US Army Corps of Engineers
JACKSONVILLE DISTRICT

FINDING OF NO SIGNIFICANT IMPACT

CHANNEL WIDENER CONSTRUCTION
CUT-1 OKEECHOBEE WATERWAY
WITH DREDGED MATERIAL PLACEMENT IN AN OFFSHORE BORROW AREA
MARTIN COUNTY, FLORIDA

The U.S. Army Corps of Engineers, Jacksonville District (Corps), has conducted four environmental assessments (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The Corps assessed the effects of the following actions within the four environmental assessments cited below. These reports are incorporated herein by reference.

- ***ENCLOSURE 1***: The Corps Regulatory Division (RD) under the Authority of Section 10 and 404 of the Clean Water Act assessed the effects of constructing an 11 acre channel widener in Cut-1 of the Okeechobee Waterway (OWW) in the "**Department of the Army Environmental Assessment and Statement of Finding for Permit SAJ-2009-03015-SP-KAE**" dated 16 March 2017 and issued to the Florida Inland Navigation District (FIND).

- ***ENCLOSURE 2***: The Corps RD under the Authority of Section 10 and 404 of the Clean Water Act assessed the effects of dredging St. Lucie Inlet and placing the material in the Town of Jupiter Islands offshore borrow area in the "**Department of the Army Environmental Assessment and Statement of Finding for Permit SAJ-1996-05620-MOD-LCK**" dated 4 May 2017 and issued to Martin County.

- ***ENCLOSURE 3***: The Corps Planning Division (PD) under the Authority of the Rivers and Harbors Act of 1974 assessed the effects of dredging St. Lucie Inlet and placing beach quality maintenance dredged material in the Town of Jupiter Islands offshore borrow area in the "**Environmental Assessment, Operations and Maintenance Dredging, Placement of Dredged Material in Offshore Borrow Area, St. Lucie Inlet, Martin County, Florida**" dated 6 July 2017.

- ***ENCLOSURE 4***: The Corps PD, under the Authority of the Rivers and Harbors Act of 1945 for the Intracoastal Waterway (IWW) and Rivers and Harbors Act of 1974 for the OWW, assessed the effects of maintenance dredging of the intersection of the IWW and OWW and adjacent channels with placement of the material in the St. Lucie inlet impoundment basin in the "**Environmental Assessment, Placement of Intracoastal Waterway and Okeechobee Waterway Dredged Material in the St. Lucie Inlet Sediment Impoundment Basin, Martin County, Florida**" dated 29 February 2016.

Subsequent to completion of ***ENCLOSURE 1***, the project sponsor (FIND) requested that the Corps incorporate the widening project feature with placement in the Town of Jupiter Islands offshore borrow area into the Civil Works project. Therefore, per 40 CFR 1506.4 this Finding of No Significant Impact combines these NEPA actions and incorporates by reference all discussions, consultations, effects determinations, and conclusions contained in the EAs enclosed hereto (***ENCLOSURES 1-4***).

The recommended plan consists of the following:

- Dredging approximately 15,000cy of beach quality material from construction of an 11 acre channel widener in Cut-1 of the OWW
- Placing the material in the Town of Jupiter Islands offshore borrow area

All practicable means to avoid and minimize adverse environmental effects have been explored with recommendations incorporated into the alternative added to the authorized Civil Works project action to include the channel widener with placement in the Town of Jupiter Islands offshore borrow area alternative. Environmental commitments as detailed in the four EAs will be implemented to minimize impacts.

Pursuant to the Clean Water Act of 1972, as amended, any discharge of dredged or fill material associated with the proposed placement of dredged material in the Town of Jupiter Islands offshore borrow area have been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). This evaluation can be found in Section 6.0 of ***ENCLOSURE 1***.

The State of Florida concurred that the proposed action is consistent with the enforceable policies of the Florida Coastal Management Program through issuance of Environmental Resource Permit 43-0296970-006-EM. The referenced water quality certification, pursuant to section 401 of the Clean Water Act, was obtained by FIND and includes the widener dredging with placement in the Town of Jupiter Islands offshore borrow area. All conditions of the water quality certification will be implemented in order to comply with State water quality standards.

Pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, the U.S. Fish and Wildlife Service (USFWS) concurred with the Corps' determination that the proposed action may affect, but would be not likely to adversely affect, threatened Florida manatee on 20 April 2017 (***ENCLOSURE 5***).

Compliance with the ESA for dredging of the inlet and placement in Borrow Area B is covered by the National Marine Fisheries Service (NMFS) South Atlantic Regional Biological Opinion dated September 25, 1997 (***ENCLOSURE 6***).

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, consultation was initiated with the Florida State Historic Preservation Officer (SHPO) and the appropriate Federally-recognized Tribes in accordance with the National Historic Preservation Act and considerations given under the NEPA. A submerged cultural resource remote sensing survey was completed for the area of the proposed widener construction. In letters dated May 29 and 30, 2018, the Seminole Tribe of Florida (STOF) and the Florida SHPO concurred with the Corps determination of no effect to historic properties providing that the Corps avoids the five (5) buffered targets previously identified within the Town of Jupiter Islands offshore borrow area.

In view of the above, and the referenced EAs, and after consideration of the public and agency comments received during the public coordination of the EAs incorporated by reference, I conclude that the recommended plan, dredging of the OWW Cut-1 widener with placement of dredged material in the Town of Jupiter Islands offshore borrow area, would not result in a significant effect on the human environment and therefore, does not require an Environmental Impact Statement. This Finding of No Significant Impact incorporates by reference all discussions and conclusions contained in the EAs enclosed herewith. A copy of these documents will be made available to the public under the Martin County tab on the following website: http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx. Expand the Martin County tab, then open "Okeechobee Waterway Cut-1 Widener Final EA and FONSI".

Jason A. Kirk, P.E.
Colonel, U.S. Army
District Commander

7 JUNE 2018
Date

ENCLOSURE 1

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Permit Application SAJ-2009-03015 (SP-KAE)

This document constitutes the Environmental Assessment, 404(b)(1) Guidelines Evaluation, Public Interest Review, and Statement of Findings for the following:

1.0 Application as described in public notice dated 8 August 2016:

1.1 Applicant: Florida Inland Navigation District
c/o Mark Crosley
1314 Marcinski Road
Jupiter, FL 33477

1.2 Location and Affected Waterway: This project encompasses work within the Intracoastal Waterway (IWW) and the Okeechobee Waterway (OWW) in the vicinity of the St. Lucie Inlet, specifically the Crossroads channel and also includes work at the M-5 Dredged Material Management Area (DMMA) dredge disposal island (PCN: 18-38-42-000-000-00010-2) in Saint Lucie County, FL.

Direction to the site:
The site can be viewed from Twin Rivers Park in Martin County at 2401 SE Monterey Road., Stuart, FL, 34996. The DMMA M-5 property shares a boundary with the St. Lucie Inlet Preserve State Park.

1.2.1 Approximate Central Coordinates:

Crossroads channel:

- Latitude: 27.174°
- Longitude: -80.183°

M-5 DMMA:

- Latitude: 27.162°
- Longitude: -80.176°

1.3 Existing conditions and Permit History: The Crossroads channel is dredged approximately every three years, the first Corps dredge permit was issued in 1991 and then revised in 1996. On 24 February 2012 the Corps issued a 9-year 8-month permit to place beach-grade material on Martin County beaches from FDEP reference monuments R-59 through R-80, approximately 100.7 acres (485,441 cubic yards) below high tide line and 2.1 acres (12,903 cubic yards) along the shoreline above the high tide for dune restoration and construct an Intermodal facility at the M-5 DMMA to assist in the transfer of the fill material. The beach fill material will come from previous dredged material located at the M-5 DMMA facility and from the dredging of Crossroads Channel to a depth of -12 feet mean low water (-10 feet with a 2 foot allowable overdredge) or -

14 feet NAVD 88. To date the only work that has been conducted has been the disposal of 36,864 cubic yards of material (Crossroads maintenance dredge) into M-5 DMMA. The 2012 permit required the purchase of 0.046 federal mitigation credits from Bear Point Mitigation Bank (SAJ-1997-07812) to offset unavoidable impacts to mangroves from construction of the Intermodal facility at M-5 DMMA.

The current depth of the Crossroads Channel is -12 feet mean low water. On 17 September 2015 a submerged resource assessment was conducted and found mangroves, wetland vegetation, submerged resources, or submerged grassbeds are not located within the proposed project boundaries. The nearest seagrass patches occur about 0.4 miles to the west of the project areas. There are no seagrasses within the project dredging area, along the pipeline dredging route to the DMMA, or immediately adjacent to these footprints. Based on the previous natural resource survey dated November 2007 and the Intermodal Facility Mangrove Impact and Mitigation Plan dated November 2010, the M-5 DMMA supports three types of wetland systems; mangrove swamp marsh/holding pond, and marsh/spoil area, none of which are proposed to be impacted with this project. The site has been historically utilized for deposition of dredge spoil. The site is utilized by migrating avian species and local wading birds for foraging habitat. The waters surrounding the M-5 DMMA area and Inlet are within the Jenson Beach to Jupiter Inlet Aquatic Preserve that includes important areas of essential fish habitat.

1.4 Work Proposed: The applicant seeks authorization to dredge 15,000 cubic yards of material within an 11-acre submerged area to a maximum depth of minus 10.00 ft. mean low water (MLW), in order to widen the existing channel and capture sediment at the intersection of the Indian River Lagoon (Intracoastal Waterway) and St. Lucie River (Okeechobee Waterway). It is anticipated that this widened dredged area will capture sediment as it enters the St. Lucie River and, therefore, reduce overall maintenance dredge frequency of the St. Lucie River. The proposed 11.0 acres of impacts shall be only impacts to surface waters.

1.5 Avoidance and minimization statement from applicant: The applicant has provided the following information in support of efforts to avoid and/or minimize impacts to the aquatic environment:

Impacts to wetlands and other surface waters would be avoided and minimized in several ways: 1) The construction would be specified for a cutter-suction type hydraulic dredge in order to minimize any potential turbidity issues and to minimize any potential manatee contact, 2) all land side activities would be conducted at the permitted DMMA M-5 disposal facility within areas currently designated and permitted for staging, truck routes, pipeline routes, etc, 3) Construction specifications will include standard best management practices as described in the permit drawings, 4) dredging of the channel widener would be a long term avoidance/minimization strategy itself in that the idea

behind the basins is to reduce the frequency of dredging events, thereby minimizing any potential short-term impacts associated with future dredging events.

1.6 Compensatory mitigation proposal from applicant: The applicant has provided the following explanation why compensatory mitigation should not be required:

The applicant does not expect the project to cause any natural resource impacts that would require mitigation; thus, they have not developed a mitigation plan. Should any impacts to aquatic resources occur the applicant will be required to submit a mitigation plan.

1.7 National Environmental Policy Act (NEPA) purpose and need:

1.7.1 Project purpose as described by applicant: The purpose of the project is to construct a channel widener at OWW Cut-1 in order to capture sediment before it shoals in the OWW channel.

1.7.2 Basic project purpose: The basic project purpose is to improve navigation and reduce maintenance dredging frequency.

1.7.3 Water-dependency determination: The proposed project is water dependent.

1.7.4 Overall project purpose: The overall project purpose is to reduce maintenance dredging frequency of the OWW Cut-1 navigational channel.

2.0 Authority: Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403)

2.1 Jurisdictional Determination Information: The U.S. Army Corps of Engineers (Corps) issued an approved jurisdictional determination the same date that the Corps authorized the project.

3.0 Scope of Analysis – *The Scope of Analysis listed in this section represents the scope of the final project description.*

3.1. National Environmental Policy Act (NEPA) – *Scope determination for NEPA review is found at 33 CFR 325, Appendix B, Paragraph 7.b. The following factors are considered in determining whether sufficient federal "control and responsibility" exists:*

3.1.1 Factors:

a. Whether or not the regulated activity comprises "merely a link" in a corridor type project – Rationale: The proposed project is a single and complete project and is not a corridor type of project.

b. Whether there are aspects of the upland facility in the immediate vicinity of the regulated activity that affect the location and configuration of the regulated activity – Rationale: There is no existing or proposed upland facility. Once the sand is in the M-5 DMMA it may be used as beach fill; however, the use of the sand was evaluated and authorized under permit SAJ-2009-03015(IP-LCK).

c. The extent to which the entire project will be within Corps jurisdiction – Rationale: The entire project, 11 acres of dredging and the discharge of dredged material into the M-5 DMMA, is within the Corps jurisdiction.

d. The extent of cumulative Federal control and responsibility – Rationale: The entire project, 11 acres of dredging and the discharge of dredged material into the M-5 DMMA, is within Federal control and responsibility due to endangered species issues and Corps jurisdiction.

3.1.2 Determination of scope – Based on an examination of NEPA (33 CFR Part 325, Appendix B) and applicable program guidance (e.g. Council on Environmental Quality's (CEQ) *Considering Cumulative Effects Under National Environmental Policy Act and the Standard Operating Procedures for the U.S. Army Corps of Engineers Regulatory Program, July 2009*), the Corps has determined that the appropriate scope for this project is: over the entire project including the dredging and the disposal of dredged material at the M-5 DMMA.

Explanation: The Corps regulatory authority has been extended to include the offloading of the DMMA.

3.2 National Historic Preservation Act (NHPA) "Permit Area" – *The NHPA scope is defined as "permit area". The permit area for an undertaking is defined in 33 CFR 325, Appendix C. The following three (3) tests must all be satisfied for an activity undertaken outside of waters of the United States to be included within the "permit area".*

3.2.1 Tests *(check all that apply)*:

x☐ a. The activity outside of waters of the United States would not occur but for the authorization of the work or structures within waters of the United States.
Explanation: Placement of sediment on the DMMA would not occur if the sediment was not being removed.

x☐ b. The activity outside waters of the United States is integrally related to the proposed work or structures within waters of the United States (or, conversely, the proposed work or structures within waters of the United States must be essential to the completeness of the overall project or program).

Explanation: The disposal of the dredged material is integrally related to the dredging in waters of the U.S.

x☐ c. The activity outside waters of the United States is directly associated (first order impact) with the proposed work or structures within waters of the United States. Explanation: The disposal of the dredged material is directly associated with the dredging in waters of the U.S.

3.2.2 Scope Determination: Activities outside waters of the United States are included because all of the above tests apply to this project.

3.2.3 NHPA Scope Summary and Description: The scope of the project includes the approximately 12-acre M-5 DMMA and the 11-acre dredging footprint of the channel wideners.

3.3 Endangered Species Act (ESA) "Action Area" – *The ESA scope is defined as "action area". The action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action; and, is defined in for an undertaking is defined in 50 CFR 402.02, Definitions.*

3.3.1 Determined Scope: The scope of the project includes the approximately 12-acre M-5 DMMA and the 11-acre dredging footprint of the channel wideners.

4.0 Public Involvement *(Public Notice required by 33 CFR 325.3)*:

4.1 Public Notice Information:
Application Received: 25 March 2016
Application Complete: 18 July 2016
Date Public Notice Issued: 8 August 2016
End Date for Public Notice Comment Period: 7 September 2016
Additional Information: N/A

4.2 Public Meeting(s): No
Discussion/Explanation: NA

4.3 Public Notice Comments:

a. Comments Received From: State Historic Preservation Officer (SHPO)
Date Received:
Comment/Issue: Comments were not received from SHPO within the public notice comment period.

b. Comments Received From: USACE Engineering Division
Date Received: 21 February 2017

Comment/ Issue: Engineering Division approves the request to dredge the Okeechobee Waterway Crossroads Channel Widener and place the sediment on the M-5 DMMA.

4.4 Corps acknowledgment of comments: NA

4.5 Issues Identified by the Corps: Issues included potential impacts to essential fish habitat and threatened and endangered species; concerns regarding the proposed dredging area widener including the frequency and the total quantity of dredging; and whether the sediments from the dredging of the widener will be included with the sediments from the channel with regards to previously authorized placement on the nearby beach.

4.6 Comments/Issues Forwarded to Applicant: Yes
Date Comments Forwarded: 18 July 2016; 15 September 2016; 03 November 2016

4.7 Applicant provided response to comments: Yes
Summary of response: 15 September 2016; 09 November 2016

4.8 Corps Purview – The following comments are not discussed further in this document as they are outside the Corps purview: NA

4.9 Additional information *(optional)*: N/A

4.10 Public Hearing Request – *(33 CFR 327) Requests for a public hearing shall be granted unless the district engineer determines that the issues raised within the request(s) for a public hearing are insubstantial or there is otherwise no valid interest to be served by the hearing. The district engineer will make such a determination in writing, and communicate his reasons therefor to all requesting parties.*

Public Hearing: No public hearing was requested or held for this project.
Discussion/Explanation *(if necessary)*: N/A

5.0 Alternatives Analysis – *(40 CFR 230.10, HQ Regulatory SOP July 2009, RGL 93-2, RGL 84-09) If the project is sited in a special aquatic site (such as a wetland), and if the project does not need to be in or near the special aquatic site to fulfill its basic purpose (i.e., the project is not "water-dependent"), it is presumed that there are practicable alternatives that do not involve special aquatic sites. To overcome this presumption, the applicant must clearly demonstrate to the Corps that practicable alternatives are not available. If the presumption is not overcome, the Corps must deny the permit application. If the project is not sited in a special aquatic site and/or is water-dependent, the applicant is not required to overcome the presumption that upland alternatives are available. However, the Corps must still address whether there are any upland alternatives (or alternatives with less impact), and if any are identified, the applicant*

must clearly demonstrate that they are not feasible. If such a demonstration cannot be made, the Corps must deny the permit application. The Corps performed an evaluation of alternatives, as described below:

5.1 Overall Project Purpose (as independently defined by Corps): The overall project purpose is the same as the Corps determined overall project purpose (reference Section 1.7.4).

5.2 Screening Criteria:

Factor	Measure and/or constraint
Overall Project Purpose	Meets/Does not meet
Proximity	Meets/Does not meet
Special Aquatic Sites	Acres of direct impact

5.3 No Action Alternative *(No action is defined as permit denial or alternative without impacts to waters of the United States)*: The No Action Alternative is no additional dredging. The no action alternative would not address the project objectives, as the channel would continue to shoal, as historically documented. Without performance of the project, there would be the additional cost of maintaining the channel more frequently.

5.4 Off-site locations and configurations:
Proposed Project Site: The applicant was not required to examine offsite alternatives because the project purpose is to improve navigation and reduce maintenance frequency of the OWW Cut-1 Channel. A project at an offsite location would not reduce the sediment in the OWW Cut-1 Channel.

5.5 On-site configurations:

a. Plan 1: dredging 15,000 cubic yards of material within a 11-acre submerged area to a maximum depth of minus 10.00 ft. MLW, in order to widen the existing channel and capture sediment at the intersection of the Indian River Lagoon (Intracoastal Waterway) and St. Lucie River (Okeechobee Waterway) and placement of sediment material at a permitted DMMA Facility.

b. Plan 2: Dredge an area larger than the 11-acre project site to a depth of minus 10.0 MLW

5.6 Practicable Alternatives carried forward: Since there are adjacent seagrass beds, Plan 2 could impact adjacent seagrasses since the footprint of the dredging is increased. The No Action Alternative and Plan 1 meet the criteria for avoiding impacts to special aquatic sites. At this time the No Action Alternative is not recommended as this area is continuously shoaling creating a potential for navigation concerns. Therefore, the

applicant preferred alternative Plan 1, is determined to be the least damaging practicable alternative that still meets the project purpose. The project description as outlined in section 1.4 above will be carried forward.

6.0 Evaluation of the 404(b)(1) Guidelines: N/A - Section 10 Only Activity

7.0 General Public Interest Review – *(33 CFR 320.4 and RGL 84-09) All public interest factors have been reviewed and summarized below. Both cumulative and secondary impacts on the public interest have been considered.*

Public Interest Factors Considered:

a. Conservation: N/A – NA

b. Economics: Beneficial (minor) – The proposed project will reduce the frequency of maintenance dredging in the channel thereby reducing the cost of maintaining the channel.

c. Aesthetics: Negligible – The project will have a negligible effect on aesthetics during construction activities obscuring the view of the waterway; however this will be temporary and therefore negligible on the public interest.

d. General Environmental Concerns: Neutral as a result of mitigative action – Impacts to water quality and endangered species are negligible as a result of the use of special conditions in the permit instrument.

e. Wetlands: None – NA

f. Historic Properties: N/A – NA

g. Fish and Wildlife Values: Neutral as a result of mitigative action – The applicant will use applicable special conditions to minimize impacts to endangered species. Threatened or Endangered Species: The project is not expected to jeopardize the continued existence of any endangered species. Recreational and Commercial Fisheries: The proposed project will adversely affect soft bottom areas and temporarily impact the marine water column. These habitats are considered EFH under the South Atlantic Fisheries Management Council. The applicant has incorporated the use of best management practices to avoid direct and secondary impacts. Adverse impacts to those species associated with EFH within the project area, as well as recreational and commercial fisheries, are not anticipated.

h. Flood Hazards: N/A – NA

i. Floodplain Values: N/A – NA

j. Land use: N/A – NA

k. Navigation: Beneficial (major) – Navigation will be greatly improved in this area and there will be a reduction of overall maintenance dredge frequency of the St. Lucie River

l. Shore Erosion and Accretion: N/A – NA

m. Recreation: Negligible – the area may be utilized more frequently by recreational vessels as depths will allow for safer passage in this area.

n. Water Supply and Conservation: N/A – NA

o. Water Quality: Neutral as a result of mitigative action – Impacts to water quality will be temporary in nature and minimized by the use of turbidity barriers during construction and compliance with the conditions of the water quality certification..

p. Energy Needs: N/A – NA

q. Safety: Negligible – There will be increased depths in the area of the proposed dredging and therefore will allow for safer ingress and egress within this area.

r. Food and Fiber Production: N/A – NA

s. Mineral Needs: N/A – NA

t. Consideration of Property Ownership: N/A – NA

u. Needs and Welfare of the People: N/A – NA

7.1 The relative extent of the public and private need for the proposed structure or work: Dredging of the channel widener would be a long term avoidance/minimization strategy itself in that the idea behind the basins is to reduce the frequency of dredging events, thereby minimizing any potential short-term impacts associated with future dredging events. The private need is more efficient maintenance of the channel for navigation. This is a public project; therefore, there is no private need.

7.2 Are there unresolved conflicts as to resource use? No
If so, are there reasonable and practicable alternative locations and/or methods to accomplish the objectives of the proposed action?

7.3

The extent and permanence of the beneficial and/or detrimental effects, which the proposed work is likely to have on the public and private use to which the area is suited: Detrimental impacts, including turbidity from construction, are expected to be minimal.

8.0 Mitigation – *33 CFR 320.4 (r); 33 CFR 332; 40 CFR 230.70-77; 40 CFR 230.90-99 and 40 CFR 1504.12(f)*:

8.1 Avoidance – In evaluating a project area containing waters of the United States, consideration must be given to avoiding impacts on these sites. Avoidance measures for this project are: Avoidance measures indicated by the applicant in Section 1.5 of this document.

8.2 Minimization – If waters of the United States cannot be avoided, impacts must be minimized. Minimization measures for this project are: Minimization measures indicated by the applicant in Section 1.5 of this document.

8.3 Compensatory Mitigation:

8.3.1 Is Compensatory Mitigation required:

☑ No

(If No, provide explanation here. Do not complete [delete] rest of Section 8, Mitigation. If Yes, indicate N/A here): No impacts to submerged aquatic vegetation are proposed or anticipated therefore no compensatory mitigation is required.

9.0 Cumulative and Secondary Impacts – *(40 CFR 230.11(g) and 40 CFR 1508.7, RGL 84-9) Cumulative impacts result from the incremental environmental impact of an action when added to all other past, present, and reasonably foreseeable future actions. They can result from individually minor but collectively significant actions taking place over a period of time. A cumulative effects assessment should consider both direct and indirect, or secondary, impacts. Indirect impacts result from actions that occur later in time or are farther removed in distance from the original action, but still reasonably foreseeable.*

9.1 Geographic scope: IWW and the OWW in the vicinity of the St. Lucie Inlet and the Florida Southeast Coast watershed.

9.2 Temporal scope: 5 years.

Explain the selected timeframe: reasonable timeframe to see changes in the sediment accumulation

9.3 Historical conditions of the area subject to this analysis: The Southeast Coast Watershed includes areas from north of the Jupiter inlet including the Lake Worth

Lagoon in Palm Beach County to the Key Biscayne in Dade County. The Southeast Coast Watershed includes the (IWW, a narrow strip of coastal land on the west of the IWW, and the series of barrier islands that extend east of the IWW.

9.4 Major changes to the area and description of current condition: For the Southeast Coast watershed- Besides the Corps authorized projects, other activities include high density urban development that continues throughout the inland portions of the watershed. Another concern is that the many canals drain into the Lake Worth Lagoon causing a large volume freshwater releases that upset the aquatic environment. North Bay separates Miami Beach on its barrier island from Miami on the mainland. It has been severely affected over the last century by raw sewage releases, urban runoff, shoreline bulk heading, dredging, the creation of artificial islands, and the loss of natural fresh water flow into the bay. Resulting natural resource changes and stresses include water quality concerns and loss of natural habitat. These resources are also being affected by erosion of sandy beaches and barrier islands. Wakes generated by boats in the lagoons, such as along the Intracoastal Waterway, can contribute to local bank erosion in some areas. A key issue(s) of concern in this watershed is the higher quality resources such as red mangroves and coastal beaches resulting from wetland loss.

9.5 Anticipated cumulative and secondary/indirect impacts (environmental consequences) of the proposed action: Anticipated secondary impacts would be turbidity in the water column during dredging events and wildlife avoidance of the area during construction. Beneficial indirect effects of the widened channel include reduced dredging frequency which decreases the potential for wildlife to be impacted from construction activities and decreases water quality impacts.

9.6 Reasonably foreseeable future actions: The projection is that authorizations for hardening structures along the coastlines will continue at the current rate because economic activity and development will continue at approximately the same rate. Natural resource issues of particular concern from Federal & non-Federal activities are wetland impacts, seagrass and hardbottom impacts, and endangered species impacts. Future conditions are expected to be similar to current conditions. Resulting natural resource changes and stresses to the watershed include water pollution, the loss of productive upland and wetland habitat, and the fragmentation of undeveloped natural areas.

9.7 Effect of the proposed mitigation, including avoidance and minimization, on reducing the project's contribution to cumulative effects in the region: The applicant will be measuring turbidity as required by the Water Quality Certification. As proposed, the project will have no effect on hard bottom habitat, seagrass or coral reefs. The magnitude of the proposed effect does not impact wetlands within the watershed.

9.8

Conclusions: The magnitude of the proposed effect is insignificant within the watershed. Avoidance and minimization methods include the use of turbidity curtains that will result in containing turbid water conditions during construction, and monitoring.

10.0 Other Laws, Policies, and Effects:

10.1 Endangered Species Act (ESA):

10.1.1 Name of Species considered: endangered West Indian manatee (*Trichechus manatus*) and its critical habitat, threatened Johnson's seagrass (*Halophila johnsonii*), the threatened Nassau grouper (*Epinephelus striatus*), the endangered smalltooth sawfish (*Pristis pectinata*), and the endangered/threatened swimming sea turtles (*Chelonia mydas*, *Eretmochelys imbricata*, *Lepidochelys kempii*, *Dermochelys coriacea*, *Caretta caretta*, *Lepidochelys olivacea*) or *Caretta caretta's* designated critical habitat.

10.1.2 Effects Determination:

☑ No Effect

For these species: Nassau grouper (*Epinephelus striatus*) and Johnson's seagrass (*Halophila johnsonii*)

Basis for determination:

The Nassau grouper is primarily a shallow-water, insular fish species found throughout the wider Caribbean, South Florida, Bermuda, and the Bahamas. The Nassau grouper is considered a reef fish, but it transitions through a series of developmental shifts in habitat. As larvae, they are planktonic. Following settlement, juvenile Nassau grouper inhabit macroalgae (primarily *Laurencia* spp.), coral clumps (*Porites* spp.), and seagrass beds. As juveniles grow, they move progressively to deeper areas and offshore reefs. No clear distinction can be made between types of adult and juvenile habitats, although a general size segregation with depth occurs—with smaller Nassau grouper in shallower inshore waters (3.7–16.5 m) and larger individuals more common on deeper (18.3–54.9 m) offshore banks. Since the proposed dredging will be taking place inshore and will avoid any vegetative or coral impacts, the Nassau grouper is likely to not be found within the project boundaries. Therefore no effects are anticipated.

Johnson's seagrass: Resource surveys were performed on 23 July 2013, 17 September 2015, and a pre-construction benthic survey was conducted 29 April 2016 with an addendum 2 May 2016 which found no submerged aquatic vegetation (sav) located within the project footprint.

☑ May affect, not likely to adversely affect

For these species: West Indian manatee (*Trichechus manatus*) and its critical habitat, smalltooth sawfish (*Pristis pectinata*), and the swimming sea turtles (*Chelonia mydas*, *Eretmochelys imbricata*, *Lepidochelys kempii*, *Dermochelys coriacea*, *Caretta caretta*, *Lepidochelys olivacea*) or *Caretta caretta's* designated critical habitat.

10.1.3 Basis for determination:

Manatee: Since the proposal by the applicant is for in-water activities and less than 50,000 cubic yards, potential impacts to the endangered West Indian manatee were evaluated using The Corps of Engineers, Jacksonville District, and the State of Florida Effect Determination Key for the Manatee in Florida, (Key) dated April 2013. Using the Key, A>B>C>G>H>I>N>O>P, couplet 5, resulted in a "May Affect Not Likely to Adversely Affect" determination and no further consultation is necessary. The applicant will comply with the Standard Manatee Construction Conditions.

Swimming sea turtle and smalltooth sawfish: The proposed dredging will avoid any vegetative impacts. In the event that an ESA species are observed in the immediate vicinity of the construction activities, work will cease until the listed species has moved beyond the 50-foot shut down zone. Turbidity curtains will be utilized for the duration of the dredging activities to eliminate impacts to surface waters. Sea Turtles and Smalltooth Sawfish are likely to leave the construction area due to project-related noise and activity, and exclusion by turbidity barriers, but are likely to return after project completion. No adverse effects are anticipated, and this area is not considered critical habitat to any species under the purview of NMFS PRD. The applicant will be required by Corps permit conditions to use the NMFS' Sea Turtle and Sawfish Construction Conditions for all work.

10.1.4 Consultation: Informal

10.1.5 Consultation response(s): Per a letter of concurrence dated 9 June 2011 from NMFS for informal consultation between USACE and NMFS (NMFS Tracking no. SER-2009-6445) the proposed project appears that it would not result in effects that were not considered in the previous consultation for the channel maintenance dredging. The proposed project effects determination was reviewed by NMFS under SER-2016-182221 and subsequently withdrawn by the Corps on 17 November 2016 because none of the reinitiating criteria would be triggered by the proposed project. No new species or critical habitat that could be affected by the proposed action have been designated since the 2011 consultation, and the request did not indicate that any take has occurred, or that new information revealed effects which were not previously considered. "Based on NMFS review of the proposed action and the previous consultation, it appears that the proposed modification would not result in effects that were not considered in the previous consultation for the existing permit", per email dated 14 November 2016 from NMFS.

10.1.6 Additional information *(optional)*: NA

10.1.7 Compliance with ESA: Yes

10.2 Magnuson-Stevens Act – Essential Fish Habitat (EFH):

10.2.1 Name of Species considered: Various life stages of various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex

10.2.2 Effects Determination:

☑ May affect, not likely to adversely affect

For these species: All species considered.

10.2.3 Basis for determination: No substantial direct or indirect adverse impacts to EFH are anticipated since seagrass is not located within the construction footprint. Impacts to the water column will be minimized by the use of turbidity barriers and compliance with water quality certification.

10.2.4 Consultation: Informal

10.2.5 Consultation response: The NMFS HCD responded with a no staffing letter on 12 September 2016 precluding further analysis of the project.

10.2.6 Additional information *(optional)*: The NMFS HCD did not object to the project, nor did they provide EFH Conservation Recommendations. The Corps believes that the intent of the Magnuson-Stevens Act has been met.

10.2.7 Compliance with Magnuson-Stevens Act: Yes

10.3 National Historic Preservation Act – Section 106:

10.3.1 Known sites present: No

10.3.2 Survey required/conducted: No

10.3.3 Effects determination:

☑ No potential to cause effect

For these historic properties eligible or listed in the National Register of Historic Places: All sites considered.

10.3.4 Rationale for effects determination: The Corps is unaware of any historic properties that may be affected by the project. The Corps provided SHPO with a copy of the public notice on 8 August 2016 for verification. No response was received within the 30 day time frame. An RAR report was pulled using google earth on 10 March 2017 and it showed that a SHPO cultural Resource Assessment is not required. Regulatory Division's Standard Operating Procedures for Section 106 of the National Historic Preservation Act, dated 21 November 2016, states that the Section 106 process is considered complete and does not warrant additional RD Archeologist review since the nature, scope, and magnitude of the proposed undertaking are such that little likelihood that historic properties exist or will be affected. A condition will be added to the permit requiring certain actions by the applicant should there be unforeseen impacts on archaeological/cultural resources during the course of work.

10.3.5 Memorandum of Agreement required: No

10.3.6 Date consultation complete *(if necessary)*: 7 September 2016

10.3.7 Additional information *(optional)*: NA

10.3.7 Compliance with National Historic Preservation Act: Yes

10.4 Corps Wetland Policy: Based on the public interest review (Section 7 of this document), the beneficial effects of the project outweigh the detrimental impacts of the project.

10.5 Water Quality Certification under Section 401 of the Clean Water Act:

10.5.1 An individual water quality certification was issued.

10.5.2 Date of Water Quality Certification decision: 27 June 2016

10.5.3 Additional information *(optional)*: FDEP permit no 43-0296970-003

10.6 Coastal Zone Management Consistency under Section 307c of the Coastal Zone Management Act (CZMA):

10.6.1 A CZMA consistency determination was issued. FDEP permit no 43-0296970-003

10.6.2 Date of CZMA decision: 27 June 2016

10.6.3 Additional information *(optional)*: NA

10.7 Effects on Federal Projects *(33 CFR 320.4(g)(4))*: Per letter dated 21 February 2017, USACOE Engineering Division approved the request for the Okeechobee Waterway Crossroads widener under Section 401 of the Rivers and Harbors Act.

10.8 Effects on the limits of the territorial seas *(33 CFR 320.4(f))*: This proposed project does not include any structure or work affecting coastal waters.

10.9 Safety of impoundment structures *(33 CFR 320.4(k))*: This proposed project does not include any impoundment structures.

10.10 Activities in Marine Sanctuaries *(33 CFR 320.4(i))*: This proposed project is not located in a marine sanctuary as established by the Secretary of Commerce under authority of Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972.

10.11 Other Authorizations: N/A

10.12 Significant issues of Overriding National Importance *(33 CFR 320.4(j)(2))*: NA

10.13 Discussion *(if necessary)*: NA

11.0 Final Project Description and Special Conditions:

11.1 Final Project Description: The final project description is the same as the applicant's proposed project description which is indicated in Section 1.4 of this document.

11.2 Special Conditions:

- The Corps will require the applicant to submit all reports, documentation and correspondence to a specific email address within the Corps Regulatory Enforcement Division.
- The applicant is required to provide a written notification of the date of commencement of authorized work to the Corps.
- The applicant is required to submit an As-Built survey to ensure the work is constructed as authorized.
- A special condition requiring other agency required and/or approved changes to the work authorized or obligated by this permit, the Permittee is advised a modification to this permit instrument is required prior to initiation of those changes.
- The applicant is required to have available and maintain for review a copy of this permit and approved plans at the construction site.
- A special condition requiring the applicant to comply with the “Standard Manatee Conditions for In-Water Work – 2011”.
- A special condition requiring the applicant to comply with National Marine Fisheries Service's “Sea Turtle and Smalltooth Sawfish Construction Conditions” dated March 23, 2006.
- The condition for historic places was included to protect cultural artifacts in the event of unanticipated discoveries.

Special Conditions for SAJ-2009-03015 (SP-KAE):

1. Reporting Address: The Permittee shall submit all reports, notifications, documentation and correspondence required by the general and special conditions of this permit to the following address:

a. For standard mail: U.S. Army Corps of Engineers, Regulatory Division, Special Projects and Enforcement Branch, 4400 PGA Boulevard, Suite 500, Palm Beach Gardens, Florida 33410.

b. For electronic mail CESAJ-ComplyDocs@usace.army.mil (not to exceed 10 MB). The Permittee shall reference this permit number, SAJ-2009-03015 (SP - KAE), on all submittals.

2. Commencement Notification: Within 10 days from the date of initiating the work authorized by this permit, the Permittee shall provide a written notification of the date of commencement of authorized work to the Corps.

3. Regulatory Agency Changes: Should any other regulatory agency require changes to the work authorized or obligated by this permit, the Permittee is advised that a modification to this permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification of this permit from the Palm Beach Gardens Regulatory Office. The Corps reserves the right to fully evaluate, amend, and approve or deny the request for modification of this permit.

4. As-Builts: Within 60 days of completion of the authorized work or at the expiration of the construction window of this permit, whichever occurs first, the Permittee shall submit as-built drawings of the authorized work and a completed As-Built Certification Form (Attachment A) to the Corps. The drawings shall be signed and sealed by a registered professional engineer and include the following:

a) A plan view drawing of the location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed in the same scale as the attached permit drawings (8½-inch by 11-inch). The drawing should show all fill areas.

b) List any deviations between the work authorized by this permit and the work as constructed. In the event that the completed work deviates, in any manner, from the authorized work, describe on the As-Built Certification Form the deviations between the work authorized by this permit and the work as constructed. Clearly indicate on the as-built drawings any deviations that have been listed. Please note that the depiction and/or description of any deviations on the drawings and/or As-Built Certification Form does not constitute approval of any deviations by the U.S. Army Corps of Engineers.

c) The Department of the Army Permit number.

d) Include pre- and post-construction aerial photographs of the project site, if available.

5. Assurance of Navigation and Maintenance: The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

6. Dredged Material Disposal: The Permittee shall place all dredged material on the upland disposal site (M-5 DMMA) as detailed on drawing sheet 3 of 5. The Permittee shall maintain the upland disposal site to prevent the discharge of dredged material and associated effluent into waters of the United States.

7. Erosion Control: Prior to the initiation of any work authorized by this permit, the Permittee shall install erosion control measures along the perimeter of all upland work areas near the M-5 DMMA to prevent the displacement of fill material outside the work area from the spoil management area, including the staging areas, into waters of the United States. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas shall be stabilized using sod, degradable mats, barriers, or a combination of similar stabilizing materials to prevent erosion. The erosion control measures shall remain in place and be maintained until all authorized work is completed and the work areas are stabilized.

8. Staging area: All staging areas, including any storage, stockpile of material, and construction equipment/tools shall be limited to upland areas and maintained in a manner that would prevent erosion within the waterbodies.

9. Turbidity Barriers: Prior to the initiation of any of the work authorized by this permit, the Permittee shall install floating turbidity barriers with weighted skirts that extend to within 1-foot of the bottom around all work areas that are in, or adjacent to, surface waters. The turbidity barriers shall remain in place and be maintained until the authorized work has been completed and all suspended and erodible materials have been stabilized. Turbidity barriers shall be removed upon stabilization of the work area.

10. Anchoring Areas: The Permittee agrees that staging or anchoring of any vessel or construction equipment over seagrass is prohibited. Any in-water staging

area for vessels or construction equipment shall be limited to areas devoid of submerged aquatic resources and in a manner that would not cause water quality impacts to the St. Lucie River and/or the Indian River Lagoon.

11. Dredge Vessels: All vessels shall operate within waters of sufficient depth (one-foot clearance from the deepest draft of the vessel to the top of submerged resources or submerged bottom, whichever is less) in a manner to preclude bottom scarring, prop dredging, or damage to the submerged resource or bottom.

12. Benthic Survey: A post-construction biological resource survey shall be conducted for the areas proposed to be dredged and all pipeline corridors. The survey shall assess the status of any aquatic resources found, including corals, coral reefs, hardbottom, and or seagrass at the site and document impacts. The pre-construction survey, has been conducted prior to the dredging (Attachment B), while the post construction survey shall be conducted no less than 30-days after dredging is completed. A copy of the report shall be submitted to the Corps' Palm Beach Gardens Regulatory Office within 30 days of the survey.

13. No impacts to hardbottom or biological aquatic resources are authorized for the project (fill, pipeline, or dredging activities). If the Corps determines project related impacts have occurred to adjacent seagrasses or other aquatic resources due to dredging, spudding or anchoring of vessels or from the pipeline, a compensatory mitigation plan shall be developed and submitted to the Corps within 30 days of notification of such impacts.

14. Monitoring Report Timeframes: Post-construction and annual monitoring reports shall be provided within 30 days of completion of the survey or monitoring event. A copy of the reports shall be submitted to the Corps Palm Beach Gardens Regulatory Office.

15. Pipeline Anchoring: The pipeline shall float over all hardbottom areas and will be anchored to the seafloor on both the east and west sides of the hardbottom.

16. Posting of Permit: The Permittee shall have available and maintain for review a copy of this permit and approved plans at the construction site.

17. Manatee Conditions:

a. **Standard Manatee Conditions:** For all in-water activities, the Permittee shall comply with the attached 2011 "Standard Manatee Conditions for In-Water Work".

b. **Reporting**: In the event a manatee is injured during in-water activities, all activities will be terminated immediately, and the dedicated manatee observed as

outlined in *The Standard Manatee Conditions for In-Water Work* (FWC 2011) will contact the USFWS, Florida Fish and Wildlife Conservation Commission (FFWCC), and the Corps no less than 12 hours after the discovery. All work shall cease until written or verbal notification from the USFWS is given to proceed. The USFWS address is:

U.S. Fish and Wildlife Service
Attn: Jeffrey Howe
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
(772) 562-3909

18. Sea Turtle and Smalltooth Sawfish Conditions: The Permittee shall comply with National Marine Fisheries Service's"Sea Turtle and Smalltooth Sawfish Construction Conditions" dated March 23, 2006, (Attached).

19. Cultural Resources/Historic Properties:

a. No structure or work shall adversely affect impact or disturb properties listed in the *National Register of Historic Places* (NRHP) or those eligible for inclusion in the NRHP.

b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work and ground-disturbing activities within a 100-meter diameter of the discovery and notify the Corps within the same business day (8 hours). The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

c. Additional cultural resources assessments may be required of the permit area in the case of unanticipated discoveries as referenced in accordance with the above Special Condition ; and if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO for finds under his or her jurisdiction, and from the Corps.

d. In the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05 Florida Statutes. All work and ground disturbing activities within a 100-meter diameter of the unmarked human

remains shall immediately cease and the Permittee shall immediately notify the medical examiner, Corps, and State Archeologist within the same business day (8-hours). The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume without written authorization from the State Archeologist and from the Corps.

20. Update of Nautical Charts: The Permittee shall notify, within 90 days of construction completion, NOAA, Nautical Data Branch N/CS26, Station 7313, 1315 East-West Highway, Silver Spring, MD 20910-3282 so that the navigation charts can be updated to reflect the changes in channel depths. The information to be submitted shall include “as-built plans,” signed and sealed by a registered surveyor/engineer licensed in the State of Florida. The signed and sealed plans shall certify that the project is constructed as authorized and must include an accurate (within plus or minus 1 foot) depiction of the location and configuration of the completed activity in relation to the mean high water of the navigable water.

21. Notice to Mariners: Within 30 days of completion of the project, the Permittee shall issue a notice to mariners and notify the mariners of the location of the deeper channel.

12.0 Findings and Determinations:

12.1 Section 176(c) of the Clean Air Act General Conformity Rule Review: The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit would not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this permit action.

12.2 Relevant Presidential Executive Orders:

12.2.1 EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians: This action has no substantial effect on one or more Indian tribes, Alaska or Hawaiian natives.

12.2.2 EO 11988, Floodplain Management: This action is not located in a floodplain.

12.2.3 EO 12898, Environmental Justice: The Corps has determined that this proposed project would not use methods or practices that discriminate on the basis of race, color

or national origin nor would it have a disproportionate effect on minority or low-income communities.

12.2.4 EO 13112, Invasive Species: There are no invasive species issues involved in this proposed project.

12.2.5 EO 13212 and EO 13302, Energy Supply and Availability: The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety.

12.2.6 EO 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes: The project would not adversely affect America's stewardship of the ocean, coasts, or Great Lakes.

12.3 Finding regarding the need for an Environmental Impact Statement: Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, we find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

12.4 Compliance with the Section 404(b)(1) Guidelines: Having completed the evaluation in Section 6, the undersigned have determined that the proposed discharge complies with the Guidelines.

Reason for noncompliance:

12.4.1 The proposed action is the Least Environmentally Damaging Practicable Alternative (LEDPA).

12.5 Public Interest Determination: We find that issuance of a Department of the Army Permit is not contrary to the public interest.

Prepared By:

Kelly Egan

Kelly Egan, Project Manager

Date: 10 January 2017

Reviewed By:

Alisa Zarbo

Alisa Zarbo
Palm Beach Gardens Section Chief

Date: 16 March 2017

Approved By:

Alisa Zarbo

Date: 16 March 2017

Jason A. Kirk, P.E.
Colonel, U.S. Army
District Commander

ENCLOSURE 2

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Permit Application SAJ-1996-5620(MOD-LCK)

This document constitutes the Environmental Assessment, 404(b)(1) Guidelines Evaluation, Public Interest Review, and Statement of Findings for the following:

1.0 Application as described in the public notice dated 22 January 2016:

1.1 Applicant: Martin County Board of County Commissioners
Attn: Kathy Fitzpatrick
2401 SE Monterey Road
Stuart, FL 34949

1.2 Location and Affected Waterway: The project would affect waters of the United States associated with dredge and fill activities. The project is located within the St. Lucie Inlet, Peck's Lake, Intracoastal Waterway, and along the shoreline of the Hobe Sound National Wildlife Refuge, St. Lucie Inlet State Park, and Town of Jupiter Island and within the waters of the Atlantic Ocean From FDEP monuments R-59 to R-76 (Sections 1, 12, 16, 17, 18, 20, 26, 35, and 36, Townships 38, 39, 40 South, Range 42 East; Martin County, Florida.

1.2.1 Approximate Central Coordinates:

Dredging	Latitude	Longitude
Western limit	27.16561°	-80.15980°
Sand placement		
Northern limit	27.12803°	-80.14468°
Southern limit	27.08943°	-80.12738°
Borrow Area B	27.02863°	-80.08546°

1.3 Existing conditions: The channels of the St. Lucie Inlet are maintained by maintenance dredging and bypassing of beach quality sand through partnerships with the Corps, the state, and the local sponsor. The St. Lucie Inlet has two types of habitat including un-vegetated sand bottom and hardbottom, and the area is exposed to high velocity tidal exchanges, waves, and storms. A previously constructed impoundment basin located within the project area accumulates sand that is deposited by the natural littoral transport when it reaches the inlet. The impoundment basin typically holds approximately 500,000 to 600,000 cubic yards (cy) of sand, providing capacity for approximately four years of sand accumulation, depending on the intensity and frequency of storm events. The most recent sand removal from the impoundment basin concluded in April 2014.

The current proposal includes staging, pumping, and offloading sand near Peck's Lake and on the beach. Seagrass patches are present in Peck's Lake, mainly along the

shoreline and in shallow areas. Mangroves are present along the shoreline of Peck's Lake. The beach fill template is located primarily within previously re-nourished beach areas consisting of marine intertidal, unconsolidated shoreline with adjacent nearshore hardbottom. The benthic habitat within the existing Borrow Area consists of mixed coarse sand and shell hash with adjacent patch reefs.

1.3.1 Project History *(if applicable)*: The Corps previously issued a permit on 21 December 2011, authorizing the dredging of approximately 550,000 cy of sand (80,000 cy from the navigable channel and 470,000 cy from the Impoundment Basin). A modification was issued on 23 January 2012, authorizing the increase of the proposed dredge material to 673,000 cy and to deepen a section of the transition area to a depth of -12-feet NGVD. The existing permit authorization expires on 21 December 2021.

1.4 Work Proposed: The applicant seeks authorization to modify the existing permit by conducting the following activities:

1) Perform maintenance dredging of the navigable channel during any time of the year on an "as-needed" basis to ensure safe navigability of the inlet. The dredged material would be placed along the shoreline described below or within the offshore Borrow Area B.

2) Discharge of dredged material from the St. Lucie Inlet within a 562 acre offshore disposal area identified as "Borrow Area B". This borrow area is located offshore Jupiter Island located approximately between R-109 and R-118. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment/re-nourishment events, authorized under a separate permit. The maximum frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every 3 to 5 years.

1.5 Avoidance and minimization statement from applicant: The applicant has stated in their application that the natural community surveys were undertaken during the design process in order to avoid impacts. The beach placement template has been designed to avoid impacts to hardbottom communities. Sand will not be placed between R-81 and R-89 which is a section of beach where the hardbottom is the closest to the shore. Seagrasses with the Intracoastal Waterway (ICW) have been mapped in order to avoid them in the event that sand is transported by barge, staged in Peck's Lake, and pumped to the beach. The staging area for equipment to access the shoreline at Peck's Lake in order to pump sand across the barrier island was selected in an area devoid of sea grass and mangrove resources. The staging and pumping activity from this location is not expected to produce elevated turbidity in Peck's Lake, therefore, no impacts to resources in the vicinity are anticipated. There will be a minimum of a 200-foot buffer between the beach equilibrium toe of fill (ETOF) and adjacent hardbottom.

1.6 Compensatory mitigation proposal from applicant: The applicant has stated in their application that there are no proposed or anticipated impacts to submerged aquatic resources and/or special aquatic sites, therefore mitigation is not necessary.

1.7 National Environmental Policy Act (NEPA) purpose and need:

1.7.1 Project purpose as described by applicant: Improve the safety and navigability of the St. Lucie Inlet and use dredged material for shoreline stabilization activities between R59 to R-76.

1.7.2 Basic project purpose: Improve safety and navigation and provide shoreline stabilization.

1.7.3 Water-dependency determination: The proposed project is water dependent.

1.7.4 Overall project purpose: Improve the safety and navigability of the St. Lucie Inlet and use dredged material for shoreline stabilization activities between R-59 to R-76.

2.0 Authority: Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) and Section 404 of the Clean Water Act of 1972 (33 U.S.C. § 1344)

2.1 Jurisdictional Determination Information: The U.S. Army Corps of Engineers (Corps) issued a preliminary jurisdictional determination the same date that the Corps authorized the project.

The jurisdictional determination for the existing authorization evaluated the entire 1,003-acre project area and determined the jurisdictional waters of the United States include the 132.39 acres between the high tide line and the equilibrium toe of fill, the 31.29 acres of dredged areas, the 562 acres located in Borrow Area B, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, and the approximately 29 acre staging area located within Pecks Lake. The area between the high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres), were evaluated and determined to be uplands.

3.0 Scope of Analysis – *The Scope of Analysis listed in this section represents the scope of the final project description.*

3.1. National Environmental Policy Act (NEPA) – *Scope determination for NEPA review is found at 33 CFR 325, Appendix B, Paragraph 7.b. The following factors are considered in determining whether sufficient federal "control and responsibility" exists:*

3.1.1 Factors:

a. Whether or not the regulated activity comprises "merely a link" in a corridor type project – Rationale: The project is not a corridor type project.

b. Whether there are aspects of the upland facility in the immediate vicinity of the regulated activity that affect the location and configuration of the regulated activity – Rationale: The proposed work associated with this modification does not include any upland work. All work associated with the existing authorization for the 132.39 acres between the high tide line and the equilibrium toe of fill, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, the approximately 29 acre staging area located within Pecks Lake, the area between the high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres) are not included because those areas have already been evaluated (Reference decision document for SAJ-1996-05620(IP-MJW) dated 21 December 2011.

c. The extent to which the entire project will be within Corps jurisdiction – Rationale: The Corps jurisdiction is limited to the waters of the United States identified in the jurisdictional.

d. The extent of cumulative Federal control and responsibility – Rationale: The extent of cumulative Federal control and responsibility includes authorities under Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act of 1972, the National Environmental Policy Act, the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), and the Magnuson-Stevens Fishery Conservation and Management Act. The ESA scope extend into the uplands; therefore, the Federal control and responsibility includes the 1,003-acre entire project area.

3.1.2 Determination of scope – Based on an examination of NEPA (33 CFR Part 325, Appendix B) and applicable program guidance (e.g. Council on Environmental Quality's (CEQ) *Considering Cumulative Effects Under National Environmental Policy Act and the Standard Operating Procedures for the U.S. Army Corps of Engineers Regulatory Program, July 2009*), the Corps has determined that the appropriate scope for this project is: explained below

Explanation: The NEPA scope includes the 31.29 acres of dredged areas and the 562 acres located in Borrow Area B. The general locations of these areas can be found in Figures 1 and 2.

The original scope of the project includes the 31.29 acres of dredged area, the 132.39 acres between the high tide line and the equilibrium toe of fill, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, the approximately 29 acre staging area located within Pecks Lake, the area between the

high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres) are not included because those areas have already been evaluated and this modification does not include those areas.

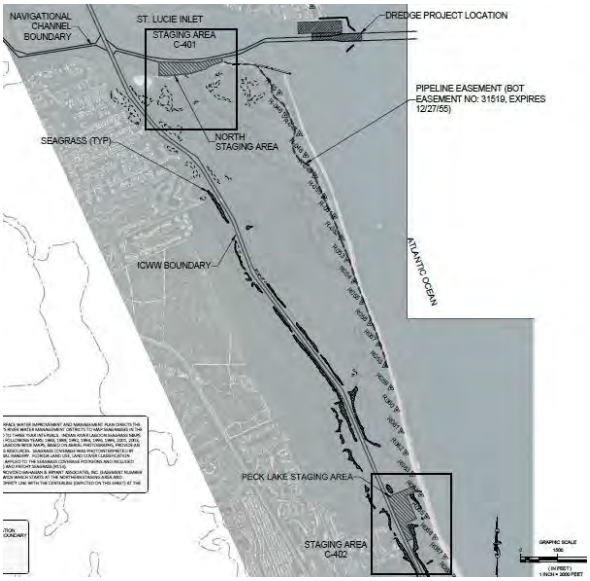

Figure 1

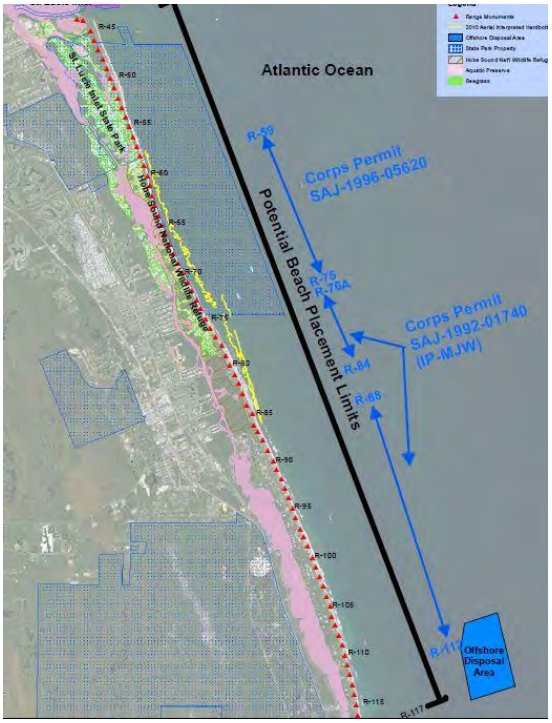

Figure 2- location of sand placement associated with SAJ-1996-5620 and the offshore Borrow area

3.2 National Historic Preservation Act (NHPA) "Permit Area" – *The NHPA scope is defined as "permit area". The permit area for an undertaking is defined in 33 CFR 325, Appendix C. The following three (3) tests must all be satisfied for an activity undertaken outside of waters of the United States to be included within the "permit area".*

3.2.1 Tests *(check all that apply)*:

☐ a. The activity outside of waters of the United States would not occur but for the authorization of the work or structures within waters of the United States.
Explanation: The proposed work associated with this modification does not include any upland work. All work associated with the existing authorization for the 132.39 acres between the high tide line and the equilibrium toe of fill, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, the approximately 29 acre staging area located within Pecks Lake, the area between the high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres) are not included because those areas have already been evaluated (Reference decision document for SAJ-1996-05620(IP-MJW) dated 21 December 2011.

☐ b. The activity outside waters of the United States is integrally related to the proposed work or structures within waters of the United States (or, conversely, the proposed work or structures within waters of the United States must be essential to the completeness of the overall project or program).
Explanation: The work in waters of the U.S. is essential to the overall project. The temporary discharge of dredged in waters of the U.S. will allow the County to meet the project need.

☐ c. The activity outside waters of the United States is directly associated (first order impact) with the proposed work or structures within waters of the United States.
Explanation: There is no work proposed outside of waters of the U.S. under this modification. The proposal would be to allow dredging without restrictions on timeframes as well as temporary disposal of the dredged sand in an offshore borrow area. Dredged material would be transported to Borrow Site B via barge or hopper dredge.

3.2.2 Scope Determination: Activities outside waters of the United States are not included because no activities outside waters of the United States are proposed. None of the above tests applied.

3.2.3 NHPA Scope Summary and Description: The NHPA scope includes the 31.29 acres of dredged areas and the 562 acres located in Borrow Area B. The general locations of these areas can be found in Figures 1 and 2.

The 132.39 acres between the high tide line and the equilibrium toe of fill, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, the approximately 29 acre staging area located within Pecks Lake, the area between the high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres) are not included because those areas have already been evaluated and this modification does not include those areas.

3.3 Endangered Species Act (ESA) "Action Area" – *The ESA scope is defined as "action area". The action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action; and, is defined in for an undertaking is defined in 50 CFR 402.02, Definitions.*

3.3.1 Determined Scope: The ESA scope includes the 31.29 acres of dredged areas and the 562 acres located in Borrow Area B. The general locations of these areas can be found in Figures 1 and 2.

The original scope of the project includes the 31.29 acres of dredged area, the 132.39 acres between the high tide line and the equilibrium toe of fill, the approximately 24 acres of staging area located south of the St. Lucie Inlet entrance channel, the approximately 29 acre staging area located within Pecks Lake, the area between the high tide line and the landward dune construction toe of fill (277.86 acres), the two pipeline corridors (1.43 acres) from the staging areas to the beach, and the pipeline corridor easement along the coastline landward of the high tide line (~3 acres) are not included because those areas have already been evaluated and this modification does not include those areas.

4.0 Public Involvement *(Public Notice required by 33 CFR 325.3)*:

4.1 Public Notice Information:
Application Received: 4 October 2013
Application Complete: 14 January 2016
Date Public Notice Issued: 22 January 2016
End Date for Public Notice Comment Period: 12 February 2016
Additional Information: The Corps requested additional information on 15 November 2013, regarding information about the borrow area and fill locations, as well as drawings. The application was withdrawn on 24 February 2014, due to lack of response to the Corps request for additional information. The applicant provided additional information on 29 July 2014 that included dredge acreage and fill acreage for both the

offshore borrow area and along the shoreline, additional information also included; existing conditions, specifically hardbottom, adjacent property owners, methodology of dredge material transport, and avoidance and minimization statements for the public notice. Additional information was requested on 16 January 2015 regarding surveys for the borrow area which were not provided and the application was withdrawn on 24 April 2015. By letter dated 16 January 2015, the Corps requested information regarding submittal of the most recent Martin County physical monitoring plan, hardbottom monitoring reports, updated drawings that indicate all modified fill placement locations, and detail regarding which sections of the proposed placement locations have active Corps permits due to the proposal overlapping beach profiles that are covered under SAJ-1992-01740 (Jupiter Island). The applicant submitted partial information to the Corps request on 18 February 2015, information not received were updated drawings and information regarding fill material. The applicant submitted the requested information on 9 November 2015 and 14 January 2016.

Compliance: The Corps has determined that the existing authorization is in compliance with all special conditions. The Corps has received all required monitoring reports and As-built certifications.

4.2 Public Meeting(s): No
Discussion/Explanation: NA

4.3 Public Notice Comments:

a. Comments Received From: National Marine Fisheries Services (NMFS) Habitat Conservation Division (HCD)
Date Received: 22 February 2016
Comment/Issue: NMFS provided one (1) essential fish habitat (EFH) conservation recommendation (Reference Section 10.2 for NMFS EFH resolution).

b. Comments Received From: State Historic Preservation Officer (SHPO)
Date Received: 16 February 2016
Comment/Issue: SHPO stated that the proposed project activities are unlikely to affect historic properties if the specific conditions are followed (Reference Section 10.3 for SHPO resolution).

4.4 Corps acknowledgment of comments: Yes, the following sections describe resolutions for NMFS and SHPO concerns; 10.2 and 10.3).

4.5 Issues Identified by the Corps: The Corps had concerns regarding two pending beach nourishment modification requests that contained overlapping geographic, Town of Jupiter Island SAJ-1992-01740 and Martin County SAJ-1996-05620).

4.6 Comments/Issues Forwarded to Applicant: Yes

Date Comments Forwarded: 16 January 2015

4.7 Applicant provided response to comments: Yes
Summary of response: Both the Town of Jupiter Island and Martin County submitted modification request to their existing DA authorizations that had overlapping geographic scopes of work. The County's modification request proposed an expanded fill template that overlapped the fill template within the Town of Jupiter Island's authorization. Furthermore, the County also proposed the option of placing access dredge material within Borrow Area B, which is currently authorized under the Town of Jupiter Island's permit. By letter dated 16 January 2015, the Corps requested a joint meeting be organized between Martin County and the Town of Jupiter Island, to discuss permitting responsibilities between both entities. A meeting was held between the Corps, the applicant and Martin County on 20 February 2015. By letter dated 23 February 2015, the Corps received a letter from the Town of Jupiter to consider the possibility of adding Martin County as a co-permittee. Since the meeting, Martin County eliminated the expanded fill template that they were proposing, but was still moving forward with the modification request to utilize the offshore borrow area and modify the dredge window. Martin County was not required to be a co-permittee on the DA permit modification for the Town of Jupiter Island, which was issued on 13 November 2015.

4.8 Corps Purview – The following comments are not discussed further in this document as they are outside the Corps purview: N/A

4.9 Additional information *(optional)*: N/A

4.10 Public Hearing Request – *(33 CFR 327) Requests for a public hearing shall be granted unless the district engineer determines that the issues raised within the request(s) for a public hearing are insubstantial or there is otherwise no valid interest to be served by the hearing. The district engineer will make such a determination in writing, and communicate his reasons therefor to all requesting parties.*

Public Hearing: No public hearing was requested or held for this project.
Discussion/Explanation *(if necessary)*: N/A

5.0 Alternatives Analysis – *(40 CFR 230.10, HQ Regulatory SOP July 2009, RGL 93-2, RGL 84-09) If the project is sited in a special aquatic site (such as a wetland), and if the project does not need to be in or near the special aquatic site to fulfill its basic purpose (i.e., the project is not "water-dependent"), it is presumed that there are practicable alternatives that do not involve special aquatic sites. To overcome this presumption, the applicant must clearly demonstrate to the Corps that practicable alternatives are not available. If the presumption is not overcome, the Corps must deny the permit application. If the project is not sited in a special aquatic site and/or is water-dependent, the applicant is not required to overcome the presumption that upland alternatives are available. However, the Corps must still address whether there are any upland*

alternatives (or alternatives with less impact), and if any are identified, the applicant must clearly demonstrate that they are not feasible. If such a demonstration cannot be made, the Corps must deny the permit application. The Corps performed an evaluation of alternatives, as described below:

5.1 Overall Project Purpose (as independently defined by Corps): Improve the safety and navigability of the St. Lucie Inlet and use dredged material for shoreline stabilization activities between R59 to R-76.

5.2 Screening Criteria:

Factor	Measure and/or constraint
Special Aquatic Sites	Acres of direct impact
Shoreline protection	Yes/No
Safe navigation	Yes/No

5.3 No Action Alternative *(No action is defined as permit denial or alternative without impacts to waters of the United States)*: Under the No Action alternative, the applicant is authorized to only dredge during winter months (1 November to 30 April). Additionally, placement of the dredged material would occur on the beach. The No Action Alternative would not allow temporary in-water placement of the sand at Borrow Area B. No special aquatic sites would be impacted, shoreline would be stabilized, and safe navigation would occur under the No Action Alternative.

5.4 Off-site locations and configurations: Not applicable, offsite locations would not meet the project purpose. Since the project is water dependent and the applicant has a valid Corps permit for the project site, the Corps did not request that the applicant offer off-site alternatives.

5.5 On-site configurations:

Proposed Action	**Siting Criteria**		
	Special Aquatic Sites	***Shoreline Protection***	***Safe Navigation***
Alternative A: Year round dredging	The proposed action is located in an existing authorized dredged footprint. No aquatic resources are present within the area, therefore no impacts are proposed or anticipated.	The material that will be dredged for sand by-passing of the Inlet on a more frequent basis will allow final placement along the shoreline to be conducted in a more proficient manner.	Excess sediment that accumulate within the dredged footprint during times of year were dredging was restricted would be removed to allow safe navigation of the Inlet year round.
Alternative B: Restricted	The proposed action is located in an existing	The material that will be dredged for sand by-	Excess sediment that accumulate within the

dredge window	authorized dredged footprint. No aquatic resources are present within the area, therefore no impacts are proposed or anticipated.	passing of the Inlet on a restricted yearly schedule would still be allowed to be placed along the shoreline for renourishment projects.	dredged footprint during times of year where dredging was restricted could shoal to a point where safe navigation could potentially be impeded.
Alternative C: Dredge disposal in offshore Borrow Area B	No submerged aquatic vegetation, hard bottom or corals are located within the Borrow area B, therefore no impacts to these resources are anticipated	In the event there is no capacity in the existing approved beach template or if dredging is required during the marine turtle nesting season, the storage of material would be beneficial for future beach renourishment activities.	The Borrow area has a depth of 60 feet, the additional material proposed to be discharged would not raise the benthic elevation to a point where navigation would be impeded.
Alternative D: Upland disposal of dredged material	Upland disposal would not impact any special aquatic sites or submerged aquatic vegetation.	Material disposed in an approved upland disposal area could be used in the future for beach renourishment and other shoreline stabilization activities	N/A

5.6 Practicable Alternatives carried forward: The applicants preferred Alternatives A and Alternative C, meet all the above criteria. The No Action Alternative and Alternative B would not allow the applicant the flexibility to dredge whenever there was a shoaled area that could impact navigation. It is also important for maintaining safe navigation relied upon by local, regional and statewide commerce, sport and recreations use. Flexibility in the timing of dredging will allow maintaining adequate flushing and water exchange for the Indian River Lagoon system, a Lagoon of National Significance that depends on the flushing action provided by St. Lucie Inlet and allows for discharge from Lake Okeechobee. This is also important for proper management and bypassing of littoral material impounded by the inlet. Alternative D meets all the criteria, however, no immediate upland disposal areas are currently available. The Florida Inland Navigation District (FIND) has an upland disposal area they use for maintenance material from dredging the ICW. FIND requires all of the available capacity and there are no other nearby upland disposal in the area. Therefore, the modifications of Alternatives A and C in regards to the dredging window and dredged spoil storage location are being carried forward.

Final project description: The applicant seeks authorization to modify the existing permit by conducting the following activities:

1) Perform maintenance dredging of the navigable channel during any time of the year on an "as-needed" basis to ensure safe navigability of the inlet. The dredged material would be placed along the shoreline described below or within the offshore Borrow Area B.

2) Discharge of dredged material from the St. Lucie Inlet within a 562 acre offshore disposal area identified as "Borrow Area B". This borrow area is located offshore Jupiter Island located approximately between R-109 and R-118. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment events, authorized under a separate permit. The maximum frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every 3 to 5 years.

6.0 Evaluation of the 404(b)(1) Guidelines:

(40 CFR 230) For each of the below listed evaluation criterion, this section describes the potential impact, any minimization measures that would be used to reduce the level of impact, and the resultant impact level. For the purpose of this evaluation, the fill associated with this project is the discharge of dredged material into offshore Borrow Area B.

6.1 Potential effects on physical and chemical characteristics of the aquatic ecosystem (Subpart C):

6.1.1 Substrate: Minor Effect (short term) – The sediment within the dredged areas (Impoundment Basin and Entrance Channel) consist primarily of poorly-graded, mostly fine to medium-grained quartz sand with few to some sand-size shell and trace sand-to-gravel sized shell fragments. Shell layers consisting of sand to gravel-sized shell fragments with trace to some sand-sized quartz are also present. Thin seams (less than 1-inch) of silt and soft clay may be encountered in the eastern reaches of the Impoundment Basin. Limestone rock fragments and pieces may be encountered, leftover from the original deepening project. These substrates are already being impacted through routine authorized dredging.

The benthic habitat of Borrow Area B is composed of mostly sand and unconsolidated sediment. There are patch reefs located a minimum of 1,115 feet to the west, 6,500 feet to the south and 7,000 feet to the north.

6.1.2 Suspended Particulates / Turbidity: Minor Effect (short term) – There will be a temporary increase in turbidity levels at the dredge areas during work and at the offshore borrow site during the discharge of material. This short-term increase may

have an adverse impact on nonmotile autotrophs as well as infaunal and sessile organisms such as periphyton, drifting phytoplankton, and mollusks. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded.

6.1.3 Water: Minor Effect (short term) – Project construction will involve the placement of beach sand material into the offshore Borrow area. No impacts to water resources are anticipated other than elevated turbidity during construction.

6.1.4 Current Patterns & Water Circulation: No Effect – Both dredging and placement will occur in open coastal waters. No modifications to existing water fluctuations are anticipated. Volumes to be placed in Borrow Area B would be determined prior to each dredging event. Since the impoundment basin, when full, holds between 450,000 cy and 600,000 cy, this would be the anticipated volume for a dredging and disposal event. The material placed in this area is intended to be dredged again and used for future project along Jupiter Island. The maximum frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every 3 to 5 years. It is more likely that the use of this site for temporary sand storage would be utilized every other maintenance event (every 6 to 10 years). The acreage that the fill would cover depends on the volume placed. The volume would be determined prior to each dredging event. The Borrow area covers a total area of 562 acres. The actual acreage that would be covered would not include the entire offshore disposal area.

6.1.5 Normal Water Fluctuations: No Effect – Both dredging and placement will occur in open coastal waters. No modifications to existing water fluctuations are anticipated.

6.1.6 Salinity Gradients: No Effect – Both dredging and placement will occur in open coastal waters. No modifications to existing salinity gradients are anticipated.

6.2 Potential effects on biological characteristics of the aquatic ecosystem (Subpart D):

6.2.1 Threatened or Endangered Species (also see section 10.1): May Affect but Not Likely to Adversely Affect – reference Section 10.1 below for ESA review.

6.2.2 Fish, Crustaceans, Mollusks, and Other Aquatic Organisms: Minor Effect (short term) – The project will have a direct impact to open sandy habitat within the borrow area which provides habitat to fish, crustaceans, mollusks and other aquatic organisms. Impacts are anticipated to be directly related to dredging and the discharge of dredged material within the offshore borrow area and are anticipated to be short term.

6.2.3 Other Wildlife: Minor Effect (short term) – Impacts to wildlife will be similar the existing authorized dredging project and the offloading of that material into the offshore borrow area would have similar effects to the existing beach nourishment projects where sand equilibrates into the offshore. Impacts will occur primarily to open sandy areas both

within the dredge footprint and placement areas and impacts will occur to wildlife associated with these habitats. Impacts will be ephemeral in nature with negligible long term impacts to these habitats. There is a potential for impacts to hardbottom resources within the vicinity of the placement area. Such impacts would result in temporary coverage of ephemeral nearshore hardbottom.

6.3 Potential Effects on Special Aquatic Sites (Subpart E):

6.3.1 Sanctuaries and Refuges: Not Applicable –

6.3.2 Wetlands: Not Applicable –

6.3.3 Mud Flats: Not Applicable –

6.3.4 Vegetated Shallows: Not Applicable –

6.3.5 Coral Reefs: Negligible Effect – Nearshore hardbottom resources (including corals) are present in the vicinity of the Borrow area. There is the potential for increased stress to corals from project related turbidity from the offloading of the dredged material within the borrow area. Direct and secondary coverage of coral resources is not anticipated and monitoring of adjacent hardbottom resources will be conducted during and post construction. Pre and Post construction surveys of the offshore disposal site will be conducted when it is used. Aquatic resources are located sufficiently far from Borrow area B. In 2010, a resource investigation of Borrow Area B was conducted. The report identifies and delineates the nearest resources, the closest of which is located over 1,000 feet away (Figure 3)

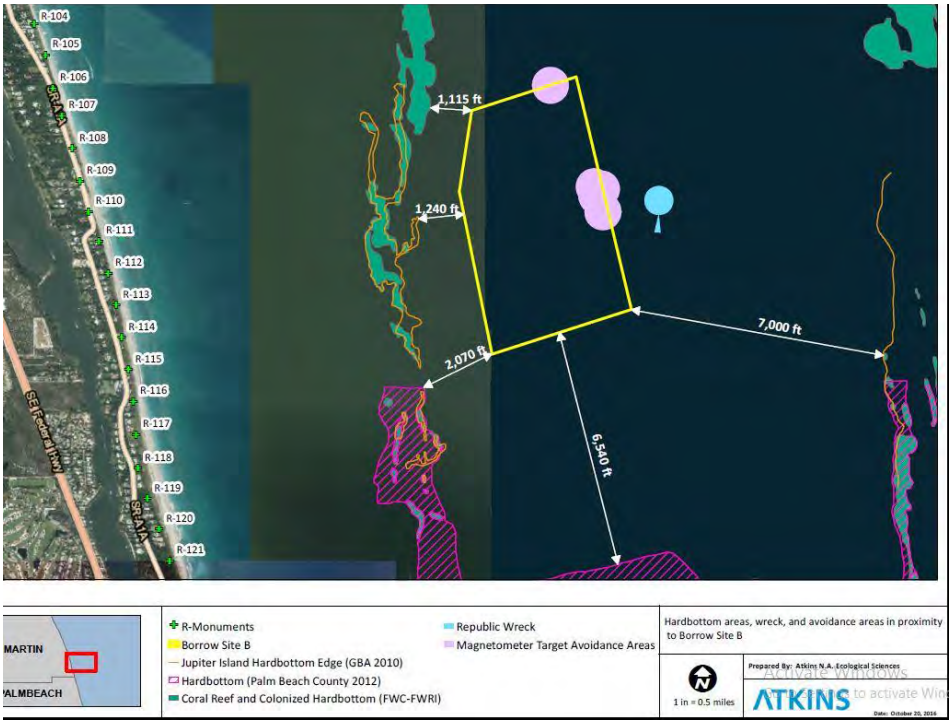

Figure 3: hardbottom and coral locations relative to Borrow Area B

6.3.6 Riffle and Pool Complexes: Not Applicable –

6.4 Potential effects on human use characteristics (Subpart F):

6.4.1 Municipal and Private Water Supplies: Not Applicable –

6.4.2 Recreational and Commercial Fisheries: Negligible Effect – Recreational and commercial fisherman may be temporarily unable to fish where the in-water construction would occur. The in-water work is temporary in nature and the boaters can maneuver around the construction vessels to other areas of the ocean while the work is occurring.

6.4.3 Water-related Recreation: Minor Effect (short term) – Impacts to water related recreation will occur during construction and will include restrictions on usage of areas in the vicinity of construction and elevated turbidity in the vicinity of the project area during construction. Impacts will be limited to direct construction activities. No unacceptable long term or cumulative impacts are anticipated.

6.4.4 Aesthetics: Minor Effect (short term) – Project related turbidity will reduce nearshore aesthetics during construction efforts. Construction equipment will temporarily impact the aesthetics. Impacts will be short term in nature.

6.5 Evaluation and testing (Subpart G):

6.5.1 General Evaluation of Dredged or Fill Material:
The sediment from the dredge cut(s) is similar to the material in the existing coastal system at the beach placement site. The dredge material have already been evaluated and authorized to be placed on the shoreline for nourishment activities (Reference decision document for SAJ-1996-05620(IP-MJW) dated 21 December 2011. A geotechnical data report for the maintenance dredging impoundment basin and entrance channel was conducted in October 2010. The sediment within the dredged areas (Impoundment Basin and Entrance Channel) consist primarily of poorly-graded, mostly fine to medium-grained quartz sand with few to some sand-size shell and trace sand-to-gravel sized shell fragments. Shell layers consisting of sand to gravel-sized shell fragments with trace to some sand-sized quartz are also present. Thin seams (less than 1-inch) of silt and soft clay may be encountered in the eastern reaches of the Impoundment Basin. Limestone rock fragments and pieces may be encountered, leftover from the original deepening project. These substrates are already being impacted through routine authorized dredging. The entire report can be found in the Administrative Record for this modification request. Analysis of the material in the Borrow Area B indicates that the sediments are slightly coarser than the existing native beach sediments. The mean grain size of borrow site “B” is between 0.28mm and 0.46mm.

This evaluation indicates that the proposed discharge material meets the testing exclusion criteria for the reason cited below.

Exclusion: Not applicable

6.5.2 Chemical, Biological, and Physical Evaluation and Testing:
N/A

6.6 Actions to minimize adverse effects (Subpart H):

Actions to be undertaken in response to 40 CFR Section 203.10(d) to minimize the adverse effects of discharges of dredged or fill material are incorporated into the discussion in sections 5.1 through 5.5 above. If applicable, additional actions to minimize adverse effects are discussed below, including actions concerning the location of the discharge, actions concerning the material to be discharged, actions controlling the material after discharge, actions affecting the method of dispersion, actions related to technology, actions affecting plant and animal populations, actions affecting human use, and other actions. Dredged material quality is anticipated to remain consistent with the past three dredging events. As such, there is no expectation that excess fines or poor quality material will be encountered. Given the characteristics of littoral drift material captured in the impoundment basin, as demonstrated in three previous maintenance events, there is every expectation material will fall well through the water column without persistent turbidity plumes that would travel and impact submerged

resources. Additionally, during construction in situ prevailing currents and other environmental factors will be taken into account to guide sand placement within the 562 acre limits of the Borrow area.

6.7 Factual Determinations – (Subpart B, section 230.11) *The determinations below are based on the determination of effects described in detail in sections 6.1 – 6.6 above*:

6.7.1 Physical substrate: Minor Effect (short term)

6.7.2 Water circulation, fluctuation and salinity: Minor Effect (short term)

6.7.3 Suspended particulates/turbidity: Minor Effect (long term)

6.7.4 Contaminants: Not Applicable

6.7.5 Aquatic ecosystem and organisms: Minor Effect (short term)

6.7.6 Proposed disposal site**:** Minor Effect (short term)

6.7.7 Cumulative effects on the aquatic ecosystem: Minor Effect (short term) – Cumulative effects are discussed in section 9 of this document.

6.7.8 Secondary effects on the aquatic ecosystem: Minor Effect (short term) – Secondary effects are discussed in section 9 of this document.

6.8 Restrictions on Discharges (Subpart B, section 230.10) *(an answer marked with an asterisk indicates noncompliance with the Guidelines)*:

No	Based on the discussion in section 5, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the US" or at other locations within these waters?
Yes	Based on the discussion in section 5, if the project is in a special aquatic site and is not water-dependent, has the applicant clearly demonstrated that there are no practicable alternative sites that do not involve SAS?
	Will the discharge:
No	Violate state water quality standards?
No	Violate toxic effluent standards (under Section 307 of the Act)?

No	Jeopardize endangered or threatened species or their critical habitat?
No	Violate standards set by the Department of Commerce to protect marine sanctuaries?
	Will the discharge contribute to significant degradation of "waters of the US" through adverse impacts to:
No	Human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?
No	Life stages of aquatic life and other wildlife?
No	Diversity, productivity, and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of the capacity of wetland to assimilate nutrients, purify water or reduce wave energy?
No	Recreational, aesthetic, and economic values?
Yes	Will all appropriate and practicable steps (40 CFR 23.70-77) be taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem?

Remarks – *if necessary*:

6.9 Compliance with the 404(b)(1) Guidelines *(Reference section 12 of this document)*: The Corps has determined that the project is in compliance with the 404(b)(1) Guidelines.

7.0 General Public Interest Review – *(33 CFR 320.4 and RGL 84-09) All public interest factors have been reviewed and summarized below. Both cumulative and secondary impacts on the public interest have been considered.*

Public Interest Factors Considered:

a. Conservation: N/A –

b. Economics: Beneficial (minor) – The ability to dredge the St. Lucie Inlet without time restrictions would allow safer navigation year-round for boaters who use the inlet, which may increase boat usage through the inlet. The project will also provide employment opportunities in the area and the tax base.

c. Aesthetics: N/A –

d. General Environmental Concerns: Adverse (minor) – Sediment deposition from the temporary placement of sand at Borrow Area B will result in burial of subtidal unconsolidated sediment. Soft bottom communities will also become buried, smothering infauna that may be food source for fish and other marine life. Organisms living in the nearshore sand areas are adapted to increased turbidity and unstable substrate conditions with tidal currents.

e. Wetlands: N/A –

f. Historic Properties: No adverse effect – reference Section 10.3.6

g. Fish and Wildlife Values: Adverse (minor) – The temporary impacts associated with this project are considered to be minimal, and are associated with construction activities. Because these impacts are temporary, there will be no loss of fish and wildlife values. Potential negative impacts to marine turtles are discussed in Section 10.1 of this document.

h. Flood Hazards: N/A –

i. Floodplain Values: N/A –

j. Land use: N/A –

k. Navigation: Beneficial (major) –Project construction would have a short-term, minor adverse impact on vessels in the project vicinity due to the presence of the dredging vessel and barge or hopper dredge vessels. The dredge footprint is already authorized and maintained to ensure safe navigation of the channel and Inlet. Flexibility in the timing of dredging will allow maintaining adequate flushing and water exchange for the Indian River Lagoon system, a Lagoon of National Significance that depends on the flushing action provided by St. Lucie Inlet and allows for discharge from Lake Okeechobee. This is also important for proper management and bypassing of littoral material impounded by the inlet.

l. Shore Erosion and Accretion: Beneficial (minor) – The existing DA permit already authorizes the placement of dredged material to stabilize and renourished the shoreline. The modification will allow more frequent dredging events and storage of excess material offshore to be used in future nourishment projects.

m. Recreation: N/A –

n. Water Supply and Conservation: N/A –

o. Water Quality: Adverse (minor) – The project is expected to cause temporary and insignificant increases in turbidity at the borrow area and intertidal swash zone seaward

of the beach. Due to the relatively low silt content and high density of the material, sand is expected to quickly fall out of the water column and only a short-term increase in turbidity is expected. A turbidity control and monitoring plan will be made a special condition of the permit to minimize impacts to surrounding waters. The FDEP permit includes conditions for water quality and certifies that the project is consistent with Water Quality Certification. The state water quality conditions will be made part of the Corp's permit. The fill material shall be free from items such as trash, debris, construction materials, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act. All beach fill material utilized would comply with the FDEP-approved Sediment Quality Assurance/Quality Control Plan (Sediment QA/QC Plan dated 11 October 2012).

p. Energy Needs: N/A –

q. Safety: N/A –

r. Food and Fiber Production: N/A –

s. Mineral Needs: N/A –

t. Consideration of Property Ownership: N/A –

u. Needs and Welfare of the People: N/A – This is a public project. Therefore, the needs and welfare of the public was considered.

7.1 The relative extent of the public and private need for the proposed structure or work: Maintaining navigational waterway is within the interest of both the public and private entities. The project increases the potential for employment opportunities and an increased tax base. Because this is a public project, there are no private needs to conduct the work.

7.2 Are there unresolved conflicts as to resource use? No
If so, are there reasonable and practicable alternative locations and/or methods to accomplish the objectives of the proposed action? NA

7.3 The extent and permanence of the beneficial and/or detrimental effects, which the proposed work is likely to have on the public and private use to which the area is suited: The proposed project is a limited volume placement within the existing offshore Borrow Area B, thus detrimental effects to hardbottom are not anticipated. Detrimental impacts of the proposed project involve the construction related disturbance; however these impacts will be temporary in the project area. The project will be beneficial in maintaining safe navigation of the channel and inlet and storing appropriate dredge material for future use of stabilizing the shoreline and protecting the dune within the

previously authorized renourishment template. Beneficial effects are permanent in the construction area with on-going maintenance.

8.0 Mitigation – *33 CFR 320.4 (r); 33 CFR 332; 40 CFR 230.70-77; 40 CFR 230.90-99 and 40 CFR 1504.12(f)*:

8.1 Avoidance – In evaluating a project area containing waters of the United States, consideration must be given to avoiding impacts on these sites. Avoidance measures for this project are: Avoidance measures indicated by the applicant in Section 1.5 of this document.

8.2 Minimization – If waters of the United States cannot be avoided, impacts must be minimized. Minimization measures for this project are: Minimization measures indicated by the applicant in Section 1.5 of this document. Additionally the applicant will adhere to the monitoring protocols are stated in the FDEP permit for turbidity monitoring during offshore placement as stated in the approved WQ/QC Plan and Monitoring Plan dated 4 October 2012. In addition the applicant shall submit an additional Monitoring Plan no less than 45 days that specifically addresses the disposal of material into the offshore disposal area (Borrow Area B) and any associated impacts to the adjacent resources to the West of Borrow Area B. This plan must receive written approval by the Corps prior to any commence of work associated with the disposal of material. Furthermore, minimization measures will also be required to avoid impacts to for historical resources as stated in Section 10.3.7.

8.3 Compensatory Mitigation:

8.3.1 Is Compensatory Mitigation required:

☑ No

(If No, provide explanation here. Do not complete [delete] rest of Section 8, Mitigation. If Yes, indicate N/A here): No impacts to submerged aquatic resources and/or special aquatic sites are proposed or anticipated, therefore mitigation is not required.

9.0 Cumulative and Secondary Impacts – *(40 CFR 230.11(g) and 40 CFR 1508.7, RGL 84-9) Cumulative impacts result from the incremental environmental impact of an action when added to all other past, present, and reasonably foreseeable future actions. They can result from individually minor but collectively significant actions taking place over a period of time. A cumulative effects assessment should consider both direct and indirect, or secondary, impacts. Indirect impacts result from actions that occur later in time or are farther removed in distance from the original action, but still reasonably foreseeable.*

9.1 Conclusions:

Temporal Scope: 5 years, the duration of the existing authorization which expires in December 2021 and the duration of authorized use of Borrow Area B per DA authorization for the Town of Jupiter Island SAJ-1992-01740, which expires in September 2021. Disposal in the offshore disposal area (Borrow Area B), which is an approximately 562 acre area, is an alternative disposal option for material routinely maintenance dredged from the St. Lucie Entrance Channel and Impoundment Basin. Volumes to be placed in Borrow Area B would be determined prior to each dredging event. The actual acreage that would be covered would not include the entire offshore disposal area (Borrow B). Since the impoundment basin, when full, holds between 450,000 cy and 600,000 cy, this would be the anticipated volume for a dredging and disposal event. Material placed in the offshore disposal area is intended to be dredged again and used for future beach project along Jupiter Island. The Town of Jupiter Island completed a beach nourishment that dredged approximately 1,670,000 cy of material from Borrow Area B in 2016. The Town expects to dredge another 1,670,000 cy from Borrow Area B within the next 5 years.

The maximum frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every 3 to 5 years, with the next even occurring in 2017, therefore there is potential for up to 2 disposal events within the next 5 years that would account for no more than 1,200,000 cy of material being discharged into Borrow Area B. It's more likely that the use of this site for temporary sand storage would be utilized every other maintenance event (every 6 to 10 years). The acreage that the fill would cover depends on the volume place.

Effect of the proposed mitigation, including avoidance and minimization, on reducing the project's contribution to cumulative effects in the region: No impacts to nearshore hardbottom or submerged aquatic vegetation is currently proposed therefore no mitigation is required by the County. The County is required to conduct project related monitoring. If adverse impacts occur as a result of work associated with this modification, the County will be required to provide compensatory mitigation.

The proposed project will not adversely impact the aquatic environment within the geographic scope. Nearshore and nearby vegetated bottoms are not likely to be adversely impacted. Similar nourishment and dredging activities have occurred in the past and will continue to occur to ensure the safety of the regulated public while ensuring no adverse impacts occur to the aquatic environment.

10.0 Other Laws, Policies, and Effects:

10.1 Endangered Species Act (ESA):

10.1.1 Name of Species considered: five species of threatened and endangered nesting and swimming sea turtles (*Chelonia mydas, Eretmochelys imbricata, Lepidochelys kempii, Dermochelys coriacea, Caretta caretta, Lepidochelys kempii*), the loggerhead

designated terrestrial critical habitat Unit LOGG-T-FL-09, the threatened piping plover (Charadrius melodus), northern right whale (*Eubalaena glacialis*), southeastern beach mouse (*Peromyscus polionotus neveiventris*), nearshore reproductive and migratory critical habitat for the loggerhead sea turtles within Unit LOGG-N-18, West Indian manatee (*Trichechus manatus latirostris*), smalltooth sawfish (*Pristis pectinata*), Rufa red knot (*Calidris canutus rufa*), and Johnson's seagrass (*Halophilia johnsonii*) and its designated critical habitat.

10.1.2 Effects Determination:

X No effect
For these species: Johnson's seagrass and designated critical habitat.

☑ May affect, not likely to adversely affect

For these species: Piping plover, red knot, West Indian manatee, sawfish, nearshore reproductive and migratory critical habitat for the loggerhead sea turtles within Unit LOGG-N-18, and terrestrial loggerhead critical habitat.

X may affect, likely to adversely affect
For these species: nesting and swimming sea turtles, right whale

10.1.3 Basis for determination: The modification request warrants reinitiating of consultation under the Endangered Species Act because it may cause an effect to listed species or critical habitat in a manner or to an extent not previously considered, and new critical habitat was designated that may be affected by the identified action. Section 7 Consultation was completed for potential affects to nesting sea turtles, piping plover and the manatee for the existing DA permit by letter dated November 1, 2011, where FWS stated the August 2011 Statewide Programmatic Biological Opinion (SPBO) applied to the project to address potential adverse effects.

No affect:

- Johnson's seagrass and designated critical habitat: The species is not located within the project footprint. The project is not located in the designated critical habitat of the species.

May affect:

- Right whale: Hopper dredging may adversely affect right whales, which occur during winter months in the vicinity of dredging. Right whales are highly migratory, and summer in the Canadian Maritime Provinces. They migrate southward in winter to the eastern coast of Florida. The breeding and calving grounds for the right whale occur off of the coast of southern Georgia and northern Florida. During winter months, right whales are routinely seen close to shore and have been sighted as far south as south Florida, with isolated sightings into the Gulf of Mexico. Offshore of St. Lucie County, the peak

probability of right whales occurrence is December through March. Due to the location of the proposed offshore disposal area, disposal operations could potentially interfere with migrating marine mammals such as the northern right whale. Dredge ship operators must exercise care as to minimize any potential impact to marine mammals. Heightened awareness and implementation of precautionary measures, as mandated in the Marine Mammal Protection Act, would minimize the possibility of inadvertently harming marine mammals.

- Nesting sea turtles: The proposed project includes the discharge of dredged material along the shoreline that known to be nesting habitat for the listed sea turtles. The Corps has determined that it is appropriate to apply the revised Statewide Programmatic Biological Opinion (2015-SPBO) concerning dredging and sand placement along the coast of Florida for the Corps.
- Piping Plover: The proposed project is within the known range of the species. The Corps has determined that it is appropriate to apply the Statewide Programmatic Piping Plover Biological Opinion (P3BO)(2013). The project would not adversely modify the species designated critical habitat.
- Swimming sea turtles and smalltooth sawfish: The Corps has determined that the proposed maintenance dredging is covered under the South Atlantic Regional Biological Opinion (SARBO) dated 29 October 1997 concerning dredging and sand placement along the coast of Florida for the Corps. Swimming sea turtles and smalltooth sawfish are mobile species that are likely to vacate the project area during the discharge of dredge material into the offshore Borrow Area.

May affect not likely to adversely affect:

- Florida scrub jay: The proposed activities will occur within known range of the species.
- Red Knott: The proposed activities will occur within known range of the species.
- Terrestrial critical habitat Unit LOGG-T-FL-09 Loggerhead: The project would affect the following four primary constituent elements essential to the species survival:

  A. Suitable nesting beach habitat that has (a) relatively unimpeded near shore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings; and, (b) is located above mean high water to avoid being inundated frequently by high tides.

  B. Sand that (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) is able to develop and maintain temperatures and moisture content conducive to embryo development.

  C. Suitable nesting beach habitat with sufficient darkness to ensure nesting turtles are not deterred from emerging onto the beach, post-nesting females re-orient back to the sea and emerging hatchlings orient correctly towards the sea.

D. Natural coastal processes or artificially created or maintained habitat mimicking natural conditions. This includes artificial habitat types that mimic the natural conditions described in the PCEs above for beach access, nest site selection, nest construction, egg deposition and incubation, and hatchling emergence and movement to the sea turtles.

The project is a beach re-nourishment within a previously authorized fill template. The beach area contains recreational use, predation. Future coastal development is not anticipated because land based infrastructure already exists. Artificial lighting also exists but the County has an existing sea turtle protection ordinance that specifically addresses coastal lighting.

- Nearshore reproductive and migratory critical habitat Unit LOGG-N-18 Loggerhead: The project may affect but is not likely to adversely affect the following neritic/Oceanic habitats identified to be essential to the species survival:

A. Nearshore Reproductive Habitat, including hatchling swim frenzy and inter-nesting female habitat. The following PCE's may be affected:

1. Waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water;
2. Waters with minimal manmade 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.

10.1.4 Consultation: Informal

10.1.5 Consultation response(s):

U.S. Fish and Wildlife Service (FWS): Section 7 Consultation was completed and the FWS provided a Biological Opinion (BO) dated 1 November 2011, for potential affects to nesting sea turtles, piping plover and the manatee for the existing DA permit. The modification request warrants reinitiating of consultation under the Endangered Species Act because it may cause an effect to listed species or critical habitat in a manner or to an extent not previously considered, and new critical habitat was designated that may be affected by the identified action. By letter dated 22 January 2016, the Corps re-initiated consultation with FWS for the proposal to dredge as needed year round and to also have the option to place the dredged material offshore at Borrow Area B. The FWS provided a Biological Opinion dated 12 April 2017 stating that the project modification was not likely to jeopardize the continued existence of the species above or adversely affect piping plover critical habitat, as described below.

Piping plover: The FWS has determined the Project's impact to optimal piping plover habitat is consistent with the analysis in the P^3BO. The County has agreed to follow and implement the Conservation Measures outlined in the P^3BO that apply to the Project. The FWS concurs that the project may affect, but is not likely to adversely affect Critical Habitat Unit FL-33 for the Piping Plover.

Red knot: Because suitable habitat for the red knot and piping plover is similar, minimization measures for potential effects to red knots in optimal habitat will be incorporated into the Project through the Corps' and Sponsor's commitment to implement the minimization measures, RPMs, and the Terms and Conditions identified in the P^3BO's. Therefore, due to lake of recent sightings, the FWS concurs that the project, as proposes, may affect but is not likely to adversely affect this species.

Terrestrial loggerhead critical habitat: The FWS has determined the Project effects on designated terrestrial loggerhead sea turtle critical habitat are consistent with those analyzed in the 2015 SPBO. Consequently the FWS concurs that the Project may affect, but is not likely to adversely affect terrestrial loggerhead sea turtle designated Critical Habitat Unit LOGG-T-FL09.

Nesting sea turtles: The FWS has determined the Project's effects concerning sand placement activities are consistent with those analyzed in the 13 March 2015 SPBO. Therefore, it is appropriate to apply the 2015 SPBO to the Project. Based on the Corps' commitment to implement the minimization measures, RPMs, and the Terms and Conditions identified in the 2015 SPBO that apply to the Project, the Project's take coverage for listed sea turtles is henceforth covered under the 2015 SPBO.

Manatee: Based on the Corps' and Sponsor's implementation of the following conditions and protective measures, the Florida Fish and Wildlife Conservation Commission's Standard Manatee Conditions for In-water Work, and the minimization measures outlined for manatees in the 2015-SPBO, the Service concurs with the Corps' determination that the proposed project may affect, but is not likely to adversely affect the manatee.

