrainment mortality d^{-1} during neap tide
= $(K_{nf} + K_{ne}) * 2$
Z_n = percent larval entrainment mortality d^{-1} during neap tide
= $(K_n/L_n*2)*100$

Mortality due to entrainment was simulated 10,100 times for each level of natural mortality (i.e. 5% d^{-1} and 10% d^{-1}) during both spring and neap tidal conditions by systematically varying **C**, $\mathbf{P_b}$, $\mathbf{P_c}$, and $\mathbf{P_c}$ over the ranges outlined above using SAS Version 8.2 (SAS Institute Inc., Cary, NC). The results depicting the distribution of outcomes are shown below and include the minimum, maximum and mean impact levels as well as the 10%, 25%, 50% (median), 75% and 90% quantiles.

	Natural mortality 10 % d^{-1}				Natural mortality 5 % d^{-1}			
	$\mathbf{K_s}$ No.	$\mathbf{Z_s}$ %	$\mathbf{K_n}$ No.	$\mathbf{Z_n}$ %	$\mathbf{K_s}$ No.	$\mathbf{Z_s}$ %	$\mathbf{K_n}$ No.	$\mathbf{Z_n}$ %
min	914	0.0006	991	0.0008	925	0.0007	1004	0.0008
max	1660902	0.1170	1801169	0.1365	1682195	0.1185	1824261	0.1382
mean	246426	0.0316	267246	0.0316	249585	0.0320	270672	0.0373
10 %	16282	0.0036	17658	0.0042	16490	0.0037	17884	0.0043
25 %	48845	0.0070	52973	0.0082	49471	0.0071	53651	0.0083
50 %	132906	0.0239	144136	0.0278	134610	0.0242	145984	0.0282
75 %	376763	0.0579	408595	0.0676	381594	0.0587	413833	0.0684
90 %	657882	0.0632	713472	0.0737	666316	0.0640	722619	0.0746

What is quite apparent is that both $\mathbf{Z_s}$ and $\mathbf{Z_n}$ (i.e. the percentage of the daily flux of larvae entrained) are very low regardless of larval concentration and the distribution of larvae within the channel. Under the worst-case scenario where the dredge operates 24 h d^{-1} , all larvae are in the navigation channel, on the bottom, and with poor retention in the estuary following flood stage, the maximum percentage entrained barely exceeds 0.1 % d^{-1} . Most of the simulated scenarios (see the 90 % quantiles) indicate the percent entrainment mortality to be less than 0.06 to 0.07 % d^{-1} with over half falling below 0.03 % d^{-1} (see 50 % quantile). The actual number of larvae entrained however, can range from as few as 914 up to over 1.8 million depending on the initial concentration of larvae within the tidal prism.
This simple analysis of the potential entrainment impacts to larvae could be further refined by stochastically varying the spatial and temporal concentration of larvae and their positions within the water column, but, based on the results presented here, such effort is not required to

achieve a useful first approximation of the level of impact to the resource. Because the estimated entrainment mortality, even under the worst-case scenario, is minimal (0.1 % d^{-1}), it seems reasonable to conclude that while any larvae that are entrained will certainly be killed, it is likely that the impact at the population-level would be insignificant.

References for larval fish distribution, abundance, seasonality, transport and ingress at Beaufort Inlet, North Carolina.

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Joyeux, J-C. 1998. Spatial and temporal entry patterns of fish larvae into North Carolina estuaries: comparisons among one pelagic and two demseral species. Estuar. Coast. and Shelf Sci. 47:731-752.

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APPENDIX J

NMFS and USFWS
BIOLOGICAL ASSESSMENT (BA)
FOR
THREATENED AND ENDANGERED SPECIES

Morehead City Harbor
Final Integrated DMMP and EIS,
Carteret County, North Carolina

BIOLOGICAL ASSESSMENT (BA)
THREATENED AND ENDANGERED SPECIES
Morehead City Harbor
Final Integrated DMMP and EIS,
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1.00 PROPOSED PROJECT

The project is implementation of the proposed Dredged Material Management Plan for the Morehead City Harbor Federal Navigation Project. The proposed project is described in detail in the Morehead City Harbor Final Integrated Dredged Material Management Plan (DMMP) and Environmental Impact Statement. Section 3.4.2 of the Final Integrated DMMP and EIS fully describes the Proposed Action.

The U. S. Army Corps of Engineers (USACE), Wilmington District is responsible for the operation and maintenance of the federally-authorized Morehead City Harbor federal navigation channel. Engineering Regulation (ER) 1105-2-100 provides that a Dredged Material Management Plan (DMMP) be developed for federal navigation projects if a preliminary assessment does not indicate sufficient capacity to accommodate maintenance dredging for at least the next twenty years. The DMMP is a planning document that ensures that sufficient confined disposal facilities are available for at least the next 20 years and that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, and are economically justified. The final product of this report will be an integrated DMMP and Environmental Impact Statement pursuant to the National Environmental Policy Act (NEPA). The DMMP addresses dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, and potential for beneficial use of dredged material and indicators of continued economic justification. This DMMP will ensure sufficient disposal capacity for the 20-year period beginning in 2016 and extending through 2035. The EIS addresses the environmental impacts associated with implementation of the DMMP.

The study area for the Morehead City Harbor DMMP includes the Morehead City Harbor navigation channels, the adjacent mainland area, the beaches of Bogue Banks and Shackleford Banks, the nearshore Atlantic Ocean off of Bogue Banks and Shackleford Banks, the Environmental Protection Agency (EPA) designated Morehead City Ocean Dredged Material Disposal Site (ODMDS), and the existing disposal sites of Brandt Island, Marsh Island and Radio Island.

The current Federal authorization for the Morehead City Harbor project consists of both deep draft and shallow draft channels. The deep draft portion of the project provides navigation channels from the deep water of the Atlantic Ocean to the North Carolina State Ports Authority (NCSPA) facilities. The shallow draft

portion of the project provides for navigation channels from the waterfront docks at downtown Morehead City to the deep draft portion of the project. Dredging methods and disposal/placement options depend on the channel location and the *in situ* material characteristics. Based on these sediment characteristics and potential disposal locations, the deep draft channels or ranges are grouped into three sections; the Inner Harbor, the Outer Harbor, the Outer Entrance Channel.

The DMMP for the Morehead City Harbor project was developed using a consistent and logical procedure by which dredged material management measures have been identified, evaluated, screened, and recommended so that dredged material placement operations are conducted in a timely, environmentally sensitive, and cost-effective manner. Table J-1 summarizes the proposed DMMP.

DMMP Cycle	Harbor Section	Navigation Range Dredged	Dredge Plant	Proposed Disposal or Placement Location	Quantity Likely to be Dredged (cy)
Years 1, 4, 7, 10…	Outer	S. Range B, Cutoff, N. Range A to Sta. 110+00	30-inch pipeline	Fort Macon State Park/Atlantic Beach	1,200,000
Years 2, 5,8,11…	Outer	S. Range C-N. Range B	hopper	Nearshore West & East	346,000
	Outer	S. Range B, Cutoff, N. Range A to Sta. 110+00	hopper	Nearshore West & East	650,000
Years 3,6,9,12…	Inner	Northwest Leg, West Legs 1 & 2, East Leg & N. Range C	18-inch pipeline	Brandt Island or ODMDS (Bucket & Barge)	514,000
	Outer	S. Range B, Cutoff, N. Range A to Sta. 110+00	hopper	Nearshore West & East	810,000
	Outer Entrance Channel	S. Range A, Sta. 110+00 out	hopper	ODMDS	344,000

Table J-1. Summary of the proposed Morehead City Harbor DMMP

Approximately 1 million cubic yards of dredged material are removed from the Morehead City Harbor annually. Current maintenance disposal practices, without modification, result in the need for “new” or expanded disposal sites or modified disposal options, including beneficial uses, by 2028. The proposed DMMP provides virtually unlimited disposal capacity for the Morehead City Harbor navigation project by recommending the following: continued use of Brandt Island without expansion, disposal of coarse-grained material on the beaches of Fort Macon State Park and Atlantic Beach, expansion of the Nearshore West

placement area, a new Nearshore East placement area and continued use of the EPA designated ODMDS. The proposed DMMP will provide more than adequate disposal capacity to maintain the Morehead City Harbor navigation project to the fully authorized dimensions for at least the next 20 years.

Beach disposal on Bogue Banks. Following public review of the draft DMMP, the National Park Service requested that the alternative to dispose of sand on Shackleford Banks be dropped; therefore, no coarse-grained (beach quality) material will be disposed of on Shackleford Banks as part of this DMMP. All future beach disposal operations will be along Bogue Banks, with dredged material being disposed of primarily between Fort Macon and the town limits of Atlantic Beach as the base location. The quantity and location of future placements should exceed the losses that have occurred between beach disposal operations.

2.00 PRIOR COORDINATION

Potential impacts on listed species have also been addressed previously for the project area. In May 2003, the USACE prepared a BA for the Morehead City Harbor Section 933 which authorized the disposal of maintenance dredged material from the existing Federal navigation channels onto the beaches of Bogue Banks from Fort Macon State Park to Indian Beach/Salter Path. The USFWS provided the USACE with a Biological Opinion (BO) dated July 22, 2003, which authorized the Section 933 project contingent on the USACE's compliance with all reasonable and prudent measures and the terms and conditions of the BO. NMFS indicated that additional consultation would not be required if the Section 933 project complied with the terms and conditions of the NMFS Regional Biological Opinion of September 27, 1997.

On 18 September 2008, the USACE provided NMFS with a revised Draft South Atlantic Regional Biological Assessment (SARBA). The USACE' SARBA would authorize the following activities: "*Dredging activities in the coastal waters, navigation channels (including designated Ocean Dredged Material Disposal Sites (ODMDS)), and sand mining areas in the South Atlantic Ocean from North Carolina/Virginia Border through and including Key West, Florida and the Islands of Puerto Rico and the U.S. Virgin Islands (USVI)*". Once NMFS provides the USACE with their Biological Opinion, any new conditions or restrictions would supersede the NMFS Biological Opinion dated September 25, 1997. Hopper dredging within the Morehead City Harbor would comply with any new conditions and/or restrictions found within the new NMFS BO.

The Finding of No Significant Impact (FONSI) for the Morehead City Interim Operations Plan (IOP) was approved on June 2009 (USACE 2009). The analysis of project impacts for the IOP resulted in a determination of "may affect, but not likely to adversely affect" threatened or endangered species as a result of implementation of the proposed project components. By letter dated April 13,

2009, the USFWS concurred with this determination, provided that reasonable and prudent measures and the terms and conditions of the July 22, 2003 Biological Opinion are met. By implementation of the Regional Biological Opinion of September 27, 1997 terms and conditions, for project implementation, by letter dated May 8, 2009 the NOAA, National Marine Fisheries Service found that additional consultation would not be required.

Dredging and disposal methods associated with the proposed action are similar to current maintenance dredging methods described in these previously coordinated documents.

3.0 SPECIES CONSIDERED UNDER THIS ASSESSMENT

Updated lists of threatened and endangered (T&E) species for the project area were obtained from NMFS (Southeast Regional Office, St. Petersburg, FL) and the USFWS (Field Office, Raleigh, NC). These were combined to develop the following composite list in Table J-2, which includes T&E species that could be present in the area based upon their geographic range. However, the actual occurrence of a species in the area would depend upon the availability of suitable habitat, the season of the year relative to a species' temperature tolerance and migratory habits, and other factors.

Table J-2. Threatened and Endangered Species Potentially Present in Carteret County, NC

Species Common Names	Scientific Name	Federal Status
Vertebrates		
American alligator	*Alligator mississippiensis*	T(S/A)
Eastern cougar	*Felis concolor couguar*	Endangered*
North Atlantic Right whale	*Eubaleana glacialis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Finback whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
Green sea turtle	*Chelonia mydas*	Threatened[1]
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
West Indian Manatee	*Trichechus manatus*	Endangered
Piping Plover	*Charadrius melodus*	Threatened
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Roseate tern	*Sterna dougallii*	Endangered
Red Knot	*Calidris canutus rufa*	Threatened
Smalltooth sawfish	Pristis pectinata	Endangered
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Atlantic Sturgeon	*Acipenser oxyrhynchus oxyrhynchus*	Endangered
Invertebrates		
a skipper (butterfly)	*Atrytonopsis sp1*	FSC
Vascular Plants		
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	Endangered
Seabeach amaranth	*Amaranthus pumilus*	Threatened

[1]Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

Table J-2 KEY:

T(S/A) - Threatened due to similarity of appearance (e.g., American alligator)--a species that is threatened due to similarity of appearance with other rare species and is listed for its protection. These species are not biologically endangered or threatened and are not subject to Section 7 consultation.

Endangered - A taxon "in danger of extinction throughout all or a significant portion of its range."

Threatened - A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

FSC - A Federal species of concern--a species that may or may not be listed in the future (formerly C2 candidate species or species under consideration for listing for which there is insufficient information to support listing).

Species with 1 asterisk behind them indicate historic records:

* Historic record - the species was last observed in the county more than 50 years ago.

4.00 ASSESSMENT OF IMPACTS TO LISTED SPECIES

4.01 General Impacts

Dredging Equipment and Sediment Disposal Activities. Maintenance dredging and disposal of sediment from the existing Federal navigation channels in Morehead City Harbor has the potential to affect animals and plants in a variety of ways. The potential for adverse impacts may result from actions of the dredging equipment (i.e. suction, sediment removal, hydraulic pumping of water and sediment); physical contact with dredging equipment and vessels; physical barriers imposed by the presence of dredging equipment (i.e. pipelines); and disposal of dredged material (i.e. covering, suffocation) in the following areas:

1. Upland disposal area on Brandt Island,
2. USEPA designated Morehead City Ocean Dredged Material Disposal Site (ODMDS),
3. Nearshore areas off Bogue and Shackleford Banks, and
4. Atlantic Ocean beaches of Bogue Banks.

Use of the existing disposal area on Brandt Island should not pose any adverse issues to the environment. Brandt Island is a 168-acre island, of which approximately 64 acres has been used as a disposal area since 1955. Return of effluent from Brandt Island is currently being discharged back into the inner harbor and can be controlled such that water released from the diked area has little or no suspended solids. Proper management of releases from Brandt Island will not increase turbidity levels in the area of the spillway pipe outfall above 25 NTUs.

The proposed DMMP will continue to use the USEPA designated Morehead City ODMDS. The dredged material proposed for ocean disposal has previously been evaluated for compliance with USEPA's Ocean Dumping Regulations and Criteria and are acceptable for transportation for ocean dumping under Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended. The USEPA, Region 4 has concurred with all previous Section 103 evaluations. Periodic re-evaluations will be performed as required by USEPA and USACE policy. Additionally, all disposal activities at the ODMDS must be conducted in accordance with the Site Management and Monitoring Plan (SMMP), dated February 2010 (USEPA and USACE 2010).

The DMMP proposes placement of dredged material in a new 1,094 acre Nearshore East placement area off Shackleford Banks and in the existing and expanded 1,768 acre Nearshore West placement area off Bogue Banks. Both nearshore placement areas are within the Beaufort Ebb Tide Delta and are about 1,000 to 2,000 feet offshore. The range in depth for the new Nearshore East is from about -16 to -23 feet North American Vertical Datum (NAVD). The range in depth for the existing and expanded Nearshore West is from approximately -16 to -40 feet

NAVD. Use of these placement areas may affect benthos. Covering of benthos and benthic habitat by discharged sediment represents a temporary resource loss since the discharge site will become a new area of benthic habitat and will be recolonized by benthic organisms. The ecological significance of temporary benthic losses is considered minor since the affected area is very small relative to the amount of benthic habitat present on the ocean bottom, the time span of loss is likely a period of months, and benthic populations in the vicinity are in a state of flux due to the dynamic sediment conditions in the area. Additionally, results of the recent survey of the new Nearshore East and the Nearshore West expansion area indicates that no hard bottoms are found in these areas.

Beach disposal of maintenance dredged material and associated construction operations (i.e. operation of heavy equipment, pipeline route, etc.) on Bogue Banks may adversely affect some species and their habitat, however the resultant constructed beach profile also will promote restoration of important habitat that has been lost or degraded as a result of erosion. Potential impacts vary according to the type of equipment used, the nature and location of sediment discharged, the time period in relation to life cycles of organisms that could be affected, and the nature of the interaction of a particular species with the dredging activities.

Noise. Within any harbor there are a number of noise sources. Ships arriving and departing (including tugs, etc.), recreational boats, dredges (cutterhead suction, mechanical, and hopper), and wharf/dock construction (pile driving, etc.), and natural (storms, biological, etc.) all make up the harbor ambient noise.

Noise in the outside environment associated with beach and nearshore placement activities would be expected to minimally exceed normal ambient noise in the project area; however, construction noise would be attenuated by background sounds from wind and surf. In-water noise would be expected in association with the dredging and the nearshore placement activities for this project. Specifically, noise associated with dredging could occur from (1) ship/machinery noise—noise associated with onboard machinery and propeller and thruster noise, (2) pump noise—noise associated with pump driving the suction through the pipe, (3) collection noise—noise associated with the operation and collection of material on the sea floor, (4) deposition noise—noise associated with the placement of the material within the barge or hopper, and (5) transport noise—noise associated with transport of material up the suction pipe. The limited available data indicate that dredging is not as noisy as seismic surveys, pile driving and sonar; but it is louder than most shipping, operating offshore wind turbines and drilling (Thomsen et al. 2009).

Dredging produces broadband and continuous, low-frequency sound (below 1 kHz) and estimated source sound pressure levels range between 168 and 186 dB reference (re) 1 μPa at 1 m, which can trigger avoidance reaction in marine mammals and marine fish. In some instances, physical auditory damage can occur. Auditory damage is the physical reduction in hearing sensitivity due to

exposure to high-intensity sound and can be either temporary (temporary threshold shift) or permanent (permanent threshold Shift) depending on the exposure level and duration. Other than physical damage, the key auditory effect is the increase in background noise levels, such that the ability of an animal to detect a relevant sound signal is diminished, which is known as *auditory masking*. Masking marine mammal vocalizations used for finding prey, navigation and social cohesion could compromise the ecological fitness of populations (Compton et al. 2008).

According to Richardson et al. (1995) the following noise levels could be detrimental to marine mammals:

> Prolonged exposure of 140 dB re 1 μPa/m (continuous man-made noise), at 1 km can cause permanent hearing loss.
>
> Prolonged exposure of 195 to 225 dB re 1 μPa/m (intermittent noise), at a few meters or tens of meters, can cause immediate hearing damage.

According to Richardson et al. (1995), "Many marine mammals would avoid these noisy locations, although it is not certain that all would do so." In a study evaluating specific reaction of bowhead whales to underwater drilling and dredge noise, Richardson et al. (1990) also noted that bowhead whales often move away when exposed to drillship and dredge sound; however, the reactions are quite variable and can be dependent on habituation and sensitivity of individual animals. According to Richardson et al (1995), received noise levels diminish by about 60 dB between the noise source and a radius of 1 km. For marine mammals to be exposed to a received level of 140 dB at 1-km radius, the source level would have to be about 200 dB re 1 μPa/m. Furthermore, few human activities emit continuous sounds at source levels greater than or equal to 200 dB re 1 μPa/m; however, supertankers and icebreakers can exceed the 195 dB noise levels.

According to Clarke et al. (2002), hopper dredge operations had the highest sustained pressure levels of 120–140 dB among the three measured dredge types; however, the measurement was taken at 40 m from the operating vessel and would likely attenuate significantly with increased distance from the dredge. On the basis of (1) the predicted noise effect thresholds noted by Richardson et al. (1995), (2) the background noise that already exists in the marine environment, and (3) the ability of marine mammals to move away from the immediate noise source, noise generated by bucket, cutterhead, and hopper dredge activities would not be expected to affect the migration, nursing/breeding, feeding/sheltering or communication of large whales. Although behavioral effects are possible (i.e., a whale changing course to move away from a vessel), the number and frequency of vessels present in a given project area is would be small, and any behavioral impacts would be expected to be minor. Furthermore, for hopper dredging activities, endangered species observers would be on board and would record all large whale sightings and note any potential behavioral impacts. Per the standard USACE specifications for all dredging projects, the USACE and the contractor

would keep the date, time, and approximate location of all marine mammal sightings. Care would be taken not to closely approach (within 300 ft.) any whales, manatees, or other marine mammals during dredging operations or transportation of dredged material. An observer would serve as a lookout to alert the dredge operator or vessel pilot or both of the occurrence of the animals. If any marine mammals are observed during other dredging operations, including vessel movements and transit to the dredged material disposal site, collisions must be avoided either through reduced vessel speed, course alteration, or both. During the evening hours, when there is limited visibility from fog, or when there are sea states of greater than Beaufort 3, the dredge must slow down to 5 knots or less when transiting between areas if whales have been spotted within 15 nautical miles of the vessel's path in the previous 24 hours. Sightings of whales or manatees (alive, injured, or dead) in the work area must be reported to NMFS Whale Stranding Network.

Similar to conclusions made regarding effects of sound on marine mammals, non-injurious impacts to sea turtles may also occur because of acoustic annoyance or discomfort. It has been hypothesized, on the basis of anatomical studies that sea turtle hearing range centers around low-frequency sounds. Ridgeway et al. (1969, 1970) evaluated the frequency sensitivity of green sea turtles and found that green turtles detect limited sound frequencies (200–700 Hz) and display high level of sensitivity at the low-tone region (approx 400 Hz). According to Bartol et al. (1999), the most sensitive threshold for loggerhead sea turtles is 250–750 Hz with the most sensitive threshold at 250 Hz. Though noise generated from dredging equipment is within the hearing range of sea turtles, no injurious effects would be expected because sea turtles can move from the area, and the significance of the noise generated by the dredging equipment dissipates with an increasing distance from the noise source.

Project Area. As mentioned above, the proposed project will occur in the following areas:

1. Morehead City Harbor (including Brandt Island), located at the confluence of the Newport River and Bogue Sound;
2. within the nearshore areas off Bogue and Shackleford Banks;
3. along the ocean beaches of Bogue Banks (from Ft. Macon State Park up to Pine Knoll Shores) in Carteret County, and;
4. in the Atlantic Ocean.

Any potential impacts on threatened and endangered species would be limited to those species, which occur in habitats provided by these areas. Therefore, the proposed work will not affect any listed species, which generally reside in freshwater, forested upland habitats (long-leaf pine savannas), including the eastern cougar, American alligator, red-cockaded woodpecker, and rough-leafed loosestrife.

Species which could be present in the project area during the proposed action are the blue whale, finback whale, humpback whale, North Atlantic right whale

(NARW), sei whale, sperm whale, West Indian manatee, piping plover, roseate tern, red knot, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, Atlantic sturgeon, shortnose sturgeon, smalltooth sawfish, and sea-beach amaranth.

4.02 Species Accounts

4.02.1 Eastern Cougar, American Alligator, Red-cockaded woodpecker, Rough-leaved Loosestrife and a Rare Butterfly (*Atrytonopis* new species 1).

The Eastern Cougar, American Alligator, Red-cockaded woodpecker, and Rough-leaved Loosestrife are all terrestrial, freshwater, upland woodland species (including longleaf pine savannas). Since this habitat type is not present in the areas to be affected by the proposed action, these species are unlikely to occur.

A rare butterfly that is known only from Bogue Banks and adjoining islands may occur in the project area. This species rare butterfly (*Atrytonopsis* new species 1), is associated with the Dune Grass natural community and its larvae are believed to feed solely on seaside little bluestem (*Schizachryium littorale*), a common to dominant member of that community. Most of the known populations occur in naturally vegetated dune fields located behind the primary beaches along the ocean. Populations are also known from dredged material disposal islands that support seaside little bluestem, including Brandt Island. There have been no documented populations within the current diked area at Brandt Island, however, the species has been observed to the south of the slough dividing Brandt Island from the main portion of Bogue Banks (Personal Communication, Allison Leidner, September 2008). During the proposed 20-year study timeframe of the DMMP, the USACE is not planning to expand the Brandt Island upland diked disposal area. However, if the Brandt Island disposal area is expanded, the USACE will coordinate with representatives of the USFWS to ensure that no impacts to seaside little bluestem (*Schizachryium littorale*) occur.

<u>Effect Determination</u>. It has been determined that the proposed action is not likely to adversely affect any of these species or their habitat.

4.02.2 Roseate Tern

Roseate terns breed primarily on small offshore islands, rocks, cays, and islets. Rarely do they breed on large islands. They have been reported nesting near vegetation or jagged rock, on open sandy beaches, close to the waterline on narrow ledges of emerging rocks, or among coral rubble (USFWS 1999b). This species is primarily observed south of Cape Hatteras, particularly at Cape Point within Cape Hatteras National Seashore, during the months of July and August. According to John Fussell, (Personal Communication, 16 August 2010), roseate

terns were collected in the 1930's in the Beaufort Inlet area and they are known to migrate north through the project area in mid to late May.

According to John Fussell (2010) roseate terns are rarely found in the project area. The only time they may be found in the project area is when they migrate north in mid to late May. The DMMP impact area for these species would be considered the Bogue Banks beaches and nearshore areas off Bogue and Shackleford Banks. The roseate tern may use the beaches of Bogue and Shackleford Banks for foraging and roosting habitat. However, disposal activities on Bogue Banks would only occur ether during the hopper dredge window (January 1 to March 31 of any year) and/or the pipeline disposal windows (November 16 to April 30 for Bogue Banks). Additionally, the physical work area on the ocean beaches would only impact a maximum of 200 feet a day. All work and equipment (i.e., shore pipe, dozers, personnel, etc.) would be off the ocean beaches by the end of the respective disposal windows. Disposal of coarse-gained sediment along the beaches of Bogue Banks will result in no adverse effects on this species. A recent year round study in Brunswick County, NC documents observed shorebird use there (USACE 2003). This report indicated that disposal of beach compatible sediment on the beaches in Brunswick County had no measurable impact on bird use.

Effect Determination. On Bogue Banks there is also a large population of feral cats and raccoons that would adversely impact the nesting roseate tern. Additionally, the northern migration of the roseate tern may occur in mid to late May (Personal Communication, John Fussell, August 16, 2010). All beach disposal activities will be completed by April 30 and all equipment (including personnel) will be off the beach strand by this date .

For these reasons it has been determined that the project may affect not likely to adversely affect this species.

4.02.3 Piping Plover

a. Status. Threatened

b. Occurrence in Immediate Project Vicinity. The Atlantic Coast piping plover population breeds on coastal beaches from Newfoundland to North Carolina (and occasionally in South Carolina) and winters along the Atlantic Coast (from North Carolina south), the Gulf Coast, and in the Caribbean where they spend a majority of their time foraging. Since being listed as threatened in 1986, only 800 pairs were known to exist in the three major populations combined and by 1995 the number of detected breeding pairs increased to 1,350. This population increase can most likely be attributed to increased survey efforts and implementation of recovery plans (Mitchell et. al. 2000).

Piping plovers are known to nest in low numbers in widely scattered localities on North Carolina's beaches. The species typically nests in sand depressions on unvegetated portions of the beach above the high tide line on sand flats at the ends of sand spits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, sparsely vegetated dunes, and washover areas cut into or between dunes. Piping plovers head to their breeding grounds in late March or early April (http://pipingplover.fws.gov/overview.html) and nesting usually begins in late April; however, nests have been found as late as July (Potter et al. 1980; Golder 1985). During a statewide survey conducted in 1988, 40 breeding pairs of piping plovers were located in North Carolina. LeGrand (1983) states that "all of the pipings in the state nest on natural beachfronts, both completely away from human habitation and [yet] in moderate proximity to man". The largest reported nesting concentration of the species in the State appears to be on Portsmouth Island where 19 nests were discovered in 1983 by John Fussell (LeGrand 1983). The southernmost nesting record for the state was one nest located in Sunset Beach by Phillip Crutchfield in 1983 (LeGrand 1983). Feeding areas include intertidal portions of ocean beaches, washover areas, mud flats, sand flats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (USFWS 1996a). Prey consist of worms, fly larvae, beetles, crustaceans, mollusks, and other invertebrates (Bent 1928).

The NC Wildlife Resources Commission database indicates that during the winter Piping Plovers were surveyed at Bear Island, Bogue Inlet Shoals, Dudley Island, and Emerald Isle, and the following numbers of wintering birds were observed: 1987–3, 1989–3, 1990–2, 1991–4, 1996–1, 1997–5, 1999–2, 2000–2, 2001–0, 2003–1, 2004–2, 2005–2, 2006–0, 2007–1 and 2008–0. More Piping Plovers were recorded during winter on Bear Island and Bogue Inlet Shoals were recorded rarely on Dudley Island. Ft. Macon survey area: 1991–0, 1996–1, 2001 –0, 2006–1 (North Carolina Wildlife Resources Commission, Wildlife Diversity Program, unpublished data, accessed August 2010).

The Cape Lookout National Seashore, National Park Service in their annual Piping Plover Breeding Pairs at Cape Lookout National Seashore reports from 2001 to 2010 indicate that during this time only one pair of piping plovers nested on Shackleford Banks in 2005. This nest was located near milepost 49.8 on Shackleford Banks, which is on the east end of the island, close to Barden's Inlet.

The piping plover is a fairly common winter resident along the beaches of North Carolina (Potter et al. 1980). On July 10, 2001, the USFWS designated 137 areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas as critical habitat for the wintering population of the piping plover where they spend up to 10 months of each year on the wintering grounds. Constituent elements for the piping plover wintering habitat are those habitat components that are essential for the primary biological needs of foraging, sheltering, and roosting, and only those areas containing these primary constituent elements within the designated boundaries are

considered critical habitat. The USFWS has defined textual unit descriptions to designate areas within the critical habitat boundary. The USFWS has designated critical habitat for the Wintering Piping Plover (see Figure J-1) on Shackleford Banks off Beaufort Inlet (NC-9) and on Emerald Isle off Bogue Inlet (NC-10). Further discussion is found in Section D Project Impacts (2), below.

c. Current Threats to Continued Use of the Area. Loss and degradation of habitat due to development and shoreline stabilization have been major contributors to the decline of piping plovers. The current commercial, residential, and recreational development has decreased the amount of coastal habitat available for piping plovers to nest, roost, and feed. Specifically on Bogue Banks, nesting habitat continues to be degraded. Washover habitat that was created after Hurricane Fran in 1996 has since been developed with residential homes resulting in a continued decrease in nesting habitat availability. Additionally, nesting habitat along the western end of Bogue Banks, adjacent to Bogue Inlet, continues to be eroded away as result of the recent southwesterly shift of Bogue Inlet and the subsequent erosion towards the residential structures. Furthermore, long and short-term coastal erosion and the abundance of predators, including wild and domestic animals as well as feral cats, have further diminished the potential for successful nesting of this species. Since project beaches are wintering area for the piping plover, the major threat to its occupation of the area during the winter months would be continued degradation of beach foraging habitat. Similar degradation of beaches elsewhere could be a contributing element to declines in the state's nesting population.

d. Project Impacts.

(1). Habitat. The existing shorelines of Bogue Banks are heavily developed and are experiencing significant shoreline erosion. Piping plover breeding territories on the Atlantic Coast typically include a feeding area along expansive sand or mudflats in close proximity to a sandy beach that is slightly elevated and sparsely vegetated for roosting and nesting (http://www.fws.gov/raleigh/species/es_pipl.html). As erosion and development persist, piping plover breeding, nesting, roosting, and foraging habitat loss continues. Habitat loss from development and shoreline erosion and heavy public use has led to the degradation of piping plover habitat in the project area. The enhancement of beach habitat through the addition of beach fill may potentially restore lost roosting and nesting habitat; however, short-term impacts to foraging and roosting habitat may occur during project construction.

Beach compatible material will be placed along the beach strand of Fort Macon State Park, Town of Atlantic Beach, and if there is sufficient material (Section 3.4.2 Beach disposal) Pine Knoll Shores. Beach compatible material will be placed on Bogue Banks either by pipeline dredge from November 16 to April 30 or by using hopper dredges and will adhere to a January 1 to March 31 dredging window. Since piping plovers head to their breeding grounds in late March and

nesting occurs in late April, beach disposal events will avoid impacts to breeding and nesting piping plovers to the maximum extent practicable. Additionally, the project construction limits do not extend into the USFWS designated critical habitat (paragraph 2, below) located across Beaufort Inlet on Shackleford Banks (see NC-8) and will therefore avoid this documented nesting habitat. However, wintering habitat for roosting and foraging may be impacted. Direct short-term foraging habitat losses will occur during construction of the project fill. Since only a small portion of the foraging habitat is directly affected at any point in time during pumpout and adjacent habitat is still available, overall direct loss of foraging habitat will be minimal and short-term. Additionally, disposal activities will be completed in three sections (i.e., Fort Macon State Park, Town of Atlantic Beach, and Pine Knoll Shores) at a rate of approximately 200 foot per day or 4-5,000 feet per month; therefore, un-impacted or recovered foraging habitat will be available throughout the disposal operation on Bogue Banks.

Direct short-term foraging habitat losses will occur during disposal of dredged material. Since only a small portion of the foraging habitat is directly affected at any point in time during sediment disposal activities and adjacent habitat is still available, overall direct loss of foraging habitat will be minimal and short-term.

(2) Designated Critical Habitat. The USFWS has designated critical habitat for the Wintering Piping Plover (see Figures J-1 and J-2) on Shackleford Banks off Beaufort Inlet (NC-8) and on Emerald Isle off Bogue Inlet (NC-10). The USFWS has designated about 168 acres on Shackleford Banks as critical habitat for the Wintering Piping Plover (NC-8). Included within the designation of critical habitat are all land areas to the mean lower low water. However, USFWS has not designated critical habitat for the Wintering Piping Plover either within the existing Federal navigation channels (which range in depth from about -35 to -45 feet NGVD) or in the Atlantic Ocean placement areas (Bogue Banks beaches or the nearshore placement areas off Bogue Banks and Shackleford Banks). Water depths in the nearshore placement areas vary, but minimum depth is about -16 feet NGVD. The Nearshore Placement Areas are located about 1,000 to 2,000 feet offshore from Bogue and Shackleford Banks.

Some locations have been slightly enlarged for display purposes only.

Figure J-1. USFWS General Locations of Designated Critical Habitat for Wintering Piping Plover

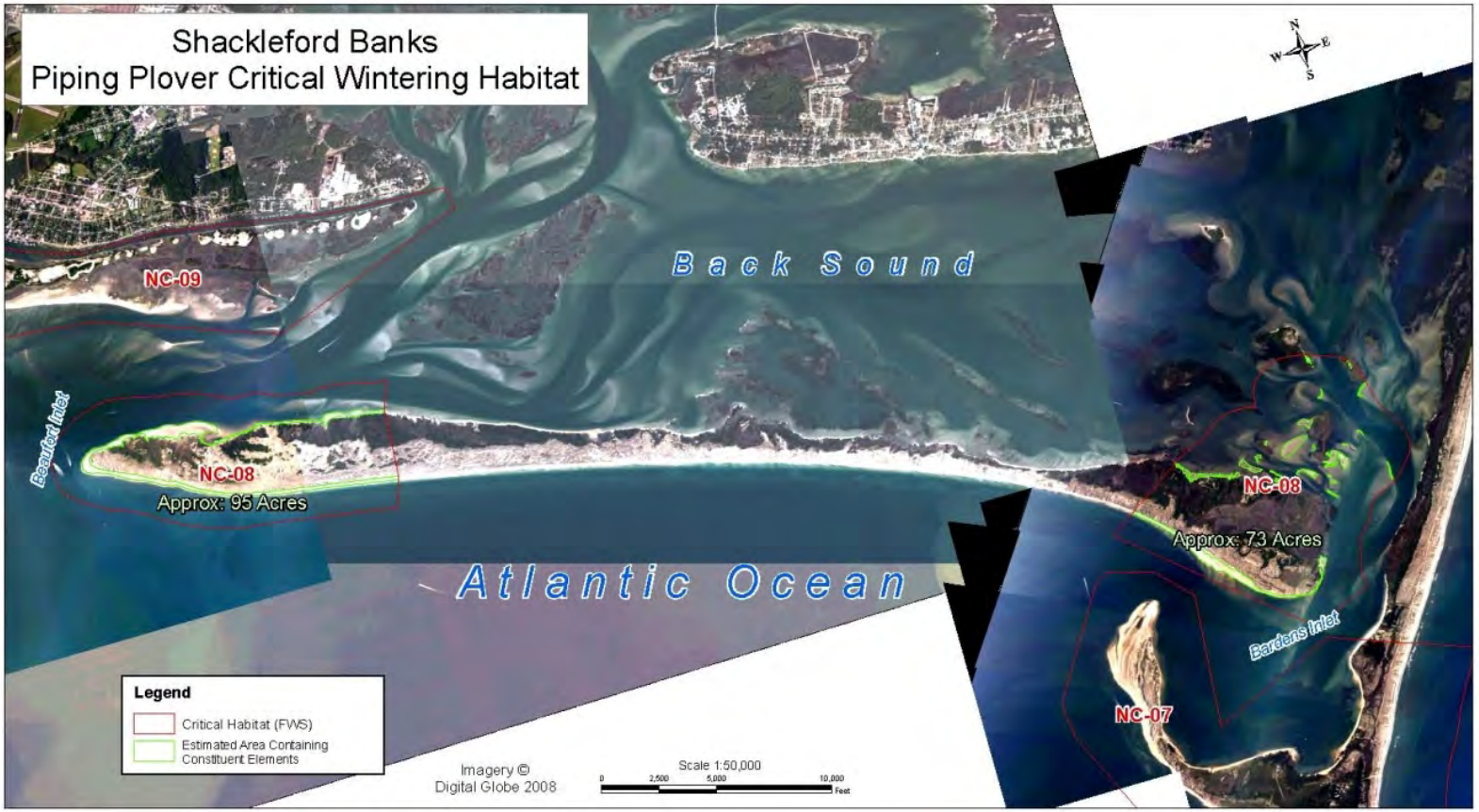

Figure J-2. USFWS Specific Locations of Designated Critical Habitat (NC-8) for Wintering Piping Plover on Shackleford Banks

Most piping plovers at Bogue Banks have been observed at the west end of Emerald Isle (which is outside of the proposed disposal area) as predominantly a migratory and winter resident (Rice and Cameron 2008). When Bogue Inlet was relocated, the Town of Emerald Isle had the North Carolina Wildlife Resources Commission prepare a waterbird monitoring and management plan for the project area. The final report (Rice and Cameron 2008) states the following:

"The federally listed Piping Plover was observed along all four transects (i.e., Bear, Bogue, Dudley and the Inlet) throughout the length of the project and there has been an increase in the total number of observations in recent years (Table J-3, below). Counts of Piping Plovers initially decreased following the channel relocation, with the lowest number of observations (106) recorded in 2006. Numbers increased in 2007 (181) and again in 2008 (275). Most birds were observed along the Bear Island and Inlet transects. Birds were observed every month of the year with peak counts in September during pre-construction surveys and in March in years following construction. Bogue Inlet appears to be an important stop-over site during spring migration as birds return to their breeding grounds. It is also important for wintering plovers with between seven and eleven birds found wintering in any given year, representing approximately ten percent of the state's wintering population. The largest one day count during pre and post-construction surveys occurred in March of 2008 when 28 birds were observed on Bear Island. Piping Plover activity and habitat use is presented as percentages in Table J-3. In most years, the majority of birds were observed foraging with most observed using intertidal habitats".

Table J-3 Summary of total Piping Plover observations, 2003-2008. Taken from Rice and Cameron (2008).

	Total	Transect				% Habitat			% Activity			Peak Ct.
	Obs.	Bear	Bogue	Dudley	Inlet	Intertidal	Beach	Surf	Roosting	Foraging	Flying	(Month)
2003/04 (pre)	179	96	23	6	54	73.2	26.8	0.0	16.8	82.1	1.1	16 (Sept.)
2005 (during/post)	149	82	16	30	21	61.7	38.3	0.0	32.2	67.1	0.7	13 (Mar.)
2006 (post)	106	74	7	13	12	51.9	48.1	0.0	28.3	71.7	0.0	16 (Mar.)
2007 (post)	181	81	10	14	76	72.4	26.5	1.1	18.8	79.5	1.7	18 (Mar.)
2008 (post)	275	202	2	27	44	62.9	37.1	0.0	24.4	74.9	0.7	28 (Mar.)
Total	890	535	58	90	207	65.4	34.4	0.2	23.5	75.6	0.9	

However, Beaufort inlet also contains intertidal flats exposed at low tide that are prime feeding and roosting habitat for a variety of shorebirds and colonial waterbirds including pelicans, cormorants, terns, and gulls. These areas may be used by piping plovers as well. These shallow intertidal flats would not be adversely impacted by the continual maintenance dredging of the existing Federal navigation channels (which range in depth from about -35 to -45 feet NGVD) or the placement areas.

(3) Food Supply. Piping plovers feed along beaches and intertidal mud and sand flats. Primary prey includes polychaete worms, crustaceans, insects, and bivalves. As described in Section 5 of the DMMP, the benthic invertebrate community will suffer short-term impacts from the disposal of sediment on the Bogue Banks beaches; thus, a diminished prey base will subsequently impact piping plovers over the short term. However, only a portion of the beach is affected at any point in time (approximately 4-5,000 feet per month or up to 200 feet per day). Once construction passes that point, recruitment from adjacent beaches can begin. Therefore, unimpacted or recovering foraging habitat on Bogue Banks will be available throughout the duration of the project.

(4) Relationship to Critical Periods in Life Cycle. Beach disposal of sand derived from maintenance dredging of Morehead City Harbor is expected to occur only from November 16 to April 30 on Bogue Banks or from January 1 to March 31 if a hopper dredge is used. Therefore, the breeding and nesting season will be avoided. However, foraging, sheltering, and roosting habitat may be temporarily impacted.

(5) Effect Determination. Short-term impacts (mentioned above) to foraging, feeding, sheltering, roosting habitat may occur during disposal on Bogue Banks; however, only a small portion of the beach would be impacted each day (up to 200 feet per day).

The long-term effects of the beach disposal may restore lost sheltering, feeding, roosting and nesting habitat; therefore, it has been determined that the project may affect not likely to adversely affect the piping plover and is not likely to adversely modify USFWS designated wintering critical habitat.

4.02.4 Red Knot

a.) <u>Status</u> Federal – Candidate

b .) <u>Background</u>

The Red Knot (*Calidris canutus rufa)* is a medium-sized shorebird that undertakes an annual 30,000 km hemispheric migration, one of the longest among shorebirds. Their migration route extends from overwintering sites in the southernmost tip of South America at Tierra del Fuego, up the Eastern coast of the Americas through the Delaware Bay, and ultimately to breeding sites in the central Canadian Arctic. Red Knots break their migration into strategically timed and selected non-stop segments, of approximately 1,500 miles, throughout the entire Atlantic coast, including North Carolina. These staging areas consist of highly productive foraging locations which are repeatedly used year to year. As the Red Knot moves towards the northern extent of its migration route, the timing of departures becomes increasingly synchronized. One critical foraging stop for Red Knots occurs in the Delaware Bay where they feed almost exclusively on horseshoe crab eggs, due to their high fat content and ease of digestion, in order to reach threshold departure masses (180-200 grams) prior to heading for the Arctic breeding grounds. The arrival of the Red Knot in the Delaware Bay coincides with the spawning of the horseshoe crabs, which peaks in May and June. Birds arrive emaciated and can nearly double their mass (~4.6 grams/day) prior to departure if foraging conditions are favorable (Baker *et. al*., 2001), eating an estimated 18,000 fat-rich horseshoe crab eggs per day (Andres et al. 2003). This critical foraging stopover enables Red Knots to achieve the nutrient store levels necessary for migration, survival, and maximizing the reproductive potential of the population (Baker et. al. 2004). In order to increase their body mass at such a rapid rate during their refueling stopover in the Delaware Bay, Red Knots morph their guts during their migration route from South America to Delaware.

The Cape Lookout National Seashore, National Park Service (provided by Michael Rikard) in their annual 2006 to 2009 Red Knot Monitoring Reports at Cape Lookout National Seashore indicates the following:

<u>For Shackleford Banks</u>: In 2006, 9 birds were observed near Barden's Inlet, in 2007, 18 birds were observed between Beaufort and Barden's Inlets, in 2008, 96 birds were observed near Barden's Inlet, and in 2009, 18 birds were observed near Barden's Inlet.

Since 2006, a total of 141 red knots have been observed on Shackleford Banks (annual monitoring reports provided by Michael Rikard, NPS.).

Ms. Sara Schweitzer, North Carolina Wildlife Resources Commission, provided the following information (email dated 1 August 2011): *The data we have for Red*

Knots is from opportunistic counts of them, as well as counts of them during other surveys. There have not been surveys or studies on Red Knots specifically. Therefore, there may be more birds in NC than are indicated by our data.

From the extant data, it appears that Red Knots are present in NC in greatest numbers (>100 per flock) during spring migration (April through May) during which time they may be in flocks up to 1000 birds.

Red Knots do feed extensively in the intertidal zone and on small coquina clams and horseshoe crab eggs. So they are either seen feeding voraciously or resting. Once they build up adequate fat reserves, they fly to their next stopover site. Some Red Knots have geo-locators on their leg bands and such data demonstrate that they can fly 100s of miles without stopping if they have adequate fat stores.

The best places for them to feed and rest are large intertidal areas for foraging, with foredunes in which to rest. No disturbance as these sites from pedestrians, dogs, or vehicles would be tolerated by the birds; thus, busy sites are not used. Our database indicates that sites with greatest numbers of Red Knots include:

Sunset Beach (northeast end and shoals in inlet) (private) Lea-Hutaff Island (Audubon) Masonboro Island (NERR) Topsail Beach, South end (private) Bald Head Island (foundation) Bear Island (State Park) Bogue Inlet shoals Bogue Sound-Bogue Inlet CLNS South Core Banks, North Core Banks, Shackleford Banks (NPS) New Drum Inlet shoals Clam Shoal CHNS Hatteras Island, South (NPS) CHNS, Ocracoke Island (NPS) Pea Island NWR -- N end Hatteras Island (USFWS & NPS)

Most areas where Red Knots occur in great numbers in spring migration are protected due to their ownership. However, there are areas with no protection from a conservation entity.

More recently, Niles *et. al.* (2009) reports continued shortage of horseshoe crab eggs at a critical stop in Delaware Bay for the Red Knot. Over the past 10 years, heavy commercial harvest of horseshoe crabs has caused a rapid decline in the crab's breeding population in Delaware Bay, reducing the number of eggs available to shorebirds. During this time the Red Knot population has declined from over 90,000 birds counted on Delaware Bay in 1989, to 32,000 in 2002. Similar declines have been shown in the South American wintering grounds suggesting that the viability of the Red Knot is seriously threatened. Demographic modeling predicts imminent endangerment and an increased risk of extinction without urgent management (Baker et al. 2004).

Morrison *et al*. (2004) have identified four factors that cause this vulnerability: (1) a tendency to concentrate in a limited number of locations during migration and

on the wintering grounds, so that deleterious changes can affect a large proportion of the population at once; (2) a limited reproductive output, subject to vagaries of weather and predator cycles in the Arctic, which in conjunction with long lifespan suggests slow recovery from population declines; (3) a migration schedule closely timed to seasonally abundant food resources, such as horseshoe crab (*Limulus polyphemus*) eggs during spring migration in Delaware Bay, suggesting that there may be limited flexibility in migration routes or schedules; and (4) occupation and use of coastal wetland habitats that are affected by a wide variety of human activities and developments.

Considering the threat of extinction, petitions have been submitted to the United States Fish and Wildlife Service (USFWS) for emergency listing of the *rufa* subspecies of the Red Knot (*Calidris canutus rufa*) as endangered and to designate "critical habitat" under the Endangered Species Act ("ESA"). On September 12, 2006, the USFWS included the Red Knot as a candidate species that may warrant protection under the Endangered Species Act (ESA). On July 20, 2007, the Red Knot final status assessment report was made available in which the Service determined that the Red Knot warranted protection, but placing the bird on the endangered species list is precluded by higher priority listing actions for species at greater risk. Although the candidate species status does not provide any regulatory protection under ESA, the USFWS recommends that, given its candidate status, all Federal agencies funding, authorizing, or conducting actions that may affect the Red Knot or its habitat, including impacts to prey resources, give full consideration to the species in project planning.

On September 30, 2013, USFWS published in the Federal Register their proposal to list the red knot (*Calidris canutus rufa*) as Threatened species under the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1543).

c.) <u>Project Impacts</u>.

The disposal of sediment on the Bogues Banks beaches may have short-term impacts on benthic invertebrates. However, recovery occurs within 1-3 years depending on sediment compatibility and the frequency and size of disturbance (See Section 3.4.2 DMMP). Given their mobile foraging patterns, local disruptions to foraging habitat is likely not that disruptive to Red Knots (Harrington, Personal Communication, September 2006). Therefore, disruption from construction activities associated with beach disposal of sediment will likely result in the movement of Red Knots to an alternative foraging location. However, multiple or large scale disruptions effecting all key foraging locations at one time could have a profound impact. Though Red Knots can relocate with localized disruption, large scale disturbances that impact the entire range of foraging locations may be significant. Within the limits of foraging distribution, beach disposal activities should be constructed in a manner as to allow for unimpacted foraging habitat locations and avoid large scale disruption to benthic invertebrates to the maximum extent practicable.

Roosting Red Knots prefer wide stretches of beach with limited disturbance. Contrary to their ability to tolerate disturbance while foraging and move among foraging habitats, Red Knots will avoid or abandon available roosting habitat adjacent to areas of disturbance. Furthermore, large scale development and continued beach erosion along the wintering and stopover range along the Atlantic has limited the availability of habitat that contains the necessary features for a suitable roosting environment. Beach disposal actions that occur within these limited roosting locations should avoid roosting time frames or implement appropriate buffer requirements during construction to the maximum extent practicable in order to minimize impacts. Beach disposal of sediment may have a beneficial effect on the Red Knot's roosting habitat in areas where significant erosion is occurring.

d.) Effect Determination. Short-term impacts to foraging, feeding, sheltering, and roosting habitat may occur during beach disposal operations. The long-term effects of beach disposal may restore lost sheltering, feeding, roosting and nesting habitat.

Considering that disposal activities will (1) avoid large scale disturbance within the limits of Red Knot foraging distribution and allow for areas of un-impacted or recovered foraging habitat within a given year, (2) avoid roosting timeframes or provide appropriate buffers around existing roosting habitat during construction operations, and (3) beach placement will only take place from November 16 to April 30 once every three years, the disposal of sediment on the Bogue Banks beaches may affect not likely adversely affect the Red Knot.

4.02.5 West Indian Manatee

a. Status. Endangered.

b. Occurrence in Immediate Project Vicinity. The manatee is an occasional summer resident off the North Carolina coast with presumably low population numbers (Clark 1987). The species can be found in shallow (5 ft to usually <20 ft), slow-moving rivers, estuaries, saltwater bays, canals, and coastal areas (USFWS 1991). The West Indian manatee is herbivorous and eats aquatic plants such as hydrilla, eelgrass, and water lettuce (USFWS, 1999a). Manatees are thermally stressed at water temperatures below 18ºC (64.4ºF) (Garrot et al. 1995); therefore, during winter months, when ambient water temperatures approach 20ºC (68ºF), the U.S. manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia. During the summer months, sightings drop off rapidly north of Georgia (Lefebvre et al, *2001*) and are rare north of Cape Hatteras (Rathbun *et al, 1982*; Schwartz 1995). However, they are sighted infrequently in southeastern North Carolina with most records occurring in July, August, and September, as they migrate up and down the coast (Clark 1993).

The Species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October (USFWS 2001). According to Schwartz (1995), manatees have been reported in the state during nine months, with most sightings in the August-September period. Manatee population trends are poorly understood, but deaths have increased steadily. A large percent of mortality is due to collisions with watercrafts, especially of calves. Another closely related factor in their decline has been the loss of suitable habitat through incompatible coastal development, particularly destruction of sea grass beds by boating facilities (USFWS 2001).

Manatees are rare visitors to Morehead City Harbor area. According to Schwartz (1995), a total of 68 manatee sightings have been recorded in 11 coastal counties of North Carolina during the years 1919-1994. Therefore, it is likely that manatees transit through the DMMP study area during the warm water months. Manatees are known to infrequently occur within nearly all North Carolina ocean and inland waters (Schwartz 1995) with four North Carolina records having been from inlet-ocean sites and six from the open ocean (Rathbun et al. 1982). According to the existing literature, specific numbers of manatees using the region are not known but are presumed to be very low. More research is needed to determine the status of the species in North Carolina and identify areas (containing food and freshwater supplies), which support summer populations.

c. Current Threats to Continued Use of the Area. Current threats to this species in the project area cannot be clearly assessed due to our lack of knowledge regarding its population, seasonality, distribution, and the habitat components in the project area that may be needed for its use. However, considering that manatees become thermally stressed at water temperatures below 18ºC (64ºF) (Garrot et al. 1995), cold winter temperatures keep the species from over wintering in the project area.

d. Project Impacts.

(1) Habitat. Impacts to estuarine and nearshore ocean habitat of the area associated with the disposal of sediment on the beach should be minor. With the current state of knowledge on the habitat requirements for the manatee in North Carolina, it is difficult to determine the magnitude of such impacts. Studies currently underway by the USFWS using animals fitted with satellite transmitters will hopefully provide data on the nature of these seasonal movements and habitat requirements during migrational periods.

(2) Noise. Section 4.01 General Impacts, describes the noise impacts on marine mammals.

(3) Food Supply. Foods, which are used by the manatee in North Carolina, are unknown. In Florida, their diet consists primarily of vascular plants. The proposed action will involve minimal change to the physical habitat

of the estuary with no known impacts to vascular plants and overall estuarine and nearshore productivity should remain high throughout the project area. Therefore, potential food sources for the manatee should be unaffected.

(4) Relationship to Critical Periods in Life Cycle. Since the manatee is considered to be an infrequent summer resident of the North Carolina coast, the proposed action should have little effect on the manatee since its habitat and food supply will not be significantly impacted. In regards to vessel collisions, the proposed maintenance dredging of the Morehead City Harbor federal navigation channels will occur in the estuarine or inlet habitat area and direct impacts from collision could take place. The USACE will implement precautionary measures for avoiding impacts to manatees from associated transiting vessels during construction activities, as detailed in the "Guidelines for Avoiding Impacts to the West Indian Manatee" established by the USFWS.

(5) Effect Determination. Since the habitat and food supply of the manatee will not be significantly impacted, overall occurrence of manatees in the project vicinity is infrequent, the maintenance dredging of the Federal navigation channels will occur in the estuarine or inlet habitat area and direct impacts from collision could take place, and precautionary measures for avoiding impacts to manatees, as established by USFWS, will be implemented for transiting vessels associated with the project, the proposed action may affect, not likely to adversely affect the manatee.

4.02.6 Blue Whale, Finback Whale, Humpback Whale, North Atlantic Right Whale (NARW), Sei Whale, and Sperm Whale

a. Status. Endangered

b. Occurrence in Immediate Project Vicinity. These whale species all occur infrequently in the ocean off the coast of North Carolina. Of these, only the NARW and the humpback whale routinely come close enough inshore to encounter the project area. Humpback whales were listed as "endangered" throughout their range on June 2, 1970 under the Endangered Species Act and are considered "depleted" under the Marine Mammal Protection Act. Humpbacks are often found in protected waters over shallow banks and shelf waters for breeding and feeding. They migrate toward the poles in summer and toward the tropics in winter and are in the vicinity of the North Carolina coast during seasonal migrations, especially between December and April. Since 1991, humpback whales have been seen in nearshore waters of North Carolina with peak abundance in January through March (NMFS 2003). In the Western North Atlantic, humpback feeding grounds encompass the eastern coast of the United States, the Gulf of St. Lawrence, Newfoundland/Labrador, and western Greenland. Major prey species include small schooling fishes (herring, sand lance, capelin, mackerel, small Pollock, and haddock) and large zooplankton, mainly krill (up to 1.5 tons per day) (http://www.nmfs.noaa.gov). Based on an

increased number of sightings and stranding data, the Chesapeake and Delaware Bays and the U.S. mid-Atlantic and southeastern states, particularly along Virginia and North Carolina coasts, have become increasingly important habitat for juvenile humpback whales (Wiley et al. 1995).

There are 6 major habitats or congregation areas for the western NARW; these are the coastal waters of the southeastern United States, the Great South Channel, Georges Bank/Gulf of Maine, Cape Cod and Massachusetts Bays, the Bay of Fundy, and the Scotian Shelf. However, the frequency with which NARWs occur in offshore waters in the southeastern U.S. remains unclear (NMFS 2003). While it usually winters in the waters between Georgia and Florida, the NARW can, on occasion, be found in the waters off North Carolina. NARWs swim very close to the shoreline and are often noted only a few hundred meters offshore (Schmidly 1981). NARWs have been documented along the North Carolina coast, as close as 250 meters from the beach, between December and April with sightings being most common from mid to late March (Dr. Frank J. Schwartz, Personal Communication, January 19, 1996). Sighting data provided by the NARW Program of the New England Aquarium indicates that 93 percent of all North Carolina sightings between 1976 and 1992 occurred between mid-October and mid-April (Slay 1993). The occurrence of NARWs in the State's waters is usually associated with spring or fall migrations. Due to their occurrence in the nearshore waters, the transport of hopper dredges to and from the USEPA approved ODMDS could result in an encounter with humpback and NARW species.

c. Project Impacts.

(1) Habitat. No critical habitat has been designated for NARWs and humpback whales within the proposed project area.

(2) Noise. Section 4.01 General Impacts, describes the noise impacts on marine mammals.

(3) Food Supply. North Atlantic right whales feed primarily on copepods (*Calanus* sp.) and euphausids (krill) (NMFS 1991) and humpback whales feed on small fish and krill. The proposed DMMP will not diminish productivity of the nearshore ocean; therefore, the food supply of these species should be unaffected.

(4) Relationship to Critical Periods in Life Cycle.

North Atlantic Right Whale (NARW).

Detailed life history information for NARWs and potential effects from dredging activities area provided within the following Section 7 consultation documents:

National Marine Fisheries Service. 1997. Regional Biological Opinion for the Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Silver Spring, Maryland

USACE. September 2008. Regional Biological Assessment for Dredging Activities in the Coastal Waters, Navigation Channels (including designated Ocean Dredged Material Disposal Sites (ODMDS)), and Sand Mining Areas in the South Atlantic Ocean. USACE, Wilmington District. Submitted to NMFS on 12 September 2008.

The referenced September 2008 Section 7 consultation document discusses in detail the June 26, 2006 proposed regulations by NMFS to implement mandatory vessel speed restrictions of 10 knots or less on vessels 65 ft. or greater in overall length in certain locations and at certain times of the year along the east coast of the U.S. Atlantic seaboard. Following the release of the referenced USACE consultation document, NMFS announced the release of the Final Rule and subsequent OMB approval of the collection-of-information requirements. Specifically, on October 10, 2008 NMFS published a final rule implementing speed restrictions to reduce the incidence and severity of ship collisions with North Atlantic right whales (73 FR 60173) with an effective date of December 9, 2008 through December 9, 2013. That final rule contained a collection-of-information requirement subject to the Paperwork reduction Act (PRA) that had not yet been approved by the Office of Management and Budget (OMB). Specifically, 50 CFR 224.105(c) requires a logbook entry to document that a deviation from the 10-knot speed limit was necessary for safe maneuverability under certain conditions. On October 30, 2008, OMB approved the collection-of-information requirements contained in the October 10, 2008, final rule. On December 5, 2008, NMFS announced that the collection-of-information requirements were approved under Control Number 0648–0580, with an expiration date of April 30, 2009 (15 CFR Part 902).

Humpback Whales.

The overall North Atlantic population of humpback whales is estimated at 10,600 individuals and is increasing (Waring et al. 1999); however the minimum population estimates for the Gulf of Maine stock is 647 individuals with a steadily increasing trend (NMFS 2003). For the period 1993-1997, the total estimated human-caused mortality and serious injury from fishery interactions and vessel collisions is estimated at 4.4 per year (NMFS 2003). According to Jensen and Silber's (2003) large whale ship strike database, of the 292 records of confirmed or possible ship strikes to large whales, 44 records (15%) were of humpback whales, the second most often reported species next to finback whales (75 records) (26%). Of the 5 documented ship strikes resulting in serious injury or mortality for North Atlantic humpback whales from January 1997-December 2001, 3 where located in North Carolina and South Carolina waters. Though the

total level of human-caused mortality and serious injury is unknown, current data indicate that it is significant; furthermore, mortality off the U.S. Mid-Atlantic States continues to increase (NMFS 2003).

(5) Effect Determination. Of the six species of whales being considered, only the NARW and humpback whale would normally be expected to occur within the project area during the project construction period. Therefore, the proposed project is not likely to adversely affect the blue whale, finback whale, sei whale, and sperm whale. Conditions outlined in previous consultations in order to reduce the potential for accidental collision (i.e. contractor pre-project briefings, large whale observers, slow down and course alteration procedures, etc.) will be implemented as a component of this project. Based on the implementation of these conditions, dredging activities associated with the proposed project may affect not likely to adversely affect the NARW and humpback whale species.

4.02.7 Loggerhead, Hawksbill, Kemp's Ridley, Green, and Leatherback Sea Turtles

a. Status.

Loggerhead	*Caretta caretta*	Threatened
Hawksbill	*Eretmochelys imbricata*	Endangered
Kemp's Ridley	*Lepidochelys kempii*	Endangered
Green	*Chelonia mydas*	Threatened[1]
Leatherback	*Dermochelys coriacea*	Endangered

[1]Green turtles are listed as threatened, except for breeding populations in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

b. Critical Habitat. Critical habitat has not been designated in the continental U.S. for the Hawksbill, Kemp's Ridley, Green, and Leatherback sea turtles identified to occur within the proposed project vicinity. Therefore, the proposed action would not result in an adverse modification to identified critical habitat for these four species. However, on March 25, 2013, the USFWS published in the Federal Register (50 CFR Part 17) their proposal to designate specific areas in the terrestrial environment as critical habitat for the Northwest Atlantic Ocean Distinct Population Segment of the threatened loggerhead sea turtle (*Caretta caretta*) under the Endangered Species Act (ESA) of 973, as amended (16 U.S.C. 1531–1543). The proposed critical habitat is located in coastal counties in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi.

Within the proposed dredged material disposal areas for the Morehead City Harbor DMMP, the beaches of Bogue Banks have been designated in the proposed USFWS Critical Habitat Rule as the Northern Recovery Unit, North Carolina, LOGG-T-NC-01 (Bogue Banks in Carteret County) for the loggerhead sea turtle. This unit extends from Beaufort Inlet to Bogue Inlet and includes terrestrial lands from the Mean High Water (MHW) line landward to the toe of the secondary dune or developed structures.

Additionally, on July 18, 2013, the NMFS published in the Federal Register (50 CFR 226) their proposal to designate specific areas in the marine environment as critical habitat for the Atlantic Ocean loggerhead sea turtle Distinct Population Segment (DPS) (*Caretta caretta*) within the Atlantic Ocean under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531–1543). In the Morehead City Harbor project area, NMFS is proposing to designate two unit descriptions for the loggerhead sea turtle: LOGG-N-2 – Southern Portion of the North Carolina Winter Concentration Area and LOGG-N-3 – Bogue Banks and Bear Island, Carteret and Onslow Counties, NC. The LOGG-N-2 unit is winter habitat only and includes waters from 20 meters (65.6 feet) to 100 meter (328 feet) depth contours. The LOGG-N-3 unit contains nearshore reproductive habitat only and consists of the nearshore ocean from Beaufort Inlet to Bogue

Inlet and seaward 1.6 km (1 mile). This unit contains an area adjacent to high density nearshore reproductive habitat (Beaufort Inlet to Bogue Inlet) as well as an area of high density nearshore reproductive habitat (Bogue Inlet to Bear Inlet). Only the LOGG-N-3 unit would be applicable to the proposed Morehead City Harbor DMMP since all existing Federal navigation channels (i.e., Ranges A, B, and C, Cutoff and inner harbor channels) and disposal areas are in water depths less than 20 meters (65.6 feet).

Currently, both USFWS' and NMFS' proposals for designating critical habitat for the threatened loggerhead sea turtle have not been finalized. Moreover, the above mentioned unit descriptions for both USFWS and NMFS could change prior to the final critical habitat designations.

c. Background. Detailed life history information associated with the in-water life cycle requirements for sea turtles and a subsequent analysis of impacts from the proposed dredging activities is provided within the following NMFS Section 7 consultation documents:

National Marine Fisheries Service. 1997. Regional Biological Opinion for the Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Silver Spring, Maryland

USACE. September 2008. Regional Biological Assessment for Dredging Activities in the Coastal Waters, Navigation Channels (including designated Ocean Dredged Material Disposal Sites (ODMDS)), and Sand Mining Areas in the South Atlantic Ocean. USACE, Wilmington District. Submitted to NMFS on 12 September 2008

A summary of project specific information associated with beach and in-water habitat use is provided in the ensuing text.

1.) Occurrence in Immediate Project Vicinity. All five species of sea turtles identified above are known to occur in both the estuarine and oceanic waters of North Carolina. According to Epperly et al. (1994), inshore waters, such as Pamlico and Core Sounds, are important developmental and foraging habitats for loggerheads, greens, and Kemp's ridleys. Nearly all sea turtles found within these sounds are immature individuals immigrating into the sounds in the spring and emigrating from the sounds in the late fall and early winter (Epperly et al. 1995). Loggerhead, green, and Kemp's ridley sea turtles are known to frequently use coastal waters offshore of North Carolina as migratory travel corridors (Wynne 1999) and commonly occur at the edge of the continental shelf when they forage around coral reefs, artificial reefs, and boat wrecks.

Hawksbill and leatherback sea turtles infrequently enter inshore waters (Epperly et al, 1995) and are normally associated solely with oceanic waters (Schwartz

1977). However, Lee and Palmer (1981) document that leatherbacks normally frequent the shallow shelf waters rather than those of the open sea, with the exception of long-range migrants.

Of the five species of sea turtles considered for this project, only the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), and the leatherback sea turtle (*Dermochelys coriacea*) nest regularly on North Carolina beaches and have the potential to nest within the project area. There are no documented nesting attempts of hawksbill and Kemp's ridley sea turtles on the project beaches; however, Kemp's ridley nests have been documented twice in North Carolina, once on Oak Island in 1992 and once on Cape Lookout in 2003 (Matthew Godfrey, Sea Turtle Program Coordinator, North Carolina Wildlife Resources Commission, Personal Communication, 2006). With a few exceptions, the entire Kemp's ridley population nests on the approximately 15 miles of beach in Mexico between the months of April and June (USFWS 1991). The hawksbill sea turtle nests primarily in tropical waters in south Florida and the Caribbean. Considering the infrequency of Kemp's ridley nesting occurrence throughout North Carolina and the lack of historical nesting of Kemp's ridley and hawksbill sea turtles on Bogue Banks, these species are not anticipated to nest within the project area. The loggerhead is considered to be a regular nester in the state, while green sea turtle nesting is infrequent and primarily limited to Florida's east coast (300 to 1,000 nests reported annually). According to Rabon et al. (2003), seven leatherback nests have been confirmed in North Carolina since 1998 constituting the northernmost nesting records for leatherbacks along the East Coast of the United States. Though almost all confirmed nesting activity in North Carolina has been between Cape Lookout and Cape Hatteras, the potential for leatherback nesting within the project area is likely.

Table J-4 shows the total number of recorded loggerhead, green, and leatherback sea turtle nests on Bogue Banks (includes Fort Macon State Park, Atlantic Beach, Pine Knoll Shores, Indian Beach/Salter Path, and Emerald Isle) beaches from 1997 to 2010. Both the Towns of Indian Beach/Salter Path and Emerald Isle are not within the DMMP DEIS project area. Though records were kept as early as 1997, consistent turtle nesting data has been recorded on Bogue Banks only since 2003. Furthermore, Standardized nest patrols were not enacted statewide until the mid 1990s; therefore, values from the first part of the 1990's to 2002 may not represent a full season of monitoring. Of the 412 nests laid within the Bogue Banks since 1997, loggerhead sea turtles laid 409 nests, 4 nests were laid by greens, and 2 nests were laid by leatherbacks (Matthew Godfrey, Personal Communication, 2010).

Table J-5, below shows the total number of recorded loggerhead, green, and leatherback sea turtle nests on Shackleford Banks between 2000 and 2009. Of the 144 nests laid on Shackleford banks since 2000, loggerhead sea turtles laid 142 nests, 1 nest was laid by a green, and 1 nest was laid by a leatherback. These numbers depicted in Table J-5 were taken from the Cape Lookout

National Seashore annual sea turtle monitoring reports. All of these NPS annual reports were provided by Michael Rikard, the National Park Service, Cape Lookout National Seashore.

Year	Loggerhead (*Caretta caretta)*	Green (*Chelonia mydas*)	Leatherback (*Dermochelys coriacea)*
1997 *	33	0	0
1998 *	22	0	0
1999 *	35	0	0
2000 *	13	2	0
2001 *	21	0	0
2002 *	19	0	0
2003	38	0	0
2004	21	0	0
2005	33	1	2
2006	33	0	0
2007	27	0	0
2008	31	0	0
2009	34	1	0
2010 **	49	0	0
TOTALS	409	4	2

Table J-4. Total sea turtle nest numbers for Bogue banks from 1997-2010, which was provided by Matthew Godfrey, NC Wildlife Resources Commission. Loggerhead, green, and leatherback sea turtles are the only species with recorded nesting activity on Bogue Banks beaches.

* The entire Bogue Banks area was not monitored (i.e., incomplete numbers)
** Preliminary data for 2010 (as of 13 August 2010)

Year	Loggerhead (*Caretta caretta)*	Green (*Chelonia mydas*)	Leatherback (*Dermochelys coriacea)*
2000	16	0	0
2001	19	0	0
2002	10	1	0
2003	20	0	0
2004	10	0	0
2005	16	0	1
2006	14	0	0
2007	8	0	0
2008	18	0	0
2009	11	0	0
TOTALS	142	1	1

Table J-5. Total sea turtle nest numbers for Shackleford Banks from 2000-2009, which was provided by NPS. Loggerhead, green, and leatherback sea turtles are the only species with recorded nesting activity on Shackleford Banks.

2.) <u>Current Threats to Continued Use of the Area</u>. In addition to affecting the coastal human population, coastal sediment loss also poses a threat to nesting sea turtles. A large percentage of sea turtles in the United States nest on nourished beaches (Nelson and Dickerson 1988a), therefore, nourishment has become an important technique for nesting beach restoration (Crain *et al.* 1995). The DMMP is not a nourishment project, however, beach disposal of coarse grained sediment from the navigation channel on the beaches of Bogue Banks will function much like a nourishment project. Since consistent turtle nesting surveys began on Bogue Banks in 2003, the average numbers of nests laid per year have remained largely constant with some minor fluctuations.

The primary threats facing these species worldwide are the same ones facing them in the project area. Of these threats, the most serious seem to be loss of breeding females through accidental drowning by shrimpers (Crouse et al. 1987) and human encroachment on traditional nesting beaches. Research has shown that the turtle populations have greatly declined in the last 20 years due to a loss of nesting habitat along the beachfront and by incidental drowning in shrimp trawl nets. It appears that the combination of poorly placed nests coupled with unrestrained human use of the beach by auto and foot traffic has impacted this species greatly. Other threats to these sea turtles include excessive natural predation in some areas and potential interactions with hopper dredges during the excavation of dredged material. With the exception of hopper dredges, none of the dredge plants (i.e., pipeline dredges or bucket and barge dredges) proposed for the maintenance of the existing navigation channel are known to take sea turtles.

d. Project Impacts.

In order to avoid periods of peak sea turtle abundance during warm water months and minimize impacts to sea turtles in the nearshore and offshore environment, the proposed hopper dredging window for this project is January 1 through 31 March. The pipeline dredging window with disposal on the adjacent beaches is from November 16 to April 30 on Bogue Banks. By adhering to this dredging window to the maximum extent practicable, beach disposal will occur outside of the North Carolina sea turtle nesting season of May 1 through November 15. The limits of the nesting season window are based on the known nesting sea turtle species within the State and the earliest and latest documented nesting events for those species.

Considering that the proposed beach disposal window for Bogue Banks will avoid the nesting season, direct impacts associated with construction activities during the nesting season are not anticipated and will be avoided to the maximum extent practicable.

Indirect impacts associated with changes to the nesting and incubating environment, from the disposal of sediment from alternate sources on the beach, are expected. The following section discusses both potential direct and indirect impacts to nesting sea turtles associated with the proposed project:

Section 4.01 General Impacts, describes the noise impacts on sea turtles.

(1) Beach disposal of Sediment Impacts.

Post-nourishment monitoring efforts have documented potential impacts on nesting loggerhead sea turtles for many years (Fletemeyer 1984; Raymond 1984; Nelson and Dickerson 1989; Ryder 1993; Bagley et al. 1994; Crain et al. 1995; Milton et al. 1997; Steinitz et al. 1998; Trindell et al. 1998; Davis et al. 1999; Ecological Associates, Inc. 1999; Herren 1999; Rumbold et al. 2001; Brock 2005). Results from these studies indicate that, in most cases, nesting success decreases during the year following nourishment as a result of escarpments obstructing beach accessibility, altered beach profiles, and increased compaction. A comprehensive post-nourishment study conducted by Ernest and Martin (1999) documented an increase in abandoned nest attempts on nourished beaches compared to control or pre-nourished beaches as well as a change in nest placement with subsequent increase in wash-out of nests during the beach equilibration process. Contrary to previous studies, this study suggests that a post-nourishment decline in nest success is more likely a result from changes in beach profile than an increase in beach compaction and escarpment formation. According to Brock (2005), the sediment used for the nourishment of Brevard County beaches in Florida offered little or no impediment to sea turtles attempting to excavate an egg chamber. Furthermore, the physical attributes of

the nourished sediment did not facilitate excessive scarp formation and; therefore, turtles were not limited in their ability to nest across the full width of beach. However, a decrease in nest success was still documented in the year following nourishment with an increase in loggerhead nesting success rates during the second season post-nourishment. This was attributed to increased habitat availability following the equilibration process of the seaward crest of the berm. This study suggests that, if compatible sediment and innovative design methods are utilized to minimize post-nourishment impacts documented in previous studies, than the post-nourishment decrease in nest success without the presence of scarp formations, compaction, etc. may indicate an absence of abiotic and or biotic factors that cue the female to initiate nesting.

As suggested by the historical literature, there are inherent changes in beach characteristics as a result of mechanically placing sediment on a beach from alternate sources. The change in beach characteristics often results in short-term decreases in nest success and/or alterations in nesting processes. Based on the available literature, it appears that these impacts are, in many cases, site specific. Careful consideration must be placed on pre- and post-project site conditions and resultant beach characteristics after beach-fill episode at a given site in order to thoroughly understand identified post-project changes in nesting processes. By better understanding potential project specific impacts, modifications to project templates and design can be implemented to improve habitat suitability. The following sections review, more specifically, documented direct or indirect impacts to nesting females and hatchlings.

a. Pipe Placement**.**

Any sediment placed along the Bogue Banks beaches will take place from November 16 to April 30. No work associated with beach disposal, including pipeline placement on the beach or in the water, staging of equipment on the beach, nor disposal operations will take place outside of this window.

b. Slope and Escarpments.

The proposed beach disposal of dredged material is designed and constructed to equilibrate to a more natural profile over time relative to the wave climate of a given area. Changes in beach slope as well as the development of steep escarpments may develop along the mean high water line as the constructed beach adjusts from a construction profile to a natural beach profile (Nelson et al. 1987). For the purposes of this assessment, escarpments are defined as a continuous line of cliffs or steep slopes facing in one general direction, which is caused by erosion or faulting. Depending on shoreline response to the wave climate and subsequent equilibration process for a given project, the slope both above and below mean high water may vary outside of the natural beach profile; thus resulting in potential escarpment formation. Though escarpment formation

is a natural response to shoreline erosion, the escarpment formation as a result of the equilibration process during a short period following a beach disposal event may have a steeper and higher vertical face than natural escarpment formation and may slough off more rapidly landward.

Adult female turtles survey a nesting beach from the water before emerging to nest (Carr and Ogren 1960; Hendrickson 1982). Parameters considered important to beach selection include the geomorphology and dimensions of the beach (Mortimer 1982; Johannes and Rimmer 1984) and bathymetric features of the offshore approach (Hughes 1974; Mortimer 1982). Beach profile changes and subsequent escarpment formations may act as an impediment to a nesting female resulting in a false crawl or nesting females may choose marginal or unsuitable nesting areas either within the escarpment face or in front of the escarpment. Often times these nests are vulnerable to tidal inundation or collapse of the receding escarpment. If a female is capable of nesting landward of the escarpment prior to its formation, as the material continues to slough off and the beach profile approaches a more natural profile, there is a potential for an incubating nest to collapse or fallout during the equilibration process. Loggerheads preferentially nest on the part of the beach where the equilibration process takes place (Brock 2005; Ecological Associates, Inc. 1999) and are more vulnerable to fallout during equilibration. However, according to Brock (2005), the majority of green turtle nests are placed on the foredune and; therefore, the equilibration process of the beach disposal event substrate may not affect green turtles as severely.

A study conducted by Ernest and Martin (1999) documented increased abundance of nests located further from the toe of the dune on nourished vs. control beaches. Thus, post beach disposal event nests may be laid in high-risk areas where vulnerability to sloughing and equilibration are greatest. Though nest relocation is not encouraged, considering that immediately following beach disposal event the likelihood of beach profile equilibration and subsequent sloughing of escarpments as profile adjustment occurs, nest relocation may be used as a last alternative to move nests that are laid in locations along the beach that are vulnerable to fallout (i.e. near the mean high water line). As a beach disposal event beach is re-worked by natural processes and the construction profile approaches a more natural profile, the frequency of escarpment formation declines and the risk of nest loss due to sloughing of escarpments is reduced. According to Brock (2005), the return of loggerhead nesting success to equivalent rates similar to those on the adjacent non-nourished beach and historical rates two seasons post-nourishment were observed and are attributed to the equilibration process of the seaward crest of the berm.

Though the equilibration process and subsequent escarpment formation are features of most beach projects, management techniques can be implemented to reduce the impact of escarpment formations. For completed sections of beach during beach disposal events, and for subsequent years following as the

construction profile approaches a more natural profile, visual surveys for escarpments could be performed. Escarpments that are identified prior to or during the nesting season that interfere with sea turtle nesting (exceed 18 inches in height for a distance of 100 ft.) can be leveled to the natural beach for a given area. If it is determined that escarpment leveling is required during the nesting or hatching season, leveling actions will be directed by the NCWRC and USFWS.

c. Incubation Environment.

Physical changes in sediment properties that result from the placement of sediment, from alternate sources, on the beach pose concerns for nesting sea turtles and subsequent nest success. Constructed beaches have had positive effects (Broadwell 1991; Ehrhart and Holloway-Adkins 2000; Ehrhart and Roberts 2001), negative effects (Ehrhart, 1995 Ecological Associates, Inc. 1998), or no apparent effect (Raymond 1984.; Nelson et al. 1987; Broadwell 1991; Ryder 1993; Steinitz et. al. 1998; Herren 1999) on the hatching success of marine turtle eggs. Differences in these findings are related to the differences in the physical attributes of each project, the extent of erosion on the pre-existing beach, and application technique (Brock 2005).

If nesting occurs in new sediment following beach construction activities, embryonic development within the nest cavity can be affected by insufficient oxygen diffusion and variability in moisture content levels within the egg clutch (Ackerman 1980; Mortimer 1990; Ackerman *et al*. 1992); thus, potentially resulting in decreased hatchling success. Ambient nest temperature and incubation time are affected by changes in sediment color, sediment grain size, and sediment shape as a result of beach nourishment (Milton *et al.* 1997) and; thus, affect incubation duration (Nelson and Dickerson 1988a). Sexual differentiation in chelonians depends on the temperature prevailing during the critical incubation period of the eggs (Pieau 1971; Yntema 1976; Yntema and Mrosovsky 1982; Bull and Vogt 1979), which occurs during the middle third of the incubation period (Yntema 1979; Bull and Vogt 1981; Pieau and Dorizzi 1981; Yntema and Mrosovsky 1982; Ferguson and Joanen 1983; Bull 1987; Webb et al. 1987; Deeming and Ferguson 1989; Wibbels *et al*. 1991), and possibly during a relatively short period of time in the second half of the middle trimester (Webster and Gouviea 1988). Eggs incubated at constant temperatures of 28°C or below develop into males. Those kept at 32°C or above develop into females. Therefore, the pivotal temperature, those giving approximately equal numbers of males and females, is approximately 30°C (Yntema and Mrosovsky 1982). Estimated pivotal temperatures for loggerhead sea turtles nesting in North Carolina, Georgia, and southern Florida are close to 29.2°C (Mrosovsky and Provancha 1989). Therefore, fluctuation in ambient nest temperature on constructed beaches could directly impact sex determination if nourished sediment differs significantly from that found on the natural beach. Since, the pivotal temperatures for the northern and southern geographic nesting ranges of loggerheads in the United States are similar, a higher percentage of males are

produced on North Carolina beaches and a higher percentage of females on Florida beaches. Hatchling sex ratios are of conservational significance (Mrosovsky and Yntema 1980; Morreale *et al*. 1982) since they may affect the population sex ratio and thus could alter reproductive success in a population (Herren et al. 1999).

d. Nest Relocation.

Relocation of sea turtle nests to less vulnerable sites was once common practice throughout the southeastern U.S. to mitigate the effects of natural or human induced factors. However, the movement of eggs creates opportunities for adverse impacts. Therefore, more recent USFWS guidelines are to be far less manipulative with nests and hatchlings to the maximum extent practicable. Though not encouraged, nest relocation is still used as a management technique of last resort where issues that prompt nest relocation cannot be resolved. Potential adverse impacts associated with nest relocation include: survey error (Shroeder 1994), handling mortality (Limpus et al. 1979; Parmenter 1980), incubation environment impacts (Limpus *et al*. 1979; Ackerman 1980; Parmenter 1980; Spotila et al. 1983; McGehee 1990), hatching and emergence success, and nest concentration.

Beach disposal event efforts associated with the DMMP are scheduled to work outside of the sea turtle nesting season in order to avoid impacts to nesting females and the nest incubation environment. Therefore, there is no proposal to relocate any sea turtle nests in the project area.

e. Beach Compaction and Hardness.

Sediment placed on the beach, as a component of shoreline protection projects, beach disposal, sand-bypassing, etc. is often obtained from three main sources: inlets, channels, or offshore borrow sites (Crain et al. 1995) with occasional use of upland sources. Significant alterations in beach substrate properties may occur with the input of sediment types from other sources. Sediment density (compaction), shear resistance (hardness), sediment moisture content, beach slope, sediment color, sediment grain size, sediment grain shape, and sediment grain mineral content can be changed by beach nourishment.

Current sea turtle literature has attributed post-nourishment beach hardness to sand compaction but it should be more appropriately attributed to sediment shear resistance. Increased shear resistance can be due to increased sand compaction (density), but it can also be due to other factors such as sand particle characteristics (size, shape) and interactions between the particles (Spangler and Handy 1982;Nelson et al. 1987; Nelson and Dickerson 1989; Ackerman 1996). Shear resistance describes the ability of the beach sand to resist sliding along internal surfaces. A measure of shear resistance can be described as a measure of beach hardening or strength. The sand particle surface

characteristics contribute to the sliding friction ability of the sand particles. Various parameters (chemical composition, cohesion, moisture content, sediment layering and mixing) contribute to the interlocking ability of the sand particles. Sliding friction, interlocking, and compaction of the sand particles all contribute to a measure of shear resistance. Thus, a measurement of increased shear resistance does not necessarily mean that the beach is also compacted (Ackerman 1996).

Factors which may contribute to increased beach hardness (shear resistance) on nourished beaches include a high silt component, angular fine-grained sand, higher moisture content, equipment and vehicular traffic, and hydraulic slurry deposition of sediments (Nelson 1985; Nelson et al, 1987; Nelson and Dickerson 1988a; 1989; Ackerman 1996). Beach fill can vary in amount of carbonate sand, quartz sand, shell, coral, silt, and clay content (National Research Council 1995). Sediments used for beach fill with clay or silt contents higher than 5-10% may cause high beach hardness once the sediment dries (Nelson 1985; Dean 1988). Harder nourished beaches typically result from angular, finer grain sand dredged from stable offshore borrow sites; whereas, less hard or "softer" beaches result from smoother, coarse sand dredged from high energy locations (e.g. inlets) (Spangler and Handy 1982; Nelson et al, 1987; Nelson and Dickerson 1988a; 1989). Nourished beaches may result in sediment moisture content more than 4% higher than adjacent, natural beaches (Ackerman 1996, Ackerman et al. 1992). Placement of fill material with heavy equipment imparts a component of "compactness" that should not occur on natural beaches. The natural process of beach formation, over an extended period of time, results in extensive sorting of the sand both by layers and within layers. Layer orientation is determined by the wave wash which is not the same for nourished beaches (National Research Council 1995).

Hard sediment can prevent a female from digging a nest or result in a poorly constructed nest cavity. Females may respond to harder physical properties of the beach by spending more time on the beach nesting, which may result in physiological stress and increased exposure to disturbances and predation; thus, in some cases leading to a false dig (Nelson and Dickerson 1989). Although increased shear resistance does not occur with every nourishment project, higher shear resistance measurement values have been more frequently reported over the past 30 years from nourished beaches than on natural beaches of the same area (e.g. Mann 1977; Fletemeyer 1983; Raymond 1984; Nelson et al. 1987; Moulding and Nelson 1988; Nelson and Dickerson 1988a; Ryder 1995; Bagley et al. 1994; Crain et al. 1995; Ernest et al. 1995; Foote and Truitt 1997; Milton et al. 1997; Steinitz et al. 1998; Trindell et al. 1998; Davis et al. 1999; Herren 1999; Allman et al. 2001; Rumbold et al. 2001; Piatkowski 2002; Scianna et al. 2001; Brock, 2005). Results have varied tremendously on the nesting success reported in these studies when comparing nourished and natural beaches of different shear resistance values. The natural variance in shear resistance values and the nesting success related to these values is still poorly understood.

Due to the many variables involved from natural and non-natural causes, it is extremely difficult to identify impacts from nourishment projects by only evaluating nesting success data. Analyses of shear resistance values and nesting success have yet to determine a consistent relationship (Trindell et al. 1998). It is difficult to define absolute or optimal shear resistance values until these relationships are better understood throughout the sea turtle nesting range in the United States (Gulf and South Atlantic states). Crain et al. (1995) also recommended this as a research priority for beach nourishment impact studies.

Measuring shear resistance has become a common procedure of most beach nourishment projects and is usually done with a hand-held cone-penetrometer (Crain et al 1995). While holding the instrument in a vertical orientation, measurements are obtained by manually pushing it into the beach sediment. Based on data collected during the 1980's from nourished and non-nourished projects on the Atlantic coast of Florida, the USACE provided initial guidelines on maximum cone-penetrometer values (600) below which might be more compatible with natural nesting beaches (Nelson et al. 1987; Moulding and Nelson 1988; Nelson et al. 1987; Nelson and Dickerson 1988a; 1989). The USFWS later adopted these guidelines into permitting regulations for all nourished projects along the U.S. Atlantic and Gulf of Mexico coasts with potential sea turtle nesting habitat. These requirements are still in effect to date and are outlined in state construction permit requirements and Biological Opinions issued by USFWS dated 22 July 2003. According to the general USFWS compaction measurement guidelines for NC outlined below, compaction measurements of 500 PSI establishes the level of beach hardness when post-nourishment beach tilling should be done to reduce the shear resistance measurements.

General USFWS Compaction Guidelines

1. Compaction sampling stations will be located at 500-foot intervals along the project area. One station will be at the seaward edge of the dune line (when material is placed in this area); and one station must be midway between the dune line and the high water line (normal wrack line).

At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. Layers of highly compact material may lie over less compact layers. Replicates will be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include 18 values for each transect line, and the final 6 averaged compaction values.

2. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled prior to May 1. If values exceeding 500 psi are distributed throughout the project area, but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Fish and Wildlife Service will be required to determine if tilling is required. If a few values exceeding 500 psi are randomly present within the project area, tilling will not be required. For all circumstances where tilling is implemented, the designated area shall be tilled to a depth of 36 inches. Tilling will be performed (i.e. overlapping rows, parallel and perpendicular rows, etc.) so that all portions of the beach are tilled and no furrows are left behind All tilling activities must be completed prior to May 1 in accordance with the following protocol.

Readings of cone index values can be roughly equated to pounds per square inch (psi). However, this is a relative value and caution should be used when attempting to compare cone index values in pounds per square inch to other sources of data (Moulding and Nelson 1988). Ferrel et al. (2002) and Piatkowski (2002) used a Lang penetrometer, as opposed to the cone-penetrometer, because readings are not influenced by the mass of the user. This is an issue when multiple people of varying mass and strength are conducting the measurements. Much of the variation in the compaction data could be due to variability inherent in the use of the cone-penetrometer itself. Ferrell *et al.* (2002) investigated the strengths and weaknesses of several different types of instruments that measure sediment compaction and shear resistance suggesting that other instruments may be more suitable for measuring beach compaction relative to sea turtle nesting behavior. Because of instrument error and given that turtles do not dig vertically in the same fashion as a penetrometer moves through the sediment layers, some have concluded that penetrometers are not appropriate for assessing turtle nesting limitations (Davis et al. 1999). However, even with this limitation, the hand-held cone-penetrometer remains the accepted method for assessing post-nourishment beach hardness.

According to Davis et al. (1999), on the Gulf Coast of Florida (1) there was no relationship between turtle nesting and sediment compactness, (2) the compactness ranges and varies widely in both space and time with little rationale, (3) tilling has a temporary influence on compactness and no apparent influence on nesting frequency, (4) and current compactness thresholds of 500 pounds per square inch (psi) are artificial. According to Brock (2005), the physical attributes of the fill sand for Brevard County beaches did not result in severe compaction and therefore did not physically impede turtles in their attempts to nest. Therefore, additional studies should be considered to evaluate the validity of this threshold (500 PSI) and its general application across all beaches as a means to assess beach-tilling requirements. If sediment characteristics are similar to the native beach and sediment grain sizes are homogenous, the resultant compaction levels will likely be similar to the native beach and tilling should not be encouraged. A study by Nelson and Dickerson

(1988b) documented that a tilled nourished beach will remain un-compacted for up to one year; however, this was a site-specific study and for some beaches it may not be necessary to till beaches in the subsequent years following nourishment.

Beach hardness impacts can be minimized by placing sand similar to the native beach In some cases, though sediment placed on the beach is similar to the native sediment characteristics and the resultant compaction is similar to the native beach, tilling is still encouraged regardless of compaction levels. It has been suggested that, in some cases, the process of tilling a beach, with compaction levels similar to native beach, may have an effect on sea turtle nesting behavior and nest incubation environment. Research on evaluating tilling impacts to nesting turtles is limited. Therefore, the idea of not tilling beaches (immediately following and/or during consecutive years after construction operations) where compatible sediments are used and compaction levels are similar to the native beach should be taken into consideration on a case-by-case basis in order to account for potential impacts of tilling activities on nest success.

Recognizing the recent literature on beach compaction measurements and associated tilling, as well as and the current concerns with the existing compaction evaluation and subsequent tilling process outlined in the USFWS general compaction guidelines, the USACE, in coordination with NCWRC and USFWS, has initiated a more qualitative approach for post construction compaction evaluations on North Carolina beaches where sediment meets the state compatibility standard. Results from this effort have recognized a reduction in the need for post construction tilling for many disposal and nourishment projects. Considering that only beach quality sediment will be placed on the beach as a component of this project, the USACE will continue to work with the Cape Lookout National Seashore (National Park Service), NCWRC and USFWS in this qualitative post construction compaction and tilling evaluation in order to assure that impacts to nesting and incubating sea turtles are minimized.

f. Lighting.

During beach disposal operations, lighting is required during nighttime activities at both the dredging site and the location on the beach where sediment is being placed. In compliance with the USACE Safety and Health Requirements Manual (2003), a minimum luminance of 30 lm/ft^2 is required for dredge operations and a minimum of 3 lm/ft^2 is required for construction activities on the beach. For dredging vessels, appropriate lighting is necessary to provide a safe working environment during nighttime activities on deck (i.e. general maintenance work deck, endangered species observers, etc.). During beach disposal operations, lighting is generally associated with the active construction zone around outflow pipe and the use of heavy equipment in the construction zone (i.e. bulldozers) in order to maintain safe operations at night.

Since all beach disposal events for the DMMP will take place outside the sea turtle nesting season (November 16 to April 30), the presence of artificial lighting on or within the vicinity of nesting beaches would not be detrimental to nesting female emergence, nest site selection, and the nocturnal sea-finding behavior of both hatchlings and nesting females.

g. Sediment Grain Size Analysis and Color of Maintenance Material Dredged from the Morehead City Harbor Navigation Channel Sediment Placed on Bogue Banks.

Sediments used to replace natural beach sand should match the natural beach as closely as possible in order to minimize environmental effects. While the scientific literature agrees with this statement in principle, there is little data available to quantify precisely what similarity (or difference) is ecologically significant. Dredged material from the Morehead City Harbor project has been disposed of on the beaches of Bogue Banks periodically since 1978 and sediment compatibility (grain size and color) has not been an issue of concern to date.

Over the long term, the speed and degree of ecological recovery largely depend on the physical characteristics of the beach habitat, mainly determined by (1) sediment quality and quantity, (2) the nourishment technique and strategy applied, (3) the location and the size of nourishment and (4) the physical environment prior to nourishment (Speybroeck, J. et al. 2006).

(2) Dredging Impacts.

a. Food Supply.

After leaving the nesting beach, hatchling green and loggerhead turtles head towards the open ocean pelagic habitats (Carr 1987) where their diet is mostly omnivorous with a strong carnivorous tendency in green turtles (Bjorndal 1985). At about 20-25 cm carapace length Atlantic green turtles enter benthic foraging areas and shift to an herbivorous diet, feeding predominantly on sea grasses and algae but may also feed over coral reefs and rocky bottoms (Mortimer 1982). At about 40 to 50 cm carapace length, loggerheads move into shallow water where they forage over benthic hard and soft bottom habitats (Carr 1986). Loggerhead sea turtles feed on benthic invertebrates including mollusks, crustaceans, and sponges (Mortimer 1982) but have also been found to eat fish, clams, oysters, sponges, jellyfish, shrimp, and crabs when near shore. Hawksbill and Kemp's ridley sea turtles are carnivorous (Mortimer 1995) with a principal food source of crustaceans, mollusks, other invertebrates, and fish (Schwartz 1977). Hawksbills feed on encrusting organisms such as sponges, tunicates, bryozoans, mollusks, and algae; whereas Kemp's ridleys feed predominantly on portunid crabs (Bjomdal 1985). Leatherback sea turtles are carnivorous (Mortimer 1995) and

feed primarily on cnidarians and tunicates (salps, pyrosomas) throughout the water column but are commonly observed feeding at the surface (Bjomdal 1985).

Dredging will be performed only within the existing authorized navigation channels within the Inner and Outer Morehead City Harbor and will not affect these resources in the inshore environment. Impacts on benthic habitat within the Nearshore Placement Areas off Bogue and Shackleford Banks will be minor as dredging will only affect a limited portion of the offshore benthic habitat. Hardbottom surveys and subsequent mapping were performed within all proposed placement areas (i.e., within the -25 foot depth of closure from Bogue to Beaufort Inlets and nearshore shore placement areas off Bogue and Shackleford Banks) and diver ground truth surveys were performed to characterize select sites within the -25 foot depth of closure from Bogue to Beaufort Inlets and side scan sonar surveys were completed within the nearshore placement areas. Impacts to sandy bottom foraging habitat are expected to be isolated and short term in duration. Therefore, the project should not significantly affect the food supply of benthic foraging sea turtles along the beach strand or in the offshore placement areas. Considering that leatherbacks feed primarily within the water column on non-benthic organisms, the project should not significantly affect the food supply of this species

b. Relationship to Critical Periods in Life Cycle.

Sea turtles migrate within North Carolina waters throughout the year, mostly between April and December. The dredging of sediment from designated and existing federal navigation channels will be performed using either a pipeline dredge, bucket and barge dredge or a hopper dredge. Hopper dredges potentially pose the greatest risk to benthic oriented sea turtles through physical injury or death by entrainment as the hopper dredge drag heads remove sediment from sea bottom.

In order to minimize potential impacts, hopper dredges will be used from January 1 to March 31, the timeframe when water temperatures are cooler and sea turtle abundance is low, generally <14°C (57.2°F). This hopper dredging window is more stringent than the December 1 to March 31 dates specified in the 1997 Regional Biological Opinion for the Continued Hopper Dredging Of Channels And Borrow Areas In the Southeastern United States. Minor deviations in the January 1 to March 31 dredging window (less than 1 week on either end of the window) may occur if approved by the Wilmington District Commander. However, because some sea turtle species may be found year-round in the offshore area, hopper-dredging activities may occur during low levels of sea turtle migration. Therefore, the proposed hopper dredging activities may adversely affect loggerhead, green, hawksbill, and Kemp's ridley sea turtles. Based on historic hopper dredging take data, leatherback sea turtles are not known to be impacted by hopper dredging operations. The USACE will abide by the provisions of the September 25, 1997 Regional Biological Opinion for The

Continued Hopper Dredging Of Channels And Borrow Areas In The Southeastern United States or any superseding RBO provided by NMFS. To reduce impacts, the USACE anticipates taking certain precautions as prescribed by NMFS and USACE under standard hopper dredging protocol and will maintain observers on hopper dredges for the periods prescribed by NMFS to document any takes of turtle species and to ensure that turtle deflector drag heads are used properly.

(3) Summary Effect Determination.

All five species are known to occur within oceanic waters of the Federal navigation channels; however, only the loggerhead, green, and leatherback sea turtles are known to nest within the limits of the project beach disposal area. Therefore, species specific impacts may occur from both the beach disposal and dredging operations. The proposed DMMP disposal windows are: November 16 through April 30 for a pipeline dredge with disposal on Bogue Banks; and January 1 through March 31 for hopper dredge work. Considering the proposed dredging window to avoid the sea turtle nesting season to the maximum extent practicable, the proposed project may affect, not likely to adversely affect nesting loggerhead, green, and leatherback sea turtles by altering nesting habitat. Since the Kemp's Ridley and Hawksbill sea turtles are not likely to nest on the beaches in the project area, the proposed DMMP is not likely to adversely affect these species.

Though significant alterations in beach substrate properties may occur with the input of sediment types from other sources, re-establishment of a berm and dune system with a gradual slope can enhance nesting success of sea turtles by expanding the available nesting habitat beyond erosion and inundation prone areas. As previously stated, in regards to suitability for nesting, turtles continue to nest on disposal beaches of Bogue Banks with hatch rate successes similar to non-disposal beaches (Matthew Godfrey, Personal Communication, 2010).

In the Morehead City Harbor, hopper dredging takes place only from January 1 to March 31 of any year and complies with the terms and conditions of the Regional Biological Opinion on hopper dredging by NOAA Fisheries, dated September 25, 1997 (NMFS 1997). NMFS Biological Opinion dated September 25, 1997 authorizes the continued hopper dredging of channels and borrow areas in the southeastern United States.

On 18 September 2008, the USACE provided NMFS with a revised Draft South Atlantic Regional Biological Assessment (SARBA). The USACE' SARBA would authorize the following activities: "*Dredging activities in the coastal waters, navigation channels (including designated Ocean Dredged Material Disposal Sites (ODMDS)), and sand mining areas in the South Atlantic Ocean from North Carolina/Virginia Border through and including Key West, Florida and the Islands of Puerto Rico and the U.S. Virgin Islands (USVI)*". Once NMFS provides the

USACE with their Biological Opinion, any new conditions or restrictions would supersede the 1997 NMFS Biological Opinion. Hopper dredging within the Morehead City Harbor would comply with any new conditions and/or restrictions of the new NMFS BO.

As indicated in Section 5.00 of this BA (Commitments to Reduce Impacts), the USACE will comply with all previous agreements with the resource agencies. With these commitments in place, for any USFWS terrestrial environment designated as critical habitat, such as LOGG-T-NC-01(Northern Recovery Unit, North Carolina) , the proposed project will not result in an adverse modification of critical habitat for the threatened loggerhead sea turtle.

Additionally, pursuant to the NMFS Biological Opinion (BO) dated September 25, 1997 and the 2008 USACE revised Draft South Atlantic Regional Biological Assessment (SARBA), the continued hopper dredging of existing navigation channels is authorized and the USACE would comply with all conditions and/or restrictions. Hopper dredging activities will not result in an adverse modification of the NMFS' proposed critical habitat for the threatened loggerhead sea turtle (LOGG-N-3).

The proposed dredging and disposal activities associated with the DMMP may occur in areas used by migrating turtles. Hopper dredges pose a risk to benthic oriented sea turtles through physical injury or death by entrainment. Though the January 1 to March 31 dredging window will avoid periods of peak turtle abundance during the warm water months, the risk of lethal impacts still exist as some sea turtle species may be found year-round in the offshore area. Therefore, the proposed hopper dredging activities may affect, but are not likely to adversely affect the loggerhead, green, hawksbill, and Kemp's ridley sea turtles. Based on historic hopper dredging take data, leatherback sea turtles are not known to be impacted by hopper dredging operations.

4.02.9 Atlantic Sturgeon

a. Status. Endangered. Within Federal Register dated January 6, 2010 (Volume 75, Number 3), NMFS announced a 90-day finding on a petition to list Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) as endangered, or to list multiple distinct population segments (DPSs) as threatened or endangered and designate critical habitat under the Endangered Species Act. NMFS found the petition presents substantial scientific or commercial information indicating that the petitioned actions may be warranted. NMFS published the Final Listing for the Atlantic Sturgeon in the Federal Register dated February 6, 2012. NMFS has listed the Carolina and South Atlantic populations of Atlantic Sturgeon as endangered under the Endangered Species Act of 1973, as amended. This final rule is effective April 6, 2012. However, NMFS has not designated any "*critical habitat*" for this species. Since the Atlantic sturgeon is found within the project

area, the purpose of this section is to address project impacts on this listed species.

b. Occurrence in Immediate Project Vicinity. Although specifics vary latitudinally, the general life history pattern of Atlantic sturgeon is that of a long lived, late maturing, estuarine dependent, an adromous species. The species' historic range included major estuarine and riverine systems that spanned from Hamilton Inlet on the coast of Labrador to the Saint Johns River in Florida (Murawski and Pacheco 1977; Smith and Clungston 1997).

Atlantic sturgeon spawn in freshwater, but spend most of their adult life in the marine environment. Spawning adults generally migrate up river in the spring/early summer; February-March in southern systems, April-May in mid-Atlantic systems, and May-July in Canadian systems (Murawski and Pacheco 1977; Smith 1985; Bain 1997; Smith and Clungston 1997; Caron et al. 2002). In some southern rivers, a fall spawning migration may also occur (Rogers and Weber 1995; Weber and Jennings 1996; Moser et al. 1998).

Atlantic sturgeon spawning is believed to occur in flowing water between the salt front and fall line of large rivers, where optimal flows are 46-76 cm/s and depths of 11-27 meters (Borodin 1925; Leland 1968; Crance 1987; Bain *et al*. 2000). Sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces (e.g., cobble) (Gilbert 1989; Smith and Clungston 1997).

Upon reaching a size of approximately 76-92 cm, the subadults may move to coastal waters (Murawski and Pacheco 1977; Smith 1985), where populations may undertake long range migrations (Dovel and Berggren 1983 and Bain 1997). Tagging and genetic data indicate that subadult and adult Atlantic sturgeon may travel widely once they emigrate from rivers. Subadult Atlantic sturgeon wander among coastal and estuarine habitats, undergoing rapid growth (Dovel and Berggren 1983; Stevenson 1997). These migratory subadults, as well as adult sturgeon, are normally captured in shallow (10-50m) near shore areas dominated by gravel and sand substrate (Stein et al. 2004). Coastal features or shorelines where migratory Atlantic sturgeon commonly aggregate include the Bay of Fundy, Massachusetts Bay, Rhode Island, New Jersey, Delaware, Delaware Bay, Chesapeake Bay, and North Carolina, which presumably provide better foraging opportunities (Dovel and Berggren 1983; Johnson et al. 1997; Rochard et al. 1997; Kynard et al. 2000; Eyler et al. 2004; Stein et al. 2004; Dadswell 2006).

c. Current Threats to Continued Use of the Area. According to the Atlantic sturgeon status review (Atlantic Sturgeon Status Review Team 2007), projects that may adversely affect sturgeon include dredging, pollutant or thermal discharges, bridge construction/removal, dam construction, removal and relicensing, and power plant construction and operation. Potential direct and indirect impacts associated with dredging that may adversely impact sturgeon

include entrainment and/or capture of adults, juveniles, larvae, and eggs by dredging and trawling activities, short-term impacts to foraging and refuge habitat, water quality, and sediment quality, and disruption of migratory pathways.

d. Project Impacts.

(1) Habitat and Food Supply. It is not known how extensively the Morehead City Harbor navigation reaches are used by sturgeon as feeding areas. Furthermore, specific aggregation areas for spawning, feeding, resting, etc. have not been identified for all dredging locations throughout the distribution range for Atlantic sturgeon. However, based on the current understanding of the variables required (ie. salinity regime, depth, substrate, etc.) for various stages of the sturgeon life cycle (ie. spawning, migrating, foraging, etc.), dredging activities presumably create some level of disruption based on their location relative to the life stage requirements. Channels maintained at frequent dredging intervals are not expected to be used extensively for feeding or other activities. As identified in the 2007 Status Review of Atlantic Sturgeon, "Hatin *et al.* (*in press*) tested whether dredging operations affected Atlantic sturgeon behavior by comparing Catch Per Unit Effort (CPUE) before and after dredging events in 1999 and 2000. The authors documented a three to seven-fold reduction in Atlantic sturgeon presence after dredging operations began, indicating that sturgeon avoid these areas during operations." Dredging activities performed in areas identified as known high aggregation areas for spawning, feeding, resting, etc., which require specific measures to minimize impacts, may require separate consultation.

Dredging activities can impact benthic assemblages either directly or indirectly and may vary in nature, intensity, and duration depending on the project, site location, and time interval between maintenance operations. Direct catastrophic impacts include physical removal or smothering by the settlement of suspended materials (Morton 1977; Guillory 1982). Suspended materials may also interfere in the feeding respiration or reproduction of filter feeding benthos and nekton (Sherk and Cronin 1970). Though initial loss of benthic resources are likely, quick recovery between 6-months (McCauley et al. 1977; Van Dolah et al. 1979; Van Dolah et al. 1984; and Clarke and Miller-Way 1992) to two years (Bonsdorff 1980; Ray 1997) is expected; thus, the impacts to sturgeon foraging habitat are expected to be short-term. Recent benthic studies in Savannah Harbor, just prior to annual maintenance dredging, have shown primarily healthy benthic communities both inside and outside the channel. For most sediment types, average abundance and biomass were found to be higher inside the channel compared to locations outside the channel with the exception of silt-sand substrates (USACE 2008). Sturgeon foraging sites with soft mud bottoms and oligohaline or mesohaline salinities tend to recover quickly, likely due to the dominance of opportunistic species assemblages (e.g., *Streblospio benedicti, Capitella capitata, Polydora Ligni*) (Ray 1997). Recovery in dredged sites occurs by four basic mechanisms: remnant (undredged) materials in the sites, slumping

of materials with their resident fauna into the site, adult immigration, and larval settlement. Remnant materials, sediments missed during the dredging operation, act as sources of “seed” populations to colonize recently defaunated sediments. Adult immigration can occur as organisms burrow laterally throughout the sediments, drift with currents and tides, or actively seek out recently defaunated sediments (Ray 1997). Likewise materials slumping or falling into the site from channel slopes provide organisms for colonization (Kaplan et al. 1975). During periods of extreme conditions (i.e. extreme temperature regimes, low dissolved oxygen, etc.), sturgeon may become relatively immobile and forage extensively in one area. Therefore, considering that limited mobility would not allow for sturgeon to move to more productive foraging grounds following dredging activities, it is possible that reduced benthic assemblages during site and time specific conditions could have a more significant impact to foraging behavior.

For benthic assemblages in estuarine and riverine systems, the distribution of individual species is consistent with their known sediment and salinity preferences (polyhaline, mesohaline, and oligohaline). The distribution of each of these assemblages varies depending on the intensity of river flow, often correlated with season (Ray 1997; Posey *et al*. 1996). Therefore, in addition to the anthropogenic dredging impacts to benthic assemblages, natural community shifts are correlated with river flow rates. Considering the ephemeral nature of this environment, the benthic assemblages consist of opportunistic species which are capable of adapting to natural fluctuations in the environment (Ray 1997). Furthermore, assuming that natural benthic community shifts are an inherent component of sturgeon foraging behavior, it is possible that post dredging movements to more productive foraging grounds are not far outside of the normal foraging behavior response to natural benthic community shifts.

Extensive studies have been done on the behavioral responses of fish to increased turbidity. These studies measured reactions such as cough reflexes, swimming activity, gill flaring, and territoriality that may lead to physiological stress and mortality; however, specific studies on sturgeon responses are limited. The effects of suspended sediment on fish should be viewed as a function of concentration and exposure duration (Wilber and Clarke 2001). The behavioral responses of adult salmonids for suspended sediment dosages under dredging-related conditions include altered swimming behavior, with fish either attracted to or avoiding plumes of turbid water (Newcombe and Jensen 1996)

Water quality impacts to sturgeon as a result of proposed dredging activities are expected to be temporary, with suspended particles settling out within a short time frame. These sediment disturbance impacts are expected to be minimal in nature and are not expected to have a measurable effect on water quality beyond the frequent natural increases in sediment load. Considering that no new work or deepening beyond existing authorizations will occur as part of this action, no

significant changes in salinity and tidal amplitude are expected within channels that have been dredged to their fully authorized channel depths and widths.

(2) Relationship to Critical Periods in Life Cycle. Assuming that channel shoaling is a result of transport of sediment from littoral drift or other nearby areas, the composition of maintenance material dredged from the channel is expected to be the same as that remaining upon completion of dredging. Therefore, no impacts to sturgeon from alterations to hydrodynamic regime or additional loss of physical habitat (i.e. changes in benthic substrate) are expected. Understanding that the existing Federal navigation channels will not be deepened and/or widened, no suspension of contaminants is expected from the dredging of previously undisturbed sediments.

(3) Effect Determination. Based on the history of incidental take data collected, both hydraulic (cutterhead and hopper) and mechanical dredge techniques have been documented to directly impact Atlantic sturgeon species through entrainment of the cutterhead or drag head or capture in the clamshell bucket. Hydraulic and mechanical dredging techniques may also indirectly impact sturgeon species through (1) short-term impacts to benthic foraging and refuge habitat, (2) short-term impacts to water and sediment quality from re-suspension of sediments and subsequent increase in turbidity/siltation, and (3) disruption of spawning migratory pathways. Therefore, all proposed hydraulic and mechanical dredging activities, may affect likely to adversely affect the Atlantic sturgeon species either directly or indirectly,

Endangered species observers (ESOs) on board hopper dredges will be responsible for monitoring for incidental take of Atlantic sturgeon. For hopper dredging operations, drag heads as well as all inflow and overflow screening will be inspected for sturgeon species following the same ESO protocol for sea turtles. Furthermore, all ESOs on board the dredge will be capable of identifying Atlantic sturgeon as well as following safe handling protocol as outlined in Moser *et. al.* 2000.

4.02.10 Shortnose Sturgeon

a. Status. Endangered

b. Occurrence in Immediate Project Vicinity. This species ranges along the Atlantic seaboard from southern Canada to northeastern Florida (USFWS 1999b). The shortnose sturgeon feeds on invertebrates and stems and leaves of macrophytes. From historical accounts, it appears that this species was once fairly abundant throughout North Carolina waters, however, many of these early records are unreliable due to confusion between this species and the Atlantic sturgeon (*Acipenser oxyrhynchus*). Because of the lack of suitable freshwater spawning areas in the project area and the requirement of low salinity

waters by juveniles, any shortnose sturgeons present would most likely be non-spawning adults. This species ranges along the Atlantic seaboard from the Saint Johns River in New Brunswick, Canada, to the Saint Johns River, Florida. The distribution of the shortnose sturgeon in the Newport and White Oak Rivers is not known. No known records of the shortnose sturgeon have been documented in the project area. According to Kynard (1997), "No known populations occur from the Delaware River, New Jersey to the Cape Fear River, in North Carolina."

c. Current Threats to Continued Use of the Area. Pollution, blockage of traditional spawning grounds, and over fishing is generally considered to be the principal causes of the decline of this species. The prohibition on taking any sturgeon in North Carolina should help to protect the species from commercial and recreational fishing pressure.

d. Project Impacts.

(1) Habitat. Spawning habitat for the shortnose sturgeon should lie well outside of the project area and should not be affected by the DMMP. Habitat conditions suitable for juveniles and adults could occur within the project area. The presence of juvenile shortnose sturgeon is not likely due to high salinity. Adults are found in shallow to deep water (6 to 30 feet) and will be expected to occupy the river channel during the day and the shallower areas adjacent to the channel during the night.

(2) Food Supply. The shortnose sturgeon is a bottom feeder, consuming various invertebrates and occasionally plant material. Adult foraging activities normally occur at night in shallow water areas adjacent to the deep-water areas occupied during the day. Juveniles are not known to leave deep-water areas and are expected to feed there.

All estuarine bottoms dredged as a part of maintenance will suffer temporary declines in benthic fauna populations in comparison to adjacent undisturbed areas. Existing channel bottoms will continue to be dredged at the same frequency as under existing conditions and will be expected to continue to support benthic populations similar to the existing populations.

Because most of the available shallow water feeding areas adjacent to the channel will not be affected by the project and channel benthic populations should continue to have their existing levels of production, it is believed that the food supply of the shortnose sturgeon will remain essentially at current levels with implementation of the DMMP.

(3) Relationship to Critical Periods in Life Cycle. Because of the mobility of adult and juvenile shortnose sturgeon and infrequent occurrence in the harbor, direct mortality as a result of dredging is not likely to occur.

(4) Effect Determination. Because no known shortnose sturgeon have been documented in the project area, it has been determined that the proposed action is not likely to affect any of this species or its habitat. It is unlikely that the shortnose sturgeon occurs in the project area (F. Rohde, Biologist NMFS, August 13, 2010, pers. comm. and Kynard 1997). However, should it occur, its habitat would be only minimally altered by dredging and disposal of maintenance dredged material. This species feeds on a wide variety of invertebrates and while some food resources may be initially affected by either burial associated with beach disposal, most invertebrates will quickly reestablish from adjacent unaffected areas.
Endangered species observers (ESOs) on board hopper dredges will be responsible for monitoring for incidental take of shortnose sturgeon. For hopper dredging operations, drag heads as well as all inflow and overflow screening will be inspected for shortnose sturgeon species following the same ESO protocol for sea turtles. Furthermore, all ESOs on board the dredge will be capable of identifying shortnose sturgeon as well as following safe handling protocol as outlined in Moser *et. al.* 2000.

Although hopper dredges have been known to impact shortnose sturgeons, this species is not likely to be present in the project area and, therefore, impacts from dredges are not anticipated to occur. Because of the unlikelihood of shortnose sturgeon being present in the project area and because of the precautions being taken with the hopper dredges, it has been determined that the actions of the proposed project are not likely to adversely affect the shortnose sturgeon.

4.02.11 Smalltooth Sawfish

Detailed life history information associated with the life cycle requirements for smalltooth sawfish and a subsequent analysis of impacts from the proposed dredging activities are provided within the following Section 7 consultation document:

USACE. September 2008. Regional Biological Assessment for Dredging Activities in the Coastal Waters, Navigation Channels (including designated Ocean Dredged Material Disposal Sites (ODMDS)), and Sand Mining Areas in the South Atlantic Ocean. USACE, Wilmington District. Submitted to NMFS on 12 September 2008

A summary of project specific information and associated impacts is provided in the ensuing text.

a. Status. Endangered. The U.S. smalltooth sawfish distinct population segment (DPS) was listed as endangered under the ESA on April 1, 2003 (68 FR 15674) and is the first marine fish to be listed in the United States.

b. Occurrence in Immediate Project Vicinity. Historic records suggest that during the 19th century the smalltooth sawfish was a common resident of the Atlantic and Gulf coastal waters of the southeastern United States. Throughout the 20th century it was recorded with declining frequency and today it can be no longer considered a functional member of the nearshore coastal community of the northwest Atlantic. Historic records indicate that the smalltooth sawfish abundantly occurred in the mid-Atlantic region only during the summer months (Adams and Wilson 1995). The smalltooth sawfish range has subsequently contracted to peninsular Florida and, within that area, can only be found with any regularity off the extreme southern portion of the state between the Caloosahatchee River and the Florida Keys (Figure J-4). Smalltooth sawfish are most common within the boundaries of the National Everglades National Park and the Florida Keys, and become less common with increasing distance from this area (Simpfendorfer 2002).

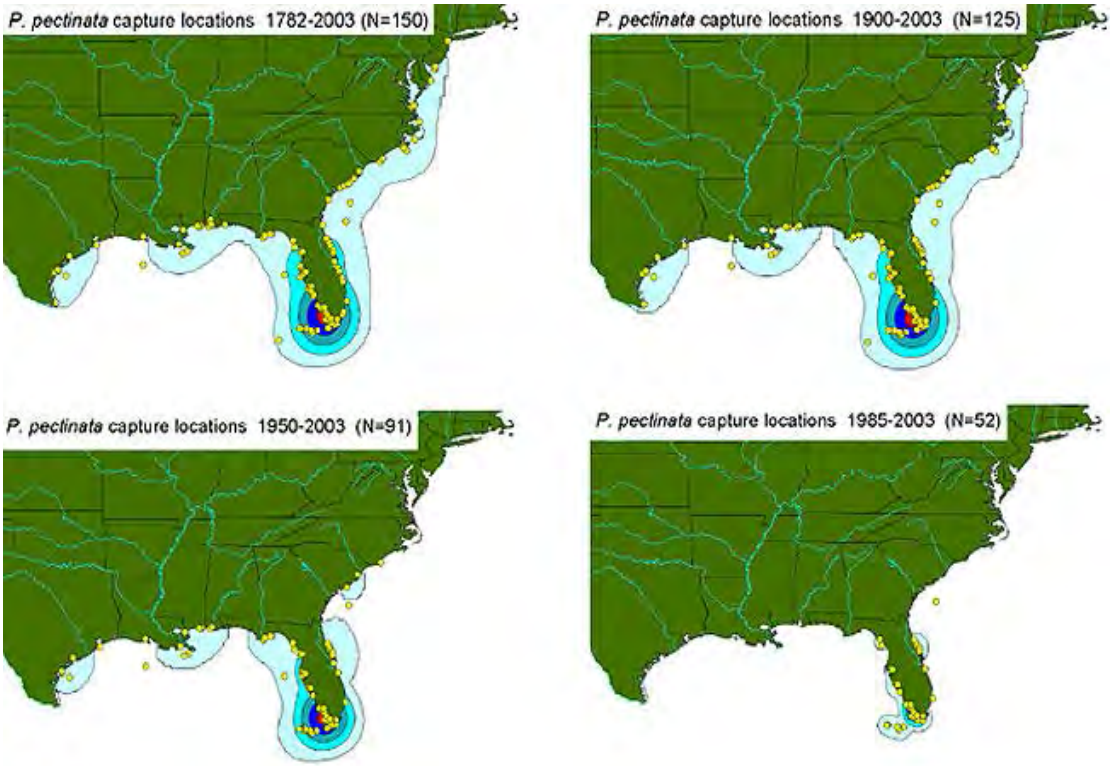

Figure J-4. Historic and Current Distribution of Smalltooth Sawfish in the U.S. (Burgess et al. 2003).

c. Current Threats to Continued Use of the Area. The principal habitats for smalltooth sawfish in the southeast U.S. are the shallow coastal areas and estuaries, with some specimens moving upriver in freshwater (Bigelow and Schroeder 1953). The continued urbanization of the southeastern coastal states has resulted in substantial loss of coastal habitat through such activities as agricultural and urban development; commercial activities; dredge and fill operations; boating; erosion and diversions of freshwater run-off (SAFMC 1998). Smalltooth sawfish may be especially vulnerable to coastal habitat degradation due to their affinity to shallow, estuarine systems. Smalltooth sawfish have historically been caught as by-catch in various fishing gears throughout their historic range, including gillnet, otter trawl, trammel net, seine, and to a lesser degree, hand line. Today, they are occasionally incidentally caught in commercial shrimp trawls, bottom longlines, and by recreational rod-and-reel gear. With the K-selected life history strategy of smalltooth sawfish, including slow growth, late maturation, and low fecundity, long-term commitments to habitat protection are necessary for the eventual recovery of the species. A complete review of the factors contributing to the decline of the smalltooth sawfish can be found in the "Status Review of Smalltooth Sawfish (*Pristis pectinata*)", (NMFS 2000). The Draft Recovery plan for smalltooth sawfish

(NMFS 2006) also presents a detailed threats assessment with four major categories of threats: 1) Pollution; 2) Habitat degradation or loss; 3) Direct injury and 4) Fisheries Interactions. Neither of these discussions will be repeated in detail in this assessment, but are incorporated herein by reference.

d. Project Impacts. As identified in the August 2006 Draft Smalltooth Sawfish Recovery Plan, "habitat effects of dredging include the loss of submerged habitats by disposal of excavated materials, turbidity and siltation effects, contaminant release, alteration of hydrodynamic regimes, and fragmentation of physical habitats (SAFMC 1998). Cumulatively, these effects have degraded habitat areas for smalltooth sawfish." The current range of sawfish has contracted to peninsular Florida and can only be found with any regularity off the extreme southern portion of the state. Smalltooth sawfish occur in shallow estuarine environments and juvenile sawfish are particularly dependent on mangrove habitat.

In the Gulf of Mexico Regional Biological Opinion (GRBO) issued by NMFS on November 19, 2003 (as amended in 2005 and 2007), in the section entitled "Species Not Likely to Be Affected," NMFS concludes the following: **"**Smalltooth sawfish (*Pristis pectinata*) are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern U.S. Currently, their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay. They have been historically caught as by-catch in commercial and recreational fisheries throughout their historic range; however, such by-catch is now rare due to population declines and population extirpations. Between 1990 and 1999, only four documented takes of smalltooth sawfish occurred in shrimp trawls in Florida (Simpfendorfer 2000). After consultation with individuals with many years in the business of providing qualified observers to the hopper dredge industry to monitor incoming dredged material for endangered species remains (Personal Communication, Chris Slay, Coastwise Consulting, August 18, 2003) and a review of the available scientific literature, NOAA Fisheries determined that there has never been a reported take of a smalltooth sawfish by a hopper dredge, and such take is unlikely to occur because of smalltooth sawfishes affinity for shallow, estuarine systems."