1. To reduce the risk of a vessel crushing a manatee, fenders or buoys shall be installed that provide a minimum standoff distance of at least 3 feet under maximum compression, and shall be utilized between moored vessels or two vessels that are moored together.
2. Any objects (e.g., pipe, rope, cords, ect.) place in the water shall be properly secured and regulatory monitored to prohibit manatee entanglement or entrapment.
3. Any bilge or other water discharge unit may attract manatees shall be prohibited.
4. For all in-water work, one observer on each vessel shall be dedicated to the task of watching form manatees, performing no other duties that would interfere with manatee observation. The observer(s) must have experience in manatee

observation and be equipped with polarized sunglasses to aid in observation. The observer(s) must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity.

5. If conditions (e.g., weather, heavy currents, ect.) are such that manatees cannot be observed within 50 -100 ft, in-water activities shall not be conducted.
6. Movement of work boats and barges shall be minimized at night.

The FWS issued a revised BO dated 20 April 2017, to clarify additional manatee conditions and protective measures outlined in the 12 April 2017 BO (manatee condition number 4). FWS stated that "upon review, manatee protective measure number 4 only applies if a clamshell dredge is utilized for Protection construction. Manatee protective measure number 4 does not apply to the use of a hydraulic (cutter suction or hopper) dredge. Based on this modification to our 12 April 2017, BO, it is our conclusion that the manatee protection measure modification as outlined above does not change the effects determination to manatees. All other components of our 12 April 2017, BO will be implemented as outlined.

The National Marine Fisheries Service (NMFS) Protected Resource Division (PRD): By letter dated 22 January 2016, the Corps reinitiated consultation with NMFS because it was determined that the modification request warrants reinitiating of consultation under the Endangered Species Act because it may cause an effect to listed species or critical habitat in a manner or to an extent not previously considered, and new critical habitat was designated that may be affected by the identified action.

By email dated 25 July 2016, NMFS informed that the Corps that this project is covered by an existing ESA consultation, the Regional Biological Opinion Concerning the use of Hopper Dredges in Channels and Borrow Areas along the Southeast U.S. Atlantic Coast (SARBO). The SARBO is a regional biological opinion originally written in 1991 to address Corps Civil Works and Regulatory maintenance dredging, sand mining areas ("borrow sites"), and beach re-nourishment areas in the South Atlantic. This Opinion was revised in 1995 and 1997 and is currently under re-initiation for a variety of reasons (e.g., expanded scope, new species, new critical habitat, etc.). Because the loggerhead critical habitat was not listed at the time the SARBO was developed, the Corps South Atlantic Division submitted a loggerhead sea turtle designated critical habitat analysis included in the 2008 South Atlantic Regional Biological Assessment (SARBA). Since the request for SARBO re-initiation, the USACE has drafted several documents called "7(a)2)/7(d) letters" that provide limited coverage to continue dredging activities under the existing permit. The SARBO combined with the SARBA address the consultation required for swimming sea turtles, right whale, and reproductive and migratory loggerhead critical habitat. The intent of the 7(a)(2)/7(d) letter is to evaluate an issue not considered or covered in the existing opinion (e.g., new species, new critical habitat, new methodology, etc.) and provide a stopgap between the time of re-initiation and the finalized revised opinion, allowing the

USACE to continue to use the opinion to facilitate their mission. Individual consultation with NMFS is not required provided the project complies with the terms and conditions of the SARBO.

10.1.6 Additional information *(optional)*: N/A

10.1.7 Compliance with ESA: Yes

10.2 Magnuson-Stevens Act – Essential Fish Habitat (EFH):

10.2.1 Name of Species considered: various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex

10.2.2 Effects Determination:

☐ No Effect
For these species:

☑ May affect, not likely to adversely affect
For these species: All species considered.

☐ May adversely affect
For these species:

10.2.3 Basis for determination: The proposal would dredge an inlet as needed without seasonal limitations and temporarily place dredged material within 562 acres of an offshore borrow area. The benthic habitat in all locations of the proposed activities contain un-vegetated sandy and/or rocky bottom, tidal, and sub-tidal areas utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or Federally managed fisheries in the South Atlantic Region.

10.2.4 Consultation: Informal

10.2.5 Consultation response: By letter dated 22 February 2016, NMFS HCD provided one (1) EFH Recommendation:

1. To reduce impacts to larval fishes, the permit should maintain the requirement for dredging to occur only during winter months (November 1 to April 30).

By letter dated 23 February 2017, the Corps informed NMFS that the above recommendation was not going to be accepted based on the following information. Dredging with hydraulic dredges usually results in little to no effect on adult fishes due to their size and ability to avoid either the drag head or cutterhead. The same cannot be said of larval fishes and eggs, which lack the ability to avoid the suction near the drag head or cutterhead. Larvae and egg distribution and concentrations in a channel are highly variable on a range of scales (spatially and temporally). Therefore it is important to recognize that not all larvae in an inlet like St. Lucie would be vulnerable to entrainment. Larvae and eggs are not equally distributed in the inlet as the tidal flows in and out of the inlet can show asymmetry. 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 (Settle 2003).

Settle (2003) discussed NOAA/NOS' National Centers for Coastal Ocean Science report entitled Assessment of Potential Larval Entrainment Mortality Due to Hydraulic Dredging of Beaufort Inlet. NOAA found, and Corps agrees that "any larvae entrained in the dredge are likely to be killed; it is likely that the impact at the population level would be insignificant" (Settle 2003). In this assessment, NOAA also determined that the use of a 30-inch hydraulic dredge dredging 24-hours a day in Beaufort Inlet, North Carolina, would result in entrainment mortality "even under the worst case scenario" of 0.1% per day where there are high densities of larval fishes (up to 5 larvae per m3). This may be informative of potential impacts St. Lucie Inlet, although it is far from Beaufort Inlet. The Corps is not aware of any studies regarding larval fish or egg densities in or around the St Lucie Inlet. Therefore, the Corps assumes that if an inlet such as Beaufort with high densities of larval fishes can be dredged for 24-hours-a-day without significant population level impacts to larval fish densities, that the same would hold true at the St. Lucie Inlet, where a significant portion of the larval development habitat is in the nearshore and offshore to the north and south of the Inlet according to previously submitted benthic surveys.

10.2.6 Additional information *(optional)*: The NMFS HCD did not respond to the Corps letter dated 23 February 2017.

10.2.7 Compliance with Magnuson-Stevens Act: Yes

10.3 National Historic Preservation Act – Section 106:

10.3.1 Known sites present: Yes

10.3.2 Survey required/conducted: No

10.3.3 Effects determination:

☐ No potential to cause effect

For these properties indicate sites here

☑ No effect

For these properties: Site 8MT00013, the Joseph Reed Mount located in the Hobe Sound National Wildlife Refuge

☐ No adverse effect

For these properties: indicate sites here

☐ Adverse effect

For these properties: indicate sites here

10.3.4 Rationale for effects determination: The aspect of the project involving dredging is located in an existing dredge footprint that is routinely maintenance and it is highly unlikely that historic artifacts would be located in an area that has been impacted previously. It was also determined that for the aspect of the project involving placement of dredged material into the offshore Borrow area, it is highly unlikely that historic artifacts would be located in the area due to the existing authorized use of the borrow area for sand mining for beach nourishment projects. All proposed activities will take place in areas that have been previously renouished or disturbed.

10.3.5 Memorandum of Agreement required: NA

10.3.6 Date consultation complete *(if necessary)*: 16 February 2016

10.3.7 Additional information *(optional)*: By letter dated 16 February 2016, the State Historic Preservation Officer stated that all project activities will take place in areas that have been previously renourished or disturbed. It is therefore the opinion of this office that the proposed project activities are unlikely to affect historic properties if the following conditions outlined below are followed:

- No ground disturbance occurs in areas that have not been previously disturbed, and does not go below the level where beach sand has previously been renourished.
- Site 8MT00013, the Joseph Reef Mound, located in the Hobe Sound National Wildlife Refuge should be avoided by all project activities.

In addition, the permit, if issued, should include the following special condition regarding unexpected discoveries:

- If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area,

the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discover. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)245-6333. Project activities shall not resume without verbal and/or written authorization. I the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, Florida Statutes.

Consultation with SHPO was also completed for DA permit SAJ-1992-01740(MOD) dated 13 November 2015, for the Town of Jupiter Island for utilizing Borrow Area B. As a result of that consultation SHPO requested the following special condition to be incorporated into the DA permit. That conditions as stated below will also be incorporated into this authorized modification:

Condition: "Borrow Area B: No sand borrowing or transfer work should be allowed to occur within a 500-foot radius of the anomalies, or their respective clusters recorded in the 1989 magnetometer survey of Borrow Area B (Florida Master Site File # 2115). The 500-foot radii should be delineated by marker buoys."

10.3.8 Compliance with National Historic Preservation Act: Yes

10.4 Corps Wetland Policy: N/A

10.5 Water Quality Certification under Section 401 of the Clean Water Act:

10.5.1 An individual water quality certification was issued.

10.5.2 Date of Water Quality Certification decision: 24 September 2014

10.5.3 Additional information *(optional)*: The Florida Department of Environmental Protection (FDEP) issued Permit No.: 0269814-007-JC

10.6 Coastal Zone Management Consistency under Section 307c of the Coastal Zone Management Act (CZMA):

10.6.1 A CZMA consistency determination was issued.

10.6.2 Date of CZMA decision: 24 September 2014

10.6.3 Additional information *(optional)*: The FDEP issued Permit No.: 0269814-007-JC

10.7 Effects on Federal Projects *(33 CFR 320.4(g)(4))*: This project is not located in the vicinity of an authorized federal project. However, the entire scope of work for this modification and the existing DA authorization is undergoing approval for federal

assistance and funding. Once the project is federally funded, it will become a Federal Project. Regulatory Division has coordinated the project with the Corps' Civil Works program. The applicant's proposed project is consistent with the proposed federal project.

10.8 Effects on the limits of the territorial seas *(33 CFR 320.4(f))*: would dredge coastal waters and temporarily place the dredged material offshore. The effects of the proposed project on the territorial seas are minor.

10.9 Safety of impoundment structures *(33 CFR 320.4(k))*: This proposed project does not include any impoundment structures.

10.10 Activities in Marine Sanctuaries *(33 CFR 320.4(i))*: This proposed project is not located in a marine sanctuary as established by the Secretary of Commerce under authority of Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972.

10.11 Other Authorizations: N/A

10.12 Significant issues of Overriding National Importance *(33 CFR 320.4(j)(2))*: NA

10.13 Discussion *(if necessary)*: N/A

11.0 Final Project Description and Special Conditions:

11.1 Final Project Description: The applicant seeks authorization to modify the existing permit by conducting the following activities:

1) Perform maintenance dredging of the navigable channel during any time of the year on an "as-needed" basis to ensure safe navigability of the inlet. The dredged material would be placed along the shoreline or within the offshore Borrow Area B.
2) Discharge of dredged material from the St. Lucie Inlet within a 562 acre offshore disposal area identified as "Borrow Area B". This borrow area is located offshore Jupiter Island located approximately between R-109 and R-118. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment events, authorized under a separate permit. The maximum frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every 3 to 5 years.

11.2 Special Conditions: Additional conditions pertaining to ESA, SHPO and project monitoring are being included in this modification authorization. The following special conditions of the original authorization are being updated and will supersede the existing conditions of the original permit: 6 (fill material), 14(SPBO), and 15(Hopper

Dredging). All other special conditions of the existing DA authorization are still valid with the addition of the below new and updated special conditions.

Special Conditions for SAJ-1996-05620(MOD-LCK):

6. **Fill Material**: The Permittee shall use only clean, beach-compatible fill material for this project. The fill material shall be free from items such as trash, debris, construction materials, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act. All beach fill material utilized shall comply with the FDEP-approved Sediment Quality Control/Quality Assurance Plans (Attachment D). Sampling reports required by the plan shall be provided to the Corps Enforcement Section. If the beach fill material placed at the project site does not meet the specifications of the Sediment Quality Control/Quality Assurance Plan and/or the specifications of the terms and conditions of the FWS Biological Opinion, the Corps and FWS shall be notified immediately and any necessary remediation efforts shall be coordinated with Corps Enforcement Section staff. To the extent the Sediment Quality Control/Quality Assurance Plan conflicts with the terms and conditions of the attached FWS Biological Opinion, the FWS Biological Opinion shall prevail.

14. **Statewide Programmatic Biological Opinion (SPBO)**: The Permittee has reviewed the Reasonable and Prudent Measures, Terms and Conditions of the SPBO dated March 13, 2015, and agreed to follow the reasonable prudent measures and term and conditions.

- **Turtle Nesting Season:** Pursuant to the attached State Programmatic Biological Opinion from the US FWS dated March 13, 2015 (Attached), beach re-nourishment activities will only occur during the non-peak sea turtle nesting season (November 1 through April 30), however dredging could occur year round.

15. **HOPPER DREDGING**

- **Reporting:** The Permittee shall ensure all reports, notifications, documentation and correspondence required by the general or special conditions of this permit are submitted to the Corps at the following email address: sajdredgenotice@usace.army.mil. Requests for documents, forms or information also be submitted to the Corps at this email address. The Permittee shall reference this permit number, SAJ-1996-05620 (MOD-LCK), SARBO, and include the topic in the subject line of the email and on all submittals.

- **Deflector Device Submittal:** No dredging shall be performed by a hopper dredge without the inclusion of an approved rigid sea turtle deflector device. The Permittee shall ensure drawings of the proposed sea turtle deflector device and the Hopper Dredge Deflector Device Checklist form (Attached) are complete and

all required documentation submitted to the Corps at least 30 days prior to initiating the authorized work. The Permittee shall not commence hopper dredging until approval of the sea turtle deflector device has been granted by the Corps. A copy of the approved drawings, calculations and signed Hopper Dredge Deflector Device Checklist form shall be available on the vessel during dredging operations.

- **Pre-Dredging Inspection Submittal**: The Permittee shall submit the completed Hopper Dredge Pre-Dredge Inspection Checklist form (Attached) to the Corps, at least 5 days prior to initiating the authorized work.

- **Dredging Quality Management:** Dredging and dredged material disposal and monitoring of dredging projects using the Dredging Quality Management (DQM) system shall be implemented for this permit. The Permittee shall ensure that each hopper dredge assigned to the work authorized by this permit is equipped with DQM, previously known as 'Silent Inspector', for hopper dredge monitoring. The Permittee's DQM system must have been certified by the DQM Support Team within one calendar year prior to the initiation of the dredging/disposal. Questions regarding certification should be addressed to the DQM Support Center at 251-690-3011. Additional information about the DQM System can be found at http://dqm.usace.army.mil. The Permittee is responsible for insuring that the DQM system is operational throughout the dredging and disposal project and that project data are submitted to the DQM National Support Center in accordance with the specifications provided at the aforementioned website. The data collected by the DQM system shall, upon request, be made available to the Regulatory Division of the U.S. Army Corps of Engineers - Jacksonville District.

- **Commencement Notification:** Within 3 days from the date of initiating the authorized work that includes hopper dredging, the Permittee shall provide to the Corps, the completed Hopper Dredge Startup Inspection Checklist form (Attached) with a written notification of the date of commencement of work authorized by this permit. An inspection of the hopper dredge will be scheduled and performed by the Corps after receipt of the notification of commencement.

21. **Piping Plover Programmatic Biological Opinion (P^3BO)**: The Permittee is required to comply with the Reasonable and Prudent Measures, Terms and Conditions of the SPBO dated March 13, 2015 and **P^3BO** dated May 22, 2013 (Attached), in order to comply with the ESA.

22. **South Atlantic Regional Biological Opinion**: The 1997 South Atlantic Regional Biological Opinion (SARBO) for swimming sea turtles, whales, and sturgeon can be found at the following web address: http://el.erdc.usace.army.mil/seaturtles/refs-bo.cfm. The RBO contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is specified in the RBO.

Your authorization is conditional upon your compliance with all of the mandatory terms and conditions associated with the incidental take of the RBO, which terms and conditions are incorporated by reference in the permit. Failure to comply with the terms and conditions associated with the incidental take of the RBO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. However, depending on the affected species NMFS is the appropriate authority to determine compliance with the terms and conditions of its RBO and with the Endangered Species Act (ESA). For further clarification on this point, you should contact NMFS. Should NMFS determine the conditions of the RBO have been violated, normally they will enforce the violation of the ESA, or refer the matter to the Department of Justice.

23. **Incidental Take Statement:** This permit does not authorize the Permittee to take an endangered species, in particular sea turtles, sturgeon, whales or any other endangered species listed in the SARBO. The SARBO includes an Incidental Take Statement (ITS) issued to the Corps. The Permittee understands and agrees that, even where it is in full compliance with the terms and conditions of the SARBO ITS and this permit, incidental take by the Permittee or other hopper dredging operations within the area covered by the SARBO may result in suspension or modification of this permit by the Corps. The amount of incidental take that will trigger suspension, and the need for any such suspension, shall be determined at the discretion of the Corps. The Permittee understands and agrees on behalf of itself, its agents, contractors, and other representatives, no claim, legal action in equity or for damages, adjustment, or other entitlement against the Corps shall arise as a result of such suspension or related action.

24. **Endangered Species Observers:** During dredging operations, NMFS approved endangered species observers (Observer) shall be aboard each hopper dredge to monitor for the presence of endangered species including sea turtles, sturgeon, whales and manatees. Observers shall perform their observations 24hr/day and every day during dredging operation.

a. During transit to and from the disposal area, the Observer shall monitor from the bridge during daylight hours for the presence of endangered species, especially the Northern right whale, during the period December through March.

b. During dredging operations, while dragheads are submerged, the Observer shall continuously monitor the inflow and/or overflow screening for turtles and/or turtle parts and sturgeon and/or sturgeon parts.

c. Upon completion of each load cycle, dragheads should be monitored as the draghead is lifted from the sea surface and is placed on the saddle in order to assure sea turtles that may be impinged within the draghead are counted and recorded. The Observer shall physically inspect dragheads and inflow and overflow screening/boxes

for threatened and endangered species take. The Observer shall identify, count, and record sea turtle or sturgeon parts during the inspection of the inflow and overflow screening/boxes. All debris shall be removed from the screening/boxes after the inspection is complete so as not to impede the functioning of the screens during the next load cycle.

d. The Observer shall maintain a log detailing all incidents, including sightings, collisions with, injuries to, or killing of endangered species during dredging operations. The data shall be recorded daily on the Observer forms which are located at the following web site under the heading "Turtle Information": http://el.erdc.usace.army.mil/seaturtle. If the Permittee is unable to view the Observer forms at this website the Permittee shall contact the Corps to receive a copy of the Observer forms. Completed Observer forms shall be submitted to the Corps at the end of each day as identified in the reporting special condition. A summary report of the above incidents and sightings shall be submitted to the Corps within 15 days of project completion.

25. **Observer Equipment:** The Permittee shall provide a digital camera, with an image resolution capability of at least 300 dpi, in order to photographically report all incidental takes, without regard to species, during dredging operations. Immediately following the incidental take of any threatened or endangered species, images shall be submitted to the Corps in a .JPG or .TIF format and shall accompany incidental take forms. The nature of findings shall be fully described in the incidental take forms including references to photographs.

26. **Incidental Take:** The Permittee shall immediately cease all hopper dredging operations and notify the Corps upon discovery of an incidental take of a sea turtle or sturgeon. The Permittee shall not resume hopper dredging until notified by the District Engineer, or his designee. The Sea Turtle Incidental Take Data form which is located at the following web site under the heading "Turtle Information Observer Forms," http://el.erdc.usace.army.mil/seaturtles, will be filled out by the Observer and shall be submitted to the Corps with photographic documentation within 6 hours of the take event.

27. **Sea Turtle Trawling:** Sea turtle trawling shall be conducted following the take of two sea turtles, without regard to species, and continue until the end of dredging or as directed by the Corps. Trawling shall be conducted in accordance with the Sea Turtle Trawling requirements (Attached). Hopper dredging shall not resume until trawling has been initiated and until notified by the District Engineer, or his designee. The results of each trawl shall be recorded on the Sea Turtle Trawling Report which is located at the following website under the heading "Turtle Information": http://el.erdc.usace.army.mil/seaturtle. If you are unable to view the Trawling Report forms at this website you must contact the Corps to receive a copy of the forms. Interim trawling reports shall be submitted to the Corps by the end of each day. A final trawling

report shall be prepared and submitted to the Corps after the completion of all trawling efforts. The final trawling report shall summarize the results of the trawling including total trawling times, number of trawls and number of captures. Any turtles captured during trawling shall be immediately release.

28. **Dredge Protocol**: The Permittee will adhere to the South Atlantic Division Corps of Engineers Hopper Dredging Protocol for Atlantic coast.

29. **As-Built Certification:** Within 60 days of completion of the work authorized (dredging and disposal of material into offshore Borrow Area B), by this permit, the Permittee shall submit as-built drawings of the authorized work and a completed "As-Built Certification By Professional Engineer" form (Attached) to the Corps. The as-built drawings shall be signed and sealed by a registered professional engineer and include the following:

a. A plan view drawing of the location of the authorized work footprint, as shown on the permit drawings, with transparent overlay of the work as constructed in the same scale as the permit drawings on 8½-inch by 11-inch sheets. The plan view drawing should show all "earth disturbance," including wetland impacts and water management structures.

b. A list of any deviations between the work authorized by this permit and the work as constructed. In the event that the completed work deviates, in any manner, from the authorized work, describe on the attached "As-Built Certification By Professional Engineer" form the deviations between the work authorized by this permit and the work as constructed. Clearly indicate on the as-built drawings any deviations that have been listed. Please note that the depiction and/or description of any deviations on the drawings and/or "As-Built Certification By Professional Engineer" form does not constitute approval of any deviations by the Corps.

c. Include the Department of the Army permit number on all sheets submitted.

30. **Turbidity Monitoring**: The Permittee shall conduct turbidity monitoring as required under FDEP permit number 0269814-007-JC (Attached Monitoring Plan and QA/QC Plan). All monitoring data shall be submitted to the Corps Enforcement Section within one week of analysis.

31. The applicant shall submit a Monitoring Plan no less than 45 days prior to commencement of work, that specifically addresses the disposal of material into the offshore disposal area (Borrow Area B) and any assessment methods of potential impacts to the adjacent resources to the West of Borrow Area B. This plan must receive written approval by the Corps prior to any commence of work associated with the disposal of material.

32. To reduce the risk of a vessel crushing a manatee, fenders or buoys shall be installed that provide a minimum standoff distance of at least 3 feet under maximum compression, and shall be utilized between moored vessels or two vessels that are moored together.

33. Any objects (e.g., pipe, rope, cords, ect.) place in the water shall be properly secured and regulatory monitored to prohibit manatee entanglement or entrapment.

34. Any bilge or other water discharge unit may attract manatees shall be prohibited.

35. For all in-water work involving the use of a clamshell dredge, one observer on each vessel shall be dedicated to the task of watching form manatees, performing no other duties that would interfere with manatee observation. The observer(s) must have experience in manatee observation and be equipped with polarized sunglasses to aid in observation. The observer(s) must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity.

36. If conditions (e.g., weather, heavy currents, ect.) are such that manatees cannot be observed within 50 -100 ft, in-water activities shall not be conducted.

37. Movement of work boats and barges shall be minimized at night.

38. **Cultural Resources/Historic Properties**:

a. No structure or work shall adversely affect, impact, or disturb properties listed in the National Register of Historic Places (NRHP) or those eligible for inclusion in the NRHP.
b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work in the vicinity and notify the Corps. The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.
c. A cultural resources assessment may be required of the permit area, if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not

resume on non-federal lands without written authorization from the SHPO and the Corps.

d. In the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05 Florida Statutes. All work in the vicinity shall immediately cease and the Permittee shall immediately notify the medical examiner, Corps, and State Archeologist. The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume without written authorization from the State Archeologist, SHPO and the Corps.

e. If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discover. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)245-6333. Project activities shall not resume without verbal and/or written authorization. I the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, Florida Statutes.

39. Borrow Area B: No sand borrowing or transfer work shall be allowed to occur within a 500-foot radius of the anomalies, or their respective clusters recorded in the 1989 magnetometer survey of Borrow Area B (Florida Master Site File # 2115). The 500-foot radii shall be delineated by marker buoys.

40. No ground disturbance occurs in areas that have not been previously disturbed, and does not go below the level where beach sand has previously been renourished.

41. Site 8MT00013, the Joseph Reef Mound, located in the Hobe Sound National Wildlife Refuge shall be avoided by all project activities.

12.0 Findings and Determinations:

12.1 Section 176(c) of the Clean Air Act General Conformity Rule Review: The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit would not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this permit action.

12.2 Relevant Presidential Executive Orders:

12.2.1 EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians: This action has no substantial effect on one or more Indian tribes, Alaska or Hawaiian natives.

12.2.2 EO 11988, Floodplain Management: This action is not located in a floodplain.

12.2.3 EO 12898, Environmental Justice: The Corps has determined that this proposed project would not use methods or practices that discriminate on the basis of race, color or national origin nor would it have a disproportionate effect on minority or low-income communities.

12.2.4 EO 13112, Invasive Species: There are no invasive species issues involved in this proposed project.

12.2.5 EO 13212 and EO 13302, Energy Supply and Availability: The project was not one that will increase the production, transmission, or conservation of energy, or strengthen pipeline safety.

12.2.6 EO 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes: The project would not adversely affect America's stewardship of the ocean, coasts, or Great Lakes.

12.3 Finding regarding the need for an Environmental Impact Statement: Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, we find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

12.4 Compliance with the Section 404(b)(1) Guidelines: Having completed the evaluation in Section 6, the undersigned have determined that the proposed discharge complies with the Guidelines.

Reason for noncompliance: N/A

12.4.1 The proposed action is the Least Environmentally Damaging Practicable Alternative (LEDPA).

12.5 Public Interest Determination: We find that issuance of a Department of the Army Permit is not contrary to the public interest.

Prepared By:

_____ Date: 4 May 2017
Linda C. Knoeck Project Manager

Reviewed By:
Alisa Zarbo
_____ Date: 4 May 2017
Alisa A. Zarbo Chief, Palm Beach Gardens Office

Approved By:
Alisa Zarbo
_____ Date: 4 May 2017
Jason A. Kirk, Colonel, U.S. Army District Commander

ENCLOSURE 3

JUNE 2017

ENVIRONMENTAL ASSESSMENT

OPERATIONS AND MAINTENANCE DREDGING PLACEMENT OF DREDGED MATERIAL IN OFFSHORE BORROW AREA

ST. LUCIE INLET
MARTIN COUNTY, FLORIDA

U.S. Army Corps
of Engineers
Jacksonville District

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 San Marco Boulevard
JACKSONVILLE, FLORIDA 32207-8175

REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT

CONTINUED OPERATIONS AND MAINTENANCE DREDGING ST. LUCIE INLET WITH STAGING OF DREDGED EQUIPMENT AT PECKS LAKE AND PLACEMENT OF DREDGED MATERIAL ON THE BEACH OR BORROW AREA "B" MARTIN COUNTY, FLORIDA

The U.S. Army Corps of Engineers, Jacksonville District (Corps), has conducted a thorough review of multiple environmental assessments (EA) and a Department of Army permit Memorandum for the Record (MFR) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The Corps adopts the assessment of effects from each of the St. Lucie Inlet Operations and Maintenance Dredging EAs dated 1994, 2000, 2011, and the 2017 MFR. This finding then references all four Environmental reviews conducted for the proposed action.

The initial EA was completed September 12, 1994 for the maintenance dredging of the St. Lucie Inlet Federal Navigation Project (SLIFNP) to the authorized depth of -16-feet deep plus 2-feet of allowable over-depth at mean lower low water (MLLW) and adjacent impoundment basin to -11-feet deep plus 2-feet of allowable over-depth MLLW. This 1994 EA included an evaluation of the placement of dredged material in the nearshore between R-89 to R-99 shoreward of the -20' bathymetric contour and on the beach beginning 4,000' south of the south jetty and extending another 10,000' further south.

The second EA, completed on June 8, 2000, for navigation improvements and continued maintenance dredging of the inlet to the authorized depth of -16-feet deep plus 2-feet of allowable over-depth at MLLW, as well as deepening of the adjacent impoundment basin to -16-feet deep plus 2-feet of allowable over-depth (plus 2-feet of additional rock dredging for initial event only). The 2000 EA included an evaluation of the placement of dredged material in the same nearshore area as assessed in the 1994 EA, but shoreward of the -16' bathymetric contour, on the beach beginning 5,000' south of the south jetty, and placement of construction material from impoundment basin in an offshore artificial reef site.

The third EA, completed December 7, 2011, for the continued maintenance dredging of the SLIFNP with alternative transfer methods for dredged materials to the beach or nearshore placement areas. The preferred alternative transferred dredged material at Pecks Lake.

Lastly, Martin County possesses a permit, issued on May 4, 2017 by the Corps Regulatory Division for Department of the Army Permit SAJ-1996-5620(MOD-LCK) under the Authority of Section 10 of the Rivers and Harbors Act of 1899 and 404 of the Clean Water Act, for dredging of the SLIFNP, placement of material on the beach between R59 to R-76 or placement of dredged material in Borrow Area "B" (it is anticipated that the Town of Jupiter Island would later use the dredged material placed in Borrow Area "B" for beach nourishment under a separate permit).

Due to the effects of hurricane Matthew in September 2016, there is an immediate need to clear the navigation channel of the St. Lucie Inlet of up to 450,000 cubic yards of sand. The non-federal sponsor wants to leverage the sand resources in the inlet for future shore protection project nourishment events and the Corps wants to meet our Regional Sediment Management goal of reuse of dredged material whenever possible. Based on information analyzed within this EA and the previous EAs outlined above, reflecting pertinent information obtained from other agencies and special interest groups having jurisdiction by law and/or special expertise, I conclude that the proposed action will have no significant impact on the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are, in summary:

a. Dredging is expected to occur every 3-5 years; however, dredging frequency may vary due to storm induced shoaling;

b. All practicable means to avoid and minimize adverse environmental effects have been incorporated into the recommended plan. Environmental commitments as detailed in this EA will be implemented to minimize impacts;

c. Pursuant to the Clean Water Act of 1972, as amended, any discharge of dredged or fill material associated with the proposed action have been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) evaluation is found in Section 6.0 of the 2017 EA (Department of the Army Permit SAJ-1996-5620(MOD-LCK);;

d. Pursuant to the Clean Water Act of 1972, as amended, the Florida Department of Environmental Protection issued Section 41 water quality certification (State Permit No.: 0269814-007-JC) on September 24, 2014;

e. Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended, coordination with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) has been adopted from the 2017 (Department of the Army Permit SAJ-1996-5620(MOD-LCK);, as there is no deviation in project scope coordinated from the permit to the civil works project. The USFWS concurred with the Corps determination that the proposed action was covered by the Statewide Programmatic Biological Opinion (SPBO) (41910-2011-F-0170) dated March 13, 2015 for sand placement activities in Florida and the Programmatic Piping Plover Biological Opinion (P3BO) (O4EF1000-2013-F-0124) dated May 22, 2013, for effects to five listed species of sea turtles, the endangered Piping plover, threatened Rufus Red Knot and threatened Florida manatee on 20 April 2017.

Compliance with the ESA for dredging of the inlet and placement on the beach or in Borrow Area B is covered by the South Atlantic Regional Biological Opinion (SARBO) dated September 25, 1997;

f. This Finding also adopts the coordination with NMFS Habitat Conservation Division under the Essential Fish Habitat provisions of the Magnuson Stevens Act, which provided one conservation recommendation on February 22, 2016 and the Corps responded to that recommendation on February 26, 2016, concluding consultation;

g. The State concurred with the Corps Coastal Zone Management Act (CZMA) consistency determination that the proposed action is consistent with the enforceable policies of the Florida Coastal Management Program through issuance of Joint Coastal Permit 0269814-007-JC;

h. Pursuant to section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, in coordination with the Florida State Historic Preservation Officer on November 13, 2015, it was determined that the continued dredging and placement of dredged material on the beach or in Borrow Area B will have no effect on historic properties;

Benefits to the public will be to facilitate dredging of a federal navigation channel with reuse of the sand resource by placement on the beach or in Borrow Area B for future placement on the beach, or placement in the approved nearshore placement area and therefore continued storm damage reduction, local economic stimulus and increased recreational benefits from the beaches of Martin County;

Measures will be in place during construction to eliminate, reduce, or avoid adverse impacts below the threshold of significance to fish and wildlife resources including the following:

1. Construction activities would follow the terms and conditions of the SPBO, P3BO and SARBO;
2. The Jacksonville District's Migratory Bird Protection requirements would be followed during the nesting season;
3. Water quality shall be protected by adherence to the State of Florida water quality criteria included in JCP 0269814-007-JC.

In consideration of the information summarized, I find that the continued maintenance dredging of the St. Lucie Inlet with placement on the beach, in the nearshore or in Borrow Area B, will not significantly affect the human environment and does not require an Environmental Impact Statement. A copy of these documents will be made available to the public at the following website:

http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx.

JASON A. KIRK, P.E.
Colonel, Corps of Engineers
Commanding

6 July 2017
Date

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ENVIRONMENTAL ASSESSMENT
ST. LUCIE INLET
OPERATIONS AND MAINTENANCE DREDGING

1 PROJECT PURPOSE AND NEED

1.1 PROJECT DESCRIPTION

The U.S. Army Corps of Engineers (USACE), Jacksonville District proposes to dredge the St. Lucie Inlet entrance channel, and impoundment basin, any time of the year and on an "as-needed" basis in order to maintain safe navigation in the channel. The work would consist of routine operations and maintenance (O&M) dredging of an estimated 400,000 cubic yards of sand from portions of the entrance channel and impoundment basin as needed. The channel is 300 feet wide and 18 feet deep, tapering to 150 feet wide and 12 feet deep, and then to 100 feet wide and 9 feet deep. The approximate length of the project is 9,200 feet. The impoundment basin is 450 feet by 2,500 feet and will be dredged to a required depth of 13 feet. Shoal material will be placed either in the 10,000-foot nearshore disposal area located approximately 10 miles south of St. Lucie Inlet between State Monuments R-89 and R-99, in a previously used beach disposal area located 4,000 feet south of the inlet and extending for 10,000 feet further south; and/or within a 562 acre offshore disposal area identified as "Borrow Area B" (Figure 3). This borrow area is located offshore Jupiter Island, approximately between R-109 and R-118 as depicted in Figure 1 and Figure 2. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment/renourishment events. The frequency of use of the offshore disposal site would coincide with the maintenance dredging frequency of every three to five years or as needed due to weather related shoaling.

If material is not placed in Borrow Area B, the staging areas developed as part of the Peck's Lake placement shall be utilized for beach renourishment.

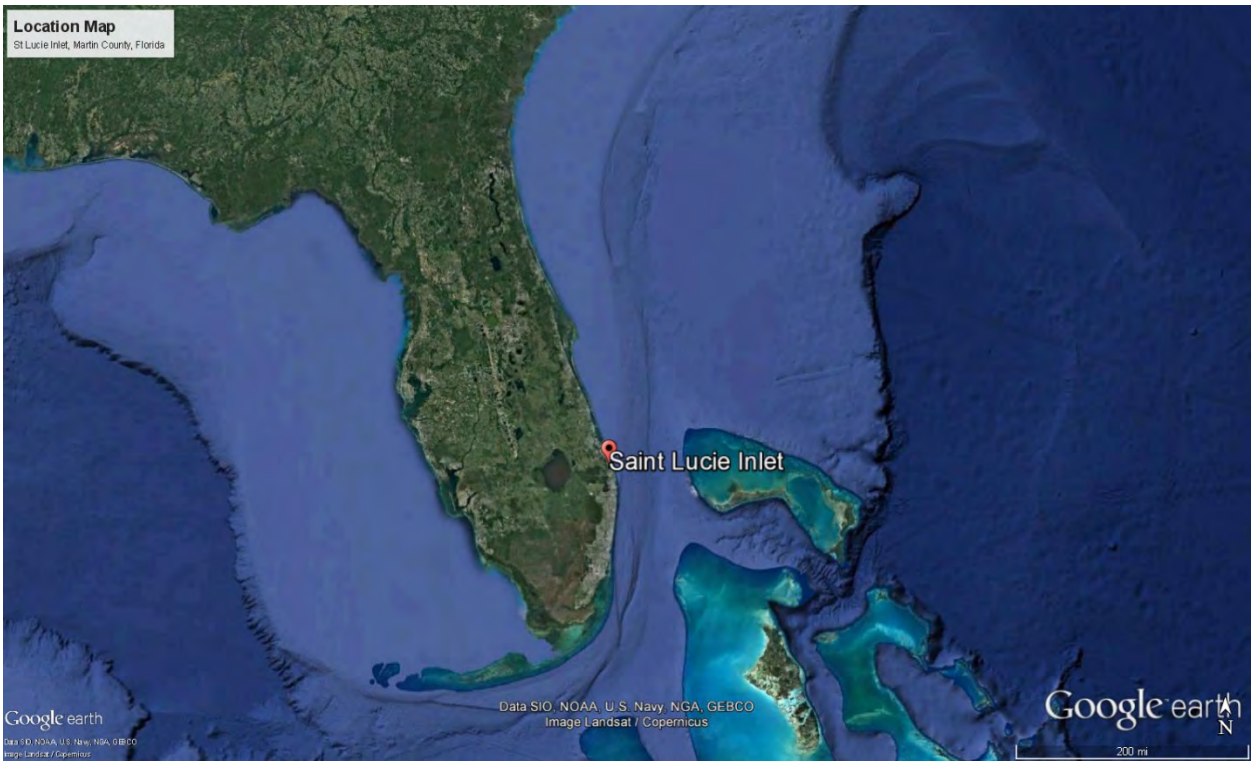

Figure 1 - Vicinity Map

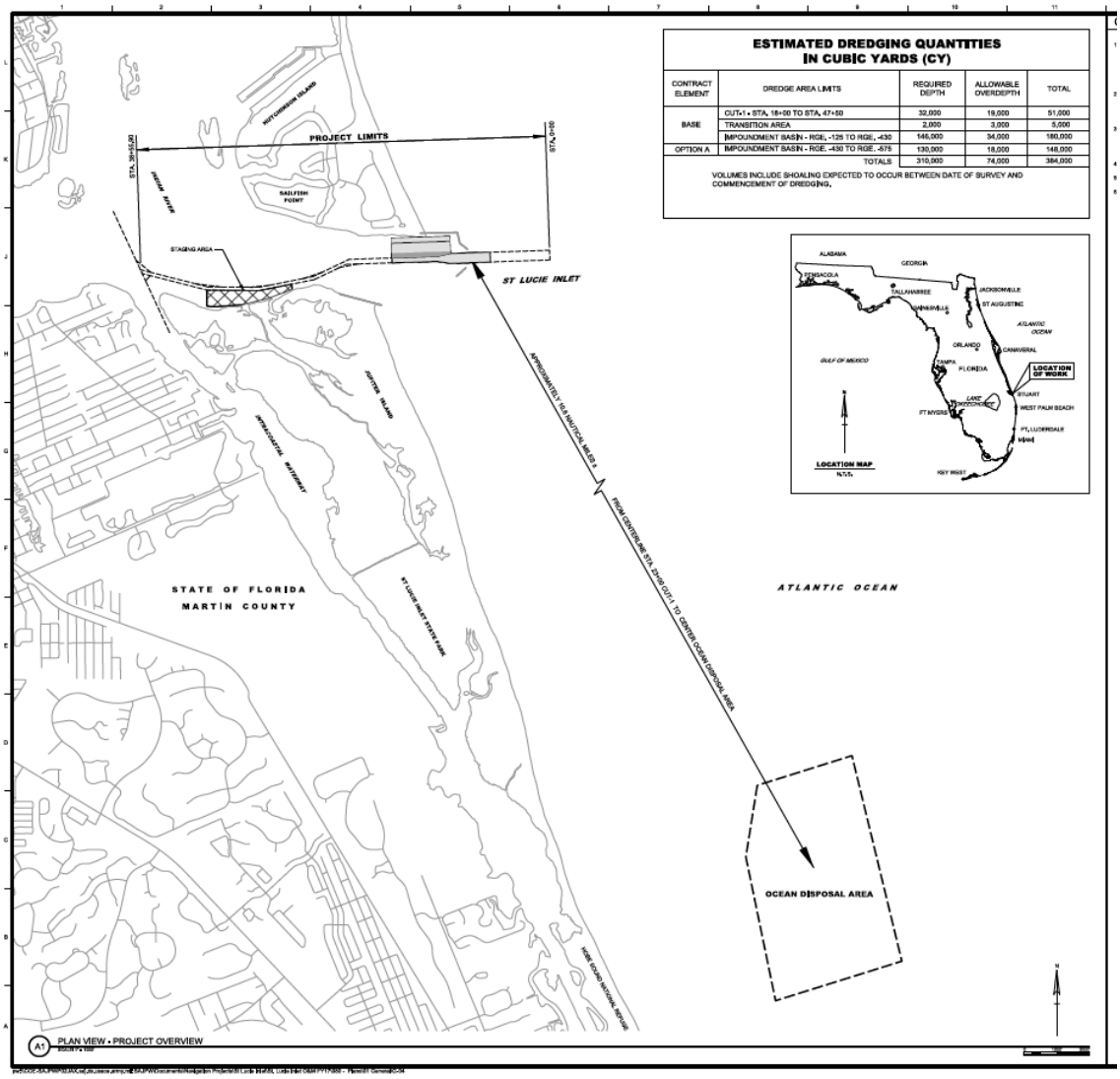

Figure 2 - Location Map (Not to Scale)

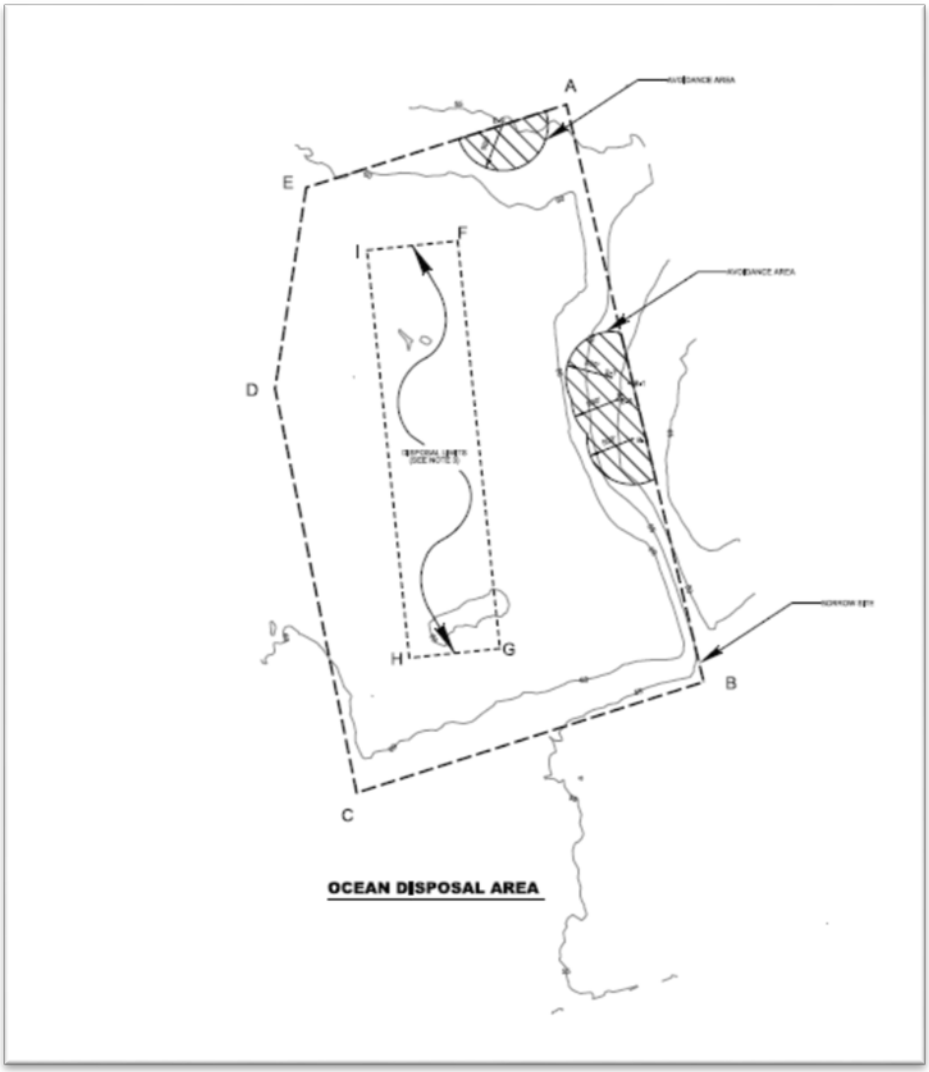

Figure 3 - Dredged Material Placement Area within Borrow Area B

1.2 PROJECT NEED OR OPPORTUNITY

The accumulation of sediment, commonly referred to as shoaling, has restricted the width of the project channel and reduced its depths, hindering safe and efficient vessel navigation. Periodic dredging is required to remove accumulated sediments and, thus, maintain the channel at its federally authorized depth. This Supplemental Environmental Assessment (EA) will evaluate an additional opportunity to beneficially utilize the dredged material as part of the USACE Regional Sediment Management Program. The Supplemental EA will discuss dredged material placement into an existing borrow area utilized by local entities as a sand source for beach nourishment, and other items, as an update to previous analyses conducted under the National Environmental Policy Act (NEPA).

1.3 PROJECT AUTHORITY

Authorization for this project is provided by the Harbor and River Act of 31May 1974, House

Document 294/93/1.

1.4 RELATED ENVIRONMENTAL DOCUMENTS

Related NEPA, design, and planning reports for the St. Lucie Inlet Federal navigation project, Martin County, FL includes the following documents:

- Maintenance Dredging, St. Lucie Inlet, Martin County, Florida, Environmental Assessment. USACE. September 1994
- St Lucie Inlet Design Memorandum and Final Environmental Assessment. St Lucie Inlet, Martin County, Florida. USACE May 2000.
- Utilization of Peck's Lake Staging Area, Operations and Maintenance Activities. St Lucie Inlet, Martin County, Florida. USACE. December 2011.
- Martin County, Florida. Hurricane and Storm Damage Reduction Project. Final Limited Reevaluation Report and Final Environmental Impact Statement. October 2011.
- Memorandum for Record, Department of the Army Environmental Assessment and Statement of Finding for Permit Application SAJ-1996-5620(MOD-LCK), issued May 4, 2017.

All of the previously listed NEPA documents for the St. Lucie Inlet Federal navigation project can be located on the USACE-Jacksonville District Environmental Documents website. http://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/. To access any of them, click on the "+" sign next to Martin County and scroll down to the row listed as "St. Lucie Inlet O&M." Each of the documents is listed there and available for review and download.

1.5 DECISION TO BE MADE

This Supplemental EA updates the assessment competed in September 1994, *St. Lucie Inlet, Martin County, Florida, Environmental Assessment/Finding of No Significant Impact.* Updates include, but are not limited to, newly proposed dredged material placement location (refer to Section 1.1) and revised resource analyses, incorporating data and information from the 2011 and 2017 EAs and 2011 Environmental Impact Statement (EIS).

1.6 SCOPING AND RELEVANT ISSUES

- 1994 EA – A public notice was published on July 21, 1994 and circulated to applicable Federal, state, and local agencies, and interested non-governmental organizations (NGOs). Comments were accepted through August 19, 1994. Comments received during the public notice were incorporated into the EA prior to the signature of the Finding of No Significant Impact (FONSI) on September 12, 1994.
- 2000 EA – A scoping letter was sent to interested Federal, state, and local organizations and individuals on May 7, 1998. A FONSI was signed on June 8, 2000.
- 2011 EA – A notice of availability of the draft EA was published on October 26, 2011. Comments were accepted through November 29, 2011. A FONSI was signed on December 7, 2011. A Record of Environmental Consideration was also completed on this EA, dated October 25, 2011.

- 2017 Memorandum for the Record/Statement of Findings for Regulatory Permit #SAJ-1996-5620(MOD-LCK). A public notice was published on January 22, 2016. Comments were received from National Marine Fisheries Service, Habitat Conservation Division (NMFS-HCD), and the State Historic Preservation Officer (SHPO). USACE responded to both sets of comments and the comments were incorporated into the permit, where applicable. The permit modification was issued on May 4, 2017.

1.6.1 RELEVANT ISSUES.

The following issues were identified as relevant to the proposed action; placement of operations and maintenance (O&M) material into Borrow Area "B," and appropriate for further evaluation: sediment characteristics; fish and wildlife resources; threatened and endangered species; wildlife refuges and sanctuaries; essential fish habitat; water quality; noise; aesthetics, recreation; socioeconomics; navigation and public safety; cultural resources; and cumulative effects. Many of these issues have been reviewed in the previous NEPA analyses conducted between 1994 and 2017. A summary of these reviews are included in Table 1.

1.6.2 ISSUES ELIMINATED FROM FURTHER ANALYSIS.

No issues were specifically identified for elimination.

Table 1 - Summary of Environmental Factors Evaluated in NEPA Documents Prepared in 1996, 2000, 2011, and 2017.

NEPA DOCUMENT ENVIRONMENTAL FACTOR	1994 EA	2000 EA	2011 EA	2017 EA/SOF
SEDIMENT CHARACTERISTICS	St. Lucie Inlet material is fine to coarse calcareous and quartz sand having a grain size range from 0.07 to 10 millimeters (mm). The amount of fine material for the inlet is less than five percent.	Not evaluated	Dredging of up to 600k cubic yards of beach quality sand from the St Lucie Inlet and impoundment basing with placement on the downdrift beach.	Beach quality sand in dredging areas and the mean grain size of borrow site "B" is between 0.28mm and 0.46mm.
ARCHAEOLOGY/ CULTURAL RESOURCES	No adverse effect. Consultation conducted. No response from SHPO.	The proposed action at St. Lucie Inlet would not affect significant historic properties. The SHPO concurred with this determination	No adverse effect to known historic properties.	In comments dated February 16, 2016, SHPO stated that the proposed project activities are unlikely to affect historic properties if the specific conditions are followed. Consultation with SHPO was also completed for DA permit SAJ-1992-01740(MOD) dated November 13, 2015, for the Town of Jupiter Island for utilizing Borrow Area B. Special condition to be included in the project – "No sand borrowing or transfer work should be allowed to occur within a 500-foot radius of the anomalies, or their respective clusters recorded in the 1989 magnetometer survey of Borrow Area B (Florida Master Site File # 2115). The 500-foot radii should be delineated by marker buoys"
AIR QUALITY	Not evaluated	No air quality permits would be required for this project	Not evaluated	Not evaluated

NEPA DOCUMENT ENVIRONMENTAL FACTOR	1994 EA	2000 EA	2011 EA	2017 EA/SOF
THREATENED AND ENDANGERED SPECIES	No effect with implementation of standard protection conditions.	U.S. Fish and Wildlife Service (FWS) concurred with USACE's may affect, but not likely to adversely affect species determinations under their jurisdiction or manatee critical habitat on February 24, 1998. NMFS concurred with USACE's may affect, not likely to adversely affect species under their jurisdiction on August 24, 1999.	May affect, but not likely to adversely affect, with implementation of standard protection measures.	Consultation completed under the South Atlantic Regional Biological Opinion (NMFS), the Statewide Programmatic Biological Opinion (FWS) and the Piping Plover Programmatic Biological Opinion (FWS). Terms and conditions from all three biological opinions incorporated into the project
ESSENTIAL FISH HABITAT (EFH)	Not evaluated (pre-dates consultation on EFH).	Not evaluated	No significant adverse effects to estuarine water column and unconsolidated substrate.	No significant adverse impacts to estuarine water column and unconsolidated substrate.
WILDLIFE REFUGES & SANCTUARIES	Beach placement on St. Lucie Inlet State Park (SLISP) and the northern 0.5 mile of the Hobe Sound National Wildlife Refuge (HSNWR). Beneficial effects to wildlife in these protected areas and continuation of recreational benefits.	Beach placement on SLISP and the northern 0.5 mile of the HSNWR. Beneficial effects to wildlife in these protected areas and continuation of recreational benefits.	Beach placement to occur HSNWR (R59 to R-69) or within the previously authorized placement areas in SLISP and northern portion of HSNWR.	Beach placement to occur within HSNWR and SLISP.
BENTHIC RESOURCES	No effect.	Benthos temporarily affected. Rapid recovery of populations expected.	No adverse effects as avoidance measures are in place.	Sediment deposition from the temporary placement of sand at Borrow Area B will result in burial of subtidal unconsolidated sediment. Soft bottom communities will also become buried, smothering infauna that may be food source for fish and other marine life. Organisms living in the nearshore sand areas are adapted to increased turbidity and unstable substrate conditions with tidal currents. Rapid recovery of populations expected.

NEPA DOCUMENT ENVIRONMENTAL FACTOR	1994 EA	2000 EA	2011 EA	2017 EA/SOF
TURBIDITY AND WATER QUALITY	Short-term localize increase in turbidity at dredge and disposal sites.	Temporary effects to the water column. No significant detrimental impact.	No effects expected at Peck's Lake.	The project is expected to cause temporary and insignificant increases in turbidity at the borrow area and intertidal swash zone seaward of the beach. Due to the relatively low silt content and high density of the material, sand is expected to quickly fall out of the water column and only a short-term increase in turbidity is expected.
FISH & WILDLIFE RESOURCES	No effect.	Not evaluated	Minor impact during beach placement. Nesting, foraging, and resting shorebirds could be temporarily impacted during construction.	Not evaluated
RECREATION AND TOURISM	Short-term impact to recreational boat traffic and beach activities in project vicinity. Long-term benefits by maintaining recreational opportunities. Failure to maintain Inlet would have negative impacts on recreational use of Inlet.	Not evaluated	Short-term disruption of recreation within the Peck's Lake area.	Short-term effect to recreational boat traffic and beach activities in dredging and placement areas vicinity. Long-term benefits by maintaining recreational opportunities. Failure to maintain Inlet would have negative effects on recreational use of inlet.
NAVIGATION AND PUBLIC SAFETY	Short-term impact from presence and operation of dredging equipment. Long term moderate impact from maintaining navigable capacity of the channel.	Not evaluated	Short term impacts to IWW boat traffic when barges are in transport.	Beneficial effect of maintaining navigation through the inlet. Short term, minor impacts associated with construction equipment operating in the area.
NOISE	Some temporary construction noise will result.	Not evaluated	Minor and temporary adverse effects associated with construction activities.	Not evaluated
HAZARDOUS. TOXIC & RADIOACTIVE WASTE	Not evaluated	Not evaluated	Not evaluated	Not evaluated

NEPA DOCUMENT ENVIRONMENTAL FACTOR	1994 EA	2000 EA	2011 EA	2017 EA/SOF
ENERGY & CONSERVATION	Not evaluated	Not evaluated	Not evaluated	Not evaluated
AESTHETICS	Heavy equipment would be used during beach placement and would be "unsightly"	Minor and temporary adverse effects associated with construction activities.	Minor and temporary adverse effects associated with construction activities.	Project related turbidity will reduce nearshore aesthetics during construction efforts. Construction equipment will temporarily effect the aesthetics. Effects will be short term in nature.
SOCIOECONOMICS	Not evaluated	Not evaluated	Not evaluated	Minor beneficial effects associated with increased navigation through the inlet, as well as potential employment opportunities associated with the project.
CUMULATIVE IMPACTS	Temporary degradation in water quality at dredging site and some loss of organisms at dredge site. Repopulation of organisms anticipated.	Over the long term, stabilization of the Inlet will reduce the cumulative effects of frequent maintenance dredging operations and result in a more stable ecosystem in the area.	There are no known local, state or Federal projects within the Peck's Lake project area currently planned, therefore there are no significant cumulative impacts expected. Future use of this area as a staging area for transfer of dredged material could have continued impacts to recreation, although projects would likely be scheduled to occur outside of the popular summer season.	No significant cumulative impacts expected.

2 ALTERNATIVES

The alternatives section is perhaps the most important component of this Supplemental EA. It describes the No Action Alternative, the proposed action, and other reasonable alternatives that were evaluated. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice to the decision maker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Environmental Effects.

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 ISSUES AND BASIS FOR CHOICE

The issues and basis for choice associated with this EA was specifically the addition of a new placement area for O&M material dredged from the St. Lucie Inlet Federal navigation project. All other issues regarding beach placement and actual O&M of in the inlet have been previously addressed in the 2000 and 2011 EAs and are incorporated by reference.

2.1.2 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

No alternatives were eliminated from detailed evaluation as only the No Action Alternative and Preferred Alternative

2.1.3 NO ACTION ALTERNATIVE

The No Action Alternative is the continued maintenance dredging of the St. Lucie Inlet Federal navigation channel and impoundment basin with placement in the existing nearshore and beach template placement areas. These alternatives were previously evaluated in the 1994, 2000 and 2011 EAs (refer to Section 1.6) and will not be discussed in this document, unless a new evaluation is required due to a change in legal status, (e.g. listing of a new species, or designation of critical habitat). The No Action Alternative includes the use of staging areas for storage of beach construction equipment, etc. required to placement the material on the beach. These are typically uplands (i.e. parking lots, recreation fields, etc.) and are selected in coordination with the contractor and local sponsor. If an upland area cannot be selected and impacts to resources would occur in association with the utilization of a staging area, the impacts would be coordinated with the appropriate resource agencies.

2.1.4 DREDGING AND PLACEMENT INTO BORROW AREA “B”

Periodic maintenance dredging of the Federal navigation channels would occur as planned (refer to Section 1.1 for more detail). Borrow Area “B” is a 562 acre offshore disposal area located south of the inlet, offshore of Jupiter Island located approximately between R-109 and R-118. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment/re-nourishment events, meeting USACE’s continued commitment to regional sediment management.

2.1.5 PREFERRED ALTERNATIVE

The preferred alternative (proposed action) is to continue periodic maintenance dredging of the Federal navigation channels with placement of dredged material into Borrow Area “B”, approved nearshore location and the authorized beach template. The location of placement, per

maintenance event, may be constrained by fiscal and/or environmental factors.

2.2 COMPARISON OF ALTERNATIVES

Table 2 lists alternatives considered and summarizes the major features and consequences of the proposed action as well as the other alternatives. See Section 4 Environmental Effects for a more detailed discussion of impacts of alternatives.

Table 2 - Comparison of Alternatives

Environmental Factor	***Dredging and Borrow Area "B"***	***Dredging with Placement on Beach, in Nearshore or in Borrow Area B***	***No Action Alternative Dredging and Beach Placement***	***No Action Alternative Dredging and Nearshore Placement***
Sediment Characteristics	No effect to native sediment characteristics within the navigation channels. Minor change to sediment characteristics within the borrow area. Placement would occur in accordance with the State permit and approved Quality Assurance/Quality Control (QA/QC) plan.	No effect to native sediment characteristics within the navigation channels. Minor change to sediment characteristics within the borrow area. Placement would occur in accordance with the State permit and approved Quality Assurance/Quality Control (QA/QC) plan.	No effect to native sediment characteristics within the navigation channels. Placement would occur in accordance with the State permit and approved QA/QC plan.	No effect to native sediment characteristics within the navigation channels. Placement would occur in accordance with the State permit and approved QA/QC plan.
Fish and Wildlife (migratory birds, hardbottom, seagrasses, benthic habitats)	Minor and temporary effect to marine life due to the temporary increase of turbidity and equilibration of sediment placement. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment/re-nourishment events, authorized under a separate permit.	Minor short-term impact during sea turtle and migratory bird nesting season. Minor and temporary effect to marine life due to the temporary increase of turbidity and equilibration of sediment placement. Substantial long term benefit by creating additional nesting areas for sea turtles and migratory birds. Beach placement template has been designed to avoid impacts to nearshore hardbottom communities. To further minimize potential adverse effects, sand will not be placed between R-81 and R-89 where the hardbottom is the closest to shore. Use of Borrow Area B would allow for storage of dredged material that may be utilized by others for future nourishment/re-nourishment events, authorized under a separate permit. Loss of infaunal benthic resources in the nearshore placement area. Rapid recolonization expected.	Minor short-term impact during sea turtle and migratory bird nesting season. Substantial long term benefit by creating additional nesting areas for sea turtles and migratory birds. Beach placement template has been designed to avoid impacts to nearshore hardbottom communities. To further minimize potential adverse effects, sand will not be placed between R-81 and R-89 where the hardbottom is the closest to shore.	Minor and temporary effect to marine life due to the temporary increase of turbidity and equilibration of sediment placement in the nearshore. Loss of infaunal benthic resources in the nearshore placement area. Rapid recolonization expected.

Threatened and Endangered Species	Hopper dredging may affect sea turtles. All other dredging and drag bar use may affect, but is not likely to adversely affect sea turtles, manatees, whales and smalltooth sawfish. Placement at Borrow Area "B" may affect, but is not likely to adversely affect sea turtles, whales and smalltooth sawfish. All terms and conditions of USFWS and NMFS biological opinions shall be implemented. Placement within Borrow Area "B" would allow entities to renourish the beach environment maintaining their benefits to listed species. Not likely to adversely modify loggerhead sea turtle critical habitat (Unit LOGG-N-18).	Hopper dredging may affect sea turtles. All other dredging and drag bar use may affect, but is not likely to adversely affect sea turtles, manatees, whales and smalltooth sawfish. Placement at Borrow Area "B" may affect, but is not likely to adversely affect sea turtles, whales and smalltooth sawfish. All terms and conditions of USFWS and NMFS biological opinions shall be implemented. Placement within Borrow Area "B" would allow entities to renourish the beach environment maintaining their benefits to listed species. Placement of material on the beach may affect, but it not likely to adversely affect piping plover and rufa red knot. Placement on the approved beach placement areas maintains nesting habitat for listed sea turtles and shorebirds. Not likely to adversely modify loggerhead sea turtle critical habitat (Unit LOGG-N-18).	Hopper dredging may affect sea turtles. All other dredging and drag bar use may affect, but is not likely to adversely affect sea turtles, manatees, whales and smalltooth sawfish. Placement of material on the beach may affect, but it not likely to adversely affect piping plover and rufa red knot. Placement on the approved beach placement areas maintains nesting habitat for listed sea turtles and shorebirds. Not likely to adversely modify loggerhead sea turtle critical habitat (Unit LOGG-N-18).	Hopper dredging may affect sea turtles. All other dredging and drag bar use may affect, but is not likely to adversely affect sea turtles, manatees, whales and smalltooth sawfish. No effect to nesting sea turtles or shorebirds. Not likely to adversely modify loggerhead sea turtle critical habitat (Unit LOGG-N-18).
Wildlife Refuges, Sanctuaries, and Management Areas	No effect	Beach placement on SLISP and the HSNWR. Beneficial effects to wildlife in these protected areas and continuation of recreational benefits. Placement of material in the nearshore seaward of SLISP and the HSNWR.	Beach placement on SLISP and the HSNWR. Beneficial effects to wildlife in these protected areas and continuation of recreational benefits.	Placement of material in the nearshore seaward of SLISP and the HSNWR. Beneficial effects to wildlife in these protected areas and continuation of recreational benefits.
Essential Fish Habitat (EFH)	Temporary and minor effects would occur to water column and unconsolidated sediment habitats. Habitats utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex.	Temporary and minor effects would occur to water column and unconsolidated sediment habitats. Habitats utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex.	Temporary and minor impacts would occur to water column and unconsolidated sediment habitats. Habitats utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex.	Temporary and minor effects would occur to water column and unconsolidated sediment habitats. Habitats utilized by various life stages of penaeid shrimp complex, reef fish, stone crab, spiny lobster, migratory/pelagic fish, and snapper/grouper complex.
Air Quality	Minor, temporary reduction of air quality due to emissions from dredging and disposal operations.	Minor, temporary reduction of air quality due to emissions from dredging and disposal operations.	Minor, temporary reduction of air quality due to emissions from dredging and disposal operations.	Minor, temporary reduction of air quality due to emissions from dredging and disposal operations.

Water Quality	There will be a temporary increase in turbidity levels at the dredge areas during work and at the offshore borrow site during the discharge of material. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded. No long-term adverse effects to water quality.	There will be a temporary increase in turbidity levels at the dredge areas during work and at the offshore borrow site during the discharge of material. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded. No long-term adverse effects to water quality.	There will be a temporary increase in turbidity levels at the dredge areas during work and in the surf zone on the beach during discharge of material. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded. No long-term adverse effects to water quality.	There will be a temporary increase in turbidity levels at the dredge areas during work and in the surf zone on the beach during discharge of material. This elevated turbidity level will be temporary and is not expected to be significant, as state standards for turbidity will not be exceeded. No long-term adverse effects to water quality.
Hazardous, Toxic, Radioactive Waste	No effect anticipated.	No effect anticipated.	No effect anticipated.	No effect anticipated.
Noise	A temporary increase in the noise level during construction in the vicinity of the project would occur.	A temporary increase in the noise level during construction in the vicinity of the project would occur.	A temporary increase in the noise level during construction in the vicinity of the project would occur.	A temporary increase in the noise level during construction in the vicinity of the project would occur.
Aesthetic Resources	During construction, equipment used for dredging would be visible, resulting in a temporary reduction in the aesthetic value in the construction area. Placement in Borrow Area B allows for continued aesthetic benefits associated with the beaches where sand placement would occur.	During construction, equipment used for dredging would be visible, resulting in a temporary reduction in the aesthetic value in the construction area. Placement in Borrow Area B, in the nearshore and placement directly on the beach allows for continued aesthetic benefits associated with the beaches that would benefit from the dredged material.	Temporary construction noise may result. Heavy equipment will used during beach disposal and may be considered "unsightly." Placement on the beach allows for continued aesthetic benefits associated with the beaches where sand placement would occur.	Temporary construction noise may result. Heavy equipment will used during beach disposal and may be considered "unsightly." Placement in the nearshore allows for continued aesthetic benefits associated with the beaches where sand placement would occur.
Recreation Resources	Dredging and placement operations may cause minor, temporary restrictions in recreation during operations.	Dredging and placement operations may cause minor, temporary restrictions in recreation during operations. Boat traffic and beach use will be temporarily interrupted due to dredging and placement activities. Supplemental beach sand will be added to the sand budget in the littoral drift zone.	Boat traffic and beach use will be temporarily interrupted due to dredging and placement activities. Supplemental beach sand will be added to the sand budget in the littoral drift zone.	Boat traffic will be temporarily interrupted due to dredging and placement activities. Supplemental beach sand will be added to the sand budget in the littoral drift zone.
Socioeconomics	Social and economic benefits that are based on navigation associated with the Federal project would continue. The extent of dredging may be limited by the appropriation of funds, approvals by Federal and state agencies and appropriate access to dredging and placement areas.	Social and economic benefits that are based on navigation associated with the Federal project would continue. The extent of dredging may be limited by the appropriation of funds, approvals by Federal and state agencies and appropriate access to dredging and placement areas.	Social and economic benefits that are based on navigation associated with the Federal project would continue. The extent of dredging may be limited by the appropriation of funds, approvals by Federal and state agencies and appropriate access to dredging and placement areas.	Social and economic benefits that are based on navigation associated with the Federal project would continue. The extent of dredging may be limited by the appropriation of funds, approvals by Federal and state agencies and appropriate access to dredging and placement areas.
Navigation and Public Safety	Dredging operations during construction may impede or restrict commercial or recreational access or ingress/egress to the area.	Dredging operations during construction may impede or restrict commercial or recreational access or ingress/egress to the area.	Dredging operations during construction may impede or restrict commercial or recreational access or ingress/egress to the area.	Dredging operations during construction may impede or restrict commercial or recreational access or ingress/egress to the area.
Cultural Resources	No adverse effect. Due to avoidance areas included in the project plans and specifications.	No adverse effect. Due to avoidance areas included in the project plans and specifications	No adverse effect.	No adverse effect.

Energy Requirements and Conservation	Fuel would be required to operate dredges, pumps, and land moving equipment.	Fuel would be required to operate dredges, pumps, and land moving equipment.	Fuel would be required to operate dredges, pumps, and land moving equipment.	Fuel would be required to operate dredges, pumps, and land moving equipment.

3 AFFECTED ENVIRONMENT

The Affected Environment section describes the existing environmental resources of the areas that would be affected if either alternative were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "No Action Alternative," forms the baseline conditions for determining the environmental effects of the reasonable alternatives.

3.1 SEDIMENT QUALITY

St. Lucie Inlet material is fine to coarse calcareous and quartz sand having a grain size range from 0.07 to 10mm. The amount of fine material for the inlet is less than five percent.

3.2 BIOLOGICAL COMMUNITIES

3.2.1 BORROW AREA B COMMUNITIES

Sedimentary habitats such as those found in Borrow Area B support a variety of invertebrates and demersal fishes. Invertebrates using these types of habitats include infaunal and epifaunal species represented primarily by annelid worms, gastropods, bivalves, crustaceans, and echinoderms. Demersal feeding fishes prey on most of these species.

Infaunal organisms present in the soft bottoms offshore central east Florida are predominantly common invertebrates including crustaceans, echinoderms, mollusks, polychaetous annelids, and interstitial bryozoans. Infaunal populations exhibit both seasonal and spatial variability in distribution and abundance, due to temperature, sediment topography, bathymetry, and sediment composition, including particle size and organic content (Hammer et al. 2005).

Epifaunal invertebrates commonly occurring on the soft bottoms offshore central east Florida include lady crabs (*Ovalipes* spp.), calico scallop (*Argopecten gibbus*), calico box crab (*Hepatus epheliticus*), iridescent swimming crab (*Portunus gibbesii*), brown shrimp (*Farfantepenaeus aztecus*), white shrimp (*Litopenaeus setiferus*), striped sea star (*Luidia clathrata*), and arrowhead sand dollar (*Encope michelini*). The distribution on the epifaunal invertebrates listed above exhibit distributions that are depth-, temperature-, and sediment type-related (Hammer et al. 2005).

During a 2009 dive survey conducted in Martin County, various invertebrate and vertebrate organisms were observed. Results indicate the sand based benthic communities offshore of Martin County were composed of taxa typical of soft bottom habitats such as bivalves, gastropods, echinoderms, and crustaceans (Hesperides Group, LLC 2009). Several species of invertebrates found strictly in soft bottom habitats were very common, including razor clams (*Ensis directus),* arrowhead sand dollar, and a portunid crab. Other notable fauna included various small bivalves and gastropods, beaded sea stars *(Astropecten articulates),* sea hare *(Aplysia* sp.), brittle stars *(Ophiarachna* sp.), and box crabs *(Calappa flammea).* Numerous sand dollars were observed on several of the dives along with egg cases of *Neverita duplicate,* a moon snail in the family *Naticidae.* These taxa are generally characterized by locally dense populations, high fecundity, and short life

spans.

3.3 FISH AND WILDLIFE

3.3.1 MIGRATORY BIRDS

A number of seabirds and shorebirds may occur along the beach and offshore the project area, including a number of species considered birds of conservation concern by the Migratory Bird Treaty Act of 1918 (MBTA). These species all use sandy beaches for foraging and/or nesting and, therefore, could occur along the project area both onshore and offshore.

3.3.2 MARINE MAMMALS

The Marine Mammal Protection Act of 1972 protects all marine mammals from harvesting within the borders of the United States, regardless of status. Therefore, all marine mammals encountered in the offshore region of Martin County must be given due consideration. This section considers marine mammals not listed under the Endangered Species Act (ESA) of 1973, as amended.

The inner shelf plain and estuaries surrounding the project area support seasonal and permanent populations of marine mammals. Bottlenose dolphins are year-round residents, while the humpback whale may pass through the area during migration. Key biological aspects of selected marine mammal species that may occur in the general action areas are included in Table 3. Specific information on the life history of each of these species is available in NMFS' "Annual Reports to Congress under the MMPA" located at http://www.nmfs.noaa.gov/pr/sars/region.htm.

Table 3 - Marine Mammals not listed under the ESA, found Offshore of Martin County, FL

Common Name	Scientific Name	Frequency off Florida
WHALES		
Bryde's whale	*Balaenoptera brydei*	Rare
Humpback Whale (West Indies Distinct Population Segment)	*Megaptera novaeangliae*	Rare
Minke whale	*Balaenoptera acutorostrata*	Regular
Pygmy sperm whale	*Kogia breviceps*	Regular
Dwarf sperm whale	*Kogia sima*	Regular
Gervais' beaked whale	*Mesoplodon europaeus*	Regular
Cuvier's beaked whale	*Ziphius cavirostris*	Regular
Blainville's beaked whale	*Mesoplodon densirostrus*	Regular
Sowerby's beaked whale	*Mesoplodon bidens*	Rare
True's beaked whale	*Mesoplodon mirus*	Extralimital
DOLPHINS		
Bottlenose dolphin	*Tursiops truncates*	Regular
Atlantic spotted dolphin	*Stenella frontalis*	Regular
Pantropical spotted dolphin	*Stenella attenuate*	Regular
Spinner dolphin	*Stenella longirostris*	Regular
Striped dolphin	*Stenella coeruleoalba*	Regular
Risso's dolphin	*Grampus griseus*	Regular
Pygmy killer whale	*Feresa attenuate*	Regular
False killer whale	*Pseudorca crassidens*	Regular
Short-finned pilot whale	*Globicephala macrorynchus*	Regular
Orca	*Orcinus orca*	Regular
Rough-toothed dolphin	*Steno bredanensis*	Regular
Clymene dolphin	*Stenella clymene*	Regular
Common dolphin	*Delphinus delphis*	Rare
Fraser's dolphin	*Lagenodelphis hosei*	Regular
Melon-headed whale	*Peponocephala electra*	Regular

3.3.3 BENTHOS

Sedimentary habitats such as sand shoals support a variety of invertebrates and demersal fishes. Invertebrates using shoals include infaunal and epifaunal species represented primarily by annelid worms, gastropods, bivalves, crustaceans, and echinoderms. Demersal feeding fishes prey on most of these species.

Infaunal organisms present in the soft bottoms offshore central east Florida are predominantly common invertebrates including crustaceans, echinoderms, mollusks, polychaetous annelids, and interstitial bryozoans. Infaunal populations exhibit both seasonal and spatial variability in distribution and abundance, due to temperature, sediment topography, bathymetry, and sediment composition, including particle size and organic content (Hammer et al. 2005).

Epifaunal invertebrates commonly occurring on the soft bottoms offshore central east Florida include lady crabs (*Ovalipes* spp.), calico scallop (*Argopecten gibbus*), calico box crab (*Hepatus epheliticus*), iridescent swimming crab (*Portunus gibbesii*), brown shrimp (*Farfantepenaeus aztecus*), white shrimp (*Litopenaeus setiferus*), striped sea star (*Luidia clathrata*), and arrowhead sand dollar (*Encope michelini*). The distribution on the epifaunal invertebrates listed above exhibit distributions that are depth-, temperature-, and sediment type-related (Hammer et al. 2005).

During a 2009 dive survey for the Martin County EIS, various invertebrate and vertebrate organisms were observed. Results indicate the benthic community of the Martin County sand source was composed of taxa typical of soft bottom habitats such as bivalves, gastropods, echinoderms, and crustaceans (Hesperides Group, LLC 2009). Several species of invertebrates found strictly in soft bottom habitats were very common, including razor clams (*Ensis directus),* arrowhead sand dollar, and a portunid crab. Other notable fauna included various small bivalves and gastropods, beaded sea stars *(Astropecten articulates),* sea hare *(Aplysia* sp.), brittle stars *(Ophiarachna* sp.), and box crabs *(Calappa flammea).* Numerous sand dollars were observed on several of the dives along with egg cases of *Neverita duplicate,* a moon snail in the family *Naticidae.* These taxa are generally characterized by locally dense populations, high fecundity, and short life spans.

Distribution of interstitial bryozoans has recently been studied at shoals located offshore St. Lucie County, including the St. Lucie Shoal. A study conducted for USACE by Brostoff (2002) identified an average of 19 different species located within the samples from the St. Lucie Shoal, with the exceedingly dominant species collected being *Cupuladria doma.* Previous studies of Capron Shoal (north of St. Lucie Shoal) by Winston and Håkansson (1986) described the interstitial bryozoan population as adapting to interstitial conditions, characterized by small size, simplified, colony structure, and very early reproduction. The distribution of encrusting bryozoans extends along sandy continental shelves, providing a food source for crustaceans, echinoderms, and mollusks (Winston and Håkansson 1986).

3.3.4 FISHERY RESOURCES

A number of sand shoal studies conducted along the eastern coast of the U.S. have documented the use of sand shoals as fish habitat (Able and Hagan 1995, Slacum et al. 2006, Walsh et al. 2006, Gilmore 2009). CSA International (2009) generally characterized use of sand shoals by fishes at several spatial scales. At broad scales (1 to 100 square kilometers), fishes may use shoal features as guideposts during migrations, local movements, or spawning. At intermediate scales (tens to hundreds of square meters), different parts of individual shoals may represent different foraging areas or shelter from predators or waves and currents. At smaller scales (e.g., meters to centimeters), sediment texture (fine sand to shell fragments), variable bedform structures, and biogenic structures may provide important predator refuge or foraging areas. Considering this spatial framework, most fundamental ecological functions of shoals for fishes fall into the categories of spawning, shelter, or foraging.

Gilmore (2009) synthesized unpublished information and data and interviewed local anglers to determine the importance of the east Florida sand shoals, including the St. Lucie Shoal, to fishes. The report inferred from the various data sources that more than 200 species potentially use shoals

for orientation, refuge, spawning, and feeding sites. Interviews with anglers confirmed that shoals served as aggregating points for small pelagic fishes such as Atlantic menhaden (*Brevoortia* spp.*)*, Spanish sardine (*Sardinella aurita*), Atlantic thread herring (*Opisthonema oglinum)*, and false pilchard (*Harengula clupeola)*. These species are important prey for numerous managed species, particularly from the coastal pelagic and highly migratory groups.

Additionally, the Bureau of Ocean Energy Management (BOEM) has recently completed a study of the usage of shoal habitats by fishes (Rutecki et al. 2014) and is currently conducting studies at Canaveral shoals to continue to refine the available information concerning shoal usage by fishes.

3.3.5 THREATENED AND ENDANGERED SPECIES

The lists of endangered and threatened species developed for this Supplemental EA (Table 4) were compiled from the South Atlantic Regional Biological Opinion (SARBO), the Statewide Programmatic Biological Opinion (SPBO) for Shore Protection Activities along the Coast of Florida and the Programmatic Piping Plover Biological Opinion (P3BO) for Shore Protection Activities in the Geographical Region of the North and South Florida Ecological Services Field Offices, as well as project specific biological assessments and biological opinions prepared for previous projects which have taken place in the vicinity of the proposed project.

Table 4 - Threatened and Endangered Species in the Project Area

Common Name	Scientific Name	Listing Status
Blue whale	*Balaenoptera musculus*	Endangered
Finback whale	*Balaenoptera physalus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Green sea turtle (North Atlantic DPS)	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle (Northwest Atlantic DPS)	*Caretta*	Threatened/Critical Habitat
Smalltooth sawfish	*Pristis pectinata*	Endangered

3.3.6 SEA TURTLES

Martin County is within the normal nesting range of three species of sea turtles; the loggerhead (*Caretta caretta*), the North Atlantic distinct population segment (DPS) of green sea turtle (*Chelonia mydas*) (80 FR 15272), and the leatherback (*Dermochelys coriacea*). The leatherback sea turtle is listed as endangered under the (ESA). The loggerhead sea turtle is listed as threatened and the North Atlantic DPS of the green sea turtle is currently proposed as a threatened species; previously all green sea turtles found in the U.S. were listed as endangered species.

Additionally, the waters offshore of Martin County are also used for foraging and shelter for the

three species listed above as well as the hawksbill (*Eretmochelys imbricata*) and Kemp's ridley sea turtles (*Lepidochelys kempii*).

NMFS has designated three units of critical habitat for the loggerhead sea turtle in the waters offshore of Martin County. Figure 4 shows each of the units. Unit 01 is Sargassum Habitat and is denoted by the pink area, Unit 18 is Constricted Migratory Habitat denoted by the blue area and Unit 19 is Nearshore Breeding Habitat denoted by the orange area. The red and purple areas in the graphic are other critical habitat units located south of the project area and are not being affected by the proposed project. The constituent elements of each designated unit can be found in the final rule issued by NMFS designating the habitat (NMFS 2014a).

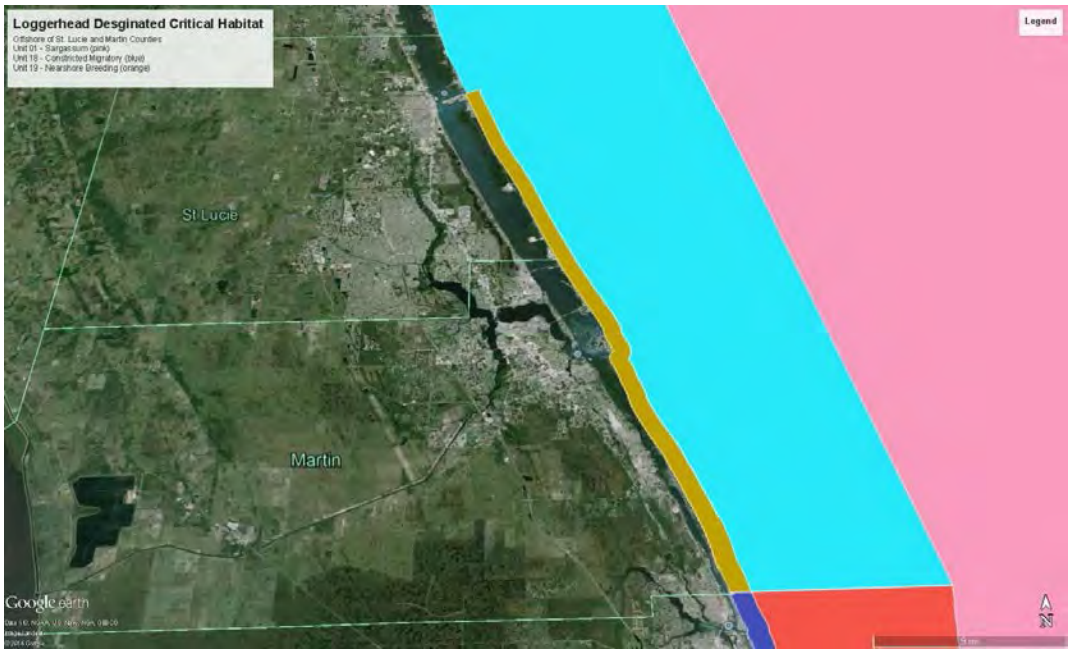

Figure 4 - Designated Critical Habitat for Loggerhead Sea Turtles Offshore of Martin County, Florida

3.3.7 MARINE MAMMALS

Four baleen whales (North Atlantic right, blue, fin, and sei), one toothed whale (sperm whale), and one sirenian (West Indian manatee) occur in the Atlantic Ocean offshore of St. Lucie Inlet and are listed as endangered under the ESA. With the exception of the North Atlantic right whale, all of the whales are typically found offshore, in deeper waters and are not expected to be encountered closer to shore near Borrow Area B.

The North Atlantic right whale (*Eubalaena glacialis*) is a federally listed endangered species and is also listed as a depleted stock under the MMPA. The estimated population within the north Atlantic Region is between 400 and 500 animals (NMFS2014). North Atlantic right whales are highly migratory, summering in feeding and nursery grounds in New England waters and northward to the Bay of Fundy and the Scotian Shelf (NMFS 2014). They migrate southward in winter to the northeastern coast of Florida. During these winter months, right whales are routinely seen close to shore. While North Atlantic right whales have been historically reported in south Florida and

the Gulf of Mexico, these sightings are extremely rare (Dan O'Dell, Hubbs-Sea World Research Institute, 2002, personal communication; North American Right Whale Consortium database, University of Rhode Island, accessed September 2003).

The Florida manatee is a subspecies of the West Indian manatee (*Trichechus manatus*) and can be found throughout the southeastern United States, including the project area. Manatees can be found in the inshore waters of the project channels and in the coastal waters of the Atlantic Ocean primarily during migration. The proposed work does not overlap any designated critical habitat for this species. Between 1974 and 2016 there have been 273 documented manatee mortalities in Martin County. The probable cause of death for 72 (26%) of these mortalities was collisions with watercraft (http://myfwc.com/research/manatee/rescue-mortality-response/mortality-statistics/yearly/).

3.3.8 SMALLTOOTH SAWFISH

The smalltooth sawfish (*Pristis pectinata*) is currently listed as endangered by NMFS and rarely occurs near any of the in-water sand source locations. This species has become rare along the southeastern Atlantic and northern Gulf of Mexico coasts of the U.S. during the past 30 years, and its known primary range is now reduced to the coastal waters of Everglades National Park in extreme southern Florida. Fishing and habitat degradation have extirpated the smalltooth sawfish from much of this former range.

The smalltooth sawfish is distributed in tropical and subtropical waters worldwide. It normally inhabits shallow waters (33 feet/ 10 meters or less), often near river mouths or in estuarine lagoons over sandy or muddy substrates, but may also occur in deeper waters (66 feet/20 meters) of the continental shelf. Shallow water less than 3.3 feet (1 meter) deep is an important nursery area for young smalltooth sawfish and maintenance and protection of these habitat is an important component of the "Recovery Plan for Smalltooth Sawfish (*Pristis pectinata*)" (NMFS 2009). Recent studies indicate that key habitat features (particularly for immature individuals) nominally consist of shallow water, proximity to mangroves, and estuarine conditions. Smalltooth sawfish grow slowly and mature at about 10 years of age. Females bear live young, and the litters reportedly range from 15 to 20 embryos requiring a year of gestation. Their diet consists of macroinvertebrates and fishes such as herrings and mullets. The saw is reportedly used to rake surficial sediments in search of crustaceans and benthic fishes or to slash through schools of herrings and mullets (NMFS 2009).

Although NMFS designated critical habitat for the species in 2009, there is no designated critical habitat in any of the project areas (either dredging or placement areas).

As part of the Identification of *Alternative Sand Sources for the Remaining Period of Federal Participation, Dade County Beach Erosion Control and Hurricane Protection Project, Miami-Dade County, Florida, March 2016* EA that included a review of sand sources in Federal waters off of Martin County, a request for sighting info smalltooth sawfish was made in December 2014. For Martin County, there are more sightings in the offshore areas: including sightings more than eight miles from shore (Figure 5).

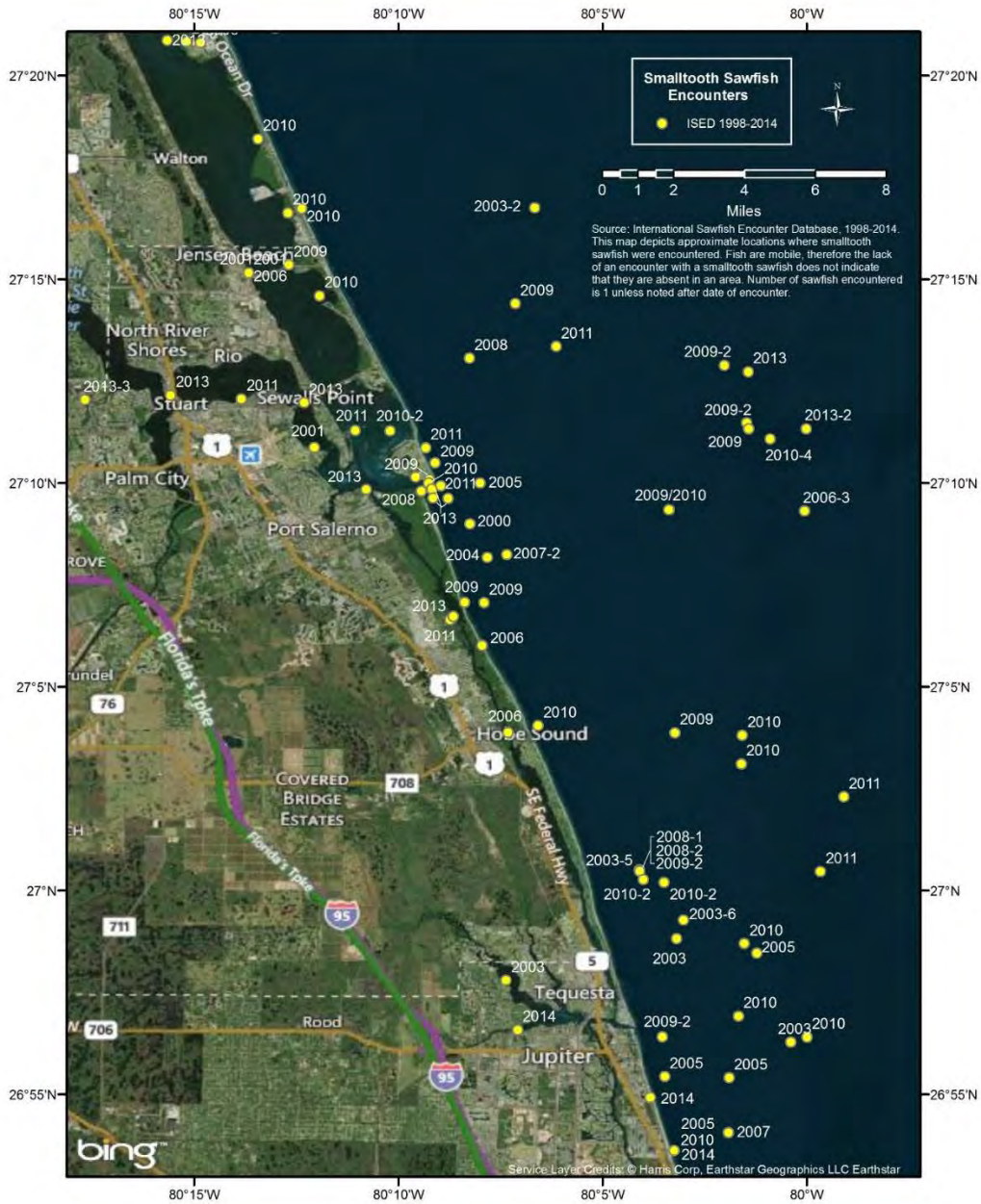

Figure 5 - Smalltooth Sawfish Sightings - Martin County and Offshore Waters

3.3.9 PIPING PLOVER

Piping plovers breed during the late spring and summer in three discrete areas of North America: The Northern Great Plains, the Great Lakes, and the Atlantic Coast. They winter in coastal areas of the United States from North Carolina to Texas. The piping plover has a patchy distribution along the coasts of Florida that is correlated with the availability of suitable, open habitat. The numbers and distribution of plovers are vulnerable to declines with loss and degradation of habitat. The habitats include beaches, mud flats, sand flats, algal flats, and washover passes (Doonan et al. 2005). Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging (Nicholls and Baldassarre 1990). Primary prey for wintering plovers includes polychaete marine worms, various

crustaceans, insects, and occasionally bivalve mollusks (Nicholls 1989).

The USFWS designated 142 areas along the Gulf and Atlantic coasts as critical habitat for the wintering population of the piping plover. The Federal Register, Vol. 66, No. 132, July 11, 2001 stated:

> *Unit FL–33: St. Lucie Inlet. 114 ha (282 ac) in Martin County. The unit includes a small area south of the jetty on the north shore of St. Lucie Inlet, from the jetty west 0.42 km (0.26 mi). While the two sides of the inlet are privately owned, the great majority of the unit is on public land in the Saint Lucie Inlet State Preserve, administered by Jonathan Dickinson State Park. It begins on the sandy shoreline south of Saint Lucie Inlet and extends along the Atlantic Ocean shoreline 2.6 km (1.6 mi). It includes land from MLLW to where densely vegetated habitat (including grass or lawns) or developed structures, not used by the piping plover, begin and where the constituent elements no longer occur. The unit does not include sandbars within the inlet.*

As part of the Federal Register Notice, maps of each of the units were included. Figure 6 shows the area of Martin County included under Unit FL-33.

Figure 6 - Unit FL-33 of Designated Critical Habitat for the Piping Plover

3.3.10 RUFA RED KNOT

The rufa subspecies of the red knot (*Calidris canutus rufa*), listed as threatened, is a small shorebird that can occur along the Atlantic and Gulf coasts during migration. It is also known to overwinter in low numbers along both coasts. Florida is home to the largest concentration of wintering rufa in the United States (A.C. Schwarzer et al. 2012). In migration and winter, it prefers coastal mudflats, tidal zones, and sometimes open sandy beaches where it feeds on small invertebrates such as small mollusks, marine worms, and crustaceans (Kaufman 1996). The knot population has declined primarily due to reduced food availability from increased harvests of horseshoe crabs (USFWS 2015). Their numbers appear to have stabilized in the past few years, but they remain at low levels relative to earlier decades (USFWS 2015). Critical Habitat has not been designated for

this species.

3.4 WILDLIFE REFUGES AND STATE PARKS

Significant wildlife protection/management areas located in the project vicinity (Figure 7) include the following: St. Lucie Inlet Preserve State Park and the Hobe Sound National Wildlife Refuge.

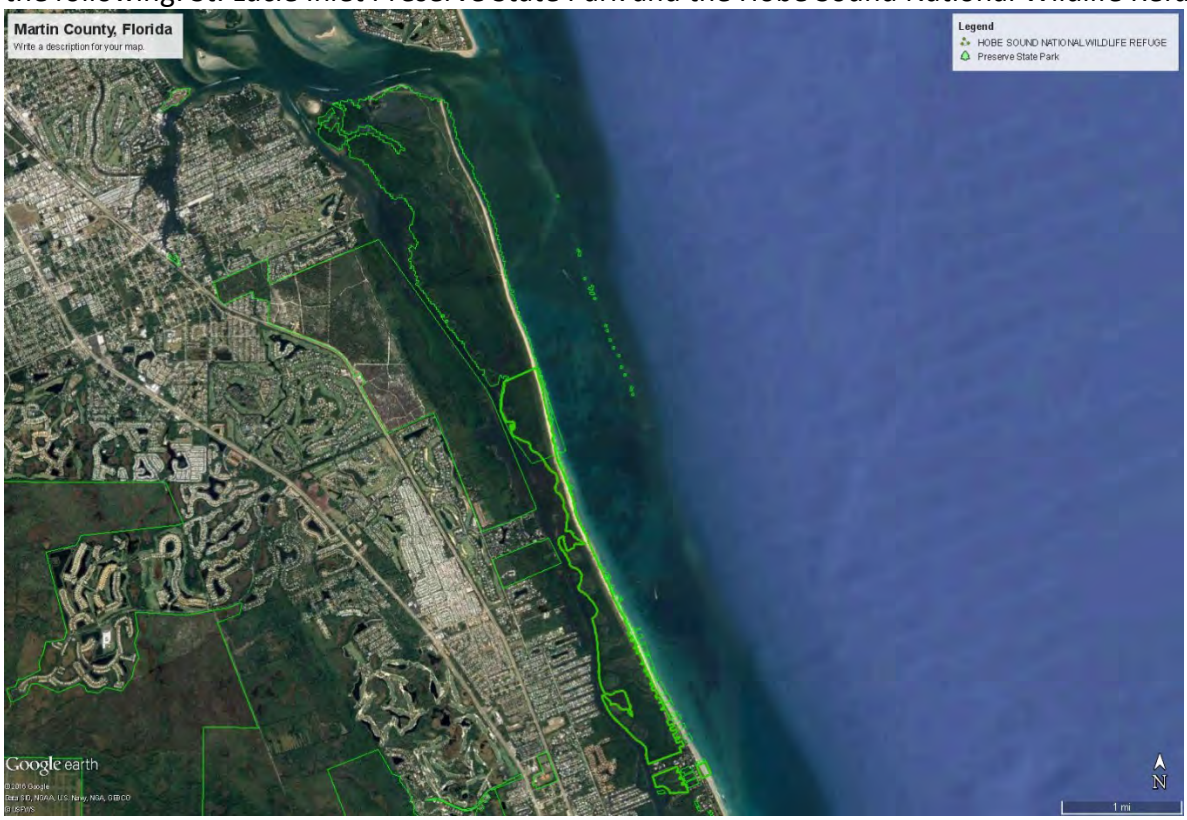

Figure 7 - Location of Wildlife Refuges and State Parks near the Project Area.

3.5 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). This EA is prepared consistent with guidance provided by the NMFS Southeast Regional Office to USACE, Jacksonville District regarding coordinating EFH consultation requirements with NEPA (NMFS 1999). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, or growth to maturity" (SAFMC 1998).

Types of EFH in oceanic waters offshore of Martin County where Borrow Area B is located:

- *Sargassum*;
- Sandy Shoals;
- Corals, Coral Reef, and Hard/Live Bottom
- Water Column.

3.5.1 SARGASSUM

Sargassum, a genus of macroalgae that permanently drifts at the surface in warm waters of the Atlantic Ocean (SAFMC 2002), normally occurs in scattered individual clumps ranging from 10 to 50 centimeters (4 to 20 inches) in diameter. Accumulation of *Sargassum* and other flotsam in lines often indicates a convergence zone between water masses. Convergence zones are sites of considerable biological activity; many species (including juvenile sea turtles and pelagic fishes) will gather along these zones regardless of whether *Sargassum* or other flotsam is present (Carr 1986).

Floating *Sargassum* provides habitat for as many as 100 fish species at some point in their life cycle, but only two spend their entire lives there: the Sargassumfish and the Sargassum pipefish (Adams 1960, Dooley 1972, Bortone et al. 1977, SAFMC 2002). Most fishes associated with *Sargassum* are temporary residents (e.g., juveniles of jacks, triggerfishes, flying fishes, and filefishes). Adults of these species reside in shelf or coastal waters (McKenney et al. 1958, Dooley 1972, Bortone et al. 1977, Moser et al. 1998, Comyns et al. 2002). In addition, several larger species of recreational or commercial importance, including dolphin, yellowfin tuna, blackfin tuna, skipjack tuna, little tunny, and wahoo, feed on the small fishes and invertebrates attracted to *Sargassum* (Morgan et al. 1985).

The South Atlantic Fisheries Management Council (SAFMC) has designated *Sargassum* as EFH for species in the snapper-grouper complex and the dolphin-wahoo fishery. Species within the snapper-grouper complex use *Sargassum* for spawning (SAFMC 2002). *Sargassum* is considered a Habitat of Particular Concern (HAPC) for dolphin and wahoo (SAFMC 2003). In addition to SAFMC-managed species, billfish and swordfish utilize *Sargassum* for various life stages.

3.5.2 SANDY SHOALS

Coastal migratory pelagic fish use sandy shoals for all life stages, though spawning most frequently takes place inshore (Collette and Nauen 1983). It is likely that sailfish, though a member of the highly migratory species complex, also use the shoals for spawning. This species tends to frequent nearshore waters more often than other highly migratory species. Interviews conducted with local fishermen indicated that shoals concentrate planktivorous fish, herrings, sardines, and menhaden. The large schools of herrings, sardines, and menhaden attract pelagic carnivores such as barracuda, mackerel, little tunny, and various jacks and sharks to waters adjacent to the shoals (Gilmore 2008).

Gilmore (2008) stated the sand/shoal fish assemblage studies of Walsh et al. (2006) and Vasslides and Able (2008) were of direct value by providing insight into the value of shoals to both benthic and pelagic species and have relevance in Florida even though they were both based on work done on the continental shelf in other states. Vasslides and Able (2008) found that sand ridges (sand shoals) off New Jersey were “strategic ecological features” increasing the abundance of certain species and providing EFH for economically important species, commercial, and recreational fisheries.

Additionally, BOEM has recently completed a study of the usage of shoal habitats by fishes (Rutecki et al. 2014) and is currently conducting studies at Canaveral shoals to continue to refine the available information concerning shoal usage by fishes.

3.5.3 CORALS, CORAL REEF AND HARD/LIVE BOTTOMS

As stated in CSA (2004), EFH for reef building stony corals is outside of the study area and extends from Palm Beach County south through the Florida reef tract bordering the Florida Keys. While very scattered hard corals may be present in oceanic waters offshore of Martin County (Walker 2012), there are insufficient densities to grow into coral reefs. Hardbottom habitats located in southern Martin County are typically described as sponge and algae dominated. EFH for most octocorals includes hard, exposed, rough, stable substrate and are found within the waters offshore of the county.

A subset of EFH that raise additional concern are Habitat Areas of Particular Concern (HAPCs). For corals, coral reefs and hard/live bottom habitats off of central east Florida, the only type of HAPC found in the project area is offshore hardbottom habitats in water depths 5 to 30m. Hardbottom resources (including corals) are present approximately 1,000 feet west of Borrow Area B as described in a 2010 resource delineation (Figure 8). Pre and Post construction surveys of Borrow Area B will be conducted when it is used as a sand source for the Town of Jupiter Island's shore protection project.

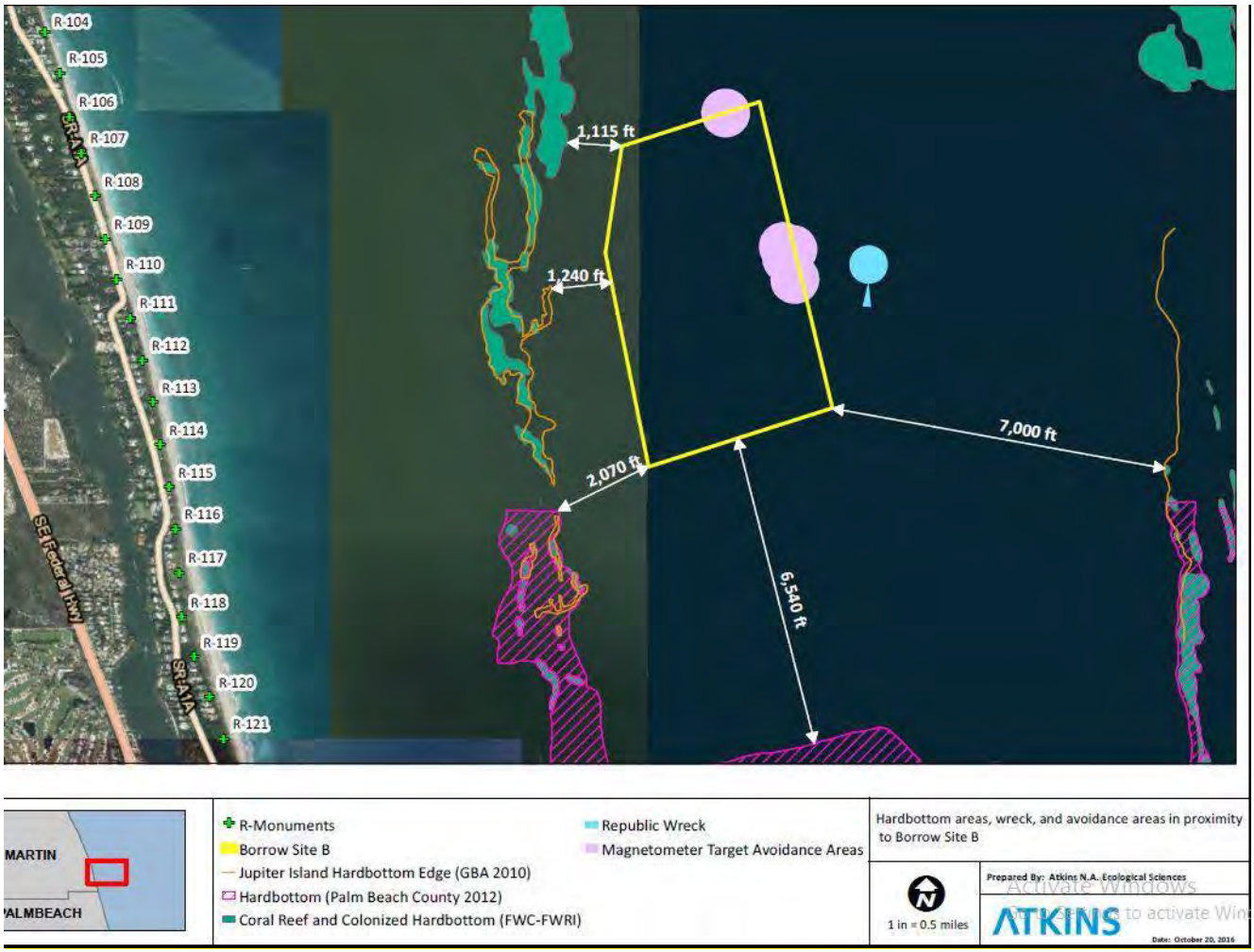

Figure 8 - Mapped Hardbottom Resources in the Vicinity of Borrow Area B.

3.5.4 SAND SOURCES USED FOR SPAWING AND GROWTH TO MATURITY

Penaeid shrimp utilize offshore habitats for multiple life stages. Shelf waters encompassing the potential sand sources provide suitable water depth and substrate for spawning shrimp, which migrate offshore as adults. EFH for penaeid shrimp includes inshore estuarine nursery areas, offshore marine habitats for spawning and growth to maturity, and all interconnecting water bodies (SAFMC 1998a, 1998b). Offshore waters also serve as habitat for larval and post-larval shrimp. These shrimp are planktonic and feed on zooplankton in the water column.

3.5.5 WATER COLUMN

The water column is considered EFH for the highly migratory species complex. Sailfish, in particular, are known to spawn nearer to shore than the other billfish in this category; therefore, they are included in this assessment.

3.5.6 MANAGED SPECIES

Managed species in these habitats include coastal pelagic fishes, sailfish, dolphin, wahoo, bluefish and highly migratory species. A comprehensive list of the species for each management plan can be located in each management plans available at NMFS' Habitat Conservation website (http://www.habitat.noaa.gov/protection/efh/newInv/index.html).

3.6 AIR QUALITY

Ambient air quality along the southeast Florida coast is generally good due to prevalent ocean breezes from the northeast to the southeast. The area is in the southeast Florida Intrastate Air Quality Control Region, as established by 40 CFR § 81.49. USEPA (40 CFR § 81.310) designates air quality compliance on a county level and Martin County is considered as being in attainment with National Ambient Air Quality Standards for ozone, nitrogen dioxide, carbon monoxide; total suspended particulates, and sulfur dioxide. The U.S. Environmental Protection Agency (EPA) has not made a designation for lead in southeastern Florida.

3.7 WATER QUALITY

The State of Florida classifies surface waters from "I" (drinking water quality) to "V" (industrial water discharge quality). The predominant issue that affects water quality in offshore waters in south Florida is turbidity, which is considered a good measure of water quality. Turbidity is measured in Nephelometric Turbidity Units (NTU), which is a measure of light-scatter by particulates within the water. This measurement does not address the characteristics of the suspended material that creates turbid conditions. Florida state guidelines set to minimize turbidity effects from beach restoration activities confine turbidity values to under 29 NTU above ambient levels outside the turbidity mixing zone.

Turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season, and are higher closer to shore (Gilliam 2008; Dompe and Haynes, 1993; Coastal Planning & Engineering, 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material will remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks, depending on the duration of the

perturbation (storm event or other) and on the amount of suspended fines.

The water quality around the St. Lucie Inlet and Atlantic Ocean has a State of Florida classification of II, which are waters that are acceptable for recreational bathing, fishing, and wildlife management.

3.8 NOISE

Noise is defined as unwanted sound and, in the context of protecting public health and welfare, implies potential effects on the human and natural environment. Noise is a significant concern associated with construction, dredging, and transportation activities and projects. Ambient noise levels within a given region may fluctuate over time because of variations in intensity and abundance of noise sources.

The degree of disturbance or annoyance of unwanted sound depends on: (1) the amount and nature of intruding noise; (2) the relationship between the background noise and the intruding noise; and (3) the type of activity occurring at the location where the noise is heard. Human response to noise varies from individual to individual and is dependent on the ambient environment in which the noise is perceived. Wind, temperature, and other conditions can change the sound volume perceived at distances from the noise source. Ambient sources of noise within the project area are recreational activities (boating and fishing), commercial vessels transiting up and down the coast and natural sounds from the physical and biological environment. Because Martin County has many seasonal residents and tourists, many more residents are present in the winter months, which results in more boating traffic during the winter tourist season. These sources are expected to remain at their present noise levels.

3.9 AESTHETIC RESOURCES

The area of Borrow Area B is open water. The aesthetic of an area are considered the visual resources in the area, in this case the open ocean and marine life in the vicinity.

3.10 RECREATIONAL RESOURCES

Recreational activities offshore of Martin County near Borrow Area B are mainly confined to offshore fishing activities due to the distance of the sand source to shore. The area is easily accessible by boat from Martin County. The high diversity of fish species in this area supports sport and recreational fishing opportunities. With the Gulf Stream just offshore, there are a significant number of marinas which offer offshore fishing opportunities for residents and visitors.

3.11 COASTAL BARRIER RESOURCES

There is one designated Coastal Barrier Resource System Unit to the south of the St Lucie Inlet, Unit P12, “Hobe Sound Unit” as well as area P12P, St. Lucie Inlet Preserve State Park, which is classified as an “Otherwise Protected Area” under the program (Figure 9).

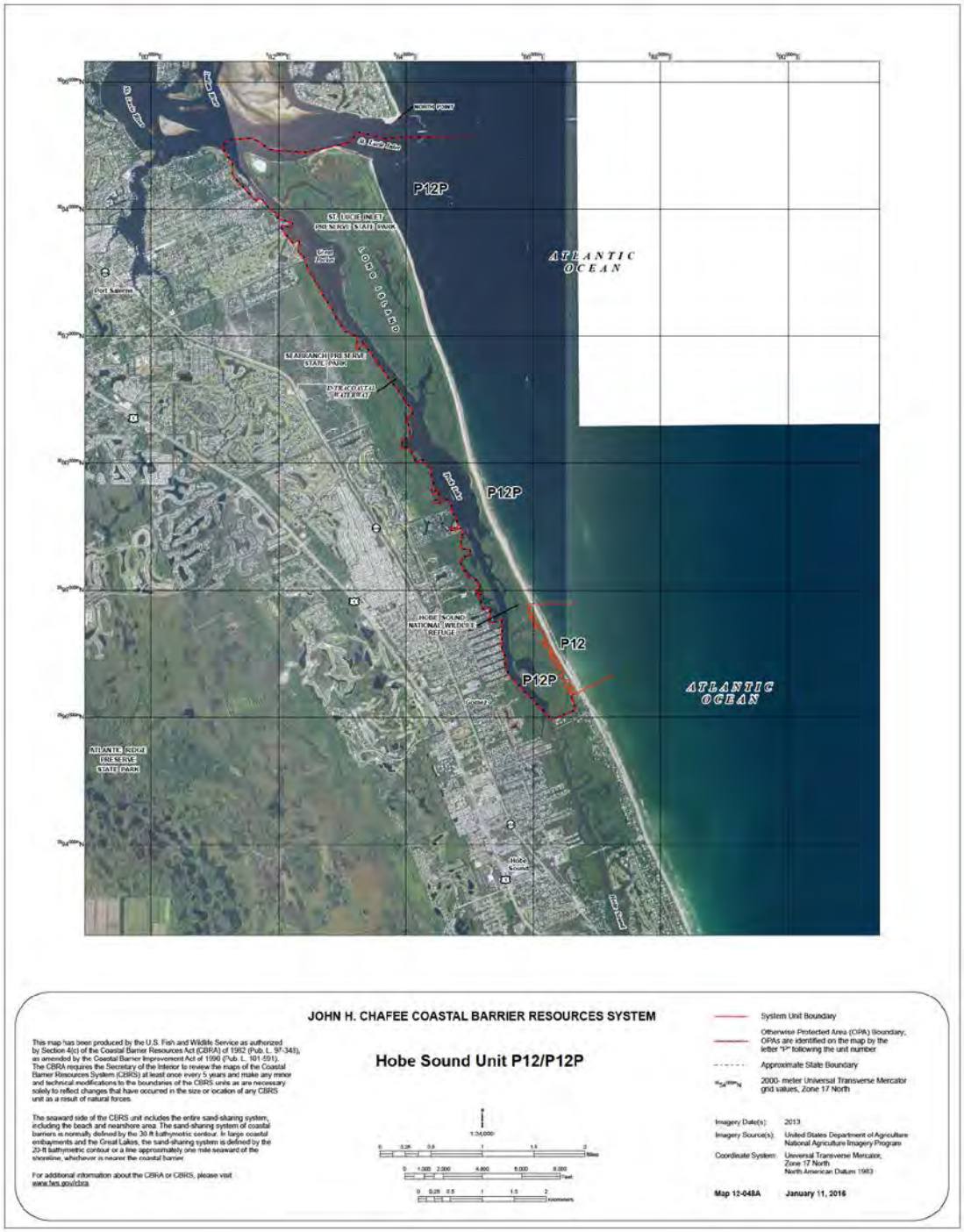

Figure 9 - Coastal Barrier Resources System - Unit P12 and P12P

3.12 NATIVE AMERICANS

Neither the St. Lucie Inlet Federal Navigation Channel or Borrow Area B are not located within or adjacent to known Native American-owned lands, reservation lands, or Traditional Cultural Properties.

3.13 CULTURAL RESOURCES

Previous consultations with the SHPO have occurred for the continued O&M dredging of the Inlet and for the placement of the sand within Borrow Area B. The O&M dredging of St Lucie Inlet was coordinated with the SHPO in 1994, and the SHPO did not respond to the public notice. A lack of response from the SHPO was deemed concurrence that the project was in compliance. In April 1999, the St. Lucie Inlet Navigation Improvements Project coordinated with the SHPO with the determination that the navigation improvements project would not affect significant historic properties. The SHPO concurred with that determination in Ausut 1999. During the 2011 NEPA coordination for the addition of the Peck's Lake pumpout station, the SHPO reviewed the project and determined that there were no historic properties eligible for listing that would be adversely affected by the project. In a November 18, 2011 letter, the SHPO concurred with the determination that no historic properties eligible for listing in the National Register would be adversely affected by the project.

A project specific SHPO consultation was conducted and in a February 16, 2016 letter, the SHPO determined that the proposed project activities were unlikely to affect historic properties if the following specific conditions are followed. The specific conditions are based on the use of Borrow Area B by the Town of Jupiter Island as a sand source under Department of Army (DA) permit SAJ-1992-01740(MOD) dated November 13, 2015. The SHPO requested the following special condition be incorporated into the DA permit.

> ***Borrow Area B****: No sand borrowing or transfer work should be allowed to occur within a 500-foot radius of the anomalies, or their respective clusters recorded in the 1989 magnetometer survey of Borrow Area B (Florida Master Site File # 2115). The 500-foot radii should be delineated by marker buoys.*

The pink bubbles on the eastern side of Borrow Area B in Figure 8 show the areas to be avoided by the project. These areas will also be noted in the plans and specs for the St. Lucie O&M project to prevent placement of any materials in the exclusion areas noted in the permit.

4 ENVIRONMENTAL EFFECTS

This section is the analytic basis for the comparisons of the alternatives. See Table 1 in section 2.0 Alternatives, for summary of effects. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. Previous EAs have assessed the effects of placing material dredged from the channel onto the beach within St. Lucie Preserve State Park and the Hobe Sound National Wildlife Refuge as identified in Section 1.1. All of these previous EAs, which are incorporated by reference (Section 1.4, Related Environmental Studies), had a corresponding FONSI.

4.1 SEDIMENT QUALITY

No Action Alternative. No adverse effects on native sediment characteristics would occur.

Proposed Action, Dredging and Placement in Borrow Area B. No adverse effects on existing sediment in Borrow Area B would occur.

4.2 BIOLOGICAL COMMUNITIES AND LAND USE

4.2.1 BORROW AREA B COMMUNITIES

No Action Alternative. No effects to communities within Borrow Area B as no material associated with O&M of St. Lucie Inlet will be placed in the Borrow Area.

Dredging and Placement in Borrow Area B. Minor and temporary effect to marine life within the Borrow Area due to the temporary increase of turbidity and equilibration of sediment placement.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Minor and temporary effect to marine life within the Borrow Area due to the temporary increase of turbidity and equilibration of sediment placement.

4.2.2 OPEN WATER HABITATS

No Action Alternative. Temporary effects associated with turbidity will on open water communities would occur during dredging and nearshore placement activities.

Proposed Action, Dredging and Placement in Borrow Area B. Minor and short term effects on open water communities would occur due to sedimentation and turbidity associated with material placement within Borrow Area B.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Minor and short term effects on open water communities would occur due to sedimentation and turbidity associated with dredging the inlet, and material placement on the beach, or within the approved nearshore template or Borrow Area B.

4.3 FISH AND WILDLIFE

4.3.1 MIGRATORY BIRDS

No Action Alternative. Short-term impact during migratory bird nesting season, if placement of

dredged material takes place during nesting season. Timeframes will be dictated by the P3BO Terms and Conditions. There are long term benefit by creating additional nesting and foraging areas for migratory birds by the increase in dry beach.

Dredging and Placement in Borrow Area B No adverse effects on migratory birds will occur associated with placement of material in Borrow Area B.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Short-term impact during migratory bird nesting season, if placement of dredged material takes place during nesting season. Timeframes will be dictated by the P3BO Terms and Conditions. There are long term benefit by creating additional nesting and foraging areas for migratory birds by the increase in dry beach. No adverse effects on migratory birds will occur associated with placement of material in Borrow Area B.

4.3.2 MARINE MAMMALS

No Action Alternative. Marine mammals that may be transiting through the area during transit from the St. Lucie Inlet to either the beach pumpout location or the nearshore placement area may avoid the area due to the dredges presence in the vicinity. However this would be a temporary effect of the project and would cease after the project is completed. No adverse effects on non-listed marine mammals would occur. In the April 25, 2005 notice in the Federal Register (70FR 21174) for the issuance of an IHA for Small Takes of Marine Mammals Incidental to Specified Activities; Port of Miami Construction Project (Phase II), NMFS stated: *According to the Corps, bottlenose dolphins and other marine mammals have not been documented as being directly affected by dredging activities and therefore the Corps does not anticipate any incidental harassment of bottlenose dolphins by dredging.*

Dredging and Placement in Borrow Area B. Marine mammals that may be transiting through the area during transit from the St. Lucie Inlet to Borrow Area B may avoid the area due to the dredges presence in the vicinity of Borrow Area B. However this would be a temporary effect of the project and would cease after the project is completed. No adverse effects on non-listed marine mammals would occur. In the April 25, 2005 notice in the Federal Register (70FR 21174) for the issuance of an IHA for Small Takes of Marine Mammals Incidental to Specified Activities; Port of Miami Construction Project (Phase II), NMFS stated: *According to the Corps, bottlenose dolphins and other marine mammals have not been documented as being directly affected by dredging activities and therefore the Corps does not anticipate any incidental harassment of bottlenose dolphins by dredging.*

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Marine mammals that may be transiting through the area during transit from the St. Lucie Inlet to the beach pumpout location, the nearshore placement area or Borrow Area B may avoid the area due to the dredges presence in the vicinity. However this would be a temporary effect of the project and would cease after the project is completed. No adverse effects on non-listed marine mammals would occur. In the April 25, 2005 notice in the Federal Register (70FR 21174) for the issuance of an IHA for Small Takes of Marine Mammals Incidental to Specified Activities; Port of Miami Construction Project (Phase II), NMFS stated: *According to*

the Corps, bottlenose dolphins and other marine mammals have not been documented as being directly affected by dredging activities and therefore the Corps does not anticipate any incidental harassment of bottlenose dolphins by dredging.

4.3.3 BENTHOS

No Action Alternative. Benthos that inhabits the dredging area or nearshore placement area would be removed from the area by either the dredging activity, or burial with nearshore placement. This impact is likely to be temporary and would likely recover within one year to 18 months. No long-term adverse effects are anticipated to the intertidal macroinfaunal community due to nourishment activities (Deis et al. 1992, Nelson 1985, Gorzelany and Nelson 1987).

Dredging and Placement in Borrow Area B. Placement of material in Borrow Area B will have a direct impact to open sandy habitat within the borrow area which provides habitat to fish, crustaceans, mollusks and other aquatic organisms. Impacts are anticipated to be directly related to dredging and the discharge of dredged material into Borrow Area B and are anticipated to be temporary and would likely recover within one year to 18 months. The immediate impact of placing material into the borrow area will be the burial of portions of the benthic invertebrate populations that inhabit the borrow area, especially those fauna with sessile and slow-moving lifestyles. Since the entire footprint of Borrow Area B is not being used for material placement (Figure 3), the remaining area where material is not placed can serve as the primary source of colonizing fauna for the recovery of those species into the placement footprint (Van Dolah et al. 1984; Jutte et al. 2002).

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Benthos that inhabits the inlet channel dredging area or nearshore placement area would be removed from the area by either the dredging activity, or burial with nearshore placement. This impact is likely to be temporary and would likely recover within one year to 18 months. No long-term adverse effects are anticipated to the intertidal macroinfaunal community due to nourishment activities (Deis et al. 1992, Nelson 1985, Gorzelany and Nelson 1987).

Placement of material into Borrow Area B will have a direct impact to open sandy habitat within the borrow area which provides habitat to fish, crustaceans, mollusks and other aquatic organisms. Impacts are anticipated to be directly related to dredging and the discharge of dredged material into Borrow Area B and are anticipated to be temporary and would likely recover within one year to 18 months. The immediate impact of placing material into the borrow area will be the burial of portions of the benthic invertebrate populations that inhabit the borrow area, especially those fauna with sessile and slow-moving lifestyles. Since the entire footprint of Borrow Area B is not being used for material placement (Figure 3), the remaining area where material is not placed can serve as the primary source of colonizing fauna for the recovery of those species into the placement footprint (Van Dolah et al. 1984; Jutte et al. 2002).

4.3.4 FISHERY RESOURCES

No Action Alternative. Dredging with hydraulic dredges usually results in little to no effect on adult fishes due to their size and ability to avoid either the drag head or cutterhead. The same cannot

be said of larval fishes and eggs, which lack the ability to avoid the suction near the draghead or cutterhead. Larvae and egg distribution and concentrations in a channel are highly variable on a range of scales (spatially and temporally). Therefore it is important to recognize that not all larvae in an inlet like St. Lucie would be vulnerable to entrainment. Larvae and eggs are not equally distributed in the inlet as the tidal flows in and out of the inlet can show asymmetry. 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 (Settle 2003).

Settle (2003) discussed the National Oceanic and Atmospheric Administration/National Ocean Services' National Centers for Coastal Ocean Science (NOAA) report entitled Assessment of Potential Larval Entrainment Mortality Due to Hydraulic Dredging of Beaufort Inlet. NOAA found, and USACE agrees that "any larvae entrained in the dredge are likely to be killed; it is likely that the impact at the population level would be insignificant" (Settle 2003). In this assessment, NOAA also determined that the use of a 30-inch hydraulic dredge dredging 24-hours a day in Beaufort Inlet, North Carolina, would result in entrainment mortality "even under the worst case scenario" of 0.1% per day where there are high densities of larval fishes (up to 5 larvae per m^3). This may be informative of potential effects associated with St. Lucie Inlet, although it is far from Beaufort Inlet. USACE is not aware of any studies regarding larval fish or egg densities in or around the St Lucie Inlet. Therefore, USACE assumes that if an inlet such as Beaufort with high densities of larval fishes can be dredged for 24-hours-a-day without significant population level effects to larval fish densities, that the same would hold true at the St. Lucie Inlet, where a significant portion of the larval development habitat is in the nearshore and offshore to the north and south of the Inlet according to previously submitted benthic surveys.

Dredging and Placement in Borrow Area B. The effects of dredging on fish are the same as the No Action Alternative. Turbidity can interfere with food gathering processes of filter feeders and organisms that feed by sight as a result of inundation with non-nutritive particles. In addition to altered feeding rates, other biological responses to turbidity include reduced hatching success, slowed growth, abnormal development, tissue abrasion, and increased mortality. Suspension and dispersion processes uncover and displace benthic organisms, temporarily providing extra food for bottom-feeding species.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.4 THREATENED AND ENDANGERED SPECIES

No Action Alternative. Adverse effects of dredging and placement of material on the beach has been reviewed in the SARBO, SPBO and P3BO. Those Biological Opinions include Terms and Conditions (T&Cs) to minimize adverse effects to listed species and provide incidental take authorizations where adverse effects cannot be avoided. USACE is incorporating those T&Cs into the project plans and specifications. As a result of the opinions, the effects of the continued

dredging of the St. Lucie Inlet Federal Navigation Project with placement of dredged material either on the downdrift beaches or in nearshore waters, may adversely affect, but is not likely to jeopardize the continued existence of any listed species.

Dredging and Placement in Borrow Area B. The effects of dredging material from the St Lucie Inlet is the same as with the No Action Alternative. The placement of sand from the Inlet into Borrow Area B is not likely to adversely affect any listed species. In compliance with Section 7 of the Endangered Species Act, the project was fully coordinated under the Endangered Species Act as part of the recently authorized Department of Army permit modification (refer to Section 1.4). The applicable conditions of the SARBO issued by NMFS and the SPBO and P3BO issued by the USFWS have been incorporated into the project plans and specifications and will be followed during construction.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

Additional analysis, by species group or species is provided below.

4.4.1 SEA TURTLES

Dredging and the use of the various placement locations (beach, nearshore and Borrow Area B) could potentially directly and indirectly affect sea turtles in several ways, including:

- Dredging activities that utilize a hopper dredge may lethally take or injure sea turtles through entrainment; preventative measures will be taken, including the use of draghead deflectors and monitoring to reduce the potential for entrainment. Placement activities on nesting beaches may affect sea turtles (See SARBO and GRBO for more details).
- Sand placement shall not occur on the beach between May 1 and October 31.
- Escarpment formations and resulting impediments to nesting females as well as potential losses to the beach equilibration process;
- 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 altered potentially affecting the nesting and incubating environment;
- Hard sediment can prevent a female turtle from digging a nest or result in a poorly constructed nest cavity;
- Changes in sediment properties and color could alter the temperature of the beach and incubating nests, thus influencing sex ratios.

With respect to effects of hopper dredging on sea turtles, the SARBO (1997) states:

> *Therefore, NMFS believes that up to 35 loggerheads may be taken by injury or mortality, as well as 7 Kemp's ridleys, 7 green turtles, 2 hawksbills, and 5 shortnose sturgeon. These takes are not likely to jeopardize the continued existence of these species and the ongoing commitment by the COE to further minimize takes may reduce the likelihood of sea turtle takes in the future*

even if nearshore sea turtle abundances increase.

The 1991 SARBO; (amended in 1995 and 1997; NMFS 1991) states:

> *Clamshell dredges are the least likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low, although the take of a live turtle by a clamshell dredge has been documented at Canaveral. On the basis of the best available information, NMFS has determined that dredging with a clamshell dredge is unlikely to result in the take of sea turtles. . . . Pipeline dredges are relatively stationary and only influence small areas at a given time. For a turtle to be taken with a pipeline dredge, it would have to approach the cutterhead and be caught in the suction. This type of behavior would appear unlikely, but may be possible. Presently, NMFS has determined that pipeline dredges are unlikely to adversely affect sea turtles. . . . the special purpose split-hull hopper dredge and sidecast dredges are used in a limited basis in the southeast. These dredges are not believed harmful to sea turtles because of the small size of dragheads (roughly 2' by 2'). For the present consultation, NMFS has determined that these dredges are unlikely to adversely affect sea turtles.*

Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened species. Thus, this biological opinion concentrates on the adverse effects of hopper dredging in the southeastern United States.

In the 1997 SARBO, NMFS also determined that leatherback sea turtles are unlikely to be adversely affected by hopper dredging activities. The USACE plans to minimize effects to nesting sea turtles in the project area by implementing steps that are now common practice including, but not limited to:

- contingency plans;
- risk assessments;
- sediment quality monitoring;
- compaction tests;
- tilling; and
- leveling escarpments in the fill

USFWS biological opinions for similar projects acknowledge that placement of sand on a critically eroded beach can enhance sea turtle nesting habitat if the sand placed is highly compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments at the recipient site, and compaction and escarpment remediation measures are properly adopted (USFWS 2005).

4.4.2 FLORIDA MANATEE

In accordance with Section 7 of the Endangered Species Act, consultation with the USFWS was conducted under the SPBO. USACE has determined that the proposed dredge work may affect, but is not likely to adversely affect manatees. This determination was based on the implementation of

species specific protective measures and the type of dredging equipment typically used to dredge the channel. Regarding protection for manatees, the 2015 USFWS SPBO T&Cs will be followed.

4.4.3 WHALES

Whales are infrequently encountered when work vessels are in transit to either the nearshore placement area or Borrow Area B. In the 1991 SARBO NMFS stated that although several ESA-listed whale species were known to occur along the Atlantic coast (finback, humpback, and sei), it was unlikely that they would be adversely affected by hopper dredging activities. And as clamshell and cutterhead dredges are static, they are also unlikely to affect the species. Therefore, whales are not likely to be struck by vessels. Work crews will monitor for whales during all waterborne work. The USACE has determined that based on NMFS' conclusions, the proposed dredging and placement operations may affect, but are not likely to adversely affect ESA-listed whales in the project area.

4.4.4 SMALLTOOTH SAWFISH

The logic set forth in NMFS' 2003 Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas Using Hopper Dredges by COE Galveston, New Orleans, Mobile, and Jacksonville Districts (GRBO) (as amended in 2005 and 2007) regarding hopper dredge effects to sawfish in the Gulf of Mexico is also applicable to St Lucie Inlet and Martin County where sawfish occurrences are rare. As stated in the GRBO (page 21):

> *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 bycatch in commercial and recreational fisheries throughout their historic range; however, such bycatch is now rare due to population declines, population extirpations and a ban on fishing with floating nets. Between 1990 and 1999, only four documented takes of smalltooth sawfish occurred in shrimp trawls in Florida (Simpendorfer 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 (C. Slay, Coastwise Consulting, pers. comm. August 18, 2003) and a review of the available scientific literature, NOAA Fisheries has 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. Only hopper dredging of Key West channels would have the potential to impact smalltooth sawfish but those channels are not within the area of influence of this project. Therefore, NOAA Fisheries believes that smalltooth sawfish are rare in the action area, the likelihood of their entrainment is very low, and that the chances of the proposed action affecting them are discountable.*

USACE agrees with this determination and incorporate it into this effects determination.

4.4.5 PIPING PLOVER

The piping plover is known to rarely use the beaches of Martin County (USACE 2011) and placement of dredged O&M material on the beach may displace birds foraging and resting. The displacement

is expected to be short term, and habitat exists outside of the beach placement areas with similar characteristics that may be used by displaced species while placement activities are underway. Birds that use the beach for nesting and breeding are more likely to be affected by beach nourishment than those that use the area for feeding and resting during migration (USDOI/MMS 1999). Piping plovers may be displaced by dredges, pipelines, and other equipment along the beach, or may avoid foraging along the shore if they are aurally affected (Peterson et al.. 2001). If the sand placed on the beach is too coarse or high in shell content, it can inhibit the birds' ability to extract food particles in the sand (Greene 2002). Fine sediment that reduces water clarity can also decrease the feeding efficiency of birds (Peterson et al. 2001).

Direct effects to piping plovers from project construction are expected to be minimal as birds are motile and can avoid construction activities. The disposal of sand on the beach may temporarily interrupt foraging and resting activities of shorebirds that utilize the project beach area. This interruption would be limited to the immediate area of disposal and duration of construction. The prey base for many shorebirds, which includes the benthic organisms previously discussed in Section 3.3.3 may be temporarily reduced in the project area. This impact would be short-term as recovery of beach infauna is expected within one year after sand placement.

Placement of dredged material in the nearshore or Borrow Area B would have no effect on piping plover.

4.4.6 RUFA RED KNOT

Like the piping plover, the rufa red knot is also known to rarely use the beaches of Martin County. And as with the plover, placement of dredged O&M material on the beach may displace foraging and resting. The displacement is expected to be short term, and habitat exists outside of the beach placement areas with similar characteristics that may be used by displaced species while placement activities are underway. Direct effects to piping plovers from project construction are expected to be minimal as birds are motile and can avoid construction activities. The disposal of sand on the beach may temporarily interrupt foraging and resting activities of shorebirds that utilize the project beach area. This interruption would be limited to the immediate area of disposal and duration of construction. The prey base for many shorebirds, which includes the benthic organisms previously discussed in Section 3.3.3, may be temporarily reduced in the project area. This impact would be short-term as recovery of beach infauna is expected within one year after sand placement.

Placement of dredged material in the nearshore or Borrow Area B would have no effect on the rufa red knot.

4.5 WILDLIFE REFUGES, SANCTUARIES, AND MANAGEMENT AREAS

No Action Alternative. Continued placement of O&M dredged material on the beaches of St. Lucie Preserve State Park and Hobe Sound National Wildlife Refuge, or in the nearshore adjacent to the parks, will decrease the effects of erosion on the beaches within those parks.

Dredging and Placement in Borrow Area B. No adverse effects to refuges, sanctuaries, and management areas would occur.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.1 ESSENTIAL FISH HABITAT

No Action Alternative. The work would temporarily impact nearshore benthic habitat, fishes, and invertebrates in the dredge areas, as well as result in temporary reductions of water quality due to turbidity. After dredging and placement, the water quality will quickly return to pre-dredging conditions, benthic communities would repopulate, and fishes and motile invertebrates would return to the area. These effects are considered to be minor and will not result in an overall adverse impact to essential fish habitat.

Dredging and Placement in Borrow Area B. The same effects from the No Action Alternative would occur in association with dredging of the St. Lucie Inlet. Placement of material into Borrow Area B will result in temporary reductions of water quality due to turbidity. After placement in Borrow Area B, the water quality will quickly return to pre-dredging conditions. Placement of dredged material in Borrow Area B will result in burial of the infaunal benthic communities in the placement area, which may be forage for species managed under EFH. If these species are non-motile, or slow moving, they may be buried and die as a result of the burial. However, these effects are considered to be minor and will not result in an overall adverse impact to essential fish habitat.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.2 AIR QUALITY

No Action Alternative. The short-term effects from emissions by the dredge and other vessels associated with the project are not anticipated to affect onshore or offshore air quality significantly. Exhaust emissions from vessels associated with the project would have a temporary and localized effect on air quality. There may be temporary and minor unpleasant odors associated with exhaust emissions. Offshore sea breezes are anticipated to disperse pollutants. This project requires no air quality permits.

The work may result in small, localized, and temporary increases in concentrations of NO_x, SO_2, CO, VOCs, and PM. Because the project is located in an air quality attainment area, the EPA requires no preliminary air quality conformity assessment.

Emissions associated with the dredge plant would provide the largest contribution to the inventory. However, the total project emissions represent a minor percentage of the existing point and nonpoint and mobile source emissions in Pinellas County. Prevailing winds will quickly disperse any pollutant released into the atmosphere from the project area. Green House Gas emissions will minimally effect global emissions or total United States emissions.

Dredging and Placement in Borrow Area B. The effects of this alternative are the same as the No Action Alternative.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.3 WATER QUALITY

No Action Alternative. The work would temporarily reduce water quality due to turbidity. After dredging and placement, water quality will quickly return to pre-dredging conditions.

Dredging and Placement in Borrow Area B. This project will be performed in compliance with State of Florida water quality standards. Coastal Zone Management Plan consistency was determined through the acquisition of the issuance of Joint Coastal Permit (JCP) to Martin County on September 24, 2014. The JCP included monitoring protocols which requires turbidity monitoring during offshore placement as stated in the approved WQ/QC Plan and Monitoring Plan dated 4 October 2012. The project is expected to cause temporary and insignificant increases in turbidity associated with the dredging, at the borrow area and intertidal swash zone seaward (USACE 2017) of the beach. Due to the relatively low silt content and high density of the material, sand is expected to quickly fall out of the water column and only a short-term increase in turbidity is expected. A turbidity control and monitoring plan is a special condition of the permit to minimize effects to surrounding waters. The Florida Department of Environmental Protection (FDEP) JCP includes conditions for water quality and certifies that the project is consistent with Water Quality Certification. The permit issued by USACE incorporates the requirements to meet state water criteria included in the state permit. The fill material will be free from items such as trash, debris, construction materials, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act. All beach fill material utilized will comply with the FDEP-approved Sediment Quality Assurance/Quality Control Plan (Sediment QA/QC Plan dated 11 October 2012).

No long term adverse impact on water quality is expected to occur as a result of the work. Dredging operations will create minor, temporary reduction of water quality in the vicinity of the construction by increased turbidities. Elevated turbidity levels would occur within the mixing zone in dredging areas and in the return water from the disposal site. Turbidities directly due to dredging are expected to return to ambient levels within a short time period. Water quality certification will be obtained prior to the commencement of any activities associated with this Supplemental EA.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.4 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

No Action Alternative. There are no identified HTRW issues associated with this dredging project. If an HTRW issue were to be discovered during operation, the USACE would comply with all applicable state and Federal regulations and guidance to ensure the issue would be addressed and resolved.

Dredging and Placement in Borrow Area B. There are no identified HTRW issues associated with this dredging project, so there will be no impact to Borrow Area B associated with HTRW. If an HTRW issue were to be discovered during operation, the USACE would comply with all applicable state and Federal regulations and guidance to ensure the issue would be addressed and resolved.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.5 NOISE

No Action Alternative. Temporary minor increases in noise would occur during the dredging and dredged material placement in the vicinity of the construction. Waterways where dredging will occur currently experience elevated background noise associated with navigation activities. Dredging and disposal operations near populated or other noise-sensitive locations may result in increased levels of noise. Some of the dredging and disposal sites are located in remote locations and the noise would attenuate. Local noise ordinances would be implemented to reduce equipment noise. Following dredging and placement operations, noise levels would revert to existing levels.

Dredging and Placement in Borrow Area B. The effects associated with noise for placement of dredged material in Borrow Area B are the same as the No Action Alternative.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.6 AESTHETICRESOURCES

No Action Alternative. Dredges, pipelines and heavy equipment will be used during beach placement and may be considered "unsightly" by members of the public. Also temporary air emissions, turbid water and increased noise can also temporarily impact aesthetics. During construction, equipment used for dredging would be visible, resulting in a temporary reduction in the aesthetic value offshore during construction. Impacts to aesthetics depend on the locations of the dredging and disposal areas. Aesthetic values are less likely to be impacted in remote or highly industrialized dredging and disposal areas

Dredging and Placement in Borrow Area B. The effects associated with aesthetic values for placement of dredged material in Borrow Area B are the same as the No Action Alternative.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.7 RECREATIONAL RESOURCES

No Action Alternative. Short-term impact to recreational boat traffic and beach activities in project vicinity due to the presence of the dredge, support vessels and pipelines. Long-term benefits by maintaining recreational opportunities associated with maintaining the beach. Failure to maintain inlet would have negative impacts on recreational use of inlet.

Dredging and Placement in Borrow Area B. The effects associated with recreational resources for placement of dredged material in Borrow Area B are the same as the No Action Alternative.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.8 SOCIOECONOMICS

No Action Alternative. Based on the continued use of St. Lucie Inlet by recreational and commercial vessels, it is evident that if maintenance dredging of the channel does not continue, there would be a deleterious effect on the local and regional socioeconomic environment.

Dredging and Placement in Borrow Area B. The regional social and economic benefits that are based on navigation associated with the St Lucie Inlet Federal Navigation project would continue. Use of Borrow Area B as a placement site would have beneficial effects on decreasing the costs associated with sand procurement for the Town of Jupiter Island for their ongoing shore protection project.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.9 NAVIGATION AND PUBLIC SAFETY

No Action Alternative. The No Action Alternative would result in shoaling and shallowing of the channel. As shoaling continues, the navigability of the channel would decrease. Because vessels would tend to use the center of the channel, shoaling at the sides would result in a narrowing of the channel, which would affect public safety by increasing the potential for collisions.

Dredging and Placement in Borrow Area B. The work would result in some temporary disruption of normal vessel traffic in the ship channel due to the presence and operation of the dredged material transport and disposal equipment. This temporary effect is considered only a minor inconvenience to navigation.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.10 NATIVE AMERCANS

No portion of the proposed action is located within or adjacent to known Native American-owned lands, reservation lands, or Traditional Cultural Properties.

No Action Alternative. There will be no effect to Native Americans with the No Action Alternative.

Dredging and Placement in Borrow Area B. There will be no effect to Native Americans with the dredging of the St. Lucie Inlet with placement of the dredged material in Borrow Area B.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.11 CULTURAL RESOURCES

As discussed in the Section 3: Affected Environment portion of this document, substantial cultural resources work and investigations have been conducted throughout various portions of the project area. Previous consultation with the Florida SHPO and the appropriate federally-recognized tribes on recurrent maintenance dredging of the St. Lucie Inlet Navigation Project and placement of dredge material on the beaches south of the inlet and in the nearshore environment has indicated that the Proposed Action will have no effect on cultural resources listed or eligible for listing in the NRHP;

No Action Alternative. The No Action Alternative would have no effect to cultural resources listed or eligible for listing in the NRHP.

Dredging and Placement in Borrow Area B. The Proposed Action would have no effect to cultural resources listed or eligible for listing in the NRHP.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.12 ENERGY REQUIREMENTS AND CONSERVATION

No Action Alternative. The work will involve the use of fuel to power dredges, pumps, and associated machinery in conjunction with the maintenance of the Federal channel and placement of dredged material.

Dredging and Placement in Borrow Area B. The work will involve the use of fuel to power dredges, pumps, and associated machinery in conjunction with the maintenance of the Federal

channel and placement of dredged material.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.13 NATURAL OR DEPLETABLE RESOURCES

No Action Alternative. No direct effects caused by the work on natural/depletable resources would occur. However, indirect effects include the use of fuel for construction and operations (petroleum depletion), machinery wear and tear (metal ore depletion), and similar effects. However, these effects are considered to be of minor consequence.

Dredging and Placement in Borrow Area B. No direct effects caused by the work on natural/depletable resources would occur. However, indirect effects include the use of fuel for construction and operations (petroleum depletion), machinery wear and tear (metal ore depletion), and similar effects. However, these effects are considered to be of minor consequence.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

4.5.14 CUMULATIVE EFFECTS

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from:

...the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ). Cumulative environmental effects were also evaluated in the NEPA documents listed in Section 1.4.

Past projects in the St. Lucie Inlet include the previous O&M dredging conducted by USACE and the non-federal local sponsor with placement of the dredged material on the beach or in the nearshore including the staging of dredge equipment at Pecks Lake. A Cumulative Effects Analysis for the continued O&M of the St. Lucie Inlet was included in the 1994 EA and the 2000 EA; and a Cumulative Effects Analysis was included in the 2011 EA for staging equipment at Pecks Lake. All three of these analyses are incorporated by reference. Other than the ongoing O&M of St. Lucie Inlet, there are no other known activities that are taking place that should be included in a Cumulative Effects Analysis.

The only other project likely to take place in the foreseeable future besides the ongoing O&M of St. Lucie Inlet, is the ongoing Martin County Shore Protection Project (MCSPP) (USACE 2011) would "primary impact the beach, nearshore hardbottom resources, offshore sand borrow areas and associated habitats." A detailed Cumulative Effects Analysis was included in the FEIS for that project (USACE 2011) and is incorporated by reference.

Continued maintenance of the St. Lucie Inlet and placement of sand on the beach or in the nearshore would also impact many of the same resources as the MCSPP. The MCSPP will continue to maintain the beaches at least through the end of its federally authorized lifespan, 2046. It is expected that St. Lucie Inlet will continue to be maintained for the foreseeable future with placement of sand from those O&M dredging events on the beach, in the nearshore, or in Borrow Area B. The cumulative effects of all three of these placement locations are similar in nature. All allow for the continued maintenance of the beach profile, and its storm damage reduction benefits. These long term effects on these resources, with the continuation of O&M dredging of the St. Lucie Inlet are not significant.

4.5.15 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

No Action Alternative. The No Action Alternative will result in the continued O&M dredging of the St. Lucie Inlet with placement of dredged material either on the beach or in the nearshore. There are unavoidable adverse environmental effects associated with the No Action Alternative as previously detailed in the NEPA documents in Section 1.4, and in Table 1.

Dredging and Placement in Borrow Area B. Continued O&M dredging of the St. Lucie Inlet with placement of dredged material in Borrow Area B will have some unavoidable impacts to sea turtles swimming in the water if hopper dredges are used. Additionally, marine animals (including fishes and marine mammals) may experience increase noise, and turbidity associated with the placement of material in Borrow Area B. Infaunal resources that live inside the boundaries of the placement area may also be adversely effected due to burial under dredged material as it is placed into the borrow area. All of these effects are expected to be short term, and minor in nature.

Dredging with Placement in Existing Nearshore and Beach Template Areas and Borrow Area "B" (Preferred Alternative). Effects would be a combination of the No Action Alternative and dredging and placement in Borrow Area B.

5 ENVIRONMENTAL COMMITMENTS

USACE shall comply with all terms and conditions of the revised SPBO and the SARBO, the Conservation Measures of the PB3O, and the State's JCP issued for the project. The PB3O conservation measures will also minimize effects to red knots. The USACE also commits to avoiding, minimizing, or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications.

5.1 PROTECTION OF FISH AND WILDLIFE RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed in the Contractor's Environmental Protection Plan (EPP) prior to the beginning of construction operation.

5.2 ENDANGERED SPECIES PROTECTION

USACE and contractors commit to avoiding, minimizing or mitigating for adverse effects to sea turtles, manatees, and sawfish during construction activities. USACE has included the T&Cs of the SPBO for sand placement and the SARBO for dredging in the project specifications. The Contractor shall also include protection criteria for Endangered and Threatened species protections in their EPP.

5.3 WATER QUALITY

The USACE Contractor will prevent oil, fuel, or other hazardous substances from entering the air or water. This will be accomplished by design and procedural controls. All wastes and refuse generated by project construction would be removed and properly disposed. The USACE contractor will implement a spill contingency plan for hazardous, toxic, or petroleum material for the borrow area. A Section 401 Water Quality Certification/State JCP was issued to Martin County, the project non-federal sponsor, and the project will be utilizing that permit. The Contractor shall monitor water quality (turbidity) at the dredging and beach placement sites, as required by the State JCP.

5.4 CULTURAL RESOURCES

An unexpected cultural resources finds clause has been included in the project specifications. Anomalies of interest at Borrow Area B have been designated as avoidance areas and no dredged material can be placed in those areas.

In the event that the dredge operators discover any archaeological resource while conducting dredging operations, dredge operations will be halted immediately within the area. If investigations determine that the resource is significant, state and Federal agencies would determine how best to protect it.

5.5 PROTECTION OF MIGRATORY BIRDS

USACE will incorporate the standard migratory bird protection protocols into the project plans and specifications and will require the contractor to abide by those requirements for the No Action

Alternative. Protections of migratory birds on the beach is not an issue for the preferred alternative.

5.6 HARBOTTOM HABITATS

Mapped hardbottom habitats have been protected through the implementation of a 400 ft. wide buffer from all dredging activities (including anchor points). The closest hardbottom habitat is more than 1,000 feet east of Borrow Area B. A post-dredging monitoring survey of the hardbottoms in the vicinity of Borrow Area B was conducted by the Town of Jupiter Island as part of their permit to utilize Borrow Area B. USACE will utilize that monitoring event as the pre-dredge condition for the dredged material placement activities within Borrow Area B. USACE will conduct a hydrographic post-placement monitoring event to determine any effects the placement may have add on the hardbottoms in the vicinity of Borrow Area B, and the Town of Jupiter Island will continue their monitoring program associated with the use of Borrow Area B as a sand source for their on-going nourishment program.

6 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled, and this EA has been prepared. The final EA and signed FONSI will be made available to the public and a notice of availability of the signed FONSI will be sent to interested parties. The project has also undergone numerous reviews under NEPA as detailed in Section 1.4. This EA summarizes and incorporates those findings by reference. The project is in compliance with NEPA.

6.2 ENDANGERED SPECIES ACT OF 1973

This project has been coordinated with NMFS through the SARBO dated 25 September 1997. By letter dated 25 October 2007, NMFS instructed USACE to continue to apply the 1997 SARBO on all O&M dredging projects while NMFS completes the new SARBO. That document is not yet complete. For species under the jurisdiction of the USFWS, the USACE will use the SPBO dated 13 March 2015 and the P3BO dated 22 May 2013 for dredging and placement activities for St. Lucie Inlet O&M. The conservation recommendations included in the P3BO will also provide protections to the rufa red knot. USACE received a concurrence from USFWS that the proposed project is covered by the SPBO and P3BO in a 12 April 2017 letter from the USFWS. This letter is included in Appendix A. This project has been fully coordinated under the Endangered Species Act and is in full compliance with the Act.

6.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

Each activity constructed pursuant to this NEPA document has been coordinated with the USFWS in accordance with the Fish and Wildlife Coordination Act (FWCA) prior to construction. This project is in full compliance with this Act.

6.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL93- 29), Archeological Resources Protection Act (PL96-95), American Indian Religious Freedom Act (PL 95- 341), Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Consultation with the SHPO for each aspect of this project has been completed.

- 1994 EA – "An archival and literature review, including a review of the current National Register of Historic Places listing and consultation with the Florida State Historic Preservation Officer (SHPO), was conducted to determine if significant cultural resources are present in the project area. No significant archeological sites or historic properties are recorded in the project area, and the area is judged to have little potential for containing significant cultural resources. No response from the SHPO was received during the public notice period. Therefore, the project would be in compliance."
- 2000 EA – "In a letter dated 22 April 1999 the proposed action was coordinated with the

State Historic Preservation Officer (SHPO) concerning historic resources. In that letter the USACE' determined that the proposed action at St. Lucie Inlet would not affect significant historic properties. In a letter dated August 5, 1999, the SHPO concurred with this determination."

- 2011 EA - In a November 18, 2011 letter, the SHPO concurred with the determination that no historic properties eligible for listing in the National Register would be adversely affected by the project.
- 2017 MFR/SOF for RD permit - A project specific SHPO consultation was conducted and in a 16 February 2016 letter, the SHPO determined that the proposed project activities were unlikely to affect historic properties if the following specific conditions are followed. The specific conditions are based on the use of Borrow Area B by the Town of Jupiter Island as a sand source under Department of Army (DA) permit SAJ-1992-01740(MOD) dated 13 November 2015. The SHPO requested the following special condition be incorporated into the DA permit.

6.5 CLEAN WATER ACT OF 1972

Maintenance dredging with placement into Borrow Area B is covered by Section 401 of the Clean Water Act (CWA). The issuance of the JCP to Martin County provides the analysis for the project's compliance with Section 401 of the CWA. All state water quality requirements will be met. The project is in full compliance with this Act.

6.6 CLEAN AIR ACT OF 1972

The short-term impacts from construction equipment associated with the project would not significantly impact air quality. No air quality permits would be required for this project. Martin County is designated as an attainment area for Federal air quality standards under the Clean Air Act. Because the project is located within an attainment area, USEPA's General Conformity Rule to implement Section 176(c) of the Clean Air Act does not apply and a conformity determination is not required.

6.7 COASTAL ZONE MANAGEMENT ACT OF 1972

The state of Florida's issuance of the JCP for the project is their determination in accordance with 15 C.F.R. 930 Subpart C.

6.8 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland will be impacted by implementation of this project. This act is not applicable.

6.9 WILD AND SCENIC RIVER ACT OF 1968

No designated wild and scenic river reaches will be affected by project related activities. This act is not applicable.

6.10 MARINE MAMMAL PROTECTION ACT OF 1972

To ensure the protection of any manatees, whales, or dolphins present in the project area, incorporation of safeguards used to protect these species have been included in the project plans

and specifications and will be implemented by the contractor during dredging and placement operations. In addition, if dredging is conducted with a clamshell dredge, a dedicated manatee monitor will be assigned to watch for manatee conflicts. Therefore, this project shall be in compliance with the Act.

6.11 ESTUARY PROTECTION ACT OF 1968

No designated Estuary of National Significance will be affected by project related activities. This act is not applicable.

6.12 FEDERAL WATER PROJECT RECREATION ACT

The principles of the Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1 (12), *et seq*. P.L. 89-72, do not apply to this project.

6.13 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976, AS AMENDED

In compliance with the Magnuson Stevens Act, the project was fully coordinated under the Essential Fish Habitat consultation as part of the recently authorized Department of Army modification (refer to Section 1.4). NMFS provided one conservation recommendation by letter dated 22 February 2016, "To reduce impacts to larval fishes, the permit should maintain the requirement for dredging to occur only during winter months (November 1 to April 30)". The USACE responded to this recommendation on 23 February 2017 rejecting the recommendation due to the findings of Settle (2003) and the potential to remove flexibility to maintain the channel when conditions threaten safe navigation (e.g. after a hurricane or large storm).

6.14 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The project was coordinated with the State via the issuance of their JCP, and is in compliance with the Act.

6.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

The Coastal Barrier Resources Act (CBRA) and the Coastal Barrier Improvement Act of 1990 (CBRIA) limit federally subsidized development within the CBRA Units to limit the loss of human life by discouraging development in high risk areas, to reduce wasteful expenditures of Federal resources, and to protect the natural resources associated with coastal barriers. CBRIA provides development goals for undeveloped coastal property held in public ownership, including wildlife refuges, parks, and other lands set aside for conservation (OPAs). These public lands are excluded from most of the CBRA restrictions, although they are prohibited from receiving Federal Flood Insurance for new structures.

Federal monies can be spent within the CBRS for certain activities, including
(1) projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats; (2) establishment of navigation aids; (3) projects funded under the Land and Water Conservation Fund Act of 1965; (4) scientific research; (5) assistance for emergency actions essential to saving lives and the protection of property and the public health and safety, if preferred pursuant to the Disaster Relief Emergency Assistance Act and the National

Flood Insurance Act and are necessary to alleviate the emergency; (6) maintenance, repair, or reconstruction, but not expansion, of publically owned or publically operated roads, structures, or facilities; (7) nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system; (8) any use or facility necessary for the exploration, extraction, or transportation of energy resources; (9) maintenance or construction of improvements of existing Federal navigation channels, including the disposal of dredge materials related to such projects; and (10) military activities essential to national security.

There is one CBRA and CBRIA units in the project area (see Section 3.11). The proposed project does not include the construction of structures that would require Federal Flood Insurance in any areas designated as "otherwise protected areas" pursuant to the CBRIA; therefore, Federal expenditures for the proposed project should not be restricted in these areas. The activities proposed in the remainder of the CBRA units in the project area are consistent with the intent of these Acts. The project is in compliance with these Acts.

6.16 RIVERS AND HARBORS ACT OF 1899

The proposed work will not obstruct navigable waters of the United States. USACE does not permit itself for civil works projects. As such, the activity discussed in this EA is in compliance from the intent of the Act.

6.17 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species are not likely to be affected. The project was coordinated with both NMFS and the USFWS, and is in compliance with this Act.

6.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

USACE has included migratory bird protection measures in the project plans and specifications for operations on the beach placement areas. If nesting activities occur within the construction area, appropriate buffers will be placed around nests to ensure their protection if the No Action Alternative is used. If the preferred alternative is constructed, no impacts to migratory birds are expected. The project is in compliance with these Acts.

6.19 MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT

The term *dumping* as defined in the Act [33 U.S.C. 1402(f)] does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than disposal (i.e., placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Material placed on the beach, in the nearshore or in Borrow Area B would not unreasonably degrade or endanger human health or the marine environment. Therefore, the project is in compliance with this Act.

6.20 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970

The purpose of PL 91-646 is to ensure that owners of real property to be acquired for Federal and federally assisted projects are treated fairly and consistently and that persons displaced as a direct result of such acquisition will not suffer disproportionate injuries as a result of projects designed

for the benefit of the public as a whole. This project shall not acquire property. Therefore, this Act is not applicable.

6.21 E.O. 11990, PROTECTION OF WETLANDS

No wetlands will be affected by project activities. This project is in compliance with the goals of this Executive Order.

6.22 E.O. 11988, FLOOD PLAIN MANAGEMENT

To comply with Executive Order 11988, the policy of USACE is to formulate projects that, to the extent possible, avoid or minimize adverse effects associated with the use of the floodplain and avoid inducing development in the floodplain unless there is no practicable alternative. No activities associated with this project are located within a floodplain, which is defined by EO 11988 as an "area which has a one percent or greater chance of flooding in any given year." The project is in compliance with the Executive Order.

6.23 E.O. 12898, ENVIRONMENTAL JUSTICE

On February 11, 1994, the President of the United States issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The Executive Order mandates that each Federal agency make environmental justice part of the agency mission and to address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs and policies on minority and low-income populations. There are no disproportionate adverse impacts to minority or low income populations resulting from the implementation of the project. The project is in compliance.

6.24 E.O. 13045, DISPARATE RISKS INVOLVING CHILDREN

On April 21, 1997, the President of the United States issued Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The Executive Order mandates that each Federal agency make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. As the proposed action does not affect children disproportionately from other members of the population, the proposed action would not increase any environmental health or safety risks to children.

6.25 E.O. 13089, CORAL REEF PROTECTION

While there are no coral reefs near the project area, there are hardbottom habitats that support some coral species approximately 1,000 feet west of Borrow Area B. Due to their distance from the Borrow Area, and the classification of the dredged material as sand, it is unlikely that adverse effects to these hardbottom habitats will occur. The hardbottoms associated with Borrow Area B have been monitored in an ongoing basis since October 1989 and to date the use of Borrow Area B as a sand source for the Town of Jupiter Island's shore protection project has not resulted in adverse impact to the hardbottoms. Based on a review of the most recent pre- and post-dredging monitoring reports, USACE expects that placement of dredged material into Borrow Area B will not adversely affect these resources. A post-placement monitoring event will occur to verify this

determination.

6.26 E.O. 13112, INVASIVE SPECIES

The proposed action will require the mobilization of dredge equipment from other geographical regions. Dredge equipment has the potential to transport species from one region to another, introducing them to new habitats where they are able to out-compete native species. The benefits of the proposed project outweigh the risks associated with the very slight potential for introducing non-native species to this region.

6.27 E.O. 13186, MIGRATORY BIRDS

This Executive Order requires, among other things, a Memorandum of Understanding (MOU) between the Federal Agency and the USFWS concerning migratory birds. Neither the Department of Defense MOU nor the USACE's Draft MOU clearly address migratory birds on lands not owned or controlled by USACE. For many USACE civil works projects, the real estate interests are provided by the non-Federal sponsor. Control and ownership of the project lands remain with a non-Federal interest. Measures to avoid the destruction of migratory birds and their eggs or hatchlings are described in a section above on the Migratory Bird Treaty Act. USACE will include our standard migratory bird protection requirements in the project plans and specifications and will require the contractor to abide by those requirements.

7 PUBLIC/AGENCY COORDINATION

7.1 SCOPING AND DRAFT EA

The project as proposed was previously coordinated under a DA permit modification issued by USACE Regulatory on 4 May 2017. The issuance of this permit modification was preceded by a 30-day public notice period. USACE Civil Works will provide a Notice of Availability of the final EA and signed FONSI.

7.2 AGENCY COORDINATION

The proposed project has been and will continue to be coordinated with the following agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Clearinghouse, Florida State Historic Preservation Officer, Florida Fish and Wildlife Conservation Commission, and the Florida Department of Environmental Protection.

8 LIST OF PREPARERS

Name	Organization	Expertise	Role in Preparation
Terri Jordan-Sellers, Senior Biologist	USACE	NEPA/Senior Biologist – 23 years	Primary Author
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Walsh, Harvey J, K. E. Marancik and J. A Hare. 2006. *Juvenile fish assemblages collected on unconsolidated sediments of the southeast United States continental shelf.* Fishery Bulletin, 104. 22 pp.

ESA CONSULTATION – NATIONAL MARINE FISHERIES SERVICE

(ENCLOSURE 6)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5312; FAX 824-5309
http://sero.nmfs.noaa.gov

OCT 25 2007

F/SER31:MCB

Brigadier General Joseph Schroedel
U.S. Army Corps of Engineers, South Atlantic Division
Room 9M15
60 Forsyth Street, S.W.
Atlanta, GA 30303-8801

Dear BG Schroedel:

This is in response to your April 30, 2007, letter on behalf of the combined U.S. Army Corps of Engineers' (COE) South Atlantic districts requesting reinitiation of consultation on the regional biological opinion, "The Continued Dredging of Channels and Borrow Areas in the Southeastern United States," dated September 25, 1997 (SARBO).

My staff is currently coordinating and assisting COE biologists in preparing a draft biological assessment, in anticipation of the formal consultation in the coming months. It should be noted that the COE is not required to suspend dredging or relocation trawling operations pending the conclusion of the reinitiated consultation, so long as the continuation of operations (by all districts) would not violate section 7(a)(2) or 7(d) of the ESA. Therefore, the combined South Atlantic COE districts may continue their hopper dredging activities under the auspices of the 1997 SARBO. So long as the COE follows the reasonable and prudent measures, and implementing terms and conditions outlined in the SARBO, and continues to ensure that its actions will not jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat, the protective coverage of the biological opinion and the Endangered Species Act (ESA) will not lapse. Section 7(o)(2) of the ESA specifically states that "any taking that is in compliance with the terms and conditions specified in a written statement provided under subsection (b)(4)(iv) shall not be considered to be prohibited taking of the species concerned."

We appreciate all the COE's past and ongoing conservation efforts during hopper dredging activities in the Gulf and South Atlantic, and look forward to the continuation of our collaborative efforts to conserve threatened and endangered species.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

DEPARTMENT OF THE ARMY
SOUTH ATLANTIC DIVISION, CORPS OF ENGINEERS
ROOM 313, 77 FORSYTH ST., S.W.
ATLANTA, GEORGIA 30335-6801

REPLY TO
ATTENTION OF:

CESAD-ET-PR (1105-2-10b) 29 OCT 1997

MEMORANDUM FOR

COMMANDER, CHARLESTON DISTRICT
COMMANDER, JACKSONVILLE DISTRICT
COMMANDER, SAVANNAH DISTRICT
COMMANDER, WILMINGTON DISTRICT

Subject: National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast

1. Reference the Endangered Species Act Section 7 Consultation, Biological Opinion for The Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States, National Marine Fisheries Service (NMFS) 25 September 1997 (Encl 1).

2. The referenced document was sent to your District Sea Turtle Coordinator by electronic mail on 29 September 1997, without the signed NMFS transmittal letter. The purpose of this memorandum is to transmit copies of the complete document to you, and to provide some guidance on its implementation.

3. During the spring of 1997 we experienced an unanticipated high level of sea turtle entrainments in our hopper dredges along the Atlantic coast. Within a month of starting work, we were approaching our incidental take limit for loggerheads, despite having taken all sea turtle protection measures we had available to us. Our commitment to protect sea turtles while maintaining safe navigation channels for defense and commerce, forced us to make some very hard choices. The result was that from March until the new Regional Biological Opinion (RBO) went into effect on 1 October 1997, we had taken 29 loggerhead sea turtles, completed work at six projects and terminated the remaining six projects with less than about half of the work being completed. Fortunately we did not take any of the endangered species of sea turtles and we were able to complete most of the critical work, or critical project reaches, during that period.

4. The Corps of Engineers has a commitment to protect sea turtles, as was exemplified by our willingness to terminate Corps projects and the NMFS reciprocated by being very cooperative during the Section 7 Consultation process.

CESAD-ET-PR 29 OCT 1997
Subject: National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast

We received an Interim Biological Opinion which extended our incidental take of loggerhead sea turtles from 20 to 35, enabling us to resume our necessary hopper dredging after just a brief delay. We must continue to do everything we can to maintain this excellent working relationship with the NMFS.

5. In implementing the new 1997 RBO, we again renew our commitment to maintaining a balance between reducing sea turtle entrainments to the lowest levels we can achieve while performing necessary dredging for navigation. The Hopper Dredging Protocol for Atlantic Coast (Encl 2) is our guidance for helping achieve this objective. The Protocol is a living document and will be revised by CESAD as appropriate. Your input into improving the Protocol is welcomed at any time, as are any suggestions you may have on how we can further reduce sea turtle takes. I also encourage you to share your views and ideas on this through our Internet newsgroup, usace.sad.turtles.

6. Should you have any questions or would like additional information, you may contact John DeVeaux, CESAD-ET-CO, at (404) 331-6742 or Rudy Nyc, CESAD-ET-PR, at (404) 331-4619 or by e-mail which is preferred.

I know you all are working this hard... your thoughts/suggestions are welcome -

2 Encl
as

R. L. VANANTWERP
Brigadier General, USA
Commanding

CF (w/encls):
COMMANDER, MOBILE DISTRICT

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

SEP 25 1997

R. L. VanAntwerp
Brigadier General, U.S. Army
Division Engineer
South Atlantic Division, Corps of Engineers
Room 313, 77 Forshyth St., S.W.
Atlanta, Georgia 30355-6801

Dear Brigadier General VanAntwerp;

Enclosed is the regional biological opinion concerning the use of hopper dredges in channels and borrow areas along the Southeast U.S. Atlantic coast. This biological opinion amends the regional opinion conducted in 1995, and supersedes the interim biological opinion issued on April 9, 1997. The opinion recognizes the efforts of the Corps of Engineer's (COE) South Atlantic Division (SAD) to minimize sea turtle takes through application of new technology such as draghead deflectors, seasonal dredging windows, termination of projects in which high rates of turtle takes are observed, and elevated staff effort to identify and resolve site-specific problems. Despite these major efforts and continuing plans by the COE to improve the effectiveness of the rigid draghead deflector and to resolve dredging schedules to reduce the likelihood of sea turtle interactions, NMFS believes that further sea turtle takes are likely in future years. However, we believe that these takes are not likely to jeopardize the continued existence of any species. An annual incidental take, by injury or mortality of 35 loggerheads 7 Kemp's ridleys, 7 green turtles, 2 hawksbills, and 5 shortnose sturgeon is listed in the incidental take statement appended to the enclosed opinion. This annual take level can be monitored over fiscal years to be consistent with project contracts.

I appreciate your continued commitment to reduce sea turtle takes associated with dredging in your Division. COE Division and District staff have facilitated the excellent working relationship that exists between our offices within the SAD. We look forward to continuing these cooperative efforts in sea turtle conservation.

Sincerely,

for Hilda Diaz-Soltero
Office Director
Office of Protected Resources

Endangered Species Act - Section 7 Consultation

Biological Opinion

Agency: U.S. Army Corps of Engineers, South Atlantic Division

Activity: The continued hopper dredging of channels and borrow areas in the southeastern United States

Consultation Conducted By: National Marine Fisheries Service, Southeast Regional Office

Date Issued: September 25, 1997

Background

Hopper dredging in channels and borrow areas along the southeastern coast of the United States during the spring of 1997 resulted in an unanticipated high rate of loggerhead turtle take. The number of takes quickly approached the incidental take level established in the regional biological opinion (BO) issued to the Army Corps of Engineers (COE) on August 25, 1995. A formal consultation considering the take rates as well as the dredging locations and conditions was conducted and an interim biological opinion (IBO) was issued on April 9, 1997 and is incorporated herein by reference. The IBO concluded that continued hopper dredging during the 1997 fiscal year was likely to take additional sea turtles but was not likely to jeopardize the continued existence of any species. The incidental take, by injury or mortality, of seven (7) documented Kemp's ridleys, seven (7) green turtles, two (2) hawksbills, sixteen (16) loggerhead turtles, and five (5) shortnose sturgeon was set pursuant in the IBO. This modification added 15 loggerheads to the annual incidental take level, bringing the 1997 fiscal year total incidental take level to 35 loggerheads.

The history of Endangered Species Act (ESA) Section 7 consultations on the deployment of hopper dredges to maintain the depths of southeastern channels is discussed in the August 25, 1995 BO and is incorporated herein by reference. Although no endangered sea turtles have been taken in any channel dredging projects during the 1997 fiscal year, 28 loggerheads have been taken, including 9 loggerheads taken subsequent to the issuance of the IBO (Table 1).

During 1997, the COE responded to high rates of sea turtle takes by assessing each dredging project, modifying draghead deflectors when apparently necessary, conducting relative abundance surveys and relocation trawling, and ultimately ending a number of projects prior to completion (Kings Bay, Brunswick Harbor, Savannah Harbor, Morehead City).

1991 Biological Opinion

Two hundred twenty-five sea turtle takes, including 22 live turtles, were documented between 1980 and 1990 in the Southeast channels despite limited observer coverage in most channels throughout most of that decade (Table 2a.). Seventy-one of these turtles were taken in four months of dredging in the Canaveral ship channel in 1980, the first year in which observers were required. Twenty-one were observed in over two years of dredging in the Kings Bay Channel in 1987-1989, after observers were first deployed on dredges in that channel. Observers were required on most hopper dredges after 1989. Documented takes of turtles on dredges in Brunswick and other Southeast U.S. channels indicated that sea turtles were vulnerable to hopper dredges in all southeastern channels during warmer months. These observations resulted in the Section 7 consultation that concluded with a BO issued on November 25, 1991.

The November 1991 BO was the first cumulative area consultation between NMFS and COE's South Atlantic Division (SAD) regarding hopper dredging. The BO considered hopper dredging in channels from the Canaveral in Florida through Oregon Inlet, North Carolina. The 1991 BO concluded that continued unrestricted hopper dredging in Southeast U.S. channels could jeopardize the continued existence of listed sea turtles. The Opinion established a reasonable and prudent alternative to unrestricted hopper dredging which prohibited the use of a hopper dredge in the Canaveral ship channel, and from April 1 through November 30 in other southeastern channels north of Canaveral. An incidental take level was established based on assumptions that takes would be significantly reduced due to limited dredging windows, but that water temperatures in some years would result in turtle presence in channels during December and March. Observers were required on dredges equipped with outflow and/or inflow screening in March and December. The presence or absence of turtles in December would determine the further need for observer coverage into January. The documented incidental take of a total of five (5) Kemp's ridley, green, hawksbill or leatherback turtle mortalities in any combination of which no more than two (2) are Kemp's ridley, or fifty (50) loggerhead turtle mortalities was set. The Opinion anticipated that seasonal restrictions on hopper dredging would be adjusted on a channel-by-channel basis as better information on turtle occurrence was collected.

Additionally, the development and testing of a draghead deflector was promoted.

1995 Biological Opinion

Between 1992 and 1995, only 16 sea turtle takes were documented (Table 2b.), including three that were alive when collected during dredging operations in the SAD under the dredging windows established in the November 1991 BO (see above). During that period COE developed a rigid draghead deflector that appeared to be effective during videotaped dredging trials using mock turtles, as well as during experimental dredging associated with trawling in the Canaveral Channel. COE also completed a study of six Southeast channels to determine seasonal abundance and spatial distribution of these turtles. A discussion of the findings can be found in the COE report entitled "Assessment of Sea Turtle Abundance in Six South Atlantic U.S. Channels" (Dickerson et al. 1994), summarized in the 1995 BO. Based on the new information, COE requested expanded dredging windows and observer requirements. NMFS considered their request and developed alternative dredging windows and observer requirements and added requirements for the use of hopper dredges in borrow areas along the east coast.

After 1995, COE districts within the SAD generally required observers in some channels, such as Kings Bay, throughout the winter, beyond the new monitoring windows. SAD hopper dredge projects were initially conducted in the middle of the dredging windows, when nearshore waters were cool. During 1996, only nine sea turtle takes, including one green turtle and eight loggerheads, were documented (Table 2c.). No more than three takes occurred in any project. The new dredging windows and draghead deflector requirements appeared to provide good protection to sea turtles.

Hopper dredging operations contracted for the 1997 fiscal year were planned for early in the calendar year, however a number of operations were not begun until late winter. Beginning on March 2, 1997, loggerhead takes occurred in Kings Bay at rates higher than previously observed. Six turtles were taken in four days of dredging. While consulting with NMFS regarding this unprecedented rate of loggerhead takes, a COE specialist from the Waterways Experiment Station proposed some modifications to the draghead with the potential to reduce sea turtle takes. Relocation trawling was also initiated, beginning March 9,1997; however, as can be seen on Table 2, these efforts did not preclude further sea turtle takes in Kings Bay. Dredging was terminated on March 12, 1997, with only 53 percent of the project completed.

Table 1 lists the sea turtle takes observed in hopper dredges throughout the SAD during 1997, as well as the steps taken by COE to reduce the likelihood of takes. Deflector dragheads were re-engineered to fit specific dredges wherever possible and relocation trawling was initiated. Dredging was terminated prior to completion of projects in Kings Bay, Brunswick Harbor, Savannah Harbor and Charleston Harbor. Consultation was reinitiated to consider the effects of the remaining hopper dredging projects anticipated for the 1997 fiscal year. In addition to those specific projects listed in the resulting April 1997 IBO, dredging at Reach II of the Myrtle Beach dredge disposal area is likely to begin before the fiscal year ends. Despite ongoing dredging at the Oregon Inlet, no sea turtle takes have been documented since May 15.

Proposed Activity

This consultation addresses the use of hopper dredges in channels and borrow areas along the Atlantic portion of COE's SAD within the existing dredging windows (Table 3). Channels dredged by hopper dredges include: Oregon Inlet, Morehead and Wilmington Harbors, Charleston, Port Royal and Savannah harbors, Brunswick, Kings Bay, Jacksonville, St. Augustine and Ponce de Leon inlets, West Palm Beach, Miami and Key west channels. Borrow areas that may be dredged by hopper dredges include areas off of Dade County Florida and Myrtle Beach South Carolina.

Draghead deflectors will be used on all projects and observers will be required at least during those periods identified in Table 3. Year-round observer coverage will likely be required by the COE for most channels, particularly those with histories of high sea turtle catch rates such as Kings Bay. Within the South Atlantic Division, the COE will try to schedule dredging of the highest risk areas (Canaveral, Brunswick, Savannah, and Kings Bay) during periods when nearshore waters are coolest -- after December 15 but well before March. Priority for winter dredging will also be given to areas that have substrates that reduce the efficiency of the deflector (Wilmington Harbor channel, Reach 1 of Myrtle Beach). Completion of all projects during the cold-water months will be attempted when possible.

Listed Species and Critical Habitat

Listed species under the jurisdiction of the NMFS that may occur in channels along the southeastern United States and which may be affected by dredging include:

THREATENED:
(1) the threatened loggerhead turtle - Caretta caretta

ENDANGERED:

(1) the endangered right whale - Eubalaena glacialis
(2) the humpback whale - Megaptera novaeangliae
(3) the endangered/threatened green turtle - Chelonia mydas
(4) the endangered Kemp's ridley turtle - Lepidochelys kempii
(5) the endangered hawksbill turtle - Eretmochelys imbricata
(6) the endangered shortnose sturgeon - Acipenser brevirostrum

Green turtles in U.S. waters are listed as threatened, except for the Florida breeding population which is listed as endangered.

Additional endangered species which are known to occur along the Atlantic coast include the finback (Balaenoptera physalus), the sei (Balaenoptera borealis), and sperm (Physeter macrocephalus) whales and the leatherback sea turtle (Dermochelys coriacea). NMFS has determined that these species are unlikely to be adversely affected by hopper dredging activities.

Information on the biology and distribution of sea turtles can be found in the 1991 and 1995 BOs, which are incorporated by reference. Channel specific information has been collected by COE for channels at Morehead City, Charleston, Savannah, Brunswick, Fernandina and Canaveral, and is presented in detail in COE summary report entitled "Assessment of Sea Turtle Abundance in Six South Atlantic US Channels" (Dickerson et al., 1994) and in the COE Biological Assessment.

There is no significant new information regarding the status of these species that has not been discussed in the BOs that have been incorporated by reference (March 12, 1997 and August 25, 1995).

Assessment of Impacts

The Biological Opinion issued in 1991 contained strict dredging windows that appeared to be very effective at limiting the number of sea turtles taken by hopper dredges during channel maintenance dredging in the Southeast U.S. along the Atlantic coast. Between 1991 and 1995, no more than 8 turtles were taken in any year, and many of those taken were released alive. Studies conducted by the COE (Dickerson et al., 1994) documented turtle distribution and abundance in six channels that suggesting the existing windows were accurate. However, the COE requested expansion of existing windows to lessen the burden of maintenance dredging while testing and further developing a rigid draghead deflector design. The deflector was effective at pushing aside mock turtles when tested during 1994, and preliminary field trials in the Canaveral shipping channel had encouraging results. NMFS considered this new information, presented by the COE in a biological assessment forwarded to NMFS in November 1994. The resulting BO, issued August 25 1995 expanded dredging windows and modified observer requirements.

Only 9 sea turtle takes were documented in 1996, suggesting that the expanded dredging windows and the deflector requirements provided protection to sea turtles that was similar to the previously more-restrictive windows. However, the COE's internal policy resulted in conduct of most of the hopper dredging projects during months when coastal waters were still cold, consistent with the previous dredging. The increased rate of take observed during 1997 and discussed below suggests that the restriction of hopper dredging to months when nearshore waters are cold remains the best method for minimizing sea turtle takes.

Unfortunately, a number of dredging projects contracted for early 1997 in the SAD but not restricted to mid-winter months, were delayed into the Spring. This delay coincided with a unseasonably warm winter, when the waters of Kings Bay reached 60°F in early March. The incidental take of nine loggerheads in Kings Bay over only 11 days of dredging indicated that the nearshore abundance of loggerheads was high, apparently higher than during the late 1980's when observers were first deployed on hopper dredges in Kings Bay.

There were other indicators of high nearshore sea turtle abundance along the Southeast U.S. Atlantic coast during 1997. Commercial shrimp trawling conducted without the use of turtle excluder devices (TEDs) offshore of South Carolina and Georgia between May 15 and July 15 resulted in sea turtle catch rates higher than previously documented. Sixty nine sea turtles were taken in 29 days of shrimping off of South Carolina, including 65 loggerheads, 3 ridleys and 1 leatherback. Forty-six sea turtles were taken in 17 days of towing off of Georgia. The sea turtle catch per unit effort (CPUE) for this operation is about 0.35 turtles per hour of trawling, standardized to 100 feet (30.5 m) of total headrope length fished. The CPUE (same units) for commercial shrimp trawling in the 1970s and 1980s reported by Henwood and Stuntz (1987a) was only 0.0487. Loggerhead turtles were the predominant species reported by Henwood and Stuntz and have also been predominantly observed in this study. They account for most of the increase in overall CPUE. The CPUE for loggerheads alone has been greater than 0.30 turtles per hour, while the value reported in Henwood and Stuntz was 0.0456 turtles per hour. The rates of taking for leatherback and Kemp's ridley turtles in the Atlantic study area have also been higher than anticipated.

The high relative density of sea turtles during 1997 may be due to an unseasonably warm winter or other factors contributing to annual variations in abundance, due to an actual increase in the abundance of benthic immature sea turtles in the loggerhead population, or due to a combination of these factors. Trends in the status of loggerheads are generally identified at the nesting beach, when the most accessible life stage, adult nesting

females, can be counted. Because they mature at 20 to 30 years of age, increases or decreases in the abundance of benthic immature loggerheads as determined by incidental captures in nearshore waters would not be observed for decades. While nesting beach surveys suggest that the South Florida population of loggerheads increased and now appears to be stable, increases have not been apparent on nesting beaches of Georgia and South Carolina. Further work on the development of multi-year in-water sampling sites is needed to identify trends in multiple age-classes of the loggerhead population.

The COE noted that 14 of the 28 takes that occurred during 1997 were on the same dredge, the Eagle. The high rate of takes, particularly on this dredge, suggested that the deflecting draghead was not installed properly or was not being operated properly. Takes occurred in a number of the 1997 dredge projects during clean-up. Ridges left behind after the initial dredging are leveled during clean-up, but the draghead passes over troughs. Takes occurring during clean-up may be difficult to avoid since the draghead deflector must remain hard on the bottom to be effective.

The COE has been conducting meetings between districts within the SAD to discuss the results of assessments of channel conditions and dredge inspections. They have determined that the draghead deflector has not been working properly due to poor education of the dredge operators on its proper use, and due to poor tailoring of the deflector to specific dragheads. Increased efforts to educate dredge operators are planned. Additionally, since fewer than 10 private hopper dredges operate within SAD, engineers that have designed the conceptual deflector will be sent to the dredges to insure that the deflectors are adapted to each draghead and that the operators understand how to use the deflector effectively.

CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal actions, that are reasonably certain to occur within the action area of the Federal action subject to consultation. These are discussed in detail in the biological opinions incorporated by reference.

Conclusion:

NMFS believes that the elevated rate of observed sea turtle takes by dredges in the southeastern United States during March of 1997 was likely due to increased abundance of loggerheads in nearshore waters due to an unseasonably warm winter. There is no way to predict whether similar conditions will be encountered in upcoming seasons. Over the past six years, the COE's SAD has

continuously expressed a commitment to minimize sea turtle takes, and has conducted research and taken repeated steps to further this goal. Repeated termination of dredging operations due to high sea turtle takes during 1997 confirms their commitment to avoid sea turtle takes. Further efforts to educate the dredging industry and recruit their interest and involvement in avoiding sea turtle takes are necessary and are planned by the COE. Additionally, the COE has committed to additional efforts to improve the effectiveness of the deflecting draghead. The sea turtle deflector should be tailored to each hopper dredge draghead and the dredge operators should be fully trained in the operation of the draghead to ensure proper use and improve effectiveness. Improvements in operator and deflector performance are necessary prior to reliance on the draghead as a mechanism for reducing sea turtle takes.

NMFS anticipates that the COE's interest in improving the performance of the deflector, their commitment to limit the use of hopper dredges in channels of high sea turtle abundance during periods when nearshore waters are likely to be cold, and their overall goal of further reducing sea turtle takes during hopper dredge activities will minimize the interactions of hopper dredges with sea turtles. However, annual variation in the abundance of sea turtles in some channels and borrow areas make it likely that sea turtle takes will still occur. Additionally, overall increases in loggerhead and Kemp's ridley populations are anticipated due to TED requirements that have reduced the mortality rates of benthic lifestages of these species. Lastly, in some years high levels of hopper dredging activity may be necessary. For example, termination of projects prior to completion during FY 1997 may result in an increase in the number and length of hopper dredging projects necessary for channel maintenance during FY 1998. Therefore, NMFS believes that up to 35 loggerheads may be taken by injury or mortality, as well as 7 Kemp's ridleys, 7 green turtles, 2 hawksbills, and 5 shortnose sturgeon. These takes are not likely to jeopardize the continued existence of these species and the ongoing commitment by the COE to further minimize takes may reduce the likelihood of sea turtle takes in the future even if nearshore sea turtle abundances increase.

Conservation Recommendations

Pursuant to section 7(a)(1) of the ESA, conservation recommendations are made to assist COE in reducing or eliminating adverse impacts to loggerhead, green, and Kemp's ridley turtles that result from hopper dredging in the southeastern United States. The recommendations made in the 1995 BO are pertinent to this consultation as well, and therefore remain valid. Further recommendations are given below.

- Because of the possibility of annual variation in water temperatures, sea turtle abundance, and hopper dredging demand, NMFS has retained the dredging windows established in the 1995 BO. However, the COE has expressed a commitment to deploy hopper dredges during cold-water periods in channels with high sea turtle abundance or with substrates that render the deflector ineffective. NMFS appreciates the COE's commitment to do this, and recommends that the SAD priority list be finalized and distributed to the Districts and NMFS prior to the initiation of dredging during FY 1998.

- The COE should work with the dredging industry to insure their understanding of the importance of sea turtle conservation and to increase the industry's interest in minimizing sea turtle takes.

- Greater than 50% of the loggerheads taken in North Carolina may be from the northern nesting assemblage of loggerheads. While recent loggerhead nesting beach surveys did not identify a decline in the number of nesting females on beaches north of Cape Canaveral, increases observed in the south Florida nesting assemblage have not been noted. High sea turtle catch rates during only the early weeks of the wood debris clean-up conducted by COE off Cape Fear during 1997, as well as preliminary work conducted in North Carolina, suggest that turtles may be abundant in North Carolina channels primarily during migration into and emigration out of North Carolina inshore waters. The COE should work with the NMFS Beaufort Laboratory and the North Carolina Division of Marine Fisheries to document the movements of sea turtles off North Carolina during spring and fall months. Results from these studies may provide insights into further safe dredging windows to minimize the likelihood of takes of loggerheads from the more vulnerable northern nesting assemblage. Summer windows would reduce the pressure to complete all SAD hopper dredging during cold-water periods.

- The COE should investigate further modifications of the draghead to minimize the need for clean-up. Some method to level the peaks and valleys created by dredging would reduce the amount of time dragheads are removed from the bottom sediments.

Incidental Take Statement

Section 7(b)(4) of the Endangered Species Act (ESA) requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA, and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts. Only incidental taking resulting from the agency action, including incidental takings caused by activities approved by the agency, that are identified in this statement and that comply with the specified reasonable and prudent alternatives, and terms and conditions, are exempt from the takings prohibition of section 9(a), pursuant to section 7 of the ESA.

Based on the high rate of sea turtle takes observed during of 1997, increases in the Kemp's ridley population, possible increases in the benthic lifestages of loggerhead populations, annual variation in nearshore abundance of sea turtles and hopper dredge demands, the NMFS anticipates that hopper dredging in the Southeast U.S. Atlantic area of the SAD may result in the injury or mortality of sea turtles and shortnose sturgeon. Therefore, a low level of incidental take, and terms and conditions necessary to minimize and monitor takes, are established. The annual (by fiscal year) documented incidental take, by injury or mortality, of seven (7) Kemp's ridleys, seven (7) green turtles, two (2) hawksbills, thirty-five (35) loggerhead turtles, and five (5) shortnose sturgeon is set pursuant to section 7(b)(4) of the ESA.

To ensure that the specified levels of take are not exceeded early in any project, COE should reinitiate consultation for any project in which more than one turtle is taken within 24 hours, or once five or more turtles are taken. The Southeast Region, NMFS, will cooperate with COE in the review of such incidents to determine the need for developing further mitigation measures or to terminate the remaining dredging activity.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the Marine Mammal Protection Act of 1972 (MMPA). Since no incidental take in the Atlantic Region has been authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered right whales is provided.

The reasonable and prudent measures that the NMFS believes are necessary to minimize the impact of hopper dredging in channels and borrow areas in the southeastern United States have been

discussed with COE. The following terms and conditions are established, in addition to those identified in the 1995 BO, to implement these measures and to document the incidental take should such take occur.

1. The COE's draghead deflector engineer that assistant in this design design should inspect the rigid draghead deflector annually to ensure that the deflector has been tailored appropriately to each draghead. Additionally, the inspector should assess whether the dredge operator appears to be familiar with the operation of the draghead deflector and provide necessary training where appropriate.

2. If the rigid draghead deflector appears to be ineffective in Wilmington Harbor and slows the dredging project such that the amount of time the hopper dredge will be deployed is increased, the deflector should be removed from the draghead for that channel.

3. The COE should develop an educational/training program for dredge operators to increase their understanding of how the draghead deflector works and why it is necessary.

Table 2a. Sea turtle takes (includes live, injured and killed) observed on hopper dredges prior to the regional consultation. Observers were not required on all projects until 1989, after which extensive monitoring was required.

Year	Project	Turtle Takes
1980 Total = 71	Canaveral	50 Cc, 3 Cm, 18 Unidentified
1981 Total = 6	Canaveral	3 Cc, 1 Cm, 2 Unidentified
1984/1985 Total = 12	Canaveral	1 Cc, 11 Unidentified
1986 Total = 9	Canaveral	5 Cc
	Kings Bay	1 Cc, 3 Cm
1987 Total = 5	Kings Bay	3 Cc, 1 Cm, 1 Unidentified
1988 Total = 46	Brunswick	1 Cc
	Canaveral	13 Cc, 3 Cm, 18 Unidentified
	Kings Bay	6 Cc, 3 Lk, 2 Cm
1989 Total = 21	Canaveral	9 Cm, 2 Unidentified
	Kings Bay	8 Cc, 1 Cm
	Savannah	1 Cc
1990 Total = 12	Canaveral	3 Cc, 5 Cm
	Kings Bay	4 Cc
1991 Total = 43	Brunswick	20 Cc, 1 Lk, 1 Unidentified
	Charleston	3 Cc
	Kings Bay	1 Cc
	Savannah	17 Cc

Cc = *Caretta caretta*, Loggerhead ; Cm = *Chelonia mydas*, Green turtle; Lk = *Lepidochelys kempi*, Kemp's ridley turtle

Table 2b. Sea turtle takes (includes live, injured and killed) observed on hopper dredges between the November 1991 and the August 1995 Regional Biological Opinion

Year	Project	Turtle Takes
1992 Total = 2	Port Royal, SC	2 Cc
1994 Total = 8	Canaveral	1 Cm
	Morehead City	1 Cc
	Kings Bay	2 Cc
	Savannah	3 Cc, 1 Lk
1995 Total = 6	Canaveral	1 Cc
	Palm Beach	3 Cc, 2 Cm

Cc = *Caretta caretta*, Loggerhead ; Cm = *Chelonia mydas*, Green turtle; Lk = *Lepidochelys kempi*, Kemp's ridley turtle

Table 2c. Sea turtle takes (includes live, injured and killed) observed on hopper dredges after the August 25, 1995 Biological Opinion

Year	Project	Turtle Takes
1996 Total = 9	Morehead City Harbor	1 Cc
	Myrtle Beach (Borrow Area Reach I)	2 Cc
	Kings Bay	1 Cc
	Palm Beach	1 Cc, 1 Cm
	Wilmington Harbor	3 Cc
1997 Total = 28	Brunswick Harbor	1 Cc
	Charleston Harbor	5 Cc
	Kings Bay	9 Cc
	Morehead City Harbor	6 Cc
	Myrtle Beach (Borrow Area Reach 1)	3 Cc
	Savannah Harbor	3 Cc
	Wilmington Harbor (Ocean Bar)	1 Cc

SOUTH ATLANTIC COAST HOPPER DREDGING (Calendar Year 97)

Project	Dredge Period	Approximate Amount of Work Completed	Turtle Takes	Mitigative Measures Taken	Remarks
Kings Bay	3/1/97 to 3/12/97	Removed 437,000 out of 821,000 CY Approximately 53% completed.	L 3/2/97 L 3/4/97 L 3/5/97 L 3/6/97 L 3/6/97 L 3/6/97 L 3/8/97 L 3/8/97 L 3/12/97	Sea turtle deflecting draghead used. Jacksonville Dist. specialist inspected deflector on 3/6/97. Relocation trawling started 3/9/97. Extensive, ongoing consultation with NMFS as takes occurred. All work terminated 3/12/97 due to high take levels even though relocation trawling had become operational.	Water temp. 57 to 58 F. Dredge Eagle 1. Two takes in one batch on 3/6/97 and 3/8/97. Contract required removal of relatively small veneer of material. Most takes occurred through starboard dragarm. Rapidity of takes was a surprise to all concerned.
Brunswick Harbor	2/6/97 to 3/19/97	Removed 975,400 CY. Work stopped at 50% completion.	L 3/9/97	Sea turtle deflecting draghead used. Sea turtle abundance, based on visual observations, prompted termination of work because of potential for unacceptable levels of entrainment.	Water temp 63 F. Dredge RN Weeks. Historic abundance of sea turtles and high levels of entrainment in 1991 was part of the reason for termination of work.
Savannah Harbor	3/4/97 to 3/22/97	Removed about 545,500 CY, or about 52% of what could have been dredged.	L 3/14/97 L 3/22/97 L 3/22/97	Sea turtle deflecting draghead used. Dredging terminated so as not to take any more sea turtles.	Water temp. 63 F. Numerous sea turtles sighted. Dredge Ouachita was 'skimming' high areas to bring depth to acceptable levels quickly before leaving for urgent work in Mississippi River.
Charleston Harbor	3/14/97 to 3/26/97	Bid qty 900,000 CY Req. qty 408,000 CY Removed qty 350,000 CY. About 39% completed.	L 3/19/97 L 3/20/97 L 3/21/97 L 3/25/97 L 3/26/97	WES expert / developer of sea turtle deflecting draghead system, conducted onboard inspection and made recommendations. Some changes to draghead and dredging operation made. Relocation trawling performed.	Water temp. 61 F. Dredge Eagle 1.
Myrtle Beach borrow area (Phase 1)	9/15/96 to 5/13/97	Bid qty 2.5 million CY. Work completed.	L 4/15/97 L 5/04/97 L 5/09/97	Sea turtle deflecting draghead used. Relative abundance trawling on 3/28-29/97, with 12 hours of "nets in water", yielded one loggerhead. Trawling on 5/8 thru 5/13/97 yielded no sea turtles.	This is one of 3 phases / reaches of total project. Part of work in all phases is by pipeline dredge. Total quantity of material to be dredged is about 6 million CY
Morehead City Harbor	4/25/97 to 5/16/97)	About 120,000 CY removed out of about 1,720,000 CY. About 7% of work completed.	L 4/27/97 L 4/30/97 L 5/01/97 L 5/02/97 L 5/15/97 L 5/15/97	Sea turtle deflecting draghead. Relocation trawling began 5/8/97 and continued until termination of dredging. One loggerhead captured on 5/9/97. Nighttime trawling performed 5/10 & 5/11 with no turtles captured. Because of concern over extensive takes, dredging terminated with only 7 % of work done.	Dredge Manhatten Island
Wilmington Harbor (Interior Channels)	2/14/97 to 3/13/97	About 217,300 CY removed. Work completed.	No takes		Dredge McFarland
MOTSU	3/14/97 to 4/3/97	About 60,000 CY. removed. Work completed.	No takes		Dredge McFarland
Wilmington Harbor (Ocean Bar)	4/3/97 to 4/30/97	About 300,000 CY Work completed.	L 4/07/97	Sea turtle deflecting draghead.	Dredge RN Weeks
Dade County Beach (Miami Reach)	3/30/97 7/20/97 (estimate)	About 380,00 of 475,000 CY completed as of 6/6/97.	No takes	Based on past dredging and anecdotal information about sea turtlesin area, takes are not anticipated.	