(e) Effect Determination. Based on the current South Atlantic distribution of smalltooth sawfish and only one sighting in North Carolina since 1999, dredging impacts to smalltooth sawfish within the project area are unlikely. Additionally, the take of a smalltooth sawfish by any dredge is unlikely considering the smalltooth sawfishes affinity for shallow, estuarine systems as well as the fact that there has never been a reported take of a smalltooth sawfish by a dredge. Therefore, implementation of the DMMP is not likely to adversely affect smalltooth sawfish.

4.02.12 Seabeach Amaranth

a. Status. Threatened

b. Occurrence in Immediate Project Vicinity. Seabeach amaranth is an annual herb that occurs on beaches, lower foredunes, and overwash flats (Fussell 1996). Weakley (1986) found that in North Carolina the plant is most common on overwash flats on accreting ends of barrier islands. This species occupies elevations ranging from 0.2 to 1.5 m above mean high tide (Weakley and Bucher 1992). Historically, seabeach amaranth was found from Massachusetts to South Carolina. But according to recent surveys (USACE 1992-2002), its distribution is now restricted to North and South Carolina with several populations on Long Island, New York. The decline of this species is caused mainly by development of its habitat, such as inlet areas and barrier islands, and increased ORV and human traffic, which tramples individuals (Fussell 1996). Seed dispersal of seabeach amaranth is achieved in a number of ways, including water and wind dispersal (USFWS 1995).

Seabeach amaranth usually grows between the seaward toe of the dune and the limit of the wave uprush zone. Greatest concentrations of seabeach amaranth occur near inlet areas of barrier islands, but in favorable years many plants may occur away from inlet areas. It is considered a pioneer species of accreting shorelines and stable foredune areas.

Since 1991, the USACE has surveyed Bogue Banks for seabeach amaranth. Table J-6 indicates numbers of plants were found on Bogue Banks.

Table J-6. Number of seabeach amaranth growing on Bogue Banks.

Year - Number of Plants	Year - Number of Plants
1992 - 2,557	2002 – 2,001
1993 – 3,762	2003 – 5,330
1994 – 1,181	2004 – 2,935
1995 – 14,776	2005 – 10,712
1996 – none (Hurricanes Bertha & Fran),	2006 – 251
1997 – 81	2007 – 130
1998 – 3,973	2008 – 313
1999 – 218	2009 – 281
2000 – 20	2010 – 69
2001 – 347	

These numbers include the Towns of Emerald Isle and Indian Beach/Salter Path, which is not within the project area. Between 1996 and 2010, at least seven hurricanes (Bertha, Fran, Bonnie, Dennis, Floyd, Irene, and Isabel) have affected

this area. Seabeach amaranth populations on Bogue Banks may have fluctuated because of these named storms.

Shackleford c. Current Threats to Continued Occurrence in the Project Area. Beach erosion is probably the primary threat to the continued presence in the area since the population was thriving prior to the recent frequent occurrence of hurricanes. However beach bulldozing and sand fencing by private interests may have affected the population on Bogue Banks.

d. Project Impacts.

(1) Habitat. New populations of sea beach amaranth have been observed following sand disposal on other beaches where sand has been placed by the USACE. Beach disposal will not occur in the inlet area where amaranth most commonly occurs.

(2) Relationship to Critical Periods in Life Cycle. Beach disposal would occur on Bogue Banks (only) and would be conducted from November 16 to April 30 of any given year, during these colder months when the plants have not germinated. If there is sufficient material, beach disposal activities on Pine Knoll Shores may take place during the warmer months (within the beach disposal window). While such disposal is not an ideal management practice for the species, the restoration of the habitat is of prime importance. The project area would be included in the USACE monitoring program during the seabeach amaranth growing season for the life of the beachfill.

(3) Effect Determination. Disposal on any portion of the beaches in the growing season may slow population recovery over the short term. Therefore, the project “may affect but is not likely to adversely affect” seabeach amaranth.

5.00 COMMITMENTS TO REDUCE IMPACTS TO LISTED SPECIES

The following is a summary of environmental commitments to protect listed species related to the construction and maintenance of the proposed project. These commitments address agreements with resource agencies and construction practices:

1. The USACE will strictly adhere to all conditions outlined in the most current National Marine Fisheries Service RBO for dredging of channels and borrow areas in the southeastern United States. Furthermore, as a component of this project, hopper dredging activities occur within the dredging window of January 1 to March 31 in order to avoid periods of peak sea turtle abundance. The use of turtle deflecting dragheads, inflow and/or overflow screening, and NMFS certified turtle and whale observers will also be implemented.

2. NMFS certified endangered species observers (ESOs) will be on board all hopper dredges and will record all large whale sightings and note any potential behavioral impacts. The USACE and the Contractor will keep the date, time, and approximate location of all marine mammal sightings. Care will be taken not to closely approach (within 300 feet) any whales, manatees, or other marine mammals during dredging operations or transportation of dredged material. An observer will serve as a lookout to alert the dredge operator and/or vessel pilot of the occurrence of these animals. If any marine mammals are observed during other dredging operations, including vessel movements and transit to the dredged material disposal site, collisions shall be avoided either through reduced vessel speed, course alteration, or both.

3. The USACE will avoid the sea turtle nesting season. Disposal of beach compatible sediment on Bogue Banks will take place from November 16 to April 30 and from January 1 to March 31 if a hopper dredge is used.

4. The beach will be monitored for escarpment formation by the Contractor prior to completion of beach disposal activities. Escarpments which exceed 18 inches in height for a distance of 100 ft. will be leveled by the Contractor. . If it is determined that escarpment leveling is required during the nesting or hatching season, leveling actions should be directed by the USFWS and the Cape Lookout National Seashore (National Park Service).

5. Only beach quality sediment will be placed on the beach as a component of the DMMP. Post nourishment beach compaction (hardness) will be evaluated by the USACE, in coordination with the NCWRC and USFWS, using qualitative assessment techniques to assure that impacts to nesting and incubating sea turtles are minimized and, if necessary, identify appropriate mitigation responses.

6. Monitoring for seabeach amaranth on Bogue Banks will be implemented to assess the post nourishment presence of plants. This survey will broken down into survey reaches for each town in accordance with the designated USACE sea beach amaranth survey reaches from 1991-2010 in order to maintain consistent data and survey techniques over time and results will be provided to USFWS.

7. The USACE will implement precautionary measures for avoiding impacts to manatees during construction activities as detailed in the “Guidelines for Avoiding Impacts to the West Indian Manatee in North Carolina Waters” established by the USFWS.

SUMMARY EFFECT DETERMINATION

Threatened and endangered species summary effect determination for beach disposal and dredging activities associated with the proposed project area (No Effect (NE – green); May Affect Not Likely to Adversely Affect (MANLAA – orange); May Affect Likely to Adversely Affect (MALAA – red), and Not Likely to Adversely Modify (NLAM - orange) Critical Habitat.

Listed Species Within Project Area		Effect Determination	
		Beach Placement Activities (USFWS)	In-Water Dredging Activities (NMFS)
Sea Turtles	Leatherback	MANLAA	MANLAA
	Loggerhead	MANLAA	MALAA
	Green	MANLAA	MALAA
	Kemp's Ridley	NE	MALAA
	Hawksbill	NE	MALAA
Large Whales	Blue, Finback, Sei, and Sperm	NE	NE
	NARW	NE	MANLAA
	Humpback	NE	MANLAA
West Indian Manatee		NE	MANLAA
Roseate Tern		NE	NE
Red Knot		MANLAA	NE
Piping Plover and Critical Wintering Habitat		MANLAA/NLAM	NE
Atlantic Sturgeon		NE	MALAA
Shortnose Sturgeon		NE	NE
Smalltooth Sawfish		NE	NE
Seabeach Amaranth		MANLAA	NE
	Rough-Leaved Loosestrife	NE	NE
	rare butterfly (*Atrytonopsis* new species 1)	NE	NE
	American Alligator	NE	NE
	Eastern Cougar	NE	NE
	Red-cockaded Woodpecker	NE	NE

Table J-7. T&E species effects determination for beach disposal and dredging activities associated with the proposed project area (Notes: No Effect (NE = green), May Affect Not Likely to Adversely Affect (MANLAA = orange), and May Affect Likely to Adversely Affect (MALAA = red).

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APPENDIX K

CUMULATIVE IMPACT ASSESSMENT

Cumulative Impact Assessment

The Council on Environmental Quality (CEQ) defines cumulative impact as:

*The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (*40 CFR 1508.7). This analysis follows the 11-step process outlined by the Council on Environmental Quality (CEQ) in their 1997 publication Considering Cumulative Effects Under the National Environmental Policy Act (see Table K-1).

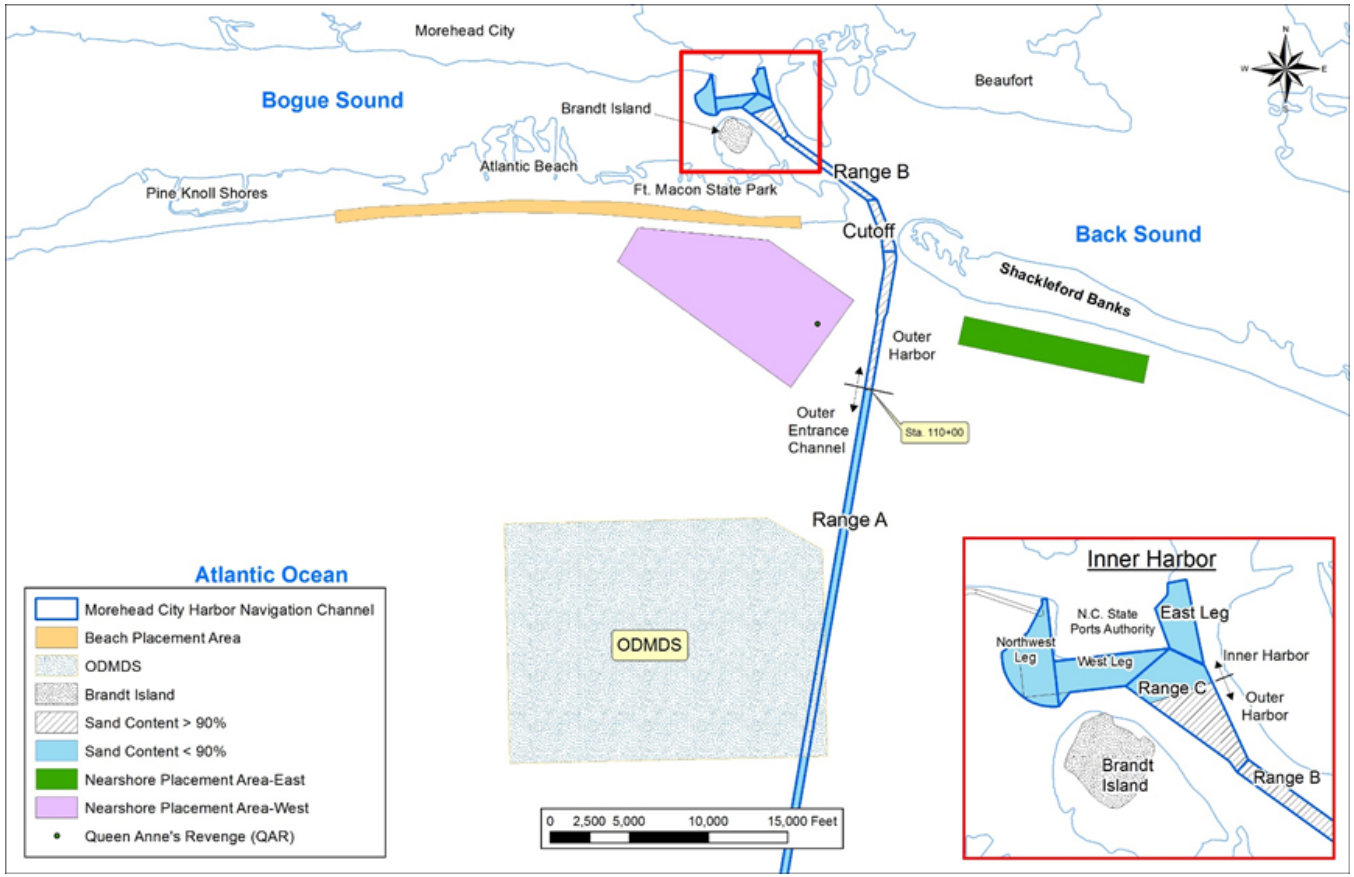

Figure K-1. Morehead City Harbor DMMP showing Ranges and Dredged Material Disposal Areas

Table K-1. Steps in the Cumulative Effects Analysis (as adapted from CEQ 1997)

Environmental Impact Assessment Components	**CEQ Steps**
I. Scoping	a. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals. b. Establish the geographic scope for the analysis. c. Establish the time frame for the analysis. d. Identify other actions affecting the resources, ecosystems, and human communities of concern.
II. Describing the Affected Environment	a. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. b. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds. c. Define a baseline condition for the resources, ecosystems, and human communities.
III. Determining the Environmental Consequences	a. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities. b. Determine the magnitude and significance of the cumulative effects. c. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects. d. Monitor the cumulative effects of the selected alternative and adapt management.

In order to reduce duplication, additional detailed information on Scoping, the Affected Environment, and the Environmental Consequences are found in Sections 7.1, 4.0, and 5.0 of the Final Integrated DMMP and EIS (here after referred to as the DMMP). The proposed monitoring plan is found in Appendix F of the DMMP.

I. Significant Cumulative Effects Issues

A. Introduction. This assessment of cumulative impacts will focus on impacts of the proposed action on significant coastal shoreline resources off Bogue and Shackleford Banks. Additionally, the future construction and expansion activities of the North Carolina State Port Authority in Morehead City and Carteret

County's Beach renourishment plans for Bogue Banks will be included in this assessment.

The DMMP impacts would deal with the future maintenance dredging of the existing Federal navigation channels and placement areas indicated in Figure K-1: the existing upland diked disposal area on Brandt Island, Bogue Banks beaches, nearshore areas off Bogue and Shackleford Banks, and the US EPA approved Morehead City ODMDS.

In making this assessment, the US Army Corps of Engineers, Wilmington District (USACE) has reviewed the reports mentioned in Tables K-2 and K-3. Additionally, the following reports included comprehensive assessments of state-wide cumulative impacts:

1. U.S. Army Corps of Engineers Draft Evaluation Report and Environmental Assessment, Morehead City Harbor Section 933, dated May 2003

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

3. U.S. Army Corps of Engineers Final Integrated General Reevaluation Report and Environmental Impact Statement, on Coastal Storm Damage Reduction, Surf City and North Topsail Beach, North Carolina, dated November 2010.

In discussing the potential cumulative impacts of the placement of sediment within the nearshore areas, and the beaches of Bogue Banks, the USACE considered time crowded perturbations, and space crowded perturbations, as defined below, to be pertinent to this action.

Time crowded perturbations *– repeated occurrence of one type of impact in the same area.*
Space crowded perturbations *– a concentration of a number of different impacts in the same area.*

B. Future Port Expansion and Carteret County's Renourishment Projects in the Project Area.

North Carolina State Ports Authority (NCSPA) Radio Island Expansion. The NCSPA maintains harbor facilities that are adjacent to the federally maintained navigation channel in Morehead City Harbor. These areas include berthing areas along the face of the Morehead City State Port wharfs and facilities along Radio Island. Maintenance of these facilities is required to realize the benefits of having a channel leading to the port. Maintenance of these areas is usually performed at the same time that the maintenance of the Federal portion is accomplished.

In addition, the NCSPA is pursuing port industrial development on Radio Island (NCSPA 2001). The adjacent deep-water Federal navigation channel, the short distance to the open Atlantic Ocean, and existing rail and road access contribute to the benefits of this site for port development. The North Carolina State Ports Authority (NCSPA) property also includes approximately 185 acres of Radio Island, including the former Aviation Fuel Terminal Inc. The public uses the eastern portion of Radio Island, known as East Beach, for recreational purposes. The northern end of the island contains a mix of residences, privately owned land, and marine-related businesses. The southern tip of the island is owned by the US Navy and is used for military deployment activities. A new general cargo facility is proposed for Radio Island. The new facility would include 2,000 feet of wharf, 300,000 square feet of warehouse space, support buildings, dredging from the Morehead City Channel to the face of the new wharf on Radio Island, and improvements to the road and rail access on Radio Island. The proposed Radio Island project consists of two 1,000-foot berths constructed using a sheet-pile bulkhead. The face of the wharf would be located 700 feet from the near channel line of Morehead City Channel. Dredging will be required between the existing channel and the proposed wharf to allow for the maneuvering and docking of ships at the wharf. Dredging of approximately 37 acres of estuarine bottom to a depth of 45 feet would be required to connect the proposed berths to Morehead City Channel. The construction of the proposed project will require the dredging of approximately 1.7 million cubic yards of dredge material.

Currently the NCSPA has not obtained the necessary authorizations from the Regulatory Division, Wilmington District, USACE (i.e., Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act permits) and the State of North Carolina (i.e., Section 401 Water Quality Certificate, Air Quality permit, Consistency Determination, CAMA permits, etc.) to complete this activity. Moreover, funding for the proposed port expansion has not been approved by the North Carolina State Legislature. No new or existing customer of the port facility has requested to fund this proposed action (Personal Communication, Mr. Todd Walton, Environmental Supervisor, NCSPA, October 19, 2011).

At this time, the NCSPA does not know when or if this expansion project will be completed. Nor does the NCSPA know the specific disposal locations of the approximately 1.7 million cubic yards of dredged material and/or the maintenance interval of the expanded harbor channels. Discussions with representatives from the NCSPA (Personal Communication, Mr. Todd Walton, Environmental Supervisor, NCSPA, October 19, 2011) indicate that the NCSPA are still interested in pursuing this action but they don’t know when or if this will occur.

Figure K-2, below depicts the proposed NCSPA Port Expansion on Radio Island.

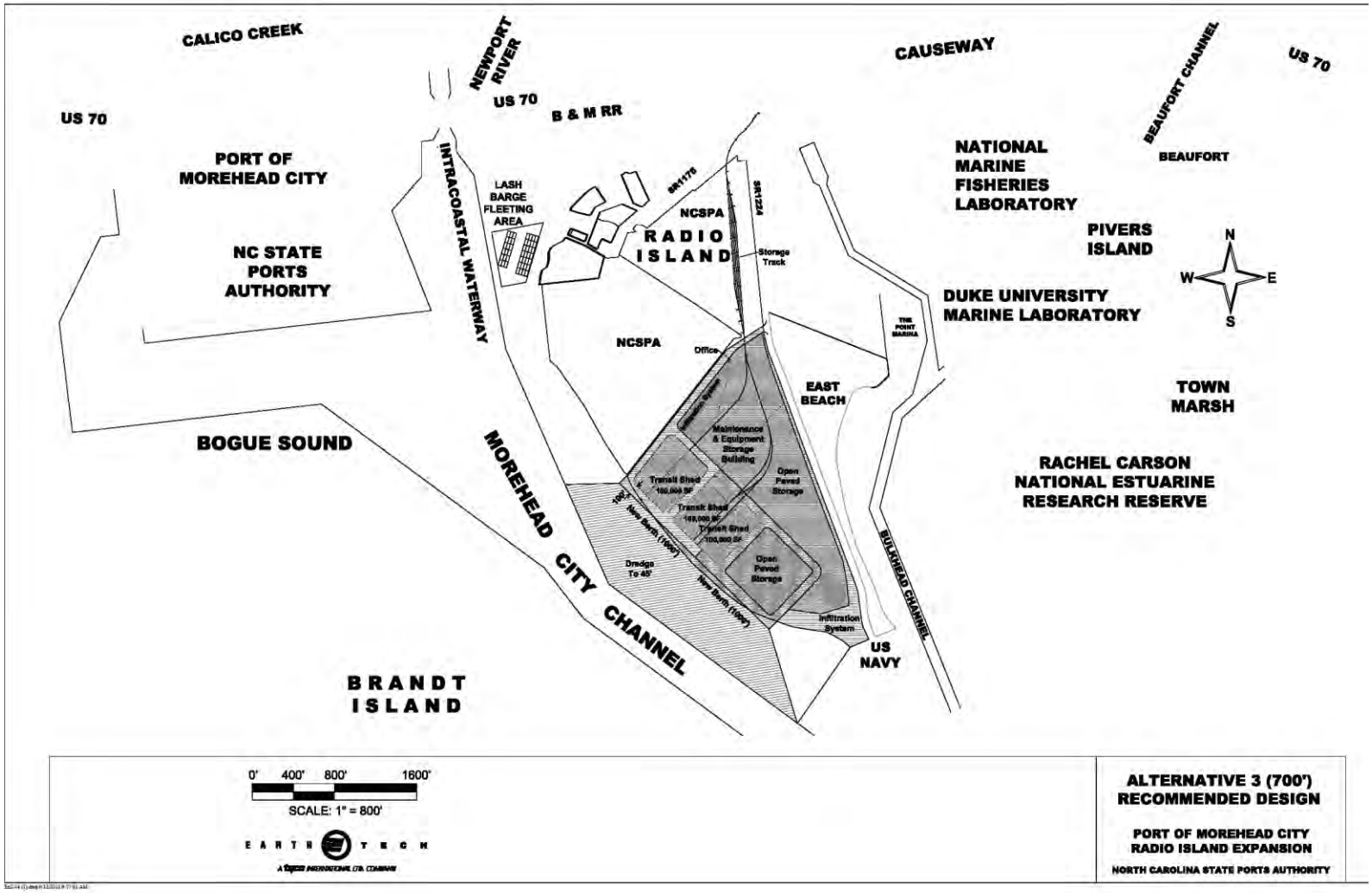

Figure K-2. Proposed NCSPA Port Expansion on Radio Island.

Carteret County's Beach Renourishment plans for Bogue Banks. The following information provides the current status of this project and was taken from Carteret County's Protect the Beach website:

The Bogue Banks Beach Master Nourishment Plan (Master Plan) was formally initiated in 2010. The anticipated completion date for the Master Plan effort (engineering report, environmental document, and final permit decision) is mid 2015.

The Master Plan will evaluate present-day beach conditions, review and reassess the effectiveness of Bogue Banks beach nourishment projects constructed the past decade and develops a new nourishment plan based on volumetric/beach elevation thresholds for Pine Knoll Shores, Indian Beach/Salter Path, and Emerald Isle. Carteret County is assuming Atlantic Beach and Fort Macon's nourishment needs will be met by utilizing dredged material from the Morehead City Harbor Federal Navigation Project. However, Atlantic Beach is included in the overall effort as a contingency wing of the Master Plan and in the spirit of developing a regional nourishment plan. If Federal operation and maintenance funding for the Morehead City Harbor dissipates in the future, then the needs for Atlantic Beach will even be more pressing and again warrant participation in regional planning.

Bogue Banks Carteret County Coastal Storm Damage Reduction Project. The U.S. Army Corps of Engineers',Bogue Banks Coastal Storm Damage Reduction Project is a Civil Works project, which is designed and partially funded by the Corps. It is often referred to as the "50-year project" because the nourishment effort includes initial construction and subsequent periodic maintenance for 50 years. The Final Integrated Feasibility Report and Environmental Impact Statement, Coastal Storm Damage Reduction, Bogue Banks, Carteret County, NC, was completed in August 2014. To date, a Record of Decision (ROD) has not been completed.

II. Geographic Scope of the Cumulative Impact Assessment

The geographic scope of this Cumulative Impact Assessment will be from Cape Lookout to Cape Fear, a distance of about 115 miles of beaches. The immediate project area is defined as in the vicinity of Bogue and Shackleford Banks. The following numbers are approximate and are used throughout this assessment: Of this 115 miles of beaches, approximately 8% (9 miles) are located within the National Park Service, 10% (11 miles) are within USMC, Camp Lejeune, 11% (12 miles) are State owned, 63% (74 miles) are developed, and 8% (9 miles) are privately owned/developed. Additionally, of the 115 miles of beaches in the geographic scope of this assessment approximately 47% (54 miles) have been designated within the Coastal Barrier Resource System by the USFWS. Table K-4 further discusses these beach classifications.

This analysis will focus on cumulative impacts of the dredged material disposal sites for the Morehead City Harbor DMMP. Figure K-3 shows all of these proposed DMMP sediment disposal areas. The upland diked disposal area on Brandt Island, the approximate 10.5 miles of inlet influenced ocean beach on Bogue Banks (from about Pine Knoll Shores to Fort Macon State Park), the existing 559 acre nearshore placement area off Bogue Banks, and the US EPA approved ODMDS have received dredged sediment in the past. The new or revised disposal/placement areas would be the following:

1. An additional 1,209 acres of nearshore placement area off Bogue Banks (total of 559 existing plus 1,209 or 1,768 acres), and

2. A 1,094-acre nearshore placement area off Shackleford Banks.

The entire 25 miles of Bogue Banks beaches from Emerald Isle to Fort Macon State Park have been previously renourished by the County and/or used as a sediment placement area for the maintenance of the Federal navigation channels in Morehead City Harbor.

Figure K-3. Proposed Disposal Areas for the Morehead City Harbor DMMP.

III. Time Frame

This analysis considers known past, present, and the reasonably foreseeable future, sand placement and/or beach nourishment projects within the geographic scope of the project. The geographic scope is defined from Cape Lookout to Cape Fear or about 115 miles of beaches.

The USACE has maintained the existing federal navigation channels in Morehead City Harbor since 1910. The proposed DMMP addresses dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, and potential for beneficial use of dredged material and indicators of continued economic justification. This DMMP will ensure sufficient disposal capacity for the 20-year period beginning in 2016 and extending through 2035.

At the project vicinity scale the cumulative assessment considers past periodic beach disposal of Morehead City Harbor maintenance material about every 2 to 3 years along portions of Atlantic Beach and Fort Macon since about 1979. Carteret County has also constructed its own beach nourishment project along Pine Knoll Shores, Salter Path, Indian Beach, and Emerald Isle in 2001/2002 (Phase 1), in 2002/2003 (Phase 2), and in 2003/2004 (Phase 3).

This assessment also includes the one time disposal of maintenance material on Indian Beach, Salter Path, Pine Knoll Shores, Atlantic Beach, and Fort Macon under Section 933 starting in 2003/2004. In the winter of 2007, beach disposal of maintenance material along Pine Knoll Shores under Section 933 was completed.

This assessment assumes continued periodic beach disposal of maintenance material along Fort Macon and Atlantic Beach. Construction of the West Onslow Beach and New River Inlet (Topsail Beach), which are proposed beach nourishment projects. The cumulative analysis also considers the potential that future federal (i.e. Brunswick County Beaches, Bogue Banks, etc.) and non-federal (i.e. Topsail Beach, Bald Head Island, Figure Eight Island, etc.) beach nourishment projects under study could be constructed.

IV. Actions Affecting Resources of Concern

A. Actions Affecting Aquatic Resources.

Dredging the existing Morehead City Harbor Navigation Channel.

Impacts on Nekton. See Section 4.5.1 of the DMMP.

Dredging Impacts. See Section 4.5 of the DMMP.

Entrainment Impacts. See Section 4.5.5 of the DMMP.

Impacts on Benthic organisms. See Section 4.5.3 of the DMMP.

B. Actions Affecting Beach Resources

The Geographic Area considered in this analysis includes Cape Lookout to Cape Fear, about 115 miles of beaches. The major sources of beach impacts are local beach maintenance activities (which include local beach nourishment), disposal of dredged material from maintenance of navigation channels, and beach nourishment (berm and dune construction with long-term periodic maintenance). Of particular concern are macroinvertebrate (section 4.5 of the DMMP), fisheries (section 4.5 of the DMMP), shorebird (section 4.7 of the *DMMP*), and sea turtle species (Section 4.8 and Appendix J of the DMMP) that utilize or occur on or adjacent to ocean beaches. These resources are also impacted by natural events and anthropogenic activities that are unrelated to disposal of sand on the beach as discussed below.

Local Maintenance Activity: Under the existing condition, the 10.5 mile long potential beach disposal area at Bogue Banks is subjected to repeated and frequent maintenance disturbance by individual homeowners and local communities following major storm events. These efforts are primarily made to protect adjacent shoreline property. Such repairs consist of dune rebuilding using sand from beach scraping and/or upland fill. Limited fill and sandbags are generally used to the extent allowable by CAMA permit. Such frequent maintenance efforts could keep the natural resources of the barrier island ecosystems from re-establishing a natural equilibrium with the dynamic coastal forces of the area.

Cape Lookout National Seashore (NPS) does not maintain the existing ocean beach on Shackleford Banks. No dune rebuilding, beach scraping, or installation of sandbags takes place along the beach strand on Shackleford Banks.

Non-Federal Beach Nourishment: Local efforts (i.e., Carteret County) can also include beach nourishment such as that conducted along Pine Knoll Shores, Salter Path, Indian Beach, and Emerald Isle by local interests in 2001-2004. The number of locally funded beach nourishment activities has increased significantly since 2004 along other developed North Carolina beaches. Though non-federal beach nourishment efforts continue to increase, many of these projects are being pursued as one-time interim efforts until the federal beach nourishment projects can be implemented. Therefore, this increase permitted non-federal projects does not necessarily reflect a subsequent increase in resource acreage impacts. Many of the non-federal projects occur within projects which are under study (i.e. Bogue Banks). Beaches that have been nourished under permit, or may be permitted to be nourished, include, but are not limited to: Bogue Banks, North Topsail Beach, Topsail Beach, Figure Eight Island, and Bald Head Island (Table

K-2). Individually, these projects total approximately 47 miles of beach or about 41% (47 miles/115 miles) of North Carolina beaches within the geographic scope of the assessment area. These frequent maintenance efforts could keep the natural resources of the barrier island ecosystems from reestablishing a natural equilibrium with the dynamic coastal forces of the area.

Federal (USACE) Beach Nourishment: Federal beach nourishment activities typically include the construction and long-term (50-year) maintenance of a berm and dune. The degree of cumulative impact would increase proportionally with the total length of beach nourishment project constructed. The first federal North Carolina beach nourishment projects were constructed at Carolina and Wrightsville Beaches in 1965, and totaled approximately 6.4 miles. An additional 3.8 miles of federal beach nourishment project was constructed in 1975 at Kure Beach. Most of the remaining developed North Carolina beaches (including the proposed project area) are currently under study by the Wilmington District for potential future beach nourishment projects (Table K-2). Individually, these existing or proposed federal projects total approximately 51 miles of beach or 44% (51 miles/115 total miles) of North Carolina beaches in the geographic scope of the assessment. Considering all existing and proposed federal and non-federal nourishment projects, and recognizing that some of the projects are overlapping or represent the same project area, approximately 98 miles or 85% (98 miles/115 total beach miles) of the North Carolina coast in the geographic scope could have private or federal beach nourishment projects by 2015.

Table K-2. Summary of federal and non-federal beach nourishment projects in North Carolina (Cape Lookout to Cape Fear) that have recently occurred, are currently underway, or will occur in the reasonably foreseeable future. (This list does not include all small scale beach fill activities (i.e. dune restoration, beach scraping, etc.). (* - federal or non-federal projects which may utilize the same borrow sources and/or overlap beach disposal locations).

Federal / Non-Federal	Project	Source of Sand for Nourishment	Beachfront Nourished	Approximate Length of Shoreline (miles)	Approximate Distance From the MHC DMMP Project Area (miles)
Federal	Cape Lookout National Seashore -East Side of Cape Lookout Lighthouse	Channel	East Side of Cape Lookout Lighthouse	1	10
	*Beaufort Inlet Dredging - Section 933 Project (Outer Harbor)	Beaufort Inlet Outer Harbor	Indian Beach, Salter Path, and Portions of Pine Knoll Shores	7	5
	*Beaufort Inlet and Brandt Island Pumpout - Section 933 (Disposal on Eastern Bogue Banks)	Beaufort Inlet Inner Harbor and Brandt Island Pumpout	Fort Macon and Atlantic Beach	4	0
	*Bogue Banks, NC (Coastal Storm Damage Reduction)	Offshore Borrow Areas	Communities of Bogue Banks	24	5
	Surf City and North Topsail Beach - (Coastal Storm Damage Reduction)	Offshore Borrow Areas	Surf City and North Topsail Beach	10	40
	*West Onslow Beach New River Inlet (Topsail Beach) (Coastal Storm Damage Reduction)	Offshore Borrow Areas	Topsail Beach	6	50
	Wrightsville Beach (Coastal Storm Damage Reduction)	Masonboro Inlet and Banks Channel	Wrightsville Beach	3	80
	Carolina Beach and Vicinity, NC Carolina Beach Portion (Coastal Storm Damage Reduction)	Carolina Beach Inlet	Carolina Beach	2	85
	Carolina Beach and Vicinity, NC Kure Beach Portion (Coastal Storm Damage Reduction)	Wilmington Harbor Confined Disposal Area 4 and an Offshore Borrow Area	Kure Beach	2	85
Non-Federal	*Emerald Isle FEMA Project	Offshore Borrow Areas - Morehead City Port Shipping Channel (ODMDS)	Emerald Isle	4	10
	*Bogue Banks FEMA Project	Offshore Borrow Areas – Morehead City Port Shipping Channel (ODMDS)	Emerald Isle (2 segments), Indian Beach, Salter Path, Pine Knoll Shores	13	5
	*Bogue Banks Restoration Project – Phase I – Pine Knoll Shores and Indian Beach Joint Restoration	Offshore Borrow Areas	Pine Knoll Shores and Indian Beach	7	10
	*Bogue Banks Restoration Project – Phase II – Eastern Emerald Isle	Offshore Borrow Areas	Indian Beach and Emerald Isle	6	20
	*Bogue Banks Restoration Project – Phase III– Bogue Inlet Channel Realignment Project	Bogue Inlet Channel	Western Emerald Isle	5	15
	*North Topsail Dune Restoration (Town of North Topsail Beach)	Upland borrow source near Town of Wallace, NC	North Topsail Beach	NA	40
	*North Topsail Beach Shoreline Protection Project	New River Inlet Realignment and Offshore Borrow Area	North Topsail Beach	11	40
	*Topsail Beach - Beach Nourishment Project	New Topsail Inlet Ebb Shoal and Offshore Borrow areas	Topsail Beach	6	40
	Figure Eight Island	Banks Channel and Nixon Channel	North & South Sections of Figure Eight Island	3	70
	Rich Inlet Management Project	Relocation of Rich Inlet	Figure Eight Island	NA	60
	Mason Inlet Relocation Project	Mason Inlet (new channel) and Mason Creek	North end of Wrightsville Beach and south end of Figure Eight Island	2	65

Federal (USACE) Navigation Channel Disposal of Dredged Material: Maintenance material from dredging in the vicinity of Morehead City Harbor has historically been disposed along about 6 miles of beach including the Town of Atlantic Beach and Fort Macon. Throughout the geographic scope of this assessment, a total of approximately 17 miles of beach or about 15% or (17 miles/115 total miles) of North Carolina beaches are authorized for disposal of beach quality dredged material from maintenance dredging of navigation channels (see Table K-3). However, not all of these projects are routinely dredged and a majority of the authorized disposal limits are not actually disposed on to the full extent. Additionally, many of the authorized placement/disposal limits overlap with existing federal or non-federal beach projects. The USACE currently uses up to about 50 percent of the length of beach in North Carolina that is approved for this purpose and does not anticipate significant increases in beach disposal in the foreseeable future.

Table K-3 Summary of dredged material disposal activities on North Carolina (Cape Lookout to Cape Fear) ocean front beaches associated with navigation dredging. Projects listed and associated disposal locations and quantities may not be all encompassing and represent an estimate of navigation disposal activities for the purposes of this cumulative impacts assessment. (* - Navigation disposal sites which may overlap with existing Federal or Non-Federal beach nourishment projects).

PROJECT		DISPOSAL LOCATION	APPROVED DISPOSAL LIMITS	ESTIMATED ACTUAL DISPOSAL LIMITS	ESTIMATED QUANTITY (CY)	COMMENTS
Beaufort	***Morehead City (Brandt Island)**	2,000 ft west of inlet, Fort Macon and Atlantic Beach to Coral Bay Club, Pine Knoll Shores	7.3 miles (38,300 lf)	5.2 miles or 27,800 linear feet	3.5 million every 8 yrs	Material from Ocean Bar routinely placed in nearshore berm or ODMDS on annual basis
	***AIWW Section I, Tangent B**	Pine Knoll Shores, vicinity of Coral Bay	2 miles (10,500 lf)	0.4 miles or 2,000 linear feet	<50,000 every 5 yrs	This area is included every 8 years as part of the pumpout for Brandt Island. Also included in the area under investigation for beach nourishment at Bogue Banks.
Swansboro	***AIWW Bogue Inlet Crossing Section I, Tangent-H through F**	Approx. 2,000 feet from inlet going east to Emerald Point Villas, Emerald Isle (Bogue Banks)	1mile (5,280 lf)	0.4 miles or 2,000 linear feet	<100,000 annually	
Browns Inlet	**AIWW Section II, Tangents-F,G,H**	Camp Lejeune, 3,000 feet west of Browns Inlet extending westward	1.58 miles (6,000 lf)	1 mile or 5,280 linear feet	<200,000 every 2 yrs	
New River Inlet	***AIWW, New River Inlet Crossing Section II, Tangents I & J, Channel to Jax. Section III, tangents 1&2**	N. Topsail Beach, 3,000 feet west of inlet extending westward to Maritime Way (Galleon Bay area)	1.5 miles (8,000 lf)	0.8 miles or 4,000 linear feet	<200,000 annually	Two areas 2,000 linear feet on either side of disposal area are routinely used.
Hampstead	***AIWW, Sect. III**	Topsail Island, Queens Grant	0.6 miles (2,500 lf)	0.6 miles or 2,500 lf	<50,000 every 6 yrs	
	***AIWW, Topsail Inlet Crossing & Topsail Creek**	Topsail Beach, from a point 2,000 feet north of Topsail Inlet	1 mile (5,280 lf)	0.4 mi or 2,000 ft	<75,000 annually	
Wrightsville Beach	**AIWW Sect. III,Tang 11&12 Mason Inlet Crossing**	Shell Island (north end of Wrightsville Beach from a point 2,000 feet from Mason Inlet	0.4 miles (2,000 lf)	0.4 mi. or 2,000 lf	<100,000	Not recently required since the inlet crossing closed up. If reopened will be rescheduled if needed
	***Masonboro Sand Bypassing**	At a point 9,000 feet from jetty extending southward midway of island	1.2 miles (6,000 lf)	1 mile 5,280 lf	500,000 every 4 years	Same time as Wrightsville Beach Nourishment
Carolina Beach	**AIWW, Section IV, Tangent 1**	Southern end of Masonboro Island at a point 2,000 linear feet from Carolina Beach Inlet extending northward to Johns Bay area	1.3 miles (7,000 lf)	0.4 miles (2,000 linear feet)	<50,000 annually	This site is used alternately with Carolina Beach disposal Site on North end of Island
Bald Head	***Bald Head**	Beach front on eastern and western shoreline	3.0 miles (16,000 lf)	3.0 miles or 16,000 lf	1.1 million every 2 years (except every 6th when it goes to Caswell)	Least Costly Disposal Option From Wilmington Harbor Ocean Bar Project.

Beach quality sand is a valuable resource that is highly sought by beach communities to provide wide beaches for recreation and tourism, as well as to provide hurricane and wave protection for public and private property in these communities.

When beach quality sand is dredged from navigation projects, it has become common practice of the USACE to make this resource available to beach communities, to the maximum extent practicable. Disposal of this sand on beaches represents return of material, which eroded from these beaches, and is, therefore, replenishment with native material. The design of beach disposal sites generally extends the elevation of the natural berm seaward.

Other factors affecting Beach Resources: Many factors unrelated to disposal of sand on the beach may affect beach resources including: benthic invertebrate resources, shorebird populations, and ocean fish stocks. The factors can be a result of natural events such as natural population cycles or as a result of favorable or negative weather conditions including droughts, floods, La Niña, El Niño, and major storms or hurricanes to name a few. A primary anthropogenic factor affecting shorebird populations is beach development resulting in a loss or disturbance of nesting habitat and invasion of domestic predators. Primary man-induced factors affecting fish stocks are over fishing and degradation of water quality due to pollution.

V. Significant Resources and Impacts

Based on scoping comments from resource agencies and others, the primary concerns with the proposed maintenance dredging and beach disposal are direct and indirect impacts to hard bottom communities, macro-invertebrates, fish, shorebirds, and sea turtles. Federally listed threatened or endangered species which could be present along the North Carolina coast are the blue whale, finback whale, humpback whale, North Atlantic right whale, sei whale, sperm whale, West Indian manatee, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, Atlantic sturgeon, shortnose sturgeon, seabeach amaranth, and piping plover. Impacts to all Federally listed protected species are provided in Appendix J Biological Assessment and summarized below and include, but are not limited to, mortality, reduction in prey species, habitat change, and disturbance during construction activities. Also discussed are the benefits of periodic disposal, which are expected to enhance nesting habitat of sea turtles and to provide additional habitat for seabeach amaranth. Detailed discussions of all significant resources and associated impacts are included in Sections 4.0 and 5.0 of the DMMP.

Beach and Dune. Terrestrial habitat types within these areas include sandy or sparsely vegetated beaches and vegetated dune communities. Mammals occurring within this environment are opossums, cottontails, gray foxes,

raccoons, feral house cats, shrews, moles, voles, and house mice. Common vegetation of the upper beach includes beach spurge, sea rocket and pennywort. The dunes are more heavily vegetated, and common species include American beach grass, panic grass, sea oats, broom straw, seashore elder, and salt meadow hay. Seabeach amaranth, a federally listed threatened species, is present throughout most of North Carolina. Ghost crabs are important invertebrates of the beach/dune community. The beach and dune also provide important nesting habitat for loggerhead and green sea turtles as well as habitat for a number of shorebirds and many other birds, including resident and migratory songbirds. Disposal of material along the ocean beach enhances and improves important habitat for a variety of plants and animals, and restores lost habitat in the areas of most severe erosion. This is especially important for nesting loggerhead sea turtles and seabeach amaranth. Historic nesting data from Bogue Banks indicate that sea turtles continue to nest on disposal beaches with hatch rate successes similar to non-disposal beaches (Matthew Godfrey, Personal Communication 2010). Furthermore, new populations of seabeach amaranth have been observed to follow sand disposal on beaches where sand has been disposed by the USACE (i.e., Wrightsville Beach and Bogue Banks) (USFWS 1996b; CSA 2002).

In addition to providing important upland habitat, the cumulative effects of beach disposal projects on Bogue Banks are not significant and would protect public infrastructure, public and private property, and human lives.

Marine Waters (including Nearshore Placement Areas). Along the coast of North Carolina, marine waters provide habitat for a variety of ocean fish and are important commercial and recreational fishing grounds. Kingfish, spot, bluefish, weakfish, spotted sea trout, flounder, red drum, king mackerel, and Spanish mackerel are actively fished from boats, the beach, and local piers. Offshore marine waters serve as habitat for the spawning of many estuarine dependent species. Oceanic large nekton located offshore of North Carolina are composed of a wide variety of bony fishes, sharks, and rays, as well as fewer numbers of marine mammals and reptiles. Marine mammals and sea turtles that may be present are addressed in Appendix J Biological Assessment. Dredging and placement of beach/nearshore fill may create impacts in the marine water column in the immediate vicinity of the activity, potentially affecting the surf zone and nearshore ocean. These impacts may include minor and short-term suspended sediment plumes and related turbidity, as well as the release of soluble trace constituents from the sediment. Overall water quality impacts for any given project are expected to be short-term and minor.

Cumulative effects of multiple simultaneous beach and nearshore placement operations in the Bogue and Shackleford Banks could potentially impact fishes of the surf zone. However, the frequency of beach (on average once every three years) and nearshore placement, the high quality of the sediment selected for

beach fill and the small amount of beach affected at any point in time would not suggest that this activity poses a significant threat.

The frequency of use for the nearshore placement areas off Bogue and Shackleford Banks are in years 2 and 3 of the DMMP cycle. The Corps will ensure that the same placement locations within the designated nearshore placement areas are not used time after time, No hardbottoms are located within these nearshore placement areas (see Section 5.5.6 in the DMMP). Additionally, by placing sediment on the Bogue Banks beaches and nearshore areas of Bogue and Shackleford Banks, the deflation of the Beaufort Inlet Ebb Tide Delta will be reduced.

Therefore the use of the beach disposal area on Bogue Banks and the nearshore placement areas off Bogue and Shackleford Banks will not result in significant cumulative impacts to the marine fauna.

Intertidal and Nearshore Zones. The intertidal zone within the proposed beach nourishment areas serves as habitat for invertebrates including mole crabs, coquina clams, amphipods, isopods, and polychaetes, which are adapted to the high energy, sandy beach environment. These species are not commercially important; however, they provide an important food source for surf-feeding fish and shore birds. The surf zone is suggested to be an important migratory area for larval/juvenile fish moving in and out of inlets and estuarine nurseries (Hackney et al. 1996). Disposal operations along the beach can result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for various fish and bird species. Therefore, feeding activities of these species may be interrupted in the immediate area of beach sand placement. These mobile species are expected to temporarily relocate to other areas as the project proceeds along the beach. Though a short-term reduction in prey availability may occur in the immediate disposal area, only a small area is impacted at any given time, and once complete, organisms can recruit into the nourished area. The anticipated construction timeframes for pipeline beach projects (Bogue Banks) would be from November 16 to April 30 and hopper dredge projects (nearshore placement) would be from January 1 to March 31 thereby avoiding a majority of the peak recruitment and abundance time period of surf zone fishes and their benthic invertebrate prey source. To summarize, the impacts of beach disposal and nearshore placement on the intertidal and nearshore zones are considered temporary, minor and reversible.

Cumulative effects of multiple simultaneous beach/nearshore placement operations in the Bogue and Shackleford Banks could be potentially harmful to benthic invertebrates in the surf zone; however, the frequency of sediment disposal on the beach (on average once every three years), the high quality of the sediment selected for beach fill and the small amount of beach affected at any point in time would suggest that this activity would not pose a significant threat.

The frequency of use for the nearshore placement areas off Bogue and Shackleford Banks are in years 2 and 3 of the DMMP cycle. No hardbottoms are located within these nearshore placement areas (see Section 5.5.6 in the DMMP). Additional benefits would be placement of sediment within the littoral zone could reduce the deflation of the Beaufort Inlet Ebb Tide Delta.

Therefore the use of the beach and nearshore placement areas off Bogue and Shackleford Banks will not cause a significant cumulative impact to the benthic macrofauna.

Hardbottoms. Of special concern in the offshore area are hard bottoms, which are localized areas, not covered by unconsolidated sediments and where the ocean floor is hard rock (see Sections 4.5.06 and 5.5.06 of the DMMP). Hard bottoms are also called "live bottoms" because they support a rich diversity of invertebrates such as corals, anemones, and sponges, which are refuges for fish and other marine life. They provide valuable habitat for reef fish such as black sea bass, red porgy, and groupers. Hard bottoms are also attractive to pelagic species such as king mackerel, amberjack, and cobia. Along the North Carolina coast, hard bottoms are most abundant in southern portion of the state. Review of data provided by the Southeast Monitoring and Assessment Program (SEAMAP 2001) and the results of surveys from Tidewater and Geo-Dynamics identified one area of hard bottom off Pine Knoll Shores, about 2 miles south of the project area.

Additional side-scan sonar surveys within the proposed Shackleford Banks nearshore and the proposed expanded Nearshore West revealed no evidence of hard bottoms. (USACE 2010a). This remote-sensing data confirms that proposed material placement at the sites will not have any impact on exposed hard bottoms or associated marine life.

Therefore the cumulative effects on hard bottoms from disposal of beach compatible sediment on the Bogue Banks beaches and nearshore areas off Bogue and Shackleford Banks is not significant since there is no evidence of any hard bottoms in the project area.

Nearshore Zone. Maintenance sediment (80% or greater sand) is also to be placed in the nearshore areas off Bogue and Shackleford Banks. Benthic organisms, phytoplankton, and seaweeds are the major primary producers in this community with species of *Ulva* (sea lettuce), *Fucus*, and *Cladocera* (water fleas) being fairly common where suitable habitat occurs. Many species of fish-eating birds are typically found in this area including gulls, terns, cormorants, loons, and grebes (Sections 4.7 and 5.7). Marine mammals and sea turtles also are frequently seen in this area and are discussed in detail in Sections 4.8 and 5.8, and in Appendix J Biological Assessment of the DMMP. Fishes and benthic

resources of this area are discussed in Sections 4.5 and 5.5 of the DMMP, respectively.

Cumulative effects of multiple simultaneous nearshore placement operations in Bogue and Shackleford Banks could be potentially harmful to benthic invertebrates in the nearshore area. No hardbottoms are located within these nearshore placement areas (see Section 5.5.6 in the DMMP) and the small amount of nearshore area affected at any point in time would suggest that this activity would not pose a significant threat. Additional benefits would be that placement of sediment within the littoral zone could reduce the deflation of the Beaufort Inlet Ebb Tide Delta. Therefore, the cumulative effect of placement of coarse-grained sediment in the nearshore areas off Bogue and Shackleford Banks is not significant.

Other Resources and Impacts

Air Quality. The ambient air quality for all of coastal North Carolina has been determined to be in compliance with the National Ambient Air Quality Standards. All coastal counties in North Carolina are designated as attainment areas and do not require conformity determinations.

Additionally, although ozone is not a significant problem in the coastal counties, ozone is North Carolina's most widespread air quality problem, particularly during the warmer months. High ozone levels generally occur on hot sunny days with little wind, when pollutants such as nitrogen oxides and hydrocarbons react in the air. The ozone season is April through October. Dredging with beach disposal or renourishment typically takes place during the cooler months of the year, during times of low biological activity and outside of the ozone season.

The project is not anticipated to create any adverse cumulative effect on the ambient air quality of this attainment area.

Social and Economic. The coastal areas of North Carolina will continue to grow and expand both with and without the Morehead City Harbor DMMP. Therefore, the economic benefit analysis for the proposed project claims no increase in benefits or hurricane and storm damage due to induced development. Development of vacant lots in Bogue Banks is limited to lots buildable under the regulations set forth by CAMA, flood plain regulations, State and local ordinances, and applicable requirements of the Federal Flood Insurance Program.

The proposed DMMP is not anticipated to create any adverse cumulative social or economic impacts. Continued maintenance of the Morehead City Harbor will provide cumulative social and economic benefits to the project area.

Wave Conditions. Placement of sediment in the nearshore areas off Bogue and Shackleford Banks is the only potential source of impacts on wave conditions. However, these changes are not expected to be significant considering the shallow nature of the proposed placement sites.

No adverse cumulative impacts are anticipated on wave conditions in the project area.

Shoreline and Sand Transport. On Bogue Banks, the 10.5 mile long placement area (from Fort Macon State Park to Pine Knoll Shores) is located within the Beaufort Inlet influence area and there is a net transport to the east. Both nearshore placement areas are located within the Beaufort Inlet area of influence.

Additional information on the dynamics of the inlet and ebb tide delta is found in the Coastal Engineering Section of the DMMP. On a regional basis, placement of maintenance sediment within the inlet influence area adds material to the longshore transport system, thus providing positive impacts to the Beaufort Inlet ebb tide delta. Although a regional sediment budget analysis has not been completed, it is expected that the proposed action and the combined effects of all other existing and proposed beach projects will have a minimal effect on shoreline and sand transport.

Therefore no adverse cumulative impacts on the shoreline and sand transport in the project area are expected.

VI. Resource Capacity to Withstand Stress and Regulatory Thresholds

There are no known thresholds relating to the extent of ocean bottom that can be disturbed without significant population level impacts to fisheries and benthic species. Therefore, a comparison of cumulative impacts to established thresholds is not made. However, the potential nearshore placement area off Bogue and Shackleford Banks impact area of the proposed project is small relative to the area of available similar habitat on a local, vicinity, and statewide basis and the quick recovery rate of opportunistic species. It is expected that there is a low risk that the direct and cumulative impacts of the proposed action and other known similar activities would reach a threshold with potential for population level impacts on important commercial fish stocks. In regard to physical habitat alterations in the placement areas, it is expected that alterations in depths and bottom sediment may occur and be persistent. However, site modifications would be within the range of tolerance by these species and, although man-altered, consistent with natural variations in depth and sediment within the geographic range of EFH for local commercial fish species.

In a 1999 Environmental Report on the use of federal offshore sand resources for beach and coastal restoration, the U.S. Department of Interior, Minerals

Management Service (no Bureau of Ocean Energy Management) (DOI 1999) provided the following assessment of potential impacts to beach fauna from beach disposal:

Because benthic organisms living in beach habitats are adapted to living in high energy environments, they are able to quickly recover to original levels following beach nourishment events; sometimes in as little as three months (Van Dolah et al. 1994; Levison and Van Dolah 1996). This is again attributed to the fact that intertidal organisms are living in high energy habitats where disturbances are common. Because of a lower diversity of species compared to other intertidal and shallow subtidal habitats (Hackney et al. 1996), the vast majority of beach habitats are recolonized by the same species that existed before nourishment (Van Dolah et al. 1992; Nelson 1985; Levison and Van Dolah 1996; Hackney et al. 1996).

While the proposed beach disposal may adversely impact benthic macrofauna, these organisms are highly resilient and any effects will be localized, short-term, and reversible.

VII*. Baseline Conditions*

The following DMMP section describes the status of significant resources that may be affected by this and other similar projects that are pertinent to this analysis.

Section 4.0, Affected Environment.

VIII. *Cause and Effect Relationships*

The following DMMP section describes impacts of the proposed action on significant resources. Cause and effect relationships described in the report are consistent with those that would be expected for other similar projects that are pertinent to this analysis.

Section 5.0, Environmental Effects.

IX. Magnitude and Significance of Resource Impacts

A. Morehead City Harbor Federal Navigation Channel

The USACE has maintained the Morehead City Harbor Federal navigation channel since 1910. Over time the harbor channels have been deepened and widened to their current dimensions. Actions associated with maintenance of the Morehead City Harbor have been addressed in a number of environmental and planning reports which describe the Morehead City Harbor federal navigation project, its ongoing and proposed improvements, the details of dredging and

disposal operations required for its construction and maintenance, and the environmental aspects of the project (see Section 1.5 Incorporation by Reference of the DMMP). The Morehead City Harbor DMMP is not planning to deepen or widened the harbor channels but to ensure that the dredge maintenance sediment is placed within the inlet influence area which would add material to the longshore transport system, thus providing positive impacts to the Beaufort Inlet Ebb Tide Delta.

In 2010, the point of the spit on the west end of Shackleford Banks had accreted toward the navigation channel and had encroached upon the authorized channel. The Morehead City Harbor channel is a fixed channel that cannot be realigned without additional physical and environmental impact analyses and additional approvals; therefore, in order to maintain safe navigation of the authorized channel, dredging of approximately 1 acre of the upland portion of the spit was imminent (Figure 1). However, in August 2011, Hurricane Irene struck the project area and drastically changed the configuration of the spit. Aerial photography and recent hydrographic surveys indicate that the upland portion of the spit no longer encroaches into the navigation channel.

Over time, the spit on the west end of Shackleford Banks may accrete and return to a position that encroaches on the navigation channel. If so, maintenance dredging of the channel could affect upland portions of the spit. Prior to any dredging of the spit, the USACE would complete a separate NEPA document to address environmental effects. During the NEPA process, the USACE would coordinate with applicable resource agencies, including coordination with USFWS regarding potential impacts to the threatened Piping Plover and its designated critical wintering habitat, as well as coordination with the NPS to obtain the required Special Use Permit.

Site Specific Impacts:
Cumulative impacts from space crowded perturbations could occur at the local scale resulting from the periodic maintenance and sediment disposal activities of the Morehead City Harbor DMMP and Bogue Banks federal and non-federal projects.

Geographic Area Impacts:

Existing and Potential Sites: Beach compatible sediment identified for all federal and non-federal nourishment projects throughout the geographic area (from Cape Lookout to Cape Fear) is most often identified from: maintenance or deepening of navigation channels, and/or offshore borrow areas (Table K-2). For the purposes of this impact assessment, only beach and nearshore placement areas are evaluated for cumulative marine resource impacts.

Considering only the projects that are currently in use (Table K-3), significant cumulative impacts associated with time and space crowded perturbations are

not expected considering that these sediment disposal areas are spread throughout the state and the acreage of impact for these disposal areas relative to the available un-impacted sites throughout the state is not significant. However, recognizing the potential for all of the federal projects identified in the geographic area (from Cape Lookout to Cape Fear) to occur within the reasonably foreseeable future (Table K-3), there is a potential for cumulative impacts for time and space crowded perturbations associated with the cyclic use of the disposal areas.

B. Beach Areas

The impacts of beach disposal on the Bogue Banks beaches is evaluated in Section 5 of the DMMP. The degree of cumulative impact would increase proportionally with the total length of beach impacted. The most likely projects to increase the length of North Carolina beach disposal are beach nourishment projects.

As shown in Table K-4 below, the North Carolina Ocean beaches (geographic scope of the assessment is from Cape Lookout to Cape Fear, about 115 miles of beaches) can be divided up based on the potential that a beach nourishment project will be proposed for them. The Coastal Area Management Act (CAMA) applies to all 20 North Carolina Coastal Counties. Proper beach nourishment , dredged material disposal, and/or local maintenance within these counties is generally regulated under CAMA and/or USACE permitting authorities alone, and for this analysis, are labeled CAMA regulated. Approximately 63 percent of North Carolina beaches are in this category. Other North Carolina ocean beach areas which are less likely to be considered for beach disposal include those identified under the Coastal Barrier Resources Act (CBRA) of 1982 (PL 9-348), the Coastal Barrier Improvement Act of 1990 (PL 101-591), and National and State park lands. CBRA restricts federal expenditures in those areas comprising the Coastal Barrier Resources System (CBRS); thus, long term federal beach nourishment projects will not occur in defined CBRA zones. However, though long term federal beach nourishment projects are restricted from CBRA zones, non-federal permitted projects may still occur (i.e. North Topsail Beach) on a short term basis. National or state park lands are the least likely to have beach disposal projects considering that their mission is often to manage lands in their natural state and protection of infrastructure is less common. National and state parks allow highly restricted placement under special use permits and conduct disposal only as required to protect resources, such as at Pea Island (1.5 miles).. Only about 8 percent (9 miles /115 total miles) of beach disposal areas within the geographic scope of the cumulative assessment are designated as National Park Lands.

Beach Classification	Percentage of NC Beaches	Potential for Beach Disposal/Nourishment Activities
Coastal Barrier Resource System	47	Medium
Developed and/or CAMA Regulated	63	High
National Park Lands	8	Low
State Park Lands	11	Low

Table K-4. North Carolina beach classifications and associated potential for beach disposal/nourishment activities from Cape Lookout to Cape Fear (115 miles of beaches). Note: the percentage of NC Beach Classifications is greater than 100% since some of the beaches have multiple designations (i.e., some developed areas have been designated within the Coastal Barrier System).

X. Summary of Impacts within the Geographic Scope of the Cumulative Assessment

The following quantitative analyses of the geographic scope (Cape Lookout to Cape Fear) impacts were determined based on data provided in Tables K-2 and K-3. These data represent an estimate of the percent of North Carolina beach affected by sand disposal for maintenance of federal navigation channels, and existing, proposed, or potential federal and non-federal beach nourishment projects. Table K-5 represents the total project miles for all existing and proposed federal and non-federal beach nourishment projects and the full authorized limits for beach disposal of navigation dredged material. However, assuming all of these activities were constructed to the full extent (which is very unlikely considering funding constraints, dredging needs from navigation channels, etc.) these estimates would not represent the actual extent of North Carolina ocean beach impacted because of overlapping project areas.

Project Type	Total Project Miles	% NC Beach
Federal Beach Nourishment	51	44
Non-Federal Beach Nourishment	47	41
Federal Authorized Beach Placement	17	15
TOTAL	**115**	**100**

Table K-5. Summary of total project miles from Cape Lookout to Cape Fear (115 miles of beaches) for existing and/or proposed federal and non-federal nourishment activities and disposal of dredged material.

Recognizing that many of the existing or proposed federal and non-federal beach nourishment project limits overlap and that some portions of the federal authorized beach disposal limits are within these project areas as well, Table K-6 provides an estimate of total mileage of North Carolina Ocean beach from Cape Lookout to Cape Fear (about 115 miles of beach) that could cumulatively be impacted by beach nourishment or navigation disposal activities without double counting the overlapping projects.

Project Type	Total Miles Impacted (*w/o double counting for overlaping projects)	% NC Beach
Federal and Non-Federal Beach Nourishment	98	85
Federal Authorized Beach Disposal	17	15
TOTAL	115	100

Table K-6. Summary of cumulative mileage of North Carolina Ocean beach from Cape Lookout to Cape Fear (115 miles of beaches) that could be impacted by beach nourishment and/or navigation disposal activities.

A. Federally Authorized Beach disposal:

17 miles or 15 percent of the North Carolina ocean beaches from Cape Lookout to Cape Fear are Federally authorized for beach disposal (see Table K-6) from Cape Lookout to Cape Fear. However, not all of these projects are routinely dredged and a majority of the authorized beach disposal limits are not actually disposed on to the full extent. Additionally, many of the authorized placement/disposal limits overlap with existing federal or non-federal beach projects. The USACE currently uses up to about 50 percent of the length of

beach in North Carolina that is approved for this purpose and does not anticipate significant increases in beach disposal in the foreseeable future.

B. Existing Beach Nourishment:

Of the total 98 miles of potential federal and non-federal beach nourishment project miles proposed for NC ocean beaches from Cape Lookout to Cape Fear (Table K-5), a total of 34 miles (29%) have actually been constructed. However, this estimate represents actual project miles nourished and does not reflect circumstances where the projects overlap. Therefore, the total number of actual miles of beach nourished is less.