L = Loggerhead CY = Cubic Yards

TABLE 3: Current requirements for dredging windows, observer requirements and use of hopper dredges in borrow areas along the east coast established in the August 1995 BO.

AREA		SEA TURTLE MONITORING: NAVIGATION CHANNELS		SEA TURTLE MONITORING: BORROW AREAS	
	WHALE MONITORING	WINDOWS	MONITORING	WINDOWS	MONITORING
North Carolina to Pawleys Island, SC (includes channels at Oregon Inlet, Morehead City and Wilmington)	One observer (daytime coverage) between 1 Dec and 31 Mar. Monitoring by dredge operator and sea turtle observer between 1 Apr and 30 Nov.	Year Round	Two observers (100% monitoring) 1 Apr - 30 Nov	Year Round	One observer (50% monitoring) 1 Apr - 30 Nov
Pawleys Island, SC to Tybee Island, GA (includes channels at Charleston, Port Royal and Savannah)	One observer (daytime coverage) between 1 Dec and 31 Mar. Monitoring by dredge operator and sea turtle observer between 1 Apr and 30 Nov.	1 Nov - 31 May	Two observers (100% monitoring) 1 Nov - 30 Nov and 1 Apr - 31 May	Year Round	One observer (50% monitoring) 1 Apr - 30 Nov
Tybee Island, GA to Titusville, FL (includes channels at Brunswick, Kings Bay, Jacksonville, St. Augustine, and Ponce de Leon Inlet)	Aerial surveys in right whale critical habitat, 1 Dec thru 31 Mar. One observer (daytime coverage) between 1 Dec and 31 Mar.	1 Dec - 15 Apr	Two observers (100% monitoring) 1 Apr - 15 Apr	Year Round	One observer (50% monitoring) 1 Apr - 15 Dec
Titusville, FL to Key West, FL (includes channels at West Palm Beach, Miami and Key West)	Whale observations are not necessary beyond those conducted between monitoring of dredge spoil.	Year Round	Two observers (100% monitoring) year round	Year Round	One observer (50% monitoring) year round

South Atlantic Division Corps of Engineers
Hopper Dredging Protocol for Atlantic Coast
FY 98 - FY 03

1. Sea turtle deflecting dragheads will be used at all times.

2. Districts will inspect sea turtle deflecting dragheads systems to ensure that they are fully operational, prior to initiation of work.

3. Districts will ensure that draghead operators know how to properly use the sea turtle deflecting system.

4. Maintenance dredging at Savannah, Brunswick and Kings Bay Harbors must be restricted to 15 December through the end of March. Maintenance dredging at Charleston and Wilmington Harbors must be restricted to 1 December through the end of March where the sea turtle deflecting draghead system can not be used effectively. Dredging may begin as soon as mid-November in those portions of the Wilmington and Charleston Harbor channels where the sea turtle deflecting draghead can be used effectively. All Districts will cooperate to ensure that their scheduling of hopper dredging contracts, does not interfere with this Division priority work area.

5. Sea turtle observers, inflow screens and overflow screens will be used during all dredging operations, except for the months of January and February, which are optional. Variations from this provision may be granted by Division, but must be justified from a technical perspective.

6. All sea turtle takes will be reported promptly to SAD-ET-CO/PD and posted at usace.sad.turtle newsgroup on the Internet.

7. If two sea turtle takes occur within 24 hours, you should immediately notify the Division POC so that he can initiate reconsultation with National Marine Fisheries Service.

8. If a third take occurs on the project the district will cease operations and notify the South Atlantic Division. Continuation of dredging will occur only after cleared by Division. Upon taking three turtles, District will develop a risk assessment along with an appropriate risk management plan, and submit that to Division for assessment. Generally relative abundance and relocation trawling would be an integral part of a risk assessment and management plan. Should a total take of 5 sea turtles occur, for whatever reason, all work will be terminated unless other prior agreements had been reached with Division.

9. If a total of two endangered species of sea turtles are taken during a project, work will be suspended until further guidance from Division has been received.

10. Arrangements will be made for appropriate observation of all species of whales. The hopper dredge must not get closer than 750 yards of a right whale. Jacksonville and Savannah Districts will contribute their share of funding for the Right Whale Early Warning System early enough in the year to ensure that this is not a cause for delay in the program.

11. From Jacksonville District north through Wilmington District, sea turtle observers will also be responsible for monitoring takes of shortnose sturgeon. All takes of shortnose sturgeon must be reported to Division. Should a total take of three shortnose sturgeons occur, District will terminate hopper dredging until further guidance has been received from Division.

ESA CONSULTATION – US FISH AND WILDLIFE SERVICE

(ENCLOSURE 5)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

April 12, 2017

Jason A. Kirk, Colonel
District Commander
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Service Consultation Code:	41420-2010-F-0328-R001
Service CPA Code:	41420-2010-CPA-0464
Date Received:	January 22, 2016
Consultation Initiation Date:	March 31, 2017
Project:	St. Lucie Inlet Maintenance Dredging
Corps Permit Application Number:	SAJ-1996-05620 (MOD-LCK)
County:	Martin

Dear Colonel Kirk:

This modifies the U.S. Fish and Wildlife Service's (Service) November 1, 2011, Biological Opinion for the maintenance dredging of the St. Lucie Inlet and sand placement project adjacent and south of St. Lucie Inlet, Martin County, Florida (Project). Our Biological Opinion addressed the Project and its effects on the endangered green sea turtle (*Chelonia mydas*), the endangered hawksbill sea turtle (*Eretmochelys imbricata*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), the endangered leatherback sea turtle (*Dermochelys coriacea*), the threatened Northwest Atlantic Ocean (NWAO) Distinct Population Segment (DPS) of the loggerhead sea turtle (*Caretta caretta*), the threatened piping plover (*Charadrius melodus*), the threatened West Indian manatee (*Trichechus manatus*; manatee), and piping plover critical habitat. For the purposes of this document, the five identified sea turtles will be referred to collectively as sea turtles. The Service determined the Project, as proposed, was not likely to jeopardize the continued existence of the species above or adversely affect piping plover critical habitat, and the Biological Opinion was submitted to the U.S. Army Corps of Engineers (Corps) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach and the NOAA Fisheries has jurisdiction for sea turtles in the marine environment. The Corps will assess and consult with NOAA Fisheries concerning potential impacts to foraging and swimming sea turtles, critical habitat in the marine environment, and all other marine species under their jurisdiction within the Project area in accordance with the Act.

Our analysis in this document will only address activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. Please note the provisions of this consultation do not apply to sea turtles in the marine environment, such as swimming juvenile and adult sea turtles or loggerhead critical habitat in the marine environment. If applicable, you are required to consult with the NOAA Fisheries on this Project. For further information on Act compliance with the NOAA Fisheries, please contact Rachel Sweeney, Chief of the Interagency Cooperation Branch, by e-mail at rachel.sweeney@noaa.gov or by phone at 727-209-5953.

This modification to the Biological Opinion is based on information provided in the Corps' letter and Public Notice dated January 22, 2016, email correspondences, and other sources of information. A complete record of this consultation is on file at the South Florida Ecological Services Office in Vero Beach, Florida.

Consultation History

On November 1, 2011, the Service completed its Biological Opinion concerning maintenance dredging of the St. Lucie Inlet sand basin and channel, and placement of dredge material in the nearshore waters or along approximately 8.5 miles (mi) (between the Department of Environmental Protection [DEP] reference monuments R-55 and R-100) of shoreline. Nesting sea turtles, West Indian manatees, piping plovers, and piping plover critical habitat were addressed in the Biological Opinion.

In a letter dated January 22, 2016, the Corps requested to modify their permit to authorize the Martin County Board of County Commissioners (Sponsor) to: 1) conduct maintenance dredging of the navigable channel during any time of the year on an "as needed" basis to ensure safe navigability of the Inlet, and 2) discharge dredge material within a 562-acre (ac) offshore disposal area identified as Borrow Area B. Based on the modification request, the Service took the opportunity to analyze the potential effects to piping plovers and threatened red knots (*Calidris canutus rufa*) in optimal habitat according to the Programmatic Piping Plover Biological Opinion (P^3BO; Service 2013), update the take coverage for listed sea turtles under the revised Statewide Programmatic Biological Opinion (2015-SPBO; Service 2015), and analyze the potential effects to terrestrial loggerhead sea turtle designated critical habitat according to the 2015-SPBO.

On March 15, 2017, the Service emailed the Corps a request for additional information.

On March 31, 2017, the Corps responded to the Service's request for additional information. The Service had sufficient information to initiate formal consultation with the Corps concerning the potential effects of the Project on sea turtles, terrestrial loggerhead sea turtle designated critical habitat, manatees, piping plovers, piping plover critical habitat, red knots, and Florida scrub-jays (*Aphelocoma coerulescens*; scrub-jay).

DESCRIPTION OF THE PROPOSED ACTION

The Corps and Sponsor propose to dredge up to 673,000 cubic yards of beach compatible sand from St. Lucie Inlet, Martin County, Florida (Figure 1). The impoundment basin and channel will be hydraulically (cutter suction or hopper dredge) or mechanically (clamshell dredge) dredged with a 2-foot (ft) allowable overdredge depth. If a cutter suction or hopper dredge is utilized, the dredge material will be transported directly to the beach fill template located between DEP reference monument R-59 and R-76 (approximately 2.85 mi) via pipeline. The majority of this area is located on public land in the St. Lucie Inlet State Preserve which is administered by Jonathan Dickinson State Park. If a clamshell dredge is utilized, the dredge material will be loaded onto shallow draft barges and transported south along the intracoastal waterway, hydraulically unloaded at the Peck's Lake staging area, and pumped via pipeline eastward to the fill template (Figure 2). Once discharged, the sand will be loaded into all terrain dump trucks using front end loaders, deposited within the fill template, and graded using bulldozers to an elevation of +8.5 ft North American Vertical Datum with a 1 vertical ft: 10 horizontal ft foreshore slope to produce the authorized beach design. All sand placed within the fill template must be approved by DEP and meet all requirements as outlined in the Florida Administrative Code subsection 62B-41.007.

In addition to the sand fill template, the Corps and Sponsor will have the option to place dredge material in nearshore waters and offshore. The nearshore area is located below the mean low water line up to the -16-ft contour between DEP reference monument R-89 and R-100. The offshore site consists of the 562-ac Borrow Area B located offshore Jupiter Island between DEP reference monuments R-109 and R-118. Use of Borrow Area B would allow for storage of dredged material to be utilized by others for future nourishment events, authorized under a separate permit. The maximum frequency of use of Borrow Area B would coincide with the maintenance dredging frequency of every 3 years.

All beach corridors, staging areas, stock piles, and pipeline corridors will be selected to avoid effects to upland habitat. Construction vehicles and equipment must traverse or be stored within these designated areas, corridors, and/or within the pipeline corridor. In addition, all construction pipes will be placed parallel to the shoreline and positioned as far landward as possible up to the vegetated dune line. Existing vegetated habitat at these sites and corridors shall be protected to the maximum extent possible to minimize disturbance; therefore, impacts associated with the beach access corridors, pipeline corridors, stock piles, staging areas, and beach fill template are not anticipated. If impacts occur, all impacted areas and vegetation will be restored to preconstruction condition and elevation. In addition, all impacts to nearshore hardbottom habitat and seagrasses will be avoided. All loose debris will be removed and properly disposed of prior to sand placement.

The proposed dredging and placement of dredge material in the dry beach fill template, will only occur during the non-peak sea turtle nesting season (November 1 through April 30). To ensure safe navigation of the inlet, maintenance dredging of the navigable channel may be performed during the peak sea turtle nesting season. If this occurs, dredged material would only be placed in the nearshore waters or within Borrow Area B as described above. Dredging and sand

placement activities will take place on a 24-hour per day, 7-day per week schedule. The frequency of impoundment basin and channel dredging, and sand placement will not exceed more than one event every 3 years. The intent of the Project is to improve safety and navigation, and to provide shoreline stabilization.

Minimization and Conservation Measures

The Corps and Sponsor will follow and implement the Reasonable and Prudent Measures (RPMs) and the Terms and Conditions identified in the 2015-SPBO and the P^3BO that apply to the Project concerning nesting sea turtles and piping plovers, respectively. The P^3BO RPMs and Terms and Conditions will also minimize effects to red knots.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. The Service identifies the action area to include the dredge template (St. Lucie Inlet impoundment basin and the Federal navigation channel), pipeline corridors, staging areas, beach access corridors, nearshore disposal area, offshore Borrow Area B, and the approximately 2.86-mi sand fill template between DEP reference monument R-59 and R-76. The Project is located along the Atlantic Ocean, Martin County, Florida at latitude 27.12803 and longitude -80.14468.

THREATENED AND ENDANGERED SPECIES

Florida scrub-jay

Suitable habitat for the scrub-jay typically includes oak scrub and scrubby coastal strand. It is widely accepted that the presence of scrub oaks (*Quercus* spp.) is a good indicator of habitat suitability for the scrub-jay. However, recent observations suggest the species occupies habitat types that include overgrown scrub, areas infested with exotic plant species, urban areas, pasture land with tree/bush islands where scrub oaks are largely absent, or a mixture of all of these habitat types.

According to our Geographic Information System (GIS) database, the entire Project area is in a scrub-jay consultation area. Between 2003 and 2008, the closest scrub-jay habitat area and documented scrub-jay are over 1 mi west of the proposed Project. In addition, the Project area does not overlap with any 850-ft buffer zones associated with a positive scrub-jay survey through 2013. Because the Project will not impact any scrub habitat, the Project is not anticipated to result in any effects to scrub-jays. The Corps determined the Project may affect, but is not likely to adversely affect the scrub-jay, and the Service concurs with the Corps' determination for this species.

Piping plover

The Corps and Sponsor have agreed to follow and implement the RPMs, and Terms and Conditions outlined in the P^3BO that apply to the Project. The Service has determined the Project effects along approximately 2.8 mi of beach and the dredging template are consistent with those analyzed in the P^3BO. Based on the Corps' and Sponsor's commitment to implement the minimization measures, RPMs, and the Terms and Conditions identified in the P^3BO, the Project's take coverage for piping plovers is henceforth covered under the P^3BO. All monitoring and reporting requirements must be submitted as outlined in the P^3BO.

Piping plover critical habitat

The action area is located within a portion of Critical Habitat Unit FL-33-St. Lucie Inlet, Martin County, Florida, which comprises 282 ac. The unit includes a small area south of the jetty on the north shore of St. Lucie Inlet, from the jetty west (approximately 0.26 mi; Figure 3). While the two sides of the Inlet area are privately owned, the majority of the unit is on public land in the St. Lucie Inlet State Preserve, administered by Jonathan Dickinson State Park. The unit begins on the sandy shoreline south of St. Lucie Inlet and extends along the Atlantic Ocean shoreline approximately 1.6 mi. Additionally, the unit includes land from mean lower low water to where densely vegetated habitat (including grass or lawns) or developed structures, not used by the piping plover, begin and where the primary constituent elements no longer occur. In addition, adjacent unvegetated or sparingly vegetated sand, mud, or algal flats above high tide are important. Critical Habitat Unit FL-33 does not include sandbars within the Inlet.

Of the 27,328 ac of designated critical habitat for wintering piping plovers in Florida outlined in the July 10, 2001 Federal Register, the approximately 86 ac directly affected by the proposed Project represents less than 0.31 percent. The effects of the Project on critical habitat are consistent with the analysis of the effects of dredging and sand placement projects on critical habitat outlined in the P^3BO. Therefore, the Service concurs that the Project may affect, but is not likely to adversely affect Critical Habitat Unit FL-33.

Red knot

Red knots may use the Project area during winter and migration periods. In Florida, red knots are commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments, and mangrove and brackish lagoons. Red knots forage along sandy beaches during spring and fall migration throughout Florida. To date, critical habitat has not been proposed or designated for the red knot. According to our GIS database one red knot was observed at St. Lucie Inlet Preserve State Park directly adjacent to the Project area in 2008. eBird (eBird 2017) documented 4 and 2 red knots at the southern end of the sand fill template in 2010 and 2012, respectively.

Because suitable habitat for the red knot and piping plover is similar, minimization measures for potential effects to red knots in optimal habitat will be incorporated into the Project through the Corps' and Sponsor's commitment to implement the minimization measures, RPMs, and the

Terms and Conditions identified in the P^3BO. Therefore, due to the lack of recent sightings, the Service concurs that the Project, as proposed, may affect but is not likely to adversely affect this species.

Sea turtles

The Project is located adjacent to sea turtle nesting habitat, and therefore could adversely affect nesting sea turtles, their nests, and hatchlings. The purpose of the proposed Project is to improve navigable safety within the channel and provide shoreline stabilization. Without the restorative activities of the shoreline, erosion is expected to continue, potentially impacting sea turtle nesting. Consequently, the proposed Project could have beneficial effects to nesting sea turtles.
The Service has determined the Project's effects concerning sand placement activities are consistent with those analyzed in the 2015-SPBO. Therefore, it is appropriate to apply the 2015-SPBO to the Project. Based on the Corps' and Sponsor's commitment to implement the minimization measures, RPMs, and the Terms and Conditions identified in the 2015-SPBO that apply to the Project, the Project's take coverage for listed sea turtles is henceforth covered under the 2015-SPBO.

Terrestrial loggerhead sea turtle designated critical habitat

As previously stated, the Project will occur along a stretch of beach that is designated terrestrial loggerhead sea turtle critical habitat. The proposed Project may directly or indirectly impact biological and physical features of critical habitat for the NWAO DPS of the loggerhead sea turtle along approximately 2.8 mi of beach along Hobe Sound National Wildlife Refuge (NWR). The 2.8 mi of beach along Hobe Sound NWR represents 18.1 percent of Critical Habitat Unit LOGG-T-FL-10, and 0.41 percent of all designated critical habitat in the NWAO DPS. The Service has determined the Project effects on designated terrestrial loggerhead sea turtle critical habitat are consistent with those analyzed in the 2015-SPBO. Consequently, based on the Corps' and Sponsor's commitment to implement the minimization measures, RPMs, and the Terms and Conditions identified in the 2015-SPBO that apply to the Project, the Service concurs that the Project may affect, but is not likely to adversely affect terrestrial loggerhead sea turtle designated Critical Habitat Unit LOGG-T-FL-10.

West Indian manatee

The Project occurs within the geographic range of the manatee and is located in the manatee consultation area. In addition, the navigable channel west of the impoundment basin and the intracoastal waterway directly west of Peck Lake is located within designated critical habitat for the manatee. The Corps and Sponsor have agreed to implement the following conditions and protective measures:

1. To reduce the risk of a vessel crushing a manatee, fenders or buoys shall be installed that provide a minimum standoff distance of at least 3 ft under maximum compression, and shall be utilized between moored vessels, or two vessels that are moored together.

2. Any objects (*e.g.*, pipe, rope, cords, etc.) placed in the water shall be properly secured and regularly monitored to prohibit manatee entanglement or entrapment.
3. Any bilge or other water discharge unit that may attract manatees shall be prohibited.
4. For all in-water work, one observer on each vessel shall be dedicated to the task of watching for manatees, performing no other duties that would interfere with manatee observation. The observer(s) must have experience in manatee observation and be equipped with polarized sunglasses to aid in observation. The observer(s) must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 ft of any in-water construction activity.
5. If conditions (*e.g.*, weather, heavy currents, etc.) are such that manatees cannot be observed within 50 – 100 ft, in-water activities shall not be conducted.
6. Movement of work boats and barges shall be minimized at night.

Based on the Corps' and Sponsor's implementation of these conditions and protective measures, the Florida Fish and Wildlife Conservation Commission's Standard Manatee Conditions for In-Water Work (FWC 2011), and the minimization measures outlined for manatees in the 2015-SPBO, the Service concurs with the Corps' determination that the proposed Project may affect, but is not likely to adversely affect the manatee.

REINITIATION NOTICE

This concludes consultation on the action(s) outlined in the January 22, 2016, request. As written in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Corps involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of incidental take outlined in the 2015-SPBO and P^3BO is exceeded. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation;
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this analysis;
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this analysis; or
4. A new species is listed or critical habitat designated that may be affected by the action.

Thank you for your cooperation and effort in protecting federally listed species and fish and wildlife resources. If you have any questions regarding this project, please contact Jeff Howe at 772-469-4283.

Sincerely yours,

FOR Roxanna Hinzman
Field Supervisor
South Florida Ecological Services Office

cc: electronic only
Corps, Palm Beach Gardens, Florida (Linda Knoeck)
DEP, Tallahassee, Florida (Lainie Edwards)
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FWC, Tallahassee, Florida (FWC-CPS, Robbin Trindell)
NOAA Fisheries, Fort Lauderdale, Florida (Audra Livergood)
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Service, St. Petersburg, Florida (Anne Marie Lauritsen, Peter Plage)

LITERATURE CITED

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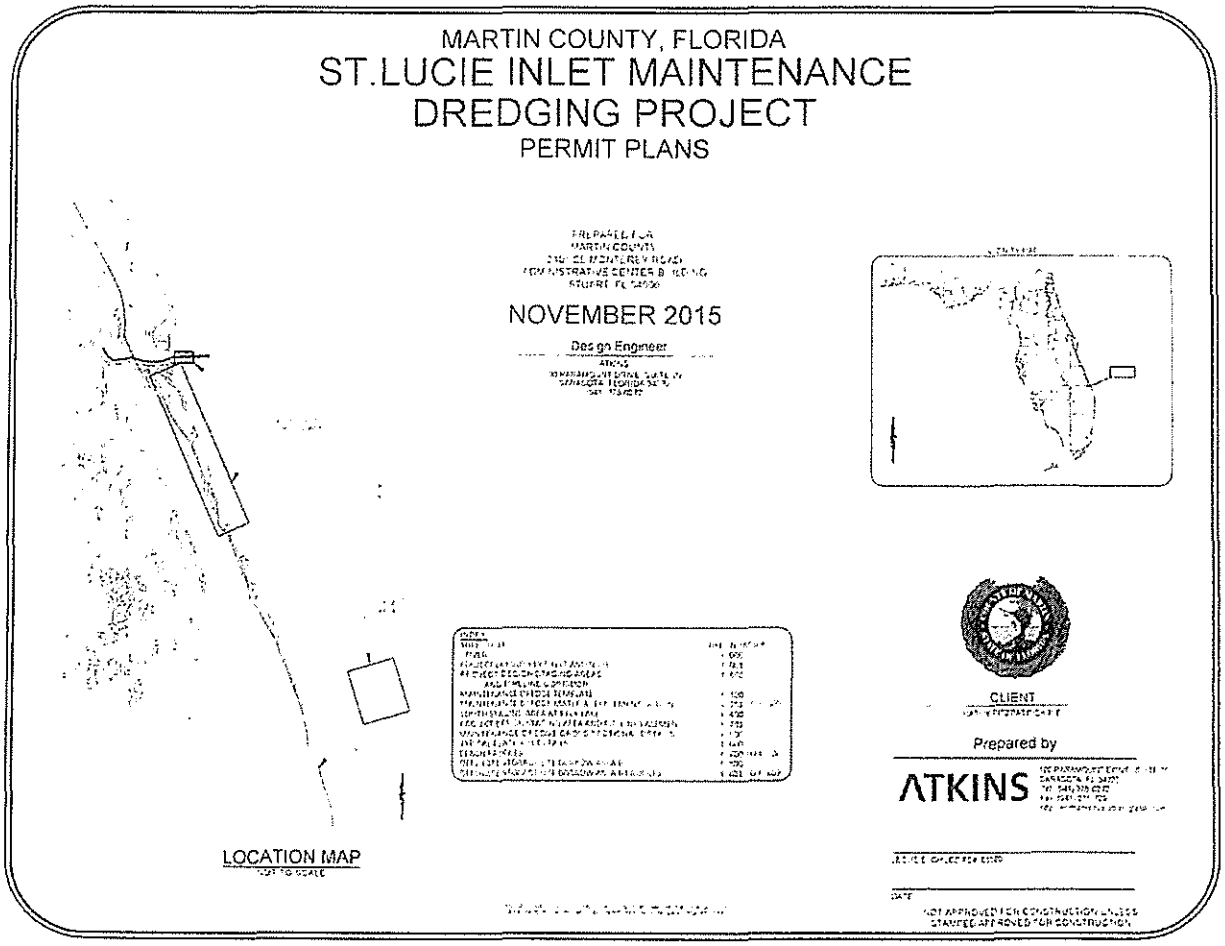

Figure 1. Location of the St. Lucie Inlet maintenance dredging project in Martin County, Florida.

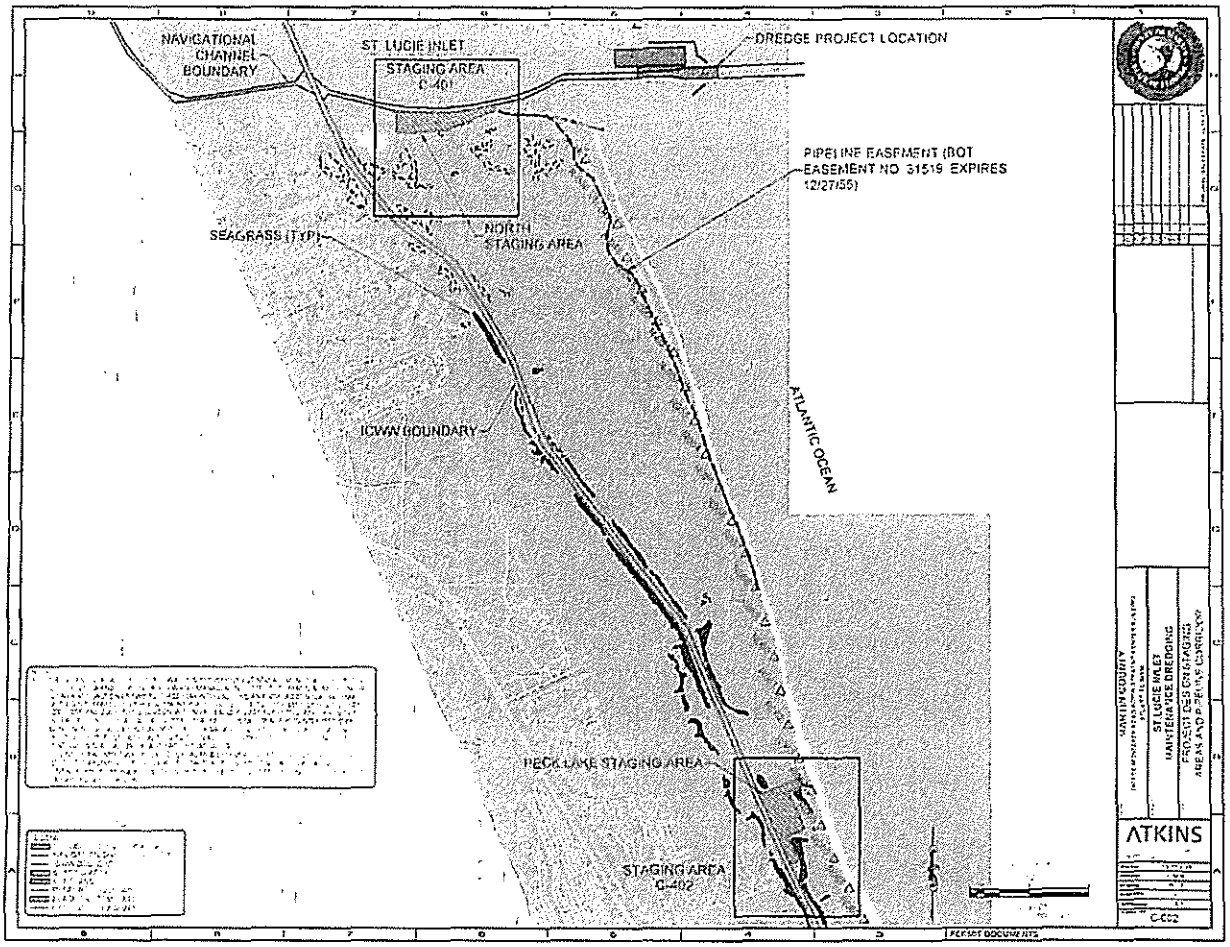

Figure 2. Location of the sand fill and dredging templates, staging areas, and pipeline corridor associated with the St. Lucie Inlet maintenance dredging project in Martin County, Florida.

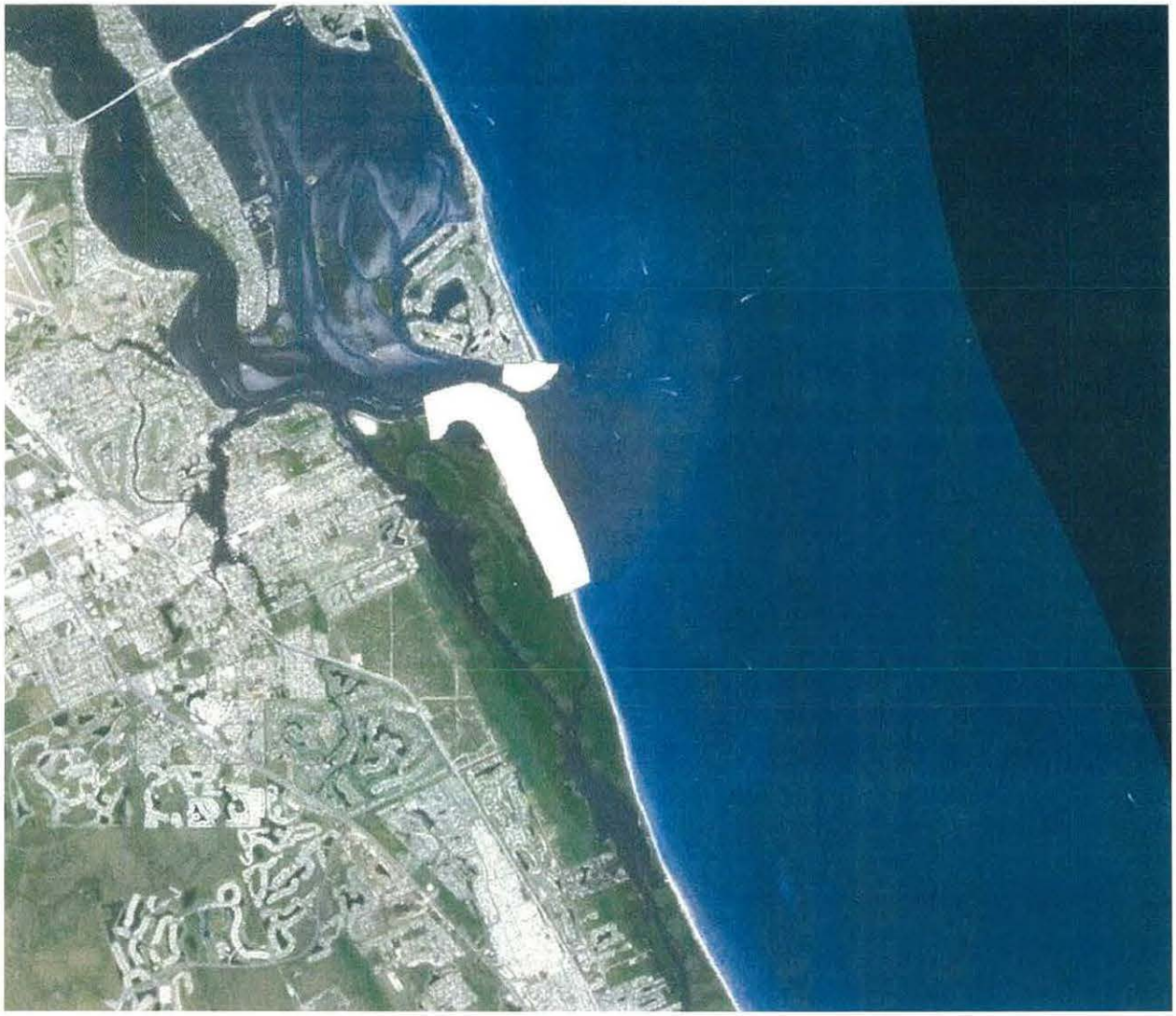

Figure 3. Piping plover Critical Habitat Unit FL-33 located north and south of St. Lucie Inlet, Martin County, Florida.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

April 20, 2017

Jason A. Kirk, Colonel
District Commander
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Service Consultation Code:	41420-2010-F-0328-R001
Service CPA Code:	41420-2010-CPA-0464
Project:	St. Lucie Inlet Maintenance Dredging
Corps Permit Application Number:	SAJ-1996-05620 (MOD-LCK)
County:	Martin

Dear Colonel Kirk:

This modifies the U.S. Fish and Wildlife Service's (Service) April 12, 2017, Biological Opinion for the maintenance dredging of the St. Lucie Inlet and sand placement project adjacent and south of St. Lucie Inlet, Martin County, Florida (Project). Our Biological Opinion addressed the Project and its effects on the endangered green sea turtle (*Chelonia mydas*), the endangered hawksbill sea turtle (*Eretmochelys imbricata*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), the endangered leatherback sea turtle (*Dermochelys coriacea*), the threatened Northwest Atlantic Ocean (NWAO) Distinct Population Segment (DPS) of the loggerhead sea turtle (*Caretta caretta*), the threatened Florida scrub-jay (*Aphelocoma coerulescens*), the threatened piping plover (*Charadrius melodus*), the threatened red knot (*Calidris canutus rufa*), the threatened West Indian manatee (*Trichechus manatus*; manatee), piping plover critical habitat, and terrestrial loggerhead sea turtle designated critical habitat. The Service determined the Project, as proposed, was not likely to jeopardize the continued existence of the species above or adversely affect piping plover or loggerhead sea turtle critical habitat, and the Biological Opinion was submitted to the U.S. Army Corps of Engineers (Corps) in accordance with section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

In an email received from the Corps on April 19, 2017, it was determined that clarification was necessary concerning the additional manatee conditions and protective measures outlined in our April 12, 2017, Biological Opinion. On page 7, protective measure number 4 states the following:

"For all in-water work, one observer on each vessel shall be dedicated to the task of watching for manatees, performing no other duties that would interfere with manatee observation. The observer(s) must have experience in manatee observation and be equipped with polarized sunglasses to aid in observation. The observer(s) must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 ft of any in-water construction activity."

Upon review, manatee protective measure number 4 only applies if a clamshell dredge is utilized for Project construction. Manatee protective measure number 4 does not apply to the use of a hydraulic (cutter suction or hopper) dredge. Based on this modification to our April 12, 2017, Biological Opinion, it is our conclusion that the manatee protection measure modification as outlined above does not change the effects determination to manatees. All other components of our April 12, 2017, Biological Opinion will be implemented as outlined.

Thank you for your cooperation and effort in protecting federally listed species and fish and wildlife resources. If you have any questions regarding this project, please contact Jeff Howe at 772-469-4283.

Sincerely yours,

FOR Roxanna Hinzman
Field Supervisor
South Florida Ecological Services Office

cc: electronic only
Corps, Palm Beach Gardens, Florida (Linda Knoeck)
DEP, Tallahassee, Florida (Lainie Edwards)
EPA, West Palm Beach, Florida (Ron Miedema)
FWC, Tallahassee, Florida (FWC-CPS, Robbin Trindell)
NOAA Fisheries, Fort Lauderdale, Florida (Audra Livergood)
NOAA Fisheries, West Palm Beach, Florida (Jocelyn Karazsia)
Service, St. Petersburg, Florida (Anne Marie Lauritsen, Peter Plage)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

Service Log Number: 41910-2011-F-0170

March 13, 2015

Alan M. Dodd, Colonel
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Dear Colonel Dodd:

This letter transmits the U.S. Fish and Wildlife Service's revised Statewide Programmatic Biological Opinion (SPBO) for the U.S. Army Corps of Engineers (Corps) Civil Works and Regulatory sand placement activities in Florida and their effects on the following sea turtles: Northwest Atlantic Ocean distinct population segment (NWAO DPS) of loggerhead (*Caretta caretta*) and its designated terrestrial critical habitat; green (*Chelonia mydas);* leatherback (*Dermochelys coriacea*); hawksbill (*Eretmochelys imbricata*); and Kemp's ridley (*Lepidochelys kempii*) ; and the following beach mice: southeastern (*Peromyscus polionotus niveiventris*); Anastasia Island (*Peromyscus polionotus phasma*); Choctawhatchee (*Peromyscus polionotus allophrys*); St. Andrews (*Peromyscus polionotus peninsularis*); and Perdido Key (*Peromyscus polionotus trissyllepsis*) and their designated critical habitat. It does not address effects of these activities on the non-breeding piping plover (*Charadrius melodus*) and its designated critical habitat or for the red knot (*Calidris canutus rufa*). Effects of Corps planning and regulatory shore protection activities on the non-breeding piping plover and its designated critical habitat within the North Florida Ecological Services office area of responsibility and the South Florida Ecological Services office area of responsibility are addressed in the Service's May 22, 2013, Programmatic Piping Plover Biological Opinion. Effects of shore protection activities for the piping plover in the Panama City Ecological Services office area of responsibility will be addressed on a project by project basis.

Each proposed project will undergo an evaluation process by the Corps to determine if it properly fits within a programmatic approach. The project description will determine if the project is appropriate to apply to this programmatic consultation. If it is determined that the minimization measures, Reasonable and Prudent Measures, and Terms and Conditions in the SPBO are applicable to the project, it will be covered by this programmatic consultation. If not, the Corps will consult separately on individual projects that do not fit within this programmatic approach.

We will meet annually during the fourth week of August to review the sand placement projects, assess new data, identify information needs, and scope methods to address those needs, including, but not limited to, evaluations and monitoring specified in this SPBO, reviewing results, formulating or amending actions that minimize take of listed species, and monitoring the effectiveness of those actions.

The entire programmatic consultation will be reviewed every five years or sooner if new information concerning the projects or protected species occurs. Reinitiation of formal consultation is also required 10 years after the issuance of this SPBO.

We are available to meet with agency representatives to discuss the remaining issues with this consultation. If you have any questions, please contact Peter Plage at the North Florida Ecological Services Office at (904) 731-3085, Jeffrey Howe at the South Florida Ecological Services Office at (772) 469-4283, or Lisa Lehnhoff at the Panama City Ecological Services Office at (850) 769-0552, extension 241.

Sincerely,

for Larry Williams
State Supervisor

Shore Protection Activities along the Coast of Florida

Statewide Programmatic Biological Opinion

(Revised)

February 27, 2015

Prepared by:
U.S. Fish and Wildlife Service

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Acronyms

ABM	Alabama Beach Mouse
Act	Endangered Species Act
AFB	Air Force Base
AIBM	Anastasia Island Beach Mouse
ASP	Anastasia State Park
BO	Biological Opinion
CBM	Choctawhatchee Beach Mouse
CBRA	Coastal Barrier Resources Act
CCAFS	Cape Canaveral Air Force Station
CFR	Code of Federal Regulations
CH	Critical Habitat
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Corps	U.S. Army Corps of Engineers
DOI	U.S. Department of the Interior
DTRU	Dry Tortugas Recovery Unit
F	Fahrenheit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FMNM	Fort Matanzas National Monument
FR	*Federal Register*
FWC	Florida Fish and Wildlife Conservation Commission

FWC/FWRI	Florida Fish and Wildlife Conservation Commission's Florida Fish and Wildlife Research Institute
GCRU	Greater Caribbean Recovery Unit
GINS	Gulf Islands National Seashore
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve
HCP	Habitat Conservation Plan
IMA	Important Manatee Areas
INBS	Index Nesting Beach Survey
IPCC	Intergovernmental Panel on Climate Change
ITP	Incidental Take Permit
K	Carrying Capacity
MANLAA	May Affect, but is Not Likely to Adversely Affect
MHW	Mean High Water
MHWL	Mean High Water Line
MMPA	Marine Mammal Protection Act
mtDNA	Mitochondrial Deoxyribonucleic Acid
NGMRU	Northern Gulf of Mexico Recovery Unit
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRU	Northern Recovery Unit
NWAO DPS	Northwest Atlantic Ocean Distinct Population Segment
NWR	National Wildlife Refuge
PBA	Programmatic Biological Assessment
PCE	Primary Constituent Elements

PFRU	Peninsular Florida Recovery Unit
PHVA	Population and Habitat Viability Analysis
PKBM	Perdido Key Beach Mouse
PKSP	Perdido Key State Park
PSI	Per Square Inch
PVA	Population Viability Analysis
SABM	St. Andrews Beach Mouse
SAJ	South Atlantic Jacksonville
SAM	South Atlantic Mobile
SAV	submerged aquatic vegetation
SEBM	Southeastern Beach Mouse
Service	U.S. Fish and Wildlife Service
SNBS	Statewide Nesting Beach Survey
SPBO	Statewide Programmatic Biological Opinion
SR	State Road
TED	Turtle Excluder Device
TEWG	Turtle Expert Working Group
U.S.C.	United States Code
U.S.	United States

March 13, 2015

Alan M. Dodd, Colonel
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Federal Activity No:	41910-2010-F-0284
Applicant:	U.S. Army Corps of Engineers
Date Started:	May 30, 2007
Project Title:	Shore Protection Activities
Ecosystem:	Florida Coastline
Counties:	Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, Escambia.

Dear Colonel Dodd:

This document is the U.S. Fish and Wildlife Service's (Service) Statewide Programmatic Biological Opinion (SPBO) for the U.S. Army Corps of Engineers (Corps) planning and regulatory shore protection activities in Florida and their effects on the Northwest Atlantic Ocean distinct population (NWAO DPS) of loggerhead (*Caretta caretta*) and its designated terrestrial critical habitat, green (*Chelonia mydas),* leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*) sea turtles, and southeastern (*Peromyscus polionotus niveiventris*), Anastasia Island (*Peromyscus polionotus phasma*), Choctawhatchee (*Peromyscus polionotus allophrys*), St. Andrews (*Peromyscus polionotus peninsularis*), and Perdido Key (*Peromyscus polionotus trissyllepsis*) beach mice and designated critical habitat (CH) for the Perdido Key beach mouse (PKBM), Choctawhatchee beach mouse (CBM), and St. Andrews beach mouse (SABM) **(Table 1)**. This SPBO is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). We have assigned Service Federal Activity number 41910-2010-F-0284 for this consultation.

The Corps determined that the proposed project "may affect and is likely to adversely affect the above listed species (**Table 1)**. The Corps also has determined that the proposed project "may affect, but is not likely to adversely affect" (MANLAA) the West Indian (Florida) manatee (*Trichechus manatus latirostris*), the roseate tern (*Sterna dougallii dougallii*), the beach jacquemontia (*Jacquemontia reclinata*), and the Garber's spurge (*Chamaesyce garberi*) **(Table 2)**. Based on our review of the project plans and the incorporation of the minimization measures listed

in the final Programmatic Biological Assessment (PBA) as conditions of the projects where these species are known to exist, we concur with these determinations.

Table 1. Status of federally listed species within the Action Area that may be adversely affected by the shore protection activities.

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	STATUS/CH
Mammals		
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	Endangered(CH)
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	Threatened
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	Endangered
St. Andrews beach mouse	*Peromyscus polionotus peninsularis*	Endangered (CH)
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	Endangered (CH)
Birds		
Piping Plover*	*Charadrius melodus*	Threatened
Red Knot*	*Calidris canutus rufa*	Proposed
Reptiles		
Green sea turtle	*Chelonia mydas*	Endangered
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle (Northwest Atlantic Ocean population)	*Caretta caretta*	Threatened (CH)

* Not covered by the revised SPBO

Table 2. Species and critical habitat evaluated for effects and those where the Service has concurred with a "may affect, not likely to adversely affect (MANLAA)" determination.

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	STATUS/CH	PRESENT IN ACTION AREA	MANLAA
Florida manatee	*Trichechus manatus latirostris*	Endangered (CH)	Yes	Yes
Roseate tern	*Sterna dougallii dougallii*	Threatened	Yes	Yes
Beach jacquemontia	*Jacquemontia reclinata*	Endangered	Yes	Yes
Garber's spurge	*Chamaesyce garberi*	Threatened	Yes	Yes

Florida Manatee

For all dredging activities, including offshore dredging activities associated with submerged borrow areas and navigational channel maintenance:

The Corps has determined that the proposed projects "may affect, but are not likely to adversely affect" the Florida manatee. The Service has reviewed the draft PBA and concurs that, if the 2011 Standard Manatee In-water Construction Conditions are made a condition of the issued permit or Corps project plan and implemented, these activities are not likely to adversely affect the Florida manatee. We also conclude that these activities will not adversely modify its critical habitat. These findings fulfill section 7 requirements of the Act in regard to manatees. In addition, because no incidental take of manatees is anticipated, no such authorization under the Marine Mammal Protection Act (MMPA) is needed. The web link to these conditions: http://www.fws.gov/northflorida/Manatee/Manate_Key_Programmatic/20130425_gd_Appendix%20B_2011_Standard%20Manatee%20Construction%20Conditions.pdf.

For all dredging activities within estuaries and adjacent to the shore, inlets, and/or inshore areas including channels associated with submerged borrow areas and navigational channels:

If the 2011 Standard Manatee In-water Construction Conditions <u>and</u> the following additional conditions are made a condition of the issued permit or Corps project plan and implemented, the Service would be able to concur with a determination by the Corps that these activities are not likely to adversely affect the Florida manatee. We also conclude that these activities will not

adversely modify its critical habitat. These findings fulfill section 7 requirements of the Act in regard to manatees. In addition, because no incidental take of manatees is anticipated, no such authorization under the Marine Mammal Protection Act (MMPA) is needed.

Additional conditions:

1. Barges shall install mooring bumpers that provide a minimum 4-foot standoff distance under maximum compression between other moored barges and large vessels, when in the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate.

2. Pipelines shall be positioned such that they do not restrict manatee movement to the maximum extent possible. Plastic pipelines shall be weighted or floated. Pipelines transporting dredged material within the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate shall be weighted or secured to the bottom substrate as necessary to prevent movement of the pipeline and to prevent manatee entrapment or crushing.

3. In the event that such positioning has the potential to impact submerged aquatic vegetation (SAV) or nearshore hardbottom, the pipeline may be elevated or secured to the bottom substrate to minimize impacts to SAV.

For dredging activities located within Important Manatee Areas (IMAs), including Warm Water Aggregation Areas (WWAAs):

Important Manatee Areas (IMAs) are areas where large numbers of manatees occur because of the presence of warm water sites (including power plants, springs, etc.), feeding sites, drinking water sites, and other attractants. Manatees congregate at these sites to shelter from the cold, rest, feed and drink, travel, and engage in other activities. Current IMA maps, including maps of Warm Water Aggregation Areas (WWAAs) and areas of inadequate protection (AIPs), can be found at the Corps' weblink: http://www.saj.usace.army.mil/Missions/Regulatory/SourceBook.aspx.

Dredging activities that occur within the IMA sites (including WWAAs) are not included in this SPBO. For dredging activities within IMAs, the Corps shall contact the appropriate FWS Ecological Services Office for project-specific conditions. See Table 3.

Table 3. FWS Ecological Services (ES) offices and areas of responsibility (counties).

County	Service ES Office	Address	Telephone
Brevard, Citrus, Dixie, Duval, Flagler, Hernando, Hillsborough, Levy, Manatee, Nassau, Pasco, Pinellas, St Johns, Taylor, Volusia	North Florida ES Office	7915 Baymeadows Way Jacksonville, FL 32256	(904) 731-3336
Broward, Charlotte, Collier, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, St Lucie, Sarasota	South Florida ES Office	1339 20th Street Vero Beach, FL 32960	(772) 562-3909
Bay, Escambia, Franklin, Gulf, Jefferson, Okaloosa, Santa Rosa, Taylor, Wakulla, Walton,	Panama City ES Office	1601 Balboa Avenue Panama City, FL 32405	(850) 769-0552

Although this does not represent a biological opinion for the manatee as described in section 7 of the Act, it does fulfill the requirements of the Act and no further action is required regarding manatees. It also fulfills the requirements of the MMPA. If modifications are made in the programmatic action or additional information becomes available, re-initiation of consultation may be required.

Loggerhead Terrestrial Critical Habitat

The Corps has determined that the proposed projects "may affect, but are not likely to adversely affect" the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population. The Service concurs with the Corps' determination and furthermore concludes that the proposed projects will not adversely modify the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population.Designated Critical Habitat: The Service has designated terrestrial critical habitat for Northwest Atlantic loggerhead population on July 10, 2014. NOTE: The proposed rule was dated March 25, 2013 (78 FR 18000) and the notice of availability of the economic analysis for the proposed rule (78 FR 42921) was dated July 18, 2013. The final rule of terrestrial critical habitat includes 88 units encompassing approximately 1,102 kilometers (685 miles) of mapped shoreline along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi: http://www.fws.gov/northflorida/SeaTurtles/2014_Loggerhead_CH/Maps/2014_NWA_Loggerhead_Terrestrial_CH_index_maps.pdf.

Table 4. List of NWAO DPS loggerhead critical habitat in the terrestrial habitat Florida and ownership.

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-01: South Duval County Beaches–County line at Duval and St. Johns Counties	11.5 (7.1)	0 (0)	0 (0)	11.5 (7.1)
LOGG-T-FL-02: Fort Matanzas National Monument, St. Johns County	1.4 (0.9)	1.4 (0.9)	0 (0)	0 (0)
LOGG-T-FL-03: River to Sea Preserve at Marineland — North Peninsula State Park, Flagler and Volusia Counties	31.8 (19.8)	0 (0)	6.1 (3.8) North Peninsula State Park, Washington Oaks Garden State Park (in Guana Tolomato Matanzas NERR), and Gamble Rogers Memorial State Recreation Area at Flagler Beach	25.7 (16.0)
LOGG-T-FL-04: Canaveral National Seashore North, Volusia County	18.2 (11.3)	18.2 (11.3) Canaveral National Seashore	0 (0)	0 (0)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-05: Canaveral National Seashore South — Merritt Island NWR-Kennedy Space, Brevard County	28.4 (17.6)	28.4 (17.6) includes Canaveral National Seashore (Brevard portion) and Merritt Island NWR/KSC	0 (0)	0 (0)
LOGG-T-FL-06: Central Brevard Beaches, Brevard County	19.5 (12.1)	0 (0)	0 (0)	19.5 (12.1)
LOGG-T-FL-07: South Brevard Beaches, Brevard County	20.8 (12.9)	4.2 (2.6) Archie Carr NWR	1.5 (1.0) Sebastian Inlet State Park	15.0 (9.3)
LOGG-T-FL-08: Sebastian Inlet — Indian River Shores, Indian River County	4.1 (2.5)	0.9 (0.6) Archie Carr NWR	3.2 (2.0) Sebastian Inlet State Park	0 (0)
LOGG-T-FL-09: Fort Pierce Inlet — St. Lucie Inlet, St. Lucie and Martin Counties	35.2 (21.9)	0 (0)	0 (0)	35.2 (21.9)
LOGG-T-FL-10: St. Lucie Inlet — Jupiter Inlet, Martin and Palm Beach Counties	24.9 (15.5)	4.8 (3.0) Hobe Sound NWR	3.7 (2.3) St. Lucie Inlet Preserve State Park	16.4 (10.2)
LOGG-T-FL-11: Jupiter Inlet — Lake Worth Inlet, Palm Beach County	18.8 (11.7)	0 (0)	2.5 (1.5) John D. MacArthur Beach State Park	16.3 (10.1)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-12: Lake Worth Inlet — Boynton Inlet, Palm Beach County	24.3 (15.1)	0 (0)	0 (0)	24.3 (15.1)
LOGG-T-FL-13: Boynton Inlet — Boca Raton Inlet, Palm Beach County	22.6 (14.1)	0 (0)	0 (0)	22.6 (14.1)
LOGG-T-FL-14: Boca Raton Inlet — Hillsboro Inlet, Palm Beach and Broward Counties	8.3 (5.2)	0 (0)	0 (0)	8.3 (5.2)
LOGG-T-FL-15: Long Key, Monroe County	4.2 (2.6)	0 (0)	4.2 (2.6) Long Key State Park	0 (0)
LOGG-T-FL-16: Bahia Honda Key, Monroe County	3.7 (2.3)	0 (0)	3.7 (2.3) Bahia Honda Key State Park	0 (0)
LOGG-T-FL-17: Longboat Key, Manatee and Sarasota Counties	16.0 (9.9)	0 (0)	0 (0)	16.0 (9.9)
LOGG-T-FL-18: Siesta and Casey Keys, Sarasota County	20.8 (13.0)	0 (0)	0 (0)	20.8 (13.0)
LOGG-T-FL-19: Venice Beaches and Manasota Key, Sarasota and Charlotte Counties	26.0 (16.1)	0 (0)	1.9 (1.2) Stump Pass Beach State Park	24.1 (15.0)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-20: Knight, Don Pedro, and Little Gasparilla Islands, Charlotte County	10.8 (6.7)	0 (0)	1.9 (1.2) Don Pedro Island State Park	8.9 (5.5)
LOGG-T-FL-21: Gasparilla Island, Charlotte and Lee Counties	11.2 (6.9)	0 (0)	1.5 (1.0) Gasparilla Island State Park	9.6 (6.0)
LOGG-T-FL-22: Cayo Costa, Lee County	13.5 (8.4)	0 (0)	13.2 (8.2) Cayo Costa State Park	0.3 (0.2)
LOGG-T-FL-23: Captiva Island, Lee County	7.6 (4.7)	0 (0)	0 (0)	7.6 (4.7)
LOGG-T-FL-24: Sanibel Island West, Lee County	12.2 (7.6)	0 (0)	0 (0)	12.2 (7.6)
LOGG-T-FL-25: Little Hickory Island, Lee and Collier Counties	8.7 (5.4)	0 (0)	0 (0)	8.7 (5.4)
LOGG-T-FL-26: Wiggins Pass — Clam Pass, Collier County	7.7 (4.8)	0 (0)	2.0 (1.2) Delnor-Wiggins Pass State Park	5.7 (3.6)
LOGG-T-FL-27: Clam Pass — Doctors Pass, Collier County	4.9 (3.0)	0 (0)	0 (0)	4.9 (3.0)
LOGG-T-FL-28: Keewaydin Island and Sea Oat Island, Collier County	13.1 (8.1)	0 (0)	12.4 (7.7) Rookery Bay NERR	0.7 (0.5)
LOGG-T-FL-29: Cape Romano, Collier County	9.2 (5.7)	0 (0)	7.2 (4.5) Rookery Bay NERR	2.0 (1.2)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-30: Ten Thousand Islands North, Collier County	7.8 (4.9)	2.9 (1.8) Ten Thousand Islands NWR	4.9 (3.1) Rookery Bay NERR	0 (0)
LOGG-T-FL-31: Highland Beach, Monroe County	7.2 (4.5)	7.2 (4.5) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-32: Graveyard Creek — Shark Point, Monroe County	0.9 (0.6)	0.9 (0.6) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-33: Cape Sable, Monroe County	21.3 (13.2)	21.3 (13.2) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-34: Dry Tortugas, Monroe County	5.7 (3.6)	5.7 (3.6) Dry Tortugas National Park	0 (0)	0 (0)
LOGG-T-FL-35: Marquesas Keys, Monroe County	5.6 (3.5)	5.6 (3.5) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-36: Boca Grande Key, Monroe County	1.3 (0.8)	1.3 (0.8) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-37: Woman Key, Monroe County	1.3 (0.8)	1.3 (0.8) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-38: Perdido Key, Escambia County	20.2 (12.6)	11.0 (6.8) Gulf Islands National Seashore	2.5 (1.6) Perdido Key State Park	6.7 (4.2)
LOGG-T-FL-39: Mexico Beach and St. Joe Beach, Bay and Gulf Counties	18.7 (11.7)	0 (0)	0 (0)	18.7 (11.7)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-40: St. Joseph Peninsula, Gulf County	23.5 (14.6)	0 (0)	15.5 (9.7) T.H. Stone Memorial St. Joseph Peninsula State Park and St. Joe Bay State Buffer Preserve	8.0 (4.9)
LOST-T-FL-41: Cape San Blas, Gulf County	11.0 (6.8)	0 (0)	0.1 (0.1) St. Joseph Bay State Buffer Preserve	10.8 (6.7)
LOGG-T-FL-42: St. Vincent Island, Franklin County	15.1 (9.4)	15.1 (9.4) St. Vincent NWR	0 (0)	0 (0)
LOGG-T-FL-43: Little St. George Island, Franklin County	15.4 (9.6)	0 (0)	15.4 (9.6) Apalachicola NERR	0 (0)
LOGG-T-FL-44: St. George Island, Franklin County:	30.7 (19.1)	0 (0)	14.0 (8.7) Dr. Julian G. Bruce St. George Island State Park	16.7 (10.4)
LOGG-T-FL-45: Dog Island, Franklin County	13.1 (8.1)	0 (0)	0 (0)	13.1 (8.1)
Florida State Totals	**637.1 (396.4)**	**130.3 (81.0)**	**117.4.0 (72.9)**	**390.3 (242.6)**

The primary constituent elements (PCEs) for loggerhead terrestrial critical habitat are those specific elements of the biological and physical features (BPF) that provide for the species' life-history processes and are essential to the conservation of the species. PBFs include those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. The PBFs and PCEs are described as follows:

Physical and Biological Features (PBF):

PBF 1: Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring

PBF 2: Habitats Protected from Disturbance or Representative of the Historical, Geographic, and Ecological Distributions of the Species

Primary Constituent Elements (PCE):

(1) Suitable nesting beach habitat that has (a) relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings and (b) is located above MHW to avoid being inundated frequently by high tides.

(2) Sand that (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) is able to develop and maintain temperatures and a moisture content conducive to embryo development.

(3) Suitable nesting beach habitat with sufficient darkness to ensure nesting turtles are not deterred from emerging onto the beach and allows hatchlings and post-nesting females to orient successfully to the sea.

(4) Natural coastal processes or artificially created or maintained habitat mimicking natural conditions.

Substantial amounts of sand are deposited along Gulf of Mexico and Atlantic Ocean beaches to protect coastal properties in anticipation of preventing erosion and to mimic what otherwise would be natural processes of overwash and island migration. Constructed beaches tend to differ from natural beaches in several important ways for sea turtles. They are typically wider, flatter, and more compacted, and the sediments are moister than those on natural beaches (Nelson *et al*. 1987; Ackerman *et al.* 1991; Ernest and Martin 1999).

Regarding PCE 1 and PCE 4 for sand placement projects, construction on the beach during sea turtle nesting and hatching season can obstruct nesting females from accessing the beach and hatchlings from entering the water unimpeded. To minimize these impacts, the Corps has agreed to avoid construction during peak nesting and hatching season in the higher density beaches within the entire NWAO DPS of the loggerhead sea turtle as described. This SPBO includes required terms and conditions that minimize incidental take of turtles and reduces the impacts to the PCE 3 by limiting activities at night and placing equipment and staging areas off the nesting beach.

More nests are washed out on the wide, flat beaches resulting from sand placement than narrower steeply sloped natural beaches. This phenomenon may persist through the second postconstruction year and results from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping occur as the beach equilibrates to a more natural contour.

A study performed for the Florida Department of Environmental Protection (FDEP) promoted the test construction of a more "turtle-friendly" beach. The Service, along with the National Fish and Wildlife Foundation and the Florida Fish and Wildlife Conservation Commission (FWC), began a study to determine if statistically significant improvements in nesting success, nest densities, and/or hatchling production can be achieved through modifications to the traditional construction template for beach nourishment projects. It is anticipated that a more natural beach profile will reduce the incidence of scarping, improve nesting success, and reduce the proportion of nests placed along the seaward portion of the berm (those at increased risk of being lost to erosion

during profile equilibration), relative to a traditionally built beach. The Corps remains committed to incorporating the results of this study into future design templates.

A significantly larger proportion of turtles emerging on engineered beaches abandon their nesting attempts than turtles emerging on natural or prenourished beaches, even though more nesting habitat is available (Trindell *et al*. 1998; Ernest and Martin 1999; Herren 1999), with nesting success approximately 10 to 34 percent lower on nourished beaches than on control beaches during the first year post-nourishment. This reduction in nesting success is most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics (beach profile, sediment grain size, beach compaction, frequency and extent of escarpments) associated with the nourishment project (Ernest and Martin 1999). This directly impacts PCE 2 above; however, on severely eroded sections of beach, where little or no suitable nesting habitat exists, and sand placement can result in increased nesting (Ernest and Martin 1999). The placement of sand on a beach with reduced dry foredune habitat may increase sea turtle nesting habitat if the placed sand is highly compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may benefit sea turtles more than the eroding beach it replaces.

Regarding PCE 3, during construction, any lights directly visible on the beach during the nesting and hatching seasons are minimized by shielding and directing the lights downward and away from the nesting beach as required in the Terms and Conditions of this SPBO.

The newly created wider and flatter beach berm exposes sea turtles and their nests to lights that were less visible, or not visible, from nesting areas before the sand placement activity leading to a higher probability of hatchling mortality due to disorientation. Changing to sea turtle compatible lighting can be accomplished at the local level through voluntary compliance or by adopting appropriate regulations. The Terms and Conditions in the Biological Opinion require a lighting survey prior to construction and post construction to determine the additional level of impacts as a result of the proposed project. The Terms and Conditions include working with the local sponsor to minimize the impacts of lighting as a result of the proposed project.

The Service has determined that with the incorporation of the conservation measures as described above, that the proposed projects will not adversely affect nor adversely modify the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population.

Migratory Birds

In order to comply with the Migratory Bird Treaty Act (16 U.S.C. 701 *et seq*.) and reduce the potential for this project to impact nesting shorebirds, the Corps or the Applicant should follow the latest Florida Fish and Wildlife Conservation Commission (FWC) standard guidelines to protect

against impacts to nesting shorebirds during implementation of this project during the periods from February 15 to August 31.

Consultation History

1980s and 1990s — Beach nourishment projects in Florida began to occur frequently in the late 1980s and early 1990s. During that time, sea turtle protection measures were developed based on research findings available at that time. These measures addressed sand compaction, escarpment formation, and timing restrictions for projects in six south Florida counties with high nesting densities. In the mid-1990s, a sea turtle Biological Opinion (BO) template was developed that included protection measures and information on the status of sea turtles. In 1995, an expanded version of the sea turtle template BO was developed to incorporate new guidance on the required format for BOs and a biological rationale for the Terms and Conditions to be imposed. This document underwent review by four State conservation agencies and the Corps, and was subsequently revised. The primary purposes of the template BO were to: (1) incorporate a standardized format and language required for use in all BOs based on guidance from the Service's Washington Office, (2) assist Service biologists in the preparation of BOs, (3) increase consistency among Service field offices, and (4) increase consistency between the Service and the State agencies.

March 7 and 8, 2006 — The Corps met with the Services' three Florida field office representatives, a representative of the FWC, and a representative of the FDEP. The purpose of that meeting was to begin discussions about a regional consultation for sand placement activities along the coast of Florida and preparation of a PBA for sand placement activities in Florida. In addition to sea turtles, other Federal and state protected species were included in the discussions. At that meeting, the following topics were discussed:

1. Sand placement activities;
2. Sand source and placement methods;
3. Species and habitat;
4. Geographic scope;
5. Information availability; and
6. Minimization of impacts.

July 13, 2006 — A second meeting was held to further discuss the draft PBA. The Service provided the Corps with copies of the latest BO templates for each species to be considered. The Service held conference calls with the species recovery leads during August 2006.

October 16, 2006 The Service received the draft PBA via email from the Corps for sand placement activities along the coast of Florida.

October 27, 2006 The Service provided the Corps with draft comments on the PBA via email.

October 31, 2006 The Corps provided a response to the Service's comments on the PBA via email.

November 9, 2006 The Service and the Corps held a conference call to discuss the comments.

December 20, 2006 The Service sent the Corps a letter with the final comments on the draft PBA.

September 18 and 19, 2007
The Corps met with the Services' three Florida field office representatives, a representative of the FWC, and a representative of the FDEP. The purpose of this meeting was to discuss the Terms and Conditions to be included in the BO.

October 5, 2007 The Service sent the Corps, via email, the modifications to the draft Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice as discussed in the previous meeting.

November 1, 2007 The Corps provided the Service with comments via email on the revised Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice.

March 31, 2008 The Service revised the Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice. The Service also revised the minimization measures for the manatee. The revisions were sent to the Corps.

September 16, 2008 The Service sent the Corps via mail the draft SPBO.

October 2, 2008 The Corps provided the Service via email with a summary of the remaining issues concerning the Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice.

October 15, 2008 The Service sent the Corps, via email, the modifications to the draft Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice as discussed in the previous email.

March 11, 2009	The Service received via email examples of previous agreements between the Corps and the local sponsor to carry out the Terms and Conditions in previous BOs.
April 7, 2009	The Service sent an email to the Corps with an update of the progress of our analysis of including piping plovers in the SPBO.
August 26, 2009	The Service sent to the Corps via email the latest Terms and Conditions for sea turtles and beach mice.
September 17, 2009	The Corps sent an email to the Service describing the actions to be taken for the completion and submittal of the PBA.
January 6, 2010	The Corps and the Service participated in a meeting to finalize the draft SPBO.
January 21, 2010	The Corps sent to the Service via email the revised draft PBA.
March 25, 2010	The Corps and the Service participated in an implementation meeting and submittal of the final PBA.
February 22, 2011	The Corps submitted the final PBA to the Service.
April 18, 2011	The Service sent the final Statewide PBO to the Corps.
June 21, 2010	The Corps provided written concerns with the final Statewide PBO
June 30, 2011	The Service revised the final Statewide PBO.
July 18, 2011	The Corps provided written agreement with the changes that were made and asked for additional changes.
July 22, 2011	The Service made additional revisions per the Corps request.
July 25, 2011	The Corps provided written agreement with the additional revisions.
March 25, 2013	The Service published the proposed rule for loggerhead terrestrial critical habitat.
March 3, 2014	The Corps contacted the Service on revising the SPBO to include loggerhead critical habitat in the terrestrial environment.
August 25, 2014	The Service provided the Corps with a Draft Revised SPBO

September 4, 2014	The Corps and Service met and discussed the Draft Revised SPBO at the annual SPBO meeting.
October 23, 2014	The Service received a letter from the Corps requesting the SPBO be revised to include loggerhead critical habitat.
November 3, 2014	The Service sent a draft Revised SPBO to the Corps for review and comment
November 20, 2014	The Corps agreed with the changes made to the draft Revised SPBO
November 24, 2014	The Corps submitted proposed section 7(a)(1) conservation recommendations
January 30, 2014	The Corps and Service agreed on proposed section 7(a)(1) conservation recommendations and finalized draft revised SPBO

This SPBO is based on the PBA, and information provided during meetings and discussions with the Corps' representatives and information from the Florida Fish and Wildlife Conservation Commission's Florida Fish and Wildlife Research Institute (FWC/FWRI) sea turtle databases. A complete administrative record of this consultation is on file in the Service's North Florida, Panama City, and South Florida Ecological Services Offices.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes all activities associated with the placement of compatible sediment on beaches of the Atlantic and Gulf coasts of Florida encompassing both South Atlantic Jacksonville (SAJ) and South Atlantic Mobile (SAM) Corps Districts. Additionally, the proposed action includes the replacement and rehabilitation of groins that are included as design components of beach projects for longer retention time and stabilization of associated sediment placed on the beach. This SPBO includes projects authorized through the Corps Regulatory Program, and funded or carried out as part of its Civil Works program. Corps Regulatory activities may include the involvement of other Federal agencies, such as the Department of Defense, Bureau of Ocean Energy Management, and the Federal Emergency Management Agency (FEMA). The shore protection activities covered in the SPBO encompass the following shore protection activities:

1. Sand placement originating from Dredged Material Management Areas (DMMAs), offshore borrow sites, and other compatible sand sources;
2. Sand placement as an associated authorization of sand extraction from the outer continental shelf by the Bureau of Ocean Energy Management;

3. Sand washed onto the beach from being placed in the swash zone;
4. Sand by-passing/back-passing (sand discharge on beach);
5. Current Operations and Maintenance (O&M) dredging of navigation channels with beach disposal (does not include new navigation projects or expansion (deepening or widening) of existing authorized navigation projects); and
6. Groins and jetty repair or replacement.

For nearshore borrow sites, the Corps must provide information to the Service on the sand flow when this sand is removed from these nearshore areas. If removal of sand from these nearshore areas is shown to cause increased erosion on the adjacent beach, a separate consultation will be required.

A detailed description of each activity is found in the final PBA. The history of shore protection activities throughout the Atlantic and Gulf Coasts of Florida is extensive and consists of a myriad of actions performed by local, State, and Federal entities. Future beach placement actions addressed in this SPBO may include maintenance of these existing projects or beaches that have not experienced a history of beach placement activities.

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment. This SPBO only addresses activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS will assess and consult with the Corps concerning potential impacts to sea turtles in the marine environment and the shoreline updrift and downdrift area of the project.

Corps Commitments as listed in the final PBA

The following paragraph from the final PBA summarizes the Corps' Commitments as listed below:

"For Corps projects, please note that "fish and wildlife enhancement" activities (which are beyond mitigation of project impacts) must be authorized as a project purpose or project feature or must be otherwise approved through Corps headquarters (Engineer Regulation ER 1105-2-100 Appendix G, Amendment #1, 30 Jun 2004). At the present time, no beach fill placement or shore protection activity in Florida has fish and wildlife enhancement as a project purpose or project feature. Since adding fish and wildlife enhancement as a project purpose or feature is not a budgetary priority (ER 1105-2-100 22 Apr 2000, Appendix C, part C-3b.(3)), authorization and funding for such is not expected."

<u>Sea Turtles</u>

1. Avoid construction during the peak nesting and hatching season in the higher density beaches, and to the maximum extent practicable during all other nesting times and locations;

2. Except for O&M disposal actions, implement sea turtle nest monitoring and relocation plan during construction if nesting window cannot be adhered to;

3. Except for O&M disposal actions, 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 feet) 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 should be directed by the Service. For Corps Civil Works projects, leveling of escarpments would be limited to the term of the construction or as otherwise may be authorized and funded;

4. Placement of pipe parallel to the shoreline and as far landward as possible so that a significant portion of available nesting habitat can be utilized, nest placement is not subject to inundation or washout, and turtles do not become trapped landward of the pipe;

5. Temporary storage of pipes and equipment will be located off the beach to the maximum extent possible;

6. The Corps will continue to work with the FDEP to identify aspects of beach nourishment construction templates that negatively impact sea turtles and develop and implement alternative design criteria that may minimize these impacts;

7. Except for O&M disposal actions, Service compaction assessment guidelines will be followed and tilling will be performed where appropriate. For Corps Civil Works projects, assessment of compaction and tilling will be limited to the term of the construction or as otherwise may be authorized and funded; and

8. All lighting associated with project construction will be minimized to the maximum extent possible, through reduction, shielding, angling, etc., while maintaining compliance with all Corps, U.S. Coast Guard, and OSHA safety requirements.

<u>Beach Mice</u>

1. Pipeline routes for beach construction projects will avoid identified primary constituent elements for beach mouse critical habitat to the maximum extent practicable;

2. Implementation of a trapping and relocation plan if avoidance alternatives of occupied habitat are not practical; and

3. Implementation of a lighting plan to reduce, shield, lower, angle, etc. light sources in order to minimize illumination impacts on nocturnal beach mice during construction.

Action Area

The Service has described the action area to include sandy beaches of the Atlantic Coast of Florida (Key West to Fernandina/Kings Bay) and the Gulf Coast (Ten Thousand Islands to Alabama State

Line) for reasons that will be explained and discussed in the "EFFECTS OF THE ACTION" section of this consultation.

Underlying Dynamics of a Barrier Island

Of all the states and provinces in North America, Florida is most intimately linked with the sea. Florida's 1,200-mile coastline (exclusive of the Keys) is easily the longest in the continental U.S. Of the 1,200 miles, 745 miles are sandy and mostly in the form of barrier islands. The coastline is dynamic and constantly changing as a result of waves, wind, tides, currents, sea level change, and storms. The entire state lies within the coastal plain, with a maximum elevation of about 400 feet, and no part is more than 60 miles from the Atlantic Ocean or Gulf of Mexico.

The east coast of Florida consists of a dynamic shoreline, with a relatively sloped berm, coarse-grained sand, and moderate to high surf (Witherington 1986). The southeast coast of Florida consists of continuous, narrow, sandy barrier islands bordering a narrow continental shelf (Wanless and Maier 2007). The dynamics of the east coast shoreline are due to the occurrence of storm surges and seas from tropical storms that occur mainly during August through early October. More erosion events can also occur during late September through March due to nor'easters. The impacts of these two types of storms may vary from event to event and year to year.

Northwest (panhandle) and Southwest Florida beaches are considered to be low energy beaches with a gradual offshore slope and low sloped fine grained quartz sand beaches. As along the east coast of Florida, the shoreline dynamics are shaped by tropical storms and hurricanes. Although Gulf beaches may experience winter erosion, they are largely protected from the severe nor'easters.

Coasts with greater tidal ranges are more buffered against storm surges than are those with low tidal ranges, except when the storm strikes during high tide. Mean tidal ranges decrease southward along the Atlantic coast from a mean of seven feet at the Florida-Georgia line to less than two feet in Palm Beach County. The mean tidal range along the Gulf Coast is less than three feet (microtidal) except in the extreme south where it ranges from three to four feet. Because of its lower elevation and lower wave energy regime, the West Coast of the peninsula is subject to greater changes during storm events than is the east coast.

Microtidal coasts have a high vulnerability to sea level rise and barrier islands respond by migrating landward. Migration occurs as a result of overwash from extreme storms that flatten topography and deposit sand on the backside of the island, extending the island landward (Young 2007). Significant widening can occur from a single storm event. For example, Dauphin Island, a barrier island in Alabama, has nearly doubled its width following Hurricanes Ivan and Katrina in 2004 and 2005, respectively.

Sea level has risen globally approximately 7.1 inches in the past century (Douglas 1997). Climate models predict a doubling of the rate of sea level rise over the next 100 years (Pendleton *et al.* 2004). Recent studies indicate a trend toward increasing hurricane number and intensity (Emanuel

2005, Webster *et al*. 2005). Barrier islands need to be able to move and respond to these conditions. By locking in a barrier island's location with infrastructure, the island loses its ability to migrate to higher elevations which can lead to its eventual collapse (Moore 2007).

Overwash from less intense storms can positively affect island topography. Low natural berms can develop along beach fronts, but generally can be exceeded by overwash from frontal storms. The berm is an accretionary feature at the landward extreme of wave influence. Sediment is transported over the berm crest and is deposited in a nearshore overwash fan and in breach corridors. Overwash deposition provides source sand for re-establishing dunes. Onshore winds transport the sediment from overwash fans to the dunes, gradually building back dune elevation during storm-free periods.

The interaction between the biology and geomorphology of barrier islands is complex. Just as the barrier island undergoes a process of continual change, so do the ecological communities present. Vegetation zones gradually re-establish following storms, and in turn affect physical processes such as sand accretion, erosion, and overwash. The beach front, dunes, and overwash areas all provide important habitat components. Many barrier island species are adapted to respond positively to periodic disturbance. As the island widens, new feeding habitat (sand/mud flats) is created for shorebirds such as the piping plover. The beaches provide nesting habitat for sea turtles. Early colonizer plants are favored as a food source by beach mice. These barrier island habitats are becoming increasingly rare as our Nation's coastlines rapidly develop and are stabilized.

SEA TURTLES

STATUS OF THE SPECIES/CRITICAL HABITAT

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment. This SPBO addresses nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. Five species of sea turtles are analyzed in this SPBO: the loggerhead, green, leatherback, hawksbill, and Kemp's ridley.

Loggerhead Sea Turtle

The loggerhead sea turtle was federally listed as a threatened species on July 28, 1978 (43 *Federal Register* [*FR*] 32800). The Service and the National Marine Fisheries Service (NMFS) listed the Northwest Atlantic Ocean distinct population segment (DPS) of the loggerhead sea turtle as threatened on September 22, 2011 (76 *FR* 58868). The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans.

The loggerhead sea turtle grows to an average weight of about 200 pounds and is characterized by a large head with blunt jaws. Adults and subadults have a reddish-brown carapace. Scales on the top of the head and top of the flippers are also reddish-brown with yellow on the borders. Hatchlings are a dull brown color (NMFS 2009a). The loggerhead feeds on mollusks, crustaceans, fish, and other marine animals.

The loggerhead may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas.

Within the Northwest Atlantic, the majority of nesting activity occurs from April through September, with a peak in June and July (Williams-Walls *et al*. 1983, Dodd 1988, Weishampel *et al*. 2006). Nesting occurs within the Northwest Atlantic along the coasts of North America, Central America, northern South America, the Antilles, Bahamas, and Bermuda, but is concentrated in the southeastern U.S. and on the Yucatán Peninsula in Mexico on open beaches or along narrow bays having suitable sand (Sternberg 1981, Ehrhart 1989, Ehrhart *et al*. 2003, NMFS and Service 2008).

Critical habitat has been designated for the NWAO DPS of the loggerhead sea turtle. **Table 4** has the list of the critical habitat units within the project area.

Green Sea Turtle

The green sea turtle was federally listed on July 28, 1978 (43 *FR* 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters.

The green sea turtle grows to a maximum size of about four feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. The carapace is smooth and colored gray, green, brown and black. Hatchlings are black on top and white on the bottom (NMFS 2009b). Hatchling green turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (NMFS and Service 1991). Nesting also has been documented along the Gulf coast of Florida from Escambia County through Santa Rosa County in northwest Florida and from Pinellas County through Collier County in southwest Florida (FWC 2009a).

Most green turtles spend the majority of their lives in coastal foraging grounds. These areas include fairly shallow waters both open coastline and protected bays and lagoons. While in these

areas, green turtles rely on marine algae and seagrass as their primary diet constituents, although some populations also forage heavily on invertebrates. These marine habitats are often highly dynamic and in areas with annual fluctuations in seawater and air temperatures, which can cause the distribution and abundance of potential green turtle food items to vary substantially between seasons and years (Carballo *et al.*, 2002). Many prey species that are abundant during winter and spring periods become patchy during warm summer periods. Some species may altogether vanish during extreme temperatures, such as those that occur during El Niño Southern Oscillation events (Carballo *et al.*, 2002).

Open beaches with a sloping platform and minimal disturbance are required for nesting.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys.

Leatherback Sea Turtle

The leatherback sea turtle was federally listed as an endangered species on June 2, 1970 (35 *FR* 8491). Leatherbacks have the widest distribution of the sea turtles; nonbreeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Foraging leatherback excursions have been documented into higher-latitude subpolar waters. They have evolved physiological and anatomical adaptations (Frair *et al.* 1972, Greer *et al.* 1973) that allow them to exploit waters far colder than any other sea turtle species would be capable of surviving.

The adult leatherback can reach four to eight feet in length and weigh 500 to 2,000 pounds. The carapace is distinguished by a rubber-like texture, about 1.6 inches thick, made primarily of tough, oil-saturated connective tissue. Hatchlings are dorsally mostly black and are covered with tiny scales; the flippers are edged in white, and rows of white scales appear as stripes along the length of the back (NMFS 2009c). Jellyfish are the main staple of its diet, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed. This is the largest, deepest diving of all sea turtle species.

Leatherback turtle nesting grounds are distributed worldwide in the Atlantic, Pacific and Indian Oceans on beaches in the tropics and sub-tropics. The Pacific Coast of Mexico historically supported the world's largest known concentration of nesting leatherbacks.

The leatherback turtle regularly nests in the U.S. Caribbean in Puerto Rico and the U.S. Virgin Islands. Along the U.S. Atlantic coast, most nesting occurs in Florida (NMFS and Service 1992). Leatherback nesting has also been reported on the northwest coast of Florida (LeBuff 1990, FWC 2009a); and in southwest Florida a false crawl (nonnesting emergence) has been observed on Sanibel Island (LeBuff 1990). Nesting has also been reported in Georgia, South Carolina, and North Carolina (Rabon *et al.* 2003) and in Texas (Shaver 2008).

Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the distance to dry sand is limited. Their preferred beaches have proximity to deep water and generally rough seas.

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (50 Code of Federal Regulations (CFR) 17.95).

Hawksbill Sea Turtle

The hawksbill sea turtle was federally listed as an endangered species on June 2, 1970 (35 *FR* 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean.

Data collected in the Wider Caribbean reported that hawksbills typically weigh around 176 pounds or less; hatchlings average about 1.6 inches straight length and range in weight from 0.5 to 0.7 ounces. The carapace is heart shaped in young turtles, and becomes more elongated or egg-shaped with maturity. The top scutes are often richly patterned with irregularly radiating streaks of brown or black on an amber background. The head is elongated and tapers sharply to a point. The lower jaw is V-shaped (NMFS 2009d).

Within the continental U.S., hawksbill sea turtle nesting is rare and is restricted to the southeastern coast of Florida (Volusia through Miami-Dade Counties) and the Florida Keys (Monroe County) (Meylan 1992, Meylan *et al.* 1995). However, hawksbill tracks are difficult to differentiate from those of loggerheads and may not be recognized by surveyors. Therefore, surveys in Florida likely underestimate actual hawksbill nesting numbers (Meylan *et al.* 1995). In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (NMFS and Service 1993).

Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico.

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle was federally listed as endangered on December 2, 1970 (35 *FR* 18320). The Kemp's ridley, along with the flatback sea turtle (*Natator depressus*), has the most geographically restricted distribution of any sea turtle species. The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland.

Adult Kemp's ridleys, considered the smallest sea turtle in the world, weigh an average of 100 pounds with a carapace measuring between 24-28 inches in length. The almost circular carapace has a grayish green color while the plastron is pale yellowish to cream in color. The carapace is often as wide as it is long. Their diet consists mainly of swimming crabs, but may also include fish, jellyfish, and an array of mollusks.

The majority of nesting for the entire species occurs on the primary nesting beach at Rancho Nuevo, Mexico (Marquez-Millan 1994). Outside of nesting, adult Kemp's ridleys are believed to spend most of their time in the Gulf of Mexico, while juveniles and subadults also regularly occur along the eastern seaboard of the U.S. (Service and NMFS 1992). There have been rare instances when immature ridleys have been documented making transatlantic movements (Service and NMFS 1992). It was originally speculated that ridleys that make it out of the Gulf of Mexico might be lost to the breeding population (Hendrickson 1980), but data indicate that many of these

turtles are capable of moving back into the Gulf of Mexico (Henwood and Ogren 1987). In fact, there are documented cases of ridleys captured in the Atlantic that migrated back to the nesting beach at Rancho Nuevo (Schmid and Witzell 1997, Schmid 1998, Witzell 1998).

Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 7.9 inches in length, at which size they enter coastal shallow water habitats (Ogren 1989).

No critical habitat has been designated for the Kemp's ridley sea turtle.

Life history

Loggerhead Sea Turtle

Loggerheads are long-lived, slow-growing animals that use multiple habitats across entire ocean basins throughout their life history. This complex life history encompasses terrestrial, nearshore, and open ocean habitats. The three basic ecosystems in which loggerheads live are the:

1. Terrestrial zone (supralittoral) - the nesting beach where both oviposition (egg laying) and embryonic development and hatching occur.

2. Neritic zone - the inshore marine environment (from the surface to the sea floor) where water depths do not exceed 656 feet (200 meters). The neritic zone generally includes the continental shelf, but in areas where the continental shelf is very narrow or nonexistent, the neritic zone conventionally extends to areas where water depths are less than 656 feet.

3. Oceanic zone - the vast open ocean environment (from the surface to the sea floor) where water depths are greater than 656 feet.

Maximum intrinsic growth rates of sea turtles are limited by the extremely long duration of the juvenile stage and fecundity. Loggerheads require high survival rates in the juvenile and adult stages, common constraints critical to maintaining long-lived, slow-growing species, to achieve positive or stable long-term population growth (Congdon *et al.* 1993, Heppell 1998, Crouse 1999, Heppell *et al.* 1999, 2003, Musick 1999).

The generalized life history of Atlantic loggerheads is shown in **Figure 1** (from Bolten 2003).

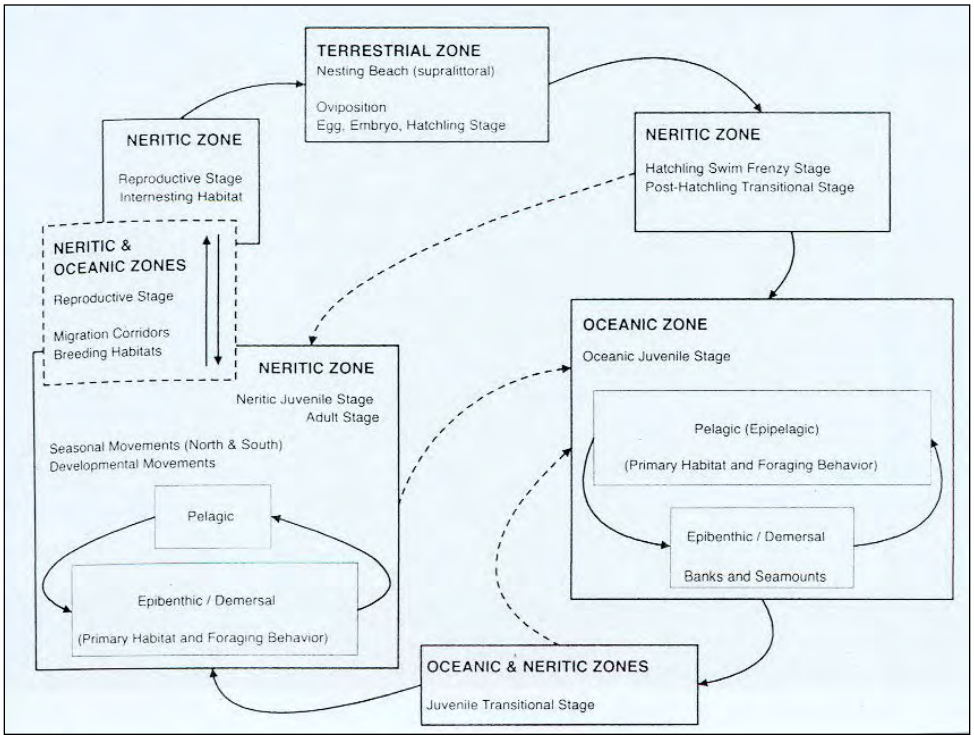

Figure 1. Life history stages of a loggerhead turtle. The boxes represent life stages and the corresponding ecosystems, solid lines represent movements between life stages and ecosystems, and dotted lines are speculative (Bolten 2003).

Numbers of nests and nesting females are often highly variable from year to year due to a number of factors including environmental stochasticity, periodicity in ocean conditions, anthropogenic effects, and density-dependent and density-independent factors affecting survival, somatic growth, and reproduction (Meylan 1982, Hays 2000, Chaloupka 2001, Solow *et al.* 2002). Despite these sources of variation, and because female turtles exhibit strong nest site fidelity, a nesting beach survey can provide a valuable assessment of changes in the adult female population, provided that the study is sufficiently long and effort and methods are standardized (Meylan 1982, Gerrodette and Brandon 2000, Reina *et al*. 2002). **Table 4** summarizes key life history characteristics for loggerheads nesting in the U.S.

Table 5. Typical values of life history parameters for loggerheads nesting in the U.S. (NMFS and Service 2008).

Life History Trait	Data
Clutch size (mean)	100-126 eggs[1]
Incubation duration (varies depending on time of year and latitude)	Range = 42-75 days[2,3]
Pivotal temperature (incubation temperature that produces an equal number of males and females)	84˚F[5]
Nest productivity (emerged hatchlings/total eggs) x 100 (varies depending on site specific factors)	45-70 percent[2,6]
Clutch frequency (number of nests/female/season)	3-4 nests[7]
Internesting interval (number of days between successive nests within a season)	12-15 days[8]
Juvenile (<34 inches Curved Carapace Length) sex ratio	65-70 percent female[4]
Remigration interval (number of years between successive nesting migrations)	2.5-3.7 years[9]
Nesting season	late April-early September
Hatching season	late June-early November
Age at sexual maturity	32-35 years[10]
Life span	>57 years[11]

[1] Dodd (1988).
[2] Dodd and Mackinnon (1999, 2000, 2001, 2002, 2003, 2004).
[3] Witherington (2006) (information based on nests monitored throughout Florida beaches in 2005, n = 865).
[4] National Marine Fisheries Service (2001); Foley (2005).
[5] Mrosovsky (1988).
[6] Witherington (2006) (information based on nests monitored throughout Florida beaches in 2005, n = 1,680).
[7] Murphy and Hopkins (1984); Frazer and Richardson (1985); Hawkes *et al*. 2005; Scott 2006.
[8] Caldwell (1962), Dodd (1988).
[9] Richardson *et al.* (1978); Bjorndal *et al.* (1983).
[10] Snover (2005).
[11] Dahlen *et al.* (2000).

Loggerheads nest on ocean beaches and occasionally on estuarine shorelines with suitable sand. Nests are typically laid between the high tide line and the dune front (Routa 1968, Witherington

1986, Hailman and Elowson 1992). Wood and Bjorndal (2000) evaluated four environmental factors (slope, temperature, moisture, and salinity) and found that slope had the greatest influence on loggerhead nest-site selection on a beach in Florida. Loggerheads appear to prefer relatively narrow, steeply sloped, coarse-grained beaches, although nearshore contours may also play a role in nesting beach site selection (Mortimer 1982; Provancha and Ehrhart 1987).

The warmer the sand surrounding the egg chamber, the faster the embryos develop (Mrosovsky and Yntema 1980). Sand temperatures prevailing during the middle third of the incubation period also determine the sex of hatchling sea turtles (Mrosovsky and Yntema 1980). Incubation temperatures near the upper end of the tolerable range produce only female hatchlings while incubation temperatures near the lower end of the tolerable range produce only male hatchlings.

Loggerhead hatchlings pip and escape from their eggs over a one to three day interval and move upward and out of the nest over a two to four day interval (Christens 1990). The time from pipping to emergence ranges from four to seven days with an average of 4.1 days (Godfrey and Mrosovsky 1997). Hatchlings emerge from their nests en masse almost exclusively at night, and presumably using decreasing sand temperature as a cue (Hendrickson 1958, Mrosovsky 1968, Witherington *et al.* 1990). Moran *et al*. (1999) concluded that a lowering of sand temperatures below a critical threshold, which most typically occurs after nightfall, is the most probable trigger for hatchling emergence from a nest. After an initial emergence, there may be secondary emergences on subsequent nights (Carr and Ogren 1960, Witherington 1986, Ernest and Martin 1993, Houghton and Hays 2001).

Hatchlings use a progression of orientation cues to guide their movement from the nest to the marine environments where they spend their early years (Lohmann and Lohmann 2003). Hatchlings first use light cues to find the ocean. On naturally lighted beaches without artificial lighting, ambient light from the open sky creates a relatively bright horizon compared to the dark silhouette of the dune and vegetation landward of the nest. This contrast guides the hatchlings to the ocean (Daniel and Smith 1947, Limpus 1971, Salmon *et al.* 1992, Witherington and Martin 1996, Witherington 1997, Stewart and Wyneken 2004).

Loggerheads in the Northwest Atlantic display complex population structure based on life history stages. Based on mitochondrial deoxyribonucleic acid (mtDNA), oceanic juveniles show no structure, neritic juveniles show moderate structure and nesting colonies show strong structure (Bowen *et al*. 2005). In contrast, a survey using microsatellite (nuclear) markers showed no significant population structure among nesting populations (Bowen *et al*. 2005), indicating that while females exhibit strong philopatry, males may provide an avenue of gene flow between nesting colonies in this region.

Green Sea Turtle

Green sea turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3 nests. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually two or more years intervene between breeding seasons (NMFS and Service 1991). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 nests (NMFS and Service 1992). The interval between nesting events within a season is about nine to 10 days. Clutch size averages 80 to 85 yolked eggs, with the addition of usually a few dozen smaller, yolkless eggs, mostly laid toward the end of the clutch (Pritchard 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in six to 10 years (Zug and Parham 1996).

Hawksbill Sea Turtle

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss *et al.* 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NMFS and Service 1993). On the basis of limited information, nesting migration intervals of two to three years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. However, the time required to reach 14 inches in length is unknown and growth rates vary geographically. As a result, actual age at sexual maturity is unknown.

Kemp's Ridley Sea Turtle

Nesting occurs from April into July during which time the turtles appear off the Tamaulipas and Veracruz coasts of Mexico. Precipitated by strong winds, the females swarm to mass nesting emergences, known as "arribadas or arribazones," to nest during daylight hours. The period between Kemp's ridley arribadas averages approximately 25 days (Rostal *et al.* 1997), but the precise timing of the arribadas is highly variable and unpredictable (Bernardo and Plotkin 2007). Clutch size averages 100 eggs and eggs typically take 45 to 58 days to hatch depending on temperatures (Marquez-Millan 1994, Rostal 2007).

Some females breed annually and nest an average of one to four times in a season at intervals of 10 to 28 days. Analysis by Rostal (2007) suggested that ridley females lay approximately 3.1 nests per nesting season. Interannual remigration rate for female ridleys is estimated to be

approximately 1.8 (Rostal 2007) to 2.0 years (Marquez-Millan *et al.* 1989). Age at sexual maturity is believed to be between 10 to 17 years (Snover *et al*. 2007).

Population dynamics

Loggerhead Sea Turtle

The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. However, the majority of loggerhead nesting is at the western rims of the Atlantic and Indian Oceans. The most recent reviews show that only two loggerhead nesting beaches have greater than 10,000 females nesting per year (Baldwin *et al.* 2003, Ehrhart *et al.* 2003, Kamezaki *et al.* 2003, Limpus and Limpus 2003, Margaritoulis *et al.* 2003): South Florida (U.S.) and Masirah (Oman). Those beaches with 1,000 to 9,999 females nesting each year are Georgia through North Carolina (U.S.), Quintana Roo and Yucatán (Mexico), Cape Verde Islands (Cape Verde, eastern Atlantic off Africa), and Western Australia (Australia). Smaller nesting aggregations with 100 to 999 nesting females annually occur in the Northern Gulf of Mexico (U.S.), Dry Tortugas (U.S.), Cay Sal Bank (Bahamas), Sergipe and Northern Bahia (Brazil), Southern Bahia to Rio de Janerio (Brazil), Tongaland (South Africa), Mozambique, Arabian Sea Coast (Oman), Halaniyat Islands (Oman), Cyprus, Peloponnesus (Greece), Island of Zakynthos (Greece), Turkey, Queensland (Australia), and Japan.

The loggerhead is commonly found throughout the North Atlantic including the Gulf of Mexico, the northern Caribbean, the Bahamas archipelago, and eastward to West Africa, the western Mediterranean, and the west coast of Europe.

The major nesting concentrations in the U.S. are found in South Florida. However, loggerheads nest from Texas to Virginia. Total estimated nesting in Florida, where 90 percent of nesting occurs, has fluctuated between 52,374 and 98,602 nests per year from 2009-2013 (FWC 2014, http://myfwc.com/media/2786250/loggerheadnestingdata09-13.pdf). About 80 percent of loggerhead nesting in the southeast U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties). Adult loggerheads are known to make considerable migrations between foraging areas and nesting beaches (Schroeder *et al.* 2003, Foley *et al.* 2008). During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.

From a global perspective, the U.S. nesting aggregation is of paramount importance to the survival of the species as is the population that nests on islands in the Arabian Sea off Oman (Ross 1982, Ehrhart 1989). The status of the Oman loggerhead nesting population, reported to be the largest in the world (Ross 1979), is uncertain because of the lack of long-term standardized nesting or foraging ground surveys and its vulnerability to increasing development pressures near major nesting beaches and threats from fisheries interaction on foraging grounds and migration routes (Possardt 2005). The loggerhead nesting aggregations in Oman and the U.S. account for the majority of nesting worldwide.

Green Sea Turtle

The majority of nesting occurs along the Atlantic coast of eastern central Florida, with an average of 10,377 each year from 2008 to 2012 (B. Witherington, Florida Fish and Wildlife Conservation Commission, pers. comm., 2013). In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year (NMFS and Service 1998b). Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting aggregation in the world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season (Limpus *et al.* 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani 1995).

Leatherback Sea Turtle

A dramatic drop in nesting numbers has been recorded on major nesting beaches in the Pacific. Spotila *et al.* (2000) have highlighted the dramatic decline and possible extirpation of leatherbacks in the Pacific.

The East Pacific and Malaysia leatherback populations have collapsed. Spotila *et al.* (1996) estimated that only 34,500 females nested annually worldwide in 1995, which is a dramatic decline from the 115,000 estimated in 1980 (Pritchard 1982). In the eastern Pacific, the major nesting beaches occur in Costa Rica and Mexico. At Playa Grande, Costa Rica, considered the most important nesting beach in the eastern Pacific, numbers have dropped from 1,367 leatherbacks in 1988-1989 to an average of 188 females nesting between 2000-2001 and 2003-2004. In Pacific Mexico, 1982 aerial surveys of adult female leatherbacks indicated this area had become the most important leatherback nesting beach in the world. Tens of thousands of nests were laid on the beaches in 1980s, but during the 2003-2004 seasons a total of 120 nests was recorded. In the western Pacific, the major nesting beaches lie in Papua New Guinea, Papua, Indonesia, and the Solomon Islands. These are some of the last remaining significant nesting assemblages in the Pacific. Compiled nesting data estimated approximately 5,000 to 9,200 nests annually with 75 percent of the nests being laid in Papua, Indonesia.

However, the most recent population size estimate for the North Atlantic alone is a range of 34,000 to 94,000 adult leatherbacks (TEWG 2007). In Florida, the number of nests has been increasing since 1979 (Stewart *et al.* 2011). The average annual number of nests in the 1980s was 63 nests, which rose to 263 nests in the 1990s and to 754 nests in the 2000s (Stewart *et al.* 2011). In 2012, 1,712 nests were recorded statewide (http://myfwc.com/research/wildlife/sea-turtles/nesting/).

Nesting in the Southern Caribbean occurs in the Guianas (Guyana, Suriname, and French Guiana), Trinidad, Dominica, and Venezuela. The largest nesting populations at present occur in the western Atlantic in French Guiana with nesting varying between a low of 5,029 nests in 1967 to a high of 63,294 nests in 2005, which represents a 92 percent increase since 1967 (TEWG 2007). Trinidad supports an estimated 6,000 leatherbacks nesting annually, which represents more than 80

percent of the nesting in the insular Caribbean Sea. Leatherback nesting along the Caribbean Central American coast takes place between Honduras and Colombia. In Atlantic Costa Rica, at Tortuguero, the number of nests laid annually between 1995 and 2006 was estimated to range from 199 to 1,623.

In Puerto Rico, the main nesting areas are at Fajardo on the main island of Puerto Rico and on the island of Culebra. Between 1978 and 2005, annual population growth rate was estimated to be 1.10 percent (TEWG 2007). Recorded leatherback nesting on the Sandy Point National Wildlife Refuge on the island of St. Croix, U.S. Virgin Islands between 1990 and 2005, ranged from a low of 143 in 1990 to a high of 1,008 in 2001 (Garner *et al*. 2005). In the British Virgin Islands, annual nest numbers have increased in Tortola from zero to six nests per year in the late 1980s to 35 to 65 nests per year in the 2000s (TEWG 2007).

The most important nesting beach for leatherbacks in the eastern Atlantic lies in Gabon, Africa. It was estimated there were 30,000 nests along 60 miles of Mayumba Beach in southern Gabon during the 1999-2000 nesting season (Billes *et al*. 2000). Some nesting has been reported in Mauritania, Senegal, the Bijagos Archipelago of Guinea-Bissau, Turtle Islands and Sherbro Island of Sierra Leone, Liberia, Togo, Benin, Nigeria, Cameroon, Sao Tome and Principe, continental Equatorial Guinea, Islands of Corisco in the Gulf of Guinea and the Democratic Republic of the Congo, and Angola. In addition, a large nesting population is found on the island of Bioko (Equatorial Guinea) (Fretey *et al*. 2007). .

Hawksbill Sea Turtle

About 15,000 females are estimated to nest each year throughout the world with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population. Only five regional populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia) (Meylan and Donnelly 1999). Mexico is now the most important region for hawksbills in the Caribbean with about 3,000 nests per year (Meylan 1999). In the U.S. Pacific, hawksbills nest only on main island beaches in Hawaii, primarily along the east coast of the island of Hawaii. Hawksbill nesting has also been documented in American Samoa and Guam (NMFS and Service 1998c).

Kemp's Ridley Sea Turtle

Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a small number of Kemp's ridleys nest consistently along the Texas coast (TEWG 1998). In addition, rare nesting events have been reported in Alabama, Florida, Georgia, South Carolina, and North Carolina. Historical information indicates that tens of thousands of ridleys nested near Rancho Nuevo, Mexico, during the late 1940s (Hildebrand 1963). The Kemp's ridley population experienced a devastating decline between the late 1940s and the mid 1980s. The total number of nests per nesting season at Rancho Nuevo remained below 1,000 throughout the 1980s, but gradually began to increase in the 1990s. In 2009, 16,273 nests were documented along the 18.6 miles of coastline patrolled at Rancho Nuevo, and the total number of nests

documented for all the monitored beaches in Mexico was 21,144 (Service 2009). In 2010, a total of 13,302 nests were documented in Mexico (Service 2010). In addition, 207 and 153 nests were recorded during 2009 and 2010, respectively, in the U.S., primarily in Texas.

Status and distribution

Loggerhead Sea turtle

Five recovery units have been identified in the Northwest Atlantic based on genetic differences and a combination of geographic distribution of nesting densities, geographic separation, and geopolitical boundaries (NMFS and Service 2008). Recovery units are subunits of a listed species that are geographically or otherwise identifiable and essential to the recovery of the species. Recovery units are individually necessary to conserve genetic robustness, demographic robustness, important life history stages, or some other feature necessary for long-term sustainability of the species. The five recovery units identified in the Northwest Atlantic (**Figure 2**) are:

1. Northern Recovery Unit (NRU) - defined as loggerheads originating from nesting beaches from the Florida-Georgia border through southern Virginia (the northern extent of the nesting range);

2. Peninsula Florida Recovery Unit (PFRU) - defined as loggerheads originating from nesting beaches from the Florida-Georgia border through Pinellas County on the west coast of Florida, excluding the islands west of Key West, Florida;

3. Dry Tortugas Recovery Unit (DTRU) - defined as loggerheads originating from nesting beaches throughout the islands located west of Key West, Florida;

4. Northern Gulf of Mexico Recovery Unit (NGMRU) - defined as loggerheads originating from nesting beaches from Franklin County on the northwest Gulf coast of Florida through Texas; and

5. Greater Caribbean Recovery Unit (GCRU) - composed of loggerheads originating from all other nesting assemblages within the Greater Caribbean (Mexico through French Guiana, The Bahamas, Lesser Antilles, and Greater Antilles).

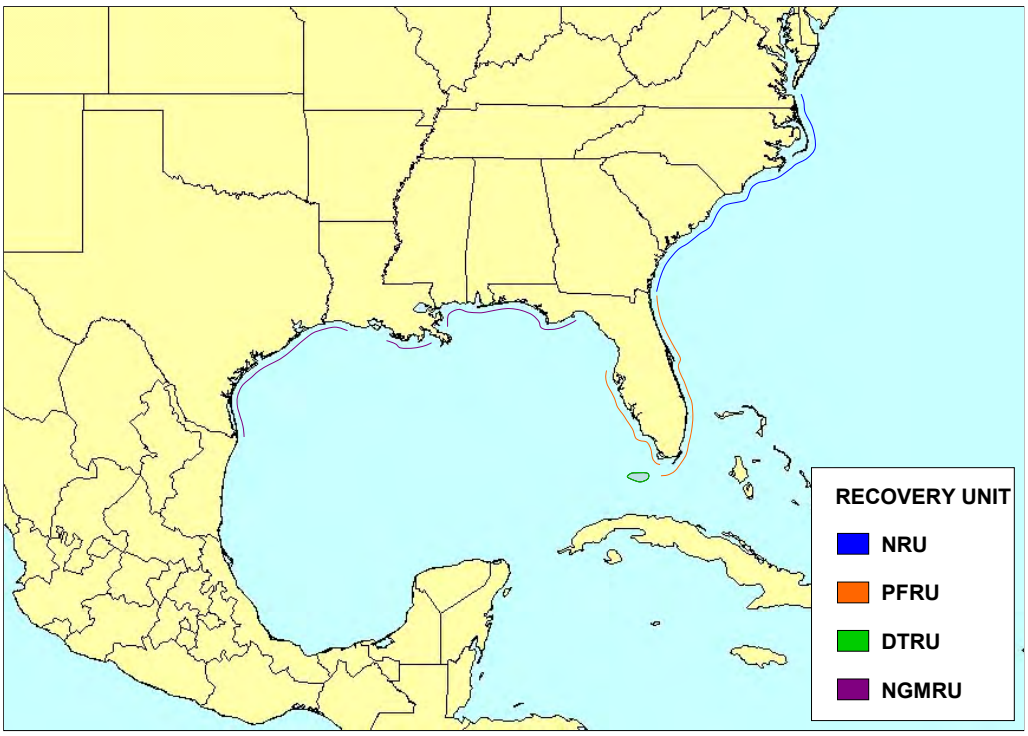

Figure 2. Map of the distribution of the loggerhead recovery units.

The mtDNA analyses show that there is limited exchange of females among these recovery units (Ehrhart 1989, Foote *et al.* 2000, NMFS 2001, Hawkes *et al.* 2005). Based on the number of haplotypes, the highest level of loggerhead mtDNA genetic diversity in the Northwest Atlantic has been observed in females of the GCRU that nest at Quintana Roo, Mexico (Encalada *et al.* 1999, Nielsen *et al*. 2012).

Nuclear DNA analyses show that there are no substantial subdivisions across the loggerhead nesting colonies in the southeastern U.S. Male-mediated gene flow appears to be keeping the subpopulations genetically similar on a nuclear DNA level (Francisco-Pearce 2001).

Historically, the literature has suggested that the northern U.S. nesting beaches (NRU and NGMRU) produce a relatively high percentage of males and the more southern nesting beaches (PFRU, DTRU, and GCRU) a relatively high percentage of females (e.g., Hanson *et al.* 1998, NMFS 2001, Mrosovsky and Provancha 1989). The NRU and NGMRU were believed to play an important role in providing males to mate with females from the more female-dominated subpopulations to the south. However, in 2002 and 2003, researchers studied loggerhead sex ratios

for two of the U.S. nesting subpopulations, the northern and southern subpopulations (NGU and PFRU, respectively) (Blair 2005, Wyneken *et al.* 2005). The study produced interesting results. In 2002, the northern beaches produced more females and the southern beaches produced more males than previously believed. However, the opposite was true in 2003 with the northern beaches producing more males and the southern beaches producing more females in keeping with prior literature. Wyneken *et al.* (2005) speculated that the 2002 result may have been anomalous; however, the study did point out the potential for males to be produced on the southern beaches. Although this study revealed that more males may be produced on southern recovery unit beaches than previously believed, the Service maintains that the NRU and NGMRU play an important role in the production of males to mate with females from the more southern recovery units.

The NRU is the second largest loggerhead nesting aggregation in the Northwest Atlantic. Annual nest totals from northern beaches averaged 5,215 nests from 1989-2008, a period of near-complete surveys of NRU nesting beaches (NMFS and Service 2008), representing approximately 1,272 nesting females per year (4.1 nests per female, Murphy and Hopkins 1984). The loggerhead nesting trend from daily beach surveys showed a significant decline of 1.3 percent annually. Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 1.9 percent annual decline in nesting in South Carolina since 1980. Overall, there is strong statistical data to suggest the NRU has experienced a long-term decline (NMFS and Service 2008).

The PFRU is the largest loggerhead nesting assemblage in the Northwest Atlantic. A near-complete nest census of the PFRU undertaken from 1989 to 2007 reveals a mean of 64,513 loggerhead nests per year representing approximately 15,735 females nesting per year (4.1 nests per female, Murphy and Hopkins 1984) (FWC 2008d). This near-complete census provides the best statewide estimate of total abundance, but because of variable survey effort, these numbers cannot be used to assess trends. Loggerhead nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time. In 1979, the Statewide Nesting Beach Survey (SNBS) program was initiated to document the total distribution, seasonality, and abundance of sea turtle nesting in Florida. In 1989, the INBS program was initiated in Florida to measure seasonal productivity, allowing comparisons between beaches and between years (FWC 2009b). Of the 190 SNBS surveyed areas, 33 participate in the INBS program (representing 30 percent of the SNBS beach length).

INBS nest counts from 1989–2010 show a shallow decline. However, recent trends (1998–2010) in nest counts have shown a 25 percent decline, with increases only observed in the most recent 6-year period, 2008–2013 although there was no trend observed (FWC/FWRI 2014). The analysis that reveals this decline uses nest-count data from 345 representative Atlantic-coast index zones (total length = 187 miles) and 23 representative zones on Florida's southern Gulf coast (total length = 14.3 miles). The spatial and temporal coverage (annually, 109 days and 368 zones) accounted for an average of 70 percent of statewide loggerhead nesting activity between 1989 and 2010.

The NGMRU is the third largest nesting assemblage among the four U.S. recovery units. Nesting surveys conducted on approximately 186 miles of beach within the NGMRU (Alabama and Florida only) were undertaken between 1995 and 2007 (statewide surveys in Alabama began in 2002). The mean nest count during this 13-year period was 906 nests per year, which equates to about 221 females nesting per year (4.1 nests per female, Murphy and Hopkins 1984; FWC 2008d). Evaluation of long-term nesting trends for the NGMRU is difficult because of changed and expanded beach coverage. Loggerhead nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time. There are 12 years (1997-2008) of Florida INBS data for the NGMRU (FWC 2008d). A log-linear regression showed a significant declining trend of 4.7 percent annually (NMFS and Service 2008).

The DTRU, located west of the Florida Keys, is the smallest of the identified recovery units. A near-complete nest census of the DTRU undertaken from 1995 to 2004, excluding 2002, (nine years surveyed) reveals a mean of 246 nests per year, which equates to about 60 females nesting per year (4.1 nests per female, Murphy and Hopkins 1984) (FWC 2008d). Surveys after 2004 did not include principal nesting beaches within the recovery unit (*i.e.*, Dry Tortugas National Park). The nesting trend data for the DTRU are from beaches that are not part of the INBS program, but are part of the SNBS program. There are nine years of data for this recovery unit. A simple linear regression accounting for temporal autocorrelation revealed no trend in nesting numbers. Because of the annual variability in nest totals, a longer time series is needed to detect a trend (NMFS and Service 2008).

The GCRU is composed of all other nesting assemblages of loggerheads within the Greater Caribbean. Statistically valid analyses of long-term nesting trends for the entire GCRU are not available because there are few long-term standardized nesting surveys representative of the region. Additionally, changing survey effort at monitored beaches and scattered and low-level nesting by loggerheads at many locations currently precludes comprehensive analyses. The most complete data are from Quintana Roo and Yucatán, Mexico, where an increasing trend was reported over a 15-year period from 1987-2001 (Zurita *et al.* 2003). However, since 2001, nesting has declined and the previously reported increasing trend appears not to have been sustained (NMFS and Service 2008). Other smaller nesting populations have experienced declines over the past few decades (e.g., Amorocho 2003).

Recovery Criteria (only the Demographic Recovery Criteria are presented below; for the Listing Factor Recovery Criteria, please see NMFS and Service 2008)

1. Number of Nests and Number of Nesting Females
   a. Northern Recovery Unit
      i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is 2 percent or greater resulting in a total annual number of nests of 14,000 or greater for this recovery unit (approximate distribution of nests is North Carolina =14 percent [2,000 nests], South Carolina =66 percent [9,200 nests], and Georgia =20 percent [2,800 nests]); and

ii. This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

b. Peninsular Florida Recovery Unit
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is statistically detectable (one percent) resulting in a total annual number of nests of 106,100 or greater for this recovery unit; and
   ii. This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

c. Dry Tortugas Recovery Unit
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is three percent or greater resulting in a total annual number of nests of 1,100 or greater for this recovery unit; and
   ii. This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

d. Northern Gulf of Mexico Recovery Unit
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is three percent or greater resulting in a total annual number of nests of 4,000 or greater for this recovery unit (approximate distribution of nests (2002-2007) is Florida= 92 percent [3,700 nests] and Alabama =8 percent [300 nests]); and
   ii. This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

e. Greater Caribbean Recovery Unit
   i. The total annual number of nests at a minimum of three nesting assemblages, averaging greater than 100 nests annually (e.g., Yucatán, Mexico; Cay Sal Bank, Bahamas) has increased over a generation time of 50 years; and
   ii. This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

2. Trends in Abundance on Foraging Grounds
   A network of in-water sites, both oceanic and neritic, across the foraging range is established and monitoring is implemented to measure abundance. There is statistical confidence (95 percent) that a composite estimate of relative abundance from these sites is increasing for at least one generation.

3. Trends in Neritic Strandings Relative to In-water Abundance
   Stranding trends are not increasing at a rate greater than the trends in in-water relative abundance for similar age classes for at least one generation.

The Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle was signed in 2008 (NMFS and Service 2008), and the Recovery Plan for U.S. Pacific Populations of the Loggerhead Turtle was signed in 1998 (NMFS and Service 1998e).

Green Sea Turtle

Annual nest totals documented as part of the Florida SNBS program from 1989-2008 have ranged from 435 nests laid in 1993 to 12,752 in 2007. The nest count for 2013 was more than twice the count from 2007 with a total of 36,195 nests recorded (http://myfwc.com/research/wildlife/sea-turtles/nesting/statewide/). Nesting occurs in 26 counties with a peak along the east coast, from Volusia through Broward Counties. Although the SNBS program provides information on distribution and total abundance statewide, it cannot be used to assess trends because of variable survey effort. Therefore, green turtle nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time (1989-2009). Green sea turtle nesting in Florida is increasing based on 19 years (1989-2009) of INBS data from throughout the state (FWC 2009a). The increase in nesting in Florida is likely a result of several factors, including: (1) a Florida statute enacted in the early 1970s that prohibited the killing of green turtles in Florida; (2) the species listing under the Act afforded complete protection to eggs, juveniles, and adults in all U.S. waters; (3) the passage of Florida's constitutional net ban amendment in 1994 and its subsequent enactment, making it illegal to use any gillnets or other entangling nets in State waters; (4) the likelihood that the majority of Florida green turtles reside within Florida waters where they are fully protected; (5) the protections afforded Florida green turtles while they inhabit the waters of other nations that have enacted strong sea turtle conservation measures (e.g., Bermuda); and (6) the listing of the species on Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which stopped international trade and reduced incentives for illegal trade from the U.S.

Recovery Criteria

The U.S. Atlantic population of green sea turtles can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The level of nesting in Florida has increased to an average of 5,000 nests per year for at least six years. Nesting data must be based on standardized surveys;

2. At least 25 percent (65 miles) of all available nesting beaches (260 miles) is in public ownership and encompasses at least 50 percent of the nesting activity;

3. A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds; and

4. All priority one tasks identified in the recovery plan have been successfully implemented.

The Recovery Plan for U.S. Population of Atlantic Green Turtle was signed in 1991 (NMFS and Service 1991), the Recovery Plan for U.S. Pacific Populations of the Green Turtle was signed in 1998 (NMFS and Service 1998b), and the Recovery Plan for U.S. Pacific Populations of the East Pacific Green Turtle was signed in 1998 (NMFS and Service 1998a).

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (historically estimated to be 65 percent of the worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200, and an upper limit of about 42,900. This is less than one-third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless action is taken to reduce adult mortality and increase survival of eggs and hatchlings.

In the U.S., nesting populations occur in Florida, Puerto Rico, and the U.S. Virgin Islands. In Florida, the SNBS program documented an increase in leatherback nesting numbers from 98 nests in 1988 to between 800 and 900 nests per season in the early 2000s (FWC 2009a, Stewart and Johnson 2006). Although the SNBS program provides information on distribution and total abundance statewide, it cannot be used to assess trends because of variable survey effort. Therefore, leatherback nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time (1989-2009). An analysis of the INBS data has shown a substantial increase in leatherback nesting in Florida since 1989 (FWC 2009b, TEWG Group 2007).

Recovery Criteria

The U.S. Atlantic population of leatherbacks can be considered for delisting if the following conditions are met:

1. The adult female population increases over the next 25 years, as evidenced by a statistically significant trend in the number of nests at Culebra, Puerto Rico, St. Croix, U.S. Virgin Islands, and along the east coast of Florida;

2. Nesting habitat encompassing at least 75 percent of nesting activity in U.S. Virgin Islands, Puerto Rico, and Florida is in public ownership; and.

3. All priority one tasks identified in the recovery plan have been successfully implemented.

The Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico was signed in 1992 (NMFS and Service 1992), and the Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle was signed in 1998 (NMFS and Service 1998d).

Hawksbill Sea Turtle

The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued declines are projected (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Hawksbills were previously abundant, as evidenced by high-density nesting at a few remaining sites and by trade statistics.

Recovery Criteria

The U.S. Atlantic population of hawksbills can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The adult female population is increasing, as evidenced by a statistically significant trend in the annual number of nests on at least five index beaches, including Mona Island and Buck Island Reef National Monument;

2. Habitat for at least 50 percent of the nesting activity that occurs in the U.S. Virgin Islands and Puerto Rico is protected in perpetuity;

3. Numbers of adults, subadults, and juveniles are increasing, as evidenced by a statistically significant trend on at least five key foraging areas within Puerto Rico, U.S. Virgin Islands, and Florida; and

4. All priority one tasks identified in the recovery plan have been successfully implemented.

The Recovery Plan for the Hawksbill Turtle in the U.S. Caribbean, Atlantic, and Gulf of Mexico was signed in 1993 (NMFS and Service 1993), and the Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle was signed in 1998 (NMFS and Service 1998c).

Kemp's Ridley Sea Turtle

Today, under strict protection, the population appears to be in the early stages of recovery. The recent nesting increase can be attributed to full protection of nesting females and their nests in Mexico resulting from a binational effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, and the requirement to use Turtle Excluder Devices (TEDs) in shrimp trawls both in the U.S. and Mexico.

The Mexico government also prohibits harvesting and is working to increase the population through more intensive law enforcement, by fencing nest areas to diminish natural predation, and by relocating most nests into corrals to prevent poaching and predation. While relocation of nests into corrals is currently a necessary management measure, this relocation and concentration of eggs into a "safe" area is of concern since it can reduce egg viability.

Recovery Criteria

The goal of the recovery plan is for the species to be reduced from endangered to threatened status. The Recovery Team members feel that the criteria for a complete removal of this species from the endangered species list need not be considered now, but rather left for future revisions of the plan. Complete removal from the federal list would certainly necessitate that some other instrument of protection, similar to the MMPA, be in place and be international in scope. Kemp's ridley can be considered for reclassification to threatened status when the following four criteria are met:

1. Continuation of complete and active protection of the known nesting habitat and the waters adjacent to the nesting beach (concentrating on the Rancho Nuevo area) and continuation of the bi-national protection project;

2. Elimination of mortality from incidental catch in commercial shrimping in the U.S. and Mexico through the use of TEDs and achievement of full compliance with the regulations requiring TED use;

3. Attainment of a population of at least 10,000 females nesting in a season; and

4. Successful implementation of all priority one recovery tasks in the recovery plan.

The Recovery Plan for the Kemp's Ridley Sea Turtle was signed in 1992 (Service and NMFS 1992). Significant new information on the biology and population status of Kemp's ridley has become available since 1992. Consequently, a full revision of the recovery plan has been completed by the Service and NMFS. The Bi-National Recover Plan for the Kemp's Ridley Sea

turtle (2011) provides updated species biology and population status information, objective and measurable recovery criteria, and updated and prioritized recovery actions.

Common threats to sea turtles in Florida

Anthropogenic factors that impact hatchlings and adult female turtles on land, or the success of nesting and hatching include: beach erosion; armoring and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants (*Solenopsis* spp.), feral hogs (*Sus scrofa*), dogs (*Canis familiaris),* and an increased presence of native species (e.g., raccoons (*Procyon lotor*), armadillos (*Dasypus novemcinctus*), and opossums (*Didelphis virginiana*)), which raid nests and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the western North Atlantic coast, other areas along these coasts have limited or no protection.

Anthropogenic threats in the marine environment include oil and gas exploration and transportation; marine pollution; underwater explosions; hopper dredging; offshore artificial lighting; power plant entrainment or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching and fishery interactions. On April 20, 2010, an explosion and fire on the Mobile Offshore Drilling Unit *Deepwater Horizon* MC252 occurred approximately 50 miles southeast of the Mississippi Delta. A broken well head at the sea floor resulted in a sustained release of oil, estimated at 35,000 and 60,000 barrels per day. On July 15, the valves on the cap were closed, which effectively shut in the well and all sub-sea containment systems. Damage assessment from the sustained release of oil is currently ongoing and the Service does not have a basis at the present time to predict the complete scope of effects to sea turtles range-wide.

Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor, particularly for green turtles. This disease has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die.

Analysis of the species/critical habitat likely to be affected

The threatened loggerhead sea turtle, the endangered green sea turtle, the endangered leatherback sea turtle, the endangered hawksbill sea turtle, and the endangered Kemp's ridley sea turtle are currently listed because of their reduced population sizes caused by overharvest and habitat loss with continuing anthropogenic threats from commercial fishing, disease, and degradation of remaining habitat. The proposed action has the potential to adversely affect nesting females of these species, their nests, and hatchlings on all nesting beaches where shore protection activities (including the placement of compatible sediment, repair or replacement of groins and jetties, and navigation channel maintenance on the beaches of the Atlantic and Gulf coasts of Florida) occur.

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment.

In accordance with the Act, the Service completes consultations with all Federal agencies for actions that may adversely affect sea turtles on the nesting beach. The Service's analysis only addresses activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS assesses and consults with Federal agencies concerning potential impacts to sea turtles in the marine environment, including updrift and downdrift nearshore areas affected by sand placement projects on the beach.

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment as a result of construction activities in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches; disorientation of hatchling turtles resulting from project lighting on beaches adjacent to the construction area as they emerge from the nest and crawl to the water; disorientation that occurs after project construction due to landward lights impacting the elevated berm; and behavior modification of nesting females due to escarpment formation within the project area during a nesting season resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. The quality of the placed sand could affect the ability of female turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion.

Some individuals in a population are more "valuable" than others in terms of the number of offspring they are expected to produce. An individual's potential for contributing offspring to future generations is its reproductive value. Because of delayed sexual maturity, reproductive longevity, and low survivorship in early life stages, nesting females are of high value to a population. The loss of a nesting female in a small recovery unit would represent a significant loss to the recovery unit. The reproductive value for a nesting female has been estimated to be approximately 253 times greater than an egg or a hatchling (NMFS and Service 2008). However, the SPBO includes avoidance and minimization measures that reduce the possibility of mortality of a nesting female on the beach as a result of the project. Therefore, we do not anticipate the loss of any nesting females on the beach as a result of the activities listed in this SPBO.

Sand placement projects are anticipated to result in decreased nesting and loss of nests that do get laid within the project area for two subsequent nesting seasons following the completion of the proposed sand placement. However, it is important to note that it is unknown whether nests that would have been laid in a project area during the two subsequent nesting seasons had the project not occurred are actually lost from the population or if nesting is simply displaced to adjacent beaches. Regardless, eggs and hatchlings have a low reproductive value; each egg or hatchling has been estimated to have only 0.004 percent of the value of a nesting female (NMFS and Service

2008). Thus, even if the majority of the eggs and hatchlings that would have been produced on the project beach are not realized for up to 2 years following project completion, the Service would not expect this loss to have a significant effect on the recovery and survival of the species, for the following reasons: 1) some nesting is likely just displaced to adjacent non-project beaches, 2) not all eggs will produce hatchlings, and 3) destruction and/or failure of nests will not always result from a sand placement project. A variety of natural and unknown factors negatively affect incubating egg clutches, including tidal inundation, storm events, and predation.

During project construction, direct mortality of the developing embryos in nests within the project area may occur for nests that are missed and not relocated. The exact number of these missed nests is not known. However, in two separate monitoring programs on the east coast of Florida where hand digging was performed to confirm the presence of nests and thus reduce the chance of missing nests through misinterpretation, trained observers still missed about 6 to 8 percent of the nests because of natural elements (Martin 1992, Ernest and Martin 1993). This must be considered a conservative number, because nests missed during surveys are not always discovered after hatching. In another study, Schroeder (1994) found that even under the best of conditions, about 7 percent of nests can be misidentified as false crawls by highly experienced sea turtle nest surveyors. Missed nests are usually identified by signs of hatchling emergences in areas where no nest was previously documented. Signs of hatchling emergence are very easily obliterated by the same elements that interfere with detection of nests.

In the U.S., consultations with the Service have included military missions and operations, beach nourishment and other shoreline protection projects, and actions related to protection of coastal development on sandy beaches along the coast. Much of the Service's section 7 consultation involves beach nourishment projects. A list of the Service's consultations completed over the last 5 years is included in Appendix A. The Act does not require entities conducting projects with no Federal nexus to apply for a section 10(a)(1)(B) permit. This is a voluntary process and is applicant driven. Section 10(a)(1)(A) permits are scientific permits that include activities that would enhance the survival and conservation of a listed species. Those permits are not listed as they are expected to benefit the species and are not expected to contribute to the cumulative take assessment.

A list of completed NMFS consultations is included in Appendix B.

ENVIRONMENTAL BASELINE

Status of the species/critical habitat within the action area

INBS nest counts represent approximately 69 percent of known loggerhead nesting in Florida, 74 percent of known green turtle nesting, and 34 percent of known leatherback nesting (FWC 2009a). The INBS program was established with a set of standardized data-collection criteria to measure seasonal nesting, and to allow accurate comparisons between both beaches and years. The reliability of these comparisons results from the uniformity of beach-survey effort in space and time, and from the specialized annual training of beach surveyors. Under the core INBS program,

178 miles of nesting beach have been divided into zones, known as core index zones, averaging 0.5 mile in length. These beaches are monitored daily beginning May 15 and ending August 31. On all index beaches, researchers record nests and nesting attempts by species, the location of each nest, and the date each nest was laid.

Nesting surveys begin at or just before sunrise. Turtle crawls are identified as a true nesting crawl or false crawl (*i.e.*, nonnesting emergence). Nests are marked with stakes and some are surrounded with surveyor flagging tape and, if needed, screened or caged to prevent predation. The marked nests are monitored throughout the incubation period for storm damage, predation, hatching activity and hatching and emerging success. Nest productivity surveys may continue into mid-November depending on nest incubation periods. All monitoring is conducted in accordance with the FWC's Marine Turtle Conservation Guidelines.

Loggerhead Sea Turtle

Five loggerhead sea turtle recovery units have been identified in the Northwest Atlantic (NMFS and Service 2008). Mitochondrial DNA analyses show that there is limited exchange of females among these recovery units (Foote *et al*. 2000, NMFS 2001, Hawkes *et al*. 2005). However, nuclear DNA analyses show that there are no substantial subdivisions across the loggerhead nesting colonies in the southeastern U.S. Male-mediated gene flow appears to be keeping the subpopulations genetically similar on a nuclear DNA level (Francisco-Pearce 2001). The NRU and NGMRU are believed to play an important role in providing males to mate with females from the more female-dominated recovery units.

Two (NGMRU and PFRU) of the five nesting subpopulations occur within the proposed Action Area. Northwest Florida, which accounts for 92 percent of the NGMRU in nest numbers, consists of approximately 234 miles of nesting shoreline. The PFRU makes up 1,166 miles of shoreline and consists of approximately was 69,982 nests per year (2008 to 2012)..

Recovery Units	**Nesting Range**
NGMRU	Escambia through Franklin Counties
PFRU	Pinellas through Nassau Counties

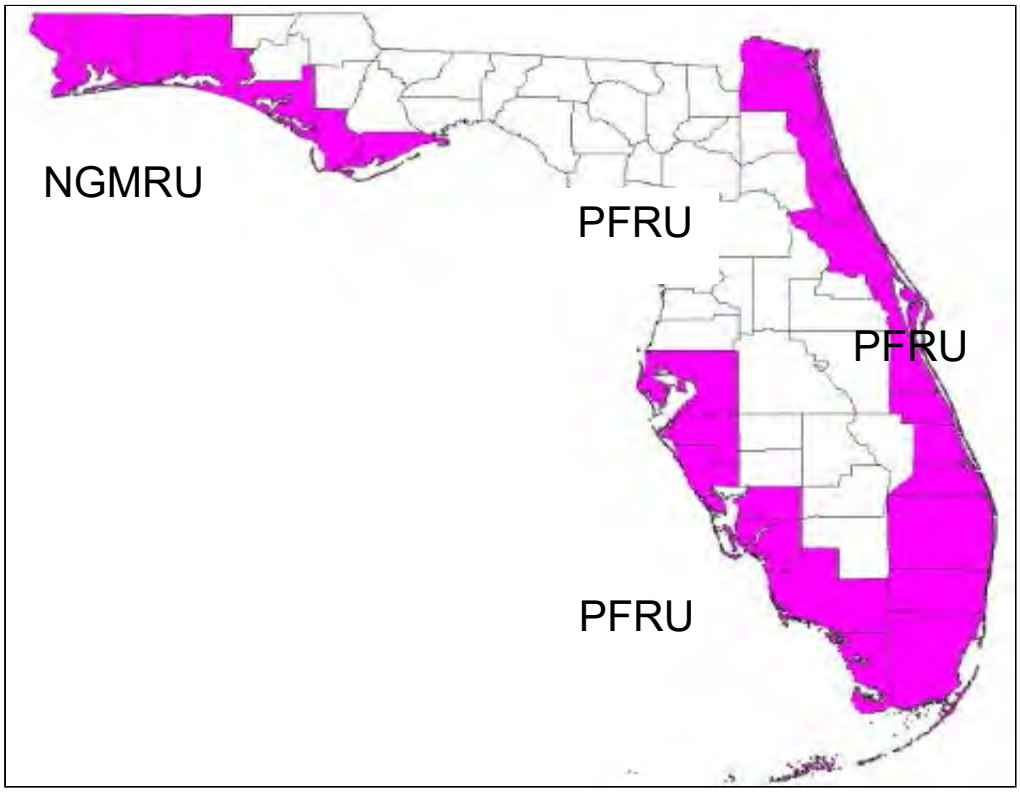

Figure 3. Distribution of loggerhead sea nesting in the PFRU and NGMRU in Florida.

The main loggerhead sea turtle nesting and hatching season throughout Florida is shown in **Table 5.**

Table 6. Loggerhead sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 1 through October 31
Southern Gulf of Mexico	Pinellas through Monroe	April 1 through November 30
Southern Florida Atlantic	Brevard through Miami-Dade	March 1 through November 30
Northern Florida Atlantic	Nassau through Volusia	April 15 through November 30

An updated analysis by FWC/FWRI reveals a shallow decline in loggerhead nest numbers around the State of Florida based on INBS nest counts from 1989 through 2010 (FWC/FWRI 2010). Analysis of nest counts over the last six years (2009 through 2013) have found no trend, although when added to the data from 1989, the overall change is an increase in loggerhead nests since 1989 (FWC/FWRI 2014). The five year average (2008 to2012) for the PFRU was 69,982 nests. The five-year average (2008 to 2012) for the NGMRU was 966 nests.

Sea turtles play a vital role in maintaining healthy and productive ecosystems. Nesting sea turtles introduce large quantities of nutrients from the marine ecosystem to the beach and dune system (Bouchard and Bjorndal 2000). In the U.S., loggerheads play a particularly important role in this regard due to their greater nesting numbers. The nutrients they leave behind on the nesting beaches in the form of eggs and eggshells play an important role for dune vegetation and terrestrial predator populations (Bouchard and Bjorndal 2000). In a study at Melbourne Beach, Florida, Bouchard and Bjorndal (2000) estimated that only 25 percent of the organic matter introduced into nests by loggerheads returned to the ocean as hatchlings. They found that 29-40 percent of all nutrients were made available to detritivores, decomposers, and plants, while 26-31 percent of all nutrients were consumed by nest predators. Thus, all loggerhead recovery units play a vital role in the maintenance of a healthy beach and dune ecosystem within their geographic distribution.

Green Sea Turtle

Green turtle nest numbers are increasing in Florida with a record number of nests being recorded during the 2013 season (FWC 2014). The five year average (2008 to 2012) for green turtles within the action area was 10,384 nests. The number of green turtle nests recorded in Florida during the 2013 nesting season was a record high of 36,195.

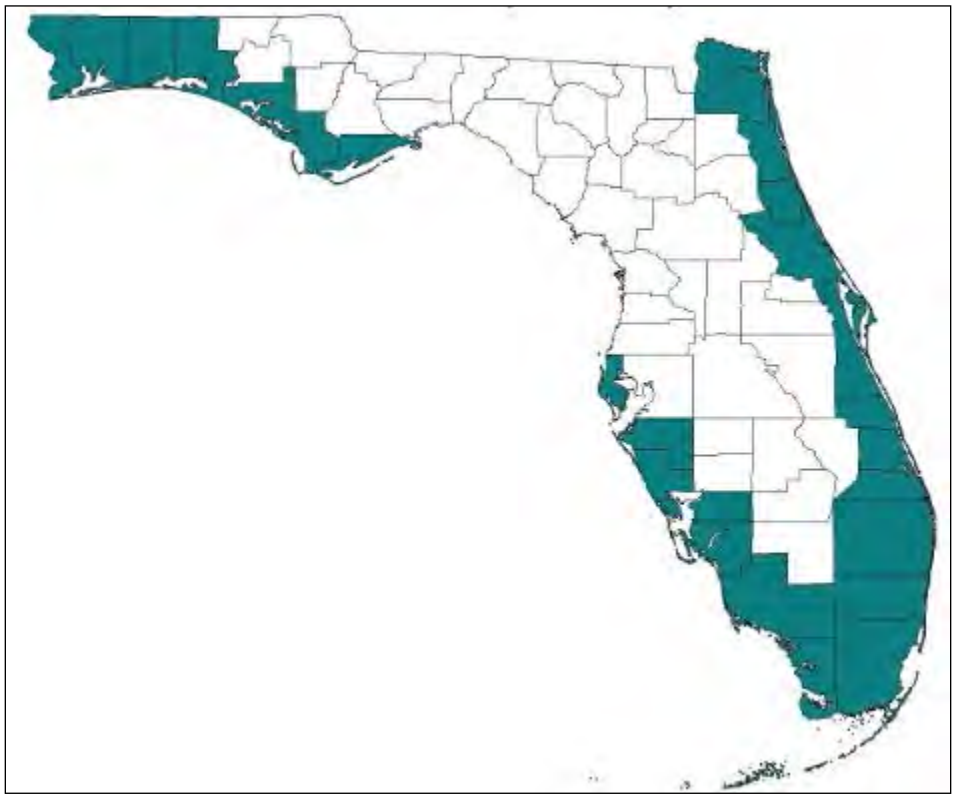

Figure 4. Distribution of green sea turtle nesting in Florida.

The main green sea turtle nesting and hatching season throughout Florida is shown in **Table 6**.

Table 7. Green sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 15 through October 31
Southern Gulf of Mexico	Pinellas through Monroe	May 15 through October 31
Southern Florida Atlantic	Brevard through Miami-Dade	May 1 through November 30
Northern Florida Atlantic	Nassau through Volusia	May 15 through November 15

Leatherback Sea Turtle

Leatherback nest numbers are increasing in Florida with a record number of leatherback nests recorded during the 2009 season (FWC 2009a). The five year average (2008 to 2012) for leatherback sea turtles within the action area was 1,435 nests with a total of 896 nests recorded in 2013.

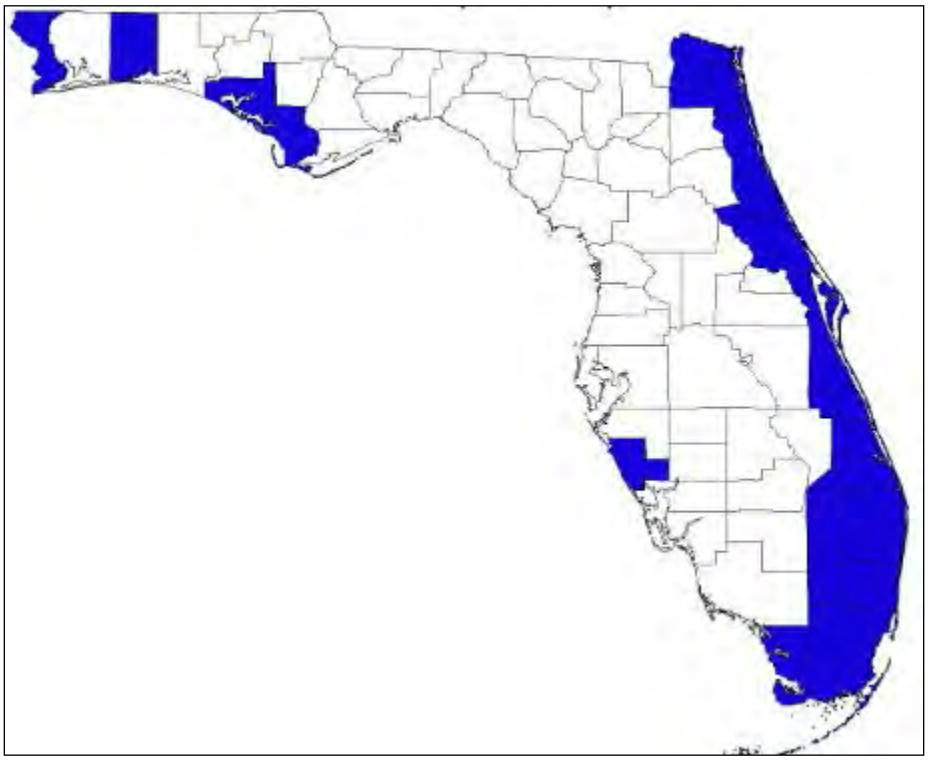

Figure 5. Distribution of leatherback sea turtle nesting in Florida.

The main leatherback sea turtle nesting and hatching season throughout Florida is shown in **Table 7**.

Table 8. Leatherback sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 1 through September 30
Southern Florida Atlantic	Brevard through Miami-Dade	February 15 through November 30
Northern Florida Atlantic	Nassau through Volusia	April 15 through September 30

Hawksbill Sea Turtle

Forty-six hawksbill nests have been documented in Florida from 1979-2013 in Volusia, Martin, Palm Beach, Broward, Miami-Dade, Monroe, and Manatee counties (FWC/FWRI 2014a). The hawksbill sea turtle nesting and hatching season throughout Florida is shown in **Table 8**.

Table 9. Hawksbill sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Southern tip of Florida	Monroe	June 1 through December 31
Southern Florida Atlantic	Brevard through Miami-Dade	June 1 through December 31
Northeast Florida	Volusia	June 1 through December 31
Southwest Florida	Manatee	June 1 through December 31

Kemp's Ridley Sea Turtle

Eighty Kemp's ridley nests have been documented in Florida from 1979-2013 in Duval, Flagler, Volusia, Brevard, Martin, Palm Beach, Lee, Charlotte, Sarasota, Pinellas, Franklin, Gulf, Walton, Okaloosa, Santa Rosa, and Escambia counties (FWC/FWRI 2014).

Factors affecting species habitat within the action area

In accordance with the Act, the Service completes consultations with all federal agencies for actions that may adversely affect sea turtles. In Florida, consultations have included military missions and operations, beach nourishment and other shoreline protection, and actions related to protection of coastal development on sandy beaches of Florida's Atlantic Coast (Key West to

Fernandina/Kings Bay) and the Gulf Coast (Ten Thousand Islands to Alabama State Line) (**Appendix A**).

Coastal Development

Loss of nesting habitat related to coastal development has had the greatest impact on nesting sea turtles in Florida. Beachfront development not only causes the loss of suitable nesting habitat, but can result in the disruption of powerful coastal processes accelerating erosion and interrupting the natural shoreline migration (National Research Council 1990b). This may in turn cause the need to protect upland structures and infrastructure by armoring, groin placement, beach emergency berm construction and repair, and beach nourishment which cause changes in, additional loss of, or impact to, the remaining sea turtle habitat.

Hurricanes

Hurricanes were probably responsible for maintaining coastal beach habitat upon which sea turtles depend through repeated cycles of destruction, alteration, and recovery of beach and dune habitat. Hurricanes generally produce damaging winds, storm tides and surges, and rain, which can result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes and other storms can result in the direct or indirect loss of sea turtle nests, either by erosion or washing away of the nests by wave action, inundation or "drowning" of the eggs or hatchlings developing within the nest or indirectly by loss of nesting habitat. Depending on their frequency, storms can affect sea turtles on either a short-term basis (nests lost for one season and/or temporary loss of nesting habitat) or long term, if frequent (habitat unable to recover). How hurricanes affect sea turtle nesting also depends on its characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where the northeast edge of the hurricane crosses land.

Because of the limited remaining nesting habitat in a natural state with no development landward of the sandy beach, frequent or successive severe weather events could threaten the ability of certain sea turtle populations to survive and recover. Sea turtles evolved under natural coastal environmental events such as hurricanes. The extensive amount of predevelopment coastal beach and dune habitat allowed sea turtles to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes has increased the threat to sea turtle survival and recovery. On developed beaches, typically little space remains for sandy beaches to become reestablished after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their prestorm locations can result in a loss of nesting habitat.

The 2004 hurricane season was the most active storm season in Florida since weather records began in 1851. Hurricanes Charley, Frances, Ivan, and Jeanne, along with Tropical Storm Bonnie, damaged the beach and dune system, upland structures and properties, and infrastructure in the

majority of Florida's coastal counties. The cumulative impact of these storms exacerbated erosion conditions throughout the state.

The 2005 hurricane season was a record-breaking season with 27 named storms. Hurricanes Dennis, Katrina, Ophelia, Rita, and Wilma, and Tropical Storms Arlene and Tammy impacted Florida. The cumulative impact of these storms exacerbated erosion conditions in south and northwest Florida.

A common question is whether the 2004 and 2005 hurricane seasons contributed to reduced loggerhead nest numbers observed from 2004-2007. Although Florida has been subject to numerous hurricanes in recent years, these storm events cannot account for the recent decline (1998-2010) observed in the number of loggerhead nests on Florida beaches. The hurricanes have a very limited effect on nesting activity of adult female turtles. Because loggerheads that hatch on Florida beaches require some 20 to 30 years to reach maturity, storm impacts would not manifest themselves for many years. Moreover, hurricane impacts to nests tend to be localized and often occur after the main hatching season for the loggerhead is over (FWC 2008a).

Erosion

The designation of a Critically Eroded Beach is a planning requirement of the State's Beach Management Funding Assistance Program http://www.dep.state.fl.us/beaches/programs/becp/index.htm. A segment of beach shall first be designated as critically eroded in order to be eligible for State funding. A critically eroded area is a segment of shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded areas may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects (FDEP 2009). It is important to note, that for an erosion problem area to be critical, there shall exist a threat to or loss of one of four specific interests – upland development, recreation, wildlife habitat, or important cultural resources.

Beachfront Lighting

Artificial beachfront lighting may cause disorientation (loss of bearings) and misorientation (incorrect orientation) of sea turtle hatchlings. Visual signs are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). Artificial beachfront lighting is a documented cause of hatchling disorientation and misorientation on nesting beaches (Philibosian 1976, Mann 1977, Witherington and Martin 1996). The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not make it to the sea quickly become food for ghost crabs, birds, and other predators, or become dehydrated and may never reach the sea. Some types of beachfront lighting attract hatchlings away from the sea while some lights cause adult turtles to avoid stretches of brightly illuminated beach. Research has

documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington 1992). During the 2007 to 2010 sea turtle nesting seasons in Florida, turtle hatchlings that were documented as being disoriented ranged from 44,828 to more than 64,000 hatchlings per year (**Table 9**) (FWC/FWRI 2014b). Exterior and interior lighting associated with condominiums had the greatest impact causing approximately 42 percent of documented hatchling disorientation/misorientation. Other causes included urban sky glow and street lights (FWC 2007a).

Table 10. Documented disorientations along the Florida coast (FWC 2007a).

Year	Total Number of Hatchling Disorientation Events	Total Number of Hatchlings Involved in Disorientation Events	Total Number of Adult Disorientation Events
2001	743	28,674	19
2002	896	43,226	37
2003	1,446	79,357	18
2004	888	46,487	24
2005	976	41,521	50
2006	1,521	71,798	40
2007	1,410	64,433	25
2008	1,192	49,623	62
2009	1,274	44,828	42
2010	1,513	46,978	82

Predation

Predation of sea turtle eggs and hatchlings by native and introduced species occurs on almost all nesting beaches. Predation by a variety of predators can considerably decrease sea turtle nest hatching success. The most common predators in the southeastern U.S. are ghost crabs (*Ocypode quadrata*), raccoons, feral hogs, foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), coyotes (*Canis latrans*), armadillos, and fire ants (Dodd 1988, Stancyk 1995). In the absence of nest protection programs in a number of locations throughout the southeast U.S., raccoons may depredate up to 96 percent of all nests deposited on a beach (Davis and Whiting 1977, Hopkins and Murphy 1980, Stancyk *et al.* 1980, Talbert *et al.* 1980, Schroeder 1981, Labisky *et al.* 1986). In response to increasing predation of sea turtle nests by coyotes, foxes, hogs, and raccoons, multi-agency cooperative efforts have been initiated and are ongoing throughout Florida, particularly on public lands.

Driving on the Beach

The operation of motor vehicles on the beach affects sea turtle nesting by interrupting or striking a female turtle on the beach, headlights disorienting or misorienting emergent hatchlings, vehicles running over nests or hatchlings attempting to reach the ocean, and vehicle tracks traversing the beach which interfere with hatchlings crawling to the ocean. Hatchlings appear to become diverted not because they cannot physically climb out of the rut (Hughes and Caine 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann 1977). The extended period of travel required to negotiate tire tracks and ruts may increase the susceptibility of hatchlings to dehydration and depredation during migration to the ocean (Hosier *et al.* 1981). Driving on the beach can cause sand compaction which may result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings, decreasing nest success and directly killing preemergent hatchlings (Mann 1977, Nelson and Dickerson 1987, Nelson 1988).

The physical changes and loss of plant cover caused by vehicles on dunes can lead to various degrees of instability, and therefore encourage dune migration. As vehicles move either up or down a slope, sand is displaced downward. Since the vehicles also inhibit plant growth, and open the area to wind erosion, dunes may become unstable, and begin to migrate. Unvegetated sand dunes may continue to migrate across stable areas as long as vehicle traffic continues. Vehicular traffic through dune breaches or low dunes on an eroding beach may cause an accelerated rate of overwash and beach erosion (Godfrey *et al.* 1978). If driving is required, the area where the least amount of impact occurs is the beach between the low and high tide water lines. Vegetation on the dunes can quickly reestablish provided the mechanical impact is removed.

In 1985, the Florida Legislature severely restricted vehicular driving on Florida's beaches, except that which is necessary for cleanup, repair, or public safety. This legislation also allowed an exception for five counties to continue to allow vehicular access on coastal beaches due to the availability of less than 50 percent of its peak user demand for off-beach parking. The counties affected by this exception are Volusia, St. Johns, Gulf, Nassau, and Flagler Counties, as well as limited vehicular access on Walton County beaches for boat launching.

Climate Change

The varying and dynamic elements of climate science are inherently long term, complex, and interrelated. Regardless of the underlying causes of climate change, glacial melting and expansion of warming oceans are causing sea level rise, although its extent or rate cannot as yet be predicted with certainty. At present, the science is not exact enough to precisely predict when and where climate impacts will occur. Although we may know the direction of change, it may not be possible to predict its precise timing or magnitude. These impacts may take place gradually or episodically in major leaps.

Climate change is evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level, according to the Intergovernmental Panel on Climate Change Report (IPCC 2007a). The IPCC Report (2007a) describes changes in natural ecosystems with potential widespread effects on many organisms,

including marine mammals and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the U.S. Department of the Interior (DOI) requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007c).

Climatic changes in Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management. Global warming will be a particular challenge for endangered, threatened, and other "at risk" species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006). As the level of information increases relative to the effects of global climate change on sea turtles and its designated critical habitat, the Service will have a better basis to address the nature and magnitude of this potential threat and will more effectively evaluate these effects to the range-wide status of sea turtles.

Florida is one of the areas most vulnerable to the consequences of climate change. Sea level rise and the possibility of more intense hurricanes are the most serious threats to Florida potentially from climate change. Florida has over 1,350 miles of coastline, low-lying topography, and proximity to the hurricane-prone subtropical mid-Atlantic Ocean and Gulf of Mexico.

One of the most serious threats to Florida's coasts comes from the combination of elevated sea levels and intense hurricanes. Florida experiences more landings of tropical storms and hurricanes than any other state in the U.S. Storm surges due to hurricanes will be on top of elevated sea levels, tides, and wave action. As a result, barrier islands and low-lying areas of Florida will be more susceptible to the effects of storm surge. An important element of adaptation strategy is how to protect beaches, buildings and infrastructure against the effects of rising seas and wind, wave action, and storm surge due to hurricanes while maintaining viable nesting habitat along Florida's coasts.

Temperatures are predicted to rise from 1.6^{o}F to 9°F for North America by the end of this century (IPCC 2007a,b). Alterations of thermal sand characteristics could result in highly female-biased sex ratios because sea turtles exhibit temperature dependent sex determination (e.g., Glen and Mrosovsky 2004, Hawkes *et al*. 2008).

Along developed coastlines, and especially in areas where shoreline protection structures have been constructed to limit shoreline movement, rising sea levels will cause severe effects on nesting females and their eggs. Erosion control structures can result in the permanent loss of dry nesting beach or deter nesting females from reaching suitable nesting sites (National Research Council

1990a). Nesting females may deposit eggs seaward of the erosion control structures potentially subjecting them to repeated tidal inundation or washout by waves and tidal action.

Based on the present level of available information concerning the effects of global climate change on the status of sea turtles and their designated critical habitat, the Service acknowledges the potential for changes to occur in the action area, but presently has no basis to evaluate if or how these changes are affecting sea turtles or their designated critical habitat. Nor does our present knowledge allow the Service to project what the future effects from global climate change may be or the magnitude of these potential effects.

EFFECTS OF THE ACTION

This section is an analysis of the beneficial, direct, and indirect effects of the proposed actions on nesting sea turtles, nests, eggs, and hatchling sea turtles within the Action Area. The analysis includes effects interrelated and interdependent of the project activities. An interrelated activity is an activity that is part of a proposed action and depends on the proposed activity. An interdependent activity is an activity that has no independent utility apart from the action.

Factors to be considered

The proposed projects will occur within habitat that is used by sea turtles for nesting and may be constructed during a portion of the sea turtle nesting season. Long-term and permanent impacts could include a change in the nest incubation environment from the sand placement activities. Short-term and temporary impacts to sea turtle nesting activities could result from project work occurring on the nesting beach during the nesting or hatching period, from changes in the physical characteristics of the beach from the placement of the sand including the profile and from sediment-induced changes in the nest incubation environment.

Proximity of action: Sand placement activities would occur within and adjacent to nesting habitat for sea turtles and dune habitats that ensure the stability and integrity of the nesting beach. Specifically, the project would potentially impact loggerhead, green, leatherback, hawksbill, and Kemp's ridley nesting females, their nests, nesting habitat, and hatchling sea turtles.

Distribution: Sand placement activities that may impact nesting and hatchling sea turtles and sea turtle nests would occur along Gulf of Mexico and Atlantic Ocean coasts.

Timing: The timing of the sand placement activities could directly and indirectly impact nesting females, their nests, and hatchling sea turtles when conducted between March 1 and November 30.

Nature of the effect: The effects of the sand placement activities may change the nesting behavior of adult female sea turtles, diminish nesting success, and reduce hatching and emerging success. Sand placement can also change the incubation conditions within the nest. Any decrease in productivity and/or survival rates would contribute to the vulnerability of the sea turtles nesting in Florida.

Duration: The sand placement activity may be a one-time activity or a multiple-year activity and each sand placement project may take between three and seven months to complete. Thus, the direct effects would be expected to be short-term in duration. Indirect effects from the activity may continue to impact nesting and hatchling sea turtles and sea turtle nests in subsequent nesting seasons.

Disturbance frequency: Sea turtle populations in Florida may experience decreased nesting success, hatching success, and hatchling emergence success that could result from the sand placement activities being conducted at night during one nesting season, or during the earlier or later parts of two nesting seasons. Disturbance due to alterations of the incubation substrate and beach profile could persist for several years, depending on continued presence of placed sand in the nesting beach.

Disturbance intensity and severity: Depending on the amount (including post-disaster work) and the timing of the sand placement activities during sea turtle nesting season, effects to the sea turtle populations of Florida, and potentially the U.S. populations, could be important.

Analyses for effects of the action

Beneficial Effects

The placement of sand on a beach with reduced dry foredune habitat may increase sea turtle nesting habitat if the placed sand is highly compatible (*i.e.*, grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may benefit sea turtles more than an eroding beach it replaces.

Adverse Effects

Through many years of research, it has been documented that beach nourishment can have adverse effects on nesting female sea turtles and hatchlings and sea turtle nests. Results of monitoring sea turtle nesting and beach nourishment activities provide additional information on how sea turtles respond to nourished beaches, minimization measures, and other factors that influence nesting, hatching, and emerging success. Science-based information on sea turtle nesting biology and review of empirical data on beach nourishment monitoring is used to manage beach nourishment activities to eliminate or reduce impacts to nesting and hatchling sea turtles and sea turtle nests so that beach nourishment can be accomplished. Measures can be incorporated pre-, during, and post-construction to reduce impacts to sea turtles. Because of the long history of sea turtle monitoring in Florida, it is not necessary to require studies on each project beach to document those effects each time.

Direct Effects

Direct effects are those direct or immediate effects of a project on the species or its habitat. Placement of sand on a beach in and of itself may not provide suitable nesting habitat for sea turtles. Although sand placement activities may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Sand placement activities during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about seven percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

Nest relocation

Besides the potential for missing nests during surveys and a nest relocation program, there is a potential for eggs to be damaged by nest movement or relocation, particularly if eggs are not relocated within 12 hours of deposition (Limpus *et al.* 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al.* 1979, Ackerman 1980, Parmenter 1980, Spotila *et al.* 1983, McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al.* 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard *et al.* 1985), hatchling size (Packard *et al.* 1981, McGehee 1990), energy reserves in the yolk at hatching (Packard *et al.* 1988), and locomotory ability of hatchlings (Miller *et al.* 1987).

In a 1994 Florida study comparing loggerhead hatching and emerging success of relocated nests with nests left in their original location, Moody (1998) found that hatching success was lower in relocated nests at nine of 12 beaches evaluated. In addition, emerging success was lower in relocated nests at 10 of 12 beaches surveyed in 1993 and 1994. Many of the direct effects of beach nourishment may persist over time. These direct effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, repair/replacement of groins and jetties and future sand migration.

Equipment

The use of heavy machinery on beaches during a construction project may also have adverse effects on sea turtles. Equipment left on the nesting beach overnight can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure.

The operation of motor vehicles or equipment on the beach to complete the project work at night affects sea turtle nesting by: interrupting or colliding with a female turtle on the beach; headlights disorienting or misorienting emergent hatchlings; vehicles running over nesting females or hatchlings attempting to reach the ocean, and vehicle tracks traversing the beach interfering with hatchlings crawling to the ocean. Apparently, hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann 1977). The extended period of travel required to negotiate tire tracks and ruts may increase the susceptibility of hatchlings to dehydration and depredation during migration to the ocean (Hosier *et al*. 1981). Driving directly above or over incubating egg clutches or on the beach can cause sand compaction which may result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings, decreasing nest success and directly killing preemergent hatchlings (Mann 1977, Nelson and Dickerson 1987, Nelson 1988).

Depending on when the dune project is completed, dune vegetation may have become established in the vicinity of dune restoration sites. The physical changes and loss of plant cover caused by vehicles on vegetated areas or dunes can lead to various degrees of instability and cause dune migration. As vehicles move over the sand, sand is displaced downward, lowering the substrate. Since the vehicles also inhibit plant growth, and open the area to wind erosion, the beach and dunes may become unstable. Vehicular traffic on the beach or through dune breaches or low dunes may cause acceleration of overwash and erosion (Godfrey *et al.* 1978). Driving along the beachfront should be limited to between the low and high tide water lines. To minimize the impacts to the beach and recovering dunes, transport and access to the dune restoration sites should be from the road. However, if the work needs to be conducted from the beach, work areas for the truck transport and bulldozer/bobcat equipment should be designated and marked.

Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and Bjorndal 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean (Philibosian 1976, Mann 1977, FWC 2007a). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches.

The newly created wider and flatter beach berm exposes sea turtles and their nests to lights that were less visible, or not visible, from nesting areas before the sand placement activity leading to a higher mortality of hatchlings. Review of over 10 years of empirical information from beach nourishment projects indicates that the number of sea turtles impacted by lights increases on the post-construction berm. A review of selected nourished beaches in Florida (South Brevard, North Brevard, Captiva Island, Ocean Ridge, Boca Raton, Town of Palm Beach, Longboat Key, and Bonita Beach) indicated disorientation reporting increased by approximately 300 percent the first nesting season after project construction and up to 542 percent the second year compared to prenourishment reports (Trindell *et al.* 2005).

Specific examples of increased lighting disorientations after a sand placement project include Brevard and Palm Beach Counties, Florida. A sand placement project in Brevard County, completed in 2002, showed an increase of 130 percent in disorientations in the nourished area. Disorientations on beaches in the County that were not nourished remained constant (Trindell 2007). This same result was also documented in 2003 when another beach in Brevard County was nourished and the disorientations increased by 480 percent (Trindell 2007). Installing appropriate beachfront lighting is the most effective method to decrease the number of disorientations on any developed beach including nourished beaches. A shoreline protection project was constructed at Ocean Ridge in Palm Beach County, Florida, between August 1997 and April 1998. Lighting disorientation events increased after nourishment. In spite of continued aggressive efforts to identify and correct lighting violations in 1998 and 1999, 86 percent of the disorientation reports were in the nourished area in 1998 and 66 percent of the reports were in the nourished area in 1999 (Howard and Davis 1999).

While the effects of artificial lighting have not been specifically studied on each beach that is nourished in Florida, based on the experience of increased artificial lighting disorientations on other Florida beaches, impacts are expected to potentially occur on all nourished beaches statewide.

Changing to sea turtle compatible lighting can be easily accomplished at the local level through voluntary compliance or by adopting appropriate regulations. Of the 27 coastal counties in Florida where sea turtles are known to nest, 21 have passed beachfront lighting ordinances in addition to 58 municipalities (http://myfwc.com/media/418420/seaturtle_lightordmap.pdf). Local governments have realized that adopting a lighting ordinance is the most effective method to address artificial lighting along the beachfront.

Indirect Effects

Indirect effects are those effects that are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Effects from the proposed project may continue to affect sea turtle nesting on the project beach and adjacent beaches in future years.

Increased susceptibility to catastrophic events

Nest relocation within a nesting season may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn 1998, Wyneken *et al.* 1998).

Increased beachfront development

Pilkey and Dixon (1996) stated that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also noted that the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami during 1982, investment in new and updated facilities substantially increased tourism there (National Research Council 1995). Increased building density immediately adjacent to the beach often resulted as much larger buildings that accommodated more beach users replaced older buildings. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (National Research Council 1990a), and can also result in greater adverse effects due to artificial lighting, as discussed above.

Changes in the physical environment

Beach nourishment may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and hatchling emergence (Nelson and Dickerson 1987, Nelson 1988).

Beach nourishment projects create an elevated, wider, and unnatural flat slope berm. Sea turtles nest closer to the water the first few years after nourishment because of the altered profile (and perhaps unnatural sediment grain size distribution) (Ernest and Martin 1999, Trindell 2005) (**Figure 6**).

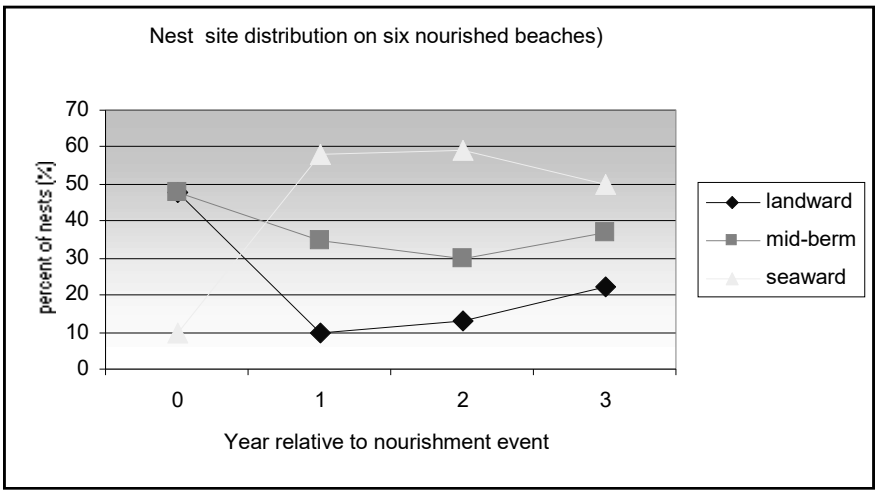

Figure 6. Review of sea turtle nesting site selection following nourishment (Trindell 2005).

Beach compaction and unnatural beach profiles resulting from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al.* 1987, Nelson and Dickerson 1988a). Significant reductions in nesting success (*i.e.*, false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980, Raymond 1984, Nelson and Dickerson 1987, Nelson *et al.* 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and cause increased physiological stress to the animals (Nelson and Dickerson 1988b). Nelson and Dickerson (1988c) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

These impacts can be minimized by using suitable sand and by tilling (minimum depth of 36 inches) compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to one year. Multi-year beach compaction monitoring and, if necessary, tilling would ensure that project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments should resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to

lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

Escarpment formation

On nourished beaches, steep escarpments may develop along the water line interface as the beach adjusts from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984, Nelson *et al.* 1987). These escarpments can hamper or prevent access to nesting sites (Nelson and Blihovde 1998). Researchers have shown that female sea turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Construction of groins and jetties

Groins and jetties are shore-perpendicular structures that are designed to trap sand that would otherwise be transported by longshore currents. Jetties are defined as structures placed to keep sand from flowing into channels (Kaufman and Pilkey 1979, Komar 1983). In preventing normal sand transport, these structures accrete updrift beaches while causing accelerated beach erosion downdrift of the structures (Komar 1983, Pilkey *et al.* 1984, National Research Council 1987), a process that results in degradation of sea turtle nesting habitat. As sand fills the area updrift from the groin or jetty, some littoral drift and sand deposition on adjacent downdrift beaches may occur due to spillover. However, these groins and jetties often force the stream of sand into deeper offshore water where it is lost from the system (Kaufman and Pilkey 1979). The greatest changes in beach profile near groins and jetties are observed close to the structures, but effects eventually may extend many miles along the coast (Komar 1983).

Jetties are placed at ocean inlets to keep transported sand from closing the inlet channel. Together, jetties and inlets are known to have profound effects on adjacent beaches (Kaufman and Pilkey 1979). Witherington *et al.* (2005) found a significant negative relationship between loggerhead nesting density and distance from the nearest of 17 ocean inlets on the Atlantic coast of Florida. The effect of inlets in lowering nesting density was observed both updrift and downdrift of the inlets, leading researchers to propose that beach instability from both erosion and accretion may discourage loggerhead nesting.

Construction or repair of groins and jetties during the nesting season may result in the destruction of nests, disturbance of females attempting to nest, and disorientation of emerging hatchlings from project lighting. Following construction, the presence of groins and jetties may interfere with nesting turtle access to the beach, result in a change in beach profile and width (downdrift erosion, loss of sandy berms, and escarpment formation), trap hatchlings, and concentrate predatory fishes, resulting in higher probabilities of hatchling predation.

Escarpments may develop on beaches between groins as the beaches equilibrate to their final profiles. These escarpments are known to prevent females from nesting on the upper beach and can cause them to choose unsuitable nesting areas, such as seaward of an escarpment. These nest sites commonly receive prolonged tidal inundation and erosion, which results in nest failure (Nelson and Blihovde 1998). As groin structures fail and break apart, they spread debris on the beach, which may further impede nesting females from accessing suitable nesting sites and trap both hatchlings and nesting turtles.

Species' response to a proposed action

The following summary illustrates sea turtle responses to and recovery from a nourishment project comprehensively studied by Ernest and Martin (1999). A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on natural or prenourished beaches. This reduction in nesting success is most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the nourishment project (e.g., beach profile, sediment grain size, beach compaction, frequency and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on untilled, hard-packed sands increases significantly relative to natural conditions. However, tilling (minimum depth of 36 inches) is effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to natural levels (Ernest and Martin 1999).

During the first post-construction year, nests on nourished beaches are deposited significantly seaward of the toe of the dune and significantly landward of the tide line than nests on natural beaches. More nests are washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped natural beaches. This phenomenon may persist through the second post-construction year monitoring and result from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occur as the beach equilibrates to a more natural contour.

The principal effect of beach nourishment on sea turtle reproduction is a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin (1999) indicated that changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a natural beach profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches.

BEACH MICE

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

The formal taxonomic classification of beach mouse subspecies follows the geographic variation in pelage and skeletal measurements documented by Bowen (1968). This peer-reviewed, published classification was also accepted by Hall (1981). Since the listing of the beach mice, further research concerning the taxonomic validity of the subspecific classification of beach mice has been initiated and/or conducted. Preliminary results from these studies support the separation of beach mice from inland forms, and support the currently accepted taxonomy (Bowen 1968) (*i.e.*, each beach mouse group represents a unique and isolated subspecies). Recent research using mitochondrial DNA data illustrates that Gulf Coast beach mouse subspecies form a well-supported and independent evolutionary cluster within the global population of the mainland or inland old field mice (Van Zant and Wooten 2006).

The old-field mouse (*Peromyscus polionotus)* is different in form and structure as well as being genetically diverse throughout its range in the southeastern U.S. (Bowen 1968, Selander *et al.* 1971). Currently there are 16 recognized subspecies of old-field mice (Hall 1981). Eight subspecies occupy coastal rather than inland habitat and are referred to as beach mice (Bowen 1968). Two existing subspecies of beach mouse and one extinct subspecies are known from the Atlantic coast of Florida and five subspecies live along the Gulf coast of Alabama and northwestern Florida.

Rivers and various inlets bisect the Gulf and Atlantic beaches and naturally isolate habitats in which the beach mice live. The outer coastline and barrier islands are typically separated from the mainland by lagoons, swamps, tidal marshes, and flatwood areas with hardpan soil conditions. However, these dispersal barriers are not absolute; sections of sand peninsulas may from time to time be cut off by storms and shift over time due to wind and current action. Human development has also fragmented the ranges of the subspecies. As a consequence of coastal development and the dynamic nature of the coastal environment; beach mouse populations are generally comprised of various disjunct populations.

<u>Atlantic Coast beach mice</u>

The southeastern beach mouse (SEBM) was listed as a threatened species under the Act in 1989 (54 *FR* 20598). Critical habitat was not designated for this subspecies. SEBM is also listed as threatened by the State of Florida. The original distribution of the SEBM was from Ponce Inlet, Volusia County, southward to Hollywood, Broward County, and possibly as far south as Miami in Miami-Dade County. It is currently restricted to Volusia, Brevard, and Indian River Counties. Formerly, this subspecies occurred along about 175 miles of Florida's southeast coast; it now occupies about 50 miles, a significant reduction in range (**Figure 7**).

This subspecies uses both beach dunes and inland areas of scrub vegetation. The most seaward vegetation typically consists of sea oats (*Uniola paniculata*), bitter panicgrass (*Panicum amarum*), railroad vine (*Ipomoea pes-caprae*), beach morning-glory (*Ipomoea stolonifera*), and camphorweed (*Heterotheca subaxillaris*). Further landward, vegetation is more diverse, including beach tea (*Croton punctatus*), pricklypear (*Opuntia humifusa*), saw palmetto (*Serenoa repens)*, wax myrtle (*Myrica cerifera)*, and sea grape (*Coccoloba uvifera*).

Anastasia Island beach mice

The Anastasia Island beach mouse (AIBM), was listed as endangered under the Act in 1989 (54 *FR* 20598). Critical habitat was not designated for the subspecies. AIBM is also listed as an endangered species by the State of Florida. The distribution of the AIBM has declined significantly, particularly in the northern part of its range. AIBM was historically known from the vicinity of the Duval-St. Johns County line southward to Matanzas Inlet, St. Johns County, Florida (Frank and Humphrey 1996). Included in their range, AIBM populations are found along 14.5 miles of Anastasia Island, mainly on 3.5 miles at Anastasia State Park (ASP) and one mile at Fort Matanzas National Monument (FMNM). AIBM have been found at low densities in dunes on the remainder of the island. Beach mice have also been located along sections of the 4.2 miles of dune habitat at Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR)-Guana River. Anastasia Island is separated from the mainland of Florida to the west by extensive salt marshes and the Mantazas River, to the north by the St. Augustine Inlet, and to the south by the Matanzas Inlet which are both maintained and open. This has restricted the range of AIBM to 14.5 mile length of Anastasia Island and sections of GTMNERR-Guana River (**Figure 8**).

In 1992 to 1993, the Service funded the reintroduction of AIBM to GTMNERR in St. Johns County where historical habitat for the subspecies existed (Service 1993). GMTNERR-Guana River portion of the Reserve (4.0 miles of undeveloped beach) is nine miles north of the existing population of beach mice at ASP. Fifty-five mice (27 females and 28 males) were trapped at FMNM and ASP from September 24, to November 12, 1992, and placed in soft-release enclosures at the state park on September 27, and November 12, 1992. During follow-up trapping conducted in February 1993, beach mice occupied the entire 4.2-mile length of the park; 34 were captured and it was estimated that the population totaled 220. Quarterly trapping has been conducted since the reintroduction and mice have not been captured since September 2006. This may be a result of habitat loss alteration from storms or habitat conditions. Sneckenberger 2001 indicates that the scrub habitat found in the tertiary dunes provides a more stable level of food resources, which becomes crucial when food is scarce or nonexistent in the primary and secondary dunes. This suggests that access to primary, secondary, and scrub dune habitat is essential to beach mice at the individual level, which may be an issue for this population as A1A Highway separates/bisects the primary dune from the secondary dunes and scrub dune habitats.

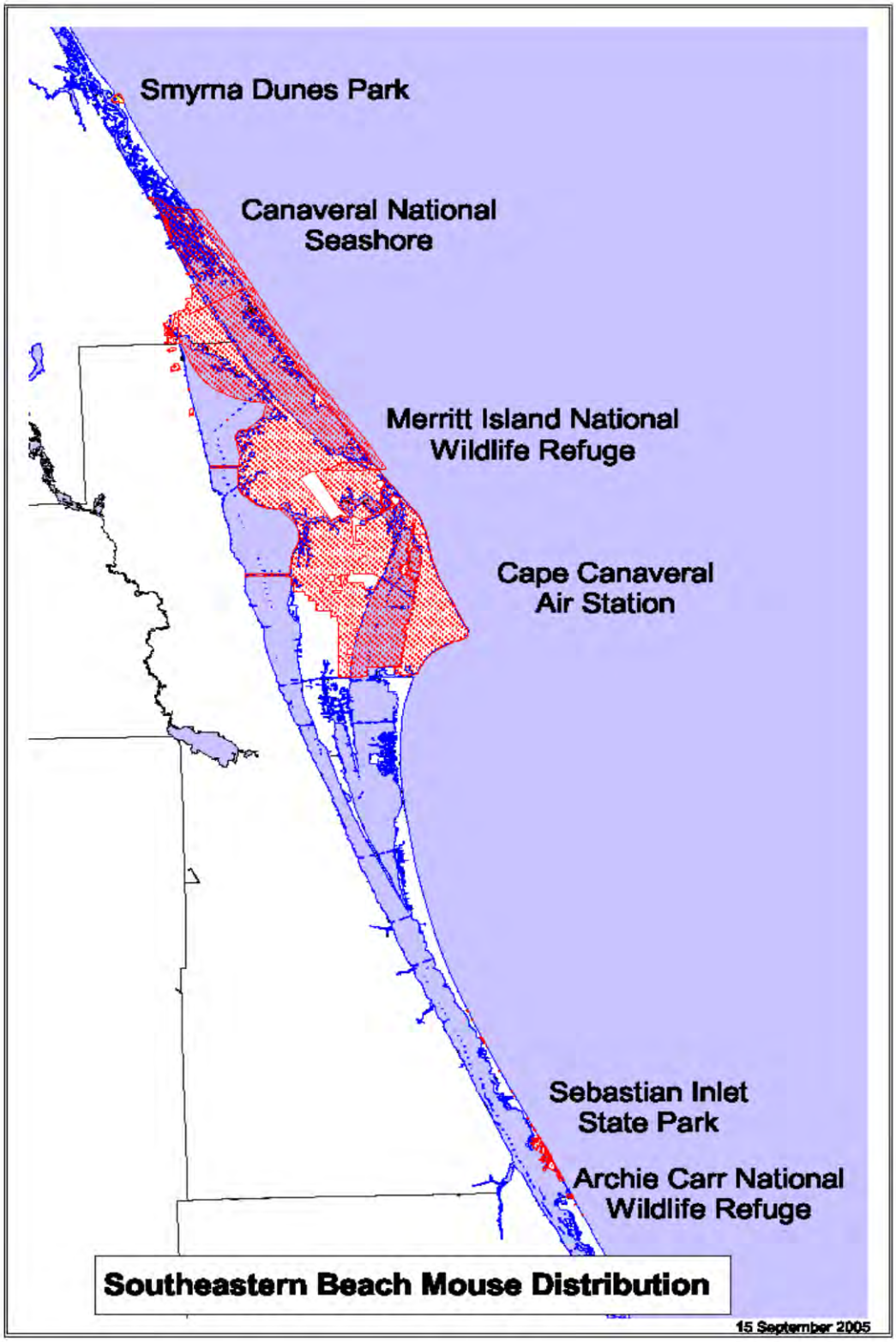

Figure 7. The distribution of the southeastern beach mouse.

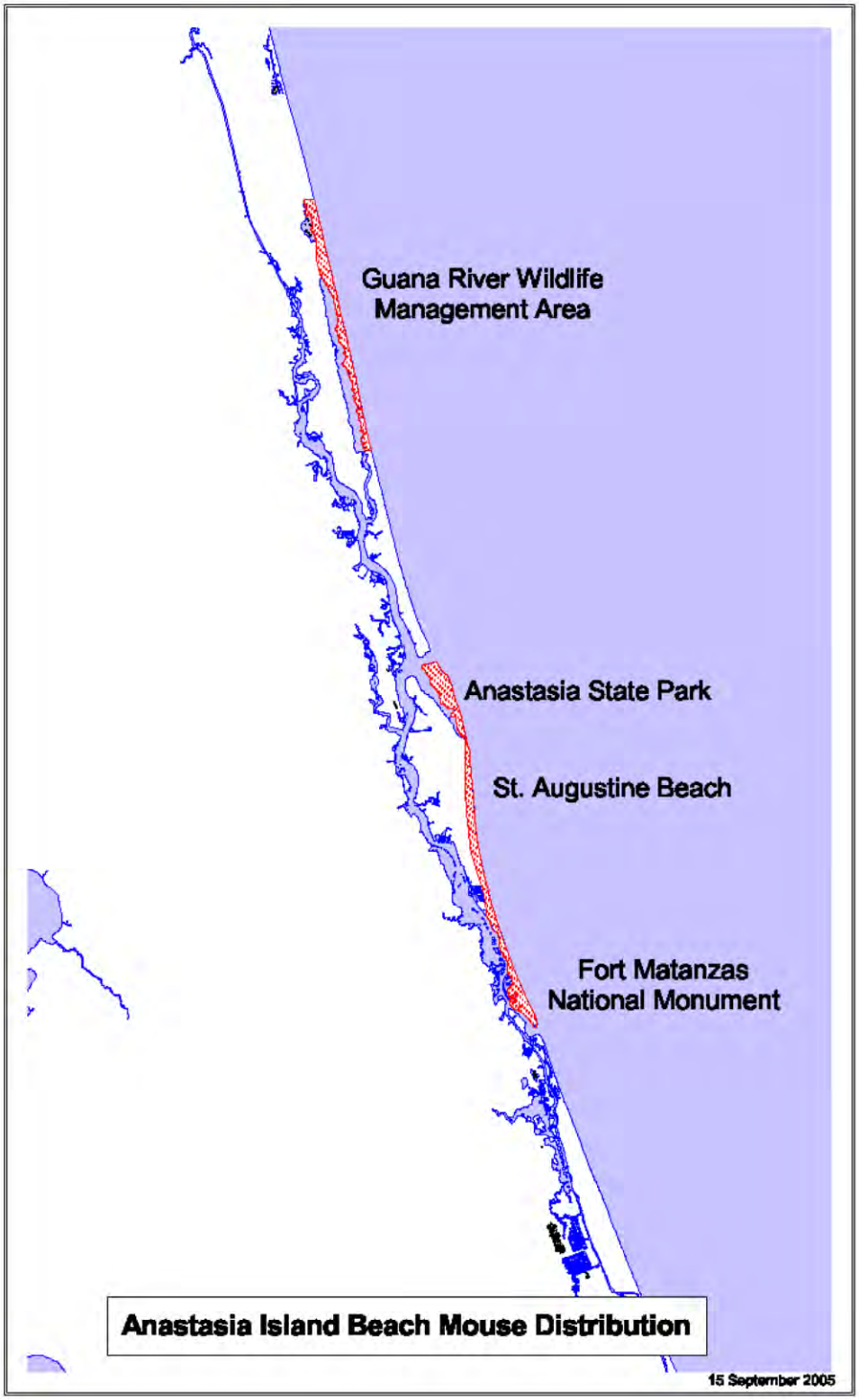

Figure 8. The distribution of the Anastasia Island beach mouse.

Gulf Coast Beach Mice

The CBM and the PKBM were listed with the Alabama beach mouse (ABM) (*Peromyscus polionotus ammobates*), as endangered species under the Act in 1985 (50 *FR* 23872). The SABM was listed under the Act in 1998 (63 *FR* 70053). CBM, SABM, and PKBM are also listed as endangered species by the State of Florida (FWC 2010). Critical habitat was designated for the CBM, and PKBM at the time of listing; however, critical habitat was revised in 2006 (71 *FR* 60238). Critical habitat was also designated for the SABM in 2006 (71 *FR* 60238).

The historical range of the CBM extended 53 miles between Destin Pass, Choctawhatchee Bay in Okaloosa County and East Pass in St. Andrew Bay, Bay County, Florida. PKBM historically ranged along the entire length of Perdido Key for 16.9 miles between Perdido Bay, Alabama (Perdido Pass) and Pensacola Bay, Florida (Bowen 1968). The historical range of the SABM extended 38 miles between Money Bayou in Gulf County, and Crooked Island at the East Pass of St. Andrews Bay, Bay County, Florida including the St. Joseph peninsula and the coastal mainland adjacent to St. Joseph Bay, Florida (**Figure 9**).

Critical habitat

Since the listing of the PKBM and CBM in 1985, research has refined previous knowledge of Gulf Coast beach mouse habitat requirements and factors that influence their use of habitat. Based on the current knowledge of the life history, biology, and ecology of the subspecies and the requirements of the habitat to sustain the essential life history functions of the subspecies, the primary constituent elements (PCE) of critical habitat for Gulf Coast beach mice consist of:

1. A contiguous mosaic of primary, secondary scrub vegetation, and dune structure, with a balanced level of competition and predation and few or no competitive or predaceous nonnative species present, that collectively provide foraging opportunities, cover, and burrow sites;

2. Primary and secondary dunes, generally dominated by sea oats that despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes provide abundant food resources, burrow sites, and protection from predators;

3. Scrub dunes, generally dominated by scrub oaks, that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding due to rainfall and/or hurricane induced storm surge;.

4. Functional, unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas; and

5. A natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth and viability of all life stages.

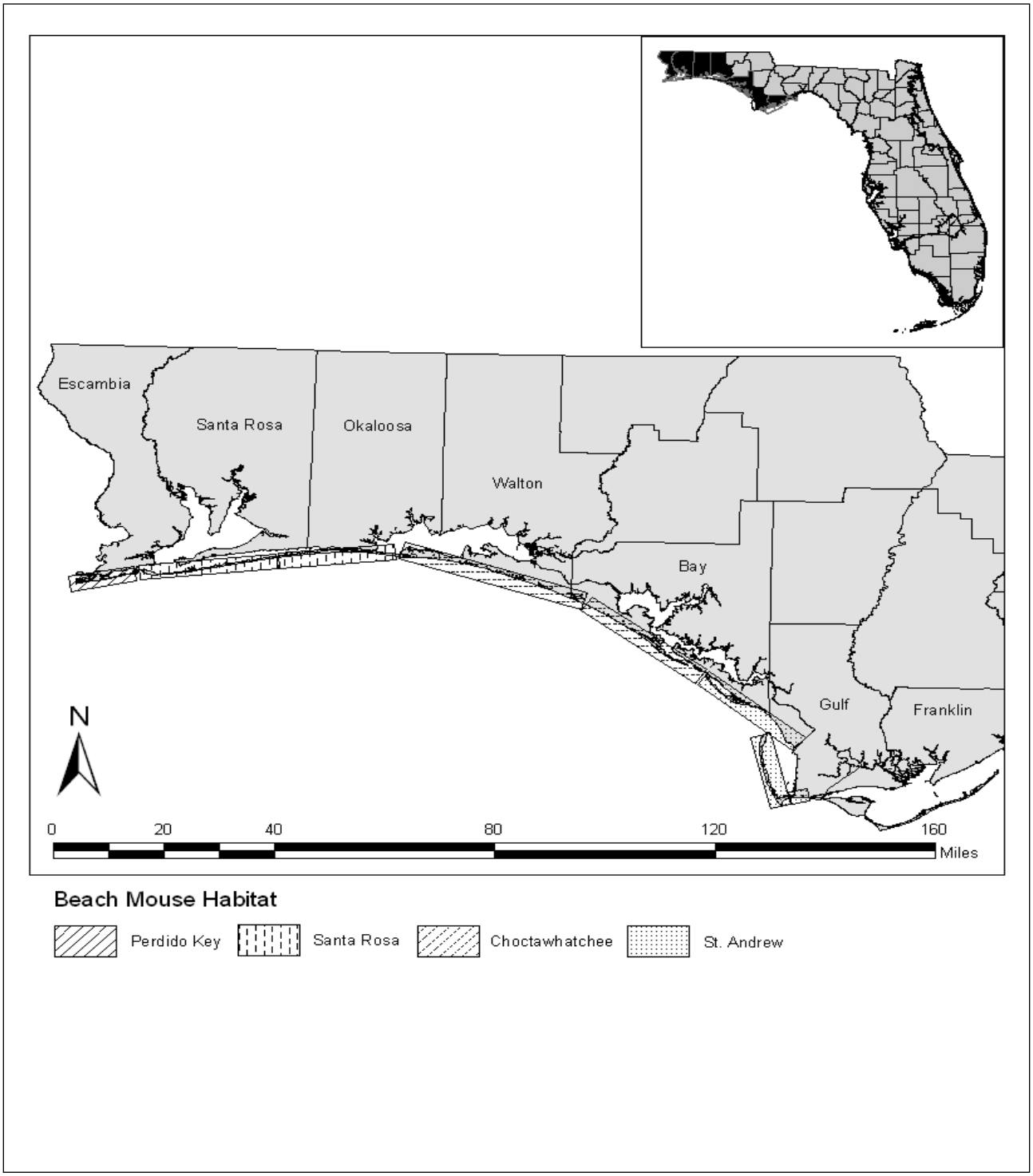

Figure 9. Historical range of Gulf Coast beach mouse subspecies.

Thirteen coastal dune areas (critical habitat units) in southern Alabama and the panhandle of Florida have been determined to be essential to the conservation of PKBM, CBM, and SABM and are designated as critical habitat (**Figures 10 through 12**). These 13 units include five units for PKBM, five units for CBM, and three units for the SABM. These units total 6,194 acres of coastal dunes, and include 1,300 acres for the PKBM in Escambia County, Florida and Baldwin County, Alabama (**Table 10**); 2,404 acres for the CBM, in Okaloosa, Walton, and Bay Counties, Florida (**Table 11**); and 2,490 acres for the SABM in Bay and Gulf Counties, Florida (**Table 12**).

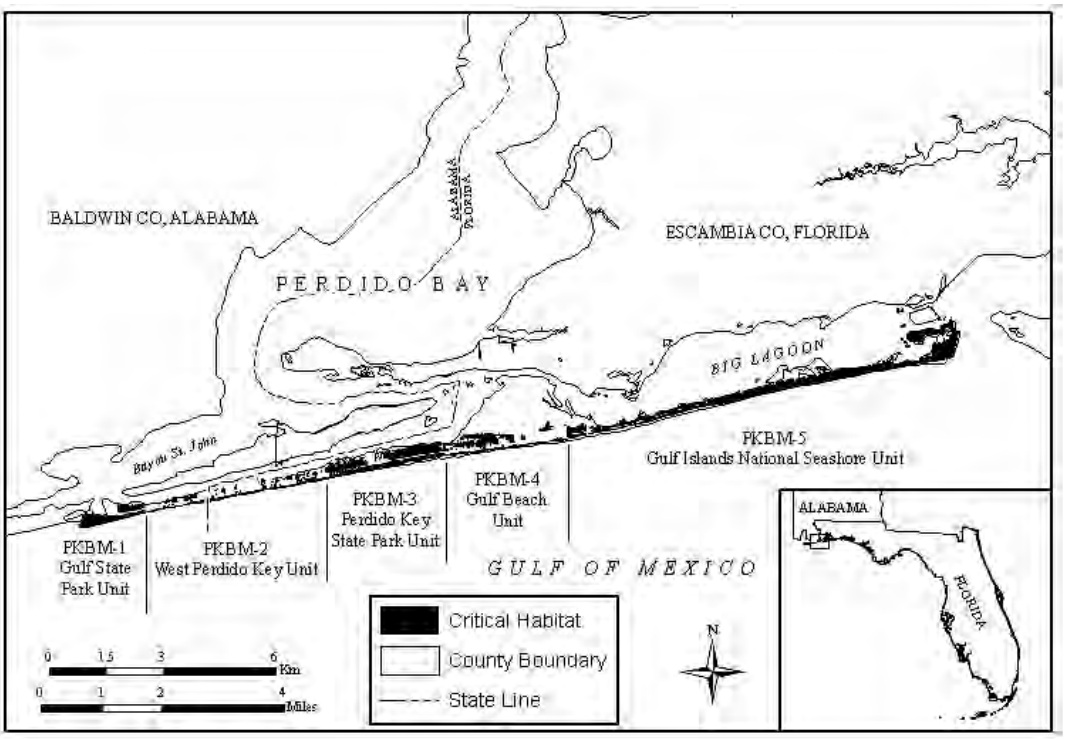

Figure 10. Critical habitat units designated for the Perdido Key beach mouse.

Table 11. Critical habitat units designated for the Perdido Key beach mouse.

Perdido Key Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. Gulf State Park Unit	0	115	0	115
2. West Perdido Key Unit	0	0	147	147
3. Perdido Key State Park Unit	0	238	0	238
4. Gulf Beach Unit	0	0	162	162
5. Gulf Islands National Seashore Unit	638	0	0	638
Total	638	353	309	1300

Gulf State Park

The Gulf State Park Unit (PKBM-1) consists of 115 acres of PKBM habitat in southern Baldwin County, Alabama, on the westernmost region of Perdido Key. PKBM were known to inhabit this unit during surveys in 1979 and 1982, and by 1986 this was the only known existing population of the subspecies (Humphrey and Barbour 1981; Holler *et al*. 1989). This population of less than 30 individuals was the donor for the reestablishment of PKBM into Gulf Islands National Seashore in 1986. This project ultimately saved Perdido Key beach mice from extinction as the population at Gulf State Park was considered extirpated in 1998 due to tropical storms and predators (Moyers *et al*. 1999). In 2010, captive bred mice are released at Gulf State Park. This reintroduction was deemed a success and the population has continued to increase. The track tube monitoring was established at GSP in 2010, which began with only a 9 percent occurrence rate and the end of the year yielded an 83 percent occurrence rate, 2011 started with an 85 percent occurrence rate and continued to increase slightly until September 2011 which yielded a 73 percent occurrence rate in the tracking tubes (FWC 2012a and FWC 2014b). A 3-day trapping effort the week of May 7, 2012, continued to find PKBM distributed throughout habitat south of Highway 182. Two reproductively-active male PKBM were found north of Highway 182 (J. Gore pers. comm. 2012). The release appears to have been a success and PKBM are occupying all three public lands for the first time since being listed as endangered. Recent track tube data for 2013 shows an average of 93 percent occurrence of PKBM in the tracking tubes at GSP (FWC 2013a and FWC 2013b).

Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. Because scrub habitat is separated from the frontal dunes by a highway in some areas, the population inhabiting this unit can be especially vulnerable to hurricane impacts, and therefore further linkage to scrub habitat and/or habitat management would improve connectivity. This unit is managed by the Alabama Department of Conservation and Natural Resources and provides primary constituent elements (PCEs) 2, 3, 4, and 5. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit, which contains interior scrub habitat as well as primary and secondary dunes, serves as a re-designation and expansion of the original critical habitat designation (50 *FR* 23872). The original designation did not include scrub habitat which we now know is necessary for the long-term persistence of beach mouse populations.

The West Perdido Key Unit (PKBM-2) consists of 114 acres in southern Escambia County, Florida, and 33 acres in southern Baldwin County, Alabama. This unit encompasses essential features of beach mouse habitat from approximately 1.0 mile west of where the Alabama-Florida State line bisects Perdido Key east to 2.0 miles east of the State line and areas from the MHWL north to the seaward extent of human development or maritime forest. This unit consists of private lands and ultimately includes essential features of beach mouse habitat between Perdido Key State Park (Unit 3) and GSP (Unit 1). Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat and provides PCEs 2, 3, and 4.

Habitat fragmentation and other threats specific to this unit are mainly due to development. Consequently, threats to this unit that may require special management considerations include habitat fragmentation and habitat loss, artificial lighting, presence of feral cats as well as other predators at unnatural levels, excessive foot traffic and soil compaction, and damage to dune vegetation and structure. This area was not known to be occupied at the time of listing. While no trapping has been conducted on these private lands to determine presence, sign of beach mouse presence was confirmed by the Service in 2013 and 2014 through observations of beach mouse burrows and tracks, and this unit is contiguous with two occupied units. Therefore, we have determined this unit to be currently occupied. This unit provides essential connectivity between two core population areas (PKBM-3 and PKBM-1), provides habitat for expansion, natural movements, and re-colonization, and is therefore essential to the conservation of the species. Specifically, this unit may have historically provided for the re-colonization of GSP (PKBM-1) and/or may facilitate similar re-colonization in the future as the habitat recovers from recent hurricane events.

The Perdido Key State Park Unit (PKBM-3) consists of 238 acres in southern Escambia County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of PKSP from approximately 2.0 miles east of the Alabama–Florida State line to 4.0 mile east of the State line and the area from the MHWL north to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. This unit provides PCEs 2, 3, 4, and 5 and is essential to the conservation of the species. Improving and/or restoring habitat connections would increase habitat quality and provide more functional connectivity for dispersal, exploratory movements, and population expansion. This unit is managed by the Florida Park Service. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit serves as a redesignation and expansion of a zone included in the initial critical habitat designation (50 *FR* 23872); however, the zone did not include scrub habitat, which we now know is necessary for the long-term persistence of beach mouse populations.

Trapping efforts in this area were limited in the past. In 2000, a successful relocation program reestablished mice at PKSP. In 2004 and 2005, hurricane/tropical storm damage to the habitat at PKSP dropped PKBM detection to only 10 percent of the available habitat, indicating low densities (Loggins 2007). In 2005, the FWC started monitoring the presence of PKBM on public lands by tracking tubes. The Service and other land managers have relied on this data as a means of tracking the presence of PKBM in GSP, PKSP, and GINS. Tracking data from June 2006 indicated that about 25 percent of the available habitat was occupied at PKSP (FWC 2007). Trapping at PKSP and GINS in March 2007 was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (FWC 2007). Trapping conducted in April of 2008 found no mice on PKSP (J. Himes pers. comm. 2008). According to 2009 tracking data, there were no mice occurrences at PKSP until May 2009, then only sporadic occurrences until November 2009 as the occurrence data started to show a slow but steady increase (FWC 2014b). Tracking data from 2010 showed a dramatic increase in PKBM

occurrences within PKSP with 20 percent occurrence at the beginning of the year, and 84 percent occurrence at the end of 2010 (FWC 2010c). Trapping in 2010 on PKSP captured 11 individual beach mice (11 total captures) in February and 36 individuals (106 total captures) in May. At that time, information was insufficient to accurately estimate population size. These captures represent the minimum number of mice in the park for those months. Trapping at GINS and PKSP in spring 2010 generally confirmed the population was increasing with PKBM widely distributed at both public lands.