C. Cumulative Impacts:

Considering all proposed and existing disposal and nourishment impacts throughout the geographic area (from Cape Lookout to Cape Fear), a significant portion of the shoreline will have beach disposal activities in the foreseeable future, likely resulting in time and space crowded perturbations. However, recognizing the funding constraints to complete all authorized and/or permitted activities, the availability of dredging equipment, etc.; it is very unlikely that all of these proposed projects would ever be constructed all at once. Therefore, though time and space crowded perturbations are expected in the reasonably foreseeable future, assuming each project adheres to project related impact avoidance measures, it is likely that adjacent un-impacted and/or recovered portions of beach will be available to support dependent species (i.e. surf zone fish, shore birds, etc.) and facilitate recovery of individual project sites to pre-project conditions.

XI. Project Level Impacts Within the Project Vicinity on Bogue and Shackleford Banks

Bogue Banks: The proposed DMMP may impact about 10.5 miles of shoreline from Fort Macon State Park to Pine Knoll Shores. An additional 1,209 acres of nearshore placement area off Bogue Banks (total of 559 existing acres plus 1,209 or 1,768 acres) is included in the DMMP.

Shackleford Banks: At the request of the National Park Service no dredged material from the Morehead City Harbor project will be disposed of on Shackleford Banks as part of this DMMP. A new 492-acrea nearshore placement area (Nearshore East) off of Shackleford Banks is included in the DMMP.

A. Existing Local Maintenance:

Under existing conditions, the entire study area on Bogue Banks (10.5 miles) is expected to experience frequent local maintenance, including beach scraping,

bulldozing, dune restoration, beach restoration, etc. No existing local maintenance is expected by the NPS on Shackleford Banks.

B. Existing Disposal Activities:

Annual navigation disposal activities (up to about 700,000 cy) may occur from the Fort Macon State Park to Atlantic Beach.

The disposal of dredged material along the 10.5-mile study area on Bogue Banks is not expected to affect the current disposal schedule.

No existing disposal activities occur on Shackleford Banks.

C. Existing Beach Nourishment:

None on Shackleford Banks. Carteret County is planning to complete the Bogue Banks Beach Master Nourishment Plan (Master Plan) in 2015.

D. Proposed Beach Nourishment:

The entire 10.5-mile federal study area is located within the Corp's Bogue Banks Feasibility Study proposed for beach disposal. Additionally, this same 10.5 mile long disposal area is proposed to be nourished by the County's (non-Federal study) Bogue Banks Beach Master Nourishment Plan (Master Plan).

E. Cumulative Impacts (Within the Project Vicinity on Bogue and Shackleford Banks):

Bogue Banks: The currently approved 10.5 mile long beach navigation disposal area is located within the proposed project area study area. Therefore, all of the existing 10.5 mile beach disposal area has had previous used as a beach disposal area. For areas that have had local disturbances (i.e. beach bulldozing), it is possible that the proposed action will impact beach invertebrates in areas that have not fully recovered from past sand deposition, extending recovery time.

Shackleford Banks: No disposal will occur on the Shackleford Banks beach.

Conclusion

Historically, the extent of beach disposal/nourishment activities on beaches within the geographic area from Cape Lookout to Cape Fear was limited to a few authorized federal projects including: Wrightsville Beach, Carolina and Kure Beaches. However, in the past 10 years, a significant number of federal and non-federal beach nourishment efforts were pursued to provide coastal storm

damage reduction along the increasingly developed North Carolina shoreline. Additionally, the number of non-federal permitted beach nourishment projects has increased in recent years in efforts to initiate coastal storm damage reduction measures in the interim of federal projects being authorized and/or funded (i.e. North Topsail Beach, and Topsail Beach, and Bogue Banks). Furthermore, the frequency of beach disposal activities for protection of infrastructure will continue throughout the state resulting in cumulative time and space crowded perturbations. However, assuming projects continue to adhere to environmental commitments for the reduction of environmental impacts, and un-developed beaches throughout the state continue to remain undisturbed, it is likely that adjacent un-impacted and/or recovered portions of beach will be available to support dependent species (i.e. surf zone fish, shore birds, etc.) and facilitate recovery of individual project sites to pre-project conditions.

Assuming recovery of impacted beaches and the sustainability of un-developed protected beaches (i.e. National/Federal and State Parks and Estuarine Reserves) the potential impact area from the proposed DMMP on Bogue and Shackleford Banks as well as existing actions is small relative to the area of available similar habitat on a vicinity and statewide basis. Therefore, the DMMP will not significantly increase cumulative impacts in the immediate project area or within the geographic scope of the cumulative assessment.

XII. Actions to Reduce Cumulative Impacts

The proposed DMMP will reduce cumulative impacts in the project area or within the geographic scope of the cumulative assessment by the following actions:

1. By placing sediment on the beaches of Bogue Banks and the nearshore areas off Bogue and Shackleford Banks, the deflation of the Beaufort Inlet Ebb Tide Delta will be reduced. Placement of material within the Beaufort Ebb Tide Delta will also ameliorate future shoreline erosion.

2. Beach disposal of coarse grained material (i.e., 90% or greater sand) on Bogue Banks will only occur once every three years, which will minimize impacts to intidal macrofauna. Moreover, the two years between placement events will provide sufficient time for recovery of marine biota.

3. Beach disposal activities on Bogue Banks would be at an average rate of approximately 200 feet per day or 4-5,000 feet per month; therefore, un-impacted habitat will be available throughout the disposal operation on the ocean beach.

4. No frontal dunes on Bogue Banks will be adversely impacted by the proposed DMMP.

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APPENDIX L

PUBLIC AND AGENCY

COMMENTS AND RESPONSES

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PUBLIC AND AGENCY COMMENTS AND RESPONSES

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INTRODUCTION.

During the 94 day (1 November 2013 to 3 February 2014) public review of the Draft Integrated Dredged Material Management Plan and Environmental Impact Statement, Morehead City Harbor, Morehead City, NC, comments were received from agencies, municipalities, communities, groups, and citizens. The substantive comments received and the USACE, Wilmington District responses are provided in the following sections. For copies of comment letters refer to Appendix D Public and Agency Correspondence.

Within each section (i.e., 1, 2, 3, and 4), the comment letters will be first listed, copies of each letter will be enclosed, and then the District's responses will be included.

NOTE: Following public review of the MHC DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on the Shackleford Banks beach during the time span of the DMMP; therefore, no sediment will be placed on the beaches of Shackleford Banks as part of this DMMP. The Wilmington District still proposes to dispose of coarse-grained dredged material on the beaches of Bogue Banks and in the nearshore areas off of Bogue and Shackleford Banks.

1. Comments Received from Federal and State Agencies.

A.. US Environmental Protection Agency letter dated February 3, 2014.

Comment 1: Our primary concerns associated with the proposed action are related to consideration of sea level rise and storm surge impacts when modeling for disposal sites, determination of sand compatibility, and ensuring compliance with State water quality standards. Overall we support the Corps preferred alternative since it will allow for beneficial use of dredge material and minimize disposal activities in the approved ODMDS.

Response 1: Sea level rise (SLR) was considered when evaluating our selected disposal areas. For this project SLR has no impact on the selected alternative. Areas in the nearshore selected for placement of dredged material will only become slightly deeper with SLR. Disposal methods in these areas are flexible and can be adjusted when determining the exact placement locations within the nearshore placement areas. The beach disposal alternative only includes a berm option which will be adjusted, in terms of berm elevation, to match the natural berm height based on wave climate and SLR.

Comment 2: No more dredged material should be placed in the ebb tidal delta than is necessary to offset current impacts. Based on the analysis shown in the draft DMMP (pp. 80-83), the ebb tidal delta losses are approximately 408,500 cy/yr (Bogue Banks) and 113,0

Response 2: The MHC DMMP proposed disposal plan details anticipated quantities needed to offset any impacts related to the operation of the Beaufort Inlet navigation channel. Material in excess of these anticipated requirements would be placed in areas

of the ebb tide delta to retain sediment within the littoral system and keep dredging costs to a minimum. By managing the dredged material in this way the Corps attempts to operate in an engineeringly feasible, environmentally sound, and least cost manner.

Comment 3: Section 5.1.2- The majority of this section is focused on the sand grain size analysis for sand on Shackleford Banks (subaerial and submarine) however the same level of discussion is not provided for the beaches of Bogue Banks. EPA recommends a similar discussion be provided in the FEIS related to dredge material and the suitability for the beaches of Bogue Banks in this section.

Response 3: Dredged material from the Morehead City Harbor project has been disposed of on the beaches of Bogue Banks periodically since 1978 and sediment compatibility has not been an issue. Dredged material from the Morehead City project has never been placed on Shackleford Banks and therefore a more detailed analysis of the material dredged compared to the native beach on Shackleford Island was performed to confirm that dredged material from the harbor would be a good match for that beach as well. The Corps guideline for beneficial disposal is no more than 10% of the material passing the # 200 sieve, i. e. dredged material must be 90% sand. The dredged material to be placed on the beaches meets this guideline and is dredged from the same channel reaches of the harbor that have been placed on the Bogue Banks beaches in the past. Text has been added to the DMMP to explain this.

Comment 4: The sea level modeling presented in the DEIS doesn't appear to include storm-surge impacts upon the project and any associated impacts on disposal sites (i.e., proposed nearshore and beach placement areas) or shoaling rates, e.g., impacts to channel dredging frequency. Because sea level is not expected to gently rise independent of frequent and high energy storms North Carolina is known for, EPA recommends the sea level rise analysis include the appropriate storm surge modeling. EPA recommends the historic loss rate calculations used to replace sediments lost in the proposed disposal areas appropriately reflect erosion rates associated with seal level rise and storm surges.

Response 4: Disposal of material along the beaches adjacent to the Beaufort Inlet navigation channel is not intended as a coastal storm damage reduction project and as a result no modeling of storm surge or impacts related to accelerated SLR were completed. The disposal along the beaches is intended to retain dredged material within the littoral system of Beaufort Inlet in an engineeringly feasible, environmentally sound, and least cost manner. If sea level rise (SLR) does increase at an accelerated rate, the berm elevation of the disposed material would be elevated to correspond to the natural berm height resulting from the adjusted wave climate and sea level. Dredging depths are controlled by a local datum and would not be impacted by SLR.

Comment 5: According to the DEIS, the net flow within this region of Shackleford Banks is westerly, toward the Inlet. It is stated in the DEIS that "Material placed within this area should move toward the west and nourish the eastern side of the ebb tide delta." 10 Placing sand in the Shackleford Banks nearshore disposal area east of the channel seems counterintuitive. The DEIS figures appear to show accretion occurrence in the channel, which could be from sediment sources lying to the east of the channel

since the net flow in this region is westerly, toward the channel. Consequently, the EIS should explain whether dredged material placed east of the channel will accrete in the channel requiring additional maintenance dredging.

Response 5: The depths of the east ebb tide delta are too shallow to efficiently place sediment directly onto the delta. The proposed disposal area was selected so that material placed would migrate onto the eastern ebb shoal. Some material will re-enter the navigation channel, however this is the case with all selected nearshore placement areas as well as beach disposal areas. The areas are large enough to allow adjustments to the exact placement to reduce shoaling based on monitoring results, however to retain material within the Beaufort Inlet complex some shoaling of placed material is unavoidable.

Comment 6: EPA recommends the EIS address why an erosion hot spot located just west of the northern most visible portion of the navigation channel and has experienced extensive vertical erosion up to 38 feet has not been considered for disposal of appropriate dredged material quality. It is unclear whether this erosional feature is associated with the erosion of the down drift beaches. The beaches the Corps is proposing placing sediments 2:90% sand, i.e., Figure 3-12. EPA recommends additional discussion be added to the FEIS related to the pros/cons/issues related to disposal in this area.

Response 6: This area is too close to the navigation channel and material disposed of there would rapidly transport into the navigation channel. The proposed disposal areas attempt to balance retention of material within the Beaufort Inlet complex while minimizing impacts to dredging through increased shoaling resulting from nearshore and beach placement.

Comment 7: The Corps has categorized zones of the channel it maintains based on sediment types. However, it is unclear the volumes of each sediment type it anticipates dredging on annual or every 3-year cycle for the life of the DMMP. This has been done for the Interim Operations Plan, 13 which is a three-year plan, not a 20-year plan as is the proposed action. Consequently, it appears unclear how much material will be placed in nearshore areas and on beaches based upon the schedule provided.

Response 7: A table that shows the sediment types and volumes expected to be dredged each year of the 20-year DMMP has been added to Section 3 of the Final DMMP report.

Comment 8: EPA notes the DEIS statement, The quantity of material to be placed in this new nearshore area over the three year cycle of the proposed DMMP is expected to be the equivalent of the historic loss rate for the area over the three year cycle which is 339,000 cubic yards of sand (113,000 cy per year). The amount to be placed is not the same as the amount expected to be dredged of this type material.

Response 8: Sediment dredged within the navigation channel is separated based on sediment quality and placed either on the beach, nearshore, Brandt Island, or the ODMDS. These quantities are considered as a whole for the entire project and not

separated by intended disposal location. The amount placed in the new nearshore should be approximately 339,000 cubic yards over a three year period, but may fluctuate based on conditions at the time of contract execution.

Comment 9: The time series Figures 3-12 (1974- 1998)/6 3-13 (1998- 2005),17 and 3-14 (2005- 2009) 18 are very helpful to understanding bathymetric changes associated with longshore drift, more so than the time-averaged Figure 3-15 (1974- 2009). These time series may be capturing a cycle of accretion and erosion. The definition of such a cycle could prove useful for determining the appropriate times to deposit dredged material to keep it in the littoral system and to minimize accretion in the channel. EPA notes these figures are based upon a collection of a mere four surveys and may not truly reflect ongoing conditions.

Response 9: Noted.

Comment 10: EPA recommends the proposed monitoring plan provide sufficient data to potentially modify and assess ongoing operations and its impacts to the nearshore disposal site and associated impacts to the channel associated with dredged material placement into the proposed new Shackleford Banks nearshore disposal site.

Response 10: EPA recommends the proposed monitoring plan provide sufficient data to potentially modify and assess ongoing operations and its impacts to the nearshore disposal site and associated impacts to the channel associated with dredged material placement into the proposed new Shackleford Banks nearshore disposal site.

Comment 11: EPA appreciates the discussion provided in the DEIS relating to the NC Technical Standards for Beach Fill Projects (15A NCAC 07H .0312). EPA also notes that "Within the NC Technical Standards, characterization of the recipient beach is not required for the disposal of sediment directly from and completely confined to a federally or state maintained navigation channel." However, the Corps used sampling methods similar to the NC Technical Standards when sampling Shackleford Banks beach. The Corps indicates that the Morehead City Harbor material will be compatible for placement on Shackleford Banks based on the criteria in the NC Technical Standards (p.225-226). However, the same analysis does not appear to be conducted for Bogue Banks beaches. Please clarify.

Response 11: Dredged material from the Morehead City Harbor project has been disposed of on the beaches of Bogue Banks periodically since 1978 and sediment compatibility has not been an issue. Dredged material from the Morehead City project has never been placed on Shackleford Banks and therefore a more detailed analysis of the material dredged compared to the native beach on Shackleford Island was performed to confirm that dredged material from the harbor would be a good match for that beach as well. The Corps guideline for beneficial disposal is no more than 10% of the material passing the # 200 sieve, i. e. dredged material must be 90% sand. The dredged material to be placed on the beaches meets this guideline and is dredged from the same channel reaches of the harbor that have been placed on the Bogue Banks beaches in the past. Text has been added to the DMMP to explain this. Also, at the

request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 12: Funding for projects that are being considered under the DMMP that are not currently proposed but may be future options should be discussed (Projects f-h under Proposed Measures Above). Will the funding be 100% State or Federal? Also, EPA recommends that the likelihood of funding for future project options be discussed in the FEIS.

Response 12: In the draft DMMP, two measures that were not feasible to include as part of the recommended plan were identified (Table 3-26) as possible future options. The first of these options is the placement of Inner Harbor dredged material that is at least 80% sand in the nearshore placement areas. Due to concerns raised by NOAA Fisheries during review of the draft DMMP and the fact that this is not a least cost option (not part of recommended plan), USACE has deleted this measure from the final DMMP. The second option identified on Table 3-16 is the expansion and raising of dikes at Brandt Island. This option currently costs more than taking the (fine-grained) dredged material to the ODMDS but would be reevaluated in the future when the existing Brandt Island reaches capacity. The likelihood of funding for future projects is unknown and the DMMP states that implementation of the DMMP is funding-dependent. Text will be added to the DMMP to more clearly address the funding situation.

Comment 13: EPA is supportive of the conditions outlined in the issued State 401 certifications for the subject project (Appendix D). Ensuring that the proposed activities are not causing or contributing to violations of State Water Quality Standards should be a principal focus when determining appropriate BMPs and monitoring.

Response 13: The proposed DMMP will not contribute to any water quality violations of North Carolina's Water Quality standards. As discussed in Section 5.3.1 Water Quality and in Appendix H Section 404(b)(1) Analysis, the proposed sediment disposal areas will comply with all conditions and restrictions of the North Carolina Division of Water Quality Section 401 Certificates. Because of the low percentage of silt and clay in the coarse-grained sediment (less than 10% for beach disposal and for placement in the nearshore areas), turbidity impacts would not be expected to be greater than the natural increase in turbidity and suspended material that occurs during storm events. Significant increases in turbidity are not expected to occur outside the immediate construction/maintenance area (turbidity increases of 25 nephelometric turbidity units [NTUs]) or less are not considered significant). Turbidity levels would be expected to return to background levels in the surf zone and nearshore area when dredging ends. All conditions and requirements of the NC Division of Water Quality Section 401 Certificates will be adhered to in the implementation of the proposed DMMP.

Comment 14: EPA recommends adding examples of past NPS activities in designated wilderness areas that are comparable to the actions proposed at Shackleford Banks in the DEIS.

Response 14: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford

Banks during the time span of this proposed DMMP. However, the placement of sediment on the beach at Shackleford Banks would not be in opposition to, but rather consistent with, established laws, policies, and practices. The purpose of the sediment placement was be to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at Boston Harbor Islands and Cape Hatteras National Seashore.

Comment 15: Cumulative Impacts Analysis Appendix K- EPA notes that a Cumulative Impact Analysis (CIA) was provided in Appendix K of the DEIS. Based on our review, it appears that several similar actions (federal and non federal) projects have been identified in the CIA. EPA finds this information particularly relevant to this discussion for the proposed actions in the Morehead City Harbor DMMP DEIS and recommends that a summary of the CIA be included in the main body of the FEIS. Table K-2 provides a clear description of federal and non-federal beach nourishment projects in North Carolina and we believe this type of information would be well suited to be part of the main DMMP/EIS document. EPA recommends adding a summary of Appendix K to the main document of the FEIS.

Response 15: Concur. The USACE will summarize the conclusions mentioned in the cumulative impact analysis found in Appendix K and will include this summary in Section 5.20 Cumulative Effects in the FEIS.

Comment 16: Table 2-5- The reason for the increase in barge traffic should be discussed in the text of the EIS

Response 16: The increase in barge traffic is directly correlated to the economy and fuel prices. Over the past several years it has become more cost effective to ship via barge than it is to use other methods of intermodal transport (rail or truck). The barge traffic is most likely shipping containers regionally via the AIWW.

Comment 17: Pages 26-27- Please clarify maximum vessel draft for Morehead City Harbor (38.5 or 44ft)

Response 17: As currently maintained, the Morehead City Harbor could accommodate vessels coming through the expanded canal to a depth of about 42 feet under normal conditions and up to 44 feet using the advantage of high tide. Language has been added to clarify this in Sections 2.1 and 2.1.1.

Comment 18: Chapter 3 - EPA notes that a significant portion of this chapter is dedicated to discussion of sand loss at Bogue Banks and Shackleford Banks, however it may be more appropriate for this discussion to be in Chapter 2 - Existing Conditions.

Response 18: While we agree that sand loss could be discussed in Chapter 2, we believe that it's more appropriate to include it in Section 3, Alternatives, since the formulation of alternatives is largely based on sand losses from the Beaufort Inlet system. Also, this document has been reviewed by the National Park Service and by a Corps of Engineers' multi-disciplined team (members outside of the Wilmington District), and the report format was acceptable to all reviewers.

Comment 19: Section 3.1- No action plan description- recommend better explanation of why the no action is not a sustainable plan

Response 19: The "sustainable" language has been revised to explain that the No Action plan results in disposal of dredged material on one side of the inlet (only) and continuing to return sand to one side of the inlet, when both sides are losing sand, is not a good long-term engineering practice.

Comment 20: Section 3.2.2 - Recommend expansion of discussion on why disposal of material on
Shackleford Banks was previously not consistent with NPS Management Policies

Response 20: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 21: Section 3.2.5.2 and Section 3.2.5.3 - The DEIS is confusing regarding when the Brandt Island disposal site will reach its capacity. EPA recommends clarification in the FEIS. For Example:
o In one section the DEIS states Once Brandt Island reaches capacity in 2028 22
o Another section states Brandt Island is not expected to reach capacity for at least the next 20 years.23 (which is defined in another section as 2034

Response 21: The Brandt Island disposal site will reach capacity in 2028. The draft DMMP included discussion about an option to take the dredged material that was 80% sand to the nearshore placement areas. That would reduce the amount of material going to Brandt Island and therefore Brandt Island may not reach capacity until 2034. However, taking the Inner Harbor 80% sand to the nearshore areas is not feasible (not part of the recommended plan) and the National Marine Fisheries Service has concerns about placement of 80% sand in the nearshore, so this option has been dropped from the DMMP and is now discussed in Section 3.2.5 (DMMP Measures Eliminated) of the final report.

Comment 22: Page 115- It's a little unclear why construction of a terminal groin would be inconsistent with NPS management policies when disposal of dredge material on Shackleford Banks would be consistent with this policy. Recommend clarification.

Response 22: NPS Management Policies at 4.8.1.1 direct the NPS to investigate alternatives for mitigating the effects of human activities or structures that have altered

the nature or rate of natural shoreline processes, and for restoring natural conditions. The disposal of dredged sediment into the area along Shackleford Banks that is impacted by the navigation channel would comply with this policy because it would partially mitigate the impacts of the channel-induced erosion along Shackleford. Disposal of dredged sediment in impacted areas is an increasingly common restoration method along the coastal United States and is considered a beneficial use of the material. Hard structures such as groins, however, do not restore natural conditions. They lock shorelines in place, exacerbate erosion elsewhere, and affect intertidal resources.

Comment 23: Page 144- Environmental Considerations- What about water quality? We recommend water quality be added as a consideration here.

Response 23: Concur. Water quality has been added to the Environmental Considerations.

Comment 24: Figure 4-5 - Does this mean that Morehead City Harbor dredge material is best suited from the trough to -24ft? Please clarify.

Response 24: This figure is intended to show that the distribution of the grain sizes in the harbor which will be dredged are very similar to the distribution of the grain sizes on the native beach of Shackleford banks where they are to be placed.

Comment 25: Table 5-l- EPA recommends adding categories that separate positive and negative consequences to this table in the FEIS.

Response 25: The USACE agrees to add categories showing the positive and negative consequences to Table 5-1 in the FEIS. Table 5-1 summarizes and compares the potential environmental effects of the recommended plan and the No Action alternative. As noted previously, the NPS has requested that the USACE drop the alternative of disposing of sediment on the beaches of Shackleford Banks.

Comment 26: • Page 1 - 1st sentence - acronym for Corps is missing.
• Figure 1-1- DMMP Final Phase- Years should be updated
• Figure 1-3- Non-federal berthing areas should be more clearly defined in this figure
• Table 2-3 -Units need to be added to this table (dollars?)
Figure 3-9- The station symbol should be added to the legend • Figure 3- 19- West Throat Area, is the only one in the time series that depicts net loss in the color blue. The other figures use the color red. Is this a typo?

Response 26: USACE acronym added; Fig 1-1 updated;Berth numbers adding to Figure 1-3;

B. US Fish and Wildlife Service (USFWS) letter dated November 26, 2013 from the Raleigh NC Field Office and December 4, 2013. Both letters have identical comments regarding Threatened and Endangered Species.

Comment 1: With the conservation measures proposed in the DMMP/EIS and BA and those requested by the Service below #2 above, the Service would concur that the

proposed project may affect, but is not likely to adversely affect the West Indian manatee, piping plover

Response 1: Noted

Comment 2: Although the Service remains concerned that beaches may be nourished as often as every three years (based upon channel and harbor management concerns rather than a need to nourish the beach), we recognize that the Bogue Banks Beaches may need the sand every three years. It is also our understanding that in the appropriate project years, the NPS will have the option to decline disposal of sand on Shackleford Banks. Adhering to the winter construction window and the use of compatible sand will minimize the impacts to the benthic infauna to the extent possible.

Response 2: Noted. Also, of note, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 3: We recommend that the Corps commit to visual surveys to be conducted each morning in the area of work for that day, to determine if piping plovers or red knots are present. If plovers or red knots are present in the work area, careful movement of equipment in the early morning hours should allow those individuals to move out of the area. With these measures, potential impacts to wintering piping plovers and red knots are likely to be avoided, to the maximum extent practicable.

Response 3: Agree. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Any time dredged material is disposed of on Bogue Banks, the Corps will conduct daily visual surveys of the work area to determine whether piping plovers and/or red knots are present. If piping plovers and/or red knots are found in the work area, the contractor will be careful in moving any equipment.

Comment 4: With the conservation measures proposed in the DMMP/EIS and BA and those requested by the Service in Item #2 above, the Service would concur that the proposed project may affect, but is not likely to adversely affect the West Indian manatee, piping plover, red knot, seabeach amaranth, and all three sea turtle species. The proposed project may modify, but is not likely to adversely modify, designated wintering critical habitat of the piping plover in the project area and proposed critical habitat for the loggerhead sea turtle. Therefore, the requirements of section 7 (a)(2) of the ESA have been satisfied for this project. However, the Corps' obligations under the ESA must be reconsidered if: (1) new information identifies impacts of this action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Response 4: Concur. If there are any new obligations under the ESA, the USACE, Wilmington District agrees to reconsult with the USFWS.

C. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, (NMFS) letter dated February 18, 2014. This letter provided comments regarding project EFH impacts.

Comment 1: As the nation's federal trustee for the conservation and management of marine, estuarine, and diadromous fishery resources, the following comments and recommendations are provided pursuant to the authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Draft EIS Section 4.5.7 describes EFH and federally managed fishery species in the Morehead City Harbor area. These descriptions do not require augmentation to complete the EFH consultation.

Response 1: Noted.

Comment 2: The Final EIS would benefit from an expanded discussion of environmental windows. Relevant literature includes Reine et al. (1998), National Research Council (2002), Suedel et al. (2008), and Evans et al. (2011). Collectively, these papers outline a process for optimizing use of environmental windows to protect organisms from dredging projects. Draft EIS Section 3.2.5.5 indicates no changes to existing environmental windows are proposed, however, a new environmental window may be necessary should nearshore placement of inner harbor material be pursued and discussion are underway with the North Carolina Division of Coastal Management regarding an environmental window for bucket to barge dredging of inner harbor material. NMFS is unlikely to support nearshore placement of material with a high concentrations of fine material and supports an environmental window for bucket to barge dredging of inner harbor material. Exposure to high concentrations of suspended sediments may, depending on exposure duration, decrease larval feeding rate, damage the epidermis of larval fishes, and increase larval mortality (Wilber and Clarke 2001). Mechanical (bucket to barge) dredging yields higher concentrations of suspended sediments than either hopper or pipeline dredges, and mechanical dredges can cause this impact throughout the water column. Further, this method of dredging has been observed to produce large amounts of suspended sediments in the confined area of the Morehead City Inner Harbor, especially in the Northwest, West, and East legs.

Response 2: Discussion of environmental windows has been expanded and moved to Section 3.2.5. This section addresses existing and proposed environmental windows and the USACE believes these windows adequately protect aquatic organisms from the continued maintenance of Morehead City Harbor navigation channels. The USACE has decided that all Inner Harbor (Northwest Leg, West Leg, East Leg and a portion of Range C) sediment will be either disposed of by pipeline dredge in the existing diked disposal area on Brandt Island and/or dredged by bucket and barge and placed in the ODMDS. This means that no 80% sand will be placed in the nearshore areas off Bogue and Shackleford Banks. Only 90% or greater sand will be placed on the beaches and nearshore placement areas. To reduce potential impacts of suspended sediments caused by use of a bucket and barge in the Inner Harbor that could adversely impact larval feeding rate, cause damage to the epidermis of larval fishes, and increase larval mortality in the harbor (no overflow would be allowed), the USACE agrees to adhere

to the recommended window of August 1 to March 31 for bucket and barge dredging in the Inner Harbor.

Comment 3: The Final EIS would benefit from an expanded discussion of the impacts of beach disposal on fishes. The negative impacts beach disposal has on benthic organisms living in the surf zone is well documented (Petersen and Bishop 2005). The Draft EIS provides examples of these impacts and varying rates of recovery on disposal beaches. There is no record of any dredged material disposal on Shackleford Banks. Manning et al. (2013) conducted research on Shackelford Backs and Bogue Banks and state "Beyond the immediate mass mortality of invertebrate prey caused by >1 m of sediment disposition during beach filling, coarse shell fragments and other large particles persist as a press disturbance for years after the nourishment ends, and elevated silts/clays can become resuspended by erosive wind events in repeated pulse disturbances for at least months afterwards, in each case reflecting demonstrable long-term degradation of sandy-beach foraging habitat for surf fish." This paper notes beach sediments on Shackelford Banks consist of approximately 90% fine/very fine sand and medium sand while beach sediment on nourished areas of Bogue Banks had significantly higher percentages of medium sand, coarse sand, very coarse sand, and gravel. They also note the density of Donax clams decreases linearly with increasing sediment size and concentration of shell-derived material.

Response 3: Concur. The USACE expanded its discussion in the FEIS regarding the impacts of beach disposal on fishery resources. As you are aware, during 2001-2002, the USACE Wilmington Harbor Project deepened and realigned the navigational entrance channel to the Cape Fear River located near Wilmington, North Carolina. The work required the removal of about 5.6 million cubic yards of sandy material from the lower portion of the Cape Fear River navigation channel as well as the offshore navigational river entrance channel. The dredged material was used beneficially to replenish the beaches of four North Carolina Brunswick County beaches (Bald Head Island, Caswell Beach, Oak Island, and Holden Beach), which had eroded over the past years. In 2004, the USACE completed the Year 2 Recovery from Impacts of Beach Nourishment on Nearshore and Surf Zone Fish and Benthic Resources on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach, North Carolina. This study states: "Based on fish sampling with seines and trawls, no immediate impacts in fish abundances and diversities among the disturbed, undisturbed, and reference stations were found at any beach (i.e., Bald Head Island, Caswell Beach, Oak Island, and Holden Beach)". These results were further supported by the second year study where annual and quarterly seine and trawl sampling exhibited no significant depressions in abundance and diversity one-year after the initial beach construction. The schooling nature of a number of dominant species and the highly mobile nature of the fish community constrained the ability to detect impacts and recovery. The fish community's ability to migrate caused a highly variable community in both a temporal and spatial aspect but also indicated that they could move in and out of the beaches impacted by the replenishment operations. Copies of this monitoring reports were provided to the Federal and State review agencies (including NMFS and NCDMF). Therefore based on the literature cited in Section5.5.2 and USACE (2004), dredged material disposal on Bogue Banks is not anticipated to result in long-term impacts on fishery resources.

You are correct that the USACE has not disposed of any dredge sediment on Shackleford Banks. Also, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Any dredged material disposed of on Bogue Banks will comply with the NC Technical Standards. Refer to Section 5.1.2 and Table 5-2 in the DMMP which provides the sediment data applicable to the North Carolina Technical Standards. Table 5-2 also provides the % Visual Shell for the Morehead City Harbor Channel Sediments as well as the beaches of Bogue Banks. All sediments disposed of on Bogue Banks are in compliance with the NC Technical Standards (including % Visual Shell). No adverse impacts to fishery resources on Bogue Banks are anticipated as a result of beach disposal.

Comment 4: Finally, the Draft EIS does not examine the effects of placing dredged material on the Beaufort Inlet ebb tide delta on the fishes, crabs, and shrimp that use the delta for foraging, predator avoidance, and staging before moving into the estuary. This is the most significant omission in Draft EIS Section 5, Environmental Consequences of the Recommended Plan and the No Action Alternative. While this section includes discussions of impacts to benthic communities (Sections 5.5.2 and 5.5.3) and surf zone fishes (Section 5.5.4), neither of these sections addresses the ebb tidal delta, which is a Habitat Area of Particular Concern because the delta is part of the inlet. Further, NMFS expects more careful consideration of these impacts to result in the DMMP including biological monitoring of the delta to ensure disposal at this location to protect nearby shoreline has the least impact on fishery species using the inlet to access spawning and nursery areas.

Response 4: Concur. The USACE has revised the FEIS to reflect the impacts of placing dredged material within the Beaufort Inlet Ebb Tide Delta on aquatic species. The placement of 90% or greater sand sediment on Bogue Banks beaches and in the nearshore areas off Bogue and Shackleford Banks will not require any biological monitoring to ensure the least impact on fishery species using the inlet to access spawning and nursery areas. Past biological monitoring in Brunswick County (USACE 2004 and 2003), the characterization of the dredge sediment placed within the disposal areas off Bogue and Shackleford Banks (Section 5.1.2 and Table 5-2 in the DMMP), literature cited in Section 5.5 Marine and Estuarine Resources indicate that the proposed placement of sediment within the Beaufort Inlet Ebb Tide Delta will not adversely impact fishery resources using the Inlet to access spawning and nursery areas. Since 1978 the USACE has placed about 16 million cubic yards of this same sediment along Bogue Banks beaches and within the offshore nearshore area.

Comment 5: NMFS finds the proposed project would adversely affect EFH and federally-managed fishery species. Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely impact EFH. Based on this requirement, NMFS provides the following:

EFH Conservation Recommendations

1. No bucket to barge dredging from April 1 to July 31 shall occur in the Northwest, West, and East legs of the Inner Harbor

2. Inner Harbor material shall not be placed in open water, nearshore disposal areas.
3. Disposal on Shackleford Banks shall be done only when other alternatives are not practicable and when closely monitored to evaluate physical benefits and biological impacts.

Response 5: As discussed with Dr. Pace Wilbur and Mr. Fritz Rhode on February 27, 2014, the Wilmington District, USACE provided the NMFS with an interim response (letter dated 28 February 2014) to the EFH Conservation Recommendations pursuant to Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulations at 50 CFR 600.920(k). The Wilmington District will prepare a detailed final response to the EFH Conservation Recommendations which will be coordinated with the NMFS. Coordination with NMFS will be completed prior to implementation of the DMMP.

D. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, (NMFS) letter dated July 22, 2014. This letter provided comments on project impacts to Threatened and Endangered Species.

Comment: We have analyzed the potential effects of the action and conclude that the proposed project would not adversely modify the proposed critical habitat for the NWA DPS of loggerhead sea turtles. Dredging activities are covered by the SARBO, and slow-moving dredge vessels transiting back and forth to the ODMDS do not pose a collision risk to sea turtles. This concludes your consultation responsibilities under the ESA for species and their critical habitats under NMFS's purview. Consultation must be reinitiated if new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

Response: Noted.

E. US Department of Homeland Security, United States Coast Guard letter dated December 16, 2013.

Comment: The Fifth Coast Guard District has reviewed the proposal and has no comments with regards to Aids of Navigation or any potential hazards to navigation in the vicinity of Morehead City Harbor.

Response: Noted.

F. US Department of the Interior, National Park Service, Cape Lookout National Seashore letter dated June 11, 2014.

Comment 1: After reviewing the public feedback and various internal discussions, the National Park Service (NPS) requests dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP.

Response 1: As requested, no sand will be disposed of on Shackleford Banks as part of the DMMP.

Comment 2: The NPS does support placement of sediment in the nearshore area of Shackleford Banks. The NPS would prefer that the placement occur in water depths of less than 25 feet.

Response 2: The depth of the nearshore placement area is constrained by the operating depths of the commercial hopper dredge fleet. The logistics involved with the dredging of material from the Outer Harbor channel to a great degree define the ideal location of the Nearshore Placement Area. Specifically, in order to maintain this section of the MCHP, a dredge vessel must be able to remove material to a depth of 47 feet, dredge shoals that are long and roughly linear, and work in the rough sea conditions mandated by the District's voluntarily-imposed environmental dredging window in the winter months (the purpose of this dredging window is to minimize impacts to sea turtles). Ocean-going hopper dredges have so far been the only vessels able to accomplish such tasks. These dredges, when fully laden, often have keel depths of 22 feet or more, and therefore, must operate in more than 22 feet of water to avoid colliding with the bottom. When working in seas of several feet, or at lower tides, deeper operating depths are necessary. Therefore, it is not practicable to place material in a nearshore area at depths much less than 25 feet. The average depth of the existing Nearshore Area is roughly 26 feet, and it has been placed across the 25- and 30-foot contours, allowing for enough space to contain sufficient material and provide vessels with an adequately large target for material placement. Logistical concerns make it imperative that a nearshore placement area include depths sufficient to allow most small-to- medium hopper dredges to operate safely. Any logistically feasible nearshore placement area must include depths between -25 and -30 feet. Placing material anywhere within the proposed nearshore placement area off of Shackleford Banks will keep it within the Beaufort Inlet littoral system.

G. NC Division of Cultural Resources (SHPO) letter dated November 5, 2013.

Comment : We have reviewed the draft DMMP and EIS for the Morehead City Harbor. The document adequately addresses the concerns and provisions invoking the protection of archaeological resources within the project area. Given the provisions to eliminate physical and possible chemical damage to the shipwrecks we would consider the plan to be a benefit to cultural resources, particularly those measures involving a reduction or reversal of the ebb tide delta deflation.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 C FR Part 800.

Response : Noted.

H. NC Department of Administration, NC State Clearing House letter dated December 5, 2013

Comment : Reference memo dated December 5, 2013. According to G.S. ll3A-1 0, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act.

Response : Noted.

I. NC Division of Environmental Assistance and Customer Service letter dated December 3, 2013.

Comment: The staff of Shellfish Sanitation & Recreational Water Quality of the Division of Marine Fisheries has provided some guidance for the applicant consideration. These comments are below.

Response: Noted.

J. NC Division of Marine Fisheries, Shellfish Sanitation & Recreational Water Quality letter dated November 4, 2013.

Comment: According to the Dredged Material Management Plan presented in the draft EIS, placement of dredged materials along the beaches of Bogue Banks may occur within a window extending from November 16th to April 30th. The placement of dredged materials along a swimming beach has the potential to cause a localized increase in bacteria concentrations within the waters surrounding the project. Thus, the placement of these dredged materials along the beach any time after March 31st may necessitate that a swimming advisory be issued, notifying the public of the risks associated with swimming in the area. In conjunction with this swimming advisory, notification signs will be placed throughout the project area. Swimming advisories can be avoided by scheduling these types of projects between November 1st and March 31st of a given year, which falls outside of the swimming season.

Response: Concur. Environmental Commitments in Chapter 6.15 of the FEIS states: Within Morehead City Harbor, some of the navigational channels are closed to shellfish harvesting. By Memorandum dated January 31, 2010, from the North Carolina Department of Environment and Natural Resources, Division of Environmental Health, Shellfish Sanitation and Recreational Water Quality Section (Appendix D), if maintenance material is excavated from these closed shellfishing areas between April 1 and October 31 and disposed of on Bogue Banks, a swimming advisory will be posted and a press release made. The Wilmington District will notify the Shellfish Sanitation and Recreational Water Quality Section prior to dredging from a closed shellfishing area with disposal on a recreational swimming area.

K. NC Division of Coastal Management letter dated May 28, 2014. This letter included comments from Carteret County.

Carteret County Comments Part 1

Comment 1: Paragraphs 1-3 of the Carteret County letter are history and have been resolved with DCM.

Response 1: Refer to Appendix D for specific responses to these comments. The NC DCM has concurred that all past and current maintenance dredging and disposal practices at MHC, which include the nearshore west and the ODMDS, are Consistent.

Comment 2: The Corps has acknowledged that placement of dredged material in the existing nearshore berm is inconsistent with NC's CMP. Contrary to the Corps' expectation, the material has exhibited little movement (even if the Corps had placed the material in the location described (-25 to -30 feet), such location is outside the active littoral zone). "Monitoring of the [nearshore] disposal area has shown very little movement or dispersal of the material. Accordingly, the disposal of dredged material in this shallower location does not provide any positive benefit to the beaches and effectively continues to remove the material from the active littoral zone." (Corps' Draft Section Ill Report dated February 2001, p. 38; Corps' Final Section Ill Report dated June 2001, p. 48). • "[B]athymetric surveys suggest that aside from flattening slightly over the past several years, [the nearshore berm] remains generally stable, even though several severe weather events have impacted the area.

Response 2: Disagree. By letter dated October 1, 2013, the USACE provided the NC Division of Coastal Management with a copy of the Morehead City Harbor DMMP North Carolina Coastal Zone Consistency Determination. As per the Consistency Determination, in accordance with Section 307 (c)(1) of the Federal Coastal Zone Management Act of 1972, as amended, USACE has determined that the proposed DMMP and continued maintenance dredging of the project channels is consistent, to the maximum extent practicable, with North Carolina’s coastal management program. The proposed activities comply with the enforceable policies of North Carolina’s approved coastal management program and will be conducted to the maximum extent practicable in a manner consistent with the program and any received authorizations. Our analysis included a review of sediment placement within the existing nearshore west area between 1995 and 2008. This analysis was a comparison of pre and post placement

surveys, as well as surveys of the placement area in years where no placement was made. The comparison showed that sediment within the nearshore west area is moving and is generally moving in a north/northeast direction and that material placed in shallower depths at lower lift heights will diffuse more rapidly. Details are provided in section 3.2.4.2 of the report.

Comment 3: The Corps has placed less than half of the eligible dredged material at the nearshore berm, and the remaining material has generally been placed in the ODMDS. • "Since 1997, approximately 1 million cubic yards of ocean bar channel maintenance material, or slightly less than one-half of the total volume removed from the channel since 1997, has been placed in the near shore site. Monitoring of the 25-foot mlw disposal site has also indicated very little movement of the deposited material." (Draft Section Ill Report dated March 2001, p. 5).

Response 3: Disagree. The only circumstance where beach-quality material has been disposed of in the ODMDS is when weather conditions prevent safe operations in the nearshore. While the USACE will continue to minimize disposal of beach quality material in the ODMDS as much as possible, the narrow dredging window (usually 90 days between January-March) often requires that dredge vessels work in adverse weather and seas and place some material in the ODMDS in order to accomplish all dredging work within the short timeframes required. On past contracts, when weather conditions were deemed unsafe for placement of material in the nearshore, contractors were allowed to dispose of material in the ODMDS. Based on analysis of dredging operations between years 1995 and 2006, approximately 43% of coarse-grained material that was intended for the nearshore placement area, was diverted to the ODMDS due to weather restrictions. The Corps will continue to work to reduce the amount of beach-quality sediment that is disposed of in the ODMDS, and to make sure that the beach-quality material disposed of in the ODMDS is available for subsequent nourishment activities. No practicable alternatives exist to the occasional placement of material in the ODMDS when hopper dredges are the necessary piece of dredging equipment, as further described below. The Corps is committed to reducing the impact that its dredging program has on endangered sea turtle species. Hopper dredging, in particular, can pose dangers to turtles in the water, and the Corps has elected, with the concurrence of all resource agencies, to restrict its hopper dredging at MCHP to the winter months of January-March, when likelihood of turtle encounters is at its lowest. Dredging is most difficult to accomplish in wintertime months, due to the increased frequency and duration of foul weather. Foul weather conditions, especially those which result in increased wave amplitude, make placement of material in the nearshore area hazardous for a laden dredge, which often has minimal clearance when placing material in the nearshore area. The Corps has chosen to allow its contractors to continue to dredge in foul weather, allowing them to dispose in the ODMDS when weather and wave conditions make nearshore placement hazardous. To do otherwise, and require contractors to stop work in high wave conditions, would have two distinct consequences: costs for dredging would increase, and just as importantly, it would be far less likely that the Corps could accomplish the work within the narrow 90-day “sea turtle” window. This would mean that the Corps, in addition to paying more for the job,

would face the choice of not being able to finish the navigation dredging or, alternatively, increase its risk of killing endangered turtles.

The Corps' experience in the FY 2013 dredging season confirmed the impracticability of a "No ODMDS" policy. In the contract solicitation advertised in late 2012, the Corps removed the ODMDS foul-weather option from the proposed contract, leaving the nearshore placement area as the only available placement option. Only one dredging company responded to the solicitation, and the prices offered by that company far exceeded our awardable range (the Corps is prohibited by law from entering into dredging contracts that exceed the Government estimate by more than 25%). In subsequent discussions with that contractor, it was clear that the primary reason for the increased cost was the likelihood that the dredge would have to both attempt nearshore placement in foul weather (risking damage to vessel and danger to crew) and shut down more often when weather was deteriorating. Our experience has shown that utilizing a hopper dredge to dispose material on the beach also necessitates some disposal of material in the ODMDS during adverse weather conditions, as the pump-out of hoppers can be difficult in foul weather. The only practicable alternative available to the Corps, when utilizing hopper dredges, is to allow the placement of material into the ODMDS in hazardous conditions.

The Corps has continued to explore options that reduce the amount of beach-quality material placed in the ODMDS, without removing from a vessel captain the essential flexibility necessary to protect vessel and crew. Our most recent contract for nearshore placement included the following condition: "If weather and/or wave conditions prohibit safe disposal in the Nearshore Placement Area, the Contractor shall place dredged material in Zone 2 or Zone 4 [areas designated for beach-suitable material] of the Ocean Dredged Material Disposal Site (ODMDS). No more than 15% of the total loads of dredged material may be dumped in the ODMDS. For each dump placed in the ODMDS, the Contractor shall document the weather and/or wave conditions that prohibited safe disposal in the Nearshore Placement Area and submit the documentation to the Contracting Officer or his/her designated representative. Loads dumped in the ODMDS without proper documentation will be deemed misplaced material and deducted from the pay quantity."

It is our intent to include similar language in future contracts for hopper dredging unless problems arise. Finally, it is important to note that the ODMDS has been, and continues to be, a valuable borrow source for material for use in storm damage reduction projects along all of Bogue Banks. The Corps specifically requires its contractors to place beach-quality material in specific sections of the ODMDS so that it can be available for future deposition on the beach. Recent locally-funded projects have used the ODMDS as a borrow site, and both Carteret County and the Corps have included the ODMDS as a preferred borrow site for material in their long-term storm damage reduction plans. It is the Corps' expectation that future trends will mirror the past decade, where more material was removed from the ODMDS than was placed into it. While placement of beach-quality material in the ODMDS is never the Corps' preferred option, the ODMDS remains a valuable "safety net" for this project, allowing for winter dredging of the channel in an environmentally responsible manner, while

preserving beach-quality material for future use. For discussion of sediment movement in the nearshore see comment #2, above.

Comment 4: Dredged material has been placed between the -26 and -40 foot contours, not between the -25 and -30 contours as described in the prior NEPA documents and CZMA consistency determination.

Response 4: Depths within the authorized nearshore disposal location range from approximately -20 feet mllw to nearly -35 feet mllw. While material has been placed within the authorized placement area in depths greater than -30 feet mllw, as described in the prior NEPA documents and CZMA consistency determination, the majority of material has been placed within the upper S blocks and lower T blocks, which range from -20 feet mllw to -36 feet mllw. The effect of these placements is shown in the most recent survey of the area which shows the depths within the upper S blocks has shallowed to between -17 and -18 feet mllw and to depths of -26 to -27 feet mllw in the lower T blocks. In addition, the proposed expansion of the nearshore placement area extends to cover a wider area with shallower depths ranging from -17 feet mllw to -35 feet mllw which will allow more flexibility when placing nearshore sediment and improve the Corps ability to place the material in shallower depths and in thinner lifts which will aid the evolution of the placed material.

Comment 5: The Corps has admitted that placement of dredged material in offshore disposal areas is inconsistent with North Carolina's CMP. "[P]lacement of dredged material in the ODMDS is neither environmentally acceptable, nor engineeringly sound. Also, it is not consistent with North Carolina's Coastal Zone Management Act regulations." Corps' Wilmington Harbor, Draft Dredged Material Management Plan, Alternative Formulation Briefing dated October 2007, pp. 91-92.

Response 5: Disagree. The quote provided is from a preliminary draft of the Wilmington Harbor DMMP that was in its earliest phase of formulation, and was pulled particularly far out of context. That quote, besides being in draft form and applied to a completely different project, stood for a proposition that the Wilmington District still supports: that disposal of ***all*** beach-suitable material dredged from a navigation project into an ODMDS, particularly one where unsuitable material is not segregated from suitable material, is not environmentally acceptable, engineeringly sound, or consistent with the NC CMP. That is not the case here, where material is kept within the active littoral system whenever feasible.

Comment 6: The draft DMMP/EIS preferred alternative is inconsistent with the enforceable policies of North Carolina's CMP.

Response 6: Disagree. The preferred alternative is fully consistent with the enforceable policies of the NC CMP.

Comment 7: The Corps' position that navigation and funding are the determinative factors related to dredged material management practices and lack of commitment to beneficial use and mitigation is inconsistent with North Carolina's CMP. North Carolina's CMP requires that dredged material be placed in the active nearshore or beach unless

no practicable alternative exists. The Corps may not use lack of funding as a basis for failure to be "consistent to the maximum extent practicable." City of Sausalito v. O'Neill, 386 F. 3d 1186, 1223 (9th Cir. 2004) ("lack of funds is explicitly forbidden as a criterion for finding consistency under 15 C.F.R. § 930.32(a)(3)"); 16 U.S.C. § 1456(c)(l)(B) ("[N]o such exemption shall be granted on the basis of a lack of appropriations unless the President has specifically requested such appropriations and Congress has failed to make them available."); 15 CFR § 930.32(a)(3) ("The only circumstance where a federal agency may rely on a lack of funding as a limitation on being fully consistent with an enforceable policy is the Presidential exemption.").

Response 7: The Corps does not claim that funding keeps it from being fully consistent with the enforceable policies of the NC CMP. Carteret County is confusing the definition of the term “practicable” found in the NCDCM regulations with the phrase “maximum extent practicable” found at 16 USC § 1456 and defined at 15 CFR §930.32. The Corps agrees that NOAA regulations, found at 15 CFR §930.32, define “consistent to the maximum extent practicable” to mean fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal agency. This DMMP is fully consistent with the enforceable policies of the NC CMP; the Corps does not claim that full consistency is prohibited in this case by existing law. We understand the phrase “practicable alternative” found in 15A NCAC 07M.1102 to have a meaning similar to that found in the Clean Water Act 404 (b)(1) guidelines at 40 CFR §230.3(q), which defined practicability, as applied to an alternative, to mean “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” This understanding was confirmed orally with the NCDCM Consistency Coordinator, Director, and Counsel in a consistency review meeting on this project in 2009. Additionally, when discussing nearshore and ODMDS placement in her August 24, 2001 letter to the Corps, NCDCM Director Donna Moffitt noted that when considering a project's compliance with Section 1102, that section should be read in concert with "7H.0208 (2)(G) [which] does provide some flexibility for publicly funded projects, allowing them to be considered by review agencies on a case by case basis with respect to spoil disposal." (Corps Attachment F).

The Corps therefore understands that cost, technology, and logistics are an integral part of determining whether disposal options are “practicable alternative[s]” under 15A NCAC 07M.1102. As discussed further below, this DMMP fully explains why the selected plan meets the criteria outlined in 15A NCAC 07M.1102 and 15A NCAC 7H.0208 (2)(G). The quoted statements from the DMMP in paragraph 6 emphasize two important points: 1) that the District’s funding stream for maintenance of this project is subject to change and 2) that flexibility in disposal location is important in the event of unexpected shoaling events or issues which reduce dredge availability. The Corps’ recent contract experience at Morehead City includes the following:

• FY 2009 (Beach Placement Job): All bids were too high to be awardable. No contract was issued. The Corps dredge McFARLAND was mobilized to do minimal necessary dredging.

• FY 2010 (Beach Placement): Contract was awarded and successfully completed.

• FY 2011 (Inner Harbor (ODMDS disposal) and minimal Nearshore Placement): Contract was awarded and successfully completed.

• FY 2012 (Nearshore Placement): Only one bid was received; bid was too high and unawardable. No contract was issued. The Corps dredge McFARLAND was mobilized to do minimal necessary dredging.
• FY 2013 (Nearshore Placement – the proposed contract prohibited ODMDS disposal in bad weather): Only one bid was received; the bid was too high and unawardable. No contract was issued. The Corps dredge McFARLAND was mobilized to do minimal necessary dredging. Discussions with the sole bidder revealed that the lack of a bad weather ODMDS disposal option led directly to high bid prices.
• FY 2013 (Nearshore Placement via pipeline dredge): This was a job brought about by unexpected shoaling off the submerged tip of Shackleford Island. About 2/3 of the navigation channel was obstructed by a shoal that reached 30 feet in height (water depths less than -15 feet MLW) inside channel boundaries. The contract included modified ODMDS disposal language for bad weather (see response 8 for that language). Contract was awarded and successfully completed.
• FY 2014 (Beach placement): Contract was awarded and work was completed.

Comment 8: Although the Corps has proposed to expand the Nearshore West area, the proposed Nearshore West includes the existing Nearshore Berm and the Corps has failed to commit to placing any material in depths less than -18 feet NAVD. Carteret County strongly disagrees with the Corps' contention that placement of dredged material in the ebb tidal delta would retain sediment within the littoral system. As a result of the Corps' dredging activities, the ebb tidal delta has deflated and extends seaward of approximately the -48-foot contour. Although placement of dredged material in some locations of the ebb tidal delta might retain such sediment within the littoral system, the vast majority of the ebb tidal delta is outside the littoral system as a direct result of the Corps' dredging activities.

Response 8: The Corps does not agree that the -18 feet NAVD depth indicated in this comment is the seaward boundary of the “active nearshore area” described in 15A NCAC 07M.1102. As the draft DMMP explains, our recent monitoring and analysis of nearshore area placement shows that material in the placement area is moving in a landward direction. In the opinion of our coastal engineers, the entire current nearshore placement area, and entire proposed expansion of the nearshore placement area, is within the active nearshore area. Placing material anywhere within the current nearshore placement area or expanded nearshore placement areas will keep it within the Beaufort Inlet littoral system. Further, the depth of the nearshore placement area is constrained by the operating depths of the commercial hopper dredge fleet. As the District explained in its May 13, 2009 letter to DCM: “It is also important to note that the logistics involved with the dredging of material from the Outer Harbor channel to a great degree define the ideal location of the Nearshore Placement Area. Specifically, in order to maintain this section of the MCHP, a dredge vessel must be able to remove material to a depth of 47 feet, dredge shoals that are long and roughly linear, and work in the rough sea conditions mandated by the District's voluntarily-imposed environmental dredging window in the winter months (the purpose of this dredging window is to minimize impacts to sea turtles). Ocean-going hopper dredges have so far been the only vessels able to accomplish such tasks. These dredges, when fully laden, often have keel depths of 22 feet or more, and therefore, must operate in more than 22 feet of

water to avoid colliding with the bottom. When working in seas of several feet, or at lower tides, deeper operating depths are necessary. Therefore, it is not practicable to place material in a nearshore area at depths much less than 25 feet. The average depth of the existing Nearshore Area is roughly 26 feet, and it has been placed across the 25- and 30-foot contours, allowing for enough space to contain sufficient material and provide vessels with an adequately large target for material placement." Currently there is only one dredge in the entire commercial hopper dredge fleet that could dredge as deep as 47 feet and dispose of material in less than 18 feet of water. That dredge, the ATCHAFALAYA, has only one drag arm (all others have two) and has a hopper capacity of 1,300 cubic yards (most other hoppers' capacity is 3600-7500cy). Given these constraints, the dredge could not reasonably be expected to do a large-scale (750,000cy) dredging job in the 90 days available to do the work at Morehead City each winter. It would also be imprudent for the District to create dredging requirements that only one dredge could fulfill, for obvious competitive and logistical reasons. There may be opportunities for pipeline dredges to use scows or barges to dispose of material in 18 feet of water or less. The work of Marinex Dredging in the summer of 2013 showed that such an operation is possible, but only for dredging shoaled areas where pipeline dredges can effectively work (e.g., the Cutoff section of the Morehead City channel). Other portions of the channel require hopper dredges. Logistical concerns make it imperative that a nearshore placement area include depths sufficient to allow most small-to- medium hopper dredges to operate safely. Any logistically feasible nearshore placement area must include depths between -25 and -30 feet.

Comment 9: Any placement of beach-quality dredged material in the ODMDS is inconsistent with North Carolina's CMP.

Response 9: Disagree. The Corps will continue to work to reduce the amount of beach-quality sediment that is disposed of in the ODMDS, and to make sure that the beach-quality material disposed of in the ODMDS is available for subsequent nourishment activities. No practicable alternatives exist to the occasional placement of material in the ODMDS when hopper dredges are the necessary piece of dredging equipment, as further described below. The Corps is committed to reducing the impact that its dredging program has on endangered sea turtle species. Hopper dredging, in particular, can pose dangers to turtles in the water, and the Corps has elected, with the concurrence of all resource agencies, to restrict its hopper dredging at MCHP to the winter months of January-March, when likelihood of turtle encounters is at its lowest. Dredging is most difficult to accomplish in wintertime months, due to the increased frequency and duration of foul weather. Foul weather conditions, especially those which result in increased wave amplitude, make placement of material in the nearshore area hazardous for a laden dredge, which often has minimal clearance when placing material in the nearshore area. The Corps has chosen to allow its contractors to continue to dredge in foul weather, allowing them to dispose in the ODMDS when weather and wave conditions make nearshore placement hazardous. To do otherwise, and require contractors to stop work in high wave conditions, would have two distinct consequences: costs for dredging would increase, and just as importantly, it would be far less likely that the Corps could accomplish the work within the narrow 90-day "sea turtle" window. This would mean that the Corps, in addition to paying more for the job,

would face the choice of not being able to finish the navigation dredging or, alternatively, increase its risk of killing endangered turtles. The Corps' experience in the FY 2013 dredging season confirmed the impracticability of a "No ODMDS" policy. In the contract solicitation advertised in late 2012, the Corps removed the ODMDS foul-weather option from the proposed contract, leaving the nearshore placement area as the only available placement option. Only one dredging company responded to the solicitation, and the prices offered by that company far exceeded our awardable range (the Corps is prohibited by law from entering into dredging contracts that exceed the Government estimate by more than 25%). In subsequent discussions with that contractor, it was clear that the primary reason for the increased cost was the likelihood that the dredge would have to both attempt nearshore placement in foul weather (risking damage to vessel and danger to crew) and shut down more often when weather was deteriorating. Our experience has shown that utilizing a hopper dredge to dispose material on the beach also necessitates some disposal of material in the ODMDS during adverse weather conditions, as the pump-out of hoppers can be difficult in foul weather. The only practicable alternative available to the Corps, when utilizing hopper dredges, is to allow the placement of material into the ODMDS in hazardous conditions. The Corps has continued to explore options that reduce the amount of beach-quality material placed in the ODMDS, without removing from a vessel captain the essential flexibility necessary to protect vessel and crew. Our most recent contract for nearshore placement included the following condition: "If weather and/or wave conditions prohibit safe disposal in the Nearshore Placement Area, the Contractor shall place dredged material in Zone 2 or Zone 4 [areas designated for beach-suitable material] of the Ocean Dredged Material Disposal Site (ODMDS). No more than 15% of the total loads of dredged material may be dumped in the ODMDS. For each dump placed in the ODMDS, the Contractor shall document the weather and/or wave conditions that prohibited safe disposal in the Nearshore Placement Area and submit the documentation to the Contracting Officer or his/her designated representative. Loads dumped in the ODMDS without proper documentation will be deemed misplaced material and deducted from the pay quantity." It is our intent to include similar language in future contracts for hopper dredging unless problems arise. Finally, it is important to note that the ODMDS has been, and continues to be, a valuable borrow source for material for use in storm damage reduction projects along all of Bogue Banks. The Corps specifically requires its contractors to place beach-quality material in specific sections of the ODMDS so that it can be available for future deposition on the beach. Recent locally-funded projects have used the ODMDS as a borrow site, and both Carteret County and the Corps have included the ODMDS as a preferred borrow site for material in their long-term storm damage reduction plans. It is the Corps' expectation that future trends will mirror the past decade, where more material was removed from the ODMDS than was placed into it. While placement of beach-quality material in the ODMDS is never the Corps' preferred option, the ODMDS remains a valuable "safety net" for this project, allowing for winter dredging of the channel in an environmentally responsible manner, while preserving beach-quality material for future use.

Comment 10: Enforceable policies within North Carolina's approved CMP require the Corps to place sufficient dredged material on Bogue Bank's beaches west of the nodal

point. The MCHP has a number of impacts on the beaches of Bogue Banks west of the nodal point. Not only does the MCHP eliminate natural sand bypassing across the inlet, it has significantly modified longshore transport rates along eastern Bogue Banks. As a result of the project, sand placed east of the nodal point is rapidly transported back to the inlet. As recognized by the Corps, the area of inlet influence extends 10.7 miles west of the inlet. The MHCHP has resulted in significant deflation or deepening (i.e., volumetric losses) to a distance of at least 6 or 7 miles west of the inlet. • The Corps' proposed beach placement area includes portions of Fort Macon State Park and Atlantic Beach (Draft DMMP/EIS, Figure 3-38, p. 140). The Corps', however, fails to commit to placing any sand west of the nodal point.

Response 10: The disposal of beach-quality dredged material on beaches adjacent to navigation channels is consistent with, and encouraged by, the NC CMP. Placement of material on Bogue Banks as described in the DMMP is fully consistent with the NC CMP. The precept of the current plan is that most beach-quality sand comes into the channel from one of four locations: Bogue Banks, Shackleford Banks, the eastern side of the ebb tide delta, and the western side of the ebb tide delta. Our plan is to put the sand back into those four locations in roughly the same percentages as it is being lost. We find this to be the most logical way to preserve coastal resources that may be affected by the dredging of the channel. Effects of the navigation project on adjacent shorelines diminish as distance from the inlet increases. As described more fully in the Final Section 111 Report for Morehead City/Pine Knoll Shores, North Carolina (June 2001) (Corps Attachment G), the MCHP is not having an effect on the shoreline at Pine Knoll Shores, although this area is within the inlet influence area, and is a potential disposal location identified in the DMMP. Essentially, the effects of MCHP on the beaches of Bogue Banks are limited to the Fort Macon and Atlantic Beach areas, and exhibited most strongly in those areas close to the channel, namely the Fort Macon area and eastern Atlantic Beach. Surveys of the beach over the past several decades have shown that the disposal of navigation project material on the beach has been able to keep the shoreline change rates of Atlantic Beach and Fort Macon at roughly the same level for the pre- and post-project condition. Additionally, the 2001 Section 211 Report noted that “the disposal of dredged material removed from the harbor project on the shorelines of the Town of Atlantic Beach has effectively improved the condition of this beach relative to the pre-project condition.” This is an indication that navigation project disposal has been enough to counteract not only project-related erosion, but also natural background erosion, sea level rise, and storm-induced losses. Thus far, since 1978, the project has put about 16 million cubic yards, at 100% federal expense, on the beaches of Bogue Banks. In the previous 35 years, placement of beach-quality material from the MCHP has been severely unbalanced. Losses of sand have occurred on both sides of the inlet, but all sand disposal has been made on the west (Bogue Banks) side of the inlet. For 35 years, Bogue Banks has reaped the benefit of the National Park Service’s decision to decline sand disposal on Shackleford Banks. Sand that otherwise would have been disposed on Shackleford Banks has been disposed on Atlantic Beach and Fort Macon instead. Using current loss rates, roughly 7 million cubic yards of material has been placed on Bogue Banks that otherwise would have been placed on Shackleford Banks. Placement of sand on Atlantic Beach and Fort Macon

has exceeded the loss of sand that can reasonably be attributed to the project. The Park Service may now decide to request some disposal on Shackleford, to offset current losses. Sediment placement that is in balance with current project-induced losses is not an impact to Bogue Banks. Disposal locations along Bogue Banks will be made based upon losses measured from the previous survey period. Some placement of sand west of the nodal point should occur during most cycles, but as the volume and location of material placed is dependent upon funding, losses, and other relevant considerations, no commitments can be made in advance regarding specific disposal locations or volumes.

Comment 11: A DMMP that fails to address impacts to beaches caused by the navigation project is not environmentally acceptable and is inconsistent with North Carolina's CMP.

Response 11: A per Engineering Regulation (ER) 1105-2-100, the purpose of a DMMP is to demonstrate that sufficient capacity exists, for at least the next 20 years, to accommodate maintenance dredged material from an existing federal navigation project. It is beyond the scope and authority of a DMMP to address impacts caused by the navigation project. As documented in the draft DMMP, the recommended plan is environmentally acceptable and consistent with North Carolina's CMP.

Comment 12: Placement of sand on Shackleford Banks not only would provide little to no benefit to Shackleford Banks, it also would disturb the natural conditions of Shackleford Banks, which is managed as a wilderness area.

Response 12: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. However, placement of sediment on Shackleford Banks was intended to offset the measured losses within the Beaufort Inlet influence area that are attributable to dredging operations of the MHC navigation channel. Details of how the volumetric losses were developed are included in Section 3.2.2 "Beach Disposal" of the DMMP report. From this section it was found that the west end of Shackleford Banks is losing approximately 166,450 cy/yr of sediment and has lost nearly 1.5 million cubic yards of material since October 2000. It is known that this material is being transported west into the navigation channel and then dredged to nearby disposal locations including the nearshore west placement area, Bogue Banks Beaches, and the ODMDS. It is inaccurate to categorically state that adding sediment back to Shackleford Banks -- as partial compensation for the accelerated erosion that is resulting from the navigation channel -- would provide little or no benefit to the island. The island itself is beneficial, not only for the plants, animals, and people that utilize it, but also as a barrier between the ocean and the communities of Harkers Island and Beaufort. In addition, the island provides the public with recreational opportunities. Currently, the island beach is impassible for park visitors on some high tides. Adding

sediment back into the island's sediment budget would counteract that trend, increasing park visitors' use and enjoyment. Adding sediment may also facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford Banks have varied over time with an overall decline to zero plants in the entire seashore in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report). The purpose of the sediment placement was to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at Boston Harbor Islands, Cape Hatteras National Seashore, and here in Cape Lookout National Seashore. The NPS has also conducted minor and major restoration projects in other NPS coastal areas managed as wilderness, including Everglades National Park, Olympic National Park, and Point Reyes National Seashore. The NPS National Wilderness Steering Committee has recognized that "The re-establishment and maintenance of natural ecosystem components and processes on national park lands through intervention has become an increasingly important resources management function," and issued guidance for determining how and when to proceed with intervention actions in wilderness (NPS 2004). The inclusion of the Shackleford Banks alternative in the DMMP – allowing the NPS to weigh ecosystem restoration benefits against wilderness character impacts – is consistent with these policies and guidance.

Lastly, Shackleford Banks has not been designated by Congress as wilderness. Shackleford Banks was identified by the park as being "suitable" (now called "eligible") for wilderness designation in the park's General Management Plan in approximately 1984-1985. There has been no further action on the suitability proposal since then. The suitability proposal does not appear to have been reviewed by the NPS Director, published in the Federal Register, or forwarded to the Department of the Interior as "proposed" wilderness in accordance with NPS Management Policies Chapter 6 or NPS Reference Manual #41. The 1984 wilderness suitability Environmental Assessment, pp. 20-21, stated that the resource, visitor, and recreation management actions on Shackleford Banks would be the same regardless of the island's wilderness designation.

Comment 13: This plan would greatly reduce the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses. For the past century, the Corps has administered a federally-authorized navigation project commonly known as the Morehead City Harbor Project ("MCHP"). The MCHP involves the Corps' regular dredging of Beaufort Inlet and the disposal of dredged material. The Corps has dumped the vast majority of the dredged material offshore – essentially removing it from the active nearshore zone or littoral system (generally considered to extend from the upper beach to the seaward edge of the nearshore zone where sediment is actively transported by waves and currents). This practice has caused a number of significant, adverse impacts to Bogue Banks. Of particular concern, the accelerated beach erosion caused by removal of sand from the Bogue Banks littoral system jeopardizes homes, commercial development, infrastructure, and Fort Macon, an important historic landmark and the most visited state park in North Carolina.

Response 13: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Regardless, a clear distinction needs to be made between beach renourishment and beach disposal. Beach renourishment is the placement of beach quality sand on a beach area for the purpose of building the beachfront area to a specific template or design, whereas beach disposal refers to use of a designated beach area for the disposal of dredged material from a navigation channel. In the case of Bogue Banks and Shackleford Banks, the Corps of Engineers does not propose to renourish the beaches, but may dispose of beach quality sediment from the Morehead City Harbor navigation channel on adjacent beaches. Nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigation priorities. Although the amount of sand available for disposal on Bogue Banks would have been reduced, the DMMP plan would have distributed the dredged material to the beaches based on the quantity lost from these areas relative to the last beach placement activity. The recommended plan would have fully restored Atlantic Beach and Fort Macon Beach to the condition of the beach at the start of the previous dredging cycle. The sediment was intended to be divided between the two beaches as was described in Section 3.2.2 "Beach Disposal" of the DMMP report. The sediment split was based on the amount of sediment lost within the inlet influence areas on both adjacent beaches. For Bogue Banks this included Ft. Macon and the entirety of Atlantic Beach, the majority of which is west of the nodal point. While less sediment would have been available in the beach disposal year for Bogue Banks, sufficient quantities were projected to be dredged to replace sediment lost within Ft. Macon and Atlantic Beach based on the erosion rates detailed in Section 3.2.2. Findings within the Corps Section 111 report show that there have been no measureable differences in the shoreline change rate along Bogue Banks when comparing pre and post project deepening conditions. The exception is along Atlantic Beach and Ft. Macon where

material has been historically placed. Although there were no measureable impacts to the shoreline change rates within these areas, it was determined that disposal of sediment along these areas has ameliorated any impacts related to the navigation project. With this in mind the proposed sediment split was intended to back pass sediment to the areas of Atlantic Beach and Ft. Macon as described in Section 3.2.2 to maintain this equilibrium condition. The vast majority of sediment has **not** been taken offshore. Since 1986, 11.7 million cubic yards of mostly fine-grained material (not suitable for beach disposal) has been taken offshore, whereas, approximately 23 million cubic yards of beach quality sand has been disposed of on Bogue Banks or in the nearshore. Over 16 million cubic yards of that 23 million was put on Bogue Banks (at 100% federal cost).

Comment 14: Despite the NPS' management of Shackleford Banks as wilderness area, the NPS Coastal Geology Program – located in Lakewood, Colorado – has relied upon an exception to the wilderness designation to request dredged material be placed on Shackleford Banks. Although NPS policy permits mitigation of certain adverse impacts to wilderness areas, mitigation is only permitted to the extent caused by external forces – in this case, the navigation project. See NPS Management Policy § 6.3.7 (providing that that management intervention may be undertaken in wilderness areas "to the extent necessary to correct past mistakes, the impacts of human use, and influences originating outside of wilderness boundaries"); Draft DMMP/EIS, p. 54 ("The National Park Service (NPS) is the agency responsible for the management of Shackleford Banks, and has determined that only the quantity of material lost from the island as a result of the navigation channel can be returned to the beaches of Shackleford Banks."). Despite this limitation, the Corps failed to determine the amount of material lost at Shackleford Banks as a result of the navigation project. Draft DMMP/EIS, p. 46 ("The following volumes computed for these areas do not separate volume loss resulting from the navigation channel from the loss that would naturally occur with no project in place."). Therefore, placement of material at Shackleford Banks is inconsistent with NPS policy, and no material should be placed at Shackleford Banks until the Corps determines the amount of sediment lost as a result of the navigation project.

Response 14: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. However, the comparison made between islands to determine the distribution split of future dredged material was performed similarly for both Bogue Banks and for Shackleford Banks. That is, background erosion was not factored out and the gross loss for each side of the inlet was compared to determine a relative difference. The relative difference of these quantities was used to develop the percentage split that would have been applied to future placements of dredged material. The logical extension of this comment is that no dredged material should be placed anywhere, including on Bogue Banks, until the Corps determines the exact amounts of sediment lost as a result of the navigation project.

NPS Management Policies and guidance documents do not require an exact determination of the amount of sediment lost due to human activities and structures before dredged sediment is placed at park units. Instead, the NPS focuses on evaluating sediment compatibility and reducing impacts of placement as much as possible in order to maximize the benefits of the restoration. The NPS is required to "seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated" (NPS Management Policies § 4.1.5), not to their exact pre-disturbance volume, configuration, and condition. In addition, the NPS policies state that decisions are to be based on best available scientific and technical information (e.g., NPS Management Policies § 2.1.2). As stated in the draft DMMP, the proposal for disposal on Shackleford was based on the Corps' best estimate of the volume lost in the island profiles from maintenance dredging. Thus, disposal of sediment on Shackleford would have been consistent with NPS policy.

Comment 15: While Shackleford Banks does experience a loss of sand due to the MCHP, there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island. Because the island is undeveloped, and will never be developed, there is no threat to buildings or other infrastructure due to beach erosion.

Response 15: We agree with the comment that Shackleford Banks is experiencing a loss of sand due to the navigation channel. However, we disagree with the rest of the comment. NPS Management Policies do not require the NPS to produce evidence that human activities and structures are adversely affecting or threatening park resources, ecological function, visitor use, and buildings before taking restoration actions (see NPS Management Policies § 4.8.1.1). To the contrary, the policies clearly state that the NPS mandate is to conserve park resources and values, and that this mandate is independent of the separate prohibition on impairment (see NPS Management Policies § 1.4.3). Any placement of dredged sediment on Shackleford Banks would, as in other NPS units, have been conducted to fulfill this conservation mandate. The NPS believes that Shackleford Banks is a valuable and important part of the National Park System and is well worth conserving for ecological, historical, and visitor enjoyment reason; however, following public review of the Draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of the DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 16: Renourishment of Shackleford Banks will not result in any meaningful benefit to the island. In fact, due to concerns of rapid shoaling, dredged material will not be placed in the most critical area of erosion on the western end of Shackleford Banks. While sand placed in the westerly transport zone will be transported back towards the inlet, this sand will be rapidly lost to the channel without construction of a terminal structure, exacerbating shoaling issues in this section of the channel. It is well documented that Shackleford Banks is migrating to the west into Beaufort Inlet. In fact,

as a result of that migration, the most critical section of the channel for navigation purposes is the "cutoff." If sand is placed on Shackleford Banks (especially within the westerly transport zone), this rate of migration will likely increase and further inhibit navigation.

Response 16: Following public review of the Draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The disposal area along Shackleford Banks was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. Material placed in the proposed disposal area would have transported west and served as a feeder to the most critically eroded areas of Shackleford Banks. Additionally, the disposal area was large enough to allow modifications to disposal practices based on monitoring data of the fill evolution. If it was observed that material is not stable at the western end of the proposed disposal area, future disposal operations would have considered disposal of material farther east along Shackleford Banks, while still remaining within the westerly transport area.

Comment 17: Shackleford Banks is also known as a popular surfing location. The Corps has recognized that "Shackleford Banks supports one of the best and most unique surfing spots on the east coast of the United States" and "when the conditions are right, local and national surfers will travel long distances to surf this unique wave." Draft DMMP/EIS, p. 208. Despite this recognition, the Corps failed to analyze the potential impact of placing sand on Shackleford and in the nearshore area off the coast of Shackleford on this unique surf break.

Response 17: The surf break extends from the spit (off Beaufort Inlet) to about 4,000 to 6,000 feet east to Rough Point on Shackleford Banks. Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. The western limit of the proposed beach disposal area was at or near the eastern end of the surf break. Both the proposed beach and nearshore disposal areas along Shackleford Banks were selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. Because of the existing steep offshore beach profiles in the vicinity of the spit, its high rate of erosion, and the relatively small amount of sediment to be in the nearshore area, the USACE does not anticipate that sediment movement from the nearshore placement area off Shackleford Banks would adversely impact the surf break. This information has been added to the final DMMP.

Comment 18: While providing no meaningful benefit to Shackleford Banks, the placement of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting. In a letter dated May

31, 2011, the North Carolina Division of Marine Fisheries expressed concerns regarding placement of dredged material on Shackleford Banks' beaches. "Since Shackleford Banks is an undisturbed island, serving as valuable habitat to fish and rare species, and there is no development to protect by using the beach renourishment shoreline stabilization techniques, DMF sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

Response 18: Following public review of the Draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Regardless, the ecosystem of Shackleford Banks is not undisturbed; it is disturbed in part because of the navigation channel. Having used heavy equipment in other NPS restoration projects around the country, including placement of dredged material, the NPS was well aware of the need to minimize impacts on park resources and values. Therefore, if the NPS had accepted sediment disposal on Shackleford Banks, the Corps would have followed NPS beach disposal guidance to ensure that any sediment placed on Shackleford Banks would comply with park-protective conditions such as sediment compatibility and restrictions on timing, fill design and volume, equipment, and lighting.

Comment 19: Diverting a substantial portion of the limited dredged material to Shackleford Banks will severely reduce the benefits of the DMMP to Bogue Banks. Under the Corps' preferred alternative, the sand available for renourishment of Bogue Banks would be reduced by almost half, and much of the sand placed on Bogue Banks will be placed east of the nodal point. As confirmed by the Corps' own studies, any sand placed east of the nodal point is rapidly transported back to the inlet. Therefore, it is critical for a sufficient quantity of sand to be placed west of the nodal point where it will benefit Atlantic Beach and other communities to the west. However, because of the proposed renourishment at Shackleford Banks, there is less sand available to be placed on Bogue Banks, especially west of the nodal point. In summary, the beaches of Bogue Banks will receive less sand under the proposed DMMP than has been placed historically and therefore will be more vulnerable to background and storm-induced erosion than in the past. For the reasons outlined above, the County does not favor any renourishment of Shackleford Banks

Response 19: Following public review of the Draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The sediment would have been divided between the two beaches as described in Section 3.2.2 "Beach Disposal" of the DMMP report. The sediment split was based on the amount of sediment lost within the inlet influence areas on both adjacent beaches. For Bogue Banks this included Ft. Macon and the entirety of Atlantic Beach, the majority of which is west of the nodal point. While less sediment would have been available in the beach disposal year for Bogue Banks, sufficient quantities were

projected to be dredged to replace sediment lost within Ft. Macon and Atlantic Beach based on the erosion rates detailed in Section 3.2.2.

Comment 20: In the interest of compromise, the County has attempted to work with the Corps and NPS to reach a mutually acceptable DMMP. The County initially proposed an 80:20 split, with 80% of the dredged material intended for beach placement to be placed on Bogue Banks' beaches. More recently, the County proposed a 65:35 split. However, the Corps and NPS continue to call for a 57:43 split, with 57% being placed on Bogue Banks.

Response 20: Following public review of the Draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The percentage used to establish the first year split for sediment disposed of on nearby beaches was developed based on measured volumetric changes from the inlet influence area on both Bogue Banks and Shackleford Banks. These calculations are detailed in Section 3.2.2 "Beach Disposal" of the DMMP report. No data was available to support changing the split percentage to 65:35.

K. NC Department of Transportation, memo dated December 2, 2013.

Comment: No comment.
Response: Noted.

L. NC Department of Agriculture letter dated November 21, 2013.

Comment: No comment.
Response: Noted.

M. NC Department of Public Safety, Emergency Management letter dated November 7, 2013.

Comment 1: Reference letter dated November 7, 2013. All federal agencies are required to follow the guidelines of Executive Order 11988, signed May 24, 1977. Any work within the Special Flood Hazard Area, based on the current Flood Insurance Rate Map, should follow these guidelines in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains. The guidelines address an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain. The eight steps are summarized below.
a. Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year). b. Conduct early public review, including public notice. c. Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain. d. Identify impacts of the proposed action. e. If impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as

appropriate. f. Reevaluate alternatives. g. Present the findings and a public explanation. h. Implement the action.

Response 1: Concur. Please review the Corps discussion on EO 11988 mentioned in Chapter 6.7 in the document. Dredged material will be placed in the floodplain adjacent to the beaches of Bogue Banks. The proposed action is not anticipated to induce development of the floodplain or otherwise adversely affect the floodplain. No practical alternative exists to locating components of the proposed project in the floodplain. Every effort will be taken to minimize potential effects within the flood plain. The proposed action is in compliance with the requirements of Executive Order 11988. The action is also in compliance with State/local floodplain protection standards.

Comment 2: 44 CPR 60.3.e prohibits man-made alteration of sand dunes and mangrove stands within Zones Vl-30, VE, and V on the community's FIRM which would increase potential flood damage. Grading activity within one of these zones shall be accompanied by a hydraulic study to assume there will be no increase in flood damage potential.

Response 2: The proposed action will not adversely impact sand dunes on Bogue Banks. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. All equipment (dozers, shore pipe, light towers, etc.) would be located between the toe of the frontal dune and the mean high water contour. No mechanical equipment would be allowed to work within the interior of the island or within the frontal dunes. There are no mangroves in the project area so no impacts to mangroves would occur.

N. NC Department of Water Quality letter dated November 8, 2013.

Comment: The proposed project looks to be consistent with the 401.

Response: Noted.

2. Comments Received from Congressional Representatives.

A. Representative George Holding, United States House of Representatives letter dated January 24, 2014.

This letter forwarded comments from Kenny and Cathy Coats. Responses provided in this appendix, Section 3, Representative Public Comments Received. The Congressional letter and the USACE formal response are included in Appendix D.

B. Representative Walter B. Jones, United States House of Representatives letter dated February 5, 2014. Note: responses below were drafted before the NPS requested that no sand be disposed of on Shackleford Banks as part of this DMMP. Also, costs have been updated since 2014. By letter dated February 13, 2014 (Appendix D), NPS responded to letter from Representative Jones.

Comment 1: The Corps was compelled to create the DMMP as a result of the settlement of a 2007 Carteret County lawsuit over the impact of Morehead City Harbor dredging on Bogue Banks. Therefore, it is surprising to see the DMMP propose to direct 43 percent of sand dredged from the harbor to Shackleford Banks, not Bogue Banks.

Response 1: Carteret County sued the Corps in December of 2007 due to its displeasure with the dredged material disposal practices that had been in place for the Morehead City Harbor Project (MCHP). Please note, however, that the Corps' decision to prepare a DMMP for the MCHP was made before the lawsuit was filed. The Corps had committed effort and funding to this endeavor in advance of Carteret County's legal action, and has always recognized that creating a thorough plan for dredged material disposal is important to the long-term success of the navigation project and the port. While the settlement agreement we signed did include a commitment to complete the DMMP, there were no commitments made about where dredged material would be placed. The Corps must place dredged material in a manner that follows good long-term engineering practices, is environmentally responsible, and provides the lowest cost to the government.

Comment 2: While NPS and the Corps have asserted that Morehead City Harbor dredging has caused erosion on the western tip of Shackelford Banks, the Park Service has never expressed a desire to actually place dredged sand back on Shackleford Banks. In fact, Park Service management has repeatedly stated to my office that all the agency wants from a DMMP is to reserve the right to place dredged sand on Shackleford Banks at some point over the 20-year life of the plan.

Response 2: Since the 1970's, the Corps has recognized that dredging of the Morehead City Harbor channel has detrimental effects on the natural sediment balance of the Beaufort Inlet Complex, which includes the ebb tide delta and beaches on both sides of the Inlet. For this reason, the Corps has always recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. In the past, the NPS, who manages Shackleford Banks, declined the disposal of sand on Shackleford Banks. So, to date, all beach disposal of dredged material from the navigation channel has been on Bogue Banks. Following review of the coastal analysis that was completed for the DMMP, the NPS, for the first

time, requested that the Corps consider disposal of sand on Shackleford Banks as a potential alternative in the DMMP. The NPS indicated that this alternative represents a significant opportunity to address ongoing erosion issues at Shackleford Banks and protects vitally important natural and wilderness resources for future generations. As requested by the NPS, the Corps added this option to the alternatives analysis for the DMMP.

Comment 3: Unfortunately, the DMMP goes far beyond reserving that right. In reality, it lays out a specific timetable for placing sand on, or just offshore of, Shackleford Banks every year for the next 20 years. Corps personnel explain the discrepancy by arguing that each year NPS will decide whether or not it wants to place sand on the beach in accordance with the plan. However, the plan does not specify, nor can the Park Service explain, what metrics they might use to decide when they want sand. In my opinion, that's a very poor way to manage the situation, as it gives the people of Carteret County no certainty about how much sand they'll receive in any given year.

Response 3: In order to clearly demonstrate that adequate dredged material disposal capacity is available for the next 20 years, the DMMP lays out a specific timetable for each year of the 20-year plan. To minimize the adverse effects of dredging the navigation channel, the DMMP attempts to keep as much beach-quality material in the system as possible, by balancing disposal on the adjacent beaches and nearshore placement areas. Based on the alternatives analysis, the current DMMP recommended plan is for the coarse-grained (≥90 percent sand) dredged material to be returned to the adjacent beaches and nearshore areas in ratios comparable to calculated sediment losses. Volumetric loss calculations show that 57 percent of the material is lost from the Bogue Banks side of the Inlet and 43 percent of the total losses come from the Shackleford Banks side. With this approximate 57/43 split of sediment entering the navigation channel from the west and east, material should be returned to the beaches in similar ratios during future beach disposal operations. Likewise, volumetric sediment loss calculations for the ebb tide delta indicate that 78 percent of the sediment losses are from the west lobe (the Bogue Banks side) while 22 percent of the losses are from the east lobe (the Shackleford Banks side). With this approximate 78/22 split of sediment entering the navigation channel from both the west and east lobes of the ebb tide delta, material should be placed in the nearshore areas in similar ratios during future placement operations. These ratios may be re-evaluated based on the performance of the material disposed of and beach disposal limits may be adjusted to maximize the benefits while minimizing costs and environmental impacts. Although the recommended plan would result in less sand being disposed of on Bogue Banks in the future than the currently-utilized Interim Operations Plan projects, the quantity of dredged material expected to be placed on the beaches of Bogue Banks is approximately 684,000 cubic yards every 3 years. This volume of dredged material more than offsets the Bogue Banks annual erosion rate of approximately 219,000 cubic yards per year within the area of inlet influence, which includes all erosion, not just erosion caused by maintaining the navigation channel. It should also be noted since 1978, over 16 million cubic yards of sand from the Morehead City Harbor navigation channel have been placed on Bogue Banks at 100 percent federal cost.

Comment 4: If the Park Service decides it wants to place sand on Shackleford Banks in accordance with the DMMP, it is difficult to see how the plan is affordable, or the best deal for taxpayers. The plan's average annual cost is about $11.1 million. That is almost twice the roughly $6 million which the project has been allocated in average annual federal appropriations over the past five years. Given the fiscal challenges facing the federal government for the foreseeable future, it is difficult to see where the additional funds would come from on a regular basis.

One reason the cost appears to be so high is because the plan calls for placement of sand on Bogue Banks and Shackleford Banks via pipeline dredge every third year starting in year one of the plan. Knowing of the significant costs to mobilize a pipeline dredge, it would be cheaper to place sand on only one beach in any given year, rather than two.

Response 4: The NPS has the option at any point during implementation of the 20-year DMMP to decline disposal of sand on Shackleford Banks; however, the draft DMMP does not include information regarding the metrics that would be used by the NPS to decide whether or not the Service will decline sand. We agree that these metrics would benefit the final DMMP and will request input from the NPS to allow us to add this information to the final report if at all possible. Although the NPS option to decline sand at any point during the DMMP adds some uncertainty to the plan, of greater concern is the Operations and Maintenance (O & M) budget which may result in significant uncertainty on an annual basis regarding the size and type of dredging operation that the Corps will be able to carry out to keep the port at Morehead City operating adequately. For this reason, the DMMP specifically states: "[t]he three year dredging cycle proposed for the DMMP assumes that funding will be available to dredge and monitor as planned, appropriate dredge equipment will be available, and that unexpected shoaling would not occur. The three year rotational cycle is the base plan, but must remain flexible and adjustable to meet the navigation needs of the Morehead City Harbor Navigation project, therefore, from time to time, the cycle may be adjusted, resulting in fewer dredging events and dredged material quantities that differ from those described in this DMMP. Nothing in this document should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigability priorities."

Your concern regarding the average annual cost of the plan versus the annual O & M budget is valid, and an important concern for our agency as well. As documented in the DMMP, ER 1105-2-100 requires that federal navigation projects demonstrate sufficient dredged material disposal capacity for at least the next 20 years. To ensure that dredged material disposal capacity is adequate, all DMMP analyses, including sediment volumes and costs, are based on maintaining the Morehead City Harbor channel to its fully authorized dimensions regardless of whether or not adequate funding is available to do so. The high cost of the DMMP is due in part to the requirement to develop a plan that dredges the full channel dimensions, which results in an annual dredging volume of about 1.3 million cubic yards, higher than the historic amount of approximately 1 million

cubic yards per year that our budgets have allowed us to dredge. Also, all cost estimates in the DMMP include a contingency of 27 percent. The highest DMMP costs are those associated with beach disposal. Although it would cost slightly more to go to the beaches of both Bogue Banks and Shackleford Banks than to go to one beach only, the cost difference (about 4 percent more than the cost to go to one beach only) is relatively minor, and continuing to return sand to one beach only, when both are losing sand, is not a good long-term engineering practice. We recognize that there is a discrepancy between the cost of implementing the DMMP and the annual funding provided to maintain the navigation channel. As you have requested, we will continue to investigate ways to reduce the cost of the DMMP, including all reasonable options regarding the timing and frequency of beach disposal.

Comment 5: I am also concerned about the lack of analysis in the DMMP on how sand placement on Shackleford Banks might benefit or harm the Shackleford horses. These horses are a key piece of Eastern North Carolina's heritage. Under federal law, NPS is required to allow for a herd of at l east 110 horses on the seashore. Given this responsibility, the plan should ensure that sand placement, if done, is carried out in a way that does not jeopardize the herd.

Response 5: The USACE deferred to the NPS to respond to this comment. See NPS letter to Representative Jones, dated February 13, 2014, which reads, in part: Although the Corps has provided information that indicates that maintenance dredging of the Beaufort Inlet Complex has accelerated erosion of the shoreline on Shackleford Banks, the NPS has not yet developed criteria or metrics that would determine when or if sand would be allowed to be placed on Shackleford. At this point in the planning effort for the DMMP, the NPS wants to be sure that option is analyzed and available. Currently, the NPS is contacting several scientists and other knowledgeable persons to discuss this issue. The NPS is considering having a facilitated meeting of these experts to conduct an open forum discussion. This discussion would include analysis of impacts on the horse herd on Shackleford. However, because the activities of placing sand on Shackleford would be limited to the beach and the horses only use the beach for a movement corridor, not for grazing or drinking, the NPS does not believe that sand placement would impact the horses.

C. Senator Kay Hagan, United States Senate letter dated April 2, 2104 (letter addressed to NPS and the USACE). Note: responses below were drafted before the NPS requested that no sand be disposed of on Shackleford Banks as part of this DMMP. Also, by letter dated April 8, 2014 (Appendix D), NPS responded to the letter from Senator Hagan.

Comment 1: Since the 1970's, the Corps has recognized that dredging of the Morehead City Harbor channel has detrimental effects on the natural sediment balance of the Beaufort Inlet Complex, which includes the ebb tide delta and beaches on both sides of the Inlet. For this reason, the Corps has always recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks

and Shackleford Banks. In the past, the NPS, who manages Shackleford Banks, declined the disposal of sand on Shackleford Banks. So, to date, all beach disposal of dredged material from the navigation channel has been on Bogue Banks. Following review of the coastal analysis that was completed for the DMMP, the NPS, for the first time, requested that the Corps consider disposal of sand on Shackleford Banks as a potential alternative in the DMMP. The NPS indicated this alternative represents a significant opportunity to address ongoing erosion issues at Shackleford Banks and protects vitally important natural and wilderness resources for future generations. As requested by the NPS, the Corps added this option to the alternatives analysis for the DMMP.

Diverting sand to Shackelford [sic] could leave communities like Atlantic Beach vulnerable to flooding and storm damage. Whereas Shackelford Banks is managed as a wilderness area and thus devoid of development, properties on Atlantic Beach are valued at $1.7 billion. In addition, Atlantic Beach is a tourist destination. Reducing funding to maintain these beaches could reduce tourism and harm the area's economy.

Response 1: Although the recommended plan would result in less sand being disposed of on Bogue Banks in the future than the currently-utilized Interim Operations Plan projects, the quantity of dredged material expected to be placed on the beaches of Bogue Banks is approximately 684,000 cubic yards every 3 years. This volume of dredged material more than offsets the Bogue Banks annual erosion rate of approximately 219,000 cubic yards per year within the area of inlet influence, which includes all erosion, not just erosion caused by maintaining the navigation channel. Since 1978, over 16 million cubic yards of sand from the Morehead City Harbor navigation channel have been placed on Bogue Banks at 100-percent federal cost. Surveys of the beach over the past several decades have shown that the disposal of navigation project material on the beach has been able to keep the shoreline change rates of Atlantic Beach and Fort Macon at roughly the same level for the pre- and post-project condition**.** Additionally, the 2001 Section 111 Report noted that “the disposal of dredged material removed from the harbor project on the shorelines of the Town of Atlantic Beach has effectively improved the condition of this beach relative to the pre-project condition.” This is an indication that navigation project disposal has been enough to counteract not only project-related erosion, but also natural background erosion, sea level rise, and storm-induced losses.

Comment 2: Depositing sand in both locations would require additional funding. In this budget environment, it is a continuous challenge to maintain sufficient funding for existing projects in this area and across the state. Securing the additional resources needed to place sand on Shackelford Banks could result in budget cuts to these other Corps projects across my state.

Response 2: In the previous 35 years, placement of beach-quality material from the Morehead City Harbor Project has been severely unbalanced. Losses of sand have occurred on both sides of the inlet, but all sand disposal has been made on the west

(Bogue Banks) side of the inlet. For 35 years, Bogue Banks has reaped the benefit of the NPS's decision to decline sand disposal on Shackleford Banks. Sand that otherwise would have been disposed on Shackleford Banks has been disposed on Atlantic Beach and Fort Macon instead. Using current loss rates, roughly 7 million cubic yards of material has been placed on Bogue Banks that otherwise would have been placed on Shackleford Banks. Placement of sand on Atlantic Beach and Fort Macon has exceeded the loss of sand that can reasonably be attributed to the project. The NPS may now decide to request some disposal on Shackleford, to offset current losses. Sediment disposal that is in balance with current project-induced losses will not negatively impact Bogue Banks but it may reduce the benefits the island has been receiving through disposal of beach-quality material; disposal locations along Bogue Banks will be made based upon losses measured from the previous survey period. Regarding your concern about the cost of disposing of sand on Shackleford Banks, the highest DMMP costs are those associated with beach disposal and it costs essentially the same to go to either Bogue Banks or Shackleford Banks. It would cost approximately an additional $630,000 to go to the beaches of both Bogue Banks and Shackleford Banks than to go to one beach only, however, continuing to return sand to one beach only, when both are losing sand, is not a good long-term engineering practice.

Comment 3: Lastly, the proposal does not specify the variables NPS must use to determine whether to accept the sand. Given the aforementioned consequences of diverting beach quality sand to Shackleford, it is unacceptable for the draft DMPP to not define the conditions under which the NPS would accept sand to renourish Shackelford Banks. I urge the National Park Service to withdraw the request for authority to accept sand on Shackelford Banks and I ask the Corps to remove this authority from the proposed DMMP.

Response 3: The NPS addressed this comment in a letter, dated April 8, 2014 (Appendix D), as follows: The Wilmington District of the U.S. Army Corps of Engineers (Corps) developed the draft DMMP, with the National Park Service (NPS) as a cooperating agency. This response will address those issues within the purview of the NPS; we understand that the Corps will be responding separately regarding its policies and considerations with respect to the DMMP.

Since the 1970s, the Corps has documented to NPS that dredging of the Morehead City Harbor channel has had detrimental effects on the natural sediment balance of the Beaufort Inlet Complex, which includes the ebb tide delta and beaches on both sides of the Inlet. For this reason, the Corps has always recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. Previously the NPS has declined the disposal of sand on Shackleford Banks. So, to date, all beach disposal of dredged material from the navigation channel has been directed to Bogue Banks. Following review of the coastal analysis that was completed for the DMMP, the NPS requested that the Corps consider disposal of sand on Shackleford Banks as a potential alternative in the DMMP. The NPS has

determined that this alternative represents a significant opportunity to address ongoing human-caused erosion issues at Shackleford Banks and protect vitally important natural and wilderness resources for future generations.

The NPS views the DMMP as an endeavor by the Corps to fulfill its obligations to maintain the Morehead City Harbor while minimizing the detrimental effects of dredging on the natural sediment balance of the Beaufort Inlet Complex. The NPS, in no way, considers this to be a beach nourishment plan. To minimize the adverse effects of dredging the navigation channel, the DMMP is attempting to keep as much beach-quality material in the system as possible, by balancing disposal on the adjacent beaches and nearshore placement areas. Because current science presented by the Corps indicates that maintenance dredging of the Beaufort Inlet Complex has accelerated erosion of the shoreline on Shackleford Banks, the NPS asked for the alternative of placing sand on the beach at Shackleford be considered and analyzed in the DMMP. If the NPS did not ask for this option now, then it would not be available to the NPS for the life of the plan, which is 20 years. The current DMMP includes an option for placement of less than half of the dredged sand on the ocean beach at Shackleford on, at most, a three year cycle. The placement of sand would occur on a 3.65 mile section of beach which is approximately 1.5 miles from the western tip of Shackleford. Also, because of the limited amount of sand that would be placed on Shackleford, only a portion of the designated 3.65 miles would have sand placed on the beach during each 3-year sand placement cycle. The NPS would have to provide the Corps with a permit every time sand is placed on Shackleford. The permit would have conditions as to how and when sand would be placed on the island. The permit would include conditions to ensure the preservation of the Shackleford horses. In no way would the NPS allow equipment anywhere on the island other than on the ocean beach.

Although the Corps has provided information that indicates that maintenance dredging and current disposal practices of the Beaufort Inlet Complex have accelerated erosion of the shoreline on Shackleford Banks, the NPS has not yet developed criteria or metrics that would determine when or if sand would be placed on Shackleford. At this point in the planning effort for the DMMP, the NPS wants to be sure that option is analyzed and available. The NPS is working with several scientists and other experts to ensure we are utilizing the best available science to inform our decision-making.

The Morehead City Harbor DMMP is an example of federal agencies sharing information, effort, and resources in a collaborative manner to strike a balance among all interested parties. By being included in the DMMP, the NPS will be able to consider mitigation of the impacts of erosion correlated to the dredging of the channel over the next 20 years.

The NPS understands the importance of this DMMP and appreciates your interest in this matter. All comments received during the public review period will be carefully

considered during development of the final DMMP, which will also be circulated for public review. The NPS will strive to assist the Corps develop a final DMMP that considers the interests of all parties affected by maintenance of the Morehead City Harbor navigation project, while upholding our mandate to protect Shackleford Banks for the enjoyment of future generations.

3. Distinctive Public Comments Received from Individuals, Communities, Groups, and Universities.

A. Joe Exum, Executive Director, Bogue Banks Environment Stewardship Corporation letters dated December 23, 2013 and revised on January 21, 2014.

Comment 1: The Morehead City Inner Harbor may require capital improvements because of 2014 Panama Canal changes accommodating freighters drawing 44'. The anticipated increase in TEU's is used to justify revenue forecasts necessary to achieve a 1/1 benefit analysis ratio in the DMMP/EIS.

Response 1: The DMMP is a 20-year disposal plan for maintenance of the existing authorized federal channel and has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7, which requires a disposal plan that is least cost, environmentally acceptable, and engineeringly sound. A cost/benefit analysis is not required. There is no study underway considering improvements to Morehead City Harbor.

Comment 2: Having re-read the DMMP/EIS, the role of the National Park Service in altering least cost disposal practices was not only unique but also ambiguous.

Response 2: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. However, since the 1970's, the Corps has recognized that dredging of the Morehead City Harbor channel has detrimental effects on the natural sediment balance of the Beaufort Inlet Complex, which includes the ebb tide delta and beaches on both sides of the Inlet. For this reason, the Corps has always recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. While disposing of material on both sides of an inlet is more expensive than disposal on one side only, the long-term effects of disposing sand on only one side of the inlet are not conducive to the long-term sustainability of the channel or the inlet complex. This information will added to the DMMP.

Comment 3: Ranger Kenny has chosen to exercise his authority to divert sand from the ODMDS and ultimately PKS and EI to Cape Lookout National Park if scientific studies indicate the erosion at the western end of Shackleford Banks was caused by maintenance of Beaufort Inlet, i.e., erosion induced by human activity.

Response 3: There are no plans to divert sand from the ODMDS to any location.

Comment 4: The best scientific studies available have been used to exculpate the USACE from the environmental damage caused by the 1993 MHCHIP as well as prosecute the USACE for inverse taking of property. The following extensive studies confirm demonstrative knowledge gained since the 1993 MHCHIP concerning littoral drift, wave refraction and energy dissipation, and long shore current velocity.

1. Effects of Offshore Geology and the Morehead City Harbor Project on Eastern Bogue Banks by Todd S. Roessler. UNC School of Marine Science.

2. Living with an Island by Orrin Pilkey,
3. Olsen Associates study of Bogue Banks
4. USACE 933 Project 2003
5. Inlet Spits and Maintenance of Navigation channels. USACE 2002.

All of these reports conclude Bogue Banks has a sand deficit as a result of maintaining Beaufort Inlet at artificial depths. Establishing littoral drift from east to west makes it difficult to explain what part of Shackleford Banks appears to be eroding because of eastward migration and what part is being eroded as a result of hopper dredging.

Response 4: It is difficult to separate the influence of the navigation channel from what changes would occur along the island without the channel in place. However, the same is true for the east end of Bogue Banks where material is being transported easterly into the navigation channel and the Bogue Banks spit is migrating east. The MHC DMMP recommended plan simply attempts to balance future disposal on both islands based on volumetric losses observed along the islands; however, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 5: The DMMP/EIS proposal provides cost/benefit analysis in compliance with the National Economic Development Act. The USACE has relied upon optimistic economic forecasts similar to 1993 in which justification required 50 year depreciation rates for long-term capital investments. In summary, the revenues generated by North Carolina Ports do not exceed the cost of maintenance dredging and operational costs.

Response 5: The DMMP is a 20-year disposal plan for maintenance of the existing authorized federal channel and does not require a cost benefit analysis. The DMMP is required to demonstrate that the Port of Morehead City will remain viable and that is addressed in Section 2.1 of the DMMP.

Comment 6: Dickinson, Millender, and Applegate v USACE, are court cases establishing the doctrine of inverse taking of property by erosion. The fact that erosion is a continuing process which occurs during channel changes causing permanent loss of property is not disputed by USACE. In effect, the USACE is choosing not to condemn the adjacent beaches in order to avoid just compensation for what in actuality is a taking. In the Applegate case the USACE promised a sand transfer plant to avoid condemning adjacent beaches. The USACE never delivered on their promise. The USACE settled out of court and was required to provide Captiva homeowners sand transfers as far as 20 miles from the inlet created by the USACE.

Response 6: Since 1978, USACE has placed approximately 16 million cubic yards of material on Bogue Banks at 100% federal expense. Surveys of the beach over the past several decades have shown that the disposal of navigation project material on the beach has been able to keep the shoreline change rates of Atlantic Beach and Fort Macon at roughly the same level for the pre- and post-project condition. Additionally, the 2001 Section 211 Report noted that “the disposal of dredged material removed from the

harbor project on the shorelines of the Town of Atlantic Beach has effectively improved the condition of this beach relative to the pre-project condition." This is an indication that navigation project disposal has been enough to counteract not only project-related erosion, but also natural background erosion, sea level rise, and storm-induced losses. Far from being a "taking," the project has thus far been a benefit to Atlantic Beach and Fort Macon.

Comment 7: The 20-year DMMP/EIS does not count the loss of Bogue Banks property taxes in their cost/benefit analysis. In fact, Ranger Kenny may order the USACE to divert sand from the near shore berm and ODMDS to Shackleford Banks if he determines "the best scientific evidence" suggests Shackleford Banks is eroding as a result of human endeavor. It was not made clear how such diversion would be funded and if successful how the diversion would impact the 1/1 cost/benefit analysis for the MCHP.

Response 7: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7, which requires a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. A cost/benefit analysis is not required. Since the 1970's, the Corps has recognized that dredging of the Morehead City Harbor channel has detrimental effects on the natural sediment balance of the Beaufort Inlet Complex, which includes the beaches on both sides of the Inlet. For this reason, the Corps has always recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. There was never a plan to divert sand from the nearshore placement areas or the ODMDS to Shackleford Banks.

Comment 8: What appears to be erosion at the western end of Shackleford Banks is probably due to eastward island migration.

Response 8: Because the navigation channel has historically been operated in a fixed location any natural migration of the island or of the thalweg of the channel has been disrupted and therefore the transport process within the inlet that allows for exchange of sediment between Bogue Banks and Shackleford Banks has been disrupted. The purpose of the sediment back passing recommended in the MHC DMMP was to reduce the impact of the navigation channel on both adjacent islands; however, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 9: Any 20-year DMMP/EIS that does not consider the threat to sustainable property tax revenues exceeding $80 million annually would be reckless and set the USACE on a collision course with legal precedents set by Dickinson, Millender, and Applegate involving an inverse condemnation. The DMMP/EIS's obsession with erosion patterns on Shackleford Banks with reckless disregard for property owners in EI and PKS will only provoke speculation the DMMP/EIS has been hijacked by the NPS to

promote an invidious social agenda with adverse legal, economic, and environmental consequences for all parties concerned.

Response 9: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7, which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. A cost/benefit analysis is not required. Sediment disposal that is in balance with current project-induced losses will not negatively impact Bogue Banks but it may reduce the benefits the island has been receiving through past disposal of beach-quality material. The Corps is committed to keeping as much sand from the channel as possible within the Area of Inlet Influence (see Section 3.2 of the DMMP).

B. Larry F. Baldwin, Vice President Regulatory Affairs, Twenty Counties One Voice letter dated January 15, 2014.

Comment 1: Excluding National Park Service (NPS) properties and the waters 150 ft from the sound-side, all other areas within the Morehead City Harbor Dredged Material Management Plan (DMMP) are lands, sediments, and waters (out to three ocean nautical miles) of the State of North Carolina. The management of these State controlled and privately owned lands, sediments, and waters are critical to the health and sustainability of coastal properties. We fully recognize the Federal Government's role in permitting oversight of North Carolina coastal lands and waters, but not the control of these State owned sediments. The dredged materials within NC controlled lands and waters are the sediments of NC. Why is the proposed DMMP taking State sediments and placing them on Federal properties? The State of NC should be the entity to fully grant usage of these sediments to be utilized on Federal properties, and if so, should be fully compensated for the taking of these State sediments.

Response 1: The USACE exercises control over sediments within navigable channels to the extent necessary to protect the federal navigation servitude, and in compliance with specific Congressional authorization to construct and maintain the channel. The State of North Carolina is the non-Federal sponsor of the project, and project actions are taken in compliance with our project partnership agreements with the State. If the removal of material is to be done at federal cost, however, it must be accomplished according to federal standards for dredged material management. The precept of the current plan is that most beach-quality sand comes into the channel from one of four locations: Bogue Banks, Shackleford Banks, the eastern side of the ebb tide delta, and the western side of the ebb tide delta. The DMMP recommends that sand be put back into those four locations in roughly the same percentages as it is being lost. We find this to be the most logical way to preserve coastal resources that may be affected by the dredging of the channel, and to be compliant with the federal standard for dredged material management. Lastly, should the State wish to maintain the channel at its expense, it would have the opportunity to designate an alternate disposal plan. It should be noted that NPS has requested dismissal of the option to place dredged material on Shackleford Banks during the time span of this proposed DMMP.

Comment 2: Formerly, dredged State sediments were being taken by the Federal Government, dumped +2 - 3 miles off-shore into Federal waters and/or completely out of NC's littoral / riparian coastal shoreline system. Recent Federal court actions in ~2007-2008 ordered arbitration of this practice which mandated 100% of suitable dredged sediments to be placed onto Bogue Banks. Has this court ordered arbitration been legally modified or nullified by the DMMP, NPS, USACOE, or the court?

Response 2: The Federal court case of Carteret County v. USACE et.al. was settled by the parties in 2008, and voluntarily dismissed by agreement of the parties. A main point of agreement in the settlement was that this DMMP would be completed. No agreement was made regarding where any dredged material would be placed. There was no arbitration, and there was no court order to place dredged sediments anywhere.

Comment 3: The Federal Government and NPS have sand sediments available in federally controlled waters and lands. If sediment is needed on Shackleford Banks, why has the DMMP and NPS not using or explored the usage of these available sediments for usage on Shackleford Banks, rather than utilizing State sediments from the DMMP?

Response 3: The purpose of the DMMP is to identify disposal locations for dredged material from the authorized navigation channel. Investigating sand resources outside the navigation channel is beyond the scope and authority of a DMMP.

Comment 4: Based upon the draft DMMP and January 15, 2014 informational meeting, it appears only empirical estimates have been done by the USACOE, NPS, and the DMMP. No detailed evaluations, quantitative studies, or modeling has been completed to document actual sediment movement, sediment volume loss / gain, current flows, or actual erosion / accretion processes. This is required by NEPA – CMZ policies in order to document environmental impacts, best use of these sediments, or need for a shoreline renourishment project. When or will these quantitative studies be done by the NPS and the DMMP?

Response 4: Measured data was used to calculate physical changes within the ebb tide delta and along both Shackleford and Bogue Banks. These data were then used to develop volumetric loss rates for each area of analysis, which in turn were used to develop the sediment placement distribution plan. Physical data were also used to determine movement of sediment placed in the existing nearshore placement area. Previous modeling of the longshore transport rates for both adjacent islands from the USACE Section 111 study dated June 2001 was incorporated into the plan when determining the best location for the disposal of beach-quality material along Bogue and Shackleford Banks. Lastly, a physical monitoring plan is part of the DMMP (Appendix F). Due to the highly variable nature of littoral processes and the uncertainty associated with the occurrence and impact of severe coastal storms; the response of the adjacent beaches, shoaling patterns in the entrance channel, and changes in the ebb tide delta (including the nearshore placement areas) will be observed through a routine monitoring program. The results of this monitoring program will be used to make necessary adjustments in the beach disposal location and volumetric distribution of the littoral

material removed from the navigation channel and harbor. In addition, the data collected as part of the monitoring program will be used to feed numerical models. These models, when developed, will provide a more complete picture of the system processes. Also, they will enable evaluation of different "what if" scenarios to determine the effects of future actions within the system such as dredging or sand placement. The use of these modeling tools in combination with the results gathered from the monitoring plan would allow for the best management of the system.

Comment 5: It appears the western end of Shackleford Banks is not eroding, but rather this portion of the Banks has accreted into Beaufort Inlet with periodic slumping of this area into Beaufort Inlet after dredging operations. Long-shore processes will continue to move coastal sediment from the north to south, and east to west, thus relocating DMMP sediments onto Shackleford Banks will hasten the migration of sediments back into the dredged Beaufort Inlet, shorten the time between dredging operations, and increase channel maintenance costs. These conditions need to be thoroughly addressed and answered before placing more sediment onto Shackleford Banks, especially in the proposed locations?

Response 5: Volumetric analysis of the cross-shore profiles along the western end of Shackleford Banks shows the island has eroded since our earliest available survey in 1991. Much of this material is being transported into the navigation channel and most likely is contributing to the elongation of the Shackleford spit. The proposed disposal area was selected to balance the need to provide a sediment source for material to naturally move into the western area of Shackleford Banks while minimizing the impact on dredging requirements. Additionally, the area was long enough to adjust the exact location for disposal operations based on observed stability of the material through our monitoring program; however, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 6: Why does the DMMP and NPS propose to place intrusive dredging operations and artificially transplanted sediment onto Shackleford Banks, with its subsequent impacts to the environment in opposition to established laws, policies, and practices?

Response 6: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 7: All riparian properties, including Shackleford Banks, are subject to long-term / short-term erosion, accretion, avulsion events impacting such properties.

Established real estate law dictates the legal rights and options for such properties. In a volatile inlet zone it would seem more appropriate for the NPS and USACOE to consider a long-term solution for inlet stabilization such as terminal groin structures to control premature channel shoaling and the growth of Shackleford Banks into Beaufort Inlet. Has this been considered by the NPS, USACOE, DMMP?

Response 7: We do not disagree that, in appropriate circumstances, terminal groins can work to the benefit of navigation projects. The impacts on adjacent beaches are often less certain to predict, and it can be a major undertaking to evaluate the potential effects of such projects on adjacent shorelines and the affected biotic communities. The major constraint preventing our consideration of your proposed groin in the MHCP DMMP, however, is our guidance on DMMP projects, Policy Guidance Letter (PGL) No. 40, which discusses the content and funding of DMMP efforts. Specifically, PGL No. 40 states that "[m]anagement plan studies for existing projects shall be conducted pursuant to existing authorities for individual project operation and maintenance, as provided in public laws authorizing specific projects." The modification you propose to the navigation project, in the form of a terminal groin, would fall outside the existing authority for the MCHP. Specifically, such modification is not within the narrow range of navigation project modifications that would be exempt from congressional approval, as outlined in Engineer Regulation 1165-2-119. The PGL explains further that: "Studies of project modifications needing congressional authorization, including dredged material management requirements related to the modification, will be pursued as cost shared feasibility studies with General Investigations funding. Where the need for such modifications is identified as part of dredged material management studies, operation and maintenance funding for the study of the modification should be terminated and a new feasibility study start sought through the budget process under the authority of Section 216 of the Water Resources Development Act (WRDA) of 1970." Terminal groins, jetties, and other potential navigation project modifications would appropriately be considered in a new feasibility study cost shared with the project sponsor, in this case the State of North Carolina, and not as part of a DMMP, which uses funds for Operation and Maintenance (O&M) of completed navigation projects. Initiation of a feasibility study to consider such modifications would require not only the concurrence of the cost-sharing sponsor, but also congressional authority to initiate the study using General Investigations (GI) funding. Based on our coordination with the National Park Service (NPS), it is also apparent that constructing a terminal groin on the east side of Beaufort Inlet as an alternative in the DMMP would likely be incompatible with NPS policy. Section 4.8.1.1 of the 2006 NPS Management Policies pertains to shorelines and barrier islands. This section states that: "Natural shoreline processes (such as erosion, deposition, dune formation, overwash, inlet formation, and shoreline migration) will be allowed to continue without interference. Where human activities or structures have altered the nature or rate of natural shoreline processes, the Service will, in consultation with appropriate state and federal agencies, investigate alternatives for mitigating the effects of such activities or structures and for restoring natural conditions…"

It is the determination of the NPS that the evaluation in the DMMP of a sediment

disposal alternative at Shackleford Banks as mitigation for the effects of the navigation channel on long-term barrier island sand supply and the alongshore sand transport system is compatible with the above-quoted policy. In contrast, the evaluation of a new terminal groin would not further the NPS policy of restoring natural processes and conditions. Nor would it likely be compatible with NPS wilderness policies, which permit management intervention to correct for human impacts, but only to the extent necessary and consistent with the minimum requirement concept (see, e.g., NPS Management Policies, Sections 6.3.5 and 6.3.7). A structure such as a terminal groin would not likely meet these protective criteria, particularly in light of funding limitations or other factors which may reduce the frequency and/or volume of sediment placement.

In conclusion, the USACE will not recommend study of a terminal groin on Shackleford Banks at this time, as it is both beyond the scope of the MCHP DMMP and unlikely to be found compatible with NPS policies.

Comment 8: Recognizing the USACOE must use least-cost measures as part of the DMMP, and Carteret County / State's willingness to cost-share deposition of Federally dredged sediments, it seems appropriate to continue the practice of placing usable sediment onto Bogue Banks.

Response 8: Maintenance of the Morehead City Harbor navigation channel is not cost-shared, but is 100% federally-funded. The DMMP proposes to continue to dispose of beach quality dredged material on Bogue Banks.

Comment 9: Recognizing the USACOE must use least-cost measures as part of the DMMP, and Carteret County / State's willingness to cost-share deposition of Federally dredged sediments, it seems appropriate to Create back-barrier, near-shore dredge spoil islands with unsuitable sediments for wildlife habitat, marsh creation, mollusk habitat, water filtration, estuarine shoreline stabilization, and etc.

Response 9: It is the intent of this DMMP to keep all beach-quality material in the Beaufort Inlet system by placing it on the beaches of Bogue Banks and in the nearshore placement areas. Some offshore disposal may occur because of bad weather or other contingencies; in the limited situation where this offshore disposal does occur, the USACE will take care to dispose of that material in the ODMDS in an area where it can be re-used on beaches. The USACE continues to partner with the State and with the County and its municipalities to identify opportunities to place sand on Bogue Banks beaches, with additional costs over the base plan to be paid by non-federal interests. In the past several years, USACE has worked to streamline its approval processes for such partnerships, and develop communication with the County to facilitate such projects. Approval of this DMMP will open the opportunity to place sand on Pine Knoll Shores under such a partnership in Year 2 or 3 of a maintenance cycle; additionally, with non-federal funding, Year 1 placement could be moved farther west on Atlantic Beach.

Comment 10: Recognizing the USACOE must use least-cost measures as part of the DMMP, and Carteret County / State's willingness to cost-share deposition of Federally dredged sediments, it seems appropriate to eliminate the costly off-shore transport of any State sediment which is vital to near-shore sediment supply and stabilization. Has this been fully evaluated, considered, and presented within the DMMP as to a costs / benefits?

Response 10: It is the intent of this DMMP to keep all beach-quality material in the Beaufort Inlet system by placing it on the beaches of Bogue Banks and in the Nearshore Placement Areas. Some offshore disposal may occur because of bad weather or other contingencies; in the limited situation where this offshore disposal does occur, the USACE will take care to dispose of that material in the ODMDS in an area where it can be re-used on beaches. The USACE continues to partner with the State and the County and its municipalities to identify opportunities to place sand on Bogue Banks beaches, with additional costs over the base plan to be paid by non-federal interests. In the past several years, USACE has worked to streamline its approval processes for such partnerships, and develop communication with the County to facilitate such projects. Approval of this DMMP will open the opportunity to place sand farther west on Atlantic Beach or on Pine Knoll Shores under such a partnerships.

C. Buddy Hartley, President, Board of Governors Southwinds Condominiums letter dated January 21, 2014.

Comment 1: Specifically, the Board of Governors opposes the plan for the nourishment of Shackleford Banks. Placing dredged material on Shackleford Banks will not result in any meaningful benefit to Shackleford Banks, which is a natural wilderness area within Cape Lookout National Seashore.

Response 1: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks; however, It is inaccurate to categorically state that adding sediment back to Shackleford Banks -- as partial compensation for the accelerated erosion that is resulting from the navigation channel -- would not result in any meaningful benefit to the island. The island itself is beneficial, not only for the plants, animals, and people that utilize it, but also as a barrier between the ocean and the communities of Harkers Island and Beaufort. In addition, the island provides the public with recreational opportunities. Currently, sections of the island beach are impassible for park visitors on some high tides. Adding sediment back into the island's sediment budget would counteract that trend, increasing park visitors' use and enjoyment. Adding sediment may also facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford Banks have varied over time with an overall decline to zero plants in the entire seashore

in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report). The purpose of the sediment placement would be to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at Boston Harbor Islands, Cape Hatteras National Seashore, and here in Cape Lookout National Seashore. The NPS has also conducted minor and major restoration projects in other NPS coastal areas managed as wilderness, including Everglades National Park, Olympic National Park, and Point Reyes National Seashore. The NPS National Wilderness Steering Committee has recognized that "The re-establishment and maintenance of natural ecosystem components and processes on national park lands through intervention has become an increasingly important resources management function," and issued guidance for determining how and when to proceed with intervention actions in wilderness (NPS 2004). The inclusion of the Shackleford Banks alternative in the DMMP – allowing the NPS to weigh ecosystem restoration benefits against wilderness character impacts – is consistent with these policies and guidance. Lastly, Shackleford Banks has not been designated by Congress as wilderness. Shackleford Banks was identified by the park as being "suitable" (now called "eligible") for wilderness designation in the park's General Management Plan in approximately 1984-1985. There has been no further action on the suitability proposal since then. The suitability proposal does not appear to have been reviewed by the NPS Director, published in the Federal Register, or forwarded to the Department of the Interior as "proposed" wilderness in accordance with NPS Management Policies Chapter 6 or NPS Reference Manual #41. The 1984 wilderness suitability Environmental Assessment, pp. 20-21, stated that the resource, visitor, and recreation management actions on Shackleford Banks would be the same regardless of the island's wilderness designation.

Comment 2: Placing dredged material on Shackleford Banks will provide less sand for Bogue Banks where it is needed to provide storm protection for infrastructure and development at Fort Macon Beach, Atlantic Beach and other municipalities along Bogue Banks. Therefore, the entire island would be more vulnerable to storm-induced erosion.

Response 2: Sediment placed during dredging operations associated with the MHC DMMP are not designed or intended to serve as a coastal storm damage reduction project, although there are ancillary benefits to the disposal. The purpose of the DMMP is to ensure the navigation project has sufficient disposal capability for a 20 year period.

In doing this the plan should be least cost, environmentally acceptable, and engineeringly sound. The erosion that has been observed and verified on Shackleford Banks as well as the deflation of the ebb tide delta is believed to be partially resulting from the historic dredging practices of the navigation channel. Although, disposal of dredged material within these areas would serve to reduce future impacts to these areas related to future dredging events; the NPS has requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this DMMP.

Comment 3: Placing dredged material on Shackleford Banks will imperil beach quality for visitors and residents alike, harming the local tourism economy and property values.

Response 3: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 4: "While the U.S. Army Corps of Engineers must adequately maintain the channel for safe passage of commerce, the Corps has an obligation to place beach-quality dredged sand along the beaches of Bogue Banks in appropriate volumes when and where appropriate to sustain and enhance the tourism industry, real estate values and other economies that benefit Carteret County as a whole."

Response 4: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7 which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. Nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigation priorities.

Comment 5: Southwinds' Board of Governors contends that diverting dredged material to Shackleford Banks is contrary to the long-standing and historical practice of placing the sand on Bogue Banks. Furthermore, the nourishment of Shackleford Banks would greatly reduce the amount of sand available for beach nourishment along Bogue Banks (a reduction of nearly 50 percent), where it is needed to protect valuable public and private investments.

Response 5: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 6: Southwinds' Board of Governors supports the position of the Carteret County Board of Commissioners and the Carteret County Beach Commission that the

placement of dredged material on Shackleford Banks has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due to the use of heavy mechanized equipment, the addition of sand and nighttime lighting.