The number of track tubes visited by mice has increased over the past several years and recent years indicate almost all track tubes contain PKBM tracks. This is likely due to the fact that the storm-impacted coastal habitats have basically recovered and development and predator pressures have decreased. Data from 2011 showed that 96 percent (81 total traps) of track tubes registered beach mouse tracks, indicating that mice were becoming widespread throughout PKSP (J. Gore pers. comm. 2011, FWC 2012a, and FWC 2014b). The 2012 track tube surveys yielded 99 percent of track tubes with beach mouse tracks at PKSP (D. Greene pers. comm. 2012 and FWC 2012a, FWC 2012b, and FWC 2012c). During 2013, the track tube data indicates 97 percent of track tubes contained PKBM tracks (FWC 2013a and FWC 2013b).

There were effects to the Unit resulting from the overwash and inundation by storm surge that occurred several times during the 2004 and 2005 storm seasons. Blow outs occurred on the west and east portions of the PKSP. Two sections of the Hwy 292 were washed out. Park facilities were destroyed. Dune vegetation was significantly impacted, but has been restored passively and actively. Park facilities have been reconstructed in accordance with protected species guidelines.

The Gulf Beach Unit (PKBM-4) consists of 162 acres in southern Escambia County, Florida. This unit includes essential features of beach mouse habitat between GINS and Perdido Key State Park from approximately 4.0 miles east of the Alabama–Florida State line to 6.0 miles east of the State line and areas from the MHWL north to the seaward extent of human development or maritime forest. This unit consists of private lands. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. Habitat fragmentation and other threats specific to this unit are mainly due to development. Consequently, threats to this unit that may require special management considerations include habitat fragmentation and habitat loss, artificial lighting, presence of feral cats as well as other predators at unnatural levels, excessive foot traffic and soil compaction, and damage to dune vegetation and structure. While not known to be occupied at the time of listing, a single beach mouse was trapped within the unit as a result of trapping efforts in 2004 (Service 2004). There have been no data collected within this unit to confirm either absence or presence since this single trapping event in 2004. However, Service personnel have observed burrows and tracks indicating PKBM are occupying the area. This unit provides PCEs 2, 3, and 4 and is essential to the conservation of the species. This unit includes high-elevation scrub habitat and serves as a refuge during storm events and as an important repopulation source if storms extirpate or greatly reduce local populations. This unit currently provides essential connectivity between two core populations GINS (PKBM-5) and PKSP (PKBM-3) and provides essential habitat for expansion, natural movements, and recolonization (PCE 4).

The Gulf Islands National Seashore Unit (Unit 5) consists of 638 acres in southern Escambia County, Florida, on the easternmost region of Perdido Key. This unit encompasses essential features of beach mouse habitat within the boundary of Gulf Islands National Seashore–Perdido Key Area (also referred to as Johnson Beach) from approximately 6.0 miles east of the Alabama–Florida State line to the eastern tip of Perdido Key at Pensacola Bay and the area from the MHWL north to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists mainly of primary and secondary dune habitat, but provides the longest contiguous expanse of frontal dune habitat within the historic range of the PKBM. PBKM were known to inhabit this unit in 1979. No beach mice were captured during surveys in 1982 and 1986 (Humphrey and Barbour 1981; Holler *et al*. 1989). However the population was impacted by Hurricane Frederic (1979), and considered unoccupied at the time of listing. However, no beach mice were captured during surveys in 1982 and 1986 (Humphrey and Barbour 1981; Holler *et al*. 1989). In 1986, PKBM were re-established to GINS as part of the State of Florida and Service recovery efforts. In 2000 and 2001, PKBM captured from this site served as donors to re-establish beach mice at PKSP. Due to damage from storm surge during the 2004 and 2005 storm seasons, PKBM are detected on approximately 30 percent of the beach mouse habitat available (Loggins 2007). Tracking data from June 2006 indicated that about 32 percent of the available habitat was occupied at GINS (FWC 2007). Trapping at PKSP and GINS in March 2007 was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (FWC 2007). Trapping conducted in April of 2008 was more encouraging with the capture of 35 mice at GINS (S. Sneckenberger pers. comm. 2008). Through 2008-2010 the population continues to expand from GINS to PKSP and beyond. This is the first natural recolonization of a park without the need for a translocation. From 2010 to 2013, the track tube occurrences have averaged 84 percent, 94 percent, 95 percent, and 94 percent respectively (FWC 2014b, FWC 2012a, FWC 2012b, FWC 2012c, FWC 2013a, and FWC 2013b).

PKBM-5, in its entirety, possesses all five PCEs and is essential to the conservation of the species. However, most of this unit consists of frontal dunes, making the population inhabiting this unit particularly threatened by storm events. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit is managed by the National Park Service–Gulf Islands National Seashore. This unit was included in the initial critical habitat designation (50 *FR* 23872) as well as the 2006 revision (71 *FR* 60238). The majority of this unit was overwashed and inundated by storm surge several times during the 2004 and 2005 storm seasons. Park facilities were destroyed and most of the Park road was destroyed. Dune vegetation was washed away or covered with sand. Habitat has since recovered and was comprised of natural and human facilitated dune restoration by GINS staff. Park structures were reconstructed landward of their former locations and in accordance with protected species guidelines.

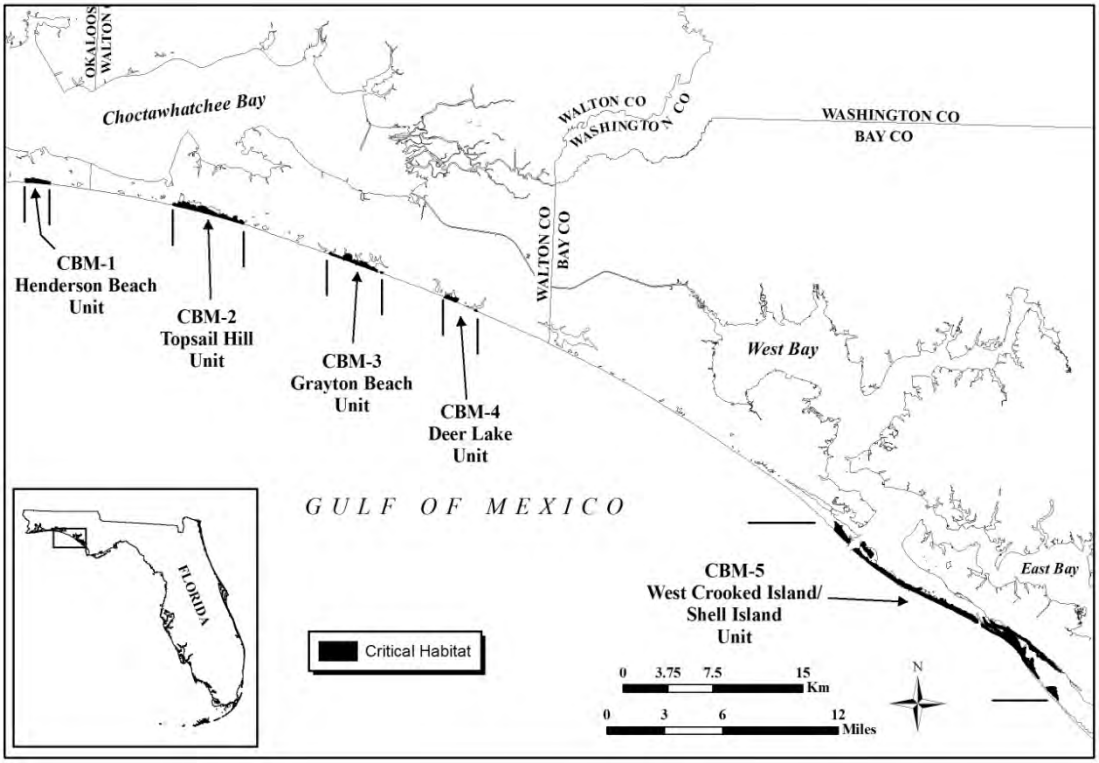

Figure 11. Critical habitat units designated for the Choctawhatchee beach mouse.

Table 12. Critical habitat units designated for the Choctawhatchee beach mouse.

Choctawhatchee Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. Henderson Beach Unit	0	96	0	96
2. Topsail Hill Unit	0	277	31	308
3. Grayton Beach Unit	0	162	17	179
4. Deer Lake Unit	0	40	9	49
5. W. Crooked Island/Shell Island Unit	1333	408	30	1771
Total	1333	982	87	2404

The Henderson Beach unit (CBM–1) consists of 96 acres in Okaloosa County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Henderson Beach State Park from 0.5 miles east of the intersection of Highway 98 and Scenic Highway 98 to 0.25 miles west of Matthew Boulevard and the area from the MHWL north to the seaward extent of the

maritime forest. This westernmost unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3). This unit is within the historical range of the subspecies; however, it was not known to be occupied at the time of listing and current occupancy is unknown because no recent efforts have been made to document beach mouse presence or absence. Because this unit includes protected, high-elevation scrub habitat, it may serve as a refuge during storm events and as an important source population if storms extirpate or greatly reduce local populations or populations to the east.

This unit is managed by the Florida Park Service and is essential to the conservation of the species. Threats specific to this unit that may require special management considerations include habitat fragmentation, Park development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The Topsail Hill Unit (CBM–2) consists of 308 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Topsail Hill Preserve State Park, as well as adjacent private lands from 0.1 miles east of the Gulf Pines subdivision to 0.6 miles west of the Oyster Lake outlet and the area from the MHWL north to the seaward extent of human development or maritime forest. This unit provides primary, secondary, and scrub dune habitat and possesses all five PCEs. Its large, contiguous, high-quality habitat allows for natural movements and population expansion. Choctawhatchee beach mice were confirmed present in the unit in 1979 (Humphrey *et al*. 1987), were present at the time of listing, and are still present.

Beach mice have been captured on Stallworth County Park and Stallworth Preserve subdivision, a private development within the unit, and east of the Park (Service 2003a and Yanchis pers comm 2014). The population of Choctawhatchee beach mice inhabiting this unit appears to harbor unique genetic variation and displays a relatively high degree of genetic divergence considering the close proximity of this population to other populations (Wooten and Holler 1999).

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include Park and residential development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the CBM within the area covered under the Habitat Conservation Plan (HCP) for the Stallworth County Preserve (4 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act.

The Grayton Beach Unit (CBM–3) consists of 179 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Grayton Beach State Park, as well as adjacent private lands and inholdings, from 0.3 mi west of the Alligator Lake outlet east to 0.8 miles west of Seagrove Beach and the area from the MHWL north to the seaward

extent of human development or maritime forest. This unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3), habitat connectivity (PCE 4) and is essential to the conservation of the species. This unit also provides a relatively natural light regime (PCE 5). Beach mice were not detected in the unit in 1979 (Holler 1992a); however, they were found to be present in 1995 after Hurricane Opal (Moyers *et al.* 1999). While it seems likely that beach mice were present at the time of listing (and may have been present, but not detected, in 1979), the Service does not have data to confirm this assumption. Therefore, the Service considered this unit to be unoccupied at the time of listing. A program to strengthen and reestablish the population began in 1989 and yielded a persistent population at Grayton Beach State Park. A recent translocation of 43 CBM from Topsail State Park to Grayton Beach State Park in 2011 has proven successful as the 2013 follow-up trapping data indicated 93 new CBM at Grayton Beach State Park. According to 2013 track tube data, there is a 69 percent occurrence of beach mouse presence (average) at Grayton Beach State Park (FWC 2013a and FWC 2013b). Beach mice are also known to currently occupy the private lands immediately east of the park.

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include hurricane impacts that may require dune restoration and revegetation, excessive open, unvegetated habitat due to recreational use or storm impacts that may require revegetation, Park development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the Choctawhatchee beach mouse within the area covered under the HCP for the Watercolor development (4 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act.

The Deer Lake Unit (CBM–4) consists of 49 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Deer Lake State Park as well as adjacent private lands from approximately one mile east of the Camp Creek Lake inlet west to approximately 0.5 miles west of the inlet of Deer Lake and the area from the MHWL north to the seaward extent of maritime forest or human development. This unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3), habitat connectivity to adjacent lands (PCE 4), and is essential to the conservation of the species. This unit also provides a relatively natural light regime (PCE 5). Because live-trapping efforts in this area have been limited to incidental trapping, and beach mice were not detected in 1998 (Moyers *et al*. 1999), the Service considered this unit to be unoccupied at the time of listing. CBM were translocated from Topsail Hill Preserve State Park to private lands adjacent to this unit in 2003 and 2005 (Service 2003b, 2005a, 2005b, 2005c, 2005d). Tracking within the adjacent State park lands have indicated expansion of the population into the park. Recent track tube data from 2013 indicates Deer Lake State Park had a 73 percent (average) occurrence rate for monthly CBM presence (FWC 2013a and FWC 2013b).

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include artificial lighting, presence of

feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the CBM within the area covered under the HCP/Incidental Take Permit (ITP) for Watersound (71 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act (see Application of Section 4(a)(3) and Exclusions Under Section 4(b)(2) of the Act section below). This excluded area is 0.5 miles west of the Camp Creek Lake inlet to 0.5 miles east of the Camp Creek Lake inlet.

The West Crooked Island/ Shell Island Unit (CBM–5) consists of 1,771 acres in Bay County, Florida. This unit encompasses essential features of beach mouse habitat within the boundaries of St. Andrew State Park mainland from 0.1 miles east of Venture Boulevard east to the entrance channel of St. Andrew Sound, Shell Island east of the entrance of St. Andrew Sound east to East Pass, and West Crooked Island southwest of East Bay and east of the entrance channel of St. Andrew Sound, and areas from the MHWL north to the seaward extent of the maritime forest. Shell Island consists of State lands, Tyndall Air Force Base (AFB) lands, and small private inholdings. Choctawhatchee beach mice were known to inhabit the majority of Shell Island in 1987 (Holler 1992b) and were again confirmed present in 1998 (Moyers *et al*. 1999), 2002, and 2003 (Lynn 2003a). Because beach mice inhabited nearly the entire suitable habitat on the island less than two years prior to listing and were reconfirmed after listing, the Service considered this area to be occupied at the time of listing. The West Crooked Island population is the result of a natural expansion of the Shell Island population after the two islands became connected in 1998 and 1999, a result of Hurricanes Opal and Georges (Service 2003b). Shell Island was connected to the mainland prior to the 1930s when a navigation inlet severed the connection on the western end. Beach mice were documented at St. Andrew State Park mainland as late as the 1960s (Bowen 1968), though no records of survey efforts exist again until Humphrey and Barbour (1981) and Meyers (1983) at which time beach mice were not detected. Therefore, it seems likely that this area was not occupied at the time of listing. Current beach mouse population levels at this site are unknown, and live-trapping to document the absence of mice has not been conducted. Similar to the original designation, this Park was designated as critical habitat because it has features essential to the CBM. It is also within the historical range of the mouse. This unit supports the easternmost population of CBM, with the next known population 22 miles to the west.

This unit provides primary, secondary, and scrub dune habitat and possesses all five PCEs. Portions of this unit are managed by the Florida Park Service, while the remaining areas are federally (Tyndall AFB) and privately owned.

Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high residential or recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Figure 12. Critical habitat units designated for the St. Andrew beach mouse.

Table 13. Critical habitat units designated for the St. Andrew beach mouse.

St. Andrew Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. East Crooked Island Unit	649	0	177	826
2. Palm Point Unit	0	0	162	162
3. St. Joseph Peninsula Unit	0	1280	222	1502
Total	649	1280	561	2490

The East Crooked Island Unit (SABM–1) consists of 826 acres in Bay County, Florida. This unit encompasses essential features of beach mouse habitat on East Crooked Island from the entrance of St. Andrew Sound to one mile west of Mexico Beach, and the area from the MHWL to the seaward extent of the maritime forest (not including Raffield Peninsula). Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat and possesses all five PCEs. SABM were known to inhabit the unit in 1986 and 1989 (James 1992), though the population was

presumably extirpated after 1989 due to impacts from hurricanes. The East Crooked Island population was reestablished with donors from St. Joseph State Park in 1997. This unit was occupied at the time of listing. Live-trapping in 2002 confirmed occupation of mice (Moyers and Shea 2002, Lynn 2002a, Slaby 2005). Recent track tube data indicates mice are still present in this unit (FWC 2013a and FWC 2013b). This unit maintains connectivity along the island and this unit is essential to provide a donor population following storm events.

The majority of this unit is federally owned (Tyndall AFB), while the remaining habitat is privately owned. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational and military use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The Palm Point Unit (SABM–2) consists of 162 acres of private lands in Gulf County, Florida. This unit encompasses habitat from Palm Point 1.25 miles northwest of the inlet of the Gulf County Canal to the southeastern boundary of St. Joseph Beach and the area from the MHWL to the seaward extent of the maritime forest. SABM were documented in the area by Bowen (1968) and were considered to have been present in this unit at the time of listing. Since SABM beach mouse habitat is limited to only two other areas, protecting this mainland site located within the species' historical range is needed for the subspecies' long-term persistence. As other viable opportunities are limited or nonexistent, this unit is essential to reduce the threats of stochastic events to this subspecies. Furthermore, as this unit is on the mainland, it is somewhat buffered from the effects of storm events. This area provides frontal and scrub dune habitat (PCEs 2 and 3), but may provide limited connectivity between habitats. Threats specific to this unit that may require special management considerations include habitat fragmentation, habitat loss, artificial lighting, presence of free-roaming cats as well as other predators at unnatural levels, and high residential use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The St. Joseph Peninsula Unit (SABM–3) consists of 1,502 acres in Gulf County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of St. Joseph Peninsula State Park (Park) as well as south of the Park to the peninsula's constriction north of Cape San Blas (also known as the "stumphole" region) and area from the MHWL to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat, and provides a relatively contiguous expanse of habitat within the historical range of the SABM. This unit possesses all five PCEs and was occupied at the time of listing. SABM were known to inhabit this unit in 1986 and 1987 (James 1987, 1992, 1995, Gore 1994, Moyers *et al.* 1999, Slaby 2005). In addition, recent trapping and tracking efforts suggest that mice continue to occupy private lands south of the Park (K. Yanchis pers comm., FWS 2012). The Park alone does not provide sufficient habitat to allow for population expansion along the peninsula, which may be necessary for a population anchored by the tip of a historically dynamic peninsula. A continuous presence of beach mice along the peninsula is the species' best defense against local and complete extinctions due to storm events. The population of SABM inhabiting

this unit appears to possess unique genetic variation, and displays greater than expected genetic divergence from other populations (Wooten and Holler 1999).

The Florida Park Service manages portions of this unit, while the remaining area is privately owned. Threats specific to this unit that may require special management considerations include artificial lighting, habitat fragmentation and habitat loss, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality. The population inhabiting this unit may also be particularly susceptible to hurricanes due to its location within St. Joseph Bay (the peninsula is a thin barrier peninsula with a north–south orientation).

Life history (All subspecies of beach mice)

Beach mice are differentiated from the inland subspecies by the variety of fur (pelage) patterns on the head, shoulders, and rump. The overall dorsal coloration in coastal subspecies is lighter in color and less extensive than on those of the inland subspecies (Sumner 1926, Bowen 1968). Similarly, beach mouse subspecies can be differentiated from each other by pelage pattern and coloration.

The SEBM averages 5.47 inches in total length (average of 10 individuals = 5.07 inches, with a 2.04-inch tail length (Osgood 1909, Stout 1992). Females are slightly larger than males. These beach mice are slightly darker in appearance than some other subspecies of beach mice, but paler than inland populations of *P. polionotus* (Osgood 1909). SEBM have pale, buffy coloration from the back of their head to their tail, and their underparts are white. The white hairs extend up on their flanks, high on their jaw, and within 0.07 to 0.12 inches of their eyes (Stout 1992). There are no white spots above the eyes as with AIBM (Osgood 1909). Their tail is also buffy above and white below. Juvenile SEBM are more grayish in coloration than adults; otherwise they are similar in appearance (Osgood 1909).

The AIBM averages 5.45 inches in total length (average of 10 individuals); with 2.05 inches mean tail length (James 1992). This subspecies has a very pale, buff-colored head and back with extensive white coloration underneath the sides (Howell 1939). Bowen (1968) noted two distinct rump color pigmentations, one tapered and the other a squared pattern, which extended to the thighs.

The SABM has head and body lengths averaging 2.95 inches, and tail mean lengths averaging 2.05 inches (James 1992). This subspecies has a very pale, buff-colored head and back with extensive white coloration underneath and along the sides (Howell 1939). Bowen (1968) noted two distinct rump color pigmentations, one tapered and the other a squared pattern, which extended to the thighs.

The PKBM is slightly smaller than the other Gulf coast beach mouse subspecies (Bowen 1968). Head and body length ranges from 2.7 to 3.3 inches (Holler 1992b). The pigmentation of PKBM

is gray to gray-brown with the underparts white and coloration on the head is less pronounced. The line between pigmented and unpigmented pelage runs dorsally posterior above the eyes and behind the ears. Pigmentation patterns on the rump are either squared or squared superimposed on a tapered pattern (Bowen 1968). There is no tail stripe.

CBM have head and body lengths ranging from 2.7 to 3.5 inches (Holler 1992a). This beach mouse is distinctly more orange-brown to yellow-brown than the other Gulf coast beach mouse subspecies (Bowen 1968). Pigmentation on the head either extends along the dorsal surface of the nose to the tip, or ends posterior to the eyes leaving the cheeks white. A dorsal tail stripe is either present or absent.

Behavior

Peromyscus polionotus is the only member of the genus that digs an extensive burrow. Beach mice are semifossorial, using their complex burrows as a place to rest during the day and between nightly foraging bouts, escape from predators, have and care for young, and hold limited food caches. Burrows of *P. polionotus* generally consist of an entrance tunnel, nest chamber, and escape tunnel. Burrow entrances are usually placed on the sloping side of a dune at the base of a shrub or clump of grass. The nest chamber is formed at the end of the level portion of the entrance tunnel at a depth of 23.6 to 35.4 inches, and the escape tunnel rises from the nest chamber to within 9.8 inches of the surface (Blair 1951). Nests of beach mice are constructed in the nest chamber of their burrows, a spherical cavity about 1.5 to 2.5 inches in diameter. The nest comprises about one-fourth of the size of the cavity and is composed of sea oat roots, stems, leaves and the chaffy parts of the panicles (Ivey 1949). Beach mice have been found to select burrow sites based on a suite of biotic and abiotic features including dune slope, soil compaction, vegetative cover, and height above sea level (Lynn 2000a, Sneckenberger 2001). A shortage of potential burrow sites is considered to be a possible limiting resource.

Reproduction and Demography

Studies on *Peromyscus* species in peninsular Florida suggest that these species may achieve greater densities and undergo more significant population fluctuations than their temperate relatives, partially because of their extended reproductive season (Bigler and Jenkins 1975). Subtropical beach mice can reproduce throughout the year; however, their peak reproductive activity is generally during late summer, fall, and early winter. Extine (1980) reported peak reproductive activity for SEBM on Merritt Island during August and September, based on external characteristics of the adults. This peak in the timing and intensity of reproductive activity was also correlated to the subsequent peak in the proportion of juveniles in the population in early winter (Extine 1980). Peak breeding season for Gulf Coast beach mice is autumn and winter, declining in spring, and falling to low levels in summer (Rave and Holler 1992, Blair 1951). However, pregnant and lactating beach mice have been observed in all seasons (Moyers *et al.* 1999).

Sex ratios in beach mouse populations are generally 1:1 (Extine 1980, Rave and Holler 1992).

Beach mice are believed to be generally monogamous (Smith 1966, Foltz 1981, Lynn 2000a). While a majority of individuals appear to pair for life, paired males may sire extra litters with unpaired females. Beach mice are considered sexually mature at 55 days of age; however some are capable of breeding earlier (Weston 2007). Gestation averages 28 to 30 days (Weston 2007) and the average litter size is four pups (Fleming and Holler 1990). Littering intervals may be as short as 26 days (Bowen 1968).

Apparent survival rate estimates (products of true survival and site fidelity) of beach mice along the Gulf Coasts of Florida and Alabama have demonstrated that their average life span is about nine months (Swilling 2000). Other research indicated that 63 percent of Alabama beach mice lived (or remained in the trapping area) for four months or less, 37 percent lived 5 months or greater and two percent lived 12 to 20 months (Rave and Holler 1992). Less than half (44 percent) of beach mice captured for the first time were recaptured the next season (Holler *et al*. 1997). Greater than 10 percent of mice were recaptured three seasons after first capture; and four to eight percent were recaptured more than one year after initial capture. Beach mice held in captivity have lived three years or more (Blair 1951, Holler 1995).

Habitat and Movement

Beach mice inhabit coastal dune ecosystems on the Atlantic and Gulf Coasts of Florida and the Gulf Coast of Alabama. The dune habitat is generally categorized as: primary dunes (characterized by sea and other grasses), secondary dunes (similar to primary dunes, but also frequently include such plants as woody goldenrod (*Chrysoma pauciflosculosa*), false rosemary (*Conradina canescens*), and interior or scrub dunes (often dominated by scrub oaks and yaupon (*Ilex vomitoria*). Contrary to the early belief that beach mice were restricted to (Howell 1909, 1921, Ivey 1949), or preferred the frontal dunes (Blair 1951, Pournelle and Barrington 1953, Bowen 1968), recent research has shown that scrub habitat serves an invaluable role in the persistence of beach mouse populations (Swilling *et al.* 1998, Sneckenberger 2001). Beach mice occupy scrub dunes on a permanent basis and studies have found no detectable differences between scrub and frontal dunes in beach mouse body mass, home range size, dispersal, reproduction, survival, food quality, and burrow site availability (Swilling *et al.* 1998, Swilling 2000, Sneckenberger 2001). While seasonally abundant, the availability of food resources in the primary and secondary dunes fluctuates (Sneckenberger 2001). In contrast, the scrub habitat provides a more stable level of food resources, which becomes crucial when food is scarce or nonexistent in the primary and secondary dunes. This suggests that access to primary, secondary, and scrub dune habitat is essential to beach mice at the individual level.

The sea oat zone of primary dunes is considered essential habitat of beach mice on the Atlantic Coast (Humphrey and Barbour 1981, Humphrey *et al.* 1987, Stout 1992). The SEBM has also been reported from sandy areas of adjoining coastal strand/scrub vegetation (Extine 1980, Extine and Stout 1987), which refers to a transition zone between the fore dune and the inland plant community (Johnson and Barbour 1990). Beach mouse habitat is heterogeneous, and distributed in patches that occur both parallel and perpendicular to the shoreline (Extine and Stout 1987). Because this habitat occurs in a narrow band along Florida's coast, structure and composition of

the vegetative communities that form the habitat can change dramatically over distances of several feet.

Primary dune vegetation described from SEBM habitat includes sea oats, bitter panicgrass, railroad vine, beach morning-glory, saltmeadow cordgrass (*Spartina patens*), lamb'squarters (*Chenopodium album*), saltgrass (*Distichlis spicata*), and camphorweed (Extine 1980). Coastal strand and inland vegetation is more diverse, and can include pricklypear, saw palmetto, wax myrtle, Florida rosemary (*Ceratiola ericoides*), sea grape, and sand pine (*Pinus clausa*) (Extine and Stout 1987). Extine (1980) observed this subspecies as far as 0.62 miles inland on Merritt Island; he concluded that the dune scrub communities he found them in represent only marginal habitat for the SEBM. SEBM have been documented in coastal scrub more than a mile from the beach habitat at Kennedy Space Center/Merritt Island National Wildlife Refuge (NWR) and Cape Canaveral Air Force Station (CCAFS) (Stout *et al*. 2006). Extine (1980) and Extine and Stout (1987) reported that the SEBM showed a preference for areas with clumps of palmetto, sea grape, and expanses of open sand.

Essential habitat of the AIBM is characterized by patches of bare, loose, sandy soil (Humphrey and Frank 1992a). Although they are mainly found in the sea oat zone of the primary zone, they will occur in sandy areas with broomsedge (*Andropogon* sp.) (Service 1993). Ivy (1949) reported AIBM to occur in woody vegetation as far as 500 feet inland. Pournelle and Barrington (1953) found this subspecies in scrub as far as 1,800 feet from the dunes. Because this habitat occurs in a narrow band along Florida's coast, structure and composition of the vegetative communities that form the habitat can change dramatically over distances of only a few feet. Much of the habitat within the range of the AIBM has been converted to condominiums and housing developments. The majority of the high quality habitat, densely occupied by beach mice, remains along the length of both ASP and FMNM, at either end of Anastasia Island.

Two main types of movement have been identified for small mammals: within home-range activity and long-range dispersal. Such movements are influenced by a suite of factors, such as availability of mates, predation risk, and habitat quality. Movement and home range studies have been conducted for most beach mouse subspecies, but are limited to natural habitat (*i.e*., research has been conducted on public lands within contiguous beach mouse habitat, not within a development or in a fragmented landscape). Novak's (1997) study of the home range of CBM on Shell Island indicated males had a mean home range of 1.0 ± 4.1 acres and females had a mean home range of 0.81 ± 2.18 acres. Lynn (2000a) found male and female radio-tagged ABM had a mean home range of 1.68 ± 0.27 acres and 1.73 ± 0.40 acres, respectively. Swilling *et al.* (1998) observed one radio-collared ABM to travel over 328 feet during nightly forays after Hurricane Opal to obtain acorns from the scrub dunes. Using radio telemetry, Lynn (2000a) documented an ABM that traveled one mile within a 30-minute period. Moyers and Shea (2002) trapped a male and female CBM that moved about 637 feet and 2,720 feet in one night, respectively. Gore and Schaefer (1993) documented a marked Santa Rosa beach mouse crossing State Road (SR) 399, a two-lane highway. Lynn and Kovatch (2004) through mark and recapture trapping documented PKBM that crossed SR 292, a two-lane highway and right-of-way (100-feet wide).

Sneckenberger (2001) found significant seasonal differences in the movement of ABM, and suggested that this was a result of seasonal fluctuations in food availability, food quality, and nutritional needs. Smith (2003) found that Santa Rosa beach mice demonstrated an increase in movement as habitat isolation increased suggesting that longer travel distances were needed to obtain necessary resources. Smith also found that Santa Rosa beach mice had a preference for vegetation cover and connectivity, which is likely a behavioral response to increased predation risk in open areas. Thus, while beach mice are able and do travel great distances the travel pathways should have vegetated cover and no large gaps or open areas. Previous connectivity research suggests critical thresholds exist for species persistence in fragmented landscapes (With and Crist 1995). As fragmentation increases and connectivity is lost, species' ability to move through and between habitats is reduced in a nonlinear fashion.

Foraging

Beach mice are nocturnal and forage for food throughout the dune system. Beach mice feed primarily upon seeds and fruits, and appear to forage based on availability and have shown no preferences for particular seeds or fruits (Moyers 1996). Beach mice also eat small invertebrates, especially during late spring and early summer when seeds are scarce (Ehrhart 1978, Moyers 1996). Research suggests that the availability of food resources fluctuates seasonally in Gulf Coast coastal dune habitat, specifically that the frontal dunes appear to have more species of high quality foods, but these sources are primarily grasses and annuals that produce large quantities of small seeds in a short period of time. Foods available in the scrub consist of larger seeds and fruits that are produced throughout a greater length of time and linger in the landscape (Sneckenberger 2001). Nutritional analysis of foods available in each habitat revealed that seeds of plant species in both habitats provide a similar range of nutritional quality.

Population dynamics

Population size

Estimating animal abundance or population size is an important and challenging scientific issue in wildlife biology (Otis *et al.* 1978, Pollock *et al.* 1990). A number of different census methods are available to estimate wildlife populations, each with particular benefits and biases. Beach mouse surveys involve live trapping mark-recapture studies, which is a common method with small mammals. A five-night minimum trapping period has been standard practice since 1987 for Gulf Coast beach mice. As the referenced trapping events were not designed similarly or using a standardized sampling techniques, data should not be compared between subspecies or trapping events, nor should densities (mice per 100 trap nights) be inferred beyond the trapping area during that trapping session.

Population densities of beach mice typically reach peak numbers in the late autumn into spring (Rave and Holler 1992, Holler *et al*. 1997). Peak breeding period occurs in autumn and winter, apparently coinciding with the increased availability of seeds and fruits from the previous growing season. Seasonal and annual variation in size of individual populations may be great (Rave and Holler 1992, Holler *et al.* 1997). Food supplementation studies showed that old field mouse

populations increased when foods were abundant; thus, populations of old field mice appear to be food-limited (Smith 1971, Galindo-Leal and Krebs 1998). Similar studies have not been conducted with beach mouse populations.

Gulf Coast Beach Mice

In 1979, Humphrey and Barbour (1981) estimated about 515 CBM existed on Topsail Hill and Shell Island. That estimate was used during the Federal listing of the CBM in 1985. Population estimates on Shell Island from February 1993 to March 1994, ranged from 105 to 338 CBM on a 23-acre study area (Novak 1997). Just prior to Hurricane Opal in 1995, it was estimated that Shell Island supported 800 to 1,200 CBM (Gore 1999). Three years following Hurricane Opal in June 1998, one trapping effort at six different sites on Shell Island resulted in a cumulative population estimate of 195 CBM (164 CBM captured) (Moyers *et al*. 1999). The east portion of the island has been trapped from 2000 to 2003. Population estimates have ranged between 24 and 67 CBM (Lynn 2004b). At Topsail Hill Preserve State Park, trapping conducted in March 2003 and March 2005 yielded a population estimate of 190 to 250 CBM (Service 2003a, Sneckenberger 2005). From late 2006 through 2007 results of tracking tubes surveys at Topsail Hill Preserve State Park suggested that the CBM population was not densely distributed (FWC 2008b). Trapping of four 100-trap transects yielded population estimates of 190, 250, less than 10 (too few to estimate), and 87 in 2003, 2005, 2006, and 2007, respectively (Service 2007a). The track and trapping data together indicate that Topsail Hill Reserve State Park currently does not support a high population of beach mice. In 2003 and again in 2005, a total of 26 mice were translocated from Topsail Hill Preserve State Park to the WaterSound private development adjacent to Deer Lake State Park. Trapping has been sporadic on WaterSound but has yielded population estimates of 5 to 46 individuals in 2003 to 2007 (Moyers 2007). Deer Lake State Park has not been trapped; however, tracks have been observed as recently as 2006 (FWC 2008b). Population estimates from trapping at Grayton Beach State Park (main unit) from 1995 to 2000, ranged from 25 to 116 CBM (Moyers *et al.* 1999, Van Zant 2000). The central unit was trapped for three nights in August 2002; however, no mice were captured (Lynn 2002b). Limited tracking surveys were accomplished in 2003, 2004 and 2005 and beach mouse tracks were observed (Kovatch 2003, Toothacker 2004, FWC 2008b). The western area, although it provides CBM habitat, has not been documented as occupied by CBM (Moyers *et al.* 1999, Van Zant 2000). The population estimates for the WaterColor development for the two years prior to and one year following development ranged from 3 to 7 CBM (St. Joe Company 1999). CBM were last captured in February of 2001 at WaterSound; quarterly trapping has continued on the site through mid-2008 without CBM being captured (St. Joe/Arvida 2003). Auburn University trapped West Crooked Island in October 2000, and the Service trapped the area in 2001 to 2003. The population estimate ranged from a low of 174 to a high of 244 CBM (Lynn 2000b, 2002d, 2002e, 2002f, 2002g, 2003b). The Service estimated the total population of CBM in 2003, to be about 600 to 1,000 beach mice. A recent translocation of 43 CBM from Topsail State Park to Grayton Beach State Park in 2011 has proven successful as the 2013 follow-up trapping data indicated 93 new CBM at Grayton Beach State Park. According to 2013 track tube data, there is a 69 percent occurrence of beach mouse presence (average) at Grayton Beach State Park (FWC 2013a and FWC 2013b). Recent track tube data

from 2013 indicates Deer Lake State Park had a 73 percent (average) occurrence rate for monthly CBM presence (FWC 2013a and FWC 2013b).

Since its listing in 1985, PKBM population estimates never reached more than 400 to 500 individuals until 2003. Before Hurricane Ivan (2004) a population estimate of 500 to 800 was divided between two populations - the Johnson Beach Unit of GINS and PKSP (Service 2004). The status of PKBM at Gulf State Park (GSP) is uncertain, likely extirpated in 1999. In October 2005, following the active hurricane seasons of 2004 and 2005, a trapping effort of less than one-third of the habitat available on public lands yielded captures of less than 30 individuals. Tracking data from June 2006 indicated that about 25 and 32 percent of the available habitat was occupied at PKSP and GINS, respectively (Loggins 2007). Trapping at PKSP and GINS in March 2007, was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (Loggins 2007). With no tracks observed in the tube surveys the PKBM may now be absent from PKSP (FWC 2008b). According to 2009 tracking data, there were no mice occurrences at PKSP until May 2009, then only sporadic occurrences until November 2009 as the occurrence data started to show a slow but steady increase (FWC 2014b). Tracking data from 2010 showed a dramatic increase in PKBM occurrences within PKSP with 20 percent occurrence at the beginning of the year, and 84 percent occurrence at the end of 2010 (FWC 2010c). Trapping in 2010 on PKSP captured 11 individual beach mice (11 total captures) in February and 36 individuals (106 total captures) in May. At that time, information was insufficient to accurately estimate population size. These captures represent the minimum number of mice in the park for those months. Trapping at GINS and PKSP in spring 2010 generally confirmed the population was increasing with PKBM widely distributed at both public lands. Recent data from 2011 showed that 96 percent (81 total traps) of track tubes registered beach mouse tracks, indicating that mice were becoming widespread throughout PKSP (J. Gore pers. comm. 2011, FWC 2012a, and FWC 2014b). The 2012 track tube surveys yielded 99 percent of track tubes with beach mouse tracks at PKSP (D. Greene pers. comm. 2012 and FWC 2012a, FWC 2012b, and FWC 2012c). During 2013, the track tube data indicates 97 percent of track tubes contained PKBM tracks (FWC 2013a and FWC 2013b). At GINS, the number of PKBM has not increased since the initial high levels in winter of 2005-2006 (FWC 2008b). However, population estimates indicate there may be a few hundred PKBM at GINS (Gore 2008). Trapping conducted in April of 2008 was more encouraging with the capture of 35 mice at GINS (S. Sneckenberger pers. comm. 2008). Through 2008-2010 the population continues to expand from GINS to PKSP and beyond. This is the first natural recolonization of a park without the need for a translocation. From 2010 to 2013, the track tube occurrences at GINS have averaged 84 percent, 94 percent, 95 percent, and 94 percent respectively (FWC 2014b, FWC 2012a, FWC 2012b, FWC 2012c, FWC 2013a, and FWC 2013b).

The SABM even at its lowest population probably numbered several hundred individuals (Gore as cited in 63 *FR* 70055). James (1992) estimated that the East Crooked Island subpopulation to be about 150. However, by 1996, SABM were no longer found on East Crooked Island. Following Hurricane Opal in 1995, Mitchell *et al.* (1997) estimated the St. Joe Peninsula State Park population to be between 300 and 500 mice. In November 1997 and January 1998, 19 pairs of St. Andrew beach mice were relocated from St. Joseph Peninsula State Park to East Crooked Island,

Tyndall Air Force Base (Moyers *et al.* 1999). Trapping surveys conducted on East Crooked Island in 2000 and 2002 through 2007 indicated that beach mice occupied the entire island (Lynn 2002c, FWC 2008b). Population estimates ranged from 71 to 133 mice (Lynn 2002c). The FWC (2008b) estimates 22 miles of habitat as occupied by SABM throughout the mouse's historical range with population estimates of about 3,000 mice at East Crooked Island and about 1,775 mice in the front dunes at St. Joseph State Park. Data from 2008-2012 on East Crooked Island showed a decrease in SABM, with average track tube occurrences of 97 percent, 97 percent, 96 percent, 87 percent, and 83 percent, respectively (FWC 2014b and FWC 2012a). However, recent data from 2013 indicates 95 percent of track tubes contained SABM tracks (FWC 2013a and FWC 2013b). Surveys conducted from 2008-2012 at Rish Park yielded average track tube occurrence that fluctuated between 79 percent, 91 percent, 76 percent, 79 percent, and 83 percent, respectively (FWC 2014b and FWC 2012a). More recent data in 2013 showed an average of 73 percent of track tubes contained SABM tracks (FWC 2013a and FWC 2013b).

Atlantic Coast Beach Mice

Populations of the SEBM have been estimated to be around 5,000 to 6,000 mice. Recent surveys have confirmed that SEBM are found on the beaches of Canaveral National Seashore, Merritt Island NWR, and CCAFS in Brevard County, all on federally protected lands. In April 2002, a population of SEBM was documented at the Smyrna Dunes Park, at the north end of New Smyrna Beach (Sauzo 2004). Prior to 2006, populations of the SEBM were thought extirpated from both sides of the Sebastian Inlet (Bard 2004). However, during surveys in June 2006, a single mouse was located at the very southern end of the Sebastian Inlet State Park. Mice were also found at Jungle Trail on the Pelican Island National Wildlife Refuge, another area where they where thought extirpated. Additional surveys of other areas south of Brevard County have not located any mice and indicate the distribution of this subspecies in the counties south of Brevard, severely fragmented. SEBM are no longer believed to occur at Jupiter Island, Palm Beach, Lake Worth, Hillsboro Inlet or Hollywood Beach (Service 1999).

Although the distribution of the AIBM has declined significantly, particularly in the northern part of its range, the populations at ASP and FMNM have continued to fluctuate seasonally between two and 90 mice per acre. It is thought that populations should be characterized by a range rather than a static value (Frank and Humphrey 1996). Quarterly surveys of these two sites have shown that the populations have remained stable. Due to the limited dune habitat at the ASP, this population has not been able to maintain a stable population and it is unknown how many mice remain.

Population variability

Beach mouse populations fluctuate on a seasonal and annual basis. Attempts to explain population dynamics have revealed an incomplete understanding of the species and its population cycles. It is clear that beach mice, like all rodents, are known for high reproductive rates and experience extreme highs and lows in population numbers. Depressed beach mouse populations may be associated with tropical storms and drought, perhaps resulting from reduced habitat and food

resources. These fluctuations can be a result of reproduction rates, food availability, habitat quality and quantity, catastrophic events, disease, and predation (Blair 1951, Bowen 1968, Smith 1971, Hill 1989, Rave and Holler 1992, Swilling *et al.* 1998, Swilling 2000).

Population stability

Population viability analysis (PVA) is essentially a demographic modeling exercise to predict the likelihood a population will continue to exist over time (Groom and Pascual 1997). The true value in using this analytical approach is not to determine the probability of a species' extinction, but to clarify factors that have the most influence on a species' persistence. From 1996 to 1999, the Service funded Auburn University to develop a PVA for beach mice (Holler *et al*. 1999, Oli *et al.* 2001). Four subpopulations of Gulf Coast beach mice subspecies were modeled. They consisted of two subpopulations of PKBM, one at GINS-Perdido Key Area and one at Florida Point, and two subpopulations of ABM, one at Bon Secour NWR and one at Fort Morgan State Park. They used a stochastic (random) differential equation (Wiener-drift) model, applied to long term demographic data. The model is stochastic because it incorporates the variable effects of the environment upon population change. However, it did not model the effects of hurricanes on the habitat or population of beach mice.

The Oli *et al.* (2001) analyses indicated that all four subpopulations were at risk of extinction, with habitat fragmentation as the most influential factor. The GINS-Perdido Key Area had the highest risk for extinction; the PKBM had a 100 percent chance of reaching one individual (becoming functionally extinct) within 21 (mode) or 45 (median) years. At Florida Point, the PKBM had a low risk of becoming functionally extinct (1.3 percent) within 13 to 20 years. However, following Hurricane Opal in 1995, and subsequent predation pressure, the PKBM population at Florida Point was believed extirpated in 1999. This localized extirpation clearly demonstrates that while PVA's are useful in determining significant factors in species survival, they have limited use in predicting the time to extinction for a given species.

More recently, the Conservation Breeding Specialist Group (Traylor-Holzer 2004, 2005, 2006) was contracted by the Service to conduct a population and habitat viability analysis (PHVA) on ABM using the Vortex population simulation model (Lacy 1993). The goal was to develop an ABM population model and use the model to assess the status of the ABM habitat, and populations and projections for continued existence. The PHVA results projects the ABM to have a 26.8 percent $\pm$ 1.0 percent likelihood of extinction over the next 100 years. Much of this risk is due to hurricane impacts on ABM populations and habitat, which can result in population declines. The model suggests that hurricanes are a driving force for ABM populations, both directly and also indirectly as their impacts interact with other factors, including development of higher elevation (scrub) habitat and predation by cats. Due to the similarities in the subspecies and proximal location, it can be inferred that these factors also have a strong influence on the persistence of PKBM populations. When reviewing PHVA results, it is crucial that the actual values for the risk of extinction are not the focus of the interpretation. The true value of a PHVA is the ability to compare management strategies and development scenarios, run sensitivity analyses, and determine the main influence(s) on population persistence.

Similar to the land use arrangement on Perdido Key, the Fort Morgan peninsula (occupied by ABM) consists of three areas of public lands separated by two areas of private lands, which allow for limited (varied) dispersal between the public lands. The current level of dispersal between public lands through private lands is unknown, but is affected by development and habitat degradation. Without dispersal between public lands through private lands, the PHVA results project the ABM to have a 41.2 percent ± 1.1 percent likelihood of extinction. If all privately-owned habitat between the public lands is lost, the likelihood of extinction increases to 46.8 percent ± 1.1 percent. Again, it can be inferred that a similar increase in risk of extinction would occur with the PKBM if dispersal could not occur through private lands.

Despite the similarities in the subspecies, it is important to note that carrying capacity (K), which was found to be a strong influence on the model, would be different in PKBM. For ABM, K was estimated using maximum ABM density estimates (4.5 to 11.6 ABM per acre) and acres of habitat (2,989 acres). As density estimates for PKBM would likely be lower, and remaining PKBM habitat is less than 1,300 acres, the Vortex model for PKBM would likely project a greater likelihood of extinction.

The Service contracted with the Georgia Cooperative Fish and Wildlife Research Unit to critique the PVAs for the ABM accomplished by Oli *et al.* (2001) and Conservation Breeding Specialist Group (Traylor-Holzer 2006). Conroy and Runge (2006) indicated that neither PVA provided reliable estimates of extinction probability for ABM. They recommended that future PVA work should incorporate sampling, temporal, and possibly spatial variance for input variables and should clearly and explicitly express uncertainty in extinction output. Until this can be done, reliable estimates of extinction probability for the ABM (and other beach mouse subspecies) cannot be estimated.

Species that are protected across their ranges have lower probabilities of extinction (Soulé and Wilcox 1980). Beach mouse populations persist naturally through local extirpations due to storm events or the harsh, stochastic nature of coastal ecosystems. Historically, these areas would be recolonized as population densities increase and dispersal occurred from adjacent populated areas. In addition, from a genetic perspective, beach mice recover well from population size reductions (Wooten 1994), given sufficient habitat is available for population expansion after the bottleneck occurs. As human development has fragmented the coastal dune landscape, beach mice can no longer recolonize along these areas as they did in the past (Holliman 1983). As a continuous presence of beach mice or suitable habitat along the coastline is no longer possible and any hurricane can impact the entire range of each subspecies, the probability of beach mice persisting would be enhanced by the presence of contiguous tracts of suitable habitat occupied by multiple independent populations (Shaffer and Stein 2000). The history of the PKBM alone illustrates the need for multiple populations (a now potentially extirpated population was the source of the two remaining populations of the subspecies) (Holler *et al.* 1989, 71 *FR* 60238). While maintaining multiple populations of beach mouse subspecies provides protection from total loss (extinction), especially when migration and relocations are possible (Oli *et al.* 2001), conservation of each subspecies necessitates protection of genetic variability throughout their ranges (Ehrlich 1988).

Preservation of natural populations is therefore crucial, as the loss of a population of beach mice can result in a permanent loss of alleles (Wooten and Holler 1999). This loss of genetic variability cannot be regained through translocations or other efforts.

Status and Distribution

The distribution of all the beach mouse subspecies is significantly reduced from their historical ranges due to modification and destruction of the coastal dune ecosystem inhabit. Habitat loss and alteration was likely a primary cause of the extinction of one subspecies, the Pallid beach mouse, which was endemic to barrier beach between Matanzas and Ponce de Leon inlets in Volusia and Flagler Counties (Humphrey and Barbour 1981).

Atlantic Coast Beach Mice

The distribution of the SEBM has declined significantly, particularly in the southern part of its range. Historically, it was reported to occur along about 174 miles of Florida's central and southeast Atlantic coast from Ponce (Mosquito) Inlet, Volusia County, to Hollywood Beach, Broward County (Hall 1981). Bangs (1898) reported it as extremely abundant on all the beaches of the east peninsula from Palm Beach at least to Mosquito (Ponce) Inlet. During the 1990s, the SEBM was reported only from Volusia County (Canaveral National Seashore); in Brevard County (Canaveral National Seashore, Kennedy Space Center/Merritt Island NWR, and CCAFS); a few localities in Indian River County (Sebastian Inlet State Park, Treasure Shores Park, and several private properties), and St. Lucie County (Pepper Beach County Park and Fort Pierce Inlet State Park) (Humphrey *et al*. 1987, Robson 1989, Land Planning Group, Inc. 1991, Humphrey and Frank 1992b, Service 1993). The SEBM is geographically isolated from all other subspecies of beach mice.

Populations of the SEBM are still found on the beaches of Canaveral National Seashore, Merritt Island NWR, and CCAFS in Brevard County, all on federally protected lands. In April 2002, a population of SEBM was documented at the Smyrna Dunes Park, at the north end of New Smyrna Beach (Sauzo 2004). Populations from the north side of Sebastian Inlet appear to be extirpated (Bard 2004). SEBM were documented on the south side of Sebastian Inlet in 2006, although none have been found since then.

The status of the species south of Brevard County is currently unknown. The surveys conducted during the mid-1990s indicated the distribution of this subspecies in the counties south of Brevard County was severely limited and fragmented. There are not enough data available to determine population trends for these populations. These surveys revealed that it occurred only in very small numbers where it was found. In Indian River County, the Treasure Shores Park population experienced a significant decline in the 1990s, and it is uncertain whether populations still exist at Turtle Trail or adjacent to the various private properties (Jennings 2004). Trapping efforts documented a decline from an estimated 300 individuals down to numbers in the single digits. In 2006, a population off Jungle Trail at Pelican Island NWR was discovered (Van Zant 2006). No beach mice were found during surveys in St. Lucie County and it is possible that this species is

extirpated there. The SEBM no longer occurs at Jupiter Island, Palm Beach, Lake Worth, Hillsboro Inlet or Hollywood Beach (Service 1999).

The primary reason for the significant reduction in the range of the SEBM is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated SEBM habitat in the southern part of its range. This increased urbanization has also increased the recreational use of dunes, and harmed the vegetation essential for dune maintenance. Loss of dune vegetation results in widespread wind and water erosion and reduces the effectiveness of the dune to protect other beach mouse habitat. In addition to this increased urbanization, coastal erosion is responsible for the loss of the dune environment along the Atlantic coast, particularly during tropical storms and hurricanes. The extremely active 2004 hurricane season had a pronounced affect on Florida's Atlantic coast beaches and beach mouse habitat.

The encroachment of residential housing onto the Atlantic coast also increases the likelihood of predation and harassment by free-roaming cats and dogs. A healthy population of SEBM on the north side of Sebastian Inlet State Park in Brevard County was completely extirpated by 1972, presumably by free-roaming cats (Bard 2004). Urbanization of coastal habitat could also lead to potential competition of beach mice with house mice (*Mus musculus*) and introduced rats.

The distribution of the beach mouse is limited due to modification and destruction of its coastal habitats due mostly to developmental pressures. One additional Atlantic coast subspecies, the pallid beach mouse (*P. p. decoloratus*), was formerly reported from two sites in Volusia County, but extensive surveys provide substantial evidence that this subspecies is extinct (Humphrey and Barbour 1981).

The distribution of the AIBM has declined significantly, particularly in the northern part of its range. Historically, it was reported to occur from the vicinity of the Duval-St. Johns County line southward to Matanzas Inlet, St. Johns County, Florida (Humphrey and Frank 1992a). It currently occurs only on Anastasia Island, primarily at the north (ASP) and south (FMNM) ends of the island, although beach mice still occur at low densities in remnant dunes along the entire length of the island (Service 1993). The original distribution consisted of about 50 miles of beach; current populations occupy about 14 miles of beach with possibly only 3 miles supporting viable populations (Service 1993).

In 1992 to 1993, 55 mice (27 females and 28 males) were reintroduced to GMTNERR-Guana River portion of the Reserve (4.0 miles of undeveloped beach) in St. Johns County. In 1993, the population was estimated at 220 mice. Quarterly trapping has been conducted since the reintroduction and mice have not been captured since September 2006. This may be a result of habitat loss or alteration from storms and or habitat conditions.

The primary reason for the significant reduction in the range of the AIBM is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated AIBM habitat in the northern two-thirds of its range. This increased urbanization has also increased the recreational use of dunes, and harmed the vegetation essential for dune

maintenance. Loss of dune vegetation results in widespread wind and water erosion and reduces the effectiveness of the dune to protect other beach mouse habitat. In addition to this increased urbanization, coastal erosion is responsible for the loss of the dune environment along the Atlantic coast, particularly during tropical storms and hurricanes. The extremely active 2004 hurricane season had a severe effect on Florida's Atlantic coast beaches and beach mouse habitat.

The encroachment of residential housing onto the Atlantic coast also increases the likelihood of predation by free-roaming cats and dogs. ASP has successfully reduced feral cat populations at the recreation area and has seen a benefit to the beach mice. Urbanization of coastal habitat could also lead to potential competition of beach mice with house mice and introduced rats.

Gulf Coast Beach Mice

PKBM populations have existed since the late 1970s as isolated populations along its historical range (16.9 miles). The effects of Hurricane Frederic (1979) coupled with increased habitat fragmentation due to human development led to the extirpation of all but one population of PKBM. The less than 30 individuals at Gulf State Park (at the westernmost end of Perdido Key) were once the only known existing population of PKBM (Holler *et al*. 1989). Beach mice from this site were used to reestablish PKBM at Gulf Islands National Seashore (GINS) between 1986 and 1988 (Holler *et al.* 1989). Then in 1999 the population at Gulf State Park was considered extirpated (Moyers *et al.* 1999). In 2000, 10 PKBM (five pairs) was relocated from GINS to PKSP. In February of 2001, this relocation was supplemented with an additional 32 PKBM (16 pairs). The PKBM were released on both north and south sides of SR 292 in suitable habitat. Two years of quarterly survey trapping indicated that the relocations of PKBM to PKSP were successful and this was considered an established population (Lynn and Kovatch 2004). PKBM were also trapped on private land between GINS and PKSP in 2004, increasing documentation of current occurrences of the mouse (Lynn 2004a). Based on the similarity of habitat between these areas and the rest of Perdido Key, as well as the continuity of the habitat, the mouse is believed to inhabit other private properties where suitable habitat exists north and south of SR 292. The PKBM is considered to occur on 42 percent of Perdido Key (1,227 acres of 2,949 acres) (**Table 14**).

Table 14. Perdido Key beach mouse habitat on Perdido Key in Florida and Alabama.

Area	Total in AL & FL		Total in Florida		Total in Alabama	
	Acres	**Percent**	**Acres**	**Percent**	**Acres**	**Percent**
Perdido Key	2,949	100	2,615	89	334	11
PKBM habitat	**1,292**	100	**1,146**	**88**	148	12
Private lands	1,440	49	1,278	43	162	5
PKBM habitat	**302**	**23**	**270**	**24**	33	3
Public lands	1,509	51	1,337	45	172	6
			GINS		GSP	
			1,052		172	
			PKSP			
			285			
PKBM habitat	990	76	876	67	114	9
			GINS		GSP	
			638		114	
			PKSP			
			238			

[1]Data calculated by Service's Panama City, Florida using 2004 Digital Orthophoto Quarter-Quadrangle (DOQQ) aerial photography, 2005 parcel data from Baldwin County, Florida and 2005 parcel data from Escambia County, Florida and revised June 2006.

The listing of PKBM was based on data collected in 1983-84, and at that time the mouse was recovering from the effects of Hurricane Frederick in 1979. Following Hurricane Frederic estimated population numbers based on trapping were 13 PKBM found at one location (Gulf State Park). Just prior to listing, only one PKBM was captured in trapping surveys, this again being at Gulf State Park. Since that time, numbers have fluctuated dramatically based on hurricanes and/or translocation efforts, but were at their highest estimate ever documented just prior to Hurricane Ivan in 2004 at between 500-800 individuals. This was a result of significant partnership efforts and included translocation and habitat restoration on public lands. Even with the destructive hurricanes in 2004 and 2005, current numbers of PKBM, while low (no population estimates are available), are greater than one mouse and mice have been confirmed from two areas (PKSP and GINS). Survey efforts (tracking and trapping) have also been sporadic and inconsistent; therefore, it is difficult to establish long term trend information at this time.

CBM subpopulations currently persist along approximately 15 miles of Gulf of Mexico shoreline consisting of four isolated areas along 11 miles of beachfront within its former range. Another 5 miles outside of the CBM's known historical range has been recently colonized (Lynn, 2000a, 2003a). In the 1950s, the CBM was widespread and abundant at that time according to Bowen (1968). By 1979, Humphrey and Barbour (1981) reported only 40 percent of the original habitat remained undeveloped in noncontiguous areas. They also documented that the CBM had been extirpated from seven of its nine historical localities being restricted to the Topsail Hill area in

Walton County and Shell Island in Bay County. In 1985 when the CBM became federally protected, CBM were still only known from the Topsail Hill area and Shell Island, an area consisting of about 10 miles of coastline (50 *FR* 23872). In 1989, a cooperative interagency effort reintroduced CBM onto the central and west units of Grayton Beach State Park increasing the occupied coastline by another mile (Holler *et al*. 1989). In 1999, with the closing of East Pass and Shell Island connecting to West Crooked Island, CBM increased their range by approximately four miles (Lynn 2000b). CBM are now known to occupy approximately 15 miles of Gulf of Mexico beachfront; 12 of the 15 miles are publicly owned lands.

There are four subpopulations of CBM that exist: 1) Topsail Hill Preserve State Park (and adjacent eastern and western private lands), 2) Shell Island (includes St. Andrew State Park mainland and Shell Island with private inholdings and Tyndall AFB), 3) Grayton Beach (and adjacent eastern private lands), and 4) West Crooked Island. Approximately 96 percent of the lands known to be occupied by CBM are public lands. Translocations to establish a fifth subpopulation of CBM occurred in March of 2003 and 2005. CBM from Topsail Hill Preserve State Park were moved to private lands at Camp Creek/Water Sound in Walton County, Florida (Lynn 2003a, Service 2005a, 2005b, 2005c, 2005d).

Topsail Hill Preserve State Park consists of 1,637 acres of which 262 acres provide CBM habitat; the majority being occupied by CBM. The Florida Park Service prepared a Unit Management Plan for the Preserve that explicitly plans for conservation and protection of CBM habitats (FDEP 2007). Private lands on the east side consist of approximately 9.63 acres. Of that, 7 acres consist of the development known as the Stallworth Preserve. The Service issued an ITP for CBM associated with the Stallworth Preserve HCP in 1995; an amendment to the permit was issued in 1999. The remaining 2.63 acres has been purchased by Walton County with a grant from the Service. Private lands on the west side of the Preserve consist of 24 acres and include Four-Mile Village, a low density single family development, and the Coffeen Nature Preserve managed by the Sierra Club.

Shell Island consists of lands within the St. Andrew State Park, Tyndall AFB, and private lands. The Unit Management Plan for the State Park was completed in 1999. The plan identifies the need for protection and management of the CBM. Tyndall AFB manages their portion of Shell Island under the installation's Integrated Natural Resources Management Plan. The Service has joined with the State Park and Tyndall AFB since 1995 by providing funding to protect and restore CBM habitats on Shell Island.

The St. Andrew State Park mainland consists of 1,260 acres of which 123 acres are beach mouse habitat. Several tracking efforts looking for signs of CBM on the mainland were made between 1995 and 1998; no evidence was found that indicated the presence of the beach mouse (Moyers 1996, Moyers *et al.* 1999). However, live-trapping to document the absence of the mouse has not been conducted. Reintroduction of this area is considered an action to support recovery of CBM.

The Grayton Beach subpopulation consists of two units in Grayton Beach State Park. The Park is divided into a central and western unit and is currently connected by a narrow band of primary

dunes. Total acreage of the Park is 2,236 acres with 153 acres providing suitable CBM habitat. The Unit Management Plan for the Park identified the protection of the CBM as an important component. The Park has requested and received funds from the Service to implement CBM habitat restoration and protection. Portions of private lands (WaterColor and Seaside developments) on the east side of the central unit are occupied by CBM or provide suitable habitat.

West Crooked Island consists of 1,558 acres of which 730 acres provide CBM habitat and remains occupied by CBM (Lynn 2004b). The West Crooked Island subpopulation resulted from its connection to Shell Island in 1998-1999. The construction of the St. Andrew Pass navigation inlet in the early 1930s severed Shell Island from the mainland on its western end. Since then, the original pass, East Pass (or Old Pass) began to close. After passage of Hurricane Opal in 1995, East Pass temporarily closed and reopened; however, after passage of hurricanes Earl and Georges in 1998, the pass closed (Coastal Tech 1999, Middlemas 1999). CBM dispersed onto West Crooked Island from Shell Island colonizing most of the island within two years (Lynn 2004b). East Pass was reopened as a joint venture between Tyndall AFB and Bay County in December of 2001 but has since closed again.

SABM is now known to consist of two subpopulations, East Crooked Island and St. Joseph Peninsula State Park. The majority of the East Crooked Island subpopulation is located on Tyndall AFB and the other on the St. Joseph Peninsula State Park. Other important public lands for the conservation of the mouse would include Eglin Air Force Base lands at Cape San Blas and Billy Joe Rish Park. Private lands adjacent to Tyndall AFB and the State Park are either known to be occupied by SABM or contain habitat. Trapping by St Joe/Arvida on about 111 acres of SABM habitat at East Crooked Island was conducted in 2000, 2001, and 2003. The trapping confirmed existence of SABM on the property (Moyers and Shea 2002). However, trapping their property in St. Joseph Beach did not result in capture of any beach mice (Moyers and Shea 2002). Although SABM is thought to continue to occupy habitat south of St. Joseph Peninsula State Park, only tracking has been conducted to confirm its presence on private lands since the late 1990s. Private lands adjacent to public lands are available for population dispersal and food source during periods of high population and after severe weather events. However, subpopulations on large tracts of private land within the historical range of the subspecies are needed for conservation of the SABM.

Land development has been primarily responsible for the permanent loss of SABM habitat along its approximately 40-mile long historical range. In addition, construction of U.S. highway 98 accelerated the habitat loss from associated development. By the mid 1990's about 12 linear miles were known to be occupied (Gore 1994, 1995), indicating a 68 percent reduction in it historical distribution (63 *FR* 70053). An effort to re-establish the SABM back into its historical range was initiated around the time of listing (Moyers *et al.* 1999); however, the range reduction described above did not take this into account since the success of the reintroduction was not known at the time (63 *FR* 70053). Similar analyses have not been conducted since.

Our best documentation of the species' decline can be seen from trapping or tracking surveys conducted at various times throughout its range. By the mid to late 1980's concerns were raised

when trapping efforts failed to result in captures at West Crooked Island (Gore 1987). By 1990 the SABM appeared to only inhabit a small portion (approximately 11 linear miles) of its original range: west end of East Crooked Island and within St. Joseph Peninsula State Park (Gore 1990). SABM's apparent decline continued into the mid-1990's when in 1994, the population on East Crooked Island was "presumed to be extinct" (Wooten and Holler 1999), leaving only one known population on St. Joseph Peninsula (Moyers *et al.* 1999). Subsequent reintroduction efforts in 1997-1998 appeared to have re-established the population on East Crooked Island (Moyers *et al.* 1999).

Recovery Criteria

The Recovery Plan for the SEBM identifies the primary recovery objectives for the subspecies (Service 1993). The SEBM can be considered for delisting if 10 viable, self-sustaining populations can be established throughout a significant portion of its historical range. More specifically, delisting can be considered if the following conditions are met:

1. Viable populations are maintained on the five public land areas where the subspecies currently occurs. Each population should not fluctuate below an effective breeding size of 500 individuals;

2. Five additional viable populations are established throughout the historical range of the subspecies; and

3. These populations should be monitored for at least five years.

The Recovery Plan for the AIBM identifies the primary recovery objectives for the subspecies (Service 1993). The AIBM can be considered for reclassification from endangered to threatened status if five viable, self-sustaining populations can be established. Because the majority of this subspecies' historical range has been permanently destroyed, it is not likely that it can be fully recovered or delisted. For the AIBM to be considered for downlisting to threatened, it is required that those populations at the northern and southern end of Anastasia Island continue to be viable. Each population should support a breeding population of 500 individuals. Two additional viable populations shall be established within the mainland portion of the historical range. All of these populations should be monitored for five years.

The Recovery Plan for the PKBM, CBM, and ABM identifies the primary recovery objectives to be the stabilization of present populations by preventing further habitat deterioration, and the reestablishment of populations in areas where they were extirpated (Service 1987). For each of the subspecies to be considered for downlisting to threatened, it is required that there be a minimum of at least three distinct self-sustaining populations in designated critical habitat with at least 50 percent of the critical habitat being protected and occupied by beach mice (Service 1987).

While this is the currently approved Recovery Plan for the three beach mouse subspecies, studies and research since the Recovery Plan publication provided additional information concerning

recovery needs for the subspecies. Protection and enhancement of existing populations and their habitat, plus reestablishment of populations in suitable areas within their historical ranges, are necessary for the subspecies survival and recovery. Core beach mouse populations remain isolated and are vulnerable to natural and anthropogenic factors that may further reduce or degrade habitat and/or directly reduce beach mouse population sizes. Maximizing the number of independent populations is critical to species survival. Protection of a single, isolated, minimally viable population risks the extirpation or extinction of a species as a result of harsh environmental conditions, catastrophic events, or genetic deterioration over several generations (Kautz and Cox 2001). To reduce the risk of extinction through these processes, it is important to establish multiple protected populations across the landscape (Soulé and Simberloff 1986, Wiens 1996). Through the critical habitat designation process we are addressing this by designating five independent units for the subspecies spaced throughout its historical range, depending on the relative fragmentation, size, and health of habitat, as well as availability of areas with beach mouse PCEs.

The Service completed a five-year status review of the CBM and PKBM in August 2007 (Service 2007a, 2007b). For both subspecies the following was recommended: designate a beach mouse recovery coordinator; revise the recovery plan; accomplish viable populations, monitor habitat improvement, corridor persistence and hurricane response; conduct genetic studies and translocations as necessary; participate in education and outreach and complete an emergency response plan.

A Recovery Plan for the SABM was finalized in 2010 and the recovery objectives are to reestablish additional populations, threat minimization or removal, habitat protection and/or restoration, and outreach/education to the public. This recovery plan is up to date and includes current threats to SABM.

In accordance with the Act, Federal agencies (including the Service) consult with the Service for actions that may adversely affect beach mice and their designated habitat. In Florida, consultations have included military missions and operations, beach nourishment and other shoreline protection, and actions related to protection of coastal development (**Table 14**).

Table 15. Previous biological opinions within Florida that have been issued for projects that had adverse impact to the nesting beach mice.

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
GINS Dune Protection (PKBM)	2000	0.01 acre (CH)
Translocation to PKSP (PKBM)	2000	≤ 3 beach mice (source mice from CH; relocation to CH and non-CH in PKSP)
Supplemental translocation to PKSP (PKBM)	2003	≤ 3 beach mice (source mice from CH; relocation to CH and non-CH in PKSP)

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
FEMA Berm Orange Beach, AL (PKBM)	2003	0.14 acre non-CH
Service scientific collecting permit program (PKBM)	2004-2005	1 beach mouse per 400 trap-nights per area (partial CH)
Florencia Development (within Action Area) (PKBM)	2005	3.5 acres (non-CH)
PKSP Re-build (PKBM)	2005	1.99 acres (CH)
FEMA Berm Emergency consultation (within Action Area) (PKBM)	2005	Consultation not complete (non-CH)
GINS road rebuild (PKBM)	2005	1.7 acres (CH)
Magnolia West Development (within Action Area) (PKBM)	2006	5.2 acres (not CH at time of construction, presently CH)
Palazzo Development (PKBM)	2006	0.58 acre (not CH at time of construction, presently CH)
Searinity Development (PKBM)	2006	0.32 acre (not CH at time of construction, presently CH)
Retreat Development (PKBM)	2006	0.21 acre (not CH at time of construction, presently CH)
Bond Residence (PKBM)	2006	0.17 acre (CH)
Three-batch condo (Island Club, Marquesas, Lorelei) (PKBM)	2007	0.95 acres (CH)
Naval Air Station Pensacola Pensacola Pass navigation channel dredging (PKBM)	2007	6.3 miles (CH)
Paradise Island development (PKBM)	2007	0.91 acres (CH)
Calabria condo development (PKBM)	2008	0.33 acres (non-CH)
Escambia County beach nourishment (PKBM)	2008	0.16 acres (partial CH)
Seabreeze Condominiums (PKBM)	2009	0.39 acres
Spanish Key Parking Lot (PKBM)	2009	0.28 acres

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
Perdido Key Fire Station (PKBM)	2010	0.43 acres (CH)
Evans Residence	2012	0.21 acre
Stern Residence	2012	0.07 acre
Whalen Residence	2012	0.18 acre
Carbone Residence	2012	0.74 acre
Lost Key	2012	26.1 acre
Stallworth Preserve Development (CBM)	1995	7 acres (CH)
Navy Panama City Beach site 4 construction (CBM)	2000	0.01 acre (CH)
East Pass Re-opening (CBM)	2001	Temporary, indirect take (CH)
WaterColor and WaterSound Developments (CBM)	2000	7.6 acres (non-CH)
Service scientific collecting permit (CBM)	2004-2005	1 beach mouse per 400 trap-nights per area (partial CH)
FEMA beach berms post hurricane Ivan emergency consultation (CBM)	2005	Consultation not complete (partial CH)
Western Lake Reopening consultation (CBM)	2006	2.7 acres annually for 5 years (CH)
FEMA Statewide post-disaster berm programmatic BO (PKBM, CBM, SABM, AIBM, and SEBM)	2007	75 miles for eroded shoreline(partial CH)
Angelos Development (CBM)	2009	0.42 acres
Bonfire Beach (SABM)	2008	38 acres
Ovation (SABM)	2010	5.41 acres (CH)
Sea Colony Development (AIBM)	1998	0.7 acres (non-CH)
Anastasia State Park beach nourishment (AIBM)	2005	50 linear feet (non-CH)

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
Service scientific collecting permit program (AIBM)	2004-2005	1 beach mouse per 400 trap-nights per area (non-CH)
Rodent Control Program on CCAFS (SEBM)	2002	50 beach mice
Cape Canaveral Air Force borrow source (SEBM)	2007	300 linear feet (non-CH)
Service scientific collecting permit program (SEBM)	2004-2005	1 beach mouse per 400 trap-nights per area (non-CH)
CCAFS Routine Maintenance Programmatic (SEBM)	2008	Temporary loss of habitat during trenching/digging for pipeline installation and repair, roadside mowing, soil remediation, pole placement, wells, soil boring, lines of sight, scrub restoration

Common Threats to Beach Mice in Florida

Habitat Loss or Degradation

Coastal dune ecosystems are continually responding to inlets, tides, waves, erosion and deposition, longshore sediment transport and depletion, and fluctuations in sea level. The location and shape of barrier island beaches perpetually adjusts to these physical forces. Winds move sediment across the dry beach forming dunes and the island interior landscape. The natural communities contain plants and animals that are subject to shoreline erosion and deposition, salt spray, wind, drought conditions, and sandy soils. Vegetative communities include foredunes, primary and secondary dunes, interdunal swales, sand pine scrub, and maritime forests. During storm events, overwash is common and may breach the island at dune gaps or other weak spots, depositing sediments on the interior and backsides of islands, increasing island elevation and accreting the sound shoreline. Breaches may result in new inlets through the island.

The quality of the dune habitat (primary, secondary, and scrub) is an important factor in maintaining and facilitating beach mouse recovery. Habitat manipulation is an old and widely used tool in wildlife management. It is especially useful in improving habitat suitability to increase local populations of a species. For beach mice, improving habitat can enhance the abundance and diversity of food resources, increase the chances of meeting a mate, and reduce competition for food and burrow sites.

Long term trapping data has shown that beach mouse densities are cyclic and fluctuate by order of magnitude on a seasonal and annual basis. These fluctuations can be a result of reproduction rates, food availability, habitat quality and quantity, catastrophic events, disease, and predation (Blair 1951, Bowen 1968, Smith 1971, Hill 1989, Rave and Holler 1992, Swilling *et al.* 1998, Swilling

2000, Sneckenberger 2001). Without suitable habitat sufficient in size to support the natural cyclic nature of beach mouse populations, subspecies are at risk from local extirpation and extinction, and may not attain the densities necessary to persist through storm events and seasonal fluctuations of resources.

Habitat loss and fragmentation associated with residential and commercial real estate development is the primary threat contributing to the endangered status of beach mice (Holler 1992a, 1992b, Humphrey and Frank 1992a). Coastal commercial and residential development has fragmented all the subspecies into disjunct populations. Isolation of habitats by imposing barriers to species movement is an effect of fragmentation that equates to reduction in total habitat (Noss and Csuti 1997). Furthermore, isolation of small populations of beach mice reduces or precludes gene flow between populations and can result in the loss of genetic diversity. Demographic factors such as predation (especially by cats), diseases, and competition with house mice, are intensified in small, isolated populations, which may be rapidly extirpated by these pressures. Especially when coupled with events such as storms, reduced food availability, and/or reduced reproductive success, isolated populations may experience severe declines or extirpation (Caughley and Gunn 1996). The influence these factors have on populations or individuals is largely dependent on the degree of isolation.

The conservation of multiple large, contiguous tracts of habitat is essential to the persistence of beach mice. At present, large parcels of land exist mainly on public lands. Protection, management, and recovery of beach mice on public areas have been complicated by increased recreational use as public lands are rapidly becoming the only natural areas left on the coast. Public lands and their staff are now under pressure to manage for both the recovery of endangered species and recreational use. Where protection of large contiguous tracts of beach mouse habitat along the coast is not possible, establishing multiple independent populations is the best defense against local and complete extinctions due to storms and other stochastic events (Danielson 2005). Protecting multiple populations increases the chance that at least one population within the range of a subspecies will survive episodic storm events and persist while vegetation and dune structure recover.

Habitat connectivity also becomes essential where mice occupy fragmented areas lacking one or more habitat types. If scrub habitat is lacking from a particular tract, adjacent or connected tracts with scrub habitat are necessary for food and burrow sites when resources are scarce in the frontal dunes, and are essential to beach mouse populations during and immediately after hurricanes. Trapping data suggests that beach mice occupying the scrub following hurricanes recolonize the foredune once vegetation and some dune structure have recovered (Swilling *et al*. 1998, Sneckenberger 2001). Similarly, when frontal dune habitat is lacking from a tract and a functional pathway to frontal dune habitat does not exist, beach mice may not be able to attain the resources necessary to expand the population and reach the densities necessary to persist through the harsh summer season or the next storm. Functional pathways may allow for natural behavior such as dispersal and exploratory movements, as well as gene flow to maintain genetic variability of the population within fragmented or isolated areas. To that end, contiguous tracts or functionally connected patches of suitable habitat are essential to the long-term conservation of beach mice.

A lack of suitable burrow sites may be a consequence of habitat degradation. Beach mice use burrows to avoid predators, protect young, store food, and serve as refugia between foraging bouts and during periods of rest. Beach mice have been shown to select burrow sites based on a suite of abiotic and biotic factors. A limitation in one or more factors may result in a shortage of suitable sites and the availability of potential burrow sites in each habitat may vary seasonally. Beach mice tend to construct burrows in areas with greater plant cover, less soil compaction, steep slopes, and higher elevations above sea level (Lynn 2000a, Sneckenberger 2001). These factors are likely important in minimizing energy costs of burrow construction and maintenance while maximizing the benefits of burrow use by making a safe and physiologically efficient refuge. Similar to food resources, this fluctuation in availability of burrow sites suggests that a combination of primary, secondary, and scrub dune habitat is essential to beach mice at the individual level.

Predation

Beach mice have a number of natural predators including coachwhip (*Masticophis flagellum*) corn snakes (*Elaphe guttata guttata*), pygmy rattlesnake (*Sistrurus miliarius*), eastern diamondback rattlesnake (*Crotalus adamanteus*), short-eared owl (*Asio flammeus*), great-horned owl (*Bubo virginianus*), great blue heron (*Ardea herodias*), northern harrier (*Circus cyaneus*), red fox, gray fox, skunk (*Mephitis mephitis*), weasel (*Shallela frenata*), and raccoon (Blair 1951, Bowen 1968, Holler 1992a, Novak 1997, Moyers *et al.* 1999, Van Zant and Wooten 2003). Predation of beach mouse populations that have sufficient recruitment and habitat availability is natural and not a concern. However, predation pressure from natural and non-native predators may result in the extirpation of small, local populations of beach mice.

Free-roaming cats are believed to have a devastating effect on beach mouse persistence (Bowen 1968, Linzey 1978) and are considered to be the main cause of the loss of at least one population of beach mice (Holliman 1983). Cat tracks have been observed in areas of low trapping success for beach mice (Moyers *et al.* 1999). The PHVA for the ABM indicated that if each population had as few as one cat, which ate one mouse a day, rapid extinction would occur in over 99 percent of all iterations (Traylor-Holzer 2005).

In response to increasing depredation of sea turtle nests by coyote, fox, hogs, and raccoon, multi-agency cooperative effort have been initiated and are ongoing throughout Florida, in particular on public lands. These programs also benefit beach mice.

Hurricanes

Hurricanes can severely affect beach mice and their habitat, as tidal surge and wave action overwash habitat, leaving a flat sand surface denuded of vegetation; sand is deposited inland, completely or partially covering vegetation; blowouts between the ocean and bays and lagoons leave patchy landscapes of bare sand; primary dunes are sheared or eroded; and habitat is completely breached, creating channels from the ocean to bays and lagoons. Other effects include direct mortality of individuals, relocation/dispersal, and subsequent effects of habitat alterations

(that impact such factors as forage abundance/production and substrate elevation). Habitat impacts can be widespread, encompassing the range of the subspecies.

Until frontal dune topography and vegetation redevelop, scrub habitat maintains beach mice populations and provides the majority of food resources and potential burrow sites (Lynn 2000a, Sneckenberger 2001). While storms temporarily reduce population densities (often severely), this disturbance regime maintains open habitat and retards plant succession, yielding a habitat more suitable for beach mice than one lacking disturbance. The low-nutrient soil of the coastal dune ecosystem often receives a pulse of nutrients from the deposition of vegetative debris along the coastline (Lomascolo and Aide 2001). Therefore, as the primary and secondary dunes recover, beach mice recolonize this habitat readily as food plants develop to take advantage of the newly available nutrients. Recovery times vary depending upon factors such as hurricane characteristics (*i.e.*, severity, amount of associated rain, directional movement of the storm eye, storm speed), successional stage of habitat prior to hurricane, elevation, and restorative actions post hurricane. Depending on these factors, recovery of habitat may take from one to over 40 years.

The impact of hurricanes on plant communities temporarily affects food availability, and hence can limit population densities in impacted habitats soon after storms. Observations indicate that Hurricane Opal (a Category 3 storm in November 1995) caused a decrease in one population of ABM by 30 percent (Swilling *et al.* 1998). However, population densities in scrub habitat typically increased following hurricanes (Swilling *et al.* 1998). Sneckenberger (2001) also found atypical numbers of ABM in scrub following a hurricane. Five months post-storm, "densities (individuals/km) were up to 7.5 times greater in scrub areas than in frontal dune grids." Impacts of the storm may have been apparent as long as 17 months after the storm when scrub densities remained triple those of frontal dunes (Sneckenberger 2001). Moyers *et al.* (1999) found similar results for CBM at Grayton Beach State Park. When frontal and primary dunes sustained extensive damage during Hurricane Opal in 1995, beach mice were captured behind what remained of primary dune habitat. By 1998, however, primary dunes and the immediate habitat inland appeared to support higher numbers of beach mice.

In addition to the overall change in post Hurricane Opal distribution of ABM, Swilling *et al.* (1998) found the mean percent of newly marked individuals increased from 14 percent for the three trapping periods before the storm to an average of 26.7 percent for the same interval post hurricane. The average for the three trapping periods immediately following was even higher, at 42.7 percent of the individuals captured. Swilling *et al.* (1998) concluded that this increased presence of new individuals reflected increased reproduction. A statistical analysis of the data indicated that the number of females exhibiting signs of reproduction was significantly higher than normal (18.9 percent higher). Moyers *et al.* (1999) also found similar results at Topsail Hill Preserve State Park. Four to five months following Hurricane Opal, all female CBM captured were pregnant or lactating. Trapping six months after the hurricane, Moyers *et al.* (1999) noted that 51.5 percent of captured CBM were new unmarked beach mice.

Although hurricanes can significantly alter beach mouse habitat and population densities in certain habitats, some physical effects may benefit the subspecies. Hurricanes are probably responsible

for maintaining coastal dune habitat upon which beach mice depend through repeated cycles of destruction, alteration, and recovery of dune habitat. Holler *et al.* (1999) suggested that hurricanes could function to break up population subgroups and force population mixing. The resultant breeding between members of formerly isolated subgroups increases genetic heterogeneity and could decrease the probability of genetic drift and bottlenecks.

Beachfront Lighting

Artificial lighting increases the risk of predation and influences beach mouse foraging patterns and natural movements as it increases their perceived risk of predation. Foraging activities and other natural behaviors are influenced by many factors. Artificial lighting alters behavior patterns causing beach mice to avoid otherwise suitable habitat and decreases the amount of time they are active (Bird *et al.* 2004).

The presence of vegetative cover reduces predation risk and perceived predation risk of foraging beach mice, and allows for normal movements, activity, and foraging patterns. Foraging in sites with vegetative cover is greater and more efficient than in sites without cover (Bird 2002). Beach mice have also been found to select habitat for increased percent cover of vegetation, and decreased distance between vegetated patches (Smith 2003).

Genetic variability

Selander *et al.* (1971) conducted an electrophoretic study on 30 populations of *P. polionotus*, including populations of beach mouse subspecies. Based on 30 allozyme loci, they estimated that the level of allozyme variation found in beach mouse populations was at least 40 percent lower than the level of variation in nearby inland populations. This work indicates that beach mouse populations already have lower genetic variability before inbreeding, bottleneck events, or founder effects that may occur in a reintroduced population. Lower levels of heterozygosity has been linked to less efficient feeding, fewer demonstrations of social dominance and exploratory behavior, and smaller body size (Smith *et al.* 1975, Garten 1976, Teska *et al.* 1990). Research focused on inbreeding depression in old-field mice (including one beach mouse subspecies), determined that the effects of inbreeding negatively influenced factors such as litter size, number of litters, and juvenile survivorship (Lacy *et al.* 1995).

In 1995, the Service contracted with Auburn to conduct genetic analysis of: 1) post-reestablishment gene structure in PKBM and CBM; 2) microgeographic patterning and its relevance to alternate management approaches for ABM on the Bon Secour NWR; and 3) if feasible, the historical relationship of SABM from Crooked Island relative to CBM from Shell Island and SABM from St. Joseph Peninsula.

Results of the work for CBM found: 1) founder effects were observed in the Grayton Beach State Park population (fixation of alleles common to the donor population and allele frequency shifts); 2) incongruity in number and size of several alleles was observed between Grayton Beach State Park and Shell Island; 3) overall genetic divergence between the donor and reestablished

population was moderate; 4) genetic differences between Topsail Hill Preserve State Park and other CBM sites were higher than expected given the spatial proximity; 5) Topsail Hill Preserve State Park appears to be a reservoir for unique variation within the remaining populations of CBM; and 6) the overall relatedness estimated for Grayton Beach State Park suggested that any mating would involve close relatives (Wooten and Holler 1999).

Wooten and Holler (1999) recommended strategies for management of CBM based on genetics. Management of the Grayton Beach State Park population for genetic characteristics appears to be needed; however, additional genetic analyses will be needed. Relocation of CBM to Grayton Beach State Park from Shell Island should be continued.

Results of the work for PKBM found that: 1) founder effect (from Florida Point to GINS) did impact the GINS-Perdido Key Area subpopulation. Loss of rare alleles and allele frequency shifts were noted; 2) a low to moderate level of overall genetic divergence was observed; 3) data suggests that some effects of genetic drift were mediated by continued transfer of individuals; 4) levels of heterozygosity were unexpected given recent history; 5) average levels of relatedness among individuals is high which may portend future inbreeding related problems (however, no evidence of existing inbreeding was observed in the data); and 6) the overall level of microsatellite variation retained in the GINS-Perdido Key Area subpopulation was higher than anticipated. Wooten and Holler (1999) recommended management of PKBM based on genetics by: 1) preserving the natural population to the maximum extent possible since the loss of the Florida Point subpopulation resulted in the permanent loss of alleles; 2) using the GINS-Perdido Key Area subpopulation as a donor for reestablishment of other populations because of the retention of a substantial amount of genetic variation; and 3) reestablishment plans should include transfers between donor and reestablished subpopulations. In addition, translocations should be accomplished in pairs.

Analysis of genetic work focused on SABM indicated that there are two possible genetic histories for Crooked Island beach mice: 1) the last known beach mice from Crooked Island were derived from CBM or 2) the last known beach mouse from Crooked Island were unique from both CBM found on Shell Island or SABM found on St. Joseph peninsula (Van Zant 2003).

Climate Change (refer to page 49)

Analysis of the Species/Critical Habitat Likely to be Affected

Beach mice are currently federally protected because of their low numbers caused by habitat loss with continuing threats to their habitat (including critical habitat for CBM, PKBM, and SABM) and resulting affects from storm and post-storm events. The primary reason for the significant reduction in their range is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated beach mouse habitat. Coastal urbanization has also increased the recreational use of beachfront areas. Dune habitat maintenance is an important component of beach mouse conservation. Providing a healthy and continuous dune system assures mouse population stability. Integral to this is keeping visitors to the beach off the

dunes and replanting as necessary when impacts occur or are observed. The extremely active 2004 and 2005 hurricane seasons also had a severe effect on Florida's beaches and beach mouse habitat.

Critical habitat for three (PKBM, CBM, and SABM) of the five subspecies of beach mice has been designated and will be discussed. No critical habitat has been designated for the other two subspecies (SEBM and AIBM). Therefore, the proposed action would have no effect on designated critical habitat for these two subspecies because none is designated.

Generally, sand placement activities or dredged navigation channel material is not placed on existing beach mouse habitat consisting of vegetated dunes. Typical effects from these activities to beach mice and their habitats consist of the staging and storage of equipment, work vehicles, or materials and beach access for sand placement activities or dredged material placement. These effects may result in the permanent and temporary loss, degradation, or fragmentation of beach mouse habitat and changes in essential life history behaviors (dispersal and movement, foraging, seeking mates, breeding, and care of young). Beach mice spend their entire lives within the dune ecosystem and are nocturnal. Sand placement projects may occur at anytime of the year depending on their location and are usually conducted on a 24/7 schedule. The quality of the placed sand could affect the suitability of the beach and dunes to support beach mouse burrow construction and food sources. The effect of the activities covered under the consultation with incorporation of the proposed conservation measures on beach mice overall survival and recovery are considered in this SPBO.

ENVIRONMENTAL BASELINE

Status of the species/Critical Habitat within the Action Area (all subspecies of beach mice)

The action area encompasses the entire range of five subspecies of beach mice, and designated critical habitats of three beach mouse subspecies. Therefore, the previous discussion in "Status of the Species" applies here. The known distribution of the five subspecies of beach mice is a result of cursory surveys and intermittent trapping involving different projects. There has not been a systematic trapping study done in order to determine the status of each subspecies throughout their ranges.

Factors affecting the species environment within the action area

<u>Coastal development</u>

Beach mice were listed as endangered and threatened species primarily because of the fragmentation, adverse alteration, and loss of habitat due to coastal development. The threat of development-related habitat loss continues to increase. Other contributing factors include low population numbers, habitat loss from a variety of reasons (including hurricanes), predation or competition by animals related to human development (cats and house mice), and the existing strength or lack of regulations regarding coastal development.

Hurricanes

Hurricanes were probably responsible for maintaining coastal beach habitat upon which beach mice depend through repeated cycles of destruction, alteration, and recovery of dune habitat. Hurricanes generally produce damaging winds, storm tides and surges, and rain and can result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes can impact beach mice either directly (e.g., drowning) or indirectly (e.g., loss of habitat). Depending on their frequency, storms can affect beach mice on either a short-term basis (e.g., temporary loss of habitat) or long term (e.g., loss of food, which in turn may lead to increased juvenile mortality, resulting in a depressed breeding season). How hurricanes affect beach mice also depends on the characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where the northeast edge of the hurricane crosses land.

Because of the limited remaining habitat, frequent or successive severe weather events could compromise the ability of certain populations of beach mice to survive and recover. Beach mice evolved under natural coastal environmental events such as hurricanes. The extensive amount of predevelopment coastal beach and dune habitat allowed beach mice to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes has increased the threat to beach mice survival and recovery. On developed beaches, typically little space remains for sandy beaches to become re-established after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their prestorm locations can result in a major loss of habitat for beach mice.

The 2004 hurricane season was the most active storm season in Florida since weather records began in 1851. Hurricanes Charley, Frances, Ivan, and Jeanne, along with Tropical Storm Bonnie, damaged the beach and dune system, upland structures and properties, and infrastructure in the majority of Florida's coastal counties. The cumulative impact of these storms exacerbated erosion conditions throughout the state.

The 2005 hurricane season was a record-breaking season with 27 named storms. Hurricanes Dennis, Katrina, Ophelia, Rita, and Wilma, and Tropical Storms Arlene and Tammy impacted Florida. The cumulative impact of these storms exacerbated erosion conditions in south and northwest Florida.

Beachfront Lighting

Artificial lighting along developed areas of both coastlines continues to cause increase susceptibility to predators, altered foraging and breeding habits which impact beach mouse recovery. While a majority of coastal local governments and counties have adopted beachfront lighting ordinances compliance and enforcement is lacking in some areas. Further, the lighting in areas outside the beachfront ordinance coverage areas continues to be unregulated resulting in

urban glow. Even the darker areas of conservation managed lands are subject to surrounding sky glow.

Predation

A major continuing threat to beach mice is predation by free-roaming cats and other nonnative species. The domestic cat is not native to North America and is considered a separate species from its wild ancestral species, *Felis silvestris*. Cats are hunters, retaining this behavior from their ancestors. However, wildlife in the western Hemisphere did not evolve in the presence of a small, abundant predator like the domestic cat, and thus did not develop defenses against them. Cats were introduced to North America a few hundred years ago.

Free-roaming pets prey on small mammals, birds, and other native wildlife. In the U.S., on a nationwide basis, cats kill over a billion small mammals and hundreds of millions of birds each year. Worldwide, cats are second only to habitat destruction in contributing to the extinction of birds. Cats have been documented to take beach mice, sea turtle hatchlings, shorebirds, and migratory birds. A significant issue in the recovery of beach mice is predation by free-ranging pet and feral cats. Beach mice have a number of natural predators including snakes, owls, herons, and raccoons. Predation is part of the natural world. However, predation pressure from both natural and nonnative predators may result in the extirpation of small, local populations of beach mice in a very short time (Bowen 1968, Linzey 1978).

Climate Change

Based on the present level of available information concerning the effects of global climate change on the status of beach mice and its designated critical habitat, the Service acknowledges the potential for changes to occur in the action area, but presently has no basis to evaluate if or how these changes are affecting beach mice or its designated critical habitat nor does our present knowledge allow the Service to project what the future effects from global climate change may be or the magnitude of these potential effects.

EFFECTS OF THE ACTION

Factors to be considered

Aspects of the sand placement and dredged material placement activities will occur within habitat that is used by beach mice year round. The activities include the storage of equipment, work vehicles, or materials and creation, expansion, or use of beach access points for sand placement activities or dredged material placement. The work, depending on the location, may be conducted any time of the year. Most effects would be expected to be temporary. These short-term and temporary impacts could include loss of foraging habitat, altered beach mouse movement and dispersal activities. Long-term and permanent impacts from the sand placement activities such as excavation of dune habitat and degradation could impact beach mice by fragmentation of their habitat including critical habitat for the PKBM, CBM, and SABM.

There are typically different "levels" of access sites needed for a project. The primary access is a "lay-down" yard, where pipe is delivered and stored, and storage trailers, and other equipment and materials are stored. These are typically big paved parking lots, so that the Corps's trucks can access the area to drop off and pick up equipment. There's typically a beach access at that point to get the pipe and equipment onto the beach and that access is usually at least 50-ft wide (pipe sections are typically 40 to 50 feet long). In NW Florida and Alabama, these yards have been approximately eight miles apart.

"Intermediate areas" are used at about the quarter points of the project length. These are used for the fuel tank, welding equipment, and other items or systems that get used a couple of times a day. These locations can vary from two to three miles apart. In addition, there are access points to allow project vehicles and trucks on and off the beach. Based on previous projects it would be expected to have single-vehicle entry points at one-half to one-mile intervals.

Protective, avoidance, and minimization measures have been incorporated into the project plan to avoid or minimize the potential impacts from the sand placement and dredged material placement activities. However, even with these measures, impacts to beach mice are expected to occur from some aspects of the project activities. The activities are expected to directly or indirectly adversely affect beach mice and/or their habitat including designated critical habitat for the PKBM, CBM, and SABM. The work may occur on public and/or private lands.

Proximity of Action: Some aspects of the sand placement and dredged material placement activities would occur directly in beach mouse habitat. The storage or staging of pipe and other equipment, and vehicles, use or creation of beach access points, and placement of pipe, nourishment or dredged material could occur in habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM. Beach mice spend their entire life cycle within the coastal dune system.

Distribution: The storage or staging of pipe and other equipment and vehicles and use of beach access points that could occur in habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM may vary depending on the individual project length and existing beach accesses and non-beach mouse habitat that can be used for storage and staging.

Timing: The timing of the activities would directly and indirectly impact beach mice and their habitat depending on the season. Beach mice reproduce year-round with more mice being produced in the late winter and early spring. Impacts could include but would not be limited to disrupting mice seeking mates, constructing nest burrows, foraging for food, caring for their young, and young mice leaving the nest burrow dispersing into new habitat.

Nature of the Effect: The effects of the activities may include the temporary loss of habitat including the loss of a few beach mice from excavation of habitat for beach access and reduction of beach mouse activity including feeding, reproduction, and movement from loss or alteration of habitat. Activities that decrease the amount or quality of dune habitat or movement could affect beach mice by reducing the amount of available habitat and fragmenting the habitat.

Duration: Time to complete the project construction may vary depending on the project length, weather, and other factors (equipment mobilization and break downs, availability of fuel, lawsuits, etc.). Project work could take as little as a month and as long as a one or two years. Beach mouse habitats would remain disturbed until the project is completed and the habitats are restored. Dune restoration could be complete from 6 to 12 months after the project has been completed. The short generation time of beach mice combined with the time frames provided in this document (projects from 1 month to 2 years, dune restoration 6 to 12 months following project completion) will impact multiple generations of beach mice. The time to complete a project and restore the habitat can be a complete loss of habitat availability and use for multiple generations of beach mice.

Disturbance frequency: Depending on the sand placement activity and dredging project frequency, this could result in impacts to beach mice and their habitats at any time during the year on a minimum cycle of every 2 years. Following initial sand placement, activities could occur every year depending on the project location and erosion events. The actual number of times the sand placement would occur is unknown. Following initial sand placement or dredge material placement, maintenance activities could occur every two to 10 years depending on the project location and situation (erosion, long shore sand transportation, upstream activities, and weather events). Thus, impacts related to the subject activities would be expected to occur no more often than every two to three years. However, while not anticipated, work could occur annually in response to emergency events. The actual number of times the nourishment and dredging material disposal activities is unknown but can be based on previous work.