Response 6: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Therefore the proposed action would not adversely impact Shackleford Banks.

Comment 7: Furthermore, the North Carolina Division of Marine Fisheries stated on May 31, 2011, that Shackleford Banks provides "valuable habitat to fish and rare species…and sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

Response 7: The NCDMF letter dated May 31, 2011 was in response to the USACE scoping letter, prior to completion of the draft DMMP and has been superseded by the NCDMF comments on the draft DMMP. The NCDMF comments are being addressed through the NC Division of Coastal Management's Federal Consistency process. Also, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 8: In conclusion, the Board of Governors believes the draft DMMP is not in the best interest of the citizens of Carteret County, the countless vacationers and Southwinds' owners who come to Bogue Banks and visit Cape Lookout National Seashore and expect us to "Keep Shack Wild." The draft DMMP needs to be rewritten to remove the "preferred alternative" of placing dredged material at Shackleford Banks.

Response 8: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7 which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. Measured data was used to calculate physical changes within the ebb tide delta and along both Shackleford and Bogue Banks. These data were then used to develop volumetric loss rates for each area of analysis, which in turn were used to develop the sediment placement distribution plan. Physical data were also used to determine movement of sediment placed in the existing nearshore disposal area. Previous modeling of the longshore transport rates for both adjacent islands from the USACE Section 111 study dated June 2001 was incorporated into the plan when determining the best location for the disposal of beach-quality material along Bogue and Shackleford Banks. Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

D. Michael A. Wagoner, President Carteret County Chamber of Commerce and William R. Rogerson, Chair Board of Directors letter dated January 23, 2014.

Comment 1: The Board of Directors of the Carteret County Chamber of Commerce opposes the draft Dredged Material Management Plan (DMMP) and Environmental Impact Statement for the Morehead City Harbor Project, as set forth as a "preferred alternative" by the U.S. Army Corps of Engineers and the National Park Service.

Response 1: Noted.

Comment 2: Specifically, the Chamber Board opposes the plan for the nourishment of Shackleford Banks. Placing dredged material on Shackleford Banks will not result in any meaningful benefit to Shackleford Banks, which is a natural wilderness area within Cape Lookout National Seashore.

Response 2: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks; however, It is inaccurate to categorically state that adding sediment back to Shackleford Banks -- as partial compensation for the accelerated erosion that is resulting from the navigation channel -- would not result in any meaningful benefit to the island. The island itself is beneficial, not only for the plants, animals, and people that utilize it, but also as a barrier between the ocean and the communities of Harkers Island and Beaufort. In addition, the island provides the public with recreational opportunities. Currently, sections of the island beach are impassible for park visitors on some high tides. Adding sediment back into the island's sediment budget would counteract that trend, increasing park visitors' use and enjoyment. Adding sediment may also facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford Banks have varied over time with an overall decline to zero plants in the entire seashore in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report). The purpose of the sediment placement would be to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at

Boston Harbor Islands, Cape Hatteras National Seashore, and here in Cape Lookout National Seashore. The NPS has also conducted minor and major restoration projects in other NPS coastal areas managed as wilderness, including Everglades National Park, Olympic National Park, and Point Reyes National Seashore. The NPS National Wilderness Steering Committee has recognized that "The re-establishment and maintenance of natural ecosystem components and processes on national park lands through intervention has become an increasingly important resources management function," and issued guidance for determining how and when to proceed with intervention actions in wilderness (NPS 2004). The inclusion of the Shackleford Banks alternative in the DMMP – allowing the NPS to weigh ecosystem restoration benefits against wilderness character impacts – is consistent with these policies and guidance. Lastly, Shackleford Banks has not been designated by Congress as wilderness. Shackleford Banks was identified by the park as being "suitable" (now called "eligible") for wilderness designation in the park's General Management Plan in approximately 1984-1985. There has been no further action on the suitability proposal since then. The suitability proposal does not appear to have been reviewed by the NPS Director, published in the Federal Register, or forwarded to the Department of the Interior as "proposed" wilderness in accordance with NPS Management Policies Chapter 6 or NPS Reference Manual #41. The 1984 wilderness suitability Environmental Assessment, pp. 20-21, stated that the resource, visitor, and recreation management actions on Shackleford Banks would be the same regardless of the island's wilderness designation.

Comment 3: Placing dredged material on Shackleford Banks will provide less sand for Bogue Banks where it is needed to provide storm protection for infrastructure and development at Fort Macon Beach, Atlantic Beach and other municipalities along Bogue Banks. Therefore, the entire island would be more vulnerable to storm-induced erosion.

Response 3: Sediment disposal is not intended to serve as a coastal storm reduction project, although there are ancillary benefits to the disposal. The purpose of the DMMP is to ensure the navigation project has sufficient disposal capability for a 20 year period. In doing this the plan should be least cost, environmentally sound, and engineeringly feasible. The erosion that has been observed and verified on Shackleford Banks as well as the deflation of the ebb tide delta is believed to be partially resulting from the historic dredging practices of the navigation channel. Placement of material within these areas would serve to reduce future impacts to these areas related to future dredging events; however, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 4: Placing dredged material on Shackleford Banks will imperil beach quality for visitors and residents alike, harming the local tourism economy and property values.

Response 4: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 5: "While the U.S. Army Corps of Engineers must adequately maintain the channel for safe passage of commerce, the Corps has an obligation to place beach-quality dredged sand along the beaches of Bogue Banks in appropriate volumes when and where appropriate to sustain and enhance the tourism industry, real estate values and other economies that benefit Carteret County as a whole."

Response 5: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7 which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. Nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigation priorities.

Comment 6: The Chamber Board contends that diverting dredged material to Shackleford Banks is contrary to the long-standing and historical practice of placing the sand on Bogue Banks. Furthermore, the nourishment of Shackleford Banks would greatly reduce the amount of sand available for beach nourishment along Bogue Banks (a reduction of nearly 50 percent), where it is needed to protect valuable public and private investments.

Response 6: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 7: The Chamber Board supports the position of the Carteret County Board of Commissioners and the Carteret County Beach Commission that the placement of dredged material on Shackleford Banks has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due to the use of heavy mechanized equipment, the addition of sand and nighttime lighting.

Response 7: The ecosystem of Shackleford Banks is not undisturbed; it is disturbed in part because of the navigation channel; however, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 8: Furthermore, the North Carolina Division of Marine Fisheries stated on May 31, 2011, that Shackleford Banks provides "valuable habitat to fish and rare species... and sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

Response 8: The NCDMF letter dated May 31, 2011 was in response to the USACE scoping letter, prior to completion of the draft DMMP and has been superseded by the NCDMF comments on the draft DMMP. The NCDMF comments are being addressed through the NC Division of Coastal Management's Federal Consistency process. Also, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 9: In conclusion, the Chamber Board believes the draft DMMP is not in the best interest of the citizens of Carteret County and the countless vacationers who come to Bogue Banks and visit Cape Lookout National Seashore and expect us to "Keep Shack Wild." The draft DMMP needs to be rewritten to remove the "preferred alternative" of placing dredged material at Shackleford Banks.

Response 9: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7 which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. Measured data was used to calculate physical changes within the ebb tide delta and along both Shackleford and Bogue Banks. These data were then used to develop volumetric loss rates for each area of analysis, which in turn were used to develop the sediment placement distribution plan. Physical data were also used to determine movement of sediment placed in the existing nearshore disposal area. Previous modeling of the longshore transport rates for both adjacent islands from the USACE Section 111 study dated June 2001 was incorporated into the plan when determining the best location for the disposal of beach-quality material along Bogue and Shackleford Banks. Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

E. Tim Gestwicki CEO North Carolina Wildlife Federation letter dated January 31, 2014.

Comment 1: We believe the placement of dredged sand on an island within the National Park system is unwise and violates the long-standing Park policy that allows natural shoreline processes to continue without interference.

Response 1: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks; however, it is the NPS policy to allow natural shoreline processes to continue without interference (NPS Management Policy § 4.8.1.1). But where human activities or structures have altered the nature or rate of natural shoreline processes (as at Cape Lookout with the navigation channel), NPS Management Policies direct the NPS to

restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at Boston Harbor Islands, Cape Hatteras National Seashore, and here in Cape Lookout National Seashore. The purpose of the sediment placement on Shackleford Banks would be to restore, as much as feasible, or approximate the natural conditions of the island. Therefore, the placement of sand on the beach at Shackleford Banks does not violate, but rather is consistent with, established laws, policies, and practices.
Comment 2: While the erosion may, or may not, be accelerating due to dredging of Beaufort Inlet, depositing sand on Shackleford Island does not address the cause of the problem. Historically the inlet has moved back and forth at varying rates without the influence of dredging. Furthermore if dredging is contributing to the erosion, employing one questionable activity to mitigate for another human activity could cause more problems that would lead to a cascade of additional, unwise attempts for mitigation.

Response 2: The recommended DMMP does not attempt to address historic losses measured on Shackleford Banks, rather it was aimed to reduce future erosion along the western end of the island and within the ebb tide delta. With the channel remaining in a fairly fixed position since 1910, the inlet no longer has the flexibility to migrate and allow for natural bypassing of sediment with changes in the thalweg orientation. The plan was for NPS and the USACE to monitor disposal of dredged material on Shackleford Banks to so that future disposal practices could be modified, if needed, to minimize any negative impacts that may result; however, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 3: Shackleford Island supports a diversity of shore birds and other wildlife. These populations will adjust to eroding shorelines and shoal formation. Placement of dredged sand on the island provides few, if any, benefits to the island's wildlife and is more likely to degrade habitat quality.

Response 3: Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks; however, placement of sand on Shackleford Banks -- as partial compensation for the accelerated erosion that is resulting from the navigation channel -- would provide benefits to the wildlife on the island. In addition, the island provides the public with recreational opportunities. Currently, sections of the island beach are completely covered on some high tides, with the water reaching all the way to the base of the dunes. Adding sediment back into the

island's sediment budget may facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford Banks have varied over time with an overall decline to zero plants in the entire seashore in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report).

Comment 4: In summary, the proposed action is contrary to the relevant policy governing National Park Service management of barrier islands; is likely to have unanticipated consequences that may stimulate further mitigation; is not likely to benefit the island's wildlife and furthermore may result in degraded wildlife populations. For these reasons the North Carolina Wildlife Federation requests that the Corps not include Shackleford Banks in the final Integrated Dredged Material Management Plan.
Response 4: In summary, the proposed action is contrary to the relevant policy governing National Park Service management of barrier islands; is likely to have unanticipated consequences that may stimulate further mitigation; is not likely to benefit the island's wildlife and furthermore may result in degraded wildlife populations. For these reasons the North Carolina Wildlife Federation requests that the Corps not include Shackleford Banks in the final Integrated Dredged Material Management Plan.

F. Town of Emerald Isle, Resolution Opposing Morehead City Harbor DMMP dated 14 Jan 2014 & Town of Atlantic Beach, Resolution Opposing the USACE and NPS DMMP & EIS for the Morehead City Harbor Project.

Comment 1: Placement of sand on Shackleford Banks not only provides little to no benefit to Shackleford Banks, it also would disturb the natural conditions of Shackleford Banks, which is managed as a wilderness area.

Response 1: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks; however, It is inaccurate to categorically state that adding sediment back to Shackleford Banks -- as partial compensation for the accelerated erosion that is resulting from the navigation channel -- would not result in any meaningful benefit to the island. The island itself is beneficial, not only for the plants, animals, and people that utilize it, but also as a barrier between the ocean and the communities of Harkers Island and Beaufort. In addition, the island provides the public with recreational opportunities. Currently, sections of the island beach are impassible for park visitors on some high tides. Adding sediment back into the island's sediment budget would counteract that trend, increasing park visitors' use and enjoyment. Adding sediment may also facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford

Banks have varied over time with an overall decline to zero plants in the entire seashore in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report). The purpose of the sediment placement would be to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The NPS has also permitted the beneficial placement of dredged sediment to protect cultural or natural park resources or accomplish other management objectives at Boston Harbor Islands, Cape Hatteras National Seashore, and here in Cape Lookout National Seashore. The NPS has also conducted minor and major restoration projects in other NPS coastal areas managed as wilderness, including Everglades National Park, Olympic National Park, and Point Reyes National Seashore. The NPS National Wilderness Steering Committee has recognized that "The re-establishment and maintenance of natural ecosystem components and processes on national park lands through intervention has become an increasingly important resources management function," and issued guidance for determining how and when to proceed with intervention actions in wilderness (NPS 2004). The inclusion of the Shackleford Banks alternative in the DMMP – allowing the NPS to weigh ecosystem restoration benefits against wilderness character impacts – is consistent with these policies and guidance. Lastly, Shackleford Banks has not been designated by Congress as wilderness. Shackleford Banks was identified by the park as being "suitable" (now called "eligible") for wilderness designation in the park's General Management Plan in approximately 1984-1985. There has been no further action on the suitability proposal since then. The suitability proposal does not appear to have been reviewed by the NPS Director, published in the Federal Register, or forwarded to the Department of the Interior as "proposed" wilderness in accordance with NPS Management Policies Chapter 6 or NPS Reference Manual #41. The 1984 wilderness suitability Environmental Assessment, pp. 20-21, stated that the resource, visitor, and recreation management actions on Shackleford Banks would be the same regardless of the island's wilderness designation.

Comment 2: This plan would also greatly reduce the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses.

Response 2: A clear distinction needs to be made between beach renourishment and beach disposal. Beach renourishment is the placement of beach-quality sand on a beach area for the purpose of building the beachfront area to a specific template or design, whereas beach disposal refers to use of a designated beach area for the

disposal of dredged material from a navigation channel. In the case of Bogue Banks and Shackleford Banks, the Corps of Engineers does not propose to renourish the beaches, but recommends disposal of beach-quality sediment from the Morehead City Harbor navigation channel on those beaches. Nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigation priorities.

Comment 3: The Corps has dumped the vast majority of the dredged material offshore- essentially removing it from the active nearshore zone or littoral system (generally considered to extend from the upper beach to the seaward edge of the nearshore zone where sediment is actively transported by waves and currents).

Response 3: The vast majority of sediment has not been taken offshore. Since 1986, 11.7 million cubic yards of mostly fine-grained material (not suitable for beach disposal) has been taken offshore, whereas, approximately 23 million cubic yards of beach quality sand has been disposed of on Bogue Banks or in the nearshore. Over 16 million cubic yards of the 23 million was put on Bogue Banks (at 100% federal cost). Also, in 2014 over 600,000 cubic yards of dredged material from the navigation channel was disposed of on Bogue Banks (also at 100% federal cost). The Corps acknowledges previous dredged material management practices have removed significant quantities of sediment from the littoral system of Beaufort Inlet. The MHC DMMP proposes several modifications designed to improve retention of dredged material within the littoral system. These include: 1) expansion of the existing nearshore west placement area to allow greater flexibility for disposal within the ebb tide delta into shallower depths; 2) Creation of a new nearshore disposal area in front of Shackleford Banks to address deflation of the eastern ebb tide delta; 3) expansion of the beach placement area along Bogue Banks to include Ft. Macon and Atlantic Beach as the base disposal area; and 4) Creation of a beach disposal area along Shackleford Banks to address the significant erosion observed along the western end of the island since October 2000. It should be noted that following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 4: This practice (dumping dredged material offshore) has caused a number of significant, adverse impacts to Bogue Banks, including accelerated beach erosion caused by removal of sand from the Bogue Banks littoral system, which jeopardizes homes, commercial development, infrastructure, and Fort Macon, an important historic landmark and the most visited state park in North Carolina.

Response 4: The Corps Section 111 study dated June 2001 found no increase in shoreline erosion along Bogue Banks. Also, this report found that any potential shoreline impacts along Bogue Banks related to the operation of the Beaufort Inlet have been ameliorated through the periodic disposal of sediment along the shoreline of Ft. Macon and Atlantic Beach. The proposed DMMP acknowledges these findings and is designed to continue to place material along Ft. Macon and Atlantic Beach in order to

minimize any negative shoreline impacts related to dredging of the adjacent navigation channel.

Comment 5: Although NPS policy permits mitigation of certain adverse impacts to wilderness areas, mitigation is only permitted to the extent caused by external forces- in this case, the navigation project. Despite this limitation, the Corps failed to determine the amount of material lost at Shackleford Banks as a result of the navigation project. Placement of material at Shackleford Banks is inconsistent with NPS policy, and no material should be placed at Shackleford Banks until the Corps determines the amount of sediment lost as a result of the navigation project.

Response 5: Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The purpose of the sediment placement was to restore, as much as feasible, or approximate the natural conditions of Shackleford Banks. NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). In fact, the NPS has conducted minor and major restoration projects in other NPS coastal areas managed as wilderness, including Everglades National Park, Olympic National Park, and Point Reyes National Seashore. The NPS National Wilderness Steering Committee has recognized that "The re-establishment and maintenance of natural ecosystem components and processes on national park lands through intervention has become an increasingly important resources management function," and issued guidance for determining how and when to proceed with intervention actions in wilderness (NPS 2004). The inclusion of the Shackleford Banks alternative in the DMMP – allowing the NPS to weigh ecosystem restoration benefits against wilderness character impacts – is consistent with these policies and guidance. Also, NPS Management Policies and guidance documents do not require an exact determination of the amount of sediment lost due to human activities and structures before dredged sediment is placed at park units. Instead, the NPS focuses on evaluating sediment compatibility and reducing impacts of placement as much as possible in order to maximize the benefits of the restoration. The NPS is required to "seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated" (NPS Management Policies § 4.1.5), not to their exact pre-disturbance volume, configuration, and condition. In addition, the NPS policies state that decisions are to be based on best available scientific and technical information (e.g., NPS Management Policies § 2.1.2). As stated in the draft DMMP, the current proposal for disposal on Shackleford is based on the Corps' best estimate of the volume lost in the island profiles from maintenance dredging. Thus, the proposal for disposal on Shackleford is consistent with NPS policy.

And finally, Shackleford Banks has not been designated by Congress as wilderness. Shackleford Banks was identified by the park as being "suitable" (now called "eligible")

for wilderness designation in the park's General Management Plan in approximately 1984-1985, but there has been no further action on the suitability proposal since then. The 1984 wilderness suitability Environmental Assessment, pp. 20-21, stated that the resource, visitor, and recreation management actions on Shackleford Banks would be the same regardless of the island's wilderness designation.

Comment 6: While Shackleford Banks does experience a loss of sand due to the MCHP, there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island.

Response 6: We agree with the comment that Shackleford Banks is experiencing a loss of sand due to the navigation channel. However, we disagree with the rest of the comment. NPS Management Policies do not require the NPS to produce evidence that human activities and structures are adversely affecting or threatening park resources, ecological function, visitor use, and buildings before taking restoration actions (see NPS Management Policies § 4.8.1.1). To the contrary, the policies clearly state that the NPS mandate is to conserve park resources and values, and that this mandate is independent of the separate prohibition on impairment (see NPS Management Policies § 1.4.3). Any placement of dredged sediment on Shackleford Banks would, as in other NPS units, be conducted to fulfill this conservation mandate. The NPS believes that Shackleford Banks is a valuable and important part of the National Park System and is well worth conserving for ecological, historical, and visitor enjoyment reasons. However, following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 7: Due to concerns of rapid shoaling, dredged material will not be placed in the most critical area of erosion on the western end of Shackleford Banks. While sand placed in the westerly transport zone will be transported back towards the inlet, this sand will be rapidly lost to the channel without construction of a terminal structure, exacerbating shoaling issues in this section of the channel.

Response 7: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. If disposal on Shackleford Banks was still part of the plan, disposal would have occurred along the western end of Shackleford Banks will be approximately one mile from the inlet. This area was selected to balance the need to place material along the western end with the need to reduce transport of the material back into the navigation channel. The Corps acknowledges some of the material would have been transported back into the navigation channel, however, the disposal area was going to be monitored and specific locations for disposal would have been modified based on the monitoring results to minimize shoaling. A terminal structure may be beneficial along the western end of Shackleford Banks, however, this is beyond the scope and authority of a DMMP. See response to previous comment on this subject.

Comment 8: The Corps failed to analyze the potential impact of placing sand on Shackleford and in the nearshore area off the coast of Shackleford on the unique surf break associated with Shackleford Banks.

Response 8: The surf break extends from the spit (off Beaufort Inlet) to about 4,000 to 6,000 feet east to Rough Point on Shackleford Banks. Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. The western limit of the proposed beach disposal area was at or near the eastern end of the surf break. Both the proposed beach and nearshore disposal areas along Shackleford Banks were selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. Because of the existing steep offshore beach profiles in the vicinity of the spit, its high rate of erosion, and the relatively small amount of sediment to be in the nearshore area, the USACE does not anticipate that sediment movement from the nearshore placement area off Shackleford Banks would adversely impact the surf break. This information has been added to the final DMMP.

Comment 9: While providing no meaningful benefit to Shackleford Banks, the placement of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting.

Response 9: The ecosystem of Shackleford Banks is not undisturbed; it is disturbed in part because of the navigation channel; however, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 10: In a letter dated May 31, 2011, the North Carolina Division of Marine Fisheries ("DMF") expressed concerns regarding placement of dredged material on Shackleford Banks' beaches. "Since Shackleford Banks is an undisturbed island, serving as valuable habitat to fish and rare species, and there is no development to protect by using the beach renourishment shoreline stabilization techniques, DMF sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area."

Response 10: The NCDMF letter dated May 31, 2011 was in response to the USACE scoping letter, prior to completion of the draft DMMP and has been superseded by the NCDMF comments on the draft DMMP. The NCDMF comments are being addressed through the NC Division of Coastal Management's Federal Consistency process. Also, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 11: Diverting a substantial portion of the limited dredged material to Shackleford Banks will severely reduce the benefits of the DMMP to Bogue Banks.

Response 11: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 12: Under the Corps' preferred alternative, the sand available for renourishment of Bogue Banks would be reduced by almost half, and much of the sand placed on Bogue Banks will be placed east of the nodal point. As confirmed by the Corps' own studies, any sand placed east of the nodal point is rapidly transported back to the inlet. It is critical for a sufficient quantity of sand to be placed west of the nodal point where it will benefit Atlantic Beach and other communities to the west. Because of the proposed renourishment at Shackleford Banks, there is less sand available to be placed on Bogue Banks, especially west of the nodal point.

Response 12: Under the proposed plan, the base beach disposal area on Bogue Banks will include a portion of Ft. Macon and the entirety of Atlantic Beach. The DMMP proposes sufficient disposal quantities to compensate for any losses that may result from dredging the adjacent navigation channel. In addition, although NPS has requested dismissal of the alternative to place dredged material on Shackleford Banks, the plan was for any excess material beyond what was necessary to satisfy the disposal requirements along the western end of Shackleford Banks would have been available for disposal along Bogue Banks. The proposed plan is dependent on receiving sufficient funding, however this is similar to the current situation in that placement and quantity is limited to funding received in the beach placement cycle years.

Comment 13: The beaches of Bogue Banks will receive less sand under the draft DMMP than has been placed historically and therefore will be more vulnerable to background and storm-induced erosion than in the past.

Response 13: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. However, the recommended DMMP proposed sufficient disposal quantities to compensate for any losses that may result from dredging the adjacent navigation channel. In addition, any excess material beyond what would have been necessary to satisfy the disposal requirements along the western end of Shackleford Banks would have been available for disposal along Bogue Banks. The proposed plan

is dependent on receiving sufficient funding, however this is similar to the current situation in that disposal locations and quantities are limited by the funding received.

Comment 14: The Corps and NPS failed to provide specific authorization to allow non-federal sponsors to pay for the additional cost of placing sand on the beaches of Bogue Banks, including west Atlantic Beach and Pine Knoll Shores, rather than dumping the sand offshore as provided in Years 2 and 3 of the draft DMMP despite being requested to do so.

Response 14: Specific authorization is not required to allow non-federal sponsors to pay for the additional cost of placing sand on the beaches of Bogue Banks. This is addressed as follows in Section 3.2.4.2 (Ebb Tide Delta Placement): "Quantities of material dredged in non-beach disposal years that exceed the annual losses to the ebb tide delta may be available for beach disposal by a local entity. Any requests by local entities to place this excess dredged material on adjacent beaches would be evaluated on a case-by-case basis. The excess material would be required to remain within the Beaufort Inlet system and as such, would only be available for disposal within the limits described in Section 3.2.2 Beach disposal. Disposal of dredged material from the Beaufort Inlet complex west of station 59 on Bogue Banks (Figure 3-9 Proposed Bogue Banks Disposal Area) would remove material from the complex and potentially increase delta deflation and for this reason would not be acceptable. "

Comment 15: The Town of Emerald Isle does not favor any renourishment of Shackleford Banks and is strongly opposed to the preferred alternative set forth in the draft DMMP. Placing dredged material on Shackleford Banks will: (i) provide little to no benefit to Shackleford Banks; (ii) disturb the natural conditions of Shackleford Banks, which is managed as wilderness area; and (iii) provide less sand for Bogue Banks where it is needed to provide protection for infrastructure and development and provide for recreation.

Response 15: Noted. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

G. Ron Butler, Chair Surfrider Foundation Bogue Banks Chapter letter dated 3 February 2014

Comment 1: As previously described, to achieve this beneficial use, the DMMP/EIS proposes to place dredge spoils on the southern shore of the western half of Shackleford Banks. This location; however, is eastward of the area described to have the greatest volume of erosion. The DMMP/EIS described that this eastward offset is “necessary to reduce rapid shoaling of the material directly back into the navigation channel while still providing sufficient beach length to place the necessary quantities.” However, no study is cited to substantiate these intended effects. Lacking this important information, it is unclear whether or not it will be beneficial or effective to place the sediment eastward of the erosion “hotspot”. Surfrider suggests that further sediment

transport studies be referenced or conducted to determine how the proposed action will effectively alleviate erosion on Shackleford Banks.

Response 1: Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 2: The DMMP/EIS also describes the amount of fill that is expected to be placed. In Table 3-27, as much as 516,000 cubic yards of sediment could be placed on Shackleford Banks during the initial placement. The document describes that subsequent disposal events would only be 166,450 cubic yards – equal to the yearly volumetric erosion rate. As for where the sediment will be placed, for each disposal event, only about a third to half of the 3.65 mile disposal area on Shackleford Banks would be impacted with disposal of Harbor sediment. Again, no studies are cited in the DMMP/EIS that can be used to extrapolate how much sediment would effectively respond to the erosion occurring (or, in this same vein, how much sediment might be unnecessary or not "beneficial" to respond to erosion), nor are there studies referenced to provide a rationale for the frequency of placement.

Response 2: Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The beach disposal plan is discussed in Section 3.2.2 of the MHC DMMP.

Comment 3: It is unclear exactly why this erosion is being viewed as a problem and, therefore, why Alternative 2k is viewed to be a beneficial use. Erosion is a natural process that need not be impeded in a natural undeveloped setting. In this instance, there is no development present that is threatened by the erosion occurring. In the absence of a problem, Surfrider argues that the current management strategy employed by the National Parks Service, which allows erosion to occur and continue unabated, should continue.

Response 3: Following public review of the draft DMMP, the NPS requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The NPS does generally allow natural shoreline processes, including erosion, to continue without interference (NPS Management Policy § 4.8.1.1). But where human activities or structures have altered the nature or rate of natural shoreline processes (as at Cape Lookout with the navigation channel), NPS Management Policies direct the NPS to restore, and when necessary actively manage, human-damaged resources, conditions, and processes, including in areas managed as wilderness (see, e.g., §§ 1.4.7.2, 4.1, 4.1.5, 4.4, 4.4.2.4, 4.8.1.1, 6.3.7). Accordingly, the NPS has permitted the beneficial use (disposal) of dredged sediment as a means of restoring or approximating natural conditions and

processes interrupted by human activities and structures in coastal units throughout the country, including Assateague Island National Seashore, Fire Island National Seashore, Gateway National Recreation Area, Golden Gate National Recreation Area, Gulf Islands National Seashore, Indiana Dunes National Lakeshore, Jean LaFitte National Historical Park and Preserve, and Padre Island National Seashore. The purpose of the sediment placement on Shackleford Banks would be to restore, as much as feasible, or approximate the natural conditions of the island. While no development or infrastructure is currently threatened by erosion, Shackleford Banks provides benefits, not only for the plants, animals, and people that utilize it, but also as a barrier between the ocean and the communities of Harkers Island and Beaufort. In addition, the island provides the public with recreational opportunities. Currently, sections of the island beach are impassible for park visitors at high tide. Adding sediment back into the island's sediment budget would counteract that trend, increasing park visitors' use and enjoyment. Adding sediment may also facilitate sea turtle nesting, since turtles do not nest and nests cannot survive in locations where the high tide is up to the dune line. Adding sediment may, or may not, facilitate the growth of seabeach amaranth, which grows on the foredunes behind sand flats. At Cape Lookout, it appears that fewer plants grow in areas of higher erosion. The park's monitoring demonstrates that the numbers of seabeach amaranth on Shackleford Banks have varied over time with an overall decline to zero plants in the entire seashore in 2013 (Cape Lookout National Seabeach Amaranth, 2013 Report).

Comment 4: Shackleford Banks and its surrounding waters provide a unique habitat for a diversity of animals including foraging and roosting grounds for shore birds, nesting beaches for sea turtles, nursery areas for fishes, and habitat for marine invertebrates. Surfrider is concerned about the cumulative long-term impacts that beach disposal will have on these organisms and does not agree that the DMMP/EIS provides sufficient science-based evidence quantifying the degree of impact that sand placement will have on the ecosystem.

Response 4: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Since no beach disposal is proposed for Shackleford Banks, we do not anticipate any adverse impacts to biota.

Comment 5: The DMMP/EIS states that "the characteristics of the dredged material dictate where disposal of that material will be permitted" and that "sediments used to replace natural beach sand should match the natural beach as closely as possible in order to minimize environmental effects". However, it goes on to state that "while the scientific literature agrees with this statement in principle, there is little data available to quantify what similarity (or difference) is ecologically significant". Surfrider agrees that there is insufficient data to determine how varied grain size of beach disposal sands will affect communities of organisms in the disposal area and would argue that such data needs to be provided before determining that the impacts to these organisms would be insignificant.

Response 5: This comment is taken out of context. Section 5.1.2 Sediment Characteristics in the DMMP states: Sediments used to replace natural beach sand should match the natural beach as closely as possible in order to minimize environmental effects. While the scientific literature agrees with this statement in principle, there is little data available to quantify precisely what similarity (or difference) is ecologically significant. The rest of the paragraph states "Morehead City Outer Harbor sediments at the time of disposal would be similar in terms of grain size distributions to portions of the Shackleford beach profile (specifically the submarine portions of the beach profile) and finer than other portions (specifically the subaerial portions of the beach)". The technical sediment standards discussed in Section 5.1.2 of the DMMP provide all the data necessary to determine that impacts of sediment disposal on Bogue Banks to beach infauna would be insignificant. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 6: The DMMP/EIS states that “beach disposal and/or nourishment of sediment may have negative effects on intertidal macrofauna through direct burial, increased turbidity in the surf zone, or changes in the sand grain size or beach profile” and that “opportunistic infauna species (e.g. Emerita and Donax) found in the nourished areas are subject to direct mortality from burial” with recovery often occurring “within one year”. It also states that “in NC, post-nourishment studies have documented similar reductions in abundance of coquina clams (Donax spp.), mole crabs (E. talpoida), and amphipods (Haustroriid spp.) immediately following disposal with recovery times persisting between one and three seasons after project construction depending on sediment compatibility”. These organisms are important prey species for numerous birds and fish species. Although the DMMP cites previous studies from other locales, within and outside North Carolina, indicating that short-term recovery is rapid after pumping operation ceases, Surfrider does not think sufficient evidence has been presented regarding the long-term impacts that sand placement will have on these organisms and the food webs that they support on Shackleford Banks. Therefore, the DMMP/EIS cannot accurately conclude that impacts to these organisms will be insignificant.

Response 6: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP; however, we disagree with the comments. In Section 5.5.2 Benthic Resources Beach and Surf Zone in the DMMP states: In a 1999 Environmental Report on the use of federal offshore sand resources for beach and coastal restoration, the U.S. Department of Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) (formerly known as the Minerals Management Service (MMS), provided the following assessment of potential effects on beach fauna from beach nourishment. Because benthic organisms living in beach habitats are adapted to living in high energy environments, they are able to quickly recover to original levels following beach nourishment events; sometimes in as little as three months (Van Dolah et al. 1994; Levisen and Van Dolah, 1996). This is again attributed to the fact that intertidal organisms are living in high energy habitats where disturbances are more common.

Because of a lower diversity of species compared to other intertidal and shallow subtidal habitats (Hackney et al. 1996), the vast majority of beach habitats are re-colonized by the same species that existed before nourishment (Van Dolah et al. 1992; Nelson 1985; Levisen and Van Dolah 1996; Hackney et al. 1996). During 2001-2002 the USACE Wilmington Harbor Project deepened and realigned the navigational entrance channel to the Cape Fear River located near Wilmington, North Carolina. The work required the removal of about 5.6 million cubic yards of sandy material from the lower portion of the Cape Fear River navigation channel as well as the offshore navigational river entrance channel. The dredged material was used beneficially to replenish the beaches of four North Carolina Brunswick County beaches (Bald Head Island, Caswell Beach, Oak Island, and Holden Beach), which had eroded over the past years. In 2004, the USACE completed the Year 2 Recovery from Impacts of Beach Nourishment on Nearshore and Surf Zone Fish and Benthic Resources on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach, North Carolina. This study states: "The data suggests that benthic communities along these Brunswick County Beaches (Bald Head Island, Caswell Beach, Oak Island, and Holden Beach) had recovered by one-year post construction".

Comment 7: The DMMP/EIS states that nourishment on Shackleford Banks would be expected to move along the beach at a rate slow enough that “surf-feeding fishes and shorebirds can move to other areas that are not affected”; however, no citation of a scientific study is provided to support this claim. It also states that “the surf zone represents HAPC for some species, including adult bluefish and red drum, which feed extensively in that portion of the ocean” and that “disposal operations along the beach can result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for those and other species. Therefore, feeding activities of the species could be interrupted in the immediate area of sand disposal”. Surfrider is concerned about the long-term impacts that sand placement activities will have on the foraging behavior and health of fishes and shorebirds, and posits that additional studies are needed before drawing a conclusion that the project will not significantly impact these species.

Response 7: We disagree. The USACE Wilmington District completed the Ocean Isle Beach Erosion and Hurricane Wave Protection Project which involved the placement of about 2 million cubic yards of sandy dredged material on the beachfront. In 2003, the Wilmington District, USACE completed the waterbird and shorebird use at Ocean Isle Beach in Brunswick County from December 2001 to November 2002. The results of the second year report (USACE 2003), Section 5.0 Summary states “Despite the potential for community changes at renourished beaches, in this study, beach renourishment was not found to alter the overall abundance or species richness of waterbirds and shorebirds. A clear renourishment effect was not evident for individual species either, including willet and sanderling, which are heavily dependent on beach habitat. Moreover, examination of weekly survey data revealed no consistent short-term changes in abundance or species richness in the weeks following beach renourishment”. USACE (2004) states: Based on fish sampling with seines and trawls, no immediate impacts in fish abundances and diversities among the disturbed, undisturbed, and reference stations were found at any beach (i.e., Bald Head Island,

Caswell Beach, Oak Island, and Holden Beach). These results were further supported by the second year study where annual and quarterly seine and trawl sampling exhibited no significant depressions in abundance and diversity one-year after the initial beach construction. The schooling nature of a number of dominant species and the highly mobile nature of the fish community constrained the ability to detect impacts and recovery. The fish community's ability to migrate caused a highly variable community in both a temporal and spatial aspect but also indicated that they could move in and out of the beaches impacted by the replenishment operations. Therefore dredged material disposal on Bogue Banks or Shackleford Banks would not be expected to result in long-term impacts on fishery resources and shorebirds. It should be noted that following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 8: The DMMP/EIS will affect the surf break, which attracts significant numbers of visitors to the area. These visitors use ferry services, dine at restaurants, stay at local hotels, and are patrons of the numerous family-owned small businesses in the area. Although the DMMP/EIS identifies the surf break as a significant recreational resource and cites the uniqueness of the surf break ("one of the best and most unique surfing spots on the east coast"), the DMMP/EIS fails to consider whether and to what extent the proposed project will impact the surf break and, if impacted, how they will be mitigated. The act of placing hundreds of thousands of cubic yards of sediment on an undeveloped natural barrier island that's managed like a wilderness area, not to mention the use of an imposing amount of equipment on the beach during pumping activities, is certainly a significant impact to the esthetics of Shackleford Banks, which people come from all over the world to see.

Response 8: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The surf break extends from the spit (off Beaufort Inlet) to about 4,000 to 6,000 feet east to Rough Point on Shackleford Banks. No beach disposal of sediment is proposed for Shackleford Banks. The nearshore placement area along Shackleford Banks was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. Because of the existing steep offshore beach profiles in the vicinity of the spit, its high rate of erosion, and the relatively small amount of sediment placed in the nearshore area off Shackleford Banks, the USACE does not anticipate that sediment movement from the nearshore placement areas on Shackleford Banks would adversely impact the surf break.

Comment 9: The surrounding coastline, such as Bogue Banks, has already been altered in drastic ways, further emphasizing the importance of preserving what little natural areas remain like Shackleford Banks. It is the closest example that our community has of what a natural barrier island should look like and there is no critical need to place fill on this National Seashore. In fact, altering the island in such an

artificial way would set a bad precedent for managing our natural coastlines. We request that you carefully consider the concerns outlined here and look forward to reviewing a revised DMMP/EIS that addresses these issues.

Response 9: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

H. Steven J. Levitas and Todd S. Roessler, Kilpatrick, Townsend & Stockton LLP, on behalf of Carteret County, North Carolina letter dated February 3, 2014.

Comment 1: If the Corps and NPS continue to seek disposal of dredged material on and offshore of Shackleford Banks, the revised EIS must also address the deficiencies in the current document by evaluating the significant adverse impacts to the human environment that may result from disposal of dredged material at Shackleford, including potential impacts to building, infrastructure and development at Bogue Banks.

Response 1: The purpose of the DMMP is to address navigation priorities; nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore. Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on the Shackleford Banks beach during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 2: The draft DMMP/EIS provides no evidence that erosion adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island.

Response 2: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to offset impacts to the ebb tide delta by removal of dredged material place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 3: The draft DMMP provides no evidence that erosion at Shackleford is either adversely impacting any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island. Because the island is undeveloped, and will never be developed, there is no threat to buildings or other infrastructure due to beach erosion. There is thus no compelling reason to place any dredged material on or offshore of Shackleford Banks, particularly in light of the significant adverse impacts to both Shackleford and Bogue banks that may result from such action.

Response 3: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Nearshore East Placement area off of Shackleford Banks remains in the proposed plan. The Nearshore East Placement Area is important to help offset the impacts to the ebb tide delta that result from dredging of the navigation channel. The specific area identified was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end.

Comment 4: The Corps and NPS have claimed benefits that are not likely and failed to adequately evaluate the potential adverse environmental impacts of the draft DMMP, and the draft EIS is therefore inadequate. Independent coastal experts agree that disposal of dredged material on and offshore of Shackleford Banks will not address the most critically eroded area of Shackleford Banks and has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks and reduce recreational benefits of the island.

Response 4: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Nearshore East Placement Area is important to help offset the impacts to the ebb tide delta that result from dredging of the navigation channel, therefore, it remains in the proposed plan. The specific area identified for nearshore placement was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. The DMMP and FEIS adequately address this.

Comment 5: Disposal of dredged material at Shackleford Banks will not result in any meaningful benefit to the island. In fact, due to concerns of rapid shoaling, dredged material will not be placed in the most critical area of erosion on the western end of Shackleford Banks. While dredged material placed in the westerly transport zone may be transported back towards the inlet, any dredged material transported to the west will be rapidly lost to the channel without construction of a terminal structure, exacerbating shoaling issues in this section of the channel. It is well documented that Shackleford Banks is migrating to the west into Beaufort Inlet. In fact, the area threatened by erosion did not exist 50 years ago but was created by relatively recent buildup of sand at the west end of Shackleford. As a result of this migration, the most

critical section of the channel for navigation purposes is the "cutoff." If sand is placed on Shackleford Banks (especially within the westerly transport zone), this rate of migration will likely increase and further inhibit navigation. The Corps has failed to evaluate these potential impacts.

Response 5: The areas along Shackleford Banks used to compute the annual erosion rate include Station 293 through 460 which is approximately the western third of the island (Visible in Figure 3-10). The recommended disposal area covers the majority of this area directly and only avoids direct disposal along the westernmost portions of the island. These areas did exist 50 years ago and have experienced significant erosion partially resulting from previous dredged material management practices. Following public review of the draft DMMP, the National Park Service requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Disposal of material in this area would have reduced future erosion along Shackleford Banks and would have been monitored to allow for modifications to the exact disposal locations to maximize benefits of disposal while minimizing impacts to the adjacent navigation channel.

Comment 6: There is no erosion 'problem' at Shackleford. The current erosion at the western tip will not eat up the island and reflects why the state has designated inlet hazard zones (i.e., reduce development near inlets). It should be noted that the area being lost to erosion did not exist 50 years ago, but was created by a relatively recent buildup of sand at the west end of Shackleford. The jetty now located among the dunes in the middle of the island was in the water during World War II. Why nourish almost half of Shackleford's beach length to repair 'damage' at the inlet? This disposal will simply delay the island's natural response to sea level rise, which is what national seashores are all about. It's not even clear that disposal of dredged material at the middle of the island will benefit the western tip.

Response 6: The areas along Shackleford Banks used to compute the annual erosion rate include Station 293 through 460, which is approximately the western third of the island (Visible in Figure 3-10). These areas did exist 50 years ago and have experienced significant erosion, partially as a result of past dredging and disposal practices. The designated disposal area covers the majority of this area directly and only avoids direct disposal along the westernmost portions of the island. The disposal area was selected to balance the need to place material along the western end of the island with the need to reduce transport of the placed material back into the navigation channel. Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Corps acknowledges that some of the material would have been be transported back into the navigation channel, however, the placement area would have been monitored and specific locations of placement would have been modified based on the monitoring

results to minimize shoaling. A terminal structure may be beneficial along the western end of Shackleford Banks, however, this is beyond the scope and authority of a DMMP.

Comment 7: Disposal of dredged material at Shackleford Banks has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due to the use of heavy mechanized equipment, addition of sand, and nighttime lighting.

Response 7: The ecosystem of Shackleford Banks is not undisturbed; it is disturbed in part because of the navigation channel; however, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 8: Nourishment of Shackleford Banks would damage its capacity to illustrate and champion natural processes and cause direct harm to the beach and surf habitat, with consequent harm to shorebirds, crabs, and surf fishes as well as to piscivorous aerially diving seabirds along shore.

Response 8: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 9: In his written comments submitted on January 30, 2014, Dr. Peterson further explains the importance of Shackleford's undisturbed ecosystem and that he has "no doubt" that disposal of dredged material at and offshore of Shackleford will adversely impact this undisturbed ecosystem. Shackleford is the only one of these coastal barriers that has not been impacted by substantial beach fill projects.... Now keeping Shackleford undisturbed by this major ecosystem perturbation is a critical scientific and management need so that at least one control system is left against which to measure and judge recovery and to serve as an ecological baseline of what beach ecosystem structure and process should be everywhere in geologically similar settings....

Response 9: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Nearshore East Placement Area is important to help offset the impacts to the ebb tide delta that result from dredging of the navigation channel, therefore, it remains in the proposed plan. The specific area identified for nearshore placement was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. The DMMP and FEIS adequately address the impacts of the proposed plan.

Comment 10: Stephen Fegley, a Research Associate Professor at UNC-IMS specializing in barrier island ecology, also questions the wisdom of placing dredged material at Shackleford Banks. As explained by Dr. Fegley: NPS has acknowledged that barrier islands are 'dynamic' systems. Yet, the goal of placing dredged material on Shackleford to maintain a set point of island size ignores this principle.

Response 10: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 11: One of the identifiable 'resources' present on barrier islands is their movement, via accretion and erosion, and how the ecological communities respond to that dynamic environment. Trying to stabilize a barrier island actually removes this essential character for education and research purposes and, seen from this perspective, goes against the NPS mission.

Response 11: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. See responses to previous comments regarding NPS policy/mission.

Comment 12: Beaches are not just geological structures. Although beach fauna and ecological uses of the beach are not as obvious as other habitats, research has shown that beach disposal has the potential to affect organisms dependent on the beach for both short and long time frames. Beaches also appear to provide important ecosystem services (by serving as sand filters) for coastal waters although this has been less well studied and has never been studied between nourished and unnourished beaches. The Corps and NPS do not recognize how rare and perishable an unnourished barrier island is where we can observe and appreciate nature responding to environmental factors without our intervention.

Response 12: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 13: The Corps failed to analyze the potential impact of placing sand on Shackleford and in the nearshore area off the coast of Shackleford on this unique surf break and on shelling. The Corps completely failed to evaluate impacts to shelling and only provided the following conclusory statement with respect to wave break: Placement of sediment in the nearshore areas off Bogue and Shackleford Banks is the only potential source of impacts to wave conditions. However, these changes are not expected to be significant considering the shallow nature of the proposed placement sites. No adverse cumulative impacts are anticipated on wave conditions in the project area. Draft DMMP, App. K, p. 21. Such a statement supported by no analysis is

not sufficient to meet NEPA's requirements. Failure to closely examine, or vague general dismissals of an issue, will result in a court finding an environmental document arbitrary and capricious. See Soda Mountain Wilderness Council v. Bureau of Land Manag., 2013 WL1975852 (D. Or. May 10, 2013) ("The court should defer to agency decisions so long as the agency's conclusions are supported by studies the agency deems reliable."); Klamath-Siskiyou Wildlands Center v. Bureau of Land Manag., 387 F.3d 989 (9th Cir. 2004) ("Although it might ultimately be appropriate for the agency to conclude, after a proper analysis, that the projects would not have significant cumulative effects, the potential for such serious cumulative impacts is apparent here, such that the subject requires more discussion than these EAs provide.")

Response 13: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The surf break extends from the spit (off Beaufort Inlet) to about 4,000 to 6,000 feet east to Rough Point on Shackleford Banks. The nearshore placement area off of Shackleford Banks was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end. Because of the existing steep offshore beach profiles in the vicinity of the spit, its high rate of erosion, and the relatively small amount of sediment placed in the nearshore area, the USACE does not anticipate that sediment movement from the nearshore placement area off Shackleford Banks would adversely impact the surf break. This information has been added to the final DMMP/EIS.

Comment 14: The draft DMMP would reduce by almost half the amount of sand available for beach placement at Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses, including the most visited state park. Based on a review of both Corps and County records, roughly 14,674,000 cy have been placed on the beaches of Atlantic Beach/Fort Macon since 1978 (see Figure 1) which equates to an annual average placement rate of approximately 419,000 cy/yr over the last 35 years. Of this total, it is estimated that roughly 7,770,000 cy have been placed west of the nodal point (Transect 97), which equates to approximately 222,000 cy/yr. The current preferred alternative provides for placement of a total of only 228,000 cy/yr on Atlantic Beach/Fort Macon beaches, with no guarantee that any material will be placed west of the nodal point. Since the historical data used in the DMMP to estimate the loss rates to Bogue Banks are based on the historical beach placement rates, it is only logical that the future placement rates on Bogue Banks should, at a minimum, follow these historical patterns of total placement volume as well as placement volume west of the nodal point. As it stands, the DMMP understates its impact on Bogue Banks. As a further demonstration of the need for historical placement rates to continue, Carteret County has just completed an engineering analysis of the 50-year sediment need for Bogue Banks and has determined that the total need for Bogue Banks is between 46.8 and 51.6 million cubic yards (Mcy) (including background and storm erosion). After an exhaustive field exploration and analysis effort of offshore and inlet sources, it was determined that approximately 50.2 Mcy of material is available. Of this amount, it was estimated that roughly 20.0 Mcy

(400,000 cy/yr) would come from beneficial use of material from Beaufort Inlet based on the historical patterns explained above.

Response 14: Since the 1970's, the Corps has recommended that the beach-quality sediment dredged from the navigation channel be disposed of on Bogue Banks and Shackleford Banks. The Corps continues to recommend that beach quality sediment be disposed of on both adjacent beaches. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The annual erosion along Ft. Macon and Atlantic Beach was used to determine the sediment split ratio between Bogue and Shackleford Banks. It did not limit the quantity of sediment placed on Bogue and would have been adjusted periodically based on monitoring. Any sand limitations during beach disposal years for Bogue Banks will be based on available funding and dredging requirements.

Comment 15: It is critical that a sufficient quantity of sand be placed on Bogue Banks where it will provide protection for Atlantic Beach and other communities to the west and recreational benefits. Fort Macon is an important historic landmark and the most visited state park in North Carolina and could be adversely impacted by the placement of dredged material on Shackleford Banks. The preferred alternative would likely result in most of the sand being placed at Fort Macon and eastern Atlantic Beach where it will be rapidly transported back to the channel, providing almost no benefit to western Atlantic Beach and other communities west as well as potentially impacting Fort Macon.

Response 15: As previously stated, the purpose of the DMMP is to address navigation priorities; nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore. KEVIN - answer portion about material going back into channel (at Fort Macon).

Comment 16: This year's maintenance dredging contract foreshadows the likely scenario if the preferred alternative is adopted. The Corps plans to dredge approximately 600,000 cubic yards of beach-quality dredged material, which is less than the typical amount of approximately one million cubic yards. Rather than decreasing the berm width and extending the beach placement to the western end of the disposal zone, the Corps has decided to keep the same berm width, resulting in the majority of the beach disposal area being located in the easterly transport zone. This placement provides little to no benefits to Atlantic Beach and communities to the west and is unacceptable. In fact, given some of the accelerated losses seen in the past with such a large berm (100+ ft and placement rate of 75 cy/ft), it may very well be advantageous to the Corps to investigate utilizing a smaller berm (50+ ft and placement rate of 30-40 cy/ft) so that material may be placed farther west and also stay in the beach littoral system longer. It is expected that less material would be directed right back into the inlet and annual maintenance dredging requirements could possibly be lessened. Given the historical loss rates of Atlantic Beach (approximately 5 cy/ft) and Fort Macon (approximately 13 cy/ft), the lower placement rate would also be more in line with the

existing system losses for a beach placement interval of three years as proposed in the draft DMMP. This option warrants further study given the potential benefits to all parties.

Response 16: The DMMP considers all of Atlantic Beach and a portion of Ft. Macon as the base disposal area for future dredging and disposal operations during the years where beach disposal occurs. Data gathered under the monitoring plan as well as the pre construction surveys will be used to determine the placement area and quantity of material to be placed within this base disposal area.

Comment 17: Disposal of dredged material at Shackleford Banks would be subject to significant mitigative measures imposed by NPS, including, but not limited to, limiting the use of equipment on the beach and imposing unique monitoring requirements. These measures would significantly drive up the cost of the project and could jeopardize other parts of the DMMP, including beach placement at Bogue Banks. Based on the review of the costs shown in Appendix G of the draft DMMP, it appears that the no consideration was given for the potential differences in cost of beach placement on Shackleford Banks versus Bogue Banks. It would seem that the mobilization costs for pipe and equipment on Shackleford Banks would be more expensive given the need to bring the items in from the waterside. Draft DMMP, p. 149. This expected difference in costs should be accounted for in the report.

Response 17: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 18: The EIS fails to consider and evaluate the significant adverse impacts to the human environment that may result from disposal of dredged material at Shackleford, including potential impacts to building, infrastructure and development at Bogue Banks. NEPA requires that the Corps and NPS perform a detailed analysis of the potential risk of placing 43% less sand on Bogue Banks than would occur under the No Action Alternative (continued implementation of the lOP) and has been historically done.

Response 18: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The impacts of the DMMP on the human environment are adequately discussed in sections 4 and 5 in the FEIS. The volume of dredged material that will be disposed of on Bogue Banks over the next 20 years more than offsets the Bogue Banks annual erosion rate of approximately 219,000 cubic yards per year within the area of inlet influence, which includes all erosion, not just erosion caused by maintaining the navigation channel. It should be noted that, since the mid-1970's, Bogue Banks beaches have received a significant surplus of sand from the Morehead City Harbor navigation channel at 100%

federal cost (over 16 million cubic yards since the mid-70's). Also, in 2014 another 600,000+ cubic yards of dredged material from the navigation channel is being disposed of on Bogue Banks (also at 100% federal cost). The purpose of the DMMP is to address navigation priorities; nothing in the DMMP should be read to suggest that material will be dredged for the purpose of renourishment to Bogue Banks or in the nearshore areas.

Comment 19: The Corps and NPS have failed to adequately evaluate the potential adverse environmental impacts of proposed DMMP by failing to prepare a sediment budget. In fact, the Corps committed to preparing a new sediment budget as part of the DMMP. Despite this commitment and acknowledgment of the importance of preparing a sediment budget to properly evaluate project impacts, the Corps failed to prepare a sediment budget. Instead, the Corps relied upon the volume of sediment lost in beach profiles and the ebb tidal delta. Nonetheless, both the Corps and Olsen Associates developed conceptual sediment budgets for their respective reports and there was general agreement between both sets of analyses for the post-project conditions. Both studies document an accumulation of material on Shackleford Banks post-project (1930s to 2000s) of 5.9- 6.5 Mcy near the inlet. Olsen Report, pp. 65-67. This accretion can be seen in Figure 2 where it is apparent that the western end of the island has migrated toward the inlet from 1946 to the mid-2000s with a sudden reversal over the last couple of years. The sediment budget prepared by Olsen Associates also made two important findings.

- Restoration of the sediment budget of the area to that approximating pre-project conditions will require the disposal of dredged material on the beaches of Bogue Banks at some reasonable distance west of the nodal point and in a configuration that will emulate natural sediment transport conditions.
- As calculated by Olsen Associates, the MCHP has resulted in a littoral impact of approximately 240,000 cy/year to the beaches of Bogue Banks west of the nodal point and beyond the Easterly Transport Zone (post-project conditions (1933-2004). Olsen Report, p. 85. This impact is quite close to the historical placement rate west of the nodal point of 222,000 cy/yr. Therefore, the proposed DMMP must include placement of beach-quality dredged material of at least 222,000 cy/yr west of the nodal point. More appropriately, however, Olsen Associates also looked at current conditions (1994-2004), and determined that this littoral impact west of the nodal point is currently at approximately 444,000 cy/yr with current deepened channel conditions. This impact more than warrants historical placement rates to be provided at a minimum and also shows the need for the DMMP to include specific language to allow the County and local entities to provide "delta" funding to make up for the projects impacts not being absolved by the DMMP (see Section H. below).

In any event, Carteret County maintains that any disposal of dredged material on and offshore of Shackleford Banks has the significant potential to adversely impact Shackleford Banks and Bogue Banks. Therefore, no dredged material should be disposed on and offshore of Shackleford Banks.

Response 19: The base disposal area includes a portion of Ft. Macon and the entirety of Atlantic Beach, the majority of which is west of the nodal point (Section 3.2.2). The DMMP does not specify the quantity to be placed as that will be determined based on monitoring results and available funding. We are not aware of any promise to complete a sediment budget for Beaufort Inlet.

Comment 20: The Corps and NPS failed to adequately evaluate the potential adverse environmental impacts of proposed DMMP by failing to evaluate cumulative impacts. NEPA requires that the Corps and NPS evaluate the cumulative impacts of its proposed project. In its cumulative impact analysis, the Corps considered "known past, present and the reasonably foreseeable future, sand placement and/or beach nourishment projects within the geographic scope of the project." Draft DMMP, App. K, p. K-10. The Corps, however, failed to consider the cumulative effects of removing beach-quality dredged material from the littoral system. The Corps has admitted that "[its] practice of disposing of beach-quality sand in offshore dredged material disposal sites is poor management of a limited resource. This practice removes sand from the littoral system and essentially 'throws it away' without regard to the environmental consequences on adjacent shorelines or other economic benefit." Corps of Engineers, Wilmington Harbor, Draft dredged Material Management Plan, Alternative Formulation Briefing, p. 92, Oct. 2007. The Corps has recognized, in the Wilmington Harbor Environmental Assessment, that the removal of large quantities of dredged material from the littoral system adversely impacts adjacent barrier islands. "Years of research by the U.S. Army Corps of Engineers and practical knowledge gained from the operation of the numerous coastal navigation projects around the country has resulted in the realization that littoral material must be conserved." (p. A- 12). "[T]he removal of a cubic yard of littoral sediment from a tidal entrance or inlet with deposition outside the active littoral zone of the beach will ultimately cause a cubic yard deficit somewhere within the sand sharing system affected by that particular entrance or inlet. The impact of the removal of littoral sediment from the active littoral zone through channel maintenance is identified as a major cause of man induced erosion in the U.S. Army Corps of Engineers Shore Protection Manual." (p. A-12).

Comment 20: The USACE has adequately evaluated the cumulative impacts of removing beach quality dredged material from the littoral system. The current DMMP maximizes the retention of dredged material in the littoral system. In Section 3.2.4 Ebb Tide Delta in the DMMP, the USACE has completed an analysis of changes since 1974 within the Beaufort Inlet ebb shoal complex. This analysis concludes on page 72 (in the DMMP) that: "Every practical and sound effort, including reasonable use of light-loaded vessels or eliminating the option of disposal in the ODMDS from dredging contracts, will be considered to retain littoral material dredged from the navigation channels within the inlet complex to minimize this ebb tide delta deflation". This recommendation has been fully incorporated within the recommended Morehead City Harbor DMMP plan described in Section 3.4.2 of the DMMP.

Comment 21: As indicated in the draft DMMP, the Corps maintains that it will continue to dispose of beach-quality dredged material in the nearshore disposal areas and ODMDS. Disposal of beach quality dredged material in these areas, especially the ODMDS, removes such sediment from the littoral system, and NEPA requires the Corps to evaluate the cumulative impacts of such actions.

Response 21: The nearshore placement areas are within the littoral system. Regarding disposal of beach quality sand in the ODMDS, refer to the Corps response to DCM comment 3. Lastly, cumulative impacts of the DMMP have been adequately addressed in the cumulative impact analysis (Appendix K).

Comment 22: The Corps' reliance on monitoring does not excuse its failure to adequately evaluate the potential impacts of the draft DMMP. The draft DMMP includes a monitoring plan to "focus on the response of four main areas in the vicinity of the Morehead City navigation project:" (i) adjacent beaches; (ii) ebb tidal delta; (iii) nearshore placement area; and (iv) ODMDS. Draft DMMP, App. F, p. F-4. The modeling component of the plan includes wave and current measurements and numerical modeling. These are the types of evaluations, including a sediment budget, that must be performed prior to the Corps adopting a preferred alternative so that it can adequately evaluate the potential impacts of the proposed DMMP as required by NEPA. Further, based on the Corps' past failures to monitor, it is doubtful whether the monitoring plan will actually be implemented. The Corps has had nearly twenty years to monitor fate and transport of dredged material placed in the existing nearshore berm and despite its previous commitments has failed to adequately do so.

Response 22: The potential impacts of the DMMP have been adequately evaluated. As clearly stated in the DMMP, all aspects of DMMP implementation, including the monitoring plan, are dependent on annual funding, which is unpredictable, at best.

Comment 23: Disposal of dredged material at and offshore of Shackleford Banks is inconsistent with the Organic Act, the Cape Lookout Enabling Act, and NPS policy. The Organic Act directs to NPS to "promote and regulate the use of the ... national parks ... by such means and measures as conform to the fundamental purpose of said parks ..., which purpose is conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." 16 U.S.C. § 1.

Response 23: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Nearshore East Placement Area is important to help offset the impacts to the ebb tide delta that result from dredging of the navigation channel, therefore, it remains in the proposed plan. The specific area identified for nearshore placement was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be

the western end. The DMMP and FEIS adequately address this. Refer to previous responses that address NPS policy.

Comment 24: There is no evidence in the draft DMMP that the erosion at Shackleford is adversely impacting the ecology, recreational use or wilderness character of Shackleford Banks. Rather, the natural, dynamic processes of barrier island migration actually result in breeding and feeding areas for shore birds and provide other ecological benefits. Disposal of dredged material on and offshore of Shackleford has the significant potential to disturb this natural ecosystem. Such disposal would also likely impact recreational uses of the island, including surfing and shelling. For these reasons, disposal of dredged material at and offshore of Shackleford Banks is inconsistent with the Organic Act and Enabling Act. NPS Management Policies Section 6.3.7 provides that management intervention may be undertaken in wilderness areas "to the extent necessary to correct past mistakes, the impacts of human use, and influences originating of wilderness boundaries." Thus, NPS policy permits mitigation, but only to extent caused by the navigation project. Draft DMMP, p. 54 ("The National Park Service (NPS) is the agency responsible for the management of Shackleford Banks, and has determined that only the quantity of material lost from the island as a result of the navigation channel can be returned to the beaches of Shackleford Banks.").

Response 24: See previous responses that address this.

Comment 25: As acknowledged in the draft DMMP, "[t]he following volumes computed for these areas do not separate volume loss resulting from the navigation channel from the loss that would naturally occur with no project in place." Draft DMMP, p. 46 (emphasis added). Thus, Shackleford Banks would receive more (potentially significantly more) dredged material than is lost as a result of the navigation project, which is inconsistent with NPS Management Policies. Therefore, no material should be placed at Shackleford Banks until the Corps determines the amount of sediment lost as a result of the navigation project.