Disturbance intensity and severity: Depending on the frequency needed to conduct the nourishment and dredged material work and the existence of staging areas and beach access points, effects to the recovery of beach mouse may vary. However, the action area encompasses entire range of each subspecies and the overall intensity of the disturbance is expected to be minimal. The severity is also likely to be slight as few if any mice would be lost and dune habitats can be restored quickly if protected from other impacts (pedestrians and vehicles).

The staging and storage of equipment and materials and beach access points could occur within habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM and could be adjacent to designated critical habitat for the PKBM, CBM, and SABM. Beach mice are permanent inhabitants of the coastal ecosystem conducting all their life cycles in this environment. While the current status of individual beach mouse subspecies is unknown, their general distribution is known.

Analysis for effects of the action

The action area consists of the Atlantic or Gulf beachfront including the wet and dry unvegetated beach, developing foredunes and interdunal swales, and areas that were formerly primary or secondary dunes. Sand placement or dredged material placement work would not occur on existing vegetated primary or secondary dunes. However, construction of or expansion of an existing beach access could be located through scrub, secondary, or primary dunes. Beach mice

would generally be found inhabiting stable primary, secondary, and scrub dunes on a permanent basis with other habitats being used periodically on a daily or seasonal basis for feeding and movement. Some of these areas also include critical habitat.

Direct and Indirect Impacts

Direct impacts are effects of the action on the species occurring during project implementation and construction (sand placement or dredged material placement). Direct loss of individual beach mice may occur during the creation or expansion of beach access points when heavy equipment clears the habitat and packs the sand. In general the length of time between project maintenance work is expected to be sufficient for beach mouse habitat to be restored. Thus, it is not anticipated that the nourishment and dredged material placement activities would result in permanent beach mouse habitat destruction (including critical habitat). However, habitat for all the beach mouse subspecies and critical habitat for the PKBM, CBM, and SABM that provides food or cover may be temporarily destroyed or altered from the activities.

Indirect effects are a result of a proposed action that occur later in time and are reasonably certain to occur. The indirect effect of the sand placement and dredged material placement activities would be newly created or expanded existing beach access points that act as barriers to beach mouse movement for foraging, or population expansion or dispersal. Maintaining the connectivity among habitats is vital to persistence of beach mice recovery. Recovery actions needed to assure the connectivity include restoration and maintenance of the dune system following project completion.

For the Service to determine if the project impacts on designated critical habitat would be an adverse modification, the Service shall determine if the impact on the habitat appreciably diminishes the capability of the critical habitat to satisfy essential requirements of beach mice. The long-term maintenance of the beach mouse populations in the project areas could be compromised if the sand placement and dredged material placement activities occur too frequently resulting in a long-term barrier to mice movement. However, our evaluation indicates the impacts to critical habitat should be temporary in nature based on past history of nourishment projects. In addition, the area to be directly affected within the individual subspecies would be a small percentage of the overall critical habitat and would not be expected to reduce the carrying capacity of the recovery unit or appreciably diminish the ability of the PCE's to provide for the essential functions of the critical habitat units.

Species' response to a proposed action

This SPBO is based on effects that are anticipated to beach mice (all life stages) as a result of the temporary physical disturbance of beach mice habitat from beach nourishment or dredged material placement and associated activities. Some individual beach mice (all life stages) may be lost during the initial construction or expansion of beach accesses where heavy equipment destroys dune habitat and compacts the sand within the access corridor. Any mice that survive the initial construction may move outside of the disturbed area and construct burrows elsewhere in the vicinity. This will result in increased exposure to predation due to the removal of their burrows.

Following access construction, a bare gap of sand could form a barrier to limit beach mouse movement within the area altering regular movement patterns. The bare areas could not be used for foraging, breeding or sheltering. These impacts are expected to be limited to the construction phase of the project (one month to two years). As the life span of a beach mouse is estimated to be approximately nine months, the loss of individual mice or the temporary loss of habitat could affect several generations of beach mice, but because beach mice can reproduce rapidly with adequate resources, colonization or recolonization of the restored habitat would be expected.

Beach mice have evolved to adapt to catastrophic weather events. Additional factors such as surrounding development pressure and nonnative predators may affect the species' ability to recover from the loss of individuals. However, the temporary loss of the habitat itself is not expected to permanently impact the populations as all beach mouse habitat within the project areas not permanently destroyed would be restored or maintained as part of the conservation measures committed to by the Corps or the Applicant. The temporary nature of the impacts to dune habitats is not expected to alter the function and conservation role of the remaining beach mouse habitat including designated critical habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this SPBO. Future Federal actions that are unrelated to the proposed project are not considered in this opinion and require separate consultation pursuant to section 7 of the Act.

It is reasonably certain to expect that coastal development, human occupancy and recreational use along the Atlantic and Gulf coasts of Florida will increase in the future. Redevelopment along with new developments following the hurricane seasons of 2004 and 2005 are occurring as allowed by local zoning standards. It is unknown how much influence a nourished beach would contribute to the development and recreational use of the shoreline. Any projects that are within endangered or threatened species habitat will require section 7 consultation or section 10(a) (1)(B) permitting from the Service.

In recognizing the importance of coastal barrier islands along the Atlantic and Gulf coasts, Congress passed the Coastal Barrier Resources Act (CBRA) of 1982 and Coastal Barrier Improvement Act in 1991. The purpose of CBRA is "…to minimize the loss of human life, wasteful expenditure of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers along the Atlantic and Gulf coasts by restricting future Federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers." Congress established the Coastal Barrier Resources System units that apply to the CBRA.

Escambia County is currently in the final permitting stages of a beach nourishment project for Perdido Key. The project would cover approximately 4 miles of beachfront along county and private lands, not including state and Federal lands. The Service completed an endangered species

consultation for the project in 2008. The project construction is expected to begin in late 2009-2010. The beach nourishment project is likely to enhance beach mouse habitat by providing an additional buffer to the dune habitats from storm events.

The Pensacola Naval Air Station has proposed to dredge their navigation channel resulting in the need to place eight million cubic yards of dredged material that is beach compatible. Because of cost, Perdido Key is the closest area to receive the material. Receiving areas include the Perdido Key Gulf beachfront (in lieu of the County implementing their project described above), PKSP, and GINS, Escambia County. The project could result in the placement of dredged material on 16 miles of beachfront including private, county, state, and Federal lands. The Navy has received their permits to complete the project. The Service completed an endangered species consultation for the project in 2007. The full project is on hold due to funding. However, the Federal navigation channel in the lower portion of the project area is expected to be maintenance dredged in 2009-2010.

Gulf County is currently completing a beach restoration project on St. Joseph peninsula and St. Joseph Peninsula State Park. The project will cover approximately 7.5 miles of Gulf of Mexico beachfront. The Service completed an endangered species consultation for the project. The project was completed in 2008.

CONCLUSION

Sea Turtles

After reviewing the current status of the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles, the environmental baseline for the action area, the effects of the proposed activities, the "Conservation Measures," and the cumulative effects, it is the Service's biological opinion that work conducted under the Statewide Programmatic action, as proposed, is not likely to jeopardize the continued existence of the loggerhead, green, leatherback, hawksbill or Kemp's ridley sea turtles. Critical habitat has been designated for the NWAO DPS of the loggerhead sea turtle. **Table 4** has the list of the critical habitat units within the project area.

The conservation of the five loggerhead recovery units in the Northwest Atlantic is essential to the recovery of the loggerhead sea turtle. Each individual recovery unit is necessary to conserve genetic and demographic robustness, or other features necessary for long-term sustainability of the entire population. Thus, maintenance of viable nesting in each recovery unit contributes to the overall population. Three of the five loggerhead recovery units in the Northwest Atlantic occur within the action area, the PFRU, the DTRU, and the NGMRU. Sand placement is not expected to occur within the DTRU. The NGMRU averages about 1,000 nests per year. Northwest Florida accounts for 92 percent of this recovery unit in nest numbers (920 nests) and consists of approximately 234 miles of nesting shoreline. Of the available nesting habitat within the NGMRU, with most sand placement projects have a project life of five to seven years and channel maintenance activities occurring every two to three years, on average, sand placement impacts will

occur on 8.8 miles of sea turtle nesting shoreline per year. This is based on the average linear feet of beach on which sand placement occurred during nonemergency years from 2001 to 2008.

The PFRU averages 64,513 nests per year. The entire recovery unit occurs within Florida and consists of approximately 595 miles of sandy shoreline (http://www.dep.state.fl.us/beaches/publications/pdf/fl_beach.pdf). Of the available nesting habitat within the PFRU, sand placement activities will occur on 18.9 miles of nesting shoreline per year during nonemergency years. This is based on the average linear feet of beach on which sand placement occurred during non-emergency years from 2001 to 2008.

Generally, green, leatherback, hawksbill, and Kemp's ridley nesting overlaps with or occurs within the beaches where loggerhead sea turtles nest on both the Atlantic and Gulf of Mexico beaches. Thus, for green, leatherback, hawksbill, and Kemp's ridley sea turtles, sand placement activities will affect an average of 27.7 miles of shoreline per year. This is based on the average linear feet of beach on which sand placement occurred during nonemergency years from 2001 to 2008.

For all species of sea turtles, post-hurricane sand placement activities occurred on approximately 205 miles of shoreline for the 2004-2005 period following the emergency events (declared disasters and Congressional Orders). These activities are within the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S.

Research has shown that the principal effect of sand placement on sea turtle reproduction is a reduction in nesting success, and this reduction is most often limited to the first year following project construction. Research has also shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline. Although a variety of factors, including some that cannot be controlled, can influence how a nourishment project will perform from an engineering perspective, measures can be implemented to minimize impacts to sea turtles.

Beach Mice

The PKBM, CBM, and SABM occur on both public and private lands throughout their historical ranges. Both the SEBM and the AIBM are located completely on county, state, or federally protected lands, except for a small area in St. Johns County in which the AIBM are found on private lands along the Florida coast.

After reviewing the current status of the species of the SEBM, AIBM, PKBM, CBM, and SABM, the environmental baseline for the action area, the effects of beach nourishment and dredged material placement and associated activities, the "Conservation Measures," and the cumulative effects, it is the Service's biological opinion that the Statewide Programmatic action for these projects, as proposed, is not likely to jeopardize the continued existence of any of the above subspecies of beach mice and is not likely to destroy or adversely modify designated critical habitat for the PKBM, CBM, or SABM.

As discussed in the Effects of the Action section of this SPBO, we would not expect the carrying capacity of beach mouse habitat within the action area to be reduced. Beach mouse habitat will continue to provide for the biological needs of the subspecies as demonstrated below:

1. No permanent loss of beach mouse habitat will occur within the action area from the project construction or maintenance;

2. Temporary impacts to beach mouse habitat will be restored within the action area after project completion; and

3. A full complement of beach mouse habitat will remain within the action area after project completion.

Temporary impacts are expected to be limited to the construction/maintenance phase of the project and habitat restoration period following the project, which could be completed between one month and two years.

While a few beach mice may be lost, beach mice recover well from population size reductions (Wooten 1994) given sufficient habitat is available for population expansion after the bottleneck occurs. Therefore, we do not consider the potential loss of individuals to be significant.

Also, 50 feet of beach mouse critical habitat for each subspecies (PKBM, CBM, and SABM) could be temporarily affected each time a project is completed as a result of the sand placement activities. We would not anticipate that the loss of the critical habitat would alter or affect the remaining critical habitat in the action area for each subspecies (PKBM, CBM, and SABM) to the extent that it would appreciably diminish the habitat's capability to provide the intended conservation role for the subspecies in the wild.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the

agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and shall be implemented by the Corps so that they become binding conditions of any grant or permit issued to the Applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps shall report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF ANTICIPATED TAKE

Sea Turtles

The Service anticipates that no more than 27.7 miles of highly eroded shoreline along the Florida coastline (no more than 8.8 miles within the NGMRU and no more than 18.9 miles within the PFRU) would receive sand placement per year during nonemergency calendar years with a maximum of 102 miles of shoreline (38 miles within the NGMRU and 64 miles of shoreline within the PFRU) receiving sand during or following an emergency event (declared disaster or Congressional Order) as a result of the Statewide Programmatic action. This represents two percent of the entire shoreline per year during a nonemergency year and seven percent of the entire shoreline during an emergency year. Over the last 10 years, one Congressional Order occurred due to emergency events in the 2004-2005 period. The increased sand placement on 102 miles of shoreline is expected to occur once in a 10-year period due to emergency events. Incidental take of sea turtles will be difficult to detect for the following reasons:

1. Turtles nest primarily at night and all nests are not located because
    a. Natural factors, such as rainfall, wind, and tides may obscure crawls; and
    b. Human-caused factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program;

2. The total number of hatchlings per undiscovered nest is unknown;

3. The reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown;

4. An unknown number of females may avoid the project beach and be forced to nest in a less than optimal area;

5. Lights may misdirect an unknown number of hatchlings and cause death; and

6. Escarpments may form and prevent an unknown number of females from accessing a suitable nesting site.

However, the level of take of these species due to disturbance and sand placement on suitable turtle nesting beach habitat can be anticipated because (1) turtles will continue to nest within the project site during and following sand placement; (2) sand placement activities will likely occur during a portion of the nesting season; (3) sand placement activities will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter or misdirect nesting females and hatchlings during and following sand placement.

Take is expected to be in the form of: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the project areas; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the projects; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the sand placement areas or on adjacent beaches during sand placement or construction activities; (5) misdirection of nesting and hatchling turtles on beaches adjacent to the sand placement or construction area as a result of project lighting including the ambient lighting from dredges; (6) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (7) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service.

According to Schroeder (1994), there is an average survey error of seven percent; therefore, there is the possibility that some nests within the Action Area may be misidentified as false crawls and missed. However, due to implementation of the sea turtle protection measures, we anticipate that the take will not exceed seven percent of the nesting average in the action area. This number is not the level of take anticipated because the exact number cannot be predicted nor can the level of incidental take be monitored.

Beach Mouse

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated from the sand placement activities may occur any time of the year within a ten-year period. The Service anticipates incidental take of beach mice would be difficult to detect for the following reasons: (1) an unknown number of beach mice may be injured, crushed or buried during beach access construction work and remain entombed in the sand; (2) beach mice are nocturnal, are small, and finding a dead or injured body is unlikely because of predation, and (3) changes in beach mouse essential life behaviors may not be detectable in standardized monitoring surveys.

For projects that occur within beach mouse habitat it is anticipated that no more than 50 linear feet of beach mouse habitat could be affected per sand placement activity for beach access within a subspecies range statewide as a result of the sand placement activities.

The incidental take is expected to be in the form of: (1) harm or harassment to all beach mice occupying the created or expanded beach access points; (2) harassment of beach mice from disturbance of foraging opportunities within the access areas during the construction period; (3) harassment of beach mice from temporary loss of foraging and burrow habitat; and (4) harassment of beach mice from temporary restriction of movement across access areas.

EFFECT OF THE TAKE

Sea Turtles

In the SPBO, the Service determined that the level of anticipated take is not likely to result in jeopardy to the loggerhead, green, leatherback, hawksbill or Kemp's ridley sea turtles. Loggerhead critical habitat has been designated in the project area. Based on the Corps incorporation of the conservation measures into the project, the Service concurs that the project may affect but is not likely to adversely affect nor adversely modify NWAO loggerhead critical habitat in the terrestrial environment. The Corps will consult with the NMFS on any impacts to critical habitat in the marine environment.

Incidental take of loggerhead nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during project construction and during the life of the project. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 18.9 miles of shoreline per year within the PFRU during a nonemergency year. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where groin maintenance is located but is not expected to exceed 102 miles of shoreline (38 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 64 miles of shoreline per year within the PFRU) during an emergency (declared disasters or Congressional Orders) year. The increased sand placement of 102 miles of shoreline is expected to occur once in a 10-year period due to emergency events.

Incidental take of green, leatherback, hawksbill and Kemp's ridley nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during project construction and during the life of the project or while placed sand remains on the beach. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 27.7 miles (8.8 miles within the northwest portion of Florida and 18.9 miles within the northeast, south and west portion of Florida) of shoreline per year during a nonemergency year. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 102 miles of shoreline (38 miles of shoreline per year within the northwest portion of

Florida for the NGMRU and 64 miles of shoreline per year within the PFRU) during an emergency (declared disasters or Congressional Orders) year.

Beach Mouse

In the SPBO, the Service determined that this level of anticipated take is not likely to result in jeopardy to AIBM, SEBM, PKBM, CBM, and SABM or in adverse modification or destruction of designated critical habitat for the PKBM, CBM, or SABM. Critical habitat for the SEBM and AIBM has not been designated; therefore, the project will not result in destruction or adverse modification of critical habitat for these subspecies.

Incidental take of SEBM, AIBM, PKBM, CBM, and SABM is anticipated to occur at beach access locations for the sand placement activities. Take will occur during project construction where beach access points are expanded or created and where equipment is staged or stored within beach mouse habitat along approximately 50 feet of vegetated dunes for beach access.

REASONABLE AND PRUDENT MEASURES

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize take of the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles; SEBM, AIBM, CBM, PKBM, and SABM in the action area for the following activities:

A. Sand placement from beach nourishment, sand bypass, and sand back pass activities;

B. Sand placement from navigation channel maintenance; and

C. Groin and jetty repair or replacement.

If the Corps is unable to comply with the Reasonable and Prudent Measures and Terms and Conditions, the Corps as the construction agent or regulatory authority may:

1. Inform the Service why the term and condition is not reasonable and prudent for the specific project or activity and request exception under the SPBO or
2. Initiate consultation with the Service for the specific project or activity. The Service may respond by either of the following:
    a. Allowing an exception to the terms and conditions under the SPBO or
    b. Recommending or accepting initiation of consultation (if initiated by the Corps) for the specific project or activity.

Post construction requirements are listed in Reasonable and Prudent measures, A11, A12, A13, and A14. These post construction requirements may besubject to congressional authorization and the allocation of funds. Florida State statutes apply. If the Corps or Applicant cannot fulfill these Reasonable and Prudent Measures, the Corps must reinitiate consultation.

REASONABLE AND PRUDENT MEASURES for:

A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection (these projects are usually larger scaled) shall include the following measures:

A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.

A2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.

A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching, to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties, sand placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte counties, sand placement shall not occur from June 1 through September 30. This time frame does not include Venice Beach and which has low density nesting. In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia counties, Florida, sand placement may occur during the sea turtle nesting season.

A4. All derelict material or other debris shall be removed from the beach prior to any sand placement.

A5. The beach profile template for the sand placement project shall be designed to mimic, the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest.

A6. If a dune system is already part of the project design, the placement and design of the dune shall emulate the natural dune system to the maximum extent possible, including the dune configuration and shape.

A7. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice.

A8. A meeting between representatives of the Applicant's or Corps, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.

A9. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted by the FWC-authorized Marine Turtle Permit Holder. Surveys for early and late nesting sea turtles shall be conducted where appropriate.

A10. If nests are constructed in the area of proposed sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.

A11. A post construction survey(s) of all artificial lighting visible from the project beach shall be completed by the Applicant or Corps.

A12. The Applicant or Corps shall ensure that daily nesting surveys are conducted by the FWC Marine Turtle Permit Holder for two nesting seasons following construction if the new sand still remains on the beach.

A13. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.

A14. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles.

A15. Construction equipment and materials including pipes shall be stored off the beach in a manner that will minimize impacts to nesting and hatchling sea turtles and beach mice.

A16. Lighting associated with the project construction including on the dredge shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatchling sea turtles and nocturnal activities of beach mice.

A17. During the sea turtle nesting season, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if a FWC permit holder is present) between dusk and the time of completion the following day's nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

A18. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice.

A19. Beach mouse habitat shall be avoided to the maximum extent possible when selecting sites for access corridors, storage and staging of equipment.

A20. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.

A21. Existing vegetated habitat at beach access points and travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access corridor.

A22. Expanded or newly created beach access points shall be restored following construction.

A23. A report describing the actions taken shall be submitted to the Service following completion of the proposed work.

A24. The Service and the FWC shall be notified if a sea turtle adult, hatchling, or egg, or beach mouse is harmed or destroyed as a direct or indirect result of the project.

TERMS AND CONDITIONS

All conservation measures described in the Corps' Programmatic Biological Assessment are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline reporting/monitoring requirements.

These Terms and Conditions are nondiscretionary.

Post construction requirements are listed in Terms and Conditions A11, A12, A13, and A14. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

TERMS AND CONDITIONS for:

A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection shall include the following conditions:

All beaches

A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

A2. Beach-compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). If a variance is requested from FDEP, the Service must be contacted to discuss whether the project falls outside of the SPBO. A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

a. Sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes may be placed and/or stored on the beach.

b. Sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties may occur during the sea turtle nesting season except on publicly owned conservation lands such as state parks and areas where such work is prohibited by the managing agency or under applicable local land use codes (see exceptions in A3.c below).

c. For higher density nesting beaches in Gulf and Franklin counties sand placement shall not occur during the main part of the nesting season (June 1 through September 30). On Manasota Key located in Sarasota and Charlotte counties (excluding Venice Beach), sand placement shall not occur during the main part of the nesting season (May 1 through October 31). These beaches include St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, and St. George Island in Franklin County.

The Service shall be contacted for coordination, on a project-by-project basis, if sand placement is needed on publicly owned conservation lands and in these higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key in Sarasota and Charlotte counties during the above exclusionary period. The Service will determine whether work (1) may proceed in accordance with the Terms and Conditions; (2) may proceed in accordance with the Terms and Conditions and other requirements as developed by the Service; or (3) would require an individual emergency consultation.

Land managers on publicly owned conservation lands must be involved in the project coordination.

A4. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach to the maximum extent possible prior to any sand placement in accordance with the dates in A3. If debris removal activities take place during shorebird breeding or peak sea turtle nesting season (**Tables 17 and 18**), the work shall be conducted during daylight hours only and shall not commence until completion of daily seabird, shorebird or marine turtle surveys each day.

A5. The beach profile template for the sand placement project shall be designed to mimic, the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest. Prior to drafting the plans and specifications for a beach nourishment project, the Corps must meet with the Service, FWC, and FDEP to discuss the beach profile surveys, dune formation (specifically on high density green turtle nesting beaches), and the sea turtle monitoring reports from previous placement events. The meeting will be used to discuss modifications to the beach profile based on the post-construction monitoring data.

Beach profile may vary depending on location, shoreline dynamics, nature of the fill material, and other factors. If a native beach berm elevation is not possible, due to the beach width, impacts to nearshore hardbottom, or other considerations, as discussed during the meeting, the alternative template shall include features to minimize impacts to sea turtle nesting success and the potential for ponding and escarpment formation for that beach. For all high density green turtle nesting beaches (http://ocean.floridamarine.org/SeaTurtleNesting/), the formation of a dune, either through direct creation or natural accretion, will be included in the project design. Dunes and other construction features must be within the scope of the Congressionally-authorized project, if it is a civil works project, and constructible without impacting other resources. If a recommended dune is not possible, the Corps will contact the Service to see if consultation needs to be reinitiated or discuss features incorporated with the profile that will enhance the existing dune. Dune features included in the profile design (or project) shall have a slope of 1.5:1 followed by a gradual slope of 4:1 for approximately 20 feet seaward on a high erosion beach (**Figure 13)** or a 4:1 slope (**Figure 14**) on a low erosion beach. The Corps must explore options to include a dune system in the project design for existing authorized projects and new non-Federal projects. If another slope is proposed for use, the Corps shall consult the Service. The seaward toe of the dune should be at least 20 feet from the waterline.

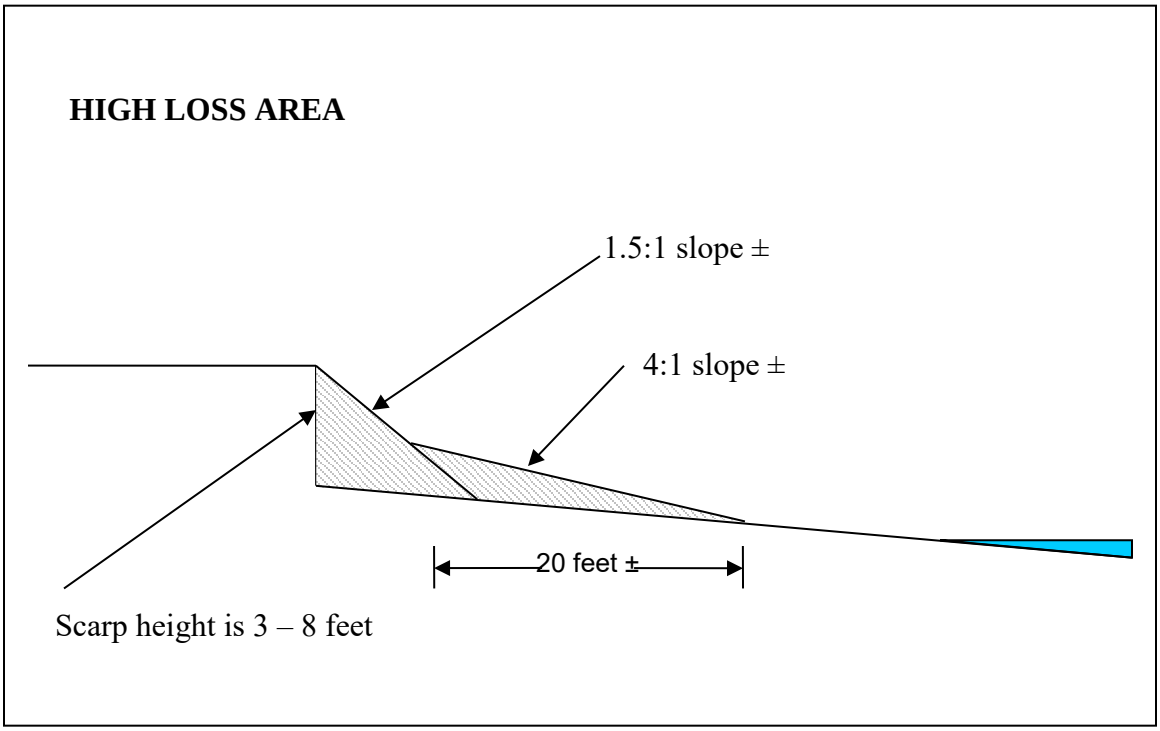

Figure 13. Recommended slope on a high erosion beach for sand placement projects that include the creation of a dune.

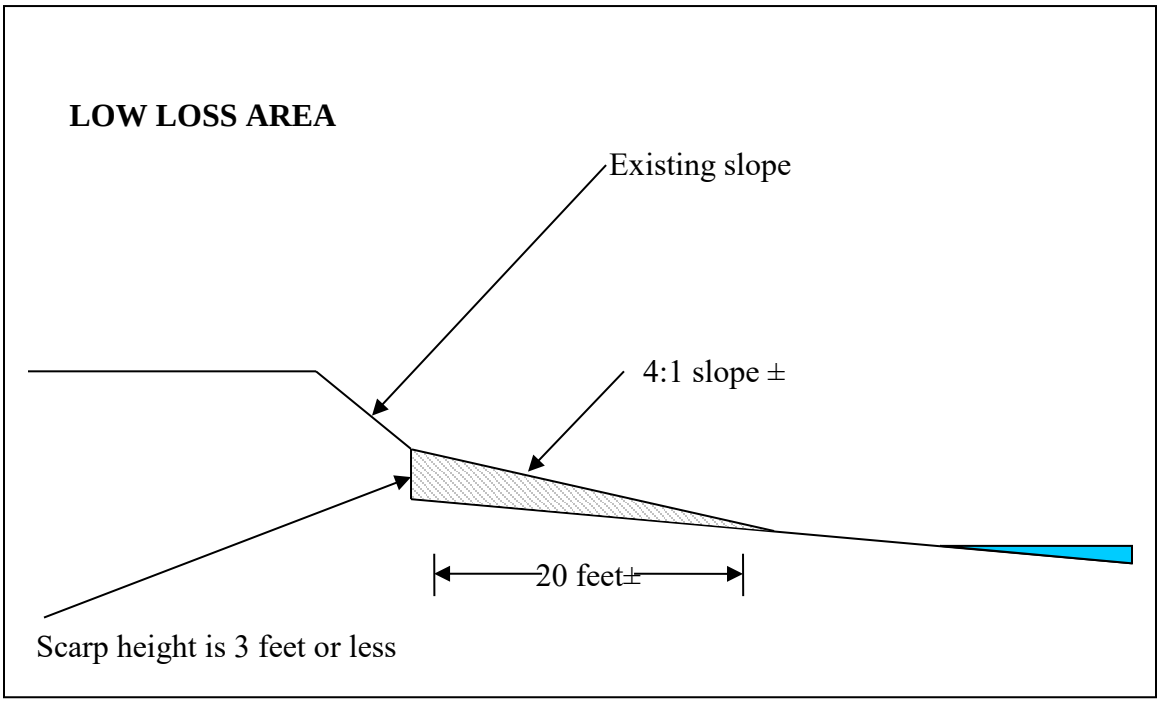

Figure 14. Recommended slope on a low erosion beach for sand placement projects that include the creation of a dune.

A6. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**). The Corps shall provide predator-proof trash receptacles for the construction workers. The Corps shall brief workers on the importance of not littering and keeping the project area trash and debris free.

A7. A meeting between representatives of the Corps (including the Corps project manager and/or the managing contractor), the Service, the FWC, the FWC Marine Turtle Permit Holder, and other species surveyors, as appropriate, shall be held prior to the commencement of work on projects. At least 10 business days advance notice shall be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the sea turtle and beach mouse protection measures as well as additional guidelines when construction occurs during the sea turtle nesting season, and will include the following

a. Staging locations, storing equipment including fuel stations
b. Coordination with the Marine Turtle Permit Holder on nesting surveys and any nighttime work
c. Pipeline placement (between 5 to 10 feet from dune)
d. Minimizing driving
e. Egg relocation- permit holder and location (must be approved by FWC)
f. Free-roaming cat observation (for projects in or near beach mouse habitat)
g. Follow up lighting surveys - dates and inspector
h. Follow up coordination during construction and post construction
i. Coordination on construction lighting including dredge lighting and travel within and adjacent to the work area
j. Direction of the project including progression of sand placement along the beach
k. Late season nests present in project area (if any)
l. Plans for compaction monitoring or tilling
m. Plans for escarpment surveys

At the preconstruction meeting, the Corps shall also provide the Service with specific anticipated shoreline lengths and anticipated duration using the form on the following web link: http://www.fws.gov/northflorida/SeaTurtles/Docs/Corp%20of%20Engineers%20Sea%20Turtle%20Permit%20Information.pdf. Only the following information should be filled out: Corps Permit Number, FWS Log Number, Project Location, Construction Activity, Duration of Protect, and Actual Take (linear feet of beach). This form shall be emailed to the Service at seaturtle@fws.gov. This form is in addition to the annual report listed below.

Sea Turtle Protection

A8. Daily early morning surveys for sea turtle nests shall be required and continue throughout the season as outlined in **Tables 16 and 17 (Nesting Season Monitoring)** if construction

occurs during the nesting and hatching season. Any known nests recorded just prior to the beginning of Nesting Season Monitoring must be relocated if it will be impacted by the construction activity or marked and avoided if feasible.

Table 16. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends (Last day requiring prior monitoring/relocation)	Beach Placement Window	Early Season Relocation*	Late Season Relocation**	Nesting Season Monitoring (monitoring throughout season)
Brevard, Indian River, St. Lucie, and Broward Counties	25 Feb - 11 Nov	15 Jan	1 Nov - 30 Apr	1 Mar - 30 Apr In Brevard, Indian River, St. Lucie, & Broward counties nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to Jan 15 (11 Nov) (or 65 days prior to start of construction **)	1 Mar - 11 Nov ***
Martin and Palm Beach Counties	12 Feb – 17 Nov	21 Jan	1 Nov - 30 Apr	1 Mar - 30 Apr In Martin and Palm Beach Counties, nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to 21 Jan (17 Nov) (or 65 days prior to start of construction**)	1 Mar - 17 Nov***

** Relocation can only begin after FWC authorizes nest relocation in accordance with Florida Statute 379.2431 (1).
*** (For late season monitoring: 7 days without a nest, can stop monitoring once electronic mail concurrence is received from FWS or FWC).

Table 17. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Outside of Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends (Last day requiring prior monitoring/ relocation)	Beach Placement Window	Nesting Season Monitoring and Relocation (monitoring throughout season)
Nassau, Duval, Flagler, St. Johns, and Volusia Counties	2 Apr. – 24 Oct	28 Dec	All Year	15 Apr – 24 Oct ***
Miami-Dade County	11 Feb – 25 Sep	29 Nov	All Year	1 Mar – 25 Sep***
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) & Franklin County (St. George Isl)	1 May - 4 Sep	13 Nov	1 Oct - 31 May	1 May – 4 Sep***
All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	2 May – 16 Sep	24 Nov	All Year	1 May - 16 Sep***
Sarasota and Charlotte Counties (Manasota Key)	24 Apr – 7 Sep	11 Nov	1 Nov - 30 Apr (except Venice beach)	15 Apr – 7 Sep***
All other beaches in Sarasota and Charlotte Counties	24 Apr – 12 Sep	16 Nov	All Year	15 Apr – 12 Sep***
Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	20 Apr – 19 Sep	23 Nov	All Year	15 Apr – 19 Sep***

*** (For late season monitoring: 7 days without a nest, can stop monitoring once electronic mail concurrence is received from FWS or FWC).

A9. If nests are constructed in the area of anticipated sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation as outlined in a through f. If nests are laid on the dune outside of the immediate sand placement area, the Corps must contact the Service to discuss whether relocation or mark and avoidance is required. Any known nests recorded just prior to the beginning of Nesting Season Monitoring must be relocated if it will be impacted by the construction activity or marked and avoided if feasible.

a. For sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties that occur during the earlier part of the nesting season (see Table 14) through April 30, daily early morning surveys shall begin March 1 and continue through the end of the beach placement window, with egg relocation continuing only until completion of fill placement. Eggs shall be relocated per the following requirements (i through iii below). For sand placement projects that occur during the period from November 1 through the end of hatching season (see Table 16), daily early morning sea turtle nesting surveys shall be conducted 65 days prior to project initiation and continue through November 11, and eggs shall be relocated per the requirements listed in (a)i through (a)iii. The Corps must contact the Service if there are any nests still incubating after November 30.

i. Nesting surveys and egg relocations will only be conducted by persons with prior experience and training in these activities and who are duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Relocation cannot begin until the Corps has a copy of the FWC permit authorizing relocation for construction purposes at that particular sand placement project. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones).

ii. Only those nests that may be affected by sand placement activities will be relocated. Nest relocation shall not occur upon completion of the project. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, predation, or be subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

iii. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished berm prior to tilling shall be marked and left in situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity will occur within this area nor will any activities occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

Daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

b. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties that occur during the period of sea turtle nest laying (**see Table 17**), daily early morning (before 9 a.m.) surveys and egg relocation shall be conducted. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin, Gulf, Sarasota, and Charlotte Counties in A10.d. below).

c. For Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, nesting surveys shall be initiated 70 days prior to sand placement activities (incubation periods are longer in these counties) or by nesting season monitoring (see Table 17) whichever is later. Nesting surveys shall continue through the end of nesting season monitoring (see Table 17) with relocation only through the end of fill placement. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin and Gulf Counties in A10.d. below).

d. For St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties, sand placement activities shall occur only during the Beach Placement Window indicated in Table 17 (except on Venice Beach), outside the period of peak sea turtle egg laying and egg hatching for this area. If nests are laid

in the early part of the nesting season monitoring during the beach placement window in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

e. For Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier, and Monroe Counties, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by the beginning of the nesting season monitoring indicated in Table 17 whichever is later. Nesting surveys shall continue through the end of nesting season monitoring (see Table 17), with egg relocation continuing only through the end of fill placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Sarasota and Charlotte Counties in A10.d. above).

f. For Miami-Dade County, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of the nesting season monitoring and egg relocation shall continue through the end of sand placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii

g. For Volusia, Flagler, St. Johns, Duval, and Nassau Counties, nesting surveys shall be initiated 65 days prior to sand placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of nesting season monitoring indicated in Table 17 and egg relocation shall continue through the end of sand placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

A10. Two surveys shall be conducted of all lighting visible from the beach placement area by the Applicant or Corps, using standard techniques for such a survey (**Appendix C**), in the year following construction. The first survey shall be conducted between May 1 and May 15 and a fill out FWS Sea Turtle Lighting Survey Form (**Appendix D**) and send electronically to seaturtle@fws.gov. The second survey shall be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, shall be submitted to the Service by December 31 of the year in which surveys are conducted. After the annual report is completed, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area. If the project is completed during the nesting season and prior to May 1, the Corps may conduct the lighting surveys during the year of construction.

A11. Daily nesting surveys shall be conducted for two nesting seasons following construction in accordance with **Table 18** and reported in accordance with **Table 20** by the Corps or the Applicant if placed material still remains on the beach. Post construction year-one surveys shall record the number of nests, nesting success, reproductive success, disorientations, and lost nests due to erosion and/or inundation. Post construction year-two surveys shall only need to record nest numbers, nesting success, and disorientations (**Table 20**). This information will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting.

Table 18. Post-Construction Sea Turtle Monitoring.

Region	Nest Laying Season	Years 1 and 2 Post-Construction Monitoring
Brevard, Indian River, St. Lucie, and Broward Counties Martin and Palm Beach Counties	25 Feb – 11 Nov 12 Feb – 17 Nov	Daily surveys: 1 Mar - 31 Oct (for late season: 15 days without a nests, can stop monitoring-email FWS and FWC to stop
Nassau, Duval, and St. Johns, Counties	2 Apr. – 24 Oct.	Daily surveys: 1 May – 30 Sep
Flagler and Volusia Counties	2 Apr. – 24 Oct.	Daily surveys: 15 Apr- 15 Oct
Miami-Dade County	11 Feb – 25 Sep	Daily surveys: 1 Apr – 30 Sep
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) and Franklin County (St. George Island) All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	1 May – 4 Sep 2 May – 16 Sep	Daily surveys: 1 May – 31 Aug
Sarasota and Charlotte Counties (Manasota Key) All other beaches in Sarasota and Charlotte Counties Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	24 Apr – 7 Sep 24 Apr – 12 Sep 20 Apr – 19 Sep	Daily surveys: 15 Apr –15 Sep

A12. Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to the dates in **Table 19** for 3 subsequent years.

Table 19. Dates for Compaction Monitoring and Escarpment Surveys by County.

County where project occurs	Date
Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, and Monroe	Work must be completed by Mar 1
Miami-Dade, Monroe	Work must be completed by April 1
Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, Volusia, Flagler, St. Johns, Duval, Nassau, Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier	Work must be completed by Apr 15

If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring shall be submitted electronically to seaturtle@fws.gov prior to any tilling actions being taken or if a request not to till is made based on compaction results. The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post construction compaction levels. Additionally, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.

(NOTE: If tilling occurs during shorebird nesting season (February 15-August 31), shorebirds surveys prior to tilling are required per the Migratory Bird Treaty Act. See Appendix E for shorebird conditions recommended by FWC.

a. Compaction sampling stations shall be located at 500-foot intervals along the sand placement template. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).

b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates at each depth). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each

depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

c. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area shall be tilled immediately prior to the appropriate date listed in **Table 19**.

d. 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 Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

e. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3 square foot buffer around the vegetated areas.

A13. Visual weekly surveys for escarpments along the project area shall be made immediately after completion of the sand placement and within 30 days prior to the start dates for Nesting Season Monitoring in **Table 19** for 3 subsequent years if sand in the project area still remains on the dry beach.

Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed in **Table 19**. Any escarpment removal shall be reported by location in the annual report. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. If during weekly escarpment surveys, it is found that subsequent reformation of escarpments interferes with sea turtle nesting or that they exceed 18 inches in height for a distance of 100 feet during the nesting and hatching season, the Service shall be contacted immediately to determine the appropriate action to be taken. If it is determined by the Service or FWC that that escarpment leveling is required during the nesting or hatching season the Service, in coordination with the FWC, will provide a brief written authorization within 5 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be sent electronically to seaturtle@fws.gov. A summary is required even when no action has been taken (**Table 3**).

A14. Staging areas for construction equipment shall be located off the beach during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see table 14) and peak nesting season (May 1 through October 31) for the remaining counties. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as

possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems. If the pipes placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune during nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents adverse effects not addressed in this SPBO. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

A15. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, and shall comply with safety requirements. A light management plan for the dredge and the work site shall be submitted for approval by the Service and FWC prior to the pre-construction meeting. In accordance with this plan, lighting on all equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, Corps EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing on dredge and land-based lights and be large enough to block light from all lamps from being transmitted outside the construction area or to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

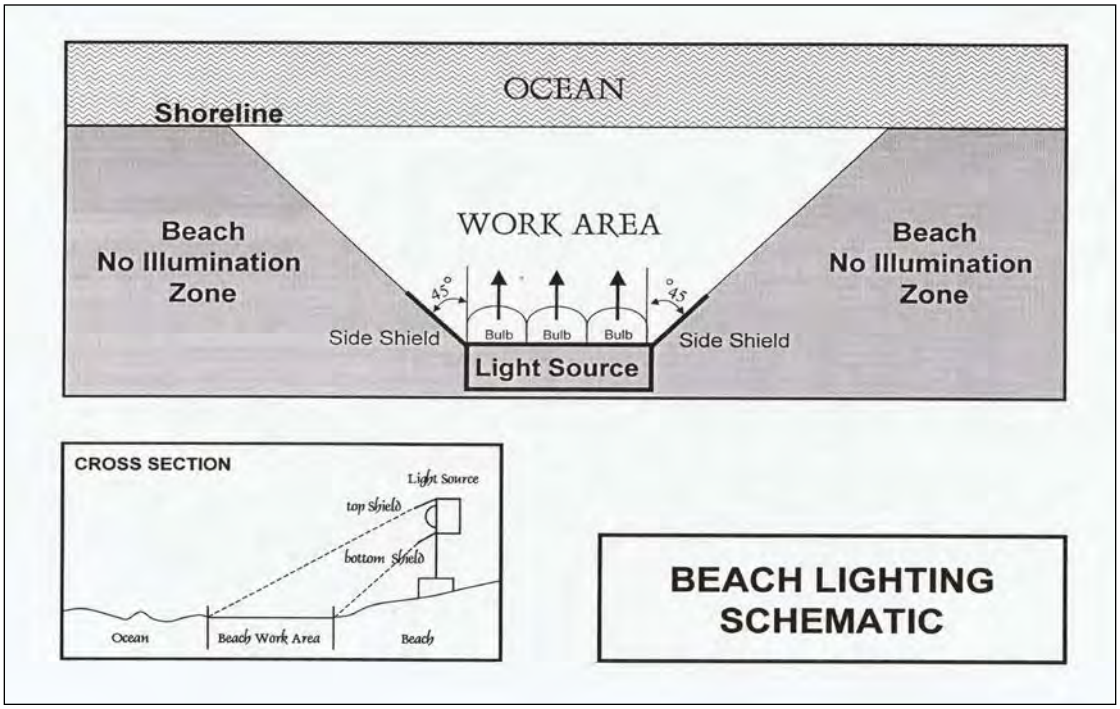

Figure 15. Beach lighting schematic.

A16. During the early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length) along the shoreline between dusk and dawn of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is a permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500 feet is not feasible for the project, an agreed upon distance will be decided on during the preconstruction meeting. Once the beach has been cleared and the necessary nest relocations have been completed, the Corps will be allowed to proceed with the placement of fill during daylight hours until dusk at which time the 500-foot length (or other agreed upon length) limitation shall apply. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

Dune Planting

A17. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice. Dune vegetation planting may occur during the sea turtle nesting season under the following conditions.

a. Daily early morning sea turtle nesting surveys (before 9 a.m.) shall be conducted during the Nest Laying period for all counties in Florida where sea turtle nesting occurs (see Tables 16 and 17). Nesting surveys shall only be conducted by personnel with prior experience and training in nesting surveys. Surveyors shall have a valid FWC permit. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (all times). No dune planting activity shall occur until after the daily turtle survey and nest conservation and protection efforts have been completed. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys;

b. Any nests deposited in the dune planting area not requiring relocation for conservation purposes shall be left in place. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 3-foot radius around the nest. No planting or other activity shall occur within this area nor will any activities be allowed that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the planting activity;

c. If a nest is disturbed or uncovered during planting activity, the Corps, or the Applicant shall cease all work and immediately contact the project turtle permit holder. If a nest(s) cannot be safely avoided during planting, all activity within 10 feet of a nest shall be delayed until hatching and emerging success monitoring of the nest is completed;

d. All dune planting activities shall be conducted by hand and only during daylight hours;

e. All dune vegetation shall consist of coastal dune species native to the local area; (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material for the plant size;

f. No use of heavy equipment shall occur on the dunes or seaward for planting purposes. A lightweight (all-terrain type) vehicle, with tire pressures of 10 psi or less may be used for this purpose; and

g. Irrigation equipment, if needed, shall be authorized under a FDEP permit.

<u>Beach Mouse Protection</u>

A18. Beach mouse habitat shall be avoided when selecting sites for equipment, pipes, vehicle storage and staging to the maximum extent possible. Suitable beach mouse habitat

constitutes the primary dunes (characterized by sea oats and other grasses), secondary dunes (similar to primary dunes, but also frequently includes such plants as woody goldenrod, false rosemary), and interior or scrub dunes.

A19. Equipment placement or storage shall be excluded in the area between 5 to 10 feet seaward of the existing dune toe or 10 percent of the beach width (for projects occurring on narrow eroded beach segments) seaward of the dune toe in areas of occupied beach mouse habitat (**Figure 16**). The toe of the dune is where the slope breaks at the seaward foot of the dune. If the pipes placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune as required during sea turtle nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents adverse effects not addressed in this SPBO.

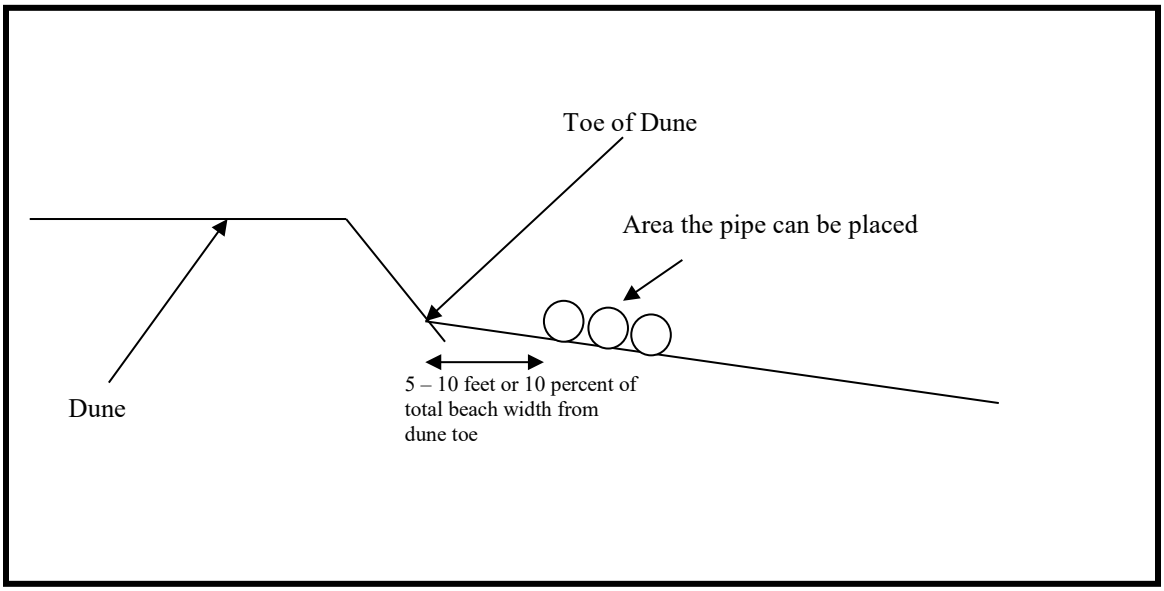

Figure 16. Equipment placement for projects occurring in beach mouse occupied habitat.

A20. Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be fully restored to the preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts to existing habitat and transporting workers along the beachfront.

A21. The location of new or expanded existing beach access corridors for vehicles and equipment within beach mouse habitat consisting of vegetated dunes shall be spaced no closer than every four miles. The distribution of access areas will result in the least

number of access areas within beach mouse habitat as possible and delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be (1) no more than 25 feet wide for vehicles and (2) no more than 50 feet wide for equipment. Expanded or new beach access points that impact vegetated dunes shall be restored within 3 months following project completion. Habitat restoration shall consist of restoring the dune to preconstruction conditions with planting of at least three species of appropriate native dune vegetation (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Seedlings shall be at least one inch square with a 2.5-inch pot. Planting shall be on 18-inch centers throughout the created dune; however, 24-inch centers may be acceptable depending on the area to be planted. Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material, as appropriate, for the plant size. No sand stabilizer material (coconut matting or other material) shall be used in the dune restoration. The plants may be watered without installing an irrigation system. In order for the restoration to be considered successful, 80 percent of the total planted vegetation shall be documented to survive six months following planting of vegetation. If the habitat restoration is unsuccessful, the area shall be replanted following coordination with the Service.

Reporting

A22. A report with the following shall be submitted to the Service electronically (seaturtle@fws.gov) by December 31 after completion of construction.

i. A summary of the information listed in Table 20 for construction

ii. A summary of the information listed in Table 21 for post-construction

Table 20. Information to include in the report following the project completion.

All projects	**Project location (include Florida DEP R-monuments and latitude and longitude coordinates)**
	Project description (include linear feet of beach, actual fill template, access points, and borrow areas)
	Dates of actual construction activities
	Names and qualifications of personnel involved in sea turtle nesting surveys and relocation activities (separate the nests surveys for nourished and non-nourished areas)
	Descriptions and locations of sites where nests were relocated
Beach mice	**Acreage of new or widened access areas affected in beach mouse habitat**
	Vegetation completed for new or widened access areas
	Success rate of vegetation of restoration

Table 21. Sea turtle monitoring following sand placement activity.

Date	Duration	Variable	Criterion
Nesting Success	Year of in season construction, two years post construction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of nests and non-nesting events	40 percent or greater
Hatching success	Year of in season construction and one year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to hatch from egg	60 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Emergence Success	Year of in season construction and one year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to emerge from nest onto beach	80 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Disorientations	Year of in season construction and two years post construction if placed sand remains on the beach	Number of nests and individuals that misorient or disorient	http://myfwc.com/media/418153/Seaturtle_Guidelines_A_LDIR_Directions.pdf
Lighting Surveys	Two surveys the year following construction, one survey between May 1 and May 15 and second survey between July 15 and August 1	Number, location and photographs of lights visible from nourished berm, corrective actions and notifications made	Lighting survey and meeting resulting with plan for reduction in lights visible from nourished berm within one to two month period
Compaction	Three seasons following construction. Not required if the beach is tilled prior to nesting season each year placed sand remains on beach	Shear resistance	Less than 500 psi
Escarpment Surveys	Weekly during nesting season for three years each year placed sand remains on the beach	Number of scarps 18 inches or greater extending for more than 100 feet that persist for more than 2 weeks	Successful remediation of all persistent scarps as needed

If nesting and reproductive (hatching and emergence) success is less than the criteria in the table above, the Corps and the Service must discuss during the annual meeting to review additional conditions prior to the next sand placement on this beach.

A23. In the event a sea turtle nest is excavated during construction activities, the project turtle permit holder responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.

Upon locating a dead or injured sea turtle adult, hatchling, egg, or beach mouse that may have been harmed or destroyed as a direct or indirect result of the project, the Corps, Applicant shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the appropriate Service Field Office immediately (**Table 3**).

Care shall be taken in handling injured sea turtles, eggs or beach mice to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

REASONABLE AND PRUDENT MEASURES for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement (not including near shore placement for shore protection) shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post construction requirements are listed in Reasonable and Prudent Measures B10 and B11. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Reasonable and Prudent Measures, the Corps must reinitiate consultation.

B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.

B2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.

B3. For dredged material placement on the beach, sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties, dredged material placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County dredged material placement shall not occur from June 1 through September 30. On Manasota Key in Sarasota and Charlotte Counties, dredged material placement shall

not occur from May 1 through October 31 (except Venice Beach). In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape Sand Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, sand placement may occur during the sea turtle nesting season (**Table 16 and Table 17**).

B4. For dredged material placement in the swash zone or submerged littoral zone during the nesting season, sand placement will be conducted at or below MLLW line.

B5. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach prior to any dredged material placement to the maximum extent possible.

B6. The Corps shall continue to work with FDEP, FWC, and the Service to create a sea turtle friendly beach profile for placement of material during construction.

B7. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**).

B8. A meeting between representatives of the Corps, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.

B9. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. Surveys for early and late nesting sea turtles shall be conducted where appropriate. If nests are constructed in the proposed area of sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.

B10. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities. Not required for dredged material placement in the swash and littoral zone.

B11. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles. Not required for dredged material placement in the swash and littoral zone.

B12. Construction equipment and materials shall be stored in a manner that will minimize impacts to nesting and hatchling sea turtles and beach mice.

B13. Lighting associated with the project construction shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatchling sea turtles and nocturnal activities of beach mice.

B14. During the sea turtle nesting season, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if a FWC sea turtle permit holder is present) between dusk and the time of completion of the following day's nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

B15. Beach mouse habitat shall be avoided when selecting sites for storage and staging of equipment to the maximum extent possible.

B16. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.

B17. Existing vegetated habitat at beach access points and along shoreline travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access and travel corridors.

B18. Expanded or newly created beach access points shall be restored.

B19. A report describing the actions taken shall be submitted to the Service work for each year when the activity has occurred.

B20. The Service and the FWC shall be notified if a sea turtle adult, hatchling, or egg, or beach mouse is harmed or destroyed as a direct or indirect result of the project.

TERMS AND CONDITIONS for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement of Corps civil works project shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post construction requirements are listed in Terms and Conditions B10 and B11. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

All beaches

B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

B2. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

B3. Dredged material placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

a. Dredged material placement in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties shall occur only during the beach placement window indicated in Table 16. construction equipment or pipes may be placed and/or stored on the beach only during the beach placement window indicated in Table 16.

b. Dredged material placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties may occur during the sea turtle nesting season except on publicly owned conservation lands such as state parks and areas where such work is prohibited by the managing agency or under applicable local land use codes (see exceptions in B3.c. below).

c. For higher density nesting beaches in Gulf and Franklin counties dredged material placement shall not occur during the main part of the nesting season June 1 through September 31. On Manasota Key in Sarasota and Charlotte Counties, dredged material placement shall not occur during the main part of the nesting season (May 1 through October 31). This timeframe does not include Venice Beach due to the low density nesting. These beaches include St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties. See Table 17 for the Beach Placement Windows.

d. For dredged material placement in the swash zone (at or below the MHWL) or submerged littoral zone during the sea turtle nesting season (**Tables 16and 17**), the Corps shall contact the Service for coordination.

The Service shall be contacted for coordination, on a project-by-project basis, if sand placement is needed on publicly owned conservation lands and in these higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key in Sarasota and Charlotte Counties during the above exclusionary period. The Service will determine whether work (1) may proceed in accordance with the Terms and Conditions; (2) proceed in accordance with the Terms and Conditions and other requirements as developed by the Service; or (3) would require that an individual emergency consultation be conducted.

B4. For dredged material placement in the swash zone or submerged littoral zone during the nesting and hatching season, sand placement will be conducted at or below the MLLW line. The swash zone is that region between the upper limit of wave run-up (approximately one-foot above MHW) and the lower limit of wave run-out (approximately one-foot below MLW). Material will not be placed so that it is exposed above the water during low tide during the nesting and hatching season. The Corps must consult with NMFS on impacts to hatchlings that emerge from those nests adjacent to the inwater construction area. The Service will discuss with the Corps and NMFS additional measures that could include caging nests close to the emergence date.

B5. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach prior to any dredged material placement to the maximum extent possible. If debris removal activities take place during the peak sea turtle nesting season (**Tables 16 and 17**), the work shall be conducted during daylight hours only and shall not commence until completion of the sea turtle nesting survey each day.

B6. The Corps shall continue to work with FDEP, FWC and the Service in conducting the second phase of testing on the sea turtle friendly profile during project construction. This includes exploring options to include a dune system in the project design for existing authorized projects and new non-federal projects and how the existing sand placement template may be modified.

B7. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**). The Corps shall provide predator-proof trash receptacles for the construction workers. All workers shall be briefed on the importance of not littering and keeping the project area trash and debris free.

B8. A meeting between representatives of the Corps, the Service, the FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on projects. At least 10 business days advance notice shall be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the sea turtle and beach mouse protection measures as well as additional guidelines when construction occurs during the sea turtle nesting season, such as storing equipment, minimizing driving, free-roaming cat observation, and reporting within the work area, as well as follow up meetings during construction (**Table 3**).

Sea Turtle Protection

B9. Daily early morning surveys for sea turtle nests shall be required as outlined in a through f. If nests are constructed in the area of sand proposed placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation (**Tables 614 and 17**).

a. For sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties that occur during earlier part of the nest laying season through April 30, daily early morning surveys shall be conducted for sea turtle nests shall begin with the start of the nesting season monitoring (see Table 16) and continue through the end of the beach placement window, with egg relocation continuing only until completion of fill placement. Eggs shall be relocated per the following requirements. For sand placement projects that occur during the period from November 1 through the end of hatching season (see Table 16), daily early morning sea turtle nesting surveys shall be conducted 65 days prior to project initiation and continue through the end of the nest laying season indicated in Table 16, and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

i. Nesting surveys and egg relocations will only be conducted by persons with prior experience and training in these activities and who are duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at (561) 575-5407 for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones).

ii. Only those nests that may be affected by sand placement activities will be relocated. Nest relocation shall not occur upon completion of the project. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to

experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, or subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

iii. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished area prior to tilling shall be marked and left in situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity will occur within this area nor will any activities occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

During the period from March 1 through April 30, daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

b. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties that occur during the nest laying period (**Table 17**), daily early morning (before 9 a.m.) surveys shall be conducted. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin, Gulf, Sarasota, and Charlotte Counties in B9.d. below).

c. For Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, nesting surveys shall be initiated 70 days prior to sand placement activities (incubation periods are longer in these counties) or at the beginning of nesting season monitoring (see Table 17) whichever is later. Nesting surveys shall continue through the end of the nest laying season (see Table 17). Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin and Gulf Counties in B9.d. below).

d. For St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County sand placement activities shall occur only during the Beach Placement Window indicated in Table 17. For Manasota Key in Sarasota and Charlotte Counties (except Venice Beach), sand placement activities shall during the Beach Placement Window indicted in Table 15, the period of peak sea turtle egg laying and egg hatching for this area. If nests laid in the early part of the nest laying season during the beach placement window in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii below.

e. For Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier, and Monroe Counties, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by April 15, whichever is later. Nesting surveys shall continue through September 15. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Sarasota and Charlotte Counties in B9.d. above).

f. For Miami-Dade County, nesting surveys shall be initiated 65 days prior to dredged material placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of the nest laying season or the end of sand placement whichever comes first. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

g. For Volusia, Flagler, St. Johns, Duval, and Nassau Counties, nesting surveys shall be initiated 65 days prior to dredged material placement activities or by the beginning of nest laying season (**Table 17**) whichever is later. Nesting surveys shall continue through the nesting season monitoring period (**Table 15).** If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

B10. Sand compaction shall be monitored in the area of dredged material placement immediately after completion of the project and prior to the dates in **Table 19** for 3 subsequent years. Not required for dredged material placement in the swash and littoral zone.

If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring shall be submitted seaturtle@fws.gov prior to any tilling actions being taken. The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post construction compaction

levels. Additionally, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.(NOTE: If tilling occurs during shorebird nesting season (February 15-August 31), shorebirds surveys prior to tilling are required per the Migratory Bird Treaty Act (http://myfwc.com/docs/Conservation/FBCI_BNB_SeaTurtleMonitors.pdf)

a. Compaction sampling stations shall be located at 500-foot intervals along the sand placement template. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).

b. At each station, the cone penetrometer shall 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. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

c. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area shall be tilled immediately prior to the appropriate date listed in **Table 19**.

d. 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 Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

e. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3 square foot buffer around the vegetated areas.

B11. Visual weekly surveys for escarpments along the project area shall be made immediately after completion of the dredged material placement and within 30 days prior to the start dates for Nesting Season Monitoring in **Table 19** for 3 subsequent years if sand in the project area still remains on the dry beach. Not required for dredged material placement in the swash and littoral zone.

Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal shall be

reported by location. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined by the Service, in coordination with the FWC, that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted electronic to seaturtle@fws.gov.

B12. If available, staging areas for construction equipment shall be located off the beach during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 16) and peak nesting season (May 1 through October 31) for the remaining counties. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems. If the pipes that are placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune during nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents take that was not considered in the SPBO. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

B13. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, and shall comply with safety requirements. Lighting on all equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, Corps EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to

block light from all lamps from being transmitted outside the construction area and to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

B14. During the period during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 16) and peak nesting season (May 1 through October 31) for the remaining counties, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if FWC sea turtle permit holder is present) along the shoreline between dusk and dawn of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is a permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500 feet is not feasible for the project, an agreed upon distance will be decided on during the preconstruction meeting. Once the beach has been cleared and the necessary nest relocations have been completed, the Corps will be allowed to proceed with the placement of fill during daylight hours until dusk at which time the 500-foot length (or other agreed upon length) limitation shall apply. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

Beach Mouse Protection

B15. Beach mouse habitat shall be avoided when selecting sites for equipment, pipes, vehicle storage and staging, and beach travel corridors to the maximum extent possible. Suitable beach mouse habitat constitutes the primary dunes (characterized by sea oats and other grasses), secondary dunes (similar to primary dunes, but also frequently includes such plants as woody goldenrod, false rosemary), and interior or scrub dunes.

B16. Equipment placement or storage shall be excluded in the area between 5 to 10 feet seaward of the existing dune toe or 10 percent of the beach width (for projects occurring on narrow eroded beach segments) seaward of the dune toe in areas of occupied beach mouse habitat (**Figure 16**). The toe of the dune is where the slope breaks at the seaward foot of the dune.

B17. Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The topography at the access points shall be fully restored to preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts to existing habitat and transporting workers along the beachfront.

B18. The location of new or expanded existing beach access corridors for vehicles and equipment within beach mouse habitat consisting of vegetated dunes shall be no closer

than every four miles. The distribution of access areas will result in the least number of access areas within beach mouse habitat as possible and delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be (1) no more than 25 feet wide for vehicles and (2) no more than 50 feet wide for equipment. Expanded or new beach access points that impact vegetated dunes shall be restored within 3 months following project completion. Habitat restoration shall consist of restoring the dune to preconstruction conditions with planting of at least three species of appropriate native dune vegetation (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Seedlings shall be at least 1 inch square with a 2.5-inch pot. Planting shall be on 18-inch centers throughout the created dune; however, 24-inch centers may be acceptable depending on the area to be planted. Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material, as appropriate, for the plant size. No sand stabilizer material (coconut matting or other material) shall be used in the dune restoration. The plants may be watered without installing an irrigation system. In order for the restoration to be considered successful, 80 percent of the total planted vegetation shall be documented to survive six months following planting of vegetation. If the habitat restoration is unsuccessful, the area shall be replanted following coordination with the Service.

Reporting

B19. An excel sheet with the information listed in **Table 20** shall be submitted to the Service electronically seaturtle@fws.gov by December 31 of the year following construction. A report with the information from Terms and Conditions B10 and B11 shall be submitted to the Service by December 31 of the year for 3 years following construction.

B20. In the event a sea turtle nest is excavated during construction activities, the project turtle permit holder responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.

Upon locating a dead or injured sea turtle adult, hatchling, egg, or beach mouse that may have been harmed or destroyed as a direct or indirect result of the project, the Corps, Applicant shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the appropriate Service Field Office immediately (**Table 3**).

Care shall be taken in handling injured sea turtles, eggs or beach mice to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

REASONABLE AND PRUDENT MEASURES for:

C. Projects that include groin or jetty repair or replacement within the existing footprint shall include the following measures:

In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties:

C1. Groin or jetty repair or replacement projects shall not occur during the period of peak sea turtle egg laying and egg hatching (May 1 through October 31), to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

C2. Maintenance of groin or jetty projects conducted during the early (February 1 through April 30) and late sea turtle nesting season (November 1 through November 30) shall adhere to the following conditions:

a. Install a barrier around the perimeter of the groin or jetty repair or replacement work area sufficient to prevent adult and hatchling sea turtles from accessing the project site.

b. For projects conducted during the early and late sea turtle nesting season, construction equipment and materials shall be stored in a manner that will minimize impacts to sea turtles to the maximum extent possible.

c. For projects conducted during the early and late sea turtle nesting season, no work may occur at night.

In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties:

C3. For maintenance of groin or jetty projects, conducted during the sea turtle nesting season.

a. Daily surveys shall be conducted by sea turtle permit holders. Nests laid adjacent to the work area shall be marked by flag and rope for avoidance.

b. A barrier shall be installed around the perimeter of the groin or jetty maintenance work area sufficient to prevent adult and hatchling sea turtles from accessing the project site.

c. Construction equipment and materials shall be stored in a manner that will minimize impacts to sea turtles and beach mice to the maximum extent possible.

d. No work shall occur at night.

In All Counties:

C4. If any safety lighting associated with the project is required, the Corps must coordinate with the Service. All safety lighting must be minimized to reduce the possibility of disrupting and disorienting nesting or hatchling sea turtles and nocturnal activities of beach mice. All lights shall be downward directed, full cut-off and fully shielded, and shall utilize long wavelength (greater than 590 nm) light sources.

C5. If entrapment of sea turtle hatchlings occurs in the groin or jetty system, the Corps shall meet with the Service to discuss a possible solution prior to the next nesting season.

C6. A report describing the projects conducted during the year and actions taken to implement the Reasonable and Prudent Measures and Terms and Conditions of this incidental take statement shall be submitted to the Service.

TERMS AND CONDITIONS for:

C. Projects that include groin or jetty repair or replacement within the existing footprint shall include the following conditions:

In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties:

C1. Groin or jetty repair or replacement projects shall be started after October 31 and be completed before May 1.

C2. For groin or jetty repair or replacement projects conducted during the early (before April 30) and/or late (after November 1) sea turtle nesting season (see Table 16):

a. A barrier (e.g., hay bales, silt screens) sufficient to prevent adult and hatchling sea turtles from accessing the project site shall be installed in a 100-foot buffer around the perimeter of the project site. The barrier shall be placed parallel to shore, at mean high water (MHW), as close to the groin or jetty as feasible, particularly during the period from sunset to sunrise. The Corps must contact the Service if there are any existing nests within the 100-foot buffer area.

b. On-beach access to the construction site shall be restricted to the wet sand below MHW to the maximum extent possible. Travel corridors on the beach to the MHWL shall be delineated. If the project is conducted during the early (before April 30) and/or late (after November 1) sea turtle nesting season (see Table 16), daily morning surveys shall be conducted within the travel corridor. If nests are laid within the travel corridor, the travel corridor must be re-routed to avoid the nest. If re-routing is not possible, these nests shall be relocated per the requirements listed in A9 (a)i through (a)iii.

c. Staging areas for construction equipment shall be located off the beach to the maximum extent possible.

d. No construction shall be conducted at night.

e. Daily early morning surveys for sea turtle nests shall be required as outlined in e(i) and e (ii). All nests laid in the vicinity of the project area shall be marked for avoidance per the requirements specified below:

   i. Nesting surveys and nest marking will only be conducted by persons with prior experience and training in these activities and who are authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones). The Corps shall not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

   ii. Nests deposited within the project area and access areas shall be left in place and marked for avoidance unless other factors threaten the success of the nest (nest laid below debris line marking the typical high tide, erosion). The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. The actual location of the clutch will be determined and nests will be marked. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 10-foot radius around the nest. No activity shall occur within this area nor will any activity occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the project activity. Nest relocation is only allowed if nests laid within the travel corridor (beach access to MHWL) cannot be rerouted to avoid the nest.

In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties:

C3. For groin or jetty repair or replacement projects conducted during the sea turtle nesting season (see Table 17):

a. Daily early morning surveys shall be conducted within the travel corridor.

b. A barrier (e.g., hay bales, silt screens) sufficient to prevent adult and hatchling sea turtles from accessing the project site shall be installed in a 100-foot buffer around the perimeter of the project site. The barrier shall be placed parallel to shore, at MHW, as close to the groin or jetty as feasible during the period from sunset to sunrise.

c. On-beach access to the construction site shall be restricted to the wet sand below MHW to the maximum extent possible. Travel corridors on the beach to the MHWL will be delineated. Nests laid within the travel corridor that would impede traffic will be relocated per the requirements listed in A9(a)i through (a)iii.. Nests laid in adjacent areas will be marked and avoided per the requirements listed in C(2)(e) i through iii. Staging areas for construction equipment shall be located off the beach to the maximum extent possible.

d. No nighttime construction may occur during the nesting season.

e. Material stockpiled on the beach shall only occur within the 200-foot barrier (100-foot area on either side). Construction activities shall not occur in any location prior to completion of the necessary sea turtle protection measures outlined below. If any nesting turtles are sighted on the beach, construction activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has marked the nest. All activities shall avoid the marked nest areas.

C4. All nests laid adjacent to the project area shall be marked for avoidance per the following requirements:

a. Nesting surveys and nest marking will only be conducted by persons with prior experience and training in these activities and who are authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones). The Corps shall not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

i. Nests deposited within the project area and access areas shall be left in place and marked for avoidance unless other factors threaten the success of the nest (nest laid below debris line marking the typical high tide, erosion). The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at

a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. The actual location of the clutch will be determined and nests will be marked. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 10-foot radius around the nest. No activity shall occur within this area nor will any activity occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the project activity. Nest relocation is only allowed if nests laid within the travel corridor (beach access to MHWL) cannot be rerouted to avoid the nest.

In All Counties:

C5. To the maximum extent possible within the travel corridor, all ruts shall be filled or leveled to the natural beach profile prior to completion of daily construction.

C6. Exterior lighting shall not be permanently installed in association with the project. Temporary lighting of the construction area during the sea turtle nesting season shall be reduced to the minimum standard required by OSHA for general construction areas. Lighting on all equipment including offshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, Corps EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for general construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area and to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

C7. If entrapment of sea turtle hatchlings occurs in the groin or jetty system during construction, the Corps shall contact the Service immediately.

C8. A report describing the work conducted during the year and actions taken to implement the Reasonable and Prudent Measures and Terms and Conditions of this incidental take statement shall be submitted to the Service electronically to seaturtle@fws.gov by December 31 of each year when the activity has occurred. This report will include the following information:

Table 22. Information to include in the report following the project completion.

All projects	Project location (include Florida DEP R-monuments and latitude and longitude coordinates)
	Project description
	Dates of actual construction activities
	Names and qualifications of personnel involved in sea turtle nesting surveys and mark and avoid activities
	Nesting survey, mark and avoid activities, and nest relocation results

The Service believes that incidental take will be limited to the 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU (38 miles during an emergency year) and 18.9 miles of shoreline within the PFRU (64 miles during an emergency year) of beach that have been identified for sand placement. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than the following types of incidental take will result from the proposed action: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the project areas; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the projects; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the sand placement areas or on adjacent beaches during and after sand placement or construction activities; (5) misdirection of nesting and hatchling turtles on beaches adjacent to the sand placement or construction area as a result of project lighting including the ambient lighting from dredges; (6) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (7) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more than a 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU (38 miles during an emergency year) and 18.9 miles of shoreline within the PFRU (64 miles during an emergency year) of sand on the of beach that have been identified for sand placement. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and

threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties, construction activities should be planned to take place outside the main part of the sea turtle nesting and hatching season (May 1 through October 31).
2. Work cooperatively with the Service, FWC, County or Municipality, to reduce sea turtle disorientations in the sand placement areas. After the annual report is completed, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area.
3. Work cooperatively with the Service to mimic the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest. For all high density green turtle nesting beaches (http://ocean.floridamarine.org/SeaTurtleNesting/), the formation of a dune, either through direct creation or natural accretion, will be included in the project design. Prior to drafting the plans and specifications for a beach nourishment project, the Corps must meet with the Service, FWC, and FDEP to discuss the beach profile surveys, dune formation (specifically on high density green turtle nesting beaches), and the sea turtle monitoring reports from previous placement events.
4. If public driving is allowed on the project beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require the local sponsor or Applicant to have authorization from the Service for incidental take of sea turtles, their nests, and hatchlings and beach mice, as appropriate, due to such driving or provide written documentation from the Service that no incidental take authorization is required. If required, the incidental take authorization for driving on the beach should be obtained prior to any subsequent sand placement events.
5. Beach nourishment should not occur on publicly owned conservation lands during the sea turtle nesting season.
6. All created dunes should be planted with at least three species of appropriate native salt-resistant dune vegetation. Examples along the Atlantic coast include: bitter panicgrass, sea oats (grown from local genetic stock), beach morning-glory, or railroad vine. Examples along the Northwest Florida coast includes: bitter panicgrass, little bluestem (Schizachyrium scoparium), sea oats (grown from local genetic stock), beach morning-glory, or railroad vine. Examples along the Southwest Florida coast include: sea oats (grown from local genetic stock), bitter panicgrass, beach morning-glory, and railroad vine.
7. If the project area is within a local municipality that has not adopted a lighting ordinance, and lighting is shown to be an issue on a nourished beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require an ordinance be adopted prior to any subsequent sand placement event.

8. To increase public awareness about sea turtles and beach mice, informational signs should be placed at beach access points where appropriate. The signs should explain the importance of the beach to sea turtles and beach mice.
9. If the Corps has the authority, we recommend it exercise its discretionary authority to require predator control programs (including education of pet owners and cat colony supporters) should be implemented that target free-roaming cats.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. Reinitiation of formal consultation is also required ten years after the issuance of this SPBO. In instances where the amount or extent of incidental take is exceeded, any operations causing such take shall cease pending reinitiation.

The above findings and recommendations constitute the report of the Service. If you have any questions about this SPBO, please contact Ann Marie Lauritsen of this office at (904) 525-0661, Richard Zane of the Panama City Field Office at (850) 769-0552, or Jeffrey Howe of the South Florida Field Office at (772) 562-3909.

Sincerely,

for Larry Williams
State Supervisor

cc:
FWC, Lake City, Florida (Melissa Tucker)
FWC, Lake City, Florida (Nancy Douglass)
FWC, Lake City, Florida (Terry Doonan)
FWC, Panama City, Florida (John Himes)
FWC, Tallahassee, Florida, (Robbin Trindell)
NMFS, Protected Species Division, St. Petersburg (Eric Hawk)
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Service, Panama City, Florida, (Patricia Kelly, Lisa Lehnhoff)
Service, St. Peteresburg, Florida (Ann Marie Lauritsen)
Service, Vero Beach, Florida (Jeffrey Howe)

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Appendix A

PREVIOUS FORMAL CONSULTATIONS/BIOLOGICAL OPINIONS WITHIN FLORIDA THAT HAVE BEEN ISSUED FOR ALL PROJECTS THAT HAD ADVERSE IMPACTS TO THE SEA TURTLES ON THE NESTING BEACH

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
STATEWIDE	Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Monroe, Miami-Dade, Collier, Lee, Charlotte, Sarasota, Manatee, Pinellas, Pasco, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, Escambia	FEMA Emergency Beach Berm Repair	2007-F-0430		Repair of 5-year beach berms post-disaster	75 miles
JAX FIELD OFFICE						
1991	Brevard	Lighting at Cape Canaveral Air Force and Patrick Air Force Station	4-1-91-028	Lighting at both installations	Sea turtle lighting	75 disoriented loggerhead nests; 2 green turtles nests at CCAFS and 2 loggerhead nests at PAFB
1993	Brevard	Beach nourishment on Cape Canaveral	4-1-93-073C		Beach nourishment	2 miles
1995	Brevard	Inlet Bypass on Brevard County Beach at Cape Canaveral		R-1 to R-14	Inlet bypass	
1996	Brevard	Canaveral Port Authority Dredge and Beach Disposal		R-34 to R-38	Dredge and beach restoration	
1998	Brevard	Inlet bypass on Brevard County Beach at Cape Canaveral		R-1 to R-14		
2000	Brevard	Amended Lighting at Cape Canaveral Air Force and Patrick Air Force Station	00-0545	Lighting at both installations	Sea turtle lighting	2 percent hatchling and nesting female disorientations at each installation.
2001	Brevard	Brevard County Shore Protection Project (North Reach)		R-5 to R-12 and R-13 to R-54.5	Beach nourishment	9.4 miles
2001	Brevard	Patrick Air Force Base Beach Restoration		R-53 to R-70	Beach nourishment	

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2002	Brevard	Brevard County Shore Protection Project (South Reach)		R-123.5 to R-139	Beach nourishment	3.02 miles
2002	Brevard	Brevard County Shore Protection Project (North Reach)		R-4 to R-20	Beach nourishment	
2002	Brevard	Permanent Sand Tightening of North Jetty at Canaveral Harbor	02-1090	North jetty at Canaveral Inlet	Sand tightening and extension of existing jetty	500 feet
2003	Brevard	Brevard County Shore Protection Project (South Reach)		R-118.3 to R-123.5		0.94 mile
2004	Brevard	Canaveral Harbor Federal Sand Bypass and Beach Placement	04-0077	R-14 to R-20	Inlet bypass and beach nourishment	18,600 linear feet
2005	Brevard	Brevard County Shore Protection Project (North and South Reach)	05-0443	R-5 to R-20 and R-21 to R-54.5 and R-118 to R-139	Beach nourishment	13.2 miles
2005	Brevard	Brevard County FEMA Berm and Dune Restoration	05-1054	R-75 to R-118	Dune repair	12 miles
2005	Brevard	Patrick Air Force Base Beach Restoration	05-0258	R-54.5 to R-75.3	Beach nourishment	
2005	Brevard	Sloped Geotexile Revetment Armoring Structures	05-0454	5 tubes along north and south Melbourne beach	Protec tube installation	4,600 linear feet
2006	Brevard	Brevard County FEMA Berm and Dune Restoration	41910-2006-F-0189	R-75 to R-118	Dune repair	12 miles
2006	Brevard	Amended Lighting at Cape Canaveral Air Force and Patrick Air Force Station	41910-2006-F-0841		Sea turtle lighting	3 percent hatchling and nesting female disorientations at each installation
15 Feb 2008	Brevard	Patrick Air Force Base Dune Restoration	41910-2008-F-0150	R-65 to R-70	Dune restoration	6,000 linear feet
25 Jan 2008	Brevard	Brevard County's Dune Restoration	41910-2008-F-0189	R-75 to R-118 and R-138 to R-202	Dune restoration	140,000 cy along 3,000 linear feet
2009	Brevard	Brevard County's Dune Restoration	41910-2009-F-0125	R 75.4 to R 118.3 and R-139 to R-213	Dune restoration	22 miles
2009	Brevard	Mid Reach		R-75 to R119	Beach berm repair (permanent)	40,748 linear feet
2009	Brevard	South Beach		R-139 to R-215	Beach berm repair (permanent)	70,385 linear feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2009	Brevard	Patrick Air Force Base Dune Restoration and Beach Nourishment	41910-2009-F-0336	R-36 to R-75, R-53 to R-65	Sand placement	8,500 linear feet for dune restoration and 11,235 linear feet for beach nourishment.
2009	Brevard	Brevard Dune Restoration	41910-2009-F-0125	R-75.4 to R-118.3, R-139 to R-213	Dune restoration	Periodically on no more than 22 miles.
2009	Brevard	Mid Reach Shore Protection	41910-2008-F-0547	R-119 to R-75.4	Sand placement	7.7 linear miles
2009	Brevard	Canaveral Harbor Sand Bypass	41910-2008-F-0547	Canaveral Harbor	Sand bypass	18,600 linear no more than every 2 years
2009	Brevard	Kennedy Space Center Lighting	41910-2009-F-0306			3% of all hatchling disorientation events
2009	Brevard	South Beach Renourishment	41910-2009-F-0327			7.8 miles
1991	Duval	Duval County Beach Erosion Control		R-44 to R-52.5	Beach nourishment	9,000 linear feet
1996	Duval	Duval County Beach Erosion Control		R-47 to R-80	Beach nourishment	5 miles
2003	Duval	Duval County Beach Erosion Control		R-72 to R-80	Beach nourishment	
2005	Duval	Duval County Beach Erosion Control	05-1544	R-43 to R-53 and R-57 to R-80	Beach nourishment	5.7 miles
2010	Duval	Duval County Hurricane and Storm Damage Reduction	2010-CPA-0045	V-501 to R-80	Beach nourishment	52,800 linear feet
2005	Flagler	Road Stabilization from SR A1A	41910-2006-IE-0173		Seawall	140 linear feet
2009	Flager	State Road (SR) A1A Shoreline Stabilization	41910-2007-F-0495	200 feet south of South 28th Street to 980 feet south of Osprey Point Drive	Sand placement, revetments, and seawalls	5.2 miles = length of take; 3,000 linear feet of anticipated incidental take
2005	Hillsborough	Egmont Key Nourishment	05-1845	R-2 to R-10	Beach nourishment	8,000 linear feet
1993	Manatee	Anna Maria Island Beach Restoration		R-2 to R-36	Beach nourishment	4.7 miles
1997	Manatee	Dredge Material Disposal and Longboat Key Beach Restoration		R-48 to R-51	Dredge and beach nourishment	
2002	Manatee	Anna Maria Island Beach Restoration		R-7 to R-10 and R-12 to R-36	Beach nourishment	5.2 miles
2005	Manatee	Anna Maria Island Shore Protection Project	41910-2006-F-0079	R-7 to R-10	Beach nourishment	3,000 linear feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2005	Manatee	Anna Maria Island Emergency Beach Restoration	05-1227	R-2 to R-41	Beach nourishment	4.2 miles
2005	Manatee	Town of Longboat Key Beach Renourishment	4-1-04-TR-4529	R-44.5 to R-46	Beach nourishment	0.34 mile
2007	Manatee	Longboat Key Groin Installation	41910-2007-F-0521		Groin installation	2,210 linear feet
2009	Manatee	Anna Maria Island Beach Nourishment	41910-2008-F-456	R-7 to R-10, R-35 +790 feet and R-41 +365 feet	Sand placement	8,000 linear feet
2010	Manatee	Longboat Key North End Nourishment	41910-2010-F-0301			4,015 linear feet of beach
1994	Nassau	South Amelia Island Beach Restoration		R-60 to R-78	Beach nourishment	
1997	Nassau	Dredging of Sawpit Creek Cut and Beach Disposal		R-73.5 to R-78	Dredge and beach nourishment	2,900 linear feet
2002	Nassau	South Amelia Island Beach Restoration		R-50 to R-80	Beach nourishment	3.4 miles
2002	Nassau	Fernandina Harbor Dredge and Beach Disposal		R-1 to R-9	Dredge and beach nourishment	8,000 linear feet
2004	Nassau	Nassau County Shore Protection Project at Amelia Island	05-1355	R-9 to R-33	Beach nourishment	3.6 miles
2005	Nassau	Nassau County Shore Protection Project at Amelia Island	05-1355	R-11 to R-34	Beach nourishment	4.3 miles
2005	Nassau	Dredging of Sawpit Creek Cut and Beach Disposal	41910-2006-F-0254	R-73.5 to R-78	Dredge and beach nourishment	2,900 linear feet
1988	Pinellas	Sand Key/Redington Beach Restoration		R-99 to R-107	Beach nourishment	
1990	Pinellas	Sand Key/Indian Rocks Beach Restoration		R-72 to R-85	Beach nourishment	
1991	Pinellas	Long Key Beach Restoration		R-144 to R-147	Beach nourishment	0.45 mile
1991	Pinellas	Johns Pass Dredge Material Disposal		R-127 to R-130	Dredge disposal and sand placement	
1992	Pinellas	Sand Key/Redington Beach Restoration		R-99 to R-107	Beach nourishment	
1992	Pinellas	Sand Key/Indian Shore Beach Restoration		R-85 to R-99	Beach nourishment	
1996	Pinellas	Treasure Island Beach Restoration		R-138 to R-142	Beach nourishment	2,500 linear feet
1996	Pinellas	Long Key Beach Restoration		R-144 to R-146	Beach nourishment	0.45 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
1998	Pinellas	Sand Key/Belleair Beach Restoration		R-56 to R-66	Beach nourishment	
1999	Pinellas	Sand Key Beach Restoration		R-71 to R-107	Beach nourishment	
2000	Pinellas	Treasure Island Beach Restoration		R-136 to R-141	Beach nourishment	2.0 miles
2000	Pinellas	Terminal Groin at North End of Treasure Island			Groin construction	
2000	Pinellas	Long Key Beach Restoration		R-144 to R-145.6	Beach nourishment	2,800 linear feet
2000	Pinellas	Dredge Material Disposal and Honeymoon Island Beach Restoration		R-10 to R-12	Dredge disposal and sand placement	
2004	Pinellas	Treasure Island Beach Restoration	04-1247	R-136 to R-141	Beach nourishment	5,000 feet
2004	Pinellas	Long Key Beach Restoration	04-1247	R-144 to R-148	Beach nourishment	4,000 linear feet
2005	Pinellas	Sand Key Emergency Renourishment	05-0627	R-56 to R-66 and R-72 to R-106	Beach nourishment	8.6 miles
2006	Pinellas	Treasure Island, Sunset, Long Key, Pass a Grill Emergency Renourishment	41910-2006-F-0480	R-126 to R-146	Beach nourishment	9.5 miles
2006	Pinellas	Dredge Material Disposal and Mullet Key and Fort DeSoto Beach Restoration	41910-2006-F-0692	R-177 to R-179.5 and R-181 to R-183	Dredge disposal and sand placement	4,500 linear feet
2009	Pinellas	Treasure Island Beach Nourishment	41910-2009-F-0250	R-136 to R-141, R-144 to R-148	Sand placement	11,375 linear feet
1997	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D	R-197 to R-209		
2001	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D			
2002	St. Johns	St. Johns County Shore Protection Project at St. Augustine		R-137 to R-152	Beach nourishment	2.5 miles
2003	St. Johns	St. Johns County Shore Protection Project at St. Augustine		R-132 to R-152	Beach nourishment	3.8 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2003	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D	R-197 to R-209	Beach nourishment	
2005	St. Johns	St. Johns County Shore Protection Project at St. Augustine	05-0446	R-137 to R-150	Beach nourishment	2.5 miles
2006	St. Johns		TE091980-0		Beach driving	41.1 linear miles
2007	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	41910-2007-F-0305	R-200 to R-208	Beach nourishment	4,000 linear feet
2009	St. Johns	Beach berm repair		R-201 to R-203, R-207 to R-208	Beach berm repair	7,000 linear feet
2009	St. Johns	Matanzas Inlet Maintenance Dredge and Summer Haven Sand Placement	41910-2009-F-0462	R-200 to R-208	Sand placement	8,000 linear feet
2009	St. Johns	St. Augustine Shore Protection Project	41910-2009-F-0444	600 feet north of R-137 and 600 feet south of R-151	Sand placement	15,280 linear feet
2010	St. Johns	St. Augustine Inlet Dredge and Sand Placement	41910-2010-F-0105			20,000 linear feet
2004	Volusia	Volusia County FEMA Berm	05-1074	R-40 to R-145 and R-161 to R-208	Beach nourishment	
2005	Volusia	Ponce de Leon Dredge and Beach Placement	05-0884	R-143 to R-145	Dredge and sand placement	3,000 linear feet
2005	Volusia		TE811813-11		Beach driving	50 miles
2006	Volusia	New Smyrna/Silver Sands Dune Restoration	05-1007	R-161 to R-175	Beach restoration	5.4 miles
2006	Volusia	Volusia County FEMA Berm	41910-2006-F-0831		Repair of right of way and beach placement	230 linear feet
2007	Volusia	Ponce de Leon Dredge and Beach Placement	41910-2007-F-0109	R-158 to R-175	Dredge and sand placement	3.2 miles
2009	Volusia	Ponce de Leon Inlet Maintenance Dredging and Sand Placement	41910-2009-F-0362	R-143 to R-145	Sand placement	8,000 linear feet
PANAMA CITY FIELD OFFICE						
8 April 1998	Bay	Panama City Beach Beach Nourishment	4-P-97-108	R-4.4 and R-93.2	Beach nourishment new project	16 miles
24 June 1998	Bay	Tyndall AFB Driving on the Beach	4-P-98-020	V-9 (virtual) to R-122	Driving on the beach for military missions	18 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
31 July 1998	Bay	Lake Powell Emergency Opening	4-P-97-089	R- 0.5	Emergency outlet opening	1,500 feet
16 April 1999	Bay	Panama City Beach Beach Nourishment Amendment 1	4-P-97-108	R-0.5 to R-9	Beach nourishment completion	16 miles (no additional take provided from original)
9 March 2000	Bay	Panama City Beach Beach Nourishment Amendment 2	4-P-97-108	R-35 to R-71	Relief from tilling requirement beach nourishment	16 miles (no additional take provided from original)
10 April 2000	Bay	Panama City Beach Beach Nourishment Amendment 3	4-P-97-108	R-35 to R-71	Relief from tilling requirement beach nourishment	16 miles (no additional take provided from original)
18 December 2000	Bay	Panama City Beach Beach Nourishment Amendment 4	4-P-97-108	R-35 to R-71	Relief from tilling depth requirement and compaction testing sample numbers beach nourishment	16 miles (no additional take provided from original)
4 January 2001	Bay	East Pass Re-Opening	4-P-00-211	No R-monuments	Dredging of a closed inlet and dredged material placement on beach	2 miles
29 March 2001	Bay	Panama City Beach Beach Nourishment Amendment 5	4-P-97-108	R-35 to R-71	Relief from tilling depth requirement beach nourishment	16 miles (no additional take provided from original)
7 Sept 2001	Bay	City of Mexico Beach Sand Bypass System	4-P-01-178	Mexico Beach canal	Dredging and spoil disposal	3,700 feet 2.0 acres
14 January 2005	Bay	Panama City Beach Beach Nourishment Amendment 5	4-P-97-108	R-4.4 and R-93.2	Post hurricane restoration	16 miles (no additional take provided from original)
2006	Bay	Tyndall Air Force Base INRMP	4-P-05-240	V-9 (virtual) to R-122	Integrated Natural Resources Management Plan	18 miles
26 March 2006	Bay	Mexico Beach Canal Sand By Pass Amendment 1	4-P-05-281 2007-F-0205	R-127 to R-129	By pass system improvements	5,000 feet
24 May 2007	Bay	Panama City Beach Beach Nourishment Amendment 6	4-P-97-108 2007-TA-0127	R-4.5 to R-30 and R-76 to R-88	New work and post hurricane restoration	31,500 feet of 16 miles total no additional take provided
25 October 2007	Bay	Panama City Beach Nourishment Amendment 8	2008-F-0004	2008 project: R-74 to R-91; Entire project: R-0.5 to R-91	Beach nourishment	17.9 miles
29 Feb 2008	Bay	Panama City Harbor (revised BO)	2008-F-0168	R-97	Navigation channel maintenance dredging and beach placement of dredged material.	500 ft of beachfront at St. Andrew State Park

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8 June 2009	Bay	Panama City Harbor Navigation Channel Amendment 1	2009-F-0175	R-92 to R-97	Maintenance navigation channel dredging and dredged material placement	0.85 mile
2009	Bay	City of Mexico Beach		R-128.5 to R-138.2	Beach berm repair (emergency)	9,393 linear feet
06 Jan 2010	Bay	Lake Powell Outlet Emergency Opening	2009-F-0226	R-0-A and R-1	Emergency opening of the outlet to the Gulf of Mexico	2,400 feet
7 August 2000	Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin	Destin Dome OCS Offshore Oil and Gas Drilling	4-P-00-003	Gulf of Mexico federal waters	Oil and gas offshore exploration	Formal consultation with no take
3 June 2002	Escambia	Pensacola Beach Beach Nourishment	4-P-02-056	R-108 to R-143	Beach nourishment	8.3 miles Loggerhead 14 nests Green 1 nest Leatherback < 1 nest Kemp's ridley <1 nest
9 June 2009	Escambia	Perdido Key Beach Nourishment	2008-F-0059	R-1 to R-34	New beach nourishment	6.5 miles
9 Sept 2010	Escambia	Pensacola Navigation Channel	2009-F-0205; using statewide programmatic 41910-2010-F-0547	R-32 to R-64	Navigation channel maintenance and dredge material disposal	6.3 miles
11 Jan 2010	Escambia	FEMA Perdido Key Upland Berm	Using statewide programmatic 41910-2010-F-0547	R-21.5 to R-31.5	Post Tropical Storm Gustav berm	2.0 miles
8 April 2005	Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf	FEMA Beach Berms Post Hurricane Ivan Emergency Coordination (consultation incomplete)		UK	Emergency beach berms	Walton 20 miles Okaloosa 4.2 miles Mexico Bch 1 mile Panama City Bch UK St Joseph peninsula UK Perdido Key UK Navarre UK
10 May 2004	Franklin	Alligator Point Beach Nourishment	4-P-02-163	R-207 to R-210	Beach nourishment	2,500 feet Loggerhead,: 2 nests, green 1 nest; leatherback 1 nest
17 May 2007	Gulf	St. Joseph Peninsula Beach Nourishment	4-P-07-056 2007-F-0220	R-67 to R-105.5	Beach nourishment	7.5 miles
31 Jan 2008	Gulf	St. Joseph Peninsula Beach Nourishment; Amendment 2	2008-F-0161	R-67 to R-105.5	Beach nourishment – change from work in 2 to 1 season.	7.5 miles; no increase in IT.
2009	Gulf	St. Joseph Peninsula Beach		R-95.3 to R-105.5	Beach berm repair (emergency)	10,300 linear feet

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25 April 2001	Okaloosa	Eglin AFB Porous Groin within Season	4-P-00-207	Eglin AFB Test Sites 1 and 3	Experimental porous groin system	
18 June 2002	Okaloosa	Eglin 737 Sensor Test Site 13-A SRI	4-P-02-088	V-507	Military testing	0.01 acre 0.12 mile
2009	Okaloosa	City of Destin		R-17.37 to R-19	Beach berm repair (emergency)	1,260 linear feet
23 Dec 2009	Okaloosa	East Pass at Destin Navigation Channel	2009-F-0096	R-17 to R-25.5	Navigational channel maintenance	1.7 miles
21 March 2003	Okaloosa Santa Rosa	Eglin Marine Expeditionary Unit Training	4-P-03-052	V-621 to V-501	Military marine training	
9 October 2003	Okaloosa Santa Rosa	Eglin AFB U.S. Army Ranger Los Banos	4-P-03-289	V-502 to V-533	Military army training	7 miles
25 February 2004	Okaloosa, Santa Rosa	Eglin AFB Advance Skills Training	4-P-03-264	R-502 to R-534	Military training	7 miles 70 acres
4 June 2004	Okaloosa Santa Rosa	Eglin AFB Airborne Littoral Reconnaissance Test	4-P-04-225	V-501 to V-514	Military naval testing	0.5 mile 15.2 acres
1 December 2005	Okaloosa Santa Rosa	Eglin Air Force Base Military Mission & Training Santa Rosa Island Programmatic	4-P-05-242	V-621 to V-501	Military missions	17 miles
6 December 2007	Okaloosa Santa Rosa	Eglin AFB Airborne Littoral Reconnaissance Test	2008-F-0056	V-501 to V-514 Test Site A-15	Military naval testing	0.7 acre
3 June 2008	Okaloosa Santa Rosa	Eglin AFB Beach and Dune Restoration	2008-F-0139	V-551 to V-609 excluding non-AF lands and V-512 to V-518	Beach nourishment including dune restoration (new)	5.0 miles
28 August 2008	Okaloosa, Santa Rosa	Eglin Air Force Base Armoring Santa Rosa Island Test Sites A-3, A-6, A-13B	2008-F-061	Test Sites A-3, A-6, A-13B	Storm protection at air force facilities, Santa Rosa island	0.57 miles
21 April 2009	Okaloosa, Santa Rosa	East Pass Destin Navigation Channel	2009-F-0295	V-619.5 to V-621 and R-17	Maintenance navigation channel dredging and dredged material placement	1.6 miles
28 Dec 2009	Okaloosa, Santa Rosa	Eglin Air Force Base protection of Test Sites A-3, A-13, and A-13b	2008-F-061 amendment 1	V-608 and V-512	Sand placement 100% proposed at sites A-3 and 50% of proposed between sites A-13b and A-13.	A-3, = 7,000 feet; between A-13b and A-13.5=5,500-7,000 feet