Response 25: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 26: The preferred alternative as set forth in the draft DMMP is not consistent to the maximum extent practicable with the enforceable policies of North Carolina's Coastal Management Program ("CMP") and is in violation of the Coastal Zone Management Act. Federal activities, such as those that will be carried out pursuant to the DMMP, must be conducted in a manner that is "consistent to the maximum extent practicable" with the enforceable policies of the State's CMP. 16 U.S.C. § 1456(c)(l)(A). In an effort to ensure that beach-quality sand was no longer dumped offshore, in the early 1990s, the State of North Carolina adopted regulations pursuant to the North Carolina Coastal Area Management Act. N.C. Gen .Stat. §§ 113-100 et seq. See 15A NCAC 7M §§ .1101 and .1102(a). These regulations have been approved by NOAA and are part of North Carolina's enforceable CMP. As discussed below, a number of components of the preferred alternative as set forth in the

draft DMMP are not consistent to the maximum extent practicable with North Carolina's enforceable CMP. The Corps may not rely on lack of funding to avoid consistency to the maximum extent practicable with North Carolina's CMP. The draft DMMP suggests in several places that the method of managing dredged material may depend on available funding.

As indicated by the Corps' own analysis, the maximum depth of active transport is -18 to -20-feet MLW or less and dredged material disposed in water depth of -25-feet or greater will not exhibit significant movement. Therefore, to be consistent to the maximum extent practicable with North Carolina's enforceable policies, any beach-quality dredged material must be placed either directly on the beach or in a nearshore area in water depths of -18 to -20-feet MLW or less. In approximately 1992, the Corps proposed to locate the nearshore disposal area along the -18-foot depth contour. The Corps' own analysis indicated that dredged material disposed in water depth of -25-feet or greater will not exhibit significant movement. Despite this conclusion, in approximately 1994, the Corps proposed that the nearshore berm be located west of Beaufort Inlet between the -25 and -30-foot contours. In fact, when disposing dredged material in the nearshore berm, the Corps has placed such material between approximately the -26 and -40-foot contours.5 The Corps has acknowledged that dredged material placed in the existing nearshore berm has exhibited very little movement and is therefore outside the active nearshore and is not consistent to the maximum extent practicable with North Carolina's enforceable CMP.

Response 26: Carteret County's interpretation of the NCDCM standard is inaccurate, and does not account for the flexibility afforded to publicly funded projects by the NCDCM regulations. See response to comment 106 for a more thorough explanation. The Corps' 2009 consistency determination and supplemental letter to NC DCM for the interim operations plan outlined why placement of material in the nearshore berm is consistent with the NC CMP; NCDCM has concurred with this determination of consistency on two separate occasions.

Regarding water depths within the existing nearshore placement area:
o Approximately 10% of the area is shallower than -20 feet;
o Approximately 40% of the area is shallower than -25 feet;
o Approximately 90% of the area is shallower than -30 feet;
o Virtually all of the area is shallower than -35 feet.

The Corps does not agree that the -18 feet NAVD depth indicated in this comment is the seaward boundary of the “active nearshore area” described in 15A NCAC 07M.1102. As the draft DMMP explains, our recent monitoring and analysis of nearshore area placement shows that material in the placement area is moving in a landward direction. In the opinion of our coastal engineers, the entire current nearshore placement area, and entire proposed expansion of the nearshore placement area, is within the active nearshore area. Placing material anywhere within the current nearshore placement area or expanded nearshore placement areas will keep it within the Beaufort Inlet littoral system.

Comment 27: Despite acknowledging that material placed in the existing nearshore berm has exhibited little movement, the Corps has made no commitment to place material in the active nearshore zone. The vast majority of the expanded Nearshore West is beyond the -20 foot MLW contour. The Corps has indicated that it will make "practical and sound efforts, including reasonable use of light-loaded vessels or eliminating the option of disposal in the ODMDS" and "where appropriate dredge equipment is available" to place dredged material in water depths less -25- feet. Draft DMMP pp. XS-5, 133. Such efforts do not meet the standard of "to the maximum extent practicable" that is required by the CZMA, and based on the Corps' past practices, it is extremely unlikely that the Corps will place any material in the active nearshore zone. Carteret County strongly disagrees with the Corps' contention that placement of dredged material in the ebb tidal delta would retain sediment within the littoral system. As a result of the Corps' dredging activities, the ebb tidal delta has deflated and extends seaward of approximately the -48-foot contour. Although placement of dredged material in some locations of the ebb tidal delta might retain such sediment within the littoral system, the vast majority of the ebb tidal delta is outside the littoral system as a direct result of the Corp's dredging activities. The Corps must ensure in the final DMMP and through either enforceable provisions in the contract specifications or economic incentives that all dredged material to be placed in the nearshore zone must be placed in -18 to -20-feet MLW or less.

Response 27: The proposed expansion of the nearshore west is to approximately the -15' MLW contour and should provide increased capability for the Corps to place material into shallower areas. However, this is not always practical based on cost, weather, and available equipment. It is the Corps position that while not optimal, placing the material within the ebb tide delta in deeper water is more beneficial to the system than completely removing the material and placing in the ODMDS.
Carteret County's interpretation of the NCDCM standard is inaccurate, and does not account for the flexibility afforded to publicly funded projects by the NCDCM regulations. See response to comment 106 for a more thorough explanation. As the draft DMMP explains, our recent monitoring and analysis of nearshore area placement shows that material in the placement area is moving in a landward direction. In the opinion of our coastal engineers, the entire current nearshore placement area, and entire proposed expansion of the nearshore placement area, is within the active nearshore area. Placing material anywhere within the current nearshore placement area or expanded nearshore placement areas will keep it within the Beaufort Inlet littoral system. Further, the depth of the nearshore placement area is constrained by the operating depths of the commercial hopper dredge fleet. As the District explained in its May 13, 2009 letter to DCM: “It is also important to note that the logistics involved with the dredging of material from the Outer Harbor channel to a great degree define the ideal location of the Nearshore Placement Area. Specifically, in order to maintain this section of the MCHP, a dredge vessel must be able to remove material to a depth of 47 feet, dredge shoals that are long and roughly linear, and work in the rough sea conditions mandated by the District's voluntarily-imposed environmental dredging window in the winter months (the purpose of this dredging window is to minimize impacts to sea turtles). Ocean-going

hopper dredges have so far been the only vessels able to accomplish such tasks. These dredges, when fully laden, often have keel depths of 22 feet or more, and therefore, must operate in more than 22 feet of water to avoid colliding with the bottom. When working in seas of several feet, or at lower tides, deeper operating depths are necessary. Therefore, it is not practicable to place material in a nearshore area at depths much less than 25 feet. The average depth of the existing Nearshore Area is roughly 26 feet, and it has been placed across the 25- and 30-foot contours, allowing for enough space to contain sufficient material and provide vessels with an adequately large target for material placement."

Currently there is only one dredge in the entire commercial hopper dredge fleet that could dredge as deep as 47 feet and dispose of material in less than 18 feet of water. That dredge, the ATCHAFALAYA, has only one drag arm (all others have two) and has a hopper capacity of 1,300 cubic yards (most other hoppers' capacity is 3600-7500cy). Given these constraints, the dredge could not reasonably be expected to do a large-scale (750,000cy) dredging job in the 90 days available to do the work at Morehead City each winter. It would also be imprudent for the District to create dredging requirements that only one dredge could fulfill, for obvious competitive and logistical reasons. There may be opportunities for pipeline dredges to use scows or barges to dispose of material in 18 feet of water or less. The recent work of Marinex Dredging in the summer of 2013 showed that such an operation is possible, but only for dredging shoaled areas where pipeline dredges can effectively work (e.g., the Cutoff section of the Morehead City channel). Other portions of the channel require hopper dredges. Logistical concerns make it imperative that a nearshore placement area include depths sufficient to allow most small-to- medium hopper dredges to operate safely. Any logistically feasible nearshore placement area must include depths between -25 and -30 feet.

The proposed expansion of the nearshore west is to approximately the -15' MLW contour and should provide increased capability for the Corps to place material into shallower areas, when logistically feasible.

Comment 28: As indicated by the North Carolina Division of Coastal Management's ("DCM") prior objection to the placement of beach-quality dredged material in the ODMDS, any placement of such material is inconsistent with North Carolina's CMP. The Corps has not only proposed to continue placing beach-quality dredged material in the ODMDS, Draft DMMP, p. 60, but astonishingly asserts that such disposal does not constitute removal of the beach-quality dredged material from the littoral system and is therefore consistent with North Carolina's enforceable CMP. Draft DMMP, pp. 292, 300.

Response 28: Carteret County has stated that a letter from NCDCM that Corps received on February 24, 1997 was a blanket prohibition of the placement of any beach-quality sand in the ODMDS. The letter was a consistency response prepared for the Corps' proposed widening of Range B of the Inner Harbor Channel by 50 feet in 1997. The widening of Range B that was the subject of this consistency determination was never accomplished. Discussion of the 1997 letter is currently irrelevant. All of the Corps' current dredged material disposal locations and practices have been the subject

of a more recent consistency determination prepared for the Corps' Interim Operations Plan. That consistency determination was provided to NCDCM on April 6, 2009, and supplemented by letter dated May 13, 2009. The consistency determination fully discussed the need for disposal of dredged material in the ODMDS during bad weather, and the recent analysis which confirms that the location of the nearshore placement area is within the active littoral system. NCDCM concurred with the Corps' consistency determination on May 21, 2009, and renewed its concurrence on March 27, 2012.

Placement of dredged material into the ODMDS does remove that material from the Beaufort Inlet system. It is important to note, however, that the ODMDS has been, and continues to be, a valuable borrow source for material for use in storm damage reduction projects along all of Bogue Banks. The Corps specifically requires its contractors to place beach-quality material in specific sections of the ODMDS so that it can be available for future deposition on the beach. Recent locally-funded projects have used the ODMDS as a borrow site, and both Carteret County and the Corps have included the ODMDS as a preferred borrow site for material in their long-term storm damage reduction plans. It is the Corps' expectation that future trends will mirror the past decade, where more material was removed from the ODMDS than was placed into it. While placement of beach-quality material in the ODMDS is never the Corps' preferred option, the ODMDS remains a valuable "safety net" for this project, allowing for winter dredging of the channel in an environmentally responsible manner, while preserving beach-quality material for future use.

Comment 29: Prior to approximately 1995, the Corps dumped all beach-quality dredged material in the ODMDS.

Response 29: This is incorrect. Prior to 1995 (in 1978, 1986 and 1994), over 10,000,000 cubic yards of beach quality dredged material was disposed of on Fort Macon and Atlantic Beach.

Comment 30: Even after developing the nearshore berm, the Corps has continued to dump vast quantities of beach-quality dredged material in the ODMDS. "Analysis of past dredging operations between the years 1995 and 2006 indicates that approximately 43 percent of coarse grained material was diverted to the ODMDS due to weather restrictions." Draft DMMP, p. 300. The Corps' practices. have resulted in approximately 58.3 million cubic yards of beach-quality dredged material being dumped in the ODMDS from 1911-2004. Olsen Report, A-16, A-17. This practice has caused a number of significant, adverse impacts to Bogue Banks, including accelerated beach erosion caused by removal of sand from the Bogue Banks littoral system, which jeopardizes homes, commercial development, infrastructure, and Fort Macon, an important historic landmark and the most visited state park in North Carolina. Carteret County has spent approximately $30.7 million in local, state and federal funds to retrieve a portion of this dredged material and use it to renourish the beaches of Bogue Banks, which was at least partly necessary to offset the impacts of the Corps' wasteful dredged material management practices. Contrary to its prior conclusions, the Corps now attempts to claim that its dumping of beach-quality dredged material in the

ODMDS is consistent with North Carolina's enforceable CMP because Carteret County spends millions of dollars to retrieve it. Such a position is not only wrong, but it is disingenuous. The Corps has admitted that placement of dredged material in offshore disposal areas is inconsistent with North Carolina's CMP.

Response 30: The Corps Section 111 study dated June 2001 found no increase in shoreline erosion along Bogue Banks. Also, this report found that any potential shoreline impacts along Bogue Banks related to the operation of the Beaufort Inlet have been ameliorated through the periodic disposal of dredged material along the shoreline of Ft. Macon and Atlantic Beach. The proposed DMMP acknowledges these findings and is designed to continue to dispose of material along Ft. Macon and Atlantic Beach in order to minimize any negative shoreline impacts related to dredging of the adjacent navigation channel. The Corps will continue to work to reduce the amount of beach-quality sediment that is disposed of in the ODMDS, and to make sure that the beach-quality material disposed of in the ODMDS is available for subsequent nourishment activities. No practicable alternatives exist to the occasional placement of material in the ODMDS when hopper dredges are the necessary piece of dredging equipment, as further described below.

The Corps is committed to reducing the impact that its dredging program has on endangered sea turtle species. Hopper dredging, in particular, can pose dangers to turtles in the water, and the Corps has elected, with the concurrence of all resource agencies, to restrict its hopper dredging at MCHP to the winter months of January-March, when likelihood of turtle encounters is at its lowest. Dredging is most difficult to accomplish in wintertime months, due to the increased frequency and duration of foul weather. Foul weather conditions, especially those which result in increased wave amplitude, make placement of material in the nearshore area hazardous for a laden dredge, which often has minimal clearance when placing material in the nearshore area. The Corps has chosen to allow its contractors to continue to dredge in foul weather, allowing them to dispose in the ODMDS when weather and wave conditions make nearshore placement hazardous. To do otherwise, and require contractors to stop work in high wave conditions, would have two distinct consequences: costs for dredging would increase, and just as importantly, it would be far less likely that the Corps could accomplish the work within the narrow 90-day “sea turtle window." This would mean that the Corps, in addition to paying more for the job, would face the choice of not being able to finish the navigation dredging or, alternatively, increase its risk of killing endangered turtles.

The Corps’ experience in the FY 2013 dredging season confirmed the impracticability of a “No ODMDS” policy. In the contract solicitation advertised in late 2012, the Corps removed the ODMDS foul-weather option from the proposed contract, leaving the nearshore placement area as the only available placement option for contractors. Only one dredging company responded to the solicitation, and the prices offered by that company far exceeded our awardable range (the Corps is prohibited by law from entering into dredging contracts that exceed the Government estimate by more than 25%). In subsequent discussions with that contractor, it was clear that the primary

reason for the increased cost was the likelihood that the dredge would have to both attempt nearshore placement in foul weather (risking damage to vessel and danger to crew) and shut down more often when weather was deteriorating. Our experience has shown that utilizing a hopper dredge to dispose material on the beach also necessitates some disposal of material in the ODMDS during adverse weather conditions, as the pump-out of hoppers can be difficult in foul weather. The only practicable alternative available to the Corps, when utilizing hopper dredges, is to allow the placement of material into the ODMDS in hazardous conditions.

The Corps has continued to explore options that reduce the amount of beach-quality material placed in the ODMDS, without removing from a vessel captain the essential flexibility necessary to protect vessel and crew. Our most recent contract for nearshore placement included the following condition:

“If weather and/or wave conditions prohibit safe disposal in the Nearshore Placement Area, the Contractor shall place dredged material in Zone 2 or Zone 4 [areas designated for beach-suitable material] of the Ocean Dredged Material Disposal Site (ODMDS). No more than 15% of the total loads of dredged material may be dumped in the ODMDS. For each dump placed in the ODMDS, the Contractor shall document the weather and/or wave conditions that prohibited safe disposal in the Nearshore Placement Area and submit the documentation to the Contracting Officer or his/her designated representative. Loads dumped in the ODMDS without proper documentation will be deemed misplaced material and deducted from the pay quantity.”

It is our intent to include similar language in future contracts for hopper dredging unless problems arise.

Several of the statements in this comment are inaccurate. The quantity of material (58.3 Mcy) identified by Olsen Associates in its report likely includes significant quantities of material that are not, in fact, beach-quality sand. Additionally, in the early years of channel maintenance, before establishment of the ODMDS in 1987 there was not a specific designated location for dredged material disposal, and some sand was very likely disposed near the channel and within the Beaufort Inlet system.

The Corps disagrees that funds spent by Carteret County to nourish the beaches of Bogue Banks have been necessitated by the Corps' activities in maintaining the MCHP channel. Effects of the navigation project on adjacent shorelines diminish as distance from the inlet increases. As described more fully in the Final Section 111 Report for Morehead City/Pine Knoll Shores, North Carolina (June 2001), the MCHP is not having an effect on the shoreline at Pine Knoll Shores, although this area is within the inlet influence area, and is a potential disposal location identified in the DMMP. Essentially, the effects of MCHP on the beaches of Bogue Banks are limited to the Fort Macon and Atlantic Beach areas, and exhibited most strongly in those areas close to the channel, namely the Fort Macon area and eastern Atlantic Beach. Surveys of the beach over the past several decades have shown that the disposal of navigation project material on the beach has been able to keep the shoreline change rates of Atlantic Beach and Fort

Macon at roughly the same level for the pre- and post-project condition. Additionally, the 2001 Section 211 Report noted that “the disposal of dredged material removed from the harbor project on the shorelines of the Town of Atlantic Beach has effectively improved the condition of this beach relative to the pre-project condition.” This is an indication that navigation project disposal has been enough to counteract not only project-related erosion, but also natural background erosion, sea level rise, and storm-induced losses. Thus far, since 1978, the project has put about 16 million cubic yards, at 100% federal expense, on the beaches of Bogue Banks. It is our understanding that most of the $30.7 million that is mentioned in this comment as being spent by the County was used to nourish Emerald Isle, which is approximately 12-25 miles away from this project, not affected by the MCHP, and out of the Beaufort Inlet system. To claim that the need to nourish this remote beach is tied to MCHP maintenance is misleading and inaccurate.

The Corps does not claim that occasional ODMDS disposal is consistent with the NC CMP because that sand is later retrieved. Occasional ODMDS disposal is consistent with the NC CMP because it is a necessary safety option for wintertime hopper dredging. Retrieval of that sand from the ODMDS, by the County or the Corps, is a beneficial re-use of that sand that the Corps encourages; long-term, this beneficial re-use will keep that sand from being permanently lost to the Beaufort Inlet system.

Comment 31: In its own draft DMMP, the Corps stated that "it is widely recognized that disposal of this non beach quality sediment in offshore placement sites (i.e., the ODMDS) potentially reduces erosion to downdrift beaches (Brunn 1996; Dean and Dalrymple 2002)." Failure to place a sufficient quantity of beach-quality dredged material on the beaches of Bogue Banks west of the nodal point is not consistent to the maximum extent practicable with North Carolina's enforceable CMP. As discussed above, the MCHP has a number of impacts on the beaches of Bogue Banks west of the nodal point. Not only does the MCHP eliminate natural sand bypassing across the inlet, it has significantly modified longshore transport rates along eastern Bogue Banks. As a result of the project, sand placed east of the nodal point is rapidly transported back to the inlet. As recognized by the Corps, the area of inlet influence extends 10.7 miles west of the inlet. The MCHP has resulted in significant deflation or deepening (i.e., volumetric losses) to a distance of at least 6 or 7 miles west of the inlet. The Corps' proposed beach placement area includes portions of Fort Macon State Park and Atlantic Beach (Draft DMMP, Figure 3-38, p. 140). The Corps', however, fails to commit to placing any sand west of the nodal point. In fact, it is possible (as evidenced by this year's dredging contract) that the vast majority of beach-quality dredged material will be placed east of the nodal point where it will provide little to no benefit to beaches west of the nodal point. Enforceable policies within North Carolina's approved CMP require the Corps to place sufficient dredged material on Bogue Bank's beaches west of the nodal point. 15A NCAC § 7M .1102(a) provides: "Preferably, this dredged material will be disposed of on the ocean beach or shallow active nearshore area where environmentally acceptable and compatible with other uses of the beach." (emphasis added). North Carolina's CMP not only includes regulations addressing the beneficial use of sediment (15A NCAC §§ 7M .1101, .1102), but also includes provisions to protect and preserve the State's coastal

resources. 15A NCAC § 7M .1202(b); 15A NCAC § 7M .0701(a); N.C. Gen. Stat. § 113A-102(a); 15A NCAC 7H .0302(b). Placement of the majority of beach-quality dredged material east of the nodal point where it will be rapidly transported back to the inlet and where it provides little to no benefit to communities west of the nodal point is not environmentally acceptable and fails to protect and preserve the State's coastal resources as required by North Carolina's enforceable CMP.

Response 31: The Corps Section 111 study dated June 2001 found no increase in shoreline erosion along Bogue Banks. Also, this report found that any potential shoreline impacts along Bogue Banks related to the operation of the Beaufort Inlet have been ameliorated through the periodic placement of sediment along the shoreline of Ft. Macon and Atlantic Beach. The proposed DMMP acknowledges these findings and is designed to continue to place material along Ft. Macon and Atlantic Beach in order to minimize any negative shoreline impacts related to dredging of the adjacent navigation channel. It should be noted that the majority of this base disposal area is west of the nodal point. Exact sand placement areas will be determined by monitoring results to maximize beneficial use of the material while minimizing dredging costs.

Comment 32: The Corps' methodology used to reach an allocation of 57/43 between Bogue and Shackleford Banks and to determine future beach placement of dredged material is flawed. It appears that the Corps used Transects 77-112 and Transects 460-293 for the baseline volume loss calculations used to determine the allocation for the Year 1 beach placements for Bogue Banks and Shackleford Banks respectively. See Draft DMMP, p. 47. Both of these lengths of shorelines include areas immediately adjacent to the inlet. However, the base placement areas shown exclude the areas near the inlet on both sides (with which Carteret County agrees and supports), and in the case of Shackleford Banks the base placement area extends further west than the calculation area (Transects 77-107 for Bogue Banks, Transects 424-229 for Shackleford). It is unclear which set of transects will be used to determine the future loss rates for future sand allocations. The loss calculation areas and the placement areas should be consistent to be sure that one side is not being treated unfairly. Carteret County also contends that the areas immediately adjacent to the inlet should not be used in the calculations given the inlet effects and the fact that material should not be placed in those areas because it will go right back into the inlet. This is especially true along Shackleford Banks where the only feasible way to block sediment from immediately depositing into the inlet and possibly provide some protection to the western end of the island would be to construct a terminal groin, which has been deemed to be outside the scope of the DMMP (but should be considered if the NPS has concerns about the western tip of Shackleford Banks).

Response 32: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The loss calculation areas are discussed in

detail in Section 3.2.2 of the final DMMP. If sand was to be disposed of on Shackleford Banks, future loss rates would have been computed using the same areas for the reasons detailed in Section 3.2.2. Also in this section of the report is the reason for the east shift of the proposed disposal area along Shackleford Banks. In essence, it was shifted to reduce erosion of the fill material and subsequent transport back into the navigation channel. Without the shift, erosion rates would be higher and would most likely have increased future disposal requirements along Shackleford Banks. It should be noted that the entire proposed disposal area was within the net westerly transport area of Shackleford Banks, which would retain sediment in the Beaufort Inlet complex.

Comment 33: In addition, the draft DMMP states that any future placement on Shackleford Banks shall not exceed the historical loss rate of 166,450 cy/yr times the number of years between placements. Draft DMMP, p. 54. If there is to be any beach placement on Shackleford Banks, which Carteret County contends is inappropriate, unsupported, and ill-advised, once the historical loss rate has been revised, this historical rate should be fixed for future placements.

Response 33: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 34: Carteret County has serious concerns that while the sediment within the harbor channel is compatible with the overall profile for Shackleford Banks, the mean diameter (d50) of the channel material (0.267mm) is roughly half of the size of the material on the visible beach for Shackleford Banks (0.532 mm- DB-MLW). Draft DMMP, p. 227, Table 5-2. Therefore, one would expect that accelerated losses of this upper material along the beachface may be likely along Shackleford Banks and future volume loss calculations may be inflated due to this issue.

Response 34: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP; however for comparison purposes, the harbor should be compared to the beach from the dune toe to -24 msl. The mean value for this portion of the beach is .334 mm. The harbor material is still finer than the native beach but the sand would have been reworked by the ocean energy and would be redistributed in a natural location. Disposal on any beach is a beneficial use of dredged material, and there's no intent to restore any beach to a specific template/profile, therefore volume loss is not as important as it would be for a "renourishment project" where a specific beach profile/template is the objective.

Comment 35: If the final DMMP adopts an alternative that includes placement on Shackleford (which as stated above Carteret County believes is inappropriate and ill-advised), Carteret County requests that the language included on page 54 of the Draft DMMP (once the historical loss rate is revised) be placed in the conclusions and executive summary as well as in future presentations since this fact is not clear throughout the document.

Response 35: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 36: If the preferred alternative is adopted and NPS declines dredged material or there is excess sand during Year 1, this dredged material must be placed on Bogue Banks' beaches. As provided in the Draft DMMP, NPS has the option to decline disposal of dredged material on Shackleford Banks during any maintenance dredging event. Draft DMMP, p. 146. The Draft DMMP further provides "any dredged quantities during beach disposal operations in excess of the amount required to satisfy the needs of the designated areas along Bogue and Shackleford Banks should be disposed of west of the designated disposal area on Bogue Banks (Stations 77-107). Specific locations for disposal west of the Bogue Banks base location would be determined just prior to the commencement of dredging activities to determine the area that produces the greatest benefits while minimizing associated pumping costs." Draft DMMP, p. 255 (emphasis added). Not only "should" this dredged material be placed on the beaches of Bogue Banks, the DMMP should require that such material be placed on the beaches of Bogue Banks.

Response 36: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 37: No more dredged material should be placed in the ebb tidal delta than is necessary to offset current impacts. Based on the analysis shown in the draft DMMP (pp. 80-83), the ebb tidal delta losses are approximately 408,500 cy/yr (Bogue Banks) and 113,000 cy/yr (Shackleford Banks), which equates to a three-yr need of 1,564,500 cy. The ebb tidal delta placements during Years 2 and 3 overcompensate for this need by placing 1,806,000 cubic yards within the ebb tidal delta. Therefore, an additional 241,500 cubic yards is being placed over the stated need. Also, based on the shoaling analysis/rates presented in the draft DMMP, it appears that there is an additional 204,000 cy/yr (shoaling vs. representative volumes for beach suitable material) that the Corps has not been able to dredge historically due to a variety of reasons. Draft DMMP, p. 34. Over three years, this total volume would be 612,000 cubic yards. Therefore, it would appear that there is 853,500 cy of beach compatible material available (over the three-year period) that could be dredged by partnering with the Corps where the State, County and/or local entities could pay the delta costs for beach placement of this volume (versus placement in the ebb tidal delta) and still meet the need of the ebb tidal delta.

Response 37: These numbers are close, calculations previously presented at public meetings on the DMMP show there is a potential of approximately 900,000 cubic yards available over a three year cycle that could be disposed of on Bogue Banks within the inlet influence area as described in Section 3.2.2 and again addressed in Section

3.2.4.2. This number is not fixed and will adjust based on monitoring results. Disposal of the additional material would require external funds from the local community and would not be paid for through typical dredging funding sources.

Comment 38: The option for partnering with the Corps where the State, County and/or local entities could pay the delta costs for beach placement needs to be codified within the DMMP as it will benefit all parties by providing funds to this project that has been historically underfunded. If the Corps adopts the preferred alternative in the draft DMMP and places more dredged material in the ebb tidal delta than is necessary to offset current impacts, the same rationale should apply to beach placement. The DMMP should include specific authorization to allow a non-federal sponsor to pay delta costs during Years Two and Three for beach placement of up to 853,500 cy as far west at Station 59 and farther west if certain conditions are met. The Draft DMMP provides that "[q]uantities of material dredged in non-beach disposal years that exceed the annual losses to the ebb tide delta may be available for beach disposal by a local entity." Draft DMMP, p. 84. To the extent that quantities of dredged material are disposed in the Nearshore West or Nearshore East that exceed annual losses, Carteret County agrees that such dredged material should be available for beach placement by a non-federal sponsor; however, the DMMP must include specific authorization to permit this option. Carteret County requests that during Year Two or Year Three of the draft DMMP, the Corps provide specific authorization in the DMMP that allows the County, a local community and/or the sponsor to pay the difference in costs associated with placing beach-quality dredged material on the beach as directed by the County, local community or sponsor and within the authorized limits of the MCHP rather than placing such material in the nearshore placement area as proposed in the base plan.

Response 38: Specific authorization is not required to allow non-federal sponsors to pay for the additional cost of placing sand on the beaches of Bogue Banks during years 2 or 3 of the 3-year cycle. This is adequately addressed as follows in Section 3.2.4.2 (Ebb Tide Delta Placement): "Quantities of material dredged in non-beach disposal years that exceed the annual losses to the ebb tide delta may be available for beach disposal by a local entity. Any requests by local entities to place this excess dredged material on adjacent beaches would be evaluated on a case-by-case basis. "

Comment 39: Carteret County further requests that the Corps permit placement of such dredged material (excess) on the beaches west of the authorized limits of the MCHP, including the beaches of Indian Beach, Salter Path and Emerald Isle, as requested by the party funding the beach placement if that party demonstrates that such placement (i) is feasible, (ii) is consistent with applicable environmental laws and regulations, and (iii) will not cause adverse impacts to the inlet system. Carteret County requests that this alternative placement be provided for in the DMMP and an appropriate agreement be executed to allow the Corps to accept such funds.

Response 39: One of the main objectives of the DMMP is to keep material dredged from the navigation channel within the Beaufort Inlet complex. Disposal of dredged

material from the navigation channel west of station 59 on Bogue Banks (Figure 3-9 Proposed Bogue Banks Disposal Area) would remove material from the inlet complex, potentially increasing delta deflation and for this reason would not be acceptable.

Comment 40: While we agree that the majority of the inlet influence terminates at the end of Pine Knoll Shores (Transect 59), there is reason to believe that the communities west of Pine Knoll Shores have also been impacted by the harbor channel dredging. While the Corps has adopted a backpassing approach to this DMMP, it is also well known that the channel currently intercepts material that before the project was in place would bypass the natural channel and feed all of Bogue Banks.

Response 40: There is no indication that the influence area of Beaufort Inlet extends beyond Transect 59 based on surveys available to the Corps at this time. Additionally, there is no indication of a measurable shoreline impact related to the operation of the Beaufort Inlet channel beyond Atlantic Beach as discussed in the Corps Section 111 report dated June 2001. Any impact to Ft. Macon and Atlantic Beach shoreline has been ameliorated through past disposal of dredged material since 1986. The proposed DMMP quantifies the anticipated sediment needed to continue to compensate for any potential impacts to Ft. Macon and Atlantic Beach and incorporates disposal of dredge material along these sections of the island as a critical piece of the operation of the navigation channel.

Comment 41: In fact, Table 7.2 within the Corps' Section 111 report shows measurable impacts to shoreline change rates within Indian Beach/Salter Path and Eastern Emerald Isle pre- vs. post project. Therefore, Carteret County requests that Indian Beach/Salter Path and Emerald Isle also be allowed to participate in delta projects on an intermittent basis if the above-referenced conditions are met. Given the need for additional funds for this project as a whole, as many potential financial partners should be identified as possible.

Response 41: The Section 111 report attributes the increased shoreline change west of Pine Knoll shores to storm activity which was unusually high during the period of 1993 and 1999. Also, the report notes that the potential sand transport comparisons are comparable for the area west of Pine Knoll Shores (PKS). This fact coupled with the data that shows Pine Knoll Shores shoreline change rates are relatively unchanged in the with project condition show that the navigation channel is unrelated to the increased change rates observed west of PKS.

I. John Fussel email dated February 3, 2014.

Comment 1: The DMMP virtually ignores the significance of the wintering population of the threatened/endangered Piping Plover in the project area, i.e. the Beaufort Inlet system.

- By the Beaufort Inlet system, I am referring to the western end of Shackleford Banks (cited in the DMMP as critical winter habitat) plus the nearby designated critical wintering habitat on the Rachel Carson Reserve (also called Bird Shoal).

- Based on recent winter surveys (International Piping Plover Censuses, surveys by the U.S. Park Service, surveys by Rachel Carson Reserve volunteers), wintering Piping Plovers regularly move from Rachel Carson to Shackleford and vice versa. A banded bird on Rachel Carson is likely to show up at Shackleford, and vice versa.
- The birds on west Shackleford and the Rachel Carson Reserve should be regarded as one discrete wintering group.

Based on the counts made during the International Piping Plover Winter Census, the Beaufort Inlet system has consistently supported as many (or more) wintering Piping Plovers (about 10 to 18 individuals) as any other area in the state; the Beaufort Inlet system has consistently supported over 20% or more of the wintering population of Piping Plovers in the state.

Response 1: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Therefore the proposed action would not adversely impact the ecosystem on Shackleford Banks.

Comment 2: The decline in the extent of roosting/resting habitat has probably exacerbated the impacts of increased human visitation to the island. Formerly, the birds could have tolerated more disturbance because there were expansive areas of potential roosting/resting sites to which birds could relocate when they were flushed from a site. Today the limited areas of suitable roosting/resting sites are more likely to be almost literally covered with people during heavy-use periods. The DMMP should discuss habitat needs of the Piping Plover at the landscape-level scale, and the processes that maintain this habitat such as inlet migration/frequent overwashing, etc. and discuss how the proposed actions in the DMMP may impact such processes. Unfortunately, the DMMP (and BA) takes a very simplistic, one-dimensional approach to the issue of Piping Plover habitat and how the proposed project might impact this habitat, i.e. it suggests that spoil deposition along 3.65 miles of ocean beach of Shackleford Banks will "increase the acres of designated critical habitat for the winter Piping Plover".

Response 2: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. In Appendix J Biological Assessment, the habitat needs of the Piping Plover and the DMMP impacts to this Federally listed species and its designated critical habitat on Bogue and Shackleford Banks have been thoroughly described. The Morehead City Harbor channel within Beaufort Inlet is in a fixed position and the inlet is not migrating. Overwash within the inlet area is not a function of the continued maintenance of this Federal navigation channel but caused by storms, high tides, etc. USFWS has designated about 168 acres on Shackleford Banks as critical habitat for the Wintering Piping Plover (NC-8). Included within the designation of critical habitat are all land areas to the mean lower low water. However, USFWS has not designated critical habitat for the Wintering Piping Plover either within the existing Federal navigation channels (which range in depth from about -35 to -45 feet NGVD) or in the Atlantic Ocean placement areas (Bogue Banks beaches or the nearshore placement areas off Bogue Banks and Shackleford Banks). Water depths in the nearshore placement areas vary, but minimum depth is about -16 feet NGVD. The Nearshore Placement Areas are

located about 1,000 to 2,000 feet offshore from Bogue and Shackleford Banks. By letter dated November 26, 2013, the USFWS stated with the conservation measures in place, the Service concurs that the proposed DMMP may effect , but is not likely to adversely affect the piping plover. In this same letter USFWS also indicated that the DMMP may modify, but is not likely to adversely modify designated wintering piping plover habitat in the project area.

Comment 3: The DMMP does not discuss the relative importance of the Beaufort Inlet system to the Red Knot. On the 2006 International Piping Plover Census, during which Red Knots were also counted, 13% of the Red Knots found in the state were found in the Beaufort Inlet system. The DMMP (and BA) should discuss 1) habitat needs of the Red Knot at the landscape-level scale, and how inlet migrations can lead to the creation and/or maintenance of extensive island-end flats, which is important habitat for the species; and 2) how the project may impact such habitat needs. The statement in the DMMP (and BA) that the beach nourishment on Shackleford Banks will improve habitat for the Red Knot by restoring 33 acres of beach and intertidal habitat is really questionable-there is already a beach on Shackleford Banks.

Response 3: The BA (Appendix J) does discuss the relative importance of the Beaufort Inlet system to the Red Knot. Within the BA, the Cape Lookout National Seashore, NPS provided their annual Red Knot monitoring reports, as well as NCWRC's information on the Red Knot. Additionally habitat needs as well as impacts of the DMMP on the Red Knot are thoroughly discussed. The Morehead City Harbor channel within Beaufort Inlet is in a fixed position and the inlet is not migrating. Overwash within the inlet area is not a function of the continued maintenance of this Federal navigation channel but caused by storms, high tides, etc. By letter dated November 26, 2013, the USFWS stated with the conservation measures in place, the Service concurs that the proposed DMMP may affect, but is not likely to adversely affect the red knot.

Comment 4: Although the DMMP has detailed discussions about impacts of harbor/inlet channel maintenance on the ebb tidal delta, it does not mention any potential impacts on the flood tidal delta and the associated Rachel Carson Reserve. The Rachel Carson Reserve has an extensive area of critical habitat for the threatened/endangered Piping Plover.

Response 4: The proposed DMMP will not adversely impact either the Beaufort Inlet Flood Tide Delta and/or the associated Rachel Carson Reserve. The USACE is not planning to widened or deepen the existing Federal navigation channels in Morehead City Harbor, no change to the existing harbor project dimensions is proposed in the DMMP. Therefore the proposed DMMP will not adversely impact either the flood tidal delta (located on the inside of Beaufort Inlet in Bogue Sound) or the Rachel Carson Reserve in Beaufort.

Comment 5: The DMMP (and BA) should discuss habitat needs of the threatened Seabeach Amaranth at the landscape-level scale, such as how inlet migrations can lead

to the creation and/or maintenance of extensive island-end flats, which is important habitat for the species, especially during sea-level rise. The DMMP (and BA) should also discuss how the proposed project may impact natural barrier island processes that lead to the creation and maintenance of such habitat. The statement in the DMMP (and BA) that beach nourishment along the ocean beach of Shackleford Banks will improve habitat for Seabeach Amaranth by restoring "33 acres of beach and intertidal habitat" is really questionable-there is already a beach on Shackleford Banks. The Recovery Plan for the Seabeach Amaranth states that "Beach replenishment projects and the placement of spoil from maintaining the Atlantic Intracoastal Waterway and various inlet projects have impacts on Seabeach Amaranth and are not advocated for Federal land where private property is not threatened and where the preservation of natural coastal processes is a prime goal".

Response 5: The BA in Appendix J satisfactorily discusses the habitat needs and the proposed DMMP impacts on the threatened Seabeach Amaranth on both Bogue and Shackleford Banks. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Again the Morehead City Harbor channel within Beaufort Inlet is in a fixed position and the inlet is not migrating. Overwash within the inlet area is not a function of the continued maintenance of this Federal navigation channel but caused by storms, high tides, etc. The DMMP will not adversely impact natural barrier island processes that lead to the creation and maintenance of island-end flats. By letter dated November 26, 2013, the USFWS stated with the conservation measures in place, the Service concurs that the proposed DMMP may affect, but is not likely to adversely affect the threatened Seabeach Amaranth.

Comment 6: The DMMP makes it clear that the National Park Service would have the option to accept or reject beach nourishment on Shackleford Banks during each beach nourishment cycle. However, it does not make it clear if that is the case in regard to disposal in the Nearshore East disposal area. If this deposition will definitely be carried out every three years (approximately) with adoption of the DMMP, then that should be made clear in the DMMP.

Response 6: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. The Nearshore East Placement Area is important to help offset the impacts to the ebb tide delta that result from dredging of the navigation channel, therefore, it remains in the proposed plan and NPS does not have the option of accepting or rejecting sand in the nearshore east. The specific area identified for nearshore placement was selected to reduce immediate loss of placed material into the navigation channel by not placing material in the most active transport areas along Shackleford Banks, which would be the western end.

Comment 7: The DMMP and BA discuss the environmental impacts of beach nourishment and spoil deposition just offshore. As they point out, such actions routinely smother much of invertebrate population but the impacts are irreversible and not

particularly long-lasting, on the order of months, with some variation depending on various factors. However, considering the proximity of the selected beach nourishment area with the nearshore disposal area, it would seem that cumulative impacts (especially percentage of time that the populations of various organisms are depressed) should be addressed, at least if the Park Service will not have the option of rejecting spoil deposition in the nearshore area.

Response 7: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Reference Section 3.4.2 Summary of Recommended Base Plan (DMMP) and Table 3-28. Impacts to benthic invertebrate population within the Bogue Banks beaches and surf zone as well as the nearshore ocean off Bogue and Shackleford Banks are discussed at length in Sections 4.5.2, 4.5.3, 5.5.2, and 5.5.3 of the DMMP. The EFH in Section 4.5.7 and 5.5.7 of the DMMP also discuss impacts to these resident populations. By letter dated November 26, 2013, the USFWS stated the following: "Adhering to the winter construction window and the use of compatible sand will minimize the impacts to the benthic infauna to the extent possible." Since the sediment placed on Bogue Banks is compatible in both grain size and color (see Section 5.1.2 of the DMMP), the USACE believes that no adverse impacts to these benthic invertebrates are anticipated. Therefore the impacts to benthic infauna on Bogue Banks beaches and nearshore off Bogue and Shackleford Banks is not anticipated to be significant.

Comment 8: The waters off Shackleford Banks (and Bogue Banks) are a major wintering area for the Common Loon, a visual feeder. Will the regular deposition of spoil material, perhaps as often as two out of every three winters, impact this population?

Response 8: As stated in Section 5.3.1 Water Quality, during disposal of coarse-grained sediment (90% or greater) along the beaches of Bogue Banks and sandy material (i.e., 90% or greater sand in the nearshore areas), there would be elevated turbidity and suspended solids in the immediate area of sand deposition when compared to the existing non-storm conditions of the surf zone. Significant increases in turbidity are not expected to occur outside the immediate construction/maintenance area (turbidity increases of 25 Nephelometric turbidity units [NTUs]) or less are not considered significant). Turbidity levels would be expected to return to background levels in the surf zone and nearshore area when dredging ends. Therefore no adverse impacts to the wintering area for the Common Loon is anticipated.

J. Dr. Stephen R. Fegley, Research Associate Professor, UNC Institute of Marine Sciences email dated February 3, 2014

Comment 1: Twice during the NPS presentation, the speaker stated that the NPS was aware that barrier islands are dynamic but then asserted that changes seen in the last few decades are a consequence of human activity and therefore unnatural, requiring mitigation. Although dredging operations probably have contributed to recent erosion on Shackleford Bank, no compelling, indisputable evidence was presented at the meeting, nor is present in the Integrated Dredged Material Management Plan and

Environmental Impact Statement, that dredging is the sole reason for island change. Local sea level rise, the patterns of storms over the past few decades, and interactions of regional wave/current patterns within the eastern end of Onslow Bay have contributed likely to changes in Shackleford geomorphology as well. Assigning, unambiguously, the proportion of geomorphological change to any of these factors, given the amount of information available, is not possible. Furthermore it is not clear that there is a stable island configuration target available for the NPS to achieve. Even though the western extent of the island was greater several decades ago, and the beach extended further south than it now does, what evidence is there that those conditions were stable? They are as likely to have been unstable configurations resulting from dredging, storms, etc. during the preceding years. Finally, placing sand on the beaches to recreate some semblance of preserving a former island configuration is fruitless if the island is still in disequilibrium with existing forcing factors derived from current anthropogenic activities and environmental conditions that continue to alter island geomorphology.

Response 1: The plan does not attempt to create a particular island configuration or build a specified beach template. The purpose of the plan is to back pass sediment to the origin of the material and reduce erosion of the island that may be partially resulting from dredging of the navigation channel. However, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 2: Changes in barrier island morphology, changes to the extent and nature of barrier island habitats, and changes to how barrier island organisms respond to habitat alteration are THE defining characteristics of barrier islands. Because so many barrier islands presently have human communities we have been nourishing beaches on these island to avoid the loss of homes and towns. That means there is a very small number of islands left on the US east coast where the most essential aspect of barrier islands, change, has been allowed to persist. If the NPS truly wishes to maintain the most essential character of barrier islands for the appreciation and education of future generations they should let the island move, regardless of the cohort of factors inducing island movement. The species that the NPS Wilderness Minimum Requirements Analysis focused on do occur on islands where humans live as well. Loss of some habitat for all of these species on Shackleford Bank will not result in regional extinction for any of them (indeed, many of the species need new habitat created by natural island movement to prosper). If Shackleford Bank is added to the extensive list of barrier islands that have been nourished extensively, the opportunity for education and research on such a naturally dynamic system cannot be regained; it will be gone forever.

Response 2: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the

alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

K. Dr. Charles H. "Pete" Peterson, Alumni Distinguished Professor of Marine Sciences, Biology, and Ecology University of North Carolina at Chapel Hill email dated January 30, 2014

Comment 1: Shackleford Banks is special for many reasons, among which is its relatively natural character on which natural environmental processes can take place without human intervention and gross modification. Consistent with the National Park Service Organic Act, the appropriate management of Shackleford is the let it remain natural so as to highlight natural environmental processes and to protect its rich biological and geological resources. This Organic Act mandate should only be violated when necessary to protect an important cultural or historical resource, such as one of the historic lighthouses. Of all the North Carolina coastal barriers on which I have done research, Shackleford is the only one of these coastal barriers that has not been impacted by substantial beach fill projects. Bogue Banks has been modified along its entire ocean shoreline by numerous beach fill projects, many of which I have studied. Any continuing study of recovery of the Bogue Banks beach ecosystem from the 2001-2 (Phase I)and 2003 (Phase II) major nourishment projects must now establish un-nourished control sites on Shackleford because there is no other remotely similar coastal barrier that has not experienced beach filling. Even Bear Island receives periodic dumps of fine dredge spoils from maintenance dredging of navigation channels, as does Onslow Beach. Now keeping Shackleford undisturbed by this major ecosystem perturbation is a critical scientific and management need so that at least one control system is left against which to measure and judge recovery and to serve as an ecological baseline of what beach ecosystem structure and process should be everywhere in geologically similar settings.

Response 1: At the request of the National Park Service, no beach-quality dredged material will be disposed of on the beaches of Shackleford Banks as part of this DMMP. Therefore the proposed action would not adversely impact the ecosystem on Shackleford Banks. Human intervention has taken place on Shackleford Banks for a number of years. Since the 1970's the USACE has informed the NPS that the Morehead City Harbor navigation project has had a detrimental impact on the natural sediment balance of Shackleford Banks. USACE informed the NPS that in order to correct this manmade impact that sediment should be placed on Shackleford Banks. The NPS indicated that the proposed placement of sediment on Shackleford Banks complies with NPS policy. There are hundreds of miles of North Carolina beaches that have not impacted by beach sediment placement, to name a few; North Core Banks, Middle Core Banks, South Core Banks and portions of Ocracoke and Hatteras Islands.

Comment 2: Both beach nourishment and spoil disposal have a common immediate consequence of killing virtually all of the beach invertebrates, such as coquina clams

and mole crabs, that feed our beach crabs, shorebirds, and surf fishes. The recovery time required for the come-back of these invertebrate populations varies depending on the nature of the sediments used as fill. Matching the natural beach sedimentology, grain size distributions and mineralogical content, especially amount of shell and shell hash, leads to the most rapid recovery, probably requiring about a year. When the fill materials are composed of unnaturally fine (muddy) sediments, this material is eroded off the beach by waves causing periodic outbreaks of turbid waters exceeding the State's water quality standard for turbidity. These muddy water events inhibit visual feeders, like fish (pompano, bluefish, and Spanish mackerel) and seabirds (terns, pelicans, osprey, and gulls). They can also cause further mortality of sensitive marine invertebrates and reduce their growth rates by clogging feeding and respiratory organs. Recovery from beach fill projects using fine sediments is incomplete after a year but probably occurs during the second year after natural sedimentology has been restored through erosion of the excess fines. Finally, beach nourishment using fill comprised of unnaturally coarse sediments, such a shell and shell hash, induces multi-year impacts on the beach sedimentology and biota. The Bogue Banks beaches nourished in 2001/2 and 2003 with excessive coarse shelly materials did not exhibit recovery of natural sedimentology 4 years after nourishment, when our study ended. Similarly, the depression in coquina clams and amphipods on the intertidal beach also showed incomplete recovery after 4 years. Our surveys of shorebirds foraging on those nourished beaches revealed that this persistent multi-year depression of coquina clams and other invertebrate prey and persistent shell cover on the intertidal beach was promulgated upwards to their shorebird predators. This demonstrates that the habitat value of ocean beaches is compromised by beach filling and those effects transfer to shorebirds, a resource of great management concern. Furthermore, we have shown that a surf fish, the Florida pompano, also suffers from dramatic reduction in feeding capacity and rate under conditions of unnaturally high levels of shell fragments in the sediment and under conditions of elevated turbidity. Hence, sustaining the beach habitat and sedimentology is critical to the habitat function and the wildlife of such high value on Shackleford.

Response 2: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Impacts to the placement of sediment on benthic infauna, fish, birds and recovery rates on beach invertebrates on Bogue Banks have been satisfactorily addressed in Sections 4 and 5 of the DMMP. Only 90% or greater sediment will be placed on Bogue Banks beaches and nearshore areas off Bogue and Shackleford Banks. As indicated in Sections 4.1.2 and 5.1.2 Sediment Characteristics and in Table 5-2, the Morehead City Harbor channel sediments placed on the beaches of Bogue Banks are in compliance with the North Carolina Technical standards in grain size and % visual shell. In addition to the sediment grain size analysis, a detailed sediment color analysis was undertaken on both Bogue and Shackleford Banks. Previous USACE studies (see response to comment 76/77) on Brunswick County Beaches and the literature cited indicate that beach placement of 90% or greater sediment has no significant impacts to both fish and bird populations. Moreover these USACE monitoring studies(as well as the literature sited), indicate that recovery times of benthic invertebrates was within a year

of sediment placement on Brunswick County Beaches. In 2005, the Town of Emerald Isle realigned Bogue Inlet, which placed about 300.000 cubic yards of sediment in Bogue Inlet and 710,000 cubic yards of sediment along the beach strand. According to the Final Summary of Infaunal Macroinvertebrate Sampling Events (Carter 2008), the infaunal abundance for all sites combined confirmed that the post-construction infaunal abundance was greater than pre-construction infaunal abundance.

L. Pat McElraft, NC House of Representatives District 13 Carteret and Jones Counties email dated January 9, 2014

Comment 1: I hope you will reconsider taking sand from the dredged material which has been promised to Bogue Banks in a Gentleman's agreement to this point and using it for an undeveloped island, Shackelford Banks. It is my understanding that you are working with Carteret County and our Beach Commission to establish a mutually agreeable plan to mitigate the dredging in the MHC harbor on our Bogue Banks Beaches. I appreciate very much the cooperation we have received from the Corps and I was quite surprised to see that almost 40% of the promised sand in the interim agreed to plan will be used for other than the Bogue Banks area. It makes no sense to me to use good sand to put on an island that is natural and uninhabited and take the sand away from a developed area of the beach that is eroding due to the dredging of the channel. Please reconsider these plans. The beachfront properties of Atlantic Beach are a critical tax revenue producer to be used for our schools and other tax supported items in Carteret county. If you take away the expected amount of sand by 40% this will not give us enough sand to protect the properties that are threatened due to the dredging of the MHC channel.

Response 1: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Under the proposed plan the base beach disposal area on Bogue Banks will be a portion of Ft. Macon and the entirety of Atlantic Beach. The plan proposes sufficient disposal quantities to compensate for any losses that may result from dredging the adjacent navigation channel. In addition, any excess material beyond what would have been necessary to satisfy the nourishment requirements along the western end of Shackleford Banks would have been available for placement along Pine Knoll Shores. With only Bogue Banks receiving material, the island has and will continue to receive more material than necessary to offset the impacts of the navigation channel.

M. The following individuals have sent the same email dated January 26. 2014: William Thomason, Mrs. Jane (Gilbert M.) Thomason, and Barry and Trudy Kritt.

Comment 1: The U.S. Army Corps of Engineers (Corps) and the National Park Service are proposing to place dredged material from the Morehead City Harbor project on

Shackleford Banks, which has long been managed as a wilderness area. This unprecedented disruption of the undeveloped Shackleford Banks ecosystem is a bad idea for several reasons: Shackleford Banks is an undisturbed ecosystem that should be allowed to remain in a natural state. Disposal of dredged material on the island has significant potential to adversely impact the undisturbed ecosystem of Shackleford Banks due the use of heavy mechanized equipment, addition of sand, and nighttime lighting.

Response 1: Although the Corps continues to recommend beach-quality dredged material disposal on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 2: As recognized by DMF, beach and nearshore disposal on Shackleford Banks could have "significant impacts on fish habitat" and "could disrupt the local food web." DMF has said it "sees no justification for the amount of disturbance that would be caused by including Shackleford Banks as a disposal area." (DMF Comments, May 31, 2011).

Response 2: The NCDMF letter dated May 31, 2011 was in response to the USACE scoping letter, prior to completion of the draft DMMP and has been superseded by the NCDMF comments on the draft DMMP. The NCDMF comments are being addressed through the NC Division of Coastal Management's Federal Consistency process. Also, at the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 3: The federal plan would reduce by almost half the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses, including the most visited state park. The property values for Atlantic Beach total $1,709,259,545, of which $622,780,775 represents ocean front property.

Response 3: The federal plan would reduce by almost half the amount of sand available for renourishment of Bogue Banks, where it is needed to protect valuable investments in infrastructure as well as recreational uses, including the most visited state park. The property values for Atlantic Beach total $1,709,259,545, of which $622,780,775 represents ocean front property.

Comment 4: Fort Macon is an important historic landmark and the most visited state park in North Carolina and could be adversely impacted by the federal plan.

Response 4: We disagree that the DMMP would adversely impact Ft. Macon. Dependent on funding and availability of contractors, the recommended plan (see Table 3-28), would result in up to 1.2 million yards of sediment being disposed on Fort Macon and Atlantic Beach every three years. This volume of dredged material more than

offsets the annual erosion rate of approximately 219,000 cubic yards per year **within** the area of inlet influence, which includes all erosion, not just erosion caused by maintaining the navigation channel.

Comment 5: The federal plan will likely result in most of the sand being placed at Fort Macon and eastern Atlantic Beach where it will be rapidly transported back to the channel, providing almost no benefit to western Atlantic Beach and other communities west. It is critical for a sufficient quantity of sand to be placed west of the nodal point where it will provide protection for Atlantic Beach and other communities to the west.

Response 5: The base disposal area includes a portion of Ft. Macon and the entirety of Atlantic Beach, the majority of which is west of the nodal point (Section 3.2.2). The DMMP does not specify the quantity to be placed as that will be determined based on monitoring results and available funding.

Comment 6: While erosion is occurring at the western tip of Shackleford Banks due to the navigation project, the affected area is limited and there is no evidence that this loss adversely affects any ecological function on Shackleford Banks or threatens the wilderness and recreational uses made of the island.

Response 6: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Comment 7: The area being lost to erosion didn't exist 50 years ago but was created by relatively recent buildup of sand at the west end of Shackleford.

Response 7: Volumetric analysis of the cross-shore profiles along the western end of Shackleford Banks show the island has eroded since our earliest available survey in 1991. Much of this material is being transported into the navigation channel and most likely is contributing to the elongation of the Shackleford spit. The proposed disposal area was selected to balance the need to provide a sediment source for material to naturally move into the western area of Shackleford Banks while minimizing the impact on dredging requirements. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. It was never the intent of the plan to nourish or attempt to stabilize the spit which has grown into the navigation channel. Reference Section 3.2.2 "Beach Disposal".

Comment 8: Because Shackleford is undeveloped, and will never be developed, there is no threat to buildings or other infrastructure due to beach erosion.

Response 8: Noted.

Comment 9: The most critical area of erosion at Shackleford is the western tip. However, if dredged material is placed in this area, it will be rapidly transported back into the channel. The federal agencies are therefore not even proposing to place

dredged material in this area. Instead, they propose to place the material in the middle of island, where there is not a significant erosion problem and where the dredged material will do little to mitigate the area that the navigation project has most significantly impacted (western tip).

Response 9: Volumetric analysis of the cross-shore profiles along the western end of Shackleford Banks show the island has eroded since our earliest available survey in 1991. Much of this material is being transported into the navigation channel and most likely is contributing to the elongation of the Shackleford spit. The proposed disposal area was selected to balance the need to provide a sediment source for material to naturally move into the western area of Shackleford Banks while minimizing the impact on dredging requirements. At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. It was never the intent of the plan to nourish or attempt to stabilize the spit which has grown into the navigation channel. Reference Section 3.2.2 "Beach Disposal".

Comment 10: For the reasons discussed above, we do not favor any disposal of dredged material at or offshore of Shackleford Banks and strongly oppose the preferred alternative set forth in the draft DMMP.

Response 10: Noted.

N. Brian Kramer, Town Manager for Pine Knoll Shores email dated January 28, 2014.

Comment 1: Pine Knoll Shores does not support the Dredged Material Management Plan as written.

Response 1: Noted.

Comment 2: The Plan will place unneeded sand on Shackleford Banks and fails to address the problem at the western tip of Shackleford Banks

Response 2: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Volumetric analysis of the cross-shore profiles along the western end of Shackleford Banks show the island has eroded since our earliest available survey in 1991. Much of this material is being transported into the navigation channel and most likely is contributing to the elongation of the Shackleford spit. The proposed disposal area was selected to balance the need to provide a sediment source for material to naturally move into the western area of Shackleford Banks while minimizing the impact on dredging requirements. It was never the intent of the plan to nourish or attempt to stabilize the spit which has grown into the navigation channel. Reference Section 3.2.2 "Beach Disposal".

Comment 3: The plan fails to mitigate the adverse effects of Port dredging on Bogue Bank's beaches

Response 3: The plan fails to mitigate the adverse effects of Port dredging on Bogue Bank's beaches

Comment 4: The Plan fails to ensure that the sand that is placed on Bogue Banks is far enough to the west to avoid it rapidly migrating back into the channel.

Response 4: The locations of the base disposal area will be monitored and if needed the east end could be moved west in the event significant erosion along the beach or increased shoaling within the channel is observed.

Comment 5: Another major shortfall of the Plan is the inability of Pine Knoll Shores to have the opportunity to participate as a Non-Federal Partner in a future project. This omission from the DMMP needs to be corrected.

Response 5: One of the main objectives of the DMMP is to keep material dredged from the navigation channel in the Beaufort Inlet complex. Disposal of dredged material from the navigation channel west of station 59 on Bogue Banks (Figure 3-9 Proposed Bogue Banks Disposal Area) would remove material from the inlet complex, potentially increasing delta deflation and for this reason would not be acceptable.

Comment 6: Section 3.2 and Section 9 of the Plan states: It is the policy of USACE that all dredged material management studies include an assessment of potential beneficial uses for environmental purposes including fish and wildlife habitat creation, ecosystem restoration and enhancement and/ or hurricane and storm damage reduction. This DMMP attempts to maximize beneficial uses of dredged material within the requirements of the federal standard. The Plan does not come close to maximizing hurricane/storm damage reduction. In fact it is not even addressed. Sand is not being placed in the most beneficial location to protect life and property. Further, in the criteria used as outlined on page 128, it is clear that you violated your own planning principle and did not even consider hurricane storm damage reduction in your decision making process. Potential impacts from the project on the beaches and ebb tide delta, and the potential to provide wildlife habitat and ecosystem restoration were considered ..... but there is no mention whatsoever of hurricane storm damage reduction. Also, there is no mention of protection of property from storms. This is wrong.

Response 6: Although, DMMPs should include an assessment of potential beneficial uses, nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigability priorities. Dredged material quantities will be subject to navigation priorities and the limitations of available funding for dredging the navigation channel and will fluctuate from year to year; therefore disposal for beneficial uses may only be considered as long as those uses meet the federal standard (least cost,

environmentally acceptable and engineeringly sound). The prime objective of the MHC DMMP, besides ensuring that there is adequate disposal capacity for at least the next 20 years, is to offset the impacts of the navigation channel on the Beaufort Inlet system. For this reason, sand from the navigation channel must remain within the Area of Inlet Influence and the pumping distance for disposal must be cost effective. Any dredged material in excess of the amount required to offset navigation channel impacts (on Bogue Banks only since NPS has requested that no can be disposed of on Shackleford Banks) will be placed on Fort Macon and Atlantic Beach. Disposal of sand farther west, beyond Atlantic Beach, is not cost effective and disposal outside the Area of Inlet Influence is not engineeringly sound or cost effective. Likewise, continuing to return sand to one side of the inlet, when both sides are losing sand, is not a good long-term engineering practice. The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7, which does not require a cost/benefit analysis. Compiling property data and calculating costs vs. benefits is beyond the scope and authority of a DMMP; however, a detailed cost/benefit analysis for coastal storm damage reduction at Bogue Banks is included in the Bogue Banks feasibility report (Feasibility Report and Environmental Impact Statement, Coastal Storm Damage Reduction, Bogue Banks, Carteret County, NC, April 2014).

O. Rick Poillon, Atlantic Beach Town Council Member email dated January 27, 2014.

Comment 1: The most disappointing aspect of this whole charade is that the ACE, an arm of the federal government, held an "Open" meeting yet refused to listen to the citizens you are supposed to serve. Why? Because you only want your side to be heard, which essentially ignores any empirical data from the citizen side of the debate.

Response 1: The National Environmental Policy Act (NEPA) process allows agencies, at their discretion, to elect to hold public hearings or public meetings about proposed actions; agencies may also elect not to hold any meeting or hearing. The USACE and NPS elected in this case to hold a public meeting on January 15, 2014 in Beaufort, NC, during the comment period for the Draft DMMP/EIS. A public meeting format has been successfully used by both agencies in the past to provide information to the public regarding proposed actions, with the expectation that these meetings help the interested public understand the project better, so that comments to the agencies can be more thorough and based on an accurate understanding of the proposed action. In this case, a public meeting was preferred, in part because there appeared to be some misunderstandings about the project (particularly related to the dredging cycle, the split of sand disposal between Bogue Banks and Shackleford Island, and the National Park Service's responsibilities and missions related to Shackleford Banks erosion). The meeting was designed to allow for each agency to present a brief overview of the plan as it affected each agency's mission, and included small informational exhibits with agency experts that could engage the public in dialogue regarding different facets of the proposed action. The agencies regret the misunderstanding that occurred when the Carteret County Beach Commission publicized the public meeting as a public hearing, and erroneously reported that oral comments were being solicited. The Beach Commission chose to provide this erroneous publicity without first contacting either

agency to confirm the details of the meeting. The public meeting was held as scheduled, was well-attended, and had the desired effect of encouraging many written comments from the public on the DMMP/EIS.

P. Harry Simmons, Executive Director, NC Beach, Inlet and Waterway Association letter dated January 30, 2014

Comment 1: We fully support the U.S. Army Corps of Engineers (Corps) beneficial reuse of dredged material and believe it to be a necessary component of the Corps' navigation projects. NCBIWA, however, does not support disposal of dredged material at Shackleford Banks.

Response 1: Following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to place dredged material on Shackleford Banks during the time span of this proposed DMMP; therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP.

Q. Susan Schmidt, PhD email dated January 23, 2014

Comment 1: So, if Shackleford is losing sand due to natural processes and as sea level is rising, its future is bleak. Rather than watch nature, I would rather intervene to prolong the island's existence. But beach nourishment requires that the sand be appropriate for the place. Primarily, the grain-size (definitely the mean grain size, what the engineers call "D_{50}") and probably the sorting should be very close to that of the sediments on the natural beach. Slightly coarser may be a bit better. One problem is the borrow area from which the sand is taken. The dredging-transporting-distributing processes may kill all indwelling fauna, and the new surface of the borrow area is relatively barren, no longer providing food for fish etc. Fortunately, sandy bottoms tend to repopulate. In this case, though, the source is not a problem -- the channel will be dredged. However, just because the sand to nourish the island is "free," by-product of the dredging, doesn't mean it's appropriate for Shackleford—What is the grain size, is it contaminated with byproducts of the harbor and shipping? Given that most of the channel fill probably came off Atlantic Beach and Shackleford, it's likely that the grain size is ok.

Response 1: At the request of the National Park Service, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. Sections 4.1.2 and 5.1.2 in the DMMP discuss the sediment characteristics (grain size, color, etc.) of the beaches and sediment that is proposed to be placed on Bogue Beach and the nearshore areas.

4. Representative Public Comments.

The USACE received over 220 emails and letters during the public review comment period for the Draft Morehead City Harbor Integrated Dredged Material Management Plan (DMMP) and Environmental Impact Statement. The National Environmental Policy Act (NEPA) provides guidance regarding responding to comments received on the Draft Environmental Impact Statement (EIS) in 40 CFR 1503.4. Additionally, according to CEQ's "*A Citizen's Guide to the National Environmental Policy Act Having Your Voice Heard*" states the following: *Commenting on the DEIS is not a form of "voting" on an alternative. The number of negative comments an agency receives does not prevent an action from moving forward. Numerous comments that repeat the same basic message of support or opposition will typically be responded to collectively*.

Pursuant to 40 CFR 1503.4 and ER 200-2-2 19 (c), District commanders will avoid lengthy or repetitive verbatim reporting of comments and will keep responses clear and concise. Duplicative comments will be combined into a single category and responded to once in the Final EIS.

Due to the number and repetitiveness, these representative comments received were categorized into the below categories. Responses are provided by category. An index of commenter and comment category is provided at the end of this appendix. These comments are not included in Appendix D Public and Agency Correspondence .

L.1 General Comment. Statement of opposition or support for the DMMP recommended plan.

Comment 1: "I am for or against the placement of dredged material on Shackleford Banks."

Response 1: Although the Corps continues to recommend disposal of beach-quality dredged material on both Bogue Banks and Shackleford Banks, following public review of the draft DMMP, the National Park Service (NPS) requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of this proposed DMMP. Therefore, no beach-quality dredged material will be disposed of on Shackleford Banks as part of this DMMP. All comments opposing or supporting sediment disposal on Shackleford Banks were placed in this category.

L.2 Impacts of the DMMP on Bird Shoal, Middle Marsh, Beaufort Inlet Flood Tide Delta, and Rachel Carson Reserve in the Beaufort area.

Comment 2: "The continued maintenance dredging of the Morehead City Harbor navigation channels may have an adverse impact on Bird Shoal, Middle Marsh, Beaufort Inlet Flood Tide Delta, and/or Rachel Carson Reserve in Beaufort. This is unacceptable!"

Response 2: The proposed Morehead City Harbor DMMP will not have any adverse impact on the Bird Shoal, Middle Marsh, Beaufort Inlet Flood Tide Delta, and/or Rachel Carson Reserve in the Beaufort area since there will be no physical changes in any

Morehead City Harbor channel alignment, width, or depth. No deepening, widening, and/or any change in any Federal channel alignment are proposed for the DMMP.

L. 3 Effects of placing less beach compatible sediment on Bogue than is currently being placed.

Comment 3: “”Concerns that an adequate amount of beach quality sand is available for maintaining Bogue Banks beaches, which are vital to Carteret County’s tourism industry.”

Response 3: The DMMP dredged material volumes fully restore Atlantic Beach and Fort Macon Beach to the condition of the beach at the start of the previous dredging cycle. A shortfall of funding could impact dredged material quantities disposed on the beaches as there may not be sufficient sediment dredged to replace the measured quantities lost (note that losses occur due to natural erosion and storms and not just as a result of channel maintenance).

L. 4 Effects of placement of sediment in the nearshore area off Shackleford Banks.

Comment 4: “I am against the placement of maintenance material in the proposed nearshore area off Shackleford Banks.”

Response 4: In Section 3.2.4 Ebb Tide Delta in the DMMP, the USACE clearly explains that from 1974 to 2009, the Beaufort Inlet Ebb Tide Delta deflated due to erosion. Placement of coarse-grained sediment in both the nearshore areas off Shackleford and Bogue Banks will keep the material dredged from the navigation channel within the littoral system and ameliorate the overall deflation impacts within the Beaufort Inlet Ebb Tide Delta. Therefore the proposed placement of coarse grained sediment within the Shackleford Banks nearshore area will benefit the overall Beaufort Inlet Ebb Tide Delta. No adverse impacts are anticipated.

The DMMP recommended plan is to dispose of dredged material in the nearshore area off Shackleford Banks (Figure 3-26 in the DMMP) in years 2 and 3 of the DMMP cycle. The proposed 1,094 acre nearshore area off Shackleford Banks is about 1.0 mile from the Inlet, in water depths from -16 to -36 feet, and about 1,500 feet offshore. Only coarse-grained material (greater or equal to 90% sand) would be placed in this proposed nearshore area and only from January 1 to March 31 of any year.

L.5 The DMMP is a 20-year disposal plan; not beach nourishment.

Comment 5: “The Corps should continue beach nourishment activities on Bogue Banks.”

Response 5: A clear distinction needs to be made between beach renourishment and beach disposal. Beach renourishment is the placement of beach quality sand on a beach area for the purpose of building the beachfront area to a specific template or design, whereas beach disposal refers to use of a designated beach area for the disposal of dredged material from a navigation channel. In the case of Bogue Banks,

the Corps of Engineers does not propose to renourish the beach, but may dispose of beach quality sediment from the Morehead City Harbor navigation channel on Bogue Banks. Nothing in the DMMP should be read to suggest that material will be dredged for the purpose of disposal on the beaches or in the nearshore, or for any purpose other than addressing navigability priorities.

L. 6 Major economic benefits of placing sand on Bogue Banks beaches.

Comment 6: "The property values for Atlantic Beach total $1,709,259,545, of which $622,780,775 represents ocean front property. Continued placement of dredged management sediment on Bogue Banks is needed to protect valuable public and private investments in infrastructure." Additionally, "The tourism revenues generated by Bogue Banks beaches provide the lifeblood of Carteret County and fuel the local economy."

Response 6: The DMMP has been developed in accordance with Engineering Regulation (ER) 1105-2-100 and 33 C.F.R. § 335.7, which require a 20-year dredged material disposal plan that includes disposal options that are least cost, environmentally acceptable, and engineeringly sound. A cost/benefit analysis is not required that considers property values for Bogue Banks and/or Carteret County. Additionally, tourist revenues generated by the Bogue Banks beaches in Carteret County were also not considered for the Morehead City Harbor DMMP. Neither property values nor tourism revenue is a requirement for the development of the DMMP.

L. 7 Comments regarding the USACE restricting oral public comments during the January 15, 2014 public meeting/informational session at the Duke Marine Lab on Pivers Island in Beaufort, NC.

Comment 7: "The "meeting," with no allowance for public questions or comments, was a disappointment."

Response 7: The National Environmental Policy Act (NEPA) process allows agencies, at their discretion, to elect to hold public hearings or public meetings about proposed actions; agencies may also elect not to hold any meeting or hearing. The USACE and NPS elected in this case to hold a public meeting on January 15, 2014 in Beaufort, NC, during the comment period for the Draft DMMP/EIS. A public meeting format has been successfully used by both agencies in the past to provide information to the public regarding proposed actions, with the expectation that these meetings help the interested public understand the project better, so that comments to the agencies can be more thorough and based on an accurate understanding of the proposed action. In this case, a public meeting was preferred, in part because there appeared to be some misunderstandings about the project (particularly related to the dredging cycle, the split of sand disposal between Bogue Banks and Shackleford Island, and the National Park Service's responsibilities and missions related to Shackleford Banks erosion). The meeting was designed to allow for each agency to present a brief overview of the plan as it affected each agency's mission, and included small informational exhibits with agency experts that could engage the public in dialogue regarding different facets of the proposed action. The agencies regret the misunderstanding that occurred when the

Carteret County Beach Commission publicized the public meeting as a public hearing, and erroneously reported that oral comments were being solicited. The Beach Commission chose to provide this erroneous publicity without first contacting either agency to confirm the details of the meeting. The public meeting was held as scheduled, was well-attended, and had the desired effect of encouraging many written comments from the public on the DMMP/EIS.

L 8 Shoreline Erosion on Bogue Banks outside the project area (i.e., Fort Macon State Park and Atlantic Beach).

Comment 8: "Since shoreline erosion continues on Bogue Banks, the Corps should place sediment on the beaches of Indian Beach/Salter Path, and Emerald Isle." Additionally some commenter's have suggested that the Corps should place beach compatible sediment along the beaches of Pine Knoll Shores.

Response 8: On Bogue Banks, the Beaufort Inlet Influence Area extends from Ft. Macon to Pine Knoll Shores (Sections 3.2.2 and 3.2.4 in the DMMP). Placement of sediment on the beaches of Indian Beach/Salter Path and Emerald Isle would be outside of the Beaufort Inlet Influence Area and would cause further deflation of the Beaufort Inlet Ebb Tide Delta. This would result in an adverse impact to the ebb tide delta.

Beach compatible material (90% or greater sand) will continue to be placed along the beach strand of Fort Macon State Park, Town of Atlantic Beach, and if there is sufficient material (see Section 3.4.2 Beach Disposal) on the beaches of Pine Knoll Shores. Additionally (see also USACE response L 3, above), any placement of beach compatible sediment on the beaches of Pine Knoll Shores would be subject to the availability of funds.

L 9 Sediment Analysis.

Comment 9: "Will any sediment from the Morehead City Inner Harbor channels (i.e., turning basin, East Leg, Northwest Leg, and West Leg 1 and 2) be placed on Bogue Banks?" "Will the sediment placed on the beaches of Bogue Banks and the nearshore areas off Bogue and Shackleford Banks be suitable for people and marine life?"

Response 9. No sediment from the Morehead City Harbor Inner Harbor channels will be placed on any beaches or nearshore areas in the project area. Sediment dredged from the Inner Harbor channels will either be placed in the existing Brandt Island upland diked disposal area or transported offshore and placed in the Morehead City ODMDS. Only 90% or greater coarse sand will be placed on the beaches of Bogue Banks and the nearshore areas off Bogue and Shackleford Banks. Figure 2-2 in the FEIS depicts the channel locations where this sediment is located. The dredged sediment is characterized by grain size and color in sections 4.1.2 and 5.1.2. The USACE believes that dredged material from the portions of Range C, Range B, the Cutoff, and Range A (to station 110+00) is compatible with the proposed disposal and placement areas and will not result in adverse impacts.

Index Notes: The representative comment emails and letters mentioned in the following index provide each individual's name (last name and first initial) and the comment category response. For example, if John Smith (i.e., Smith, J) sent an email opposing sand disposal on Shackleford Banks, because there was a greater need for disposal on Bogue Banks for renourishment purposes, the USACE, Wilmington District's response would be L 1 (NPS has requested that no sand be disposed of on Shackleford Banks) and L 5 (The DMMP is a 20-year plan for disposal of maintenance dredged material from the navigation channel, not a renourishment plan).

Index of Representative Comments. Responses to these comments are identified as L1 to L9.

Count	Commentor Last Name, Initial		Comment Category (See Appendix L)
1	Anoyes	40	L1, L9
2	Aiken	L	LI
3	Andrews	O	L1, L6
4	Archie	J	L1
5	Archie	S.	L1
6	Bailey	A	L1
7	Barbee	B	L1, L5, L6
8	Barbee	B	L1
9	Barden	G	L1
10	Barondes	M	L1, L6
11	Baum	G	L1, L6
12	Beaman	J	L1, L3
13	Bergman	B	
14	Berryman	R	L1, L9
15	Bibey-Bailey	L	L1
16	Bland	P	L1, L6
17	Bohlen	S	L1
18	Borreson	C	L1, L5, L6
19	Bradley	C	L1, L3, L5, L6
20	Bradley	D	L1, L6
21	Brewer	W	L1
22	Brooks	D.	L1
23	Brown	A	L1
24	Bryant	R	L1
25	Burnette	A	L1, L5, L6
26	Burns	C.	L1, L6
27	Burns	K	L1, L6
28	Butler	P	L1, L5, L6
29	Camnitz	J	L1
30	Carlisle	S	L1, L5, L6
31	Carraway	L	L1
32	Castleberry	R	L1, L5, L6
33	Church	R.	L1, L6
34	Coats	K	L1, L6
35	Comer	J	L1, L3, L5
36	Conway	W	L1
37	Cook	W	L1
38	Costlow	G	L1, L9
39	Cranford	J	L1
40	Crawford	E	L1, L6
41	Creelman	B	L1
42	Davenport	J	L1
43	Davis	E	L1
44	Davis	G	L1, L5
45	Denike	J	L1
46	Diemer	J	L1, L8
47	Dowdy	D	L1
48	Earp	S	L1, L6
49	Ebken	R	L1
50	Eckholdt	S	L1, L5, L6
51	Esarey	C	L1
52	Evans	G	L1, L3, L5
53	Evans	J	L1
54	Fader	C	L1
55	Fennell	M	L1, L4, L6
56	Fenwick	J	L1, L6, L8
57	Fielding	M	L1
58	Fields	R	L6, L7
59	Fishel	A	L1, L6
60	Franklin	A	L1
61	Frantz	E	L1, L3, L5, L6
62	Freeman	L	L1, L6

Count	Commentor Last Name, Initial		Comment Category (See Appendix L)
63	Funk	R	L1
64	Gardner	F	L1, L6
65	Gaskill	S	L1
66	Gilbert	J	L1
67	Gilstrap	R	L1, L3, L6
68	Gorham	H	L1, L6
69	Gorin	B	L1, L5
70	Gould	J	L1
71	Green	A	L1L5, L9
72	Griffin	P	L1
73	Griffin	S	L1, L6
74	Griffin	T	L1, L6, L7
75	Griggs	A	L1
76	Grignolo	A	L1, L3, L6
77	Grizzard	W	L1, L5
78	Guthrie	D	L1
79	Gyure	M	L1, L6
80	Hackney	S	L1, L5, L6
81	Hackney	T	L1, L5, L6
82	Hagle	J	L1
83	Haire	T	L1
84	Hamilton	G	L1
85	Hamrick	M	L1
86	Hardy	D	L1
87	Harmon	S	L1, L6
88	Harper	B	L1
89	Hedrick	T	L1
90	Heist	R	L1
91	Herford	R.	L1
92	Hesmer	R	L1
93	Hibbits	F	L1
94	Hill	T	L1
95	Hogue	C	L1
96	Horton	J	L1, L6
97	Howard	H.	L1, L5, L6
98	Inscoe	M	L1
99	Jaconis	R.	L1
100	James	E	L1, L5
101	Jernigan	E	L1, L6
102	Johnson	D	L1, L8
103	Jones	S	L1
104	Justice	W	L1
105	Kasselt	M	L1
106	Kincheloe	W	L1, L6
107	King	F	L1
108	King	C	L1
109	Kittrell	J	L1
110	Knish	B	L1
111	Koppleman	A	L1, L3, L6
112	Kraus	J	L1, L2
113	Kritt	B	L1, L4
114	Lanier	G	L1, L6
115	Larson	V	L1, L6
116	Lasitter	A	L1, L5, L9
117	Leonard	B	L1, L5, L6
118	Letchner	C	L8
119	Levey	M	L1
120	Lewis	T	L1
121	Lilly	J	L1
122	Llewellyn	C	L1, L9
123	Lyons	M	L1, L4
124	MacDonald	H	L1

Index of Representative Comments (continued).

Count	Commentor Last Name, Initial		Comment Category (See Appendix L)
125	Maruna	L	L1
126	McAlpin	J	L1, L3
127	McCaffity	C	see Larry Baldwin letter
128	McCullough	D	L1, L3, L5
129	Mercer	N	L1
130	Merrell	C	L1
131	Michaels	M	L1
132	Minor	M	L1, L5
133	Mitchell	C	L1
134	Mohorn	L	L1, L5, L6
135	Moore	P	L1, L3, L6, L8
136	Morris	C.	L1, L5, L6
137	Morris	K.	L1, L6
138	Murphy	J	L1
139	Neely	C.	L1
140	Nelson	H	L1
141	Neptune	J	L1, L6
142	Newton	E	L1, L2
143	Nicholas	T	L1
144	Nicholson	B	L1
145	Noyes	A	L1, L9
146	Oehl	M	L1, L5, L6
147	Packard	S	L1
148	Parker	H	L1
149	Payne	H	L1
150	Pelley	C	L1, L6
151	Perry	D.	L1
152	Phillips	R	L1, L5, L6
153	Poillon	R	L7
154	Price	B	L1
155	Purrington	J	L1
156	Ramsey	S	L1
157	Randall	J	L1, L5, L6
158	Rehnlund	R	L1, L5, L6
159	Riches	L.	L1, L6
160	Ricks	K	L1
161	Robinson	S	L1, L6
162	Rogers	C	L1
163	Rogers	P	L1
164	Rohrbough	S	L1
165	Roney	B	L1, L3, L6
166	Rose	M	L1
167	Rose	M	L1
168	Royall	J	L1
169	Rule	W	L1, L2
170	Rynerson	B	L1, L3
171	Sadiston	C	L1
172	Sage	R	L1
173	Scott	E	L1
174	Sebastian	M	L1, L6
175	Sessoms	F	L1
176	Simmons	K	L1, L2
177	Smith	S	L1, L2
178	Stanley	W	L1, L5, L6
179	Stowe	D	L1, L3
180	Strickland	D	L1, L6
181	Stroud	T.	L1
182	Sugg	E	L1
183	Sutton	F	L1
184	Taft	B	L1, L3
185	Tarascio	J	L1, L5
186	Taylor-Butler	P	L1, L6
187	Thomason	J	L1, ;L6

Count	Commentor Last Name, Initial		Comment Category (See Appendix L)
188	Thomason	W	L1, L6
189	Toms	J	L1
190	Trent	B	L1, L6
191	Tucker	A	L1, L5, L6
192	Van Buren	J	L1, L9
193	Van Dessel	J	L1, L6
194	Vanover	S	L1
195	Walker	J	L1
196	Walker	J	L1
197	Wall	B	L1, L6, L8
198	Waller	J	L1
199	Warholak	T	L1
200	Washburn	K	L1, L6
201	Watkins	B	L1
202	Weaver	M	L1, L3, L5, L6
203	Webster	P	L1, L6
204	Weeks	R.	L1, L5, L6
205	Weirick	K	L1
206	Wesler	L	L1
207	Wheeler	D	L1
208	White	T	L1, L6
209	Whitehurst	H	L1, L3, L5, L6
210	Whitford	J	L1, L6
211	Whitlock	K	L1
212	Wiggins	G	L1
213	Wiggins	M	L1
214	Willard	C	L1
215	Willard	C	L1, L3
216	Williams	C	L1
217	Williams	J	L1, L5, L6
218	Williamson	G	L1, L6
219	Wolf	W	L1, L3, L6
220	Wolf	D	L1, L5, L6
221	Woodward	G	L1, L6, L9
222	Wunderly	B	L1, L6
223	Young	W	L1
224	Younts	D	L1

APPENDIX M

AGENCY TECHNICAL REVIEW (ATR)
OF
DRAFT DMMP AND EIS

Completion of Agency Technical Review

MOREHEAD CITY HARBOR DMMP

Wilmington, North Carolina

May, 2010

Wilmington District has completed the dredged material management plan for the Morehead City Harbor Navigation Project. Notice is hereby given that an Agency Technical Review (ATR) has been conducted that is appropriate to the level of risk and complexity inherent in the project. The dredged material management plan (DMMP) was reviewed for compliance with established principles and procedures, using clearly justified and valid assumptions. Further, methods and procedures were reviewed to determine the appropriateness, correctness, and reasonableness of results, including determination of whether the plan meets the customer's needs consistent with law and existing United States Army Corps of Engineers policy.

An independent technical review team composed of members from, Honolulu, Mobile, and Walla Walla Districts performed the review. The Deep Draft Navigation Planning Center of Expertise (DDNPCX) managed the conduct of this review using the DrChecks software. The ATR was initiated on 29 March 2010, and completed on 21 May 2010. A complete copy of the final comment report from DrChecks is enclosed.

The ATR team placed 101 comments in DrChecks. After evaluations were completed by the Project Delivery Team (PDT), there were 15 "NonConcur" during the Backcheck by the ATR team. Coordination between the ATR team and PDT on the areas of concern resulted in satisfactory resolution of these comments. All of the review comments and evaluations are found in the attached ProjNet Report.

The Cost DX at Walla Walla has certified the costs in the report. The overall report has been fully reviewed, and all associated documentation required by the National Environmental Policy Act has been complied with. We certify that the DMMP for the Morehead City Harbor Navigation Project ATR was performed as required by Engineer Circular (EC) 1165-2-209, Civil Works Review Policy, dated 31 January 2010.

Bernard E. Moseby
Deputy Director
Deep Draft Navigation
Planning Center of Expertise

Enclosure

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
SOUTH ATLANTIC DIVISION
60 FORSYTH STREET SW, ROOM 10M15
ATLANTA, GA 30303-8801

REPLY TO
ATTENTION OF

CESAM-PD-D (1105-2-40a) 8 November 2012

MEMORANDUM FOR MS. JENNIFER OWENS (CESAW-TS-PE) U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT, 69 DARLINGTON AVENUE, WILMINGTON, NORTH CAROLINA, 28402-1890

SUBJECT: Certification and Completion of Agency Technical Review, Morehead City Harbor Draft Integrated Dredging Material Management Plan and EIS

1. References:

a. EC 1165-2-209, Civil Works Review Policy, 31 January 2010

b. EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011

c. Memorandum, CECW-CP, 30 March 2007, Subject: Peer Review Process

d. Supplemental information for the "Peer Review Process" Memo, dated March 2007

2. In accordance with EC 1165-2-209, "Civil Works Review Policy," dated 31 January 2010, Final Agency Technical Review (ATR) of the Draft Dredging Material Management Plan (DMMP) and Environmental Impact Statement (EIS) dated August 2012, has been coordinated with and executed through the Deep Draft Navigation Planning Center of Expertise (DDNPCX).

3. ATR comments were posted in DrChecks, evaluated by the Project Delivery Team (PDT), and back checked and closed out by the ATR team for incorporation into the DMMP. The cost engineering products supporting the DMMP (estimates, schedules, risk analyses and cost roll-ups) were formally and successfully ATRd by the Cost Engineering MCX and no significant outstanding issues or concerns were found. The DDNPCX point of contact is Mr. Johnny L Grandison, CESAM-PD-D, (251) 694-3804.

for Johnny L Grandison

BERNARD E. MOSEBY
Technical Director, DDNPCX

Encls

CF:
CESAD-PDS/PAYNES
CESAD-PDS/STRATTON
CESAD-PDS/SMALL

APPENDIX N

REAL ESTATE APPENDIX

Morehead City Harbor
Morehead City, NC

Integrated Dredged Material Management Plan and Environmental Impact Statement

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SECTION 1. THE REAL ESTATE REPORT

1.1 Statement of Purpose

This report is tentative in nature, focuses on the Tentatively Selected Plan, and is to be used for planning purposes only. There may be modifications to the plans that occur during Pre-construction, Engineering and Design (PED) phase, thus changing the final acquisition area(s) and/or administrative and land cost. The Real Estate Appendix is intended to support the Dredged Material Management Plan (DMMP) and Environmental Impact Statement for Morehead City Harbor, Morehead City, NC. The author of this report is familiar with the Project area. The state of North Carolina is the non-Federal sponsor for the project. Date of this report is July 2015.

1.2 Study Authority

The U. S. Army Corps of Engineers (USACE) Appendix E-15 of ER 1105-2-100 provides that a DMMP be developed for federal navigation projects if a Preliminary Assessment does not demonstrate sufficient capacity to accommodate maintenance dredging for the next twenty years. The DMMP is a planning document that ensures maintenance-dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, and are economically justified. A DMMP addresses dredging needs, disposal capabilities, capacities of disposal/placement areas, environmental compliance requirements, potential for beneficial use of dredged material and indicators of continued economic justification. Beneficial use is defined as utilizing dredged sediments as resource materials in productive ways. Dredged Material Management Plans ensure that sufficient placement capacity is available for at least the next 20 years and should be updated periodically to identify any potentially changed conditions.

In addition to ER 1105-2-100, three Policy Guidance memoranda provide additional guidance regarding the preparation of DMMPs. They are: 1) Policy Guidance Letter (PGL) No. 40, dated March 1993, Development and Financing of Dredged Material Management Studies; 2) PGL No. 42, dated March 1993, Additional Guidance on Financing of Dredged Material Management Studies and 3) PGL No. 47, dated April 1998, Cost Sharing for Dredged Material Disposal Facilities and Dredged Material Disposal Facility Partnerships.

1.3 Project Location

Morehead City Harbor is a federal navigation project located in the Town of Morehead City, North Carolina, approximately 3 miles from the Atlantic Ocean through Beaufort Inlet (Figure 1.3-1). The authorized Morehead City Harbor project is divided into two parts: The deep draft portion and the shallow draft portion. As shown on Figure 1.3-2, the deep draft portion consists of three main ranges or sections: the Inner Harbor, which includes the Northwest, West, and East Legs and North Range C; the Outer Harbor, which includes South Range C, Range B, the Cutoff and Range A out to Station 110+00; and the Outer Entrance Channel, which is made up of the seaward end of Range A (from station 110+00 out); the shallow draft portion includes 3 additional ranges: the Entrance Channel, Waterfront Channel and Bogue Sound Channel. In addition to the Morehead City Harbor navigation channels, the DMMP study area also includes the adjacent mainland area, the beaches of Bogue Banks and Shackleford Banks, the nearshore Atlantic Ocean off of Bogue Banks and Shackleford Banks (ebb tide delta), the Environmental Protection Agency (EPA) designated Ocean Dredged Material Disposal Site (ODMDS), and the existing disposal sites of Brandt Island, Marsh

Island and Radio Island.

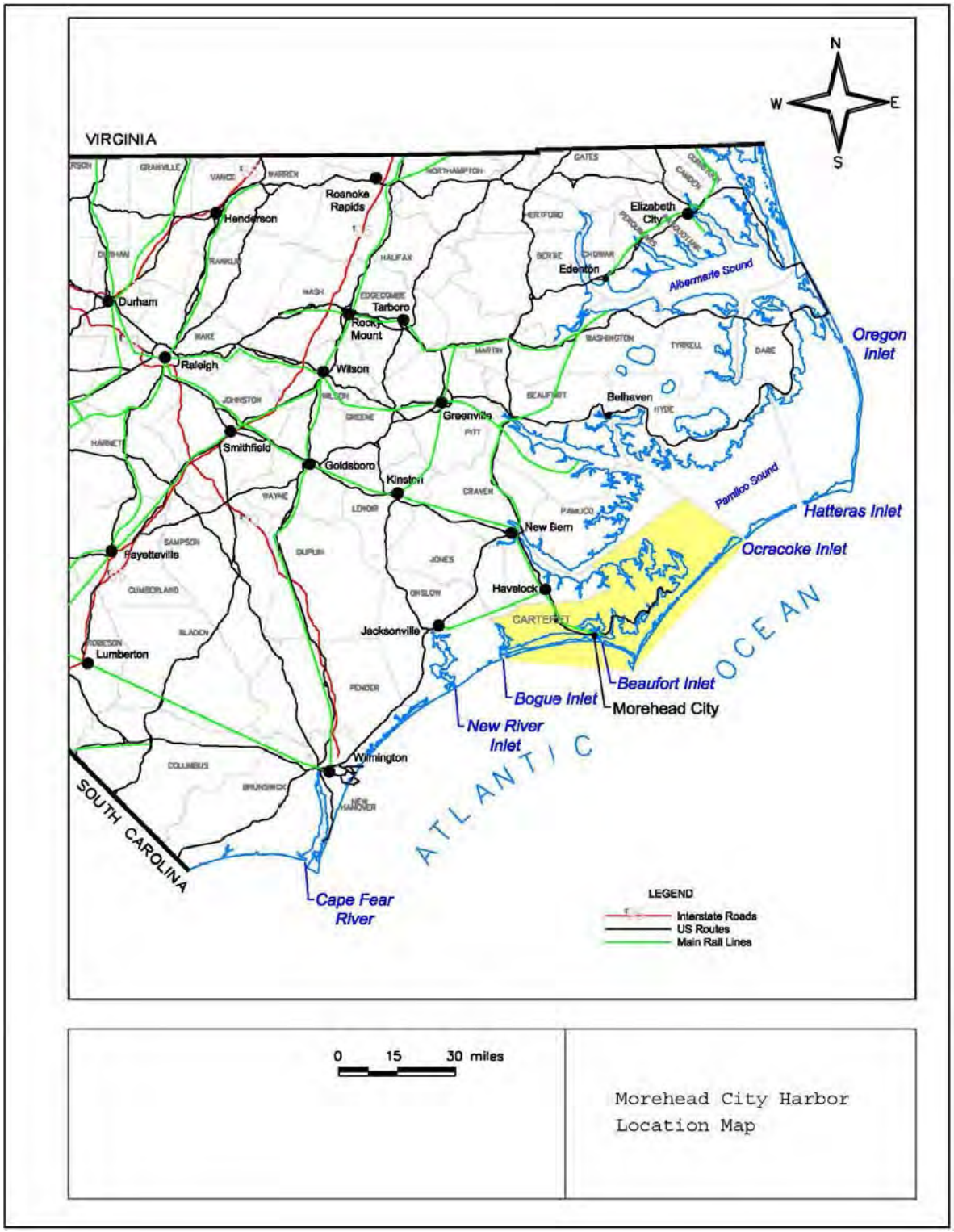

Figure 1.3-1. Project Vicinity/Location Map

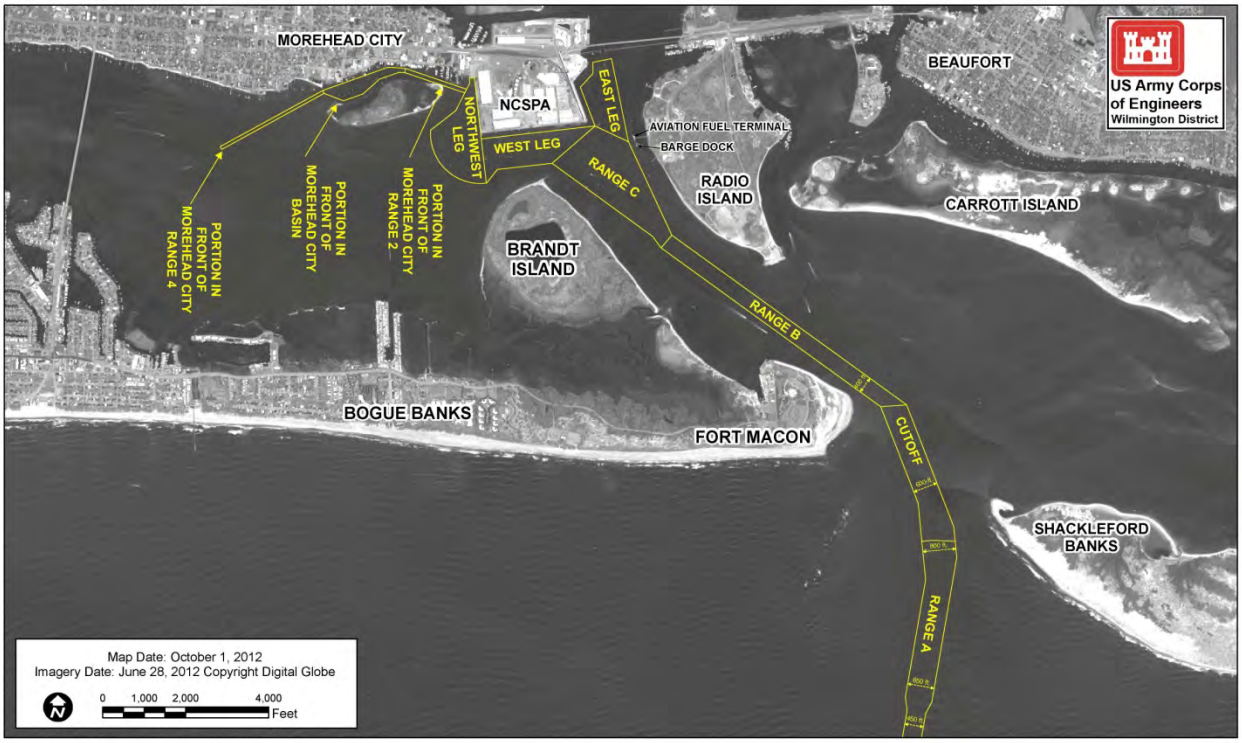

Figure 1.3-2 – Morehead City Harbor Federally Authorized Navigation Project

1.4 Project Description

The DMMP addresses dredging needs, disposal capabilities, and capacities of disposal areas with the purpose of ensuring sufficient disposal capacity for at least the next 20 years, beginning in 2015 and extending through 2034. Approximately 1 million cubic yards of dredged material are removed from the Morehead City Harbor annually. Current maintenance disposal practices, without modification, result in the need for "new" or expanded disposal sites or modified disposal options, including beneficial uses, by 2028. The proposed DMMP (base plan) provides virtually unlimited disposal capacity for the Morehead City Harbor navigation project by recommending the following: continued use of Brandt Island without expansion, placement of coarse-grained material on the beaches of Fort Macon State Park, Atlantic Beach, and Shackleford Banks, expansion of the Nearshore West placement area, a new Nearshore East placement area and continued use of the EPA designated ODMDS. Following circulation of the Draft DMMP, the NPS requested dismissal of the alternative to dispose of dredged material on Shackleford Banks during the time span of the DMMP. So, although the USACE continues to recommend that coarse-grained dredged material (sand) be disposed of on Shackleford Banks, at the request of NPS, no sand will be disposed of on Shackleford Banks as part of this DMMP.

The proposed DMMP (base plan) is show at Figures 1.4-1 through 1.4-3.

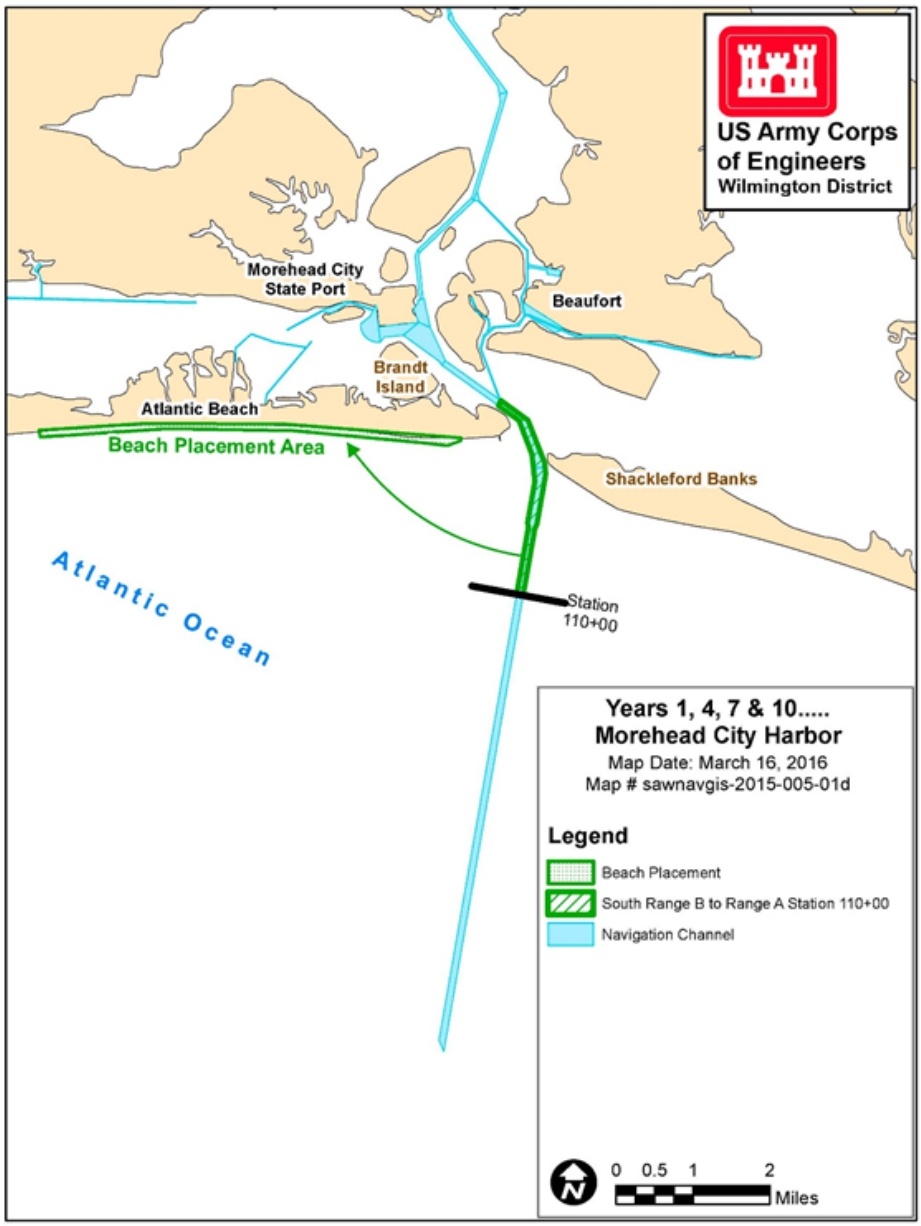

Figure 1.4-1 - Proposed Base Plan – Years 1,4,7,10…….

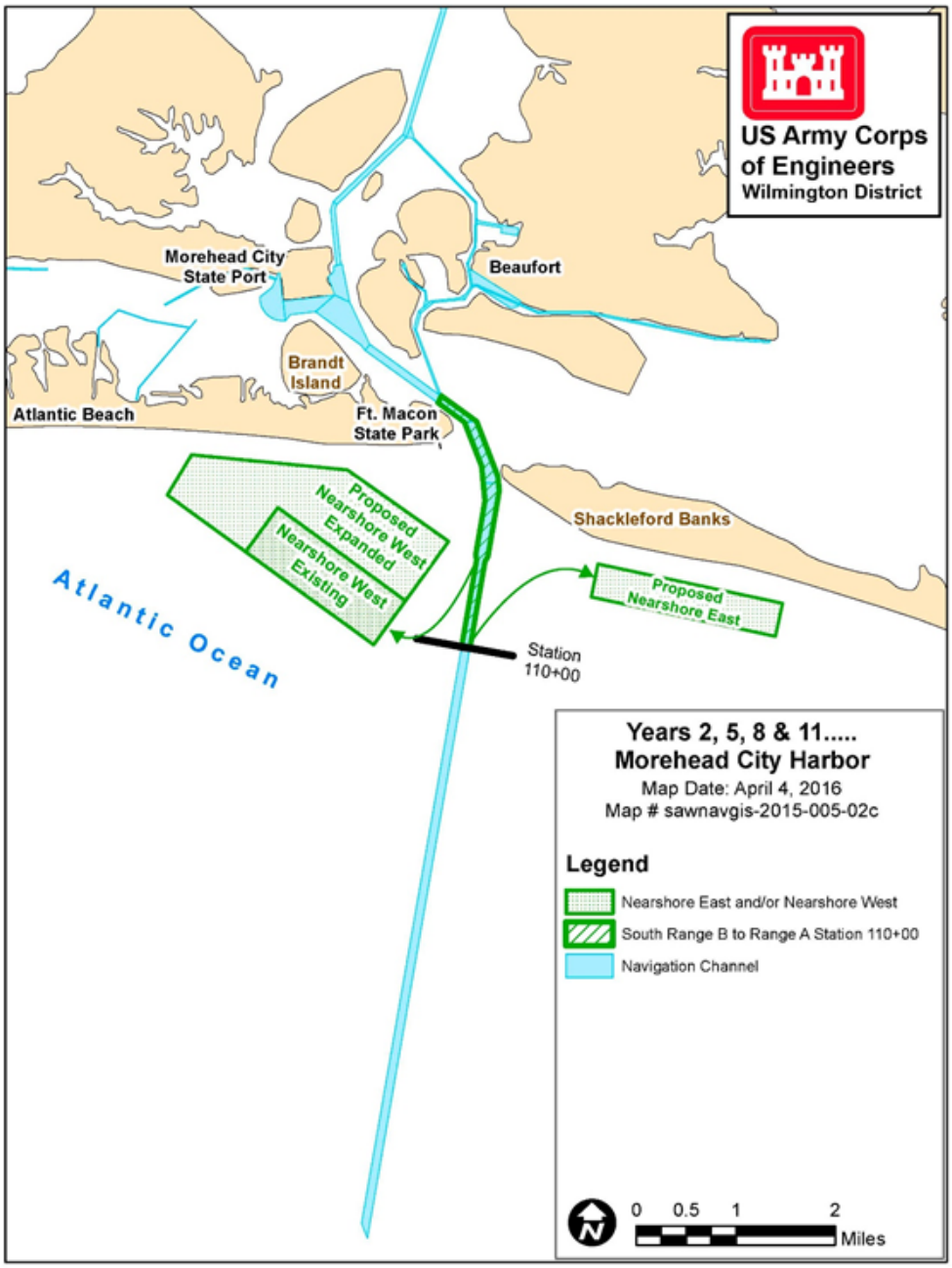

Figure 1.4-2 - Proposed Base Plan – Years 2, 5, 8, 11…..

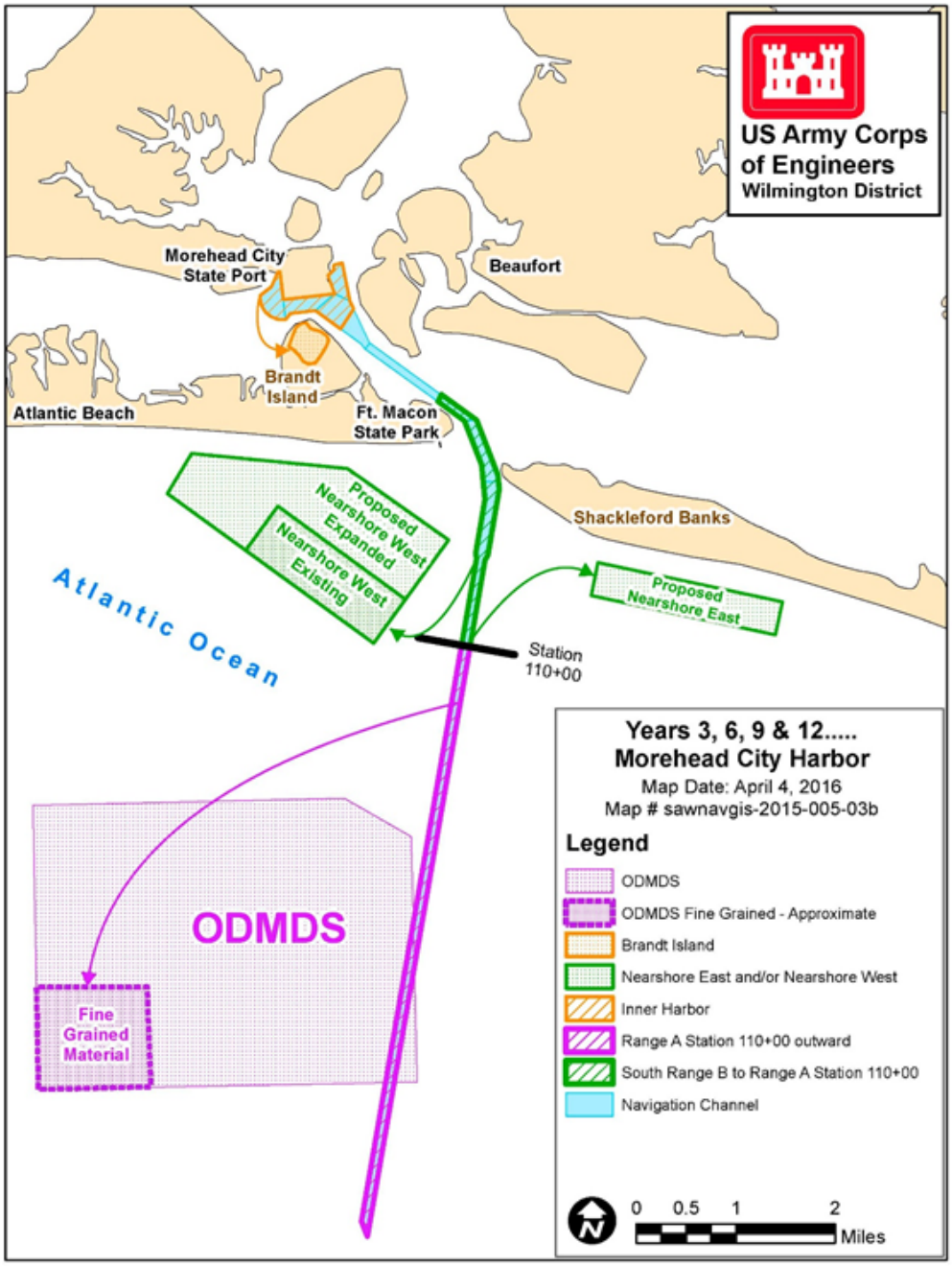

Figure 1.4-3 - Proposed Base Plan – Years 3,6,9,12……

1.5 Real Estate Requirements

Brandt Island. A large portion of the Island is owned by the State of North Carolina and since the 1950's has been dedicated for use as a disposal area. It is proposed that dredged material from the Inner Harbor be placed in Brandt Island. For past disposal events the State of North Carolina has either granted a temporary disposal easement or given a letter permit for use of the Brandt Island site. The same would be required for any subsequent use of the site.

Beaches at Fort Macon State Park. Dredged materials from the Outer Harbor will likely be placed on the beach of Fort Macon State Park which is owned by the State of North Carolina. No formal agreement exists between the USACE and the State pertaining to placement of material at Fort Macon. However, prior to each placement event, the USACE coordinates closely with the State Park regarding the details of the placement activity. Either an easement or a letter permit from the State will be required to make Fort Macon State Park available for project purposes.

Beaches of Atlantic Beach. Dredged materials from the Outer Harbor will also be placed on Atlantic Beach which is privately owned landward of mean high water (MHW). In 2005 sand was pumped from Brandt Island onto the shoreline to create more disposal capacity within the Brandt Island site. At that time, 209 parcels were impacted by the placement of fill. There were 150 perpetual easements in place and 59 temporary easements were acquired, which have since expired. The easement language used in the acquired easements was very similar to the standard “Perpetual Beach Storm Damage Reduction Easement” in Section 1.20. Since the 2005 fill from Brandt Island, the locals have continued to acquire perpetual easements for local projects and in anticipation of a federal project which further reduces the number of easements that could be needed.

An assumption is that the last sand placement created new lands which vested in state ownership. The expectation with future placement events is that fill will be placed on or below the land created at the last fill and that no further real estate interests will be required; however, this will be confirmed when surveys are completed prior to each beach placement event. Should there be areas where erosion has occurred landward of the old mean high water line, easements will be required from impacted landowners. It is suggested that the standard Perpetual Beach Storm Damage Reduction Easement be used if additional easements are required.

The worst case scenario under the recommended base plan is acquisition of approximately 59 easements. Should future beach placement occur on Bogue Banks west of the area included in the base plan, additional easements would be required, incurring additional real estate costs that cannot be accurately estimated at this time. Placement of sand along the shoreline is considered beneficial use of dredged material and is not considered a nourishment project. The sponsor will not receive credit for cost incurred in the acquisition of easements.

Nearshore West. The Nearshore West Placement Area is within State territorial waters and is located off Bogue Banks. Dredged material from the Outer Harbor will be disposed of in the Nearshore West site. The existing site is 559 acres but plans to expand the existing site by an additional 1,209 acres are being coordinated with all appropriate resource agencies. The site is available through navigation servitude, but a permit for use of the placement area will be obtained from the State of North Carolina.

Nearshore East. The Nearshore East site (Figure 3-23) is a newly proposed site that will consist of approximately 1,094 acres and will be located within State waters off Shackleford Banks. Dredged material from the Inner Harbor will be disposed of in the Nearshore East. The site is available through navigation servitude. Plans to construct the new site are being coordinated with all

appropriate resource agencies and a permit will be obtained from the State of North Carolina for use of the site.

ODMDS. The ODMDS (Figure 3-40) is an 8 square mile area located on the Outer Continental Shelf (OCS) and is also available through navigation servitude. The site was designated by EPA as an ocean dredged material disposal site. The transportation and disposal of dredged material in ocean waters, including the territorial sea, is regulated under the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) (Public Law 92-532, 86 Stat. 1052, 33 U.S.C. §§1041 et seq.) as amended by Title V of the Water Resources Development Act of 1992 (WRDA 92; Public Law 102-580). Section 102(a) of MPRSA authorizes the U.S. Environmental Protection Agency (EPA) to establish and apply regulations and criteria for ocean dumping activities. Consequently, the EPA issued in October, 1973, and revised in January, 1977, Ocean Dumping Regulations and Criteria (40 CFR 220-238). These regulations establish control of ocean dredged material disposal primarily by two activities, designation of sites for ocean dumping and the issuance of permits for dumping.

The transportation of dredged material for the purpose of disposal into ocean waters (i.e. the actual use of the designated site) is permitted by USACE (or authorized in the case of federal projects) under MPRSA Section 103(e) applying environmental criteria established in EPA's Ocean Dumping Regulations and Criteria. The MPRSA Section 104(a)(3) provides that ocean disposal of dredged material can occur only at a designated site and Section 103(b) requires the USACE to utilize dredged material disposal sites designated by EPA to the maximum extent feasible. Prior to issuing a dredged material permit or authorizing a federal project involving the ocean disposal of dredged material, the USACE must notify EPA, who may disapprove the proposed disposal. Dredged material from the Inner Harbor, Outer Harbor and Outer Entrance Channel may be disposed of in the ODMDS.

No staging areas have been identified at time of this report. When specific requirements are determined, the sponsor will be responsible for providing staging areas for the project which shall be provided prior to advertisement for construction. However, should a contractor determine that another site may be more preferable and/or convenient, he will have the option to obtain an alternate site for staging.

1.6 Utility/Facility Relocation

There are no utility/facility relocations with this project

1.7 Existing Projects

The Morehead City Harbor Project and the Morehead City Section 933 are existing Federal projects.

1.8 Environmental Impacts

The proposed DMMP is not expected to adversely affect the environment. The proposed Morehead City Harbor DMMP is not expected to result in any significant adverse environmental effects. Significant resources (including terrestrial and marine biota, cultural resources, threatened and endangered species, air and water quality, socio-economics, esthetics, and recreation) will not be adversely impacted by implementation of the proposed DMMP.

1.9 Project Sponsor Responsibilities and Capabilities

The State of North Carolina will be the non-Federal Project Sponsor (NFS). The NFS has the responsibility to acquire all real estate interests required for the Project. The NFS shall accomplish all alterations and relocations of facilities, structures and improvements determined by the government to be necessary for construction of the Project. A form for the Assessment of the Non-Federal Sponsor's Capability to Acquire Real Estate is at Exhibit "A" to the Real Estate Appendix.

Prior to advertisement of any construction contract, the NFS shall furnish to the government an Authorization for Entry for Construction (Exhibit "B" to the Real Estate Appendix) to all lands, easements and rights-of-way, as necessary. The NFS will also furnish to the government evidence supporting their legal authority to grant rights-of-way to such lands

No land acquisition is required for this project. Consequently the usual requirements of the NFS pertaining to real estate acquisition are not applicable. The non-Federal sponsor is entitled to receive credit against its share of project costs for any real estate related administrative costs incurred for the project.

1.10 Government Owned Property

The State of North Carolina owns a portion of Brandt Island and also Fort Macon State Park within the project limits.

1.11 Historical Significance

It is anticipated that resources in the area will be limited to shipwrecks that may be impacted by direct deposit of dredged material or by induced changes in current patterns. Direct project impacts will be limited to submerged cultural resources and are likely to be minimal. The actual extent of impact will depend on the amount of material placed on or near cultural resources and the chemical composition of the material. If beach quality or near beach quality material is deposited, chemical impacts will be minimal or non-existent. If dredged material release locations are specified in the contract and are monitored so that no mounding occurs on or near cultural resources, then effects from altered current are also likely to be minimal or nonexistent.

1.12 Mineral Rights

There are no known mineral activities within the scope of the proposed project.

1.13 Hazardous, Toxic, and Radioactive Waste (HTRW)

No HTRW sites are located in the project area and therefore neither the proposed DMMP nor the No Action plan will impact any HTRW sites. Also, neither plan would result in the placement of contaminated sediments in any disposal areas within the project area.

1.14 Navigation Servitude

The navigation servitude is the dominant right of the Government under the Commerce Clause of the U.S. Constitution (U.S. CONST. Art. I, §8, cl.3) to use, control and regulate the navigable waters of the United States and the submerged lands hereunder for various commerce-related purposes including navigation and flood control. In tidal areas, the servitude extends to all lands below the mean high water mark.

1.15 Zoning Ordinances

Zoning ordinances are not of issue with this project. Application or enactment of zoning ordinances is not to be used in lieu of acquisition.

1.16 Induced Flooding

There will be no flooding induced by the construction or the operation and maintenance of the project.

1.17 Public Law 91-646, Relocation Assistance Benefits

There are no relocations of individuals, businesses or farms for this project.

1.18 Attitude of Property Owners

The project is fully supported. There are no known objections to the project from landowners within the project area.

1.19 Acquisition Schedule

No real estate acquisition is currently required for the project. Should it later be determined that easements are required along Atlantic Beach for a least cost disposal, the locals will be responsible for acquiring those easements and a milestone schedule will be prepared at that time.

1.20 Estates for Proposed Project

Should easements be required on Atlantic Beach, the Perpetual Beach Storm Damage Reduction Easement is suggested.

PERPETUAL BEACH STORM DAMAGE REDUCTION EASEMENT

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tract No. __) for use by the (Project Sponsor), its representatives, agents, contractors, and assigns, to construct; preserve; patrol; operate; maintain; repair; rehabilitate; and replace; a public beach [a dune system] and other erosion control and storm damage reduction measures together with appurtenances thereto, including the right to deposit sand; to accomplish any alterations of contours on said land; to construct berms [and dunes]; to nourish and renourish periodically; to move, store and remove equipment and supplies; to erect and remove temporary structures; and to perform any other work necessary and incident to the construction, periodic renourishment and maintenance of the (Project Name), together with the right of public use and access; [to plant vegetation on said dunes and berms; to erect, maintain and remove silt screens and sand fences; to facilitate preservation of dunes and vegetation through the limitation of access to dune areas;] to trim, cut, fell, and remove from said land all trees, underbrush, debris, obstructions, and any other vegetation, structures and obstacles within the limits of the easement (except_____); [reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns, the right to construct dune overwalk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the (designated representative of the Project Sponsor) and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project; and further] reserving to the grantor(s), (his) (her) (its)

(their) (heirs), successors and assigns all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easements hereby acquired; subject however to existing easements for public roads and highways, public utilities, railroads and pipelines.

1.21 Real Estate Estimate

The estimated real estate costs include federal and non-federal administrative costs. Administrative costs are those costs incurred for verifying ownership of lands, certification of those lands required for project purposes, legal opinions, analysis or other requirements that may be necessary during Planning, Engineering and Design (PED). A 10% contingency is applied to the estimated total for these items.

Table 1.21-1.

Real Estate Estimate

a. Lands		0
b. Improvements		0
(Residential)		0
(Commercial)		0
c. Mineral Rights		0
d. Damages		0
e. P.L. 91-646 Relocation costs		0
f. Acquisition Cost - Admin (permits)		5,800
Federal	2,900	
Non-federal	2,900	
	5,800	
Sub-Total		5,800
Contingencies (10%)		580
TOTAL		**6,380**
ROUNDED		**6,500**

1.22 Chart of Accounts

The cost estimate for all Federal and non-Federal real estate activities necessary for implementation of the project after completion of the feasibility study for land acquisition, construction, LERRD, and other items are coded as delineated in the Cost Work Breakdown Structure (CWBS). This real estate cost estimate is then incorporated into the Total Current Working Estimate utilizing the Microcomputer Aided Cost Engineering System (MCACES).

Table 1.22-1.

Chart of Accounts

		Federal	Non-Federal	Total
01B	LANDS AND DAMAGES			
01B40	Acquisition/Review of NFS			
01B20	Acquisition by NFS			
01BX	Contingencies (10%)			
	Subtotal			
01G	Permit/License/ROE			
01G10	By Government	2,900		2,900
01G20	By NFS		2,900	2,900
01G30	By Government on Behalf of NFS			
01GX	Contingencies (10%)	290	290	580
	Subtotal	3,190	3,190	6,380
01H	AUDIT			
01H10	Real Estate Audit			
01HX	Contingencies (10%)			
	Subtotal			
01R	REAL ESTATE LAND PAYMENTS			
01R1B	Land Payments by NFS			
01R2B	PL91-646 Relocation Payment by NFS			
01R2D	Review of NFS			
01RX	Contingencies (10%)			
	Subtotal			
	TOTALS		3,190	6,380
	ROUNDED TO			**$6,500**

Real Estate Certification

The Real Estate Appendix for the Morehead City Harbor DMMP has been prepared in accordance with policy and guidance set forth in ER 405-1-12, Chapter 12, Real Estate Planning and Acquisition Responsibilities for Civil Works Projects.

Prepared by:

Realty Specialist

Reviewed and approved by:

Robert M. Jewell
Acting Chief, Real Estate Division

Exhibits

Exhibit A – Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability
Exhibit B - Authorization For Entry For Construction

Assessment of Non-Federal Sponsor's
Real Estate Acquisition Capability
Morehead City Harbor DMMP

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? **YES**

b. Does the sponsor have the power to eminent domain for this project? **YES**

c. Does the sponsor have "quick-take" authority for this project? **YES**

d. Are any of the land/interests in the land required for this project located outside the sponsor's political boundary? **NO**

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? **NO**

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P. L. 91-646, as amended? **NO**

b. If the answer to II.a. is "yes", has a reasonable plan been developed to provide such training? (yes/no)

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? **YES**

d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? **YES**

e. Can the sponsor obtain contractor support, if required in a timely fashion? **YES**

f. Will the sponsor likely request USACE assistance in acquiring real estate? **YES - only in advisory capacity**

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site? **YES**

b. Has the sponsor approved the project/real estate schedule/milestones? **NO – Project Milestone will be developed during PED if required and will be joint effort between RE, PM and NFS**

Exhibit A
1st page

IV. Overall Assessment:

a. Has the sponsor performed satisfactory on other USACE projects?
YES

b. With regard to the project, the sponsor is anticipated to be: **Highly capable**

V. Coordination:

a. Has this assessment been coordinated with the sponsor? **YES**

b. Does the sponsor concur with this assessment? **YES**

Prepared by:

Realty Specialist

Reviewed and approved by:

Robert M. Jewell
Acting Chief, Real Estate Division

Exhibit A
2nd page

AUTHORIZATION FOR ENTRY FOR CONSTRUCTION

I _____, _____ for the
(Name of accountable official) (Title)

(Sponsor Name) _____, do hereby certify that the ___(Sponsor Name) has acquired the real property interest required by the Department of the Army, and otherwise is vested with sufficient title and interest in lands to support construction for (Project Name, Specifically identified project features, etc.). Further, I hereby authorize the Department of the Army, its agents, employees and contractors, to enter upon _____
(identify tracts)

to construct (Project Name, Specifically identified project features, etc.) as set forth in the plans and specifications held in the U. S. Army Corps of Engineers' (district, city, state)

WITNESS my signature as _____ for the
(Title)

(Sponsor Name) this __ day of _____, 20_____.

BY: _____
(Name)

_____
(Title)

ATTORNEY'S CERTIFICATE OF AUTHORITY

I, _____ , _____ for the
(Name) (Title of legal officer)

(Sponsor Name), certify that _____ has
(Name of accountable official)

authority to grant Authorization for Entry; that said Authorization for Entry is executed by the proper duly authorized officer; and that the Authorization for Entry is in sufficient form to grant the authorization therein stated.

WITNESS my signature as _____ for the
(Title)

(Sponsor Name), this_____day of_____, 20____.

BY: _____
(Name)

_____
(Title)

Exhibit B