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28 Dec 2009	Okaloosa, Santa Rosa	Eglin Air Force Base	2008-F-039 amendment 1	V-608 and V-512	Sand placement 100% proposed at sites A-3 and 50% of proposed between sites A-13b and A-13.	A-3, = 7,000 feet; between A-13b and A-13.5=5,500-7,000 feet
26 March 2002	Santa Rosa, Okaloosa, Gulf	Eglin AFB INRMP		V-621 to V-501	Integrated natural resources management program	17 miles
19 July 2005	Santa Rosa	Navarre Beach Nourishment Emergency Coordination (consultation incomplete)	4-P-04-244	R-192.5 to R-213.5	Emergency beach nourishment	4.1 miles
24 Aug 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
30 Aug 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
29 Nov 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
28 August 2008	Santa Rosa	Eglin AFB SRI Armoring at Test Sites	2008-F-0061	V-608, V-551, and V-512	Bulkheads around test sites A-3, A-6, and A-13B	0.57 mile
7 Dec 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
9 October 2009	Santa Rosa	Navarre Beach Restoration Amendment 7	2010-F-0036	R-192 to R-194	Emergency beach restoration	1,800 feet
30 April 2004	Walton, Okaloosa	Walton County-Destin Beach Nourishment	4-P-01-149	R-39 (Okaloosa Co.) to R-21.93 (Walton Co.)	New beach nourishment	6.7 miles Loggerhead: 11 nests; green 1 nests; leatherback & Kemp's ridley: < 1 nests
8 May 2006	Walton	Western Lake Emergency Opening	4-P-01-105	R-72 to R-73	Emergency outlet opening	0.5 miles 3.0 acres
26 October 2007	Walton	Eastern Lake Emergency Opening	2007-F-0627	R-94 to R-95	Emergency opening of coastal dune lake to GOM	0.5 mile

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9 November 2007	Walton	Alligator Lake Emergency Opening	2007-F-0031	R-68 to R-70	Emergency opening of coastal dune lake to GOM	0.5 mile
2 October 2008	Walton	Walton County Beach Nourishment Phase 2	2008-F-060	R-41 to R-67, R-78 to R-98, R-105.5 to R-127	Beach nourishment (new)	13.5 miles
SOUTH FLORIDA FIELD OFFICE						3,390 feet
11 March 2003	Broward	Broward County Shore Protection Project	4-1-99-F-506		Port Everglades dredging and beach nourishment	
4 Dec 2003	Broward	Diplomat Beach Nourishment	4-1-00-F-743		Nourishment and 200 feet of riprap	
25 Aug 2004	Broward	Fishermen's Pier	4-1-04-F-8366		Pier repair	14,910 square feet
18 June 2007	Broward	Hillsboro Inlet Maintenance Dredging and Sand Placement	41420-2006-FA-0896	315 feet of the Inlet and 500 feet of shoreline at R-25.	Inlet dredging and sand nourishment	500 feet
10 Dec 2007	Broward	Town of Hillsboro Beach Pressure Equalizing Modules (PEMs) Pilot Project	41420-2007-F-0859	300 feet north of R-7 to 100 feet south of R-12 1 mile of shoreline	Pilot project to investigate the effectiveness of the PEMs	1 mile
7 Mar 2008	Broward	Broward County Glass Cullet Pilot Project	41420-2007-FA-0599	Centered at R-103	Pilot project to examine the effectiveness of glass cullet as potential beach fill supplement material for shoreline stabilization.	333 feet
28 April 2008	Broward	Town of Hillsboro Truck Haul Beach Nourishment Project	41420-2008-FA-0187	330 feet north and 100 feet south of R-7	Temporary beach nourishment	0.08 mile (430 feet)
3 Sept 2008	Broward	Hillsboro Inlet Maintenance Dredging and Sand Placement	41420-2006-FA-0896	500 feet south of R-25	Inlet dredging and sand placement. This is an amended BO in regard to the original BO completed on 18 June 2007.	500 feet
28 May 2010	Broward	Port Everglades Jetty Repair	41420-2010-CPA-0144	South Jetty	Repair of the south jetty.	0.15 mile

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18 June 2010	Broward	Hillsboro Beach Sand Placement	41420-2008-FA-0187	R-5 +300 to R-12 +450 feet	Beach nourishment	1.35 miles
23 March 2005	Charlotte	Manasota Key Groin Construction	4-1-04-F-8338	R-19 to R-20	Stump Pass dredging (material placed on beach); and groin construction	1,000 feet
29 March 2006	Charlotte	Stump Pass Dredging and Beach Nourishment	4-1-04-F-8338	R-16.5 to R-18	Stump Pass dredging and beach nourishment	1,500 feet
26 April 2010	Charlotte	Stump Pass Dredging and Sand Placement	41420-2008-FA-0425	R-14.4 to R-20 R-22 to R-23 R-29 to R-39	Stump Pass dredging and sand placement	3.5 miles
3 April 2003	Collier	Keewaydin Island Limited Partnership T-Groin Project	4-02-F-1099	R-90 to R-91	Gordon Pass – maintenance dredge; nourish the section of beach where groins are to be constructed; construct three t-groins	1,000 feet
14 March 2005	Collier	Hideaway Beach	4-1-04-F-6342	H-1 to H-5 and H-9 to H-12	Beach nourishment and t-groin construction	1.4 miles
20 Sept 2005	Collier	Collier County Beach Re-Nourishment Project	4-1-04-TR-8709	Segments within R-22 and R-79	Beach nourishment	13.4 miles
14 Nov 2005	Collier	South Marco Island Beach Re-Nourishment	4-1-04-TR-11752	R-144 to G-2	Beach nourishment	0.83 mile
28 August 2008	Collier	Doctor's Pass North Jetty Repair	41420-2008-FA-0432	R-57 plus 500 feet south	Removing the existing 240 feet of existing jetty and constructing a new jetty within generally the same footprint.	0.25 mile
27 October 2009	Collier	Hideaway Beach Erosion Control	41420-2008-FA-0935	H-4 to H-9	Sand placement and construction of six T-head groins.	0.47 mile
18 August 2010	Collier	Gordon Pass Erosion Control Project – Phase 2 (T-head groins)	41420-2008-FA-0765	R-91 to R-92	Construction of two T-head groins.	0.19 mile
28 Oct 2010	Collier	Collier County Truck Haul Sand Placement (Park Shore & Naples Beach)	41420-2010-F-0225	R-45 +600 feet to R-46 +400 feet; R-58A -500 feet to R-58	A truck haul sand placement project	0.37 mile

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12 Oct 2004	Indian River	Issuance of Permits to Homeowners for Emergency Coastal Armoring	10(a)(1)(B) permit			3,196 feet
28 Feb 2005	Indian River	Indian River County Beach Nourishment - Sectors 3 and 5	4-1-05-F-10922	Gaps between R-21 and R-107	Dune restoration and beach nourishment	5.90 miles dunes 0.8 mile beach
22 Nov 2005	Indian River	Indian River County Beach Nourishment – Sector 7	4-1-05-TR-9179	R-97 to R-108	Beach nourishment	2.2 miles
31 Oct 2006	Indian River	Indian River County Beach Nourishment – Sectors 1 and 2	41420-2006-FA-1491	R-3.5 to R-12	Dune enhancement and beach nourishment	1.62 miles
10 Sept 2007	Indian River	Sebastian Inlet Channel and Sand Trap Dredging, Sectors 1 and 2 Beach Nourishment	41420-2007-F-0864	R-3 to R-12	Sand trap dredging and beach nourishment	1.61 miles
10 October 2008	Indian River	Baytree and Marbrisa Condominium Dune Restoration	41420-2008-FA-0007	200 feet south of R-46 to 200 feet south of R-48	Dune restoration/enhancement	0.38 mile
16 October 2009	Indian River	City of Vero Beach, Outfall Pipe Installation	41420-2009-FA-0255	220 feet north and 930 feet south of R-83	Outfall pipe installation	0.22 mile
2 December 2009	Indian River	Indian River County Beach Nourishment Sector 3	41420-2007-F-0839	Phase 1 = R-32 to R-55 Phase 2 = R-20 to R-32	Beach and dune nourishment	Phase 1 = ~4.4 miles Phase 2 = ~2.3 miles
24 July 2002	Lee	Gasparilla Island Beach Nourishment	4-01-F-765	R-10 to R-26.5 R-25, R-25.5, R-26	Beach nourishment; breakwater construction; and two t-head groins	3.2 miles
19 June 2003	Lee	Bonita Beach Re-nourishment	4-1-02-F-1736		Beach nourishment	3,922 feet
4 March 2005	Lee	Sanibel and Captiva Island Beach Nourishment	4-1-04-F-9180	R-83 to R-109 and R-110 to R-118	Beach nourishment	6.0 miles
14 March 2007	Lee	Gasparilla Island Beach Nourishment (BO amendment)	41420-2007-FA-0509	South of R-26A	Beach nourishment	
27 August 2007	Lee	North Captiva Island Beach Nourishment	41420-2007-FA-1023	R-81 and 208 feet south of R-81A	Beach nourishment	0.23 mile
5 August 2009	Lee	Matanzas Pass Reopening	41420-2009-FA-0132	North end of Estero Island	Channel dredging	0.14 mile

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21 March 2008	Lee	Blind Pass Reopening	41420-2006-FA-1549	R-109 to R-114	Reopening Blind Pass and then nourishing the shoreline between R-112 and R-114.	0.95 mile
7 Dec 2009	Lee	Sanibel Island Sand Placement	41420-2009-FA-0066	R-174A to Bay 1A	Beach nourishment	0.25 mile
15 Sept 2010	Lee	Big Hickory Island Sand Placement and Groin Construction	41420-2010-CPA-0100	R-222.3 to R-223.8	Beach nourishment and groin construction	0.47 mile
31 Jan 2002	Martin	Jupiter Island	4-1-05-TR-13281	R-75 to R-117	Beach nourishment	6.5 miles
5 Jan 2005	Martin	Martin County Shore Protection Project	4-1-05-F-10476	R-1 to R-25.6	Beach nourishment	4.1 miles
2 Dec 2005	Martin	Jupiter Island Modification	4-1-05-TR-13281	R-76 to R-84 and R-87 to R-11	Beach nourishment	5 miles
2 Feb 2007	Martin	Sailfish Point Marina Channel Dredging and Beach Nourishment	41420-2007-FA-0196	R-36 to R-39	Channel dredging and beach nourishment	0.66 mile
6 October 2009	Martin	Bathtub Beach Park Sand Placement	41420-2009-FA-0110	R-34.5 to R-36	Beach nourishment	0.24 mile
8 June 2010	Martin	Martin County Beach Erosion Control Project	41420-2009-FA-0190	R-1 to R-25	Beach nourishment	~ 4 miles
23 Sept 2005	Miami-Dade	Bal-Harbour T-Groin Reconstruction	4-1-05-12842	R-27 to R-31.5	Groin removal and reconstruction	0.85 mile
11 Oct 2005	Miami-Dade	Bakers Haulover AIW Maintenance Dredging	4-1-04-TR-8700	R-28 to R-32	Dredging and beach nourishment	0.85 mile
7 June 2006	Miami-Dade	Miami-Dade Beach Nourishment	41420-2006-FA-0028	3 segments within R-48.7 and R-61	Beach nourishment	3,716 feet
25 July 2007	Miami-Dade	Miami Beach Nourishment	41420-2006-F-0028	R-67 to R-70	BO modification to June 7, 2006 BO	3,000 feet
5 Nov 2008	Miami-Dade	Baker's Haulover Dredging and Sand Placement	41420-2008-FA-0729	R-28 to R-32	BO modification to the October 11, 2005 BO. Dredging and sand placement events will be biannual.	4,000 feet
12 Nov 2008	Miami-Dade	DERM Truck Haul Sand Placement	41420-2008-FA-0776	R-27 to R-29 R-7 to R-12 R-43 to R-44+500 feet	Beach nourishment	1.78 miles
25 Nov 2009	Miami-Dade	DERM 27th Street Sand Placement	41420-2009-FA-0045	R-60 to R-61	Beach nourishment	0.19 mile
17 Dec 2009	Miami-Dade	32nd and 63rd Streets Sand Placement	41420-2009-FA-0415	R-37.75 to R-46.25 R-53.7 to R-55.5 R-60 to R-61	Sand placement	2.14 miles

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31 March 2010	Miami-Dade	55th Street Sand Placement	41420-2009-FA-0046	R-48.7 to R-50.7	Sand placement	0.38 mile
30 April 2010	Miami-Dade	44th Street Sand Placement	41420-2009-FA-0047	R-53.7 to R-55.5	Sand placement	0.34 mile
25 June 2010	Miami-Dade	Bal Harbour Sand Placement	41420-2009-FA-0593	R-29 to R-32	Sand Placement – truck haul	0.60 mile
28 June 2010	Miami-Dade	Sunny Isles BeachSand Placement	41420-2009-FA-0594	R-12 to R-15)	Sand Placement – truck haul	0.58 mile
30 July 2010	Miami-Dade	Miami Beach sand placement	41420-2009-FA-0595	R-45 to R-48 +700 feet	Sand Placement – truck haul	0.78 mile
13 Sept 2010	Miami-Dade	Miami Beach sand placement	41420-2009-FA-0527	R-43 to R-44 + 500 feet	Sand Placement – truck haul	0.26 mile
8 October 2010	Miami-Dade	Sunny Isles Beach Sand Placement	41420-2009-FA-0526	R-7 to R-12	Sand Placement – truck haul	0.95 mile
8 October 2010	Miami-Dade	Bal Harbour Sand Placement	41420-2009-FA-0525	R-27 to R-29	Sand Placement – truck haul	0.38 mile
2009	Monroe	Reclaimed sand placement and sand cleaning (seaweed removal)	41420-2010-F-0006	No R-monuments	Sand placement and cleaning	1,462 linear feet
2009	Monroe	City of Key West (South Beach)	41420-2010-F-0013	No R-monuments	Beach repair (emergency)	235 linear feet
2009	Monroe	City of Key West (Rest Beach)	41420-2010-F-0014	No R-monuments	Beach repair (emergency)	640 linear feet
2009	Monroe	City of Marathon, Sombrero Beach	41420-2010-F-0001	No R-monuments	Beach repair (emergency)	1,380 linear feet
5 March 2010	Monroe	City of Key West – Simonton Beach	41420-2010-FC-0412	Approximately 350 feet ENE of V-416 (latitude 24.562, longitude -81.8054	Emergency beach repair	95 linear feet
5 March 2010	Monroe	City of Key West – Dog Beach	41420-2010-FC-0413	Between V-414 and V-413 (latitude 24.5473, longitude -81.7929	Emergency beach repair	35 linear feet
13 May 2010	Monroe	City of Key West, Smathers Beach	41420-2008-FA-0185	No R-monuments	Sand placement	0.57 mile
27 March 2003	Palm Beach	Palm Beach Harbor M & O	4-1-03-F-139	200 feet south of the south jetty	Jetty sand tightening	200 feet
16 March 2004	Palm Beach	Boca Raton Inlet Sand Bypassing	4-1-04-F-4688	200 feet south of R-223	Inlet sand bypassing and beach nourishment	500 feet
11 Feb 2005	Palm Beach	Palm Beach Shoreline Protection Project - Delray Segment	4-1-05-F-10767	R-175 to R-188	Beach restoration	2.7 miles

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24 Feb 2005	Palm Beach	Palm Beach Shoreline Protection Project - Ocean Ridge Section	4-1-05-F-10787	R-153 to R-159	Beach nourishment	1.12 miles
11 April 2005	Palm Beach	South Lake Worth Inlet Sand Transfer Plant Reconstruction and Bypassing	4-1-04-F-8640	135 feet south of R-151, to 275 feet south of R-152	STP reconstruction and bypassing	900 feet
5 Dec 2005	Palm Beach	Mid-Town Beach Nourishment Project (Reach 3 & 4)	4-1-00-F-742	R-90.4 to R-101.4	Beach nourishment	2.4 miles
23 Dec 2005	Palm Beach	Palm Beach Harbor M & O	4-1-05-TR-13258	R-76 to R-79	Dredging and beach nourishment	3,450 feet
23 Feb 2006	Palm Beach	Boca Raton Central Beach Nourishment Project	4-1-01-F-1795	R-216 to R-222	Dredge shoal fronting Boca Raton Inlet and beach nourishment	1.3 miles
23 Feb 2006	Palm Beach	Boca Raton South Beach Nourishment Project	41420-2008-FA-0777 Old database number 41-01-F-652	R-223.3 to R-227.9	Dredge shoal fronting Boca Raton Inlet and beach nourishment	Approx. 1 mile
28 April 2006	Palm Beach	Palm Beach Nourishment Project – Reach 8	41420-2006-F-0018	R-125 to R-134	Beach nourishment	2.17 miles
31 July 2006	Palm Beach	Sea Dunes Condominium Seawall	41420-2006-FA-1108		Seawall construction	0.03 acre
15 Dec 2006	Palm Beach	North Ocean Boulevard Rock Revetment	41420-2006-FA-1490	290 feet north of R-84; 1,150 feet south of R-85	Rock revetment construction	0.34 mile
5 Feb 2007	Palm Beach	Palm Beach Sand Transfer Plant Reconstruction	41420-2006-FA-1447	R-76 to R-79	Sand transfer plant reconstruction and discharge pipe extension	0.57 mile
28 March 2007	Palm Beach	Lake Worth Inlet Jetty Repair	41420-2007-FA-0221	200 feet north of R-75 and 200 feet south of R-76	Jetty repair	400 feet
25 May 2007	Palm Beach	Singer Island and South Palm Beach Emergency Dune Restoration	41420-2007-FA-1001	385' south of R-137 to 500' north of R-136; 500'south of R-60 to 850' south of R-65	Dune Restoration	6,135 feet
25 May 2007	Palm Beach	Jupiter Island ICWW Maintenance Dredging and Beach Nourishment	41420-2006-FA-1582	16,000 feet (130,000 cy) of the ICWW dredged; material placed between R-13 and R-19.	Channel dredging and beach nourishment	1.04 miles
20 July 2007	Palm Beach	North Boca Raton Beach Nourishment	41420-2007-FA-0477	T-205 to 181 feet south of R-212	Beach nourishment	1.45 miles

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9 Nov 2007	Palm Beach	Jupiter Inlet and channel dredging	41420-2006-FA-1582	R-13 to R-17	Dune restoration	~ 4,000 linear feet
14 Nov 2007	Palm Beach	Jupiter Inlet Sand Trap Dredging and Sand Placement	41420-2007-FA-0600	Maintenance dredging of the inlet; beach compatible placed R-13 to R-19	Inlet dredging and beach nourishment	1.02 miles
28 Nov 2007	Palm Beach	Modification to a Sheet Pile and Rubble-Mound T-Head Groin System	41420-2007-FA-0574	500 feet north of R-94 south to R-95	T-groin repair, extension, construction	0.4 mile
5 Feb 2008	Palm Beach	Reach 8 Dune Restoration	41420-2006-F-0018	R-125 to 350 feet south of R-134	Dune restoration	2.17 miles
9 Sept 2008	Palm Beach	Juno Beach Sand Placement	41420-2008-FA-0081	R-26 to R-38	Sand placement	2.45 miles
4 Nov 2008	Palm Beach	Palm Beach Harbor M&O and Sand Placement	41420-2008-FA-0524	R-76 to R-79	Biannual Inlet dredging and sand placement events.	3,450 feet
2009	Palm Beach	Beach berm repair	41420-2010-F-0008	R-60 to R-68	Beach berm repair (permanent work)	6,880 linear feet
2009	Palm Beach	Beach berm repair	41420-2010-F-0009	R-135 to R-138	Beach berm repair (permanent work)	3,590 linear feet
2009	Palm Beach	Beach berm repair	41420-2010-F0010	R-137 to R-138	Beach berm repair (emergency)	125 linear feet
21 June 2010	Palm Beach	Mid-Town Reaches 3 & 4 Sand Placement	41420-2006-F-0011-R001	R-95 to R-100	Beach nourishment	0.95 mile
2 July 2010	Palm Beach	Phipps Ocean Park Reaches 7&8	41420-2010-CPA-0110	R-116 to R-125	Sand Placement	3.4 miles
3 Sept 2010	Palm Beach	Singer Island Breakwater	41420-2008-FA-0019	R-60.5 to R-66	Segmented, submerged breakwater	1.1 miles
19 June 2003	St. Lucie	Fort Pierce Shoreline Protection	4-1-03-F-1867 41420-2006-FA-1575	R-33.8 to R-41	Beach nourishment; berm expansion; and six t-head groins	1.3 miles
9 March 2006	St. Lucie	Blind Creek Restoration and South St. Lucie Emergency Berm Remediation Project	41420-2006-FA-0075	R-98 to R-115 R-88 to R-90	Wetland restoration and beach nourishment	3.6 miles
27 June 2008	St. Lucie	Fort Pierce Shoreline Protection Project	41420-2006-FA-1575	R-34 to R-41	Beach nourishment, berm expansion, and six t-head groins	1.3 miles
25 Aug 2004	Sarasota and Manatee	Longboat Key Beach Nourishment	4-1-04-F-4529	R-46A to R-29.5	Beach nourishment	9.45 miles
4 Oct 2005	Sarasota and Manatee	Longboat Key Beach Nourishment Project – BO Amendment	4-1-04-TR-4529	R-44 to R-44.5 and R-46A to R-44.5	Beach nourishment	0.47 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
20 Oct 2005	Sarasota	South Siesta Key	4-1-05-TR-12691	R-67 to R-77 plus 200 feet	Beach nourishment	2.1 miles
7 Dec 2007 (original BO) 28 July 08 (BO mod)	Sarasota	Lido Key Beach Fill Placement Project	41420-2007-F-0841	R-35.5 to R-44.2 2.27 miles	Beach nourishment with 425,000 cy of fill material.	2.27 miles
13 August 2008	Sarasota	Longboat Key Permeable Adjustable Groins	41420-2007-FA-0205	R-13 to R-13.5	Construction of two permeable adjustable groins.	0.09 mile project area 0.43 mile action area
2009	Sarasota		41420-2010-F-0003	R-77 to midpoint between R-77 and R-76	Beach restoration	700 linear feet
2009	Sarasota	Longboat Key Beach	41420-2010-F-0007	R-13 to R-14 Sarasota County; R-44 to R-5, and R-48.5 to R-49.5 Manatee County	Beach berm repair	951, 1,197, and 1,142 linear feet, respectively

Appendix B

NMFS Consultations

CONSULTATION ACTIVITY	TYPE OF ACTION	DATE SIGNED	ACTION AREA	INCIDENTAL TAKE STATEMENT (ANTICIPATED TAKE)									
				Loggerhead (NWAO & NP DPS)		Green Turtle		Leatherback		Hawksbill		Kemp's Ridley Olive Ridley	
				Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Non-Fishery Consultations													
North Carolina DENR Inshore Gillnet-Incidental Take Permit	Section 10(a)(1)(B)	9/6/13	North Carolina Inshore Waters	1-yr Estimate									
						330	165					98	49
				1-yr Observed									
				24		18		8		8		12	
Removal of Offshore Structures in the Gulf of Mexico Outer Continental Shelf	Oil & Gas	8/28/2006	Gulf of Mexico	6-yr Estimate									
				15*	0	3*	0	3*	0	3*	0	3*	0
Sinking Exercises (SINKEX) in the Western North Atlantic Ocean	Military	9/22/2006	Western North Atlantic Ocean	1-yr Estimate									
				ITS - We do not have information to determine an amount of take. Survey data for the SINKEX location is extremely limited and the densities or abundance of sea turtles within the area is not known. Therefore, we anticipate the extent of take would be within the water column that would be affected by the shock and pressure waves above levels of 12 psi and 182 dB re 1 μ Pa2-sec in the greatest 1/3 octave band. For the largest underwater detonations, the extent includes the volume within 2 nmi of the detonation. Thus, the extent of take includes the "exclusion zone" of the SINKEX.									
Issuance of multiple permits to conduct scientific research on Atlantic sturgeon pursuant to section 10 (a)(1) of the Endangered Species Act of 1973	Section 10(a)(1)(A) for Sturgeon Research	4/2/2012	U.S. Atlantic Coast (from ME to FL)	Anticipated take for the entire research permit (5 years)									
				4*	0	4*	0	4*	0	4*	0	4*	0
National Science Foundation - Marine Seismic Survey in the Central Pacific Ocean	Seismic	11/23/2011	Central Pacific Ocean	Anticipated take for the entire project period									
				ITS - We do not have information to determine an amount of take. Harassment of these sea turtles is expected to occur at received levels of seismic sounds above 166 dB re 1 μPa. Because density estimates of sea turtles in the survey area are unknown, we estimate take as the number of turtles exposed to seismic operations above 166 dB re 1 μPa during the proposed activities. These turtles could be of all ages and life stages in the survey area.									
Navy - Conduct of training in the Virginia Capes, Cherry Point and Jacksonville Range Complexes June 2011 to June 2012	Navy Activities	6/1/2011	Central Pacific Ocean	Anticipated take for the entire project period									
				485	9	311*	3*	20	1	311*	3*	557	5

Appendix C

ASSESSMENTS: DISCERNING PROBLEMS CAUSED BY ARTIFICIAL LIGHTING

LIGHTING INSPECTIONS

WHAT ARE LIGHTING INSPECTIONS?

During a lighting inspection, a complete census is made of the number, types, locations, and custodians of artificial light sources that emit light visible from the beach. The goal of lighting inspections is to locate lighting problems and to identify the property owner, manager, caretaker, or tenant who can modify the lighting or turn it off.

WHICH LIGHTS CAUSE PROBLEMS?

Although the attributes that can make a light source harmful to sea turtles are complex, a simple rule has proven to be useful in identifying problem lighting under a variety of conditions:

An artificial light source is likely to cause problems for sea turtles if light from the source can be seen by an observer standing anywhere on the nesting beach.

If light can be seen by an observer on the beach, then the light is reaching the beach and can affect sea turtles. If any glowing portion of a luminaire (including the lamp, globe, or reflector) is directly visible from the beach, then this source is likely to be a problem for sea turtles. But light may also reach the beach indirectly by reflecting off buildings or trees that are visible from the beach. Bright or numerous sources, especially those directed upward, will illuminate sea mist and low clouds, creating a distinct glow visible from the beach. This "urban skyglow" is common over brightly lighted areas. Although some indirect lighting may be perceived as nonpoint-source light pollution, contributing light sources can be readily identified and include sources that are poorly directed or are directed upward. Indirect lighting can originate far from the beach. Although most of the light that sea turtles can detect can also be seen by humans, observers should realize that some sources, particularly those emitting near-ultraviolet and violet light (e.g., bug-zapper lights, white electric-discharge lighting) will appear brighter to sea turtles than to humans. A human is also considerably taller than a hatchling; however, an observer on the dry beach who crouches to the level of a hatchling may miss some lighting that will affect turtles. Because of the way that some lights are partially hidden by the dune, a standing observer is more likely to see light that is visible to hatchlings and nesting turtles in the swash zone.

HOW SHOULD LIGHTING INSPECTIONS BE CONDUCTED?

Lighting inspections to identify problem light sources may be conducted either under the purview of a lighting ordinance or independently. In either case, goals and methods should be similar.

GATHER BACKGROUND INFORMATION

Before walking the beach in search of lighting, it is important to identify the boundaries of the area to be inspected. For inspections that are part of lighting ordinance enforcement efforts, the jurisdictional boundaries of the sponsoring local government should be determined. It will help to have a list that includes the name, owner, and address of each property within inspection area so that custodians of problem lighting can be identified. Plat maps or aerial photographs will help surveyors orient themselves on heavily developed beaches.

PRELIMINARY DAYTIME INSPECTIONS

An advantage to conducting lighting inspections during the day is that surveyors will be better able to judge their exact location than they would be able to at night. Preliminary daytime inspections are especially important on beaches that have restricted access at night. Property owners are also more likely to be available during the day than at night to discuss strategies for dealing with problem lighting at their sites.

A disadvantage to daytime inspections is that fixtures that are not directly visible from the beach will be difficult to identify as problems. Moreover, some light sources that can be seen from the beach in daylight may be kept off at night and thus present no problems. For these reasons, daytime inspections are not a substitute for nighttime inspections. Descriptions of light sources identified during daytime inspections should be detailed enough so that anyone can locate the lighting. In addition to a general description of each luminaire (e.g., HPS floodlight directed seaward at top northeast corner of the building at 123 Ocean Street), photographs or sketches of the lighting may be necessary. Descriptions should also include an assessment of how the specific lighting problem can be resolved (e.g., needs turning off; should be redirected 90° to the east). These detailed descriptions will show property owners exactly which luminaries need what remedy.

NIGHTTIME INSPECTIONS

A nighttime survey shall be conducted of all lighting visible from the beach placement area by the FWC permit holder, using standard techniques for such a survey. During the nighttime lighting surveys, the surveyor shall walk the length of the beach placement area looking for light from artificial sources. During the nighttime lighting surveys, a complete census shall be made of the number, types, locations, and custodians of artificial light sources that emit light visible from the beach. Because problem lighting will be most visible on the darkest nights, lighting inspections are to be conducted when there is no moon visible. Descriptions of light sources identified during the survey should be detailed enough so that anyone can locate the lighting. In addition to a general description of each luminaire (e.g., HPS floodlight directed seaward at top northeast corner of the building at 123 Ocean Street), photographs or sketches of the lighting may be necessary. Descriptions should also include an assessment of how the specific lighting problem can be resolved (e.g., needs turning off; should be redirected 90° to the east, etc.). A summary report of the survey shall be submitted to the Corps, FWC, and the Service.

Surveyors orienting themselves on the beach at night will benefit from notes made during daytime surveys. During nighttime lighting inspections, a surveyor walks the length of the nesting beach looking for light from artificial sources. There are two general categories of artificial lighting that observers are likely to detect:

1. **Direct lighting**. A luminaire is considered to be direct lighting if some glowing element of the luminaire (e.g., the globe, lamp [bulb], reflector) is visible to an observer on the beach. A source not visible from one location may be visible from another farther down the beach. When direct lighting is observed, notes should be made of the number, lamp type (discernable by color; style

of fixture), mounting (pole, porch, *etc.*), and location (street address, apartment number, or pole identification number) of the luminaire(s). If exact locations of problem sources were not determined during preliminary daytime surveys, this should be done during daylight soon after the nighttime survey. Photographing light sources (using long exposure times) is often helpful.

2. **Indirect lighting**. A luminaire is considered to be indirect lighting if it is not visible from the beach but illuminates an object (e.g., building, wall, tree) that is visible from the beach. Any object on the dune that appears to glow is probably being lighted by an indirect source. When possible, notes should be made of the number, lamp type, fixture style, and mounting of an indirect-lighting source. Minimally, notes should be taken that would allow a surveyor to find the lighting during a follow-up daytime inspection (for instance, which building wall is illuminated and from what angle?).

WHEN SHOULD LIGHTING INSPECTIONS BE CONDUCTED?

Because problem lighting will be most visible on the darkest nights, lighting inspections are ideally conducted when there is no moon visible. Except for a few nights near the time of the full moon, each night of the month has periods when there is no moon visible. Early-evening lighting inspections (probably the time of night most convenient for inspectors) are best conducted during the period of two to 14 days following the full moon. Although most lighting problems will be visible on moonlit nights, some problems, especially those involving indirect lighting, will be difficult to detect on bright nights.

A set of daytime and nighttime lighting inspections before the nesting season and a minimum of three additional nighttime inspections during the nesting-hatching season are recommended. The first set of day and night inspections should take place just before nesting begins. The hope is that managers, tenants, and owners made aware of lighting problems will alter or replace lights before they can affect sea turtles. A follow-up nighttime lighting inspection should be made approximately two weeks after the first inspection so that remaining problems can be identified. During the nesting-hatching season, lighting problems that seemed to have been remedied may reappear because owners have been forgetful or because ownership has changed. For this reason, two midseason lighting inspections are recommended. The first of these should take place approximately two months after the beginning of the nesting season, which is about when hatchlings begin to emerge from nests. To verify that lighting problems have been resolved, another follow-up inspection should be conducted approximately one week after the first midseason inspection.

WHO SHOULD CONDUCT LIGHTING INSPECTIONS?

Although no specific authority is required to conduct lighting inspections, property managers, tenants, and owners are more likely to be receptive if the individual making recommendations represent a recognized conservation group, research consultant, or government agency. When local ordinances regulate beach lighting, local government code-enforcement agents should conduct lighting inspections and contact the public about resolving problems.

WHAT SHOULD BE DONE WITH INFORMATION FROM LIGHTING INSPECTIONS?

Although lighting surveys serve as a way for conservationists to assess the extent of lighting problems on a particular nesting beach, the principal goal of those conducting lighting inspections should be to ensure that lighting problems are resolved. To resolve lighting problems, property managers, tenants, and owners should be give the information they need to make proper alterations to light sources. This information should include details on the location and description of problem lights, as well as on how the lighting problem can be solved. One should also be prepared to discuss the details of how lighting affects sea turtles. Understanding the nature of the problem will motivate people more than simply being told what to do.

Appendix D
Sea Turtle Lighting Survey Form

Lighting Survey Form

The lighting survey must be conducted to include a landward view from the seaward most extent of the beach profile. The survey must occur after 9 p.m. The survey must follow standard techniques for such a survey and include the number and type of visible lights, location of lights and photo documentation.

Date: _____

Contact information of person conducting the lighting survey: _____

_____

Location (name of beach): _____

Lighting ordinance (applicable County or Municipality): _____

Compliance Officer name and contact information: _____

Survey start time: _____

Survey end time: _____

Survey start location (include address or GPS location):_____

_____

_____

Survey end location (include address or GPS location): _____

_____

Date summarizing report sent to the following: marineturtle@myfwc.com, JCPCompliance@dep.state.fl.us, and seaturtle@fws.gov:_____

County or Municipality contact information for follow up meeting with the FWS and FWC:

_____

For each light visible from the nesting beach provide the following information:

Location of light (include cross street and nearest beach access)	GPS location of light	Description of light (type and location)	Photo take (YES/ NO)	Notification letter with recommendations sent? (YES/NO)

Location of light (include cross street and nearest beach access)	GPS location of light	Description of light (type and location)	Photo take (YES/ NO)	Notification letter with recommendations sent? (YES/NO)

Appendix E

Nesting Seabird and Shorebird Protection Conditions

a. Selection of Bird Monitors. The Permittee or designated representative ("Permittee") shall hire one or more Bird Monitors, depending on the size of the area to be affected, who shall monitor shorebird and seabird (shorebird) activity before, during, and after construction. Bird Monitors shall have proven seabird and shorebird identification skills and avian survey experience. Before hiring any Bird Monitors, the Representative shall provide a list of candidate Bird Monitors with (1) their contact information and (2) a summary of their qualifications, including bird identification skills and avian survey experience, to the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit) and copied to JCPCompliance@dep.state.fl.us for FWC approval before the Permittee hires the Bird Monitor(s).

b. The Bird Monitor(s) shall review and become familiar with the general information on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). They shall use the data-collection protocol and implement data-entry procedures as outlined in that website. An outline of data to be collected, including downloadable field data sheets, is available on the website.

c. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. The following dates are based on the best available information regarding ranges and habitat use by species for this project: February 15 – September 1.

   Surveys during the breeding season shall begin on the first day of the breeding season or 10 days before any site work begins, whichever is later. Surveys shall be conducted through August 31 or until all breeding activity has concluded, whichever is later.

d. During the breeding season, the Bird Monitor(s) shall survey all potential beach-nesting bird habitats that may be affected by construction or pre-construction activities. The Bird Monitor(s) shall establish one or more shorebird survey routes in the FSD website to cover these areas.

e. During the pre-construction and construction phases of the project, the Bird Monitor(s) shall complete surveys on a daily basis to detect breeding activity and the presence of flightless chicks before (1) equipment is moved to the area, (2) vehicles are operated in the area, or (3) any other activities occur that have the potential to disrupt breeding behavior or cause harm to the birds or their eggs or young. Once construction is completed and all personnel and equipment have been removed from the beach, surveys may be conducted at weekly intervals.

f. The Bird Monitor(s) shall survey the project area by walking and looking for evidence of (1) shorebirds exhibiting breeding behavior, (2) shorebird chicks, or (3) shorebird juveniles, as outlined in the FSD's Breeding Bird Protocol for Shorebirds and Seabirds. The Bird Monitor(s) shall use binoculars for these surveys.

g. If an ATV or other vehicle is needed to cover large project areas, operators shall adhere to the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach-driving/). Specifically, the vehicle shall be operated at a speed under 6 mph and only on beaches at or below the high-tide line. The Bird Monitor(s) shall stop at no greater than 200-meter intervals to look for breeding activity.

h. Once the Bird Monitor(s) confirms that birds are breeding, as evidenced by the presence of a scrape, eggs, or young, the Bird Monitor(s) shall notify the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit) within 24 hours. The Bird Monitor(s) shall report all breeding activity to the FSD website within one week of data collection.

Seabird and Shorebird Buffer Zones and Travel Corridors

The Bird Monitor(s) shall establish a disturbance-free buffer zone around any location within the project area where shorebirds have been engaged in breeding behavior, including territory defense. The FWC considers a 300-foot-wide buffer to be adequate based on published studies; however, a smaller, site-specific buffer may be established if approved by the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit). All sources of human disturbance (including pedestrians, pets, and vehicles) shall be prohibited in the buffer zone.

a. The Bird Monitor(s) shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the Bird Monitor(s) shall widen of the buffer zone immediately to a sufficient size to protect breeding birds.

b. The Bird Monitor(s) shall ensure that reasonable and traditional pedestrian access is not blocked in situations where breeding birds will tolerate pedestrian traffic. This is generally the case with lateral movement of beach-goers walking parallel to the beach at or below the highest tide line. Pedestrian traffic may also be tolerated when breeding was initiated within 300 feet of an established beach access pathway. The Bird Monitor(s) shall work with the FWC Regional Species Conservation Biologist to determine if pedestrian access can be accommodated without compromising nesting success.

c. The Bird Monitor(s) shall ensure that the perimeters of designated buffer zones are marked with posts, twine, and signs stating "Do Not Enter, Important Nesting Area" or similar language. The signs shall include the name and a phone number of the entity responsible for posting. Posts shall not be higher than 3 feet once installed. "Symbolic fencing" (i.e., twine, string, or rope) shall be placed between all posts and be clearly visible to pedestrians. In areas where marine turtles nest, the ropes shall be at least 2.5 feet above the ground. If pedestrian pathways are approved by the FWC Regional Species Conservation Biologist within the 300-foot buffer zone, these shall be clearly marked. The Bird Monitor(s) shall ensure that the posting is maintained in good repair until breeding is completed or terminated. Although solitary nesters may leave the buffer zone with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

d. The Bird Monitor(s) shall ensure that no construction activities, pedestrians, moving vehicles, or stockpiled equipment are allowed within the buffer area.

e. The Bird Monitor(s) shall designate and mark travel corridors outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may go past breeding areas in these corridors. However, other activities such as stopping or turning heavy equipment and vehicles shall be prohibited within the designated travel corridors adjacent to the breeding site.

f. When flightless chicks are present on the beach, the Bird Monitor(s) shall accompany any moving vehicles or equipment to ensure that no chicks are in the path of the moving vehicle and no tracks are left that could trap flightless chicks.

g. The FWC recommends that the Bird Monitor(s) ensure that some activity in the travel corridor is maintained on a daily basis in order to discourage birds from nesting within the travel corridor. These activities shall not be allowed to disturb shorebirds nesting on site or interfere with marine turtle nesting, especially if the corridors are established before construction has started.

h. *Notification.* If the Bird Monitor(s) find that shorebirds are breeding within the project area, he or she shall ensure that an informational bulletin board is placed and maintained in the construction staging area. This bulletin board shall display the location map of the construction site, depict the location(s) of the bird breeding areas, and include a clearly visible warning stating: "NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE AND FEDERAL MIGRATORY BIRD ACTS".

Post-construction Conditions, Monitoring and Reporting

i. Shorebird: If beach cleaning will occur on the nourished beach, a minimum of 30 percent of the biotic material within the wrack line shall be left on the beach post-cleaning at the strand line in a natural configuration to ensure that the nourished beach re-establishes its function as foraging habitat for shorebirds. This shall occur for as long as the placed sand remains on the beach.

Appendix F

EXAMPLES OF PREDATOR PROOF TRASH RECEPTACLES

Example of predator proof trash receptacle at Gulf Islands National Seashore. Lid must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle anchored into the ground so it is not easily turned over.

Example of predator proof trash receptacle at Perdido Key State Park. Metal trash can is stored inside. Cover must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle must be secured or heavy enough so it is not easily turned over.

ENCLOSURE 4

JANUARY 2016

ENVIRONMENTAL ASSESSMENT

PLACEMENT OF INTRACOASTAL WATERWAY AND OKEECHOBEE WATERWAY DREDGED MATERIAL IN THE ST. LUCIE INLET SEDIMENT IMPOUNDMENT BASIN

MARTIN COUNTY, FLORIDA

U.S. Army Corps
of Engineers
JACKSONVILLE
DISTRICT

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 San Marco Boulevard
JACKSONVILLE, FLORIDA 32207-8175

REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT
PLACEMENT OF INTRACOASTAL WATERWAY AND OKEECHOBEE WATERWAY DREDGED MATERIAL IN THE ST. LUCIE INLET SEDIMENT IMPOUNDMENT BASIN MARTIN COUNTY, FLORIDA

This Finding references three previous Environmental Assessments (EA) and the current Supplemental Environmental Assessment SEA conducted for the proposed dredging of the federally authorized Intracoastal Waterway (IWW) and Okeechobee Waterway (OWW) projects in Martin County, FL. The initial EA was completed in 1996 by the Planning Division (PD) under the Civil Works Project authority and evaluated the dredging and placement of dredged sand from the IWW-OWW to MSA-M5 (Dredged Material Management Area), St. Lucie Inlet State Park and Hobe Sound National Wildlife Refuge beaches, and St. Lucie Inlet State Park and Hobe Sound National Wildlife Refuge nearshore areas. A subsequent EA developed by the Planning Division was completed in 2000 to raise the north jetty and raise and lengthen the south jetty at St. Lucie Inlet and construct a 1750 x 450 foot sediment impoundment basin to a depth of -16 feet MLW plus 2 feet overdepth. A third EA was completed in 2011 by PD and evaluated maintenance dredging of St. Lucie Inlet and the IWW and the use of Peck's Lake Staging Area which is south of the inlet in Martin County. This Supplemental Environmental Assessment (SEA) evaluates the periodic maintenance dredging at the intersection of the IWW and OWW with placement of dredged material into the St. Lucie Impoundment Basin. Based on information analyzed in the three previous EAs and this SEA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. The proposed action would be conducted in accordance with the Endangered Species Act, and specifically in compliance with the Currituck Specific Biological Opinion issued by the National Marine Fisheries Service and standard manatee construction conditions for in water work per US Fish and Wildlife Service concurrence letter dated 8 Feb 2016. The work would not jeopardize the continued existence of any threatened or endangered species or impact any designated "critical habitat."

b. This project has been coordinated with the State of Florida, and all applicable water quality standards will be met.

c. The State of Florida has concurred with the Corps consistency determination that the proposed work is consistent with the enforceable policies of the Florida Coastal Management Program.

d. Consultation for the proposed work has been initiated under Section 106 of the National Historic Preservation Act with the Florida State Historic Preservation Officer and appropriate federally recognized tribes. The Corps has determined no historic properties would be affected by the proposed project. Consultation will be completed prior to project implementation.

e. Public benefits (navigation, recreation) will be provided with unobstructed channel navigation.

f. Measures will be in place during construction to eliminate, reduce, or avoid adverse impacts below the threshold of significance to fish and wildlife resources.

In consideration of the information summarized, I find that the proposed Federal navigation project, IWW-OWW Crossroads, Martin County, FL, will not significantly affect the human environment and does not require an Environmental Impact Statement. A copy of these documents will be made available to the public at the following website:
http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx.

Jason A. Kirk

JASON A. KIRK, P.E.
Colonel, Corps of Engineers
Commanding

29 FEB 2016
Date

FINAL ENVIRONMENTAL ASSESSMENT
PLACEMENT OF INTRACOASTAL WATERWAY AND OKEECHOBEE WATERWAY DREDGED MATERIAL IN THE ST. LUCIE INLET SEDIMENT IMPOUNDMENT BASIN MARTIN COUNTY, FLORIDA

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FINAL ENVIRONMENTAL ASSESSMENT
PLACEMENT OF INTRACOASTAL WATERWAY AND OKEECHOBEE WATERWAY DREDGED MATERIAL IN THE ST. LUCIE INLET SEDIMENT IMPOUNDMENT BASIN MARTIN COUNTY, FLORIDA

1. PROJECT PURPOSE AND NEED

1.1 PROJECT DESCRIPTION.

The U.S. Army Corps of Engineers, Jacksonville District (Corps), is proposing to conduct periodic maintenance dredging of the intersection of the Intracoastal Waterway (IWW) and Okeechobee Waterway (OWW) Federal navigation project at St. Lucie Inlet in Martin County, Florida. This Supplemental Environmental Assessment (SEA) will evaluate the periodic maintenance dredging at the intersection of the IWW and OWW with placement of dredged material into the St. Lucie Impoundment Basin. The Corps currently proposes to place approximately 10,000 CY of beach quality dredged material into the St. Lucie Impoundment Basin (Figure 1). OWW Cut 1 is approximately 3,500 feet in length and 80 feet wide with an authorized depth of eight feet and two feet overdepth. Authorized depth of the IWW is ten feet with two feet of overdepth. The centerline of Cut 1 extends into the intersection of the IWW along the eastern boundary of the Cut (OWW Cut 1 Sta. 00+00.00) and terminates at the midpoint of a widener along the western boundary of the Cut (OWW Cut 1 Sta. 35+17.51). The St. Lucie Impoundment Basin is approximately 8,500 feet east of OWW Cut 1 and is 1750 x 450 feet and is authorized to a depth of -16 feet MLW plus 2 feet allowable overdepth.

1.2 PROJECT NEED OR OPPORTUNITY.

The accumulation of sediment, commonly referred to as shoaling, has restricted the width of the project channel and reduced navigable depth. Minimum depths recorded from the project channel are less than 6 feet mean low water (MLW), resulting in navigation restrictions. Removal of the shoal material would maintain the navigable capacity of the project channel.

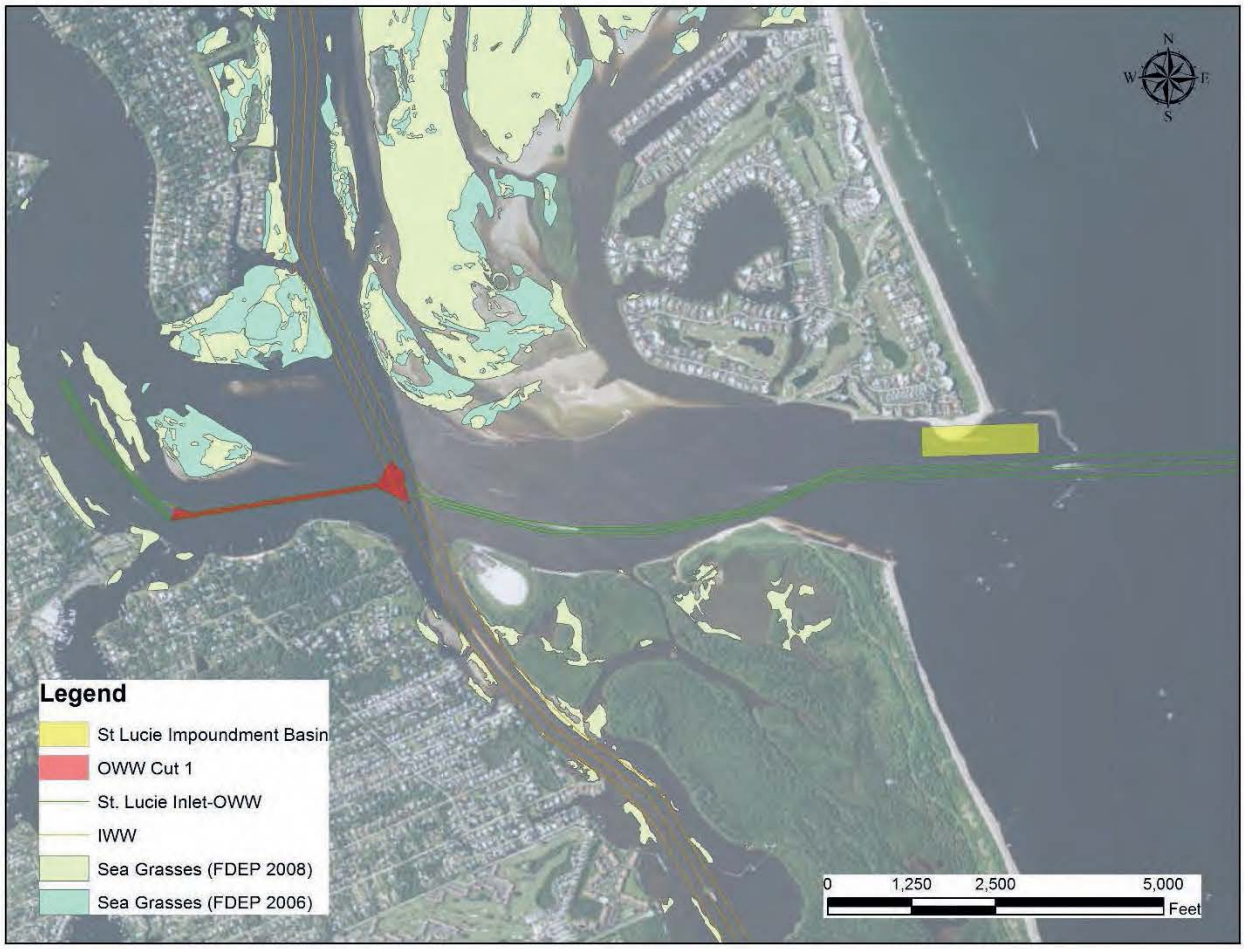

Figure 1. 2016 IWW-OWW Crossroads St. Lucie Inlet Project Map. Note: Sea grass data provided by Florida Department of Environmental Protection was acquired in 2006 and 2008.

1.3 PROJECT AUTHORITY.

1.3.1 Authorization

Maintenance of the IWW was authorized by the Rivers and Harbors Act of 2 March 1945, House Document 740, 79th Congress, 2nd Session, and Chief of Engineers Report 22 July 1960, modifying the 12-foot channel. The OWW was authorized by the Harbor and River Act of 31 May 1974, House Document 294/93/1.

1.4 RELATED ENVIRONMENTAL DOCUMENTS.

Related National Environmental Policy Act (NEPA), design, and planning documents for the IWW-OWW Crossroads Federal navigation project, Martin County, FL includes the following:

- Finding of No Significant Impact and Environmental Assessment on Peck's Lake Staging Area Operations and Maintenance Activities St. Lucie Inlet, Martin County, FL. Army Corps of Engineers. Jacksonville, FL. 2011.

- Permit Modification No. 0129368-007-JC Martin County. Florida Department of Environmental Protection, Tallahassee, FL. 2002.
- Finding of No Significant Impact St. Lucie Inlet Navigation Improvements and Environmental Assessment St. Lucie Inlet Navigation Study Design Memorandum, Martin County, FL. Army Corps of Engineers. Jacksonville, FL. 2000.
- SAW99-BO-sidecast.pdf National Marine Fisheries Service, St. Petersburg, FL. 1999.
- Finding of No Significant Impact Maintenance Dredging IWW-OWW Interface (Cross Roads) and Environmental Assessment, Martin County, FL. Army Corps of Engineers. Jacksonville, FL. 1996.

1.5 DECISIONS TO BE MADE.

This SEA will evaluate the proposed placement of dredged material in the St. Lucie Impoundment Basin from the periodic maintenance of the IWW and OWW Federal navigation projects, Martin County, FL (hereafter project channel).

1.6 SCOPING AND ISSUES.

1.6.1 Relevant Issues.

The following issues were identified as relevant to the proposed action and are appropriate for further evaluation: cultural resources; air quality; threatened and endangered species including sea turtles, piping plover, West Indian manatee, and smalltooth sawfish (STSF); essential fish habitat; benthic resources; turbidity and water quality; fish and wildlife resources; recreation and tourism; navigation; and cumulative impacts.

1.6.2 Issues Eliminated from Further Analysis.

The proposed action is expected to have little or no impact on soils, housing, or population dynamics. In addition, this SEA supplements the 1996, 2000, and 2011 EA and FONSI documents listed in section 1.4. It provides an evaluation of the effects of placing beach quality dredged material from IWW and OWW into the St. Lucie Impoundment Basin only. The previous NEPA documents evaluated issues of concern related to maintenance dredging, modifications to the St. Lucie Inlet jetties, development of the St. Lucie Inlet Impoundment Basin, material placement options which included beach and nearshore, and use of Peck's Lake for beach placement. These evaluations have been determined to be still valid since the project limits and construction methodology have remained the same. In addition, Permit Modification 0129368-007-JC, approved in November 2002, allowed for dredging of 10,400 CY of material from the intersection of the IWW and OWW and placement in the St. Lucie Inlet Sediment Impoundment Basin, which is similar to the proposed project. The information presented in these evaluations appears to be complete, and relevant Federal laws have not changed in a manner that would require re-evaluation of these resources. Table 1 presents a summary of environmental factors evaluated in the previous NEPA documents.

Table 1. Summary of Environmental Factors Evaluated in NEPA Documents Prepared in 1996, 2000, and 2011.

NEPA DOCUMENT ENVIRONMENTAL FACTOR	1996 EA	2000 EA	2011 EA
ARCHAEOLOGY/ CULTURAL RESOURCES	No impact.	Potentially significant historic properties were not affected by maintenance dredging and disposal activities.	No adverse effect to known historic properties.
AIR QUALITY	Not evaluated.	No long term accumulation of particulates. No significant adverse impacts.	Not evaluated.
THREATENED AND ENDANGERED SPECIES	No impact with implementation of standard protection conditions.	Not evaluated.	May affect, but not likely to adversely affect, with implementation of standard protection measures.
ESSENTIAL FISH HABITAT (EFH)	Not evaluated.	Not evaluated.	No significant adverse impacts to estuarine water column and unconsolidated substrate.
BENTHIC RESOURCES	No impact.	Benthos temporarily impacted. Rapid recovery of populations expected.	No adverse impact as avoidance measures are in place.
TURBIDITY AND WATER QUALITY	Short-term localize increase in turbidity at dredge and disposal sites.	Temporary impacts to the water column. No significant detrimental impact.	No impacts expected at Peck's Lake.
FISH & WILDLIFE RESOURCES	No impact.	Not evaluated.	No additional impact.
RECREATION AND TOURISM	Short-term impact to recreational boat traffic and beach activities in project vicinity.	Not evaluated.	Short-term disruption of recreation within the Peck's Lake area.
NAVIGATION	Short-term impact from presence and operation of dredging equipment. Long term moderate impact from maintaining navigable capacity of the channel.	Not evaluated.	Short term impacts to IWW boat traffic when barges are in transport.
CUMULATIVE IMPACTS	Temporary degradation in water quality at dredging site and some loss of organisms at dredge site. Repopulation of organisms anticipated.	Not evaluated.	No significant cumulative impacts expected.

1.7 ENVIRONMENTAL COORDINATION

1.7.1 Water Quality Certification

This project would be performed in compliance with State of Florida water quality standards. In accordance with the Coastal Zone Management Act, a Federal Consistency Determination (CD) has been prepared for the proposed placement (Appendix B) and will be reviewed by the State for their concurrence that the project is consistent with the enforceable policies of the Florida Coastal Management Program. State consistency review will be performed during the coordination of the Draft EA and the modification review to JCP 0269814-007-JC (Issuance Date: Sept. 14, 2014).

1.7.2 Endangered Species Act- Section 7 Consultation

In accordance with Section 7 of the Endangered Species Act, the project will be coordinated under the Endangered Species Act. The applicable conditions of the South Atlantic Regional Biological Opinion (SARBO) issued by National Marine Fisheries Service (NMFS) and the Statewide Programmatic Biological Opinion (SPBO) issued by the US Fish and Wildlife Service (USFWS) would be followed during construction.

1.7.3 Essential Fish Habitat (EFH) Consultation

EFH consultation will be conducted in accordance with the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Consultation with the National Marine Fisheries Service Habitat Conservation Division will be conducted concurrently with the public notice.

1.7.4 Section 106 of the National Historic Preservation Act (NHPA) Consultation

Consultation of the proposed action will be in compliance with Section 106 of the National Historic Preservation Act of 1966 (PL 89-665), as amended, and its implementing regulations (36 CFR 800). Consultation with the Florida State Historic Preservation Office (SHPO), appropriate federally recognized tribes, and other interested parties has been initiated and is ongoing. Consultation will be concluded prior to project implementation. The project will be in compliance with the goals of this Act upon completion of the coordination.

2. ALTERNATIVES

The alternatives section is perhaps the most important component of this SEA. It describes the no-action alternative and the proposed action. Additional alternatives were assessed in the previously described EAs which included placement in adjacent beach and nearshore locations. The beneficial and adverse environmental effects of the alternative is presented in comparative form, providing a clear basis for choice to the decision maker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Probable Impacts.

2.1 DESCRIPTION OF ALTERNATIVES.

2.1.1 No-Action Alternative

The St. Lucie Sediment Impoundment Basin would not be used for the disposal of suitable dredged material from the maintenance of the project channels. This would allow for continued maintenance dredging with beach, nearshore and upland DMMA placement options. While each of the other placement options are viable, this periodic dredging of a small shoal (approximately 10,000 CY) does not warrant the greater effort, equipment, and expense required for placement in the previously evaluated locations.

2.2 PREFERRED ALTERNATIVE

The preferred alternative is to dispose of suitable dredged material from the maintenance of the project channel in the St. Lucie Sediment Impoundment Basin. This would minimize overall effects of the no-action alternative which would result in the potential loss of navigation and recreation benefits. Placement in the St. Lucie Sediment Impoundment Basin would allow for future beneficial use of the beach quality dredged material for shore protection or other Regional Sediment Management (RSM) opportunities.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER EVALUATION

2.3.1 Side-Casting/Open Water Disposal

This particular method of material disposition was perhaps the most widely used approach prior to the evolution of today's environmental regulatory programs addressing sediment management and shore protection. As a result, the use of side-casting/open water disposal was not considered an acceptable dredged material management strategy for the project channels.

2.4 COMPARISON OF ALTERNATIVES

Table 2 lists alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

Table 2: Summary of Direct and Indirect Impacts.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action Status Quo	St. Lucie Impoundment Basin Placement
CULTURAL RESOURCES	No impact.	The Corps has determined no historic properties affected. Consultation ongoing.

ALTERNATIVE ENVIRONMENTAL FACTOR	No Action Status Quo	St. Lucie Impoundment Basin Placement
AIR QUALITY	No impact.	Anticipated emissions within national ambient air quality standards. Adverse impacts not anticipated.
SEA TURTLES	No impact.	Effects to marine turtles may be avoided or minimized with approved protective measures. The Corps will comply with the SARBO.
WHALES	No impact.	Not likely to adversely affect with implementation o standard protection measures as outlined by th SARBO.
WEST INDIAN MANATEE	May affect, but not likely to adversely affect, with implementation of standard protection measures as outlined by the RBO.	May affect, but not likely to adversely affect, with implementation of standard protection measures as outlined by the RBO.
STSF	No impact.	May affect, but not likely to adversely affect, with implementation of protection measures as outlined by the re-initiation of the SARBO..
ESSENTIAL FISH HABITAT	No impact.	Marine water column and unconsolidated sediment habitat would be temporarily impacted during placement.
BENTHIC RESOURCES	No impact.	Benthos would be temporarily impacted by placement.
TURBIDITY AND WATER QUALITY	No impact.	Short-term localized increase in turbidity during placement.
FISH AND WILDLIFE RESOURCES	Wildlife temporarily displaced during placement. No significant long-term adverse impacts anticipated.	Wildlife temporarily displaced during placement. No significant long-term adverse impacts anticipated.
RECREATION AND TOURISM	Recreational boating opportunities could be lost due to inability to utilize IWW and OWW.	Recreational opportunities and tourism may be temporarily impacted during placement.
NAVIGATION	Loss of safe navigation for both IWW and OWW.	Navigation may be temporarily impacted during placement.
CUMULATIVE IMPACTS	Major long-term loss of navigation and recreation at IWW-OWW Crossroads at St. Lucie Inlet.	No long term impacts are anticipated.

3. AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if the alternative was implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the baseline conditions for determining the environmental impacts of the proposed action and reasonable alternative.

3.1 GENERAL ENVIRONMENTAL SETTING

3.1.1 St. Lucie Sediment Impoundment Basin

Summarized in the 2000 EA and referenced in section 1.4 of this document.

3.2 GEOLOGY

3.2.1 St. Lucie Sediment Impoundment Basin

Predevelopment conditions summarized in the 2000 Environmental Assessment, St. Lucie Inlet Navigation Study Design Memorandum. Since development and utilization of the Impoundment Basin, material primarily consists of beach quality sand.

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 Manatees

Manatees can be found in the inshore waters of the project channels and in the coastal waters of the Atlantic Ocean primarily during migration. The proposed work does not overlap any designated critical habitat for this species.

3.3.2 Sea Turtles

Three sea turtle species nest regularly on beaches of the southeastern US. Approximately 90% of Loggerhead (*Caretta caretta*) turtles nest in Florida. Green Sea Turtle (*Chelonia mydas*) nesting in the US occurs principally along the east central Florida beaches and Leatherback (*Dermochelys coriacea*) primarily nest in Puerto Rico and the Virgin Islands.

3.3.3 Piping Plover

The piping plover is a small, pale sand-colored shorebird listed which is endangered principally because of habitat destruction, predation, and human disturbance. The piping plover winters in coastal areas of the US from North Carolina to Texas.

3.3.4 STSF

The STSF (*Pristis pectinata*), currently listed as endangered by NMFS, rarely occurs within the project area. This species has become rare along the southeastern Atlantic and northern Gulf of Mexico coasts of the U.S. during the past 30 years, with its known primary range now reduced to the coastal waters of Everglades National Park in extreme southern Florida

3.4 WATER QUALITY

DEP has designated waters in the project area as Class III – Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife.

3.4.1 Sediment Analysis

Material from inlet and IWW-OWW Crossroads is generally beach quality material. See Florida Department of Environmental Protection (FDEP) Rule 62B-41.007 (Rules and Procedures for Application for Coastal Construction Permits).

3.5 ESSENTIAL FISH HABITAT

Estuarine/inshore EFH within footprint of the project consists of estuarine water column and unconsolidated substrate. Species managed by the NMFS that are common within the project area can be found in Table 2, and prey species in Table 3, of the 2011 EA.

3.6 BENTHIC RESOURCES

Limestone rock outcrop reef extends along the full length of Martin County with a large community north of the inlet known as the Bathtub Reef. One section of reef intersects the shoreline at the Hobe Sound Public beach and another area outcrops at the shoreline north of Coral Cove Park where it forms Blowing Rocks. Approximately 1,150 acres of hardbottom habitat exists in the St. Lucie Inlet and offshore Jupiter Island characterized by limestone, worm rock, and limestone/worm rock mix reefs.

3.7 AIR QUALITY

St. Lucie County lies within the Southeast Florida Intrastate Air Quality Region, as established by 40 CFR Part 81.49. The U.S. Environmental Protection Agency (EPA) (40 CFR Part 81.310) designates St. Lucie County as being in attainment with National Ambient Air Quality Standards for ozone, nitrogen dioxide, carbon monoxide, total suspended particulates, and sulfur dioxide. Air quality in St. Lucie County exceeds national standards. Ambient air quality along coastal St. Lucie County is generally good due to prevalent ocean breezes from the northeast through the southeast. Coastal development and the popularity of the beaches area all contribute to the presence of motorized vehicles and vessels in the project area at any given time. The usually present sea breezes along the shore readily disperse airborne pollutants.

3.8 NATIVE AMERICANS

No portion of the proposed project exists within or adjacent to any Native American properties.

3.9 CULTURAL RESOURCES

A review of the Florida Master Site File (FMSF) indicates that no prehistoric or historic resources eligible for the National Register of Historic Places (NRHP) are recorded within the project area. Previous consultation regarding development and maintenance dredging of the St. Lucie Impoundment Basin with the Florida State Historic Preservation Officer (SHPO) occurred on 22 April 1999. Further consultation regarding maintenance dredging of OWW Cut 1 and the Impoundment Basin with the SHPO, appropriate federally recognized tribes, and other interested parties occurred on 06 October 2011. In both instances it was the Corps' determination that the proposed dredging of St. Lucie Inlet and the Impoundment Basin would not affect historic properties. The SHPO concurred with these determinations (DHR Project File Nos.: 992804 and 2011-05140).

3.10 RECREATIONAL RESOURCES

A total of 16,050 boats were registered in Martin County as of 2014 (Florida Dept. of Highway Safety and Motor Vehicles). The waterway provides recreational opportunities for boaters, fishermen, wildlife observation, and leisure.

4. ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See Table 1 in section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 THREATENED AND ENDANGERED SPECIES

4.1.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided EAs listed in section 1.4 of this document.

4.1.2 St. Lucie Sediment Impoundment Basin

The following protection measures will be implemented to minimize adverse impacts to threatened and endangered species.

4.1.2.1 Sea Turtles, STSF, and West Indian Manatees

Per the 2011 EA, USACE determined that the proposed dredge work may affect, but is not likely to adversely affect sea turtles in the water, manatees, or STSF based on protective measures. Protection of manatees will follow the standard manatee construction conditions for in water work per US Fish and Wildlife Service concurrence letter dated 8 Feb 2016 and protection of swimming sea turtles and STSF are covered under the terms and conditions of the Currituck Specific Biological Opinion issued by NMFS. The proposed action is not likely to adversely affect sea turtles, STSF, or manatees with implementation of the following standard protection measures.

- The contractor would instruct all personnel associated with construction activities about the potential presence of manatees, sea turtles and STSF in the area and the need to avoid collisions with them.
- If siltation barriers are used, they shall be made of material in which manatees, sea turtles and STSF cannot become entangled, are properly secured, and are regularly monitored to avoid entrapment. Barriers must not block entry to or exit from essential habitat.
- If a manatee, sea turtle or STSF were sighted within 100 yards of the project area, all appropriate precautions would be implemented by the contractor to ensure protection of these species. These precautions would include the operation of all moving equipment no closer than 50 feet of these species. If a manatee, sea turtle or STSF were closer than 50 feet to moving equipment, the equipment would be shut down and all placement activities would cease to ensure protection of the animal. Placement activities would not resume until the species has departed the project area.
- All vessels associated with the project would operate at 'no wake' speeds at all times while in shallow waters or channels where the draft of the boat provides less than three feet clearance from the bottom. Boats used to transport personnel would be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat would follow routes

of deep water to the greatest possible extent. Shore crews would use upland road access if available.

- Mooring bumpers would be placed on all large vessels wherever and whenever there is a potential for manatees to be crushed between two moored vessels. The bumpers would provide a minimum stand-off distance of four feet.
- All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, sea turtles and STSF, which are protected under the Endangered Species Act and the Marine Mammal Protection Act.

4.1.2.2 Piping Plover

Impacts are highly unlikely as all activities associated with placement will occur below MLW and will not impact the intertidal portions of the Impoundment Basin.

4.2 WATER QUALITY

4.2.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.2.2 St. Lucie Sediment Impoundment Basin

The primary anticipated change in water quality at the St. Lucie Sediment Impoundment Basin would be a temporary increase in turbidity. According to the State of Florida's Class III water quality standards, turbidity levels during placement of dredged material are not to exceed 29 Nephelometric turbidity units (NTUs) above background levels at the edge of normally a 150-meter mixing zone. In order to comply with this standard, turbidity will be monitored according to State protocols during the proposed placement. If at any time the turbidity standard were exceeded, those activities causing the violation would temporarily cease.

4.3 ESSENTIAL FISH HABITAT

4.3.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.3.2 St. Lucie Sediment Impoundment Basin

The proposed placement area could impact approximately 18 acres of estuarine water column and unconsolidated substrate. Species managed by the NMFS that are common within the project area can be found in Table 2, and prey species in Table 3, of the 2011 EA. The Corps has determined that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries along the east coast of Florida. This determination was based on the fact that the substrate of the project area is naturally dynamic and unconsolidated, and measures shall be taken to protect adjacent habitat. Turbidity could affect vision of marine life within the sediment plume as well as those marine organisms with gills, but these effects would be temporary as they would be limited to the duration of the placement operations. Impoundment basin placement activities are

anticipated to take up to 90 days every 10-13 years and migrating larvae and/or juvenile fish could be subject to project related elevated turbidity and suspended sediment levels during that time period. A fall-winter placement window could minimize impacts to migrating larvae and juvenile fish. The Corps will consider this window as funding and scheduling allow. In addition, it is important to note that the placement area encompasses a fraction of the entire water body, and similar habitat occurs immediately adjacent. EFH coordination with NMFS for EFH from dredging was completed in section 4 of the 2000 EA. EFH coordination for the proposed action with the NMFS will be initiated concurrent with noticing of this draft NEPA document.

4.4 FISH AND WILDLIFE RESOURCES

4.4.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.4.2 St. Lucie Sediment Impoundment Basin

Fish and wildlife within the placement area would be temporarily displaced during construction. Any fish or seabirds displaced during placement operations would be expected to return following completion of construction. All material will be placed below MLW so upland bird nesting and foraging habitat should not be impacted. In addition, some opportunistic foraging during placement is expected by some fish and birds species.

4.5 BENTHIC RESOURCES

4.5.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.5.2 St. Lucie Sediment Impoundment Basin

Placement would result in temporary impacts to benthos but re-colonization by benthic organisms from adjacent similar habitats is expected. Deposition of dredged materials can bury and smother localized populations of benthic organisms, thereby reducing abundance and diversity of the benthic communities in the immediate area of dumping. Brooks et al. 2006 (The Benthic Community of the Eastern US Continental Shelf: A Literture Synopsis of the Benthic Faunal Resources, Continental Shelf Research 26: 804-818) found in most cases, polychaetes were the first to recolonize dredged or disposal sites, with crustaceans, specifically amphipods, also recolonizing relatively quickly. Therefore, due to the relatively small area that will be impacted as viewed on a spatial scale, impacts to the benthic community are anticipated to be minimal due to the relatively short period of recovery regarding infaunal communities following disturbance. Adjacent areas not impacted would most likely be the primary source of recruitment to the impacted area.

4.6 AIR QUALITY

4.6.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.6.2 St. Lucie Sediment Impoundment Basin

The short-term impacts from emissions by the dredge and other construction equipment associated with the project are not anticipated to affect onshore or offshore air quality significantly. Exhaust emissions from vehicles, vessels, and construction equipment associated with the project would have a temporary and localized effect on air quality. Offshore sea breezes are anticipated to disperse pollutants.

4.7 NATIVE AMERICAN RESOURCES

4.7.1 No-Action Alternative

No portion of the proposed project exists within or adjacent to any Native American properties. Selection of the No Action Alternative would have no adverse effect on Native American resources.

4.7.2 St. Lucie Sediment Impoundment Basin

As part of the development of this project, consultation between the Corps and appropriate federally recognized tribes within the immediate area of potential effect was initiated in December 2015. There are no known Native American properties or resources within the project area, and the project should not have any effect on Native Americans. However, consultation is ongoing and will be updated prior to project implementation.

4.8 CULTURAL RESOURCES

4.8.1 No-Action Alternative

No historic properties affected.

4.8.2 St. Lucie Sediment Impoundment Basin

The Corps has determined no historic properties affected by the proposed maintenance dredging of OWW Cut 1 and the placing of approximately 10,000 CY of beach quality dredged material into the St. Lucie Impoundment Basin. There are no historic properties within the project area and sand placement would be a beneficial effect by preventing possible future erosion. Coordination with the Florida SHPO and appropriate federally recognized tribes was initiated in December 2015 and consultation is ongoing. Consultation under Section 106 of the National Historic Preservation Act will be completed prior to project implementation. The project will maintain a fortuitous find policy that will halt use of an area should any resources be identified during maintenance dredging.

4.9 RECREATIONAL RESOURCES

4.9.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.9.2 St. Lucie Sediment Impoundment Basin

Recreational activities are likely to be temporarily impacted at OWW Cut 1 and the St. Lucie Sediment Impoundment Basin during placement activity, but no impacts are anticipated upon completion of the project and equipment demobilization.

4.10 NAVIGATION

4.10.1 No-Action Alternative

No impacts to the St. Lucie Sediment Impoundment Basin are anticipated as the no-action alternative is beach placement. Impacts associated with beach placement are provided in previous EAs.

4.10.2 St. Lucie Sediment Impoundment Basin

Navigation is likely to be temporarily impacted at OWW Cut 1 and the St. Lucie Sediment Impoundment Basin during placement activity but long-term benefits expected upon completion of the project.

4.11 CUMULATIVE IMPACTS

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Placement of dredged material in St. Lucie Impoundment Basin is defined as periodic (Variance No. 0269814-007-JC, 24 September 2014), but could require more frequent offloading due to additional volume placed in the Impoundment Basin.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.12.1 Irreversible

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. Other than the use of fuel, equipment and supplies, there would be no irreversible commitment of resources.

4.12.2 Irretrievable

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. Dredging of OWW Cut 1 and placement in the St. Lucie Sediment Basin could temporarily disrupt navigation and recreational activities.

4.13 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Dredging and placement would temporarily adversely impact water quality, recreation, navigation, and benthic resources. Benthic organisms would be affected during dredging of the impoundment basin and depending on the frequency of dredging, recolonization may be impacted.

4.14 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Most fish species and other motile organisms like crabs should be able to avoid the equipment. Since the project area is limited in size, the long-term productivity of fish and other motile species should not be significantly affected. It is anticipated that the channel and adjacent areas are of sufficient depth for the dredging vessels to operate and maneuver without impacting adjacent sea grasses and benthic resources.

4.15 INDIRECT EFFECTS

Maintaining the authorized depths of the project channels would benefit the commercial vessel traffic industry and local and statewide economies. The project may also create a temporary nuisance to recreational navigation during maintenance activities. This may contribute to increased development in adjacent areas.

4.16 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

This project has wide support and is compatible with Federal, State, and most local objectives. The project has been scoped, planned and conditioned to maintain compliance Federal, State, and local laws and regulations where the Corps has waived its sovereignty.

4.17 CONFLICTS AND CONTROVERSY

Since the project has been scoped, planned and conditioned to maintain compliance Federal, State, and local laws and regulations where the Corps has waived its sovereignty, the Corps does not anticipate conflict or controversy. Placement would be conducted in a manner that would avoid or minimize impacts to resources outside the project limits.

4.18 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

There is a potential for the dredged sediment to transport out of the St. Lucie Sediment Basin. The exact amount is uncertain, therefore, there may be "unknown" risks associated with placement activities.

4.19 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS

The proposed placement is not anticipated to set a precedent for future actions. Similar work was carried out by the county under permit modification number 0129368-007-JC issued
5 November 2002 to dredge 10,400 CY from the intersection of the IWW and OWW and place the material in the St. Lucie Sediment Impoundment Basin.

4.20 ENVIRONMENTAL COMMITMENTS

The Corps and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

1. Standard protective measures for manatees shall be required.

2. The District's migratory bird protection policy shall be implemented.

3. The work shall be performed in compliance with State water quality standards.

4. The contracting officer would notify the contractor in writing of any observed noncompliance with Federal, State, or local laws or regulations, permits and other elements of the contractor's Environmental Protection Plan. The contractor would, after receipt of such notice, inform the contracting officer of proposed corrective action and take such action as may be approved. If the contractor fails to comply promptly, the contracting officer would issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions would be granted or costs or damages allowed to the contractor for any such suspension.

5. The contractor would train his personnel in all phases of environmental protection. The training would include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to insure adequate and continuous environmental pollution control. Quality control and supervisory personnel would be thoroughly trained in the proper use of monitoring devices and abatement equipment, and would be thoroughly knowledgeable of Federal, State, and local laws, regulations, and permits as listed in the Environmental Protection Plan submitted by the contractor.

6. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract would be protected during the entire period of this contract. The contractor would confine his activities to areas defined by the plans and specifications.

4.21 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.21.1 National Environmental Policy Act of 1969

Section 1.4 depicts NEPA documents that have previously discussed and evaluated the project's dredging activity and the existing placement area. This SEA was prepared to evaluate the proposed project's effect to the human environment by referencing previous NEPA efforts in combination with the new activity. The SEA will be noticed to disclose the Federal action and offer the public an opportunity to provide comment and participate in the decision making process. Comments received will be incorporated into this document and listed in Section 6.4 below. The project is in compliance with the National Environmental Policy Act.

4.21.2 Endangered Species Act of 1973

The project will be fully coordinated under the Endangered Species Act. The applicable conditions of the SARBO issued by the NMFS and the SPBO issued by the USFWS would be followed during construction.

4.21.3 Fish and Wildlife Coordination Act of 1958

Coordination with USFWS will be conducted. The provisions of the Fish and Wildlife Coordination Act of 1958, as amended (FWCA) (48 Stat. 401; 16 U.S.C. 661 et seq.) are covered in the SPBO and a CAR is not needed.

4.21.4 **Nation Historic Preservation Act of 1966 (Inter Alia)**

The proposed action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL93-29), Archeological Resources Protection Act (PL96-95), American Indian Religious Freedom Act (PL 95-341), Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations, and appropriate Florida Statutes. Consultation with the Florida SHPO, appropriate federally recognized tribes, and other interested parties has been initiated and is ongoing. The proposed action will be in compliance with the goals of this Act upon completion of coordination as stated above.

4.21.5 **Clean Water Act of 1972**

The project shall be in compliance with this act. A Section 401 Water Quality Certification shall be obtained from the FDEP through the Joint Coastal Permitting Program. All State Water Quality Standards would be met. A Section 404(b) evaluation is included in this report as Appendix A. Martin County is currently modifying JCP 0269814-007-JC to include the proposed action.

4.21.6 **Clean Air Act of 1972**

Vehicular emission and airborne dust particulates resulting from construction activities shall be controlled. This project will be coordinated with EPA and will be in compliance with Section 309 of the Act.

4.21.7 **Coastal Zone Management Act of 1972**

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. State consistency review will be performed during the coordination of the draft EA and the JCP modification process. The State concurrence with the Corps determination that the project is consistent with the enforceable policies of the Florida Coastal Management Program will be issued with the JCP modification.

4.21.8 **Farmland Protection Policy Act of 1981**

No prime or unique farmland would be impacted by the use of the placement area. Therefore, this Act is not applicable to the proposed work.

4.21.9 **Wild and Scenic River Act of 1968**

No designated Wild and Scenic river reaches would be affected by project related activities. This Act is not applicable.

4.21.10 **Marine Mammal Protection Act of 1972**

Protective measures for marine mammals such as manatees and sea turtles shall be implemented. This project has been coordinated with the USFWS and NMFS. The work is in full compliance with the Act.

4.21.11 **Estuary Protection Act of 1968**

The protective measures described in section 4 would insure avoidance and minimization of impacts from the proposed placement. This project is in compliance with the Act.

4.21.12 **Federal Water Project Recreation Act**

Although the impoundment basin provides recreational benefits, the principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, are not applicable to this project which is Operations and Maintenance of existing Federal navigation channels.

4.21.13 **Submerged Lands Act of 1953**

The project would occur on submerged lands of the State of Florida. The project was coordinated with the State and is in compliance with the Act.

4.21.14 **Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990**

The proposed placement areas begin between < 500 feet north of Coastal Barrier Resource System (CBRS) unit P12 and 10,000 feet south of CBRS unit P11. Therefore, this act is not applicable to the proposed project.

4.21.15 **Rivers and Harbors Act of 1899**

The proposed work could temporarily obstruct navigable waters of the United States but would ultimately improve navigability of these waters. The proposed action was subjected to a public notice and other evaluations normally conducted for activities subject to the act. The project is in full compliance.

4.21.16 **Anadromous Fish Conservation Act**

Anadromous fish species would not be affected. The project was coordinated with the NMFS and is in compliance with the Act.

4.21.17 **Migratory Bird Treaty Act and Migratory Bird Conservation Act**

Measures shall be taken to protect migratory birds, i.e. avoiding nesting sites. The project is in compliance with these acts.

4.21.18 **Marine Protection, Research and Sanctuaries Act**

The term "dumping" as defined in Section 3 (f) of Act 33 U.S.C. 1402 does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than offshore disposal (i.e. placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The placement activities addressed in this SEA have been evaluated under Section 404 of the Clean Water Act.

4.21.19 **Magnuson-Stevens Fishery Conservation and Management Act**

The Corps has determined that the project would not have a substantial adverse impact on EFH or federally managed fish species occurring along the southeast coast of Florida. EFH coordination will be completed concurrent with noticing of this draft NEPA document

4.21.20 E.O. 11990, Protection of Wetlands

There would be no impacts to wetlands by project activities. This project is in compliance with the goals of this Executive Order.

4.21.21 E.O. 11988, Floodplain Management

This project would have no adverse impacts to floodplain management.

4.21.22 E.O. 12898, Environmental Justice

The proposed action would not result in adverse human health or substantial environmental effects. The work would not impact "subsistence consumption of fish and wildlife."

4.21.23 E.O. 13089, Coral Reef Protection

This project would not impact those species, habitats, and other natural resources associated with coral reefs.

4.21.24 E.O. 13112, Invasive Species

This project would not introduce any invasive species.

5. LIST OF PREPARERS

5.1 PREPARERS

Preparer	Discipline	Role
Clay McCoy, U.S. Army Corps of Engineers	Biologist	Principal Author
Meredith Moreno, U.S. Army Corps of Engineers	Archaeologist	Cultural Resources

5.2 REVIEWERS

This SEA was reviewed by the supervisory chain of the Environmental Branch and Planning Division, as well as the Construction-Operations Division, Project Management, and the Office of Counsel of the US Army Corps of Engineers, Jacksonville District.

6. PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

A Public Notice will be issued for this action in which the draft FONSI and SEA will be made available to the public. Comments received will be incorporated into this document and discussed in Section 6.4 below.

6.2 AGENCY COORDINATION

Coordination will be conducted with appropriate agencies, described in this report and discussed in section 6.4 below. Agency coordination letters will be located in Appendix C.

6.3 LIST OF RECIPIENTS

Per the Public Notice, copies of the draft SEA were made available to appropriate stakeholders. A list of stakeholders receiving notification can be found within the Public Notice in Appendix A.

6.4 COMMENTS RECEIVED AND RESPONSE

APPENDIX A - SECTION 404(B) EVALUATION

SECTION 404(b) EVALUATION

IWW-OWW CROSSROADS
MAINTENANCE DREDGING
ST. LUCIE INLET AND ADJACENT INTRACOASTAL WATERWAY
MARTIN COUNTY, FLORIDA

I. Project Description

a. Location. The proposed work would be performed at St. Lucie Inlet (Figure 1).

b. General Description. The U.S. Army Corps of Engineers, Jacksonville District (Corps), is proposing to conduct periodic maintenance dredging of the intersection of the Intracoastal Waterway (IWW) and Okeechobee Waterway (OWW) Federal navigation project at St. Lucie Inlet in Martin County, Florida. The Corps proposes to place approximately 10,000 CY of beach quality dredged material from OWW Cut 1 into the St. Lucie Impoundment Basin.

c. Authority and Purpose. Maintenance of the IWW was authorized by the Rivers and Harbors Act of 2 March 1945, House Document 740, 79th Congress, 2nd Session, and Chief of Engineers Report 22 July 1960 modifying the 12-foot channel. The OWW was authorized by the Harbor and River Act of 31 May 1974, House Document 294/93/1.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material. Dredged material from the project channels typically consists of sand.

(2) Quantity of Material. Approximately 10,000 cubic yards would be periodically dredged and placed in the St. Lucie Sediment Impoundment Basin.

(3) Source of Material. From the IWW-OWW Crossroads and OWW Cut 1.

e. Description of the Proposed Discharge Site(s).

(1) Location. The St. Lucie Sediment Impoundment Basin (see Figure 1, Sections 1-3 for more information).

(2) Size. St. Lucie Sediment Impoundment Basin: 3,500 feet in length and 80 feet wide.

(3) Type of Site: Beach: open water (inlet).

(4) Type(s) of Habitat. Open water habitat with unconsolidated substrate (please see Section 3 for more information).

(5) Timing and Duration of Discharge. Timing is undetermined and duration is generally less than two months.

f. Description of Disposal Method. A small Corps split-hull hopper dredge would perform the dredging and would bottom dump the sediments in the impoundment basin.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. The project channels have sloped bottoms with authorized depths (please see Section 1.1 for more information).

(2) Sediment Type. Unconsolidated with sand.

(3) Dredged/Fill Material Movement. Material placed in the St. Lucie Sediment Impoundment Basin will be stored and later placed on the beach.

(4) Physical Effects on Benthos. Benthic organisms would be impacted by dredging activity and placement operations. Re-colonization should begin in less than one year.

(5) Actions to minimize impacts. Placement operations would be monitored to ensure that construction activities are performed in authorized project areas only.

b. Water Circulation. Fluctuation and Salinity Determinations.

(1) Water Column Effects.

(a) Salinity: No significant effect.
(b) Water Chemistry: No significant effect.
(c) Clarity: Turbidity would temporarily decrease clarity.
(d) Color: Turbidity would temporarily change color.
(e) Odor: No significant effect.
(f) Taste: No significant effect.
(g) Dissolved Gas Levels: No significant effect.
(h) Nutrients: No significant effect.

(2) Current Patterns and Circulation.

(a) Current Patterns and Flow: Currents in the project area are primarily tidal.
(b) Velocity: No significant effect.
(c) Stratification: No significant effect.
(d) Hydrologic Regime: No significant effect.

(3) Normal Water Level Fluctuations. Tides in the project area are semi diurnal with varying levels throughout the year. The project would not affect normal water level fluctuations.

(4) Salinity Gradients. The project would not affect salinity gradients.

(5) Actions to minimize impacts. The project would not affect water levels. Turbidity would be monitored per the requirements of the State permit. If at any time the turbidity standard were exceeded, those activities causing the violation would cease.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. There will be an increase in suspended particulates and turbidity levels in the vicinity of the disposal site.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column.

(a) Light Penetration: Light penetration would decrease during placement operations.
(b) Dissolved Oxygen: Dissolved oxygen levels would not be significantly altered by this project.
(c) Toxic Metals and Organics: This project would not cause any significant release of toxic metals or organics.
(d) Pathogens: This project would not cause any release of pathogens.
(e) Aesthetics: Turbidity would temporarily impact aesthetic quality of the placement areas.

(3) Effects on Biota.

(a) Primary Production, Photosynthesis: The project would not have a significant impact on primary production or photosynthesis.
(b) Suspension/Filter Feeders: Turbidity would affect suspension/ filter feeders, but the effects would not be significant.
(c) Sight Feeders: Sight feeders would be affected by turbidity, but the effects would not be significant.

(4) Actions to minimize impacts. As stated earlier, turbidity would be monitored per the requirements of the State permit. If at any time the turbidity standard were exceeded, those activities causing the violation would cease.

d. Contaminant Determinations. Levels of contaminants are not expected to have a significant impact on plankton, benthos, nekton, or the aquatic food web. Re-suspension of sediment within the placement areas is expected to have minimal impact on these organisms.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton: Significant effects on plankton are not anticipated.
(2) Effects on Benthos: Benthos would be impacted by the project, but benthic organisms would be expected to begin recovery within one year.
(3) Effects on Nekton: Significant effects on nekton are not anticipated.
(4) Effects on Aquatic Food Web: As stated earlier, benthos would be impacted, but additional significant effects on the food web are not anticipated.
(5) Effects on Special Aquatic Sites.

(a) Sanctuaries and Refuges: Placement is not expected to have a significant impact on the adjacent areas. This work would be performed in compliance with the Water Quality Certification issued by the State of Florida.
(b) Wetlands: The proposed work would not affect wetlands.
(c) Mud Flats: The proposed work would not have a significant affect to mud flats.
(d) Vegetated Shallows: The proposed work would not affect vegetated shallows.
(e) Coral Reefs: There are no coral reefs in the project area.
(f) Riffle and Pool Complexes: There are no riffle and pool complexes in the project area.

f. Threatened and Endangered Species. Implementation of identified standard protection measures would avoid or minimize adverse impacts to threatened and endangered species per the SARBO and SPBO.

g. Other Wildlife. Use of the beach and nearshore could temporarily displace wildlife. Re-colonization of these sites would occur between maintenance events.

h. Actions to Minimize Impacts. Measures shall be taken to avoid or minimize impacts to threatened and endangered species as well as other wildlife (please refer to Section 4).

i. Proposed Disposal Site Determinations

(1) Mixing Zone Determination. This determination will be in accordance with the Water Quality Certification issued for this project.

(2) Determination of Compliance with Applicable Water Quality Standards. The work would be conducted in accordance with the Water Quality Certification issued for this project.

(3) Potential Effects on Human Use Characteristic.
(a) Municipal and Private Water Supply: No effects are anticipated.
(b) Recreational and Commercial Fisheries: Impacts to fisheries would not be significant (please see Sections 3.5 and 4.3).

(c) Water Related Recreation: Construction activities would temporarily disrupt water related recreation.
(d) Aesthetics: Construction would temporarily impact aesthetics.
(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves: Work would be conducted in compliance with the Water Quality Certification issued by the State of Florida.

j. Determination of Cumulative Effects on the Aquatic Ecosystem. Periodic placement operations would have impacts on the aquatic ecosystem. Most impacts should be relatively short-term and populations of benthic organisms within the placement areas should fully recover due to the natural sediment dynamics of the placement area.

k. Determination of Secondary Effects on the Aquatic Ecosystem. None.

III. Findings of Compliance or Non-Compliance With the Restrictions on Discharge

a. Adaptation of the Section 404(b)(l) Guidelines to this Evaluation: No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem: No practical alternative exists which meets the project objectives that do not involve discharge of fill into waters of the United States.

c. Compliance with Applicable State Water Quality Standards: Dredging would be performed in compliance with the Water Quality Certification issued by the State of Florida.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act: The discharge operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

e. Compliance with Endangered Species Act of 1973: The proposed project would not jeopardize the continued existence of any species listed as threatened or endangered or result in the destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972: This act does not apply to this project.

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

(a) Municipal and Private Water Supplies: No effect.
(b) Recreation and Commercial Fisheries: No significant adverse impacts are anticipated.

(c) Plankton: No substantial adverse impacts are anticipated.
(d) Fish: No substantial adverse impacts are anticipated.
(e) Shellfish: No substantial adverse impacts are anticipated.
(f) Wildlife: Use of the impoundment basin could temporarily displace wildlife. Re-colonization of these sites would occur between maintenance events.
(g) Special Aquatic Sites: No substantial adverse impacts are anticipated.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems: Most impacts should be relatively short-term (see section 4.2).
(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability: No significant adverse effects are anticipated.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Values: Recreation and aesthetic values would be temporarily disrupted due to construction activity.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem: Measures shall be taken to minimize impacts.

i. On the basis of the guidelines the proposed disposal sites for the discharge of dredged material are specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

FINDING OF COMPLIANCE
FOR
IWW-OWW CROSSROADS
MAINTENANCE DREDGING
ST. LUCIE INLET AND ADJACENT INTRACOASTAL WATERWAY
MARTIN COUNTY, FLORIDA

1. No significant adaptations of the guidelines were made relative to this evaluation.

2. The St. Lucie Sediment Impoundment Basin is the placement site available for this project. Use of any of this site (Figures 1) would not result in significant impacts to water level fluctuation, circulation or currents.

3. The planned disposal of dredged material at any of the sites would not violate any applicable State water quality standards with the possible exception of turbidity. Therefore, turbidity standards would be monitored per the Water Quality Certification issued by the State of Florida. If a turbidity violation is noted, then those activities causing the violation shall be terminated. The disposal operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of St. Lucie Sediment Impoundment Basin would not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended. Consultation with the U.S. Fish and Wildlife Service will be completed.

5. The proposed disposal of dredged material will not result in significant long-term adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on life stages of aquatic life and other wildlife, aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

6. Appropriate steps shall be taken to minimize potential adverse impacts of the discharge on aquatic systems.

7. On the basis of the guidelines the proposed disposal sites for the discharge of dredged material are specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

APPENDIX B - COASTAL ZONE MANAGEMENT CONSISTENCY

FLORIDA COASTAL MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

IWW-OWW CROSSROADS
MAINTENANCE DREDGING
ST. LUCIE INLET AND ADJACENT INTRACOASTAL WATERWAY
MARTIN COUNTY, FLORIDA

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information will be submitted to the State in compliance with this chapter.

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project will be coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a State emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves the placement of dredged material at the St. Lucie Sediment Impoundment Basin for future use to combat erosion. Therefore, this project is consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged State lands and resources within State lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed project complies with State regulations pertaining to the above resources. The work complies with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the State to acquire land to protect environmentally sensitive areas.

Response: Since the affected property already is in public ownership or is under an easement for public placement use, this chapter does not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the State to manage State parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project will be coordinated with the State of Florida regarding project activities within and adjacent to the Hobe Sound National Wildlife Refuge. The project is consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). Because of the nature of the project there is little potential for impact to historic properties. The project is consistent with this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the State to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed placement encourages commercial and recreational use that in turn provides economic benefits to the area. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: The placement would help maintain interstate commerce by ensuring safe navigation of the IWW and OWW and therefore is consistent with the goals of this chapter.

10. Chapter 370, Saltwater Living Resources. This chapter directs the State to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in State waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the State engaged in the taking of such resources within or without State waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed dredged material placement would not have a substantial adverse impact on saltwater living resources. Benthic organisms may be adversely affected by the work. However, the project footprint is relatively small and lies adjacent to similar habitat. Therefore,

substantial impacts to the aquatic ecosystem are not anticipated. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Fish and Wildlife Conservation Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project would not have a substantial adverse impact on living land and freshwater resources. Use of the placement areas could temporarily adversely impact wildlife, but these areas would be re-colonized between uses.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed dredged material placement will be coordinated with the local regional planning commission. Therefore, the project is consistent with the goals of this chapter.

16. Chapters 381 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the State.

Response: The project shall not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the State by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: An Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. A Water Quality Certification is being sought from the State. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the State soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: Agricultural lands do not occur in the vicinity of the project; therefore this chapter does not apply.

APPENDIX C - PERTINENT CORRESPONDENCE

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

5 2 16

To Whom It May Concern:

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers (Corps) Regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the draft Finding of No Significant Impact (FONSI) for the proposed Placement of Intracoastal Waterway and Okeechobee Waterway Dredged Material in the St. Lucie Inlet Sediment Impoundment Basin, Martin County, FL.

The draft FONSI is also available on the Corps, Jacksonville District website at http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Martin. If you have any questions or comments, please contact Dr. Clay McCoy by telephone at 904-232-3657, or by email at Clay.A.McCoy@usace.army.mil.

Sincerely,

Jason J. Spinning
Acting Chief, Environmental Branch

Enclosure

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

February 8, 2016

Planning and Policy Division
Environmental Branch

Mr. Larry Williams
U. S. Fish & Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
772-562-3909 Fax 772-562-4288

FWS Log No. 2016 - I - 0179

The proposed action is not likely to adversely affect resources protected by the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et. seq.).

This fulfills the requirements of section 7 of the Act and further action is not required. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

for Larry Williams, State Supervisor — 2/10/16 Date

Dear Mr. Williams,

I am requesting informal consultation pursuant to Section 7 of the Endangered Species Act for the Maintenance Dredging of the Intracoastal Waterway (IWW) and Okeechobee Waterway (OWW) in Martin River County, Florida.

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is proposing to conduct unscheduled dredging of the Martin County, Florida portion of the IWW-OWW in the vicinity of intersection of the two waterways. This would include OWW Cut 1 which extend from the intersection of the IWW and OWW westward approximately 3,500 feet (Figure 1). OWW Cut 1 is approximately 3,500 feet in length and 80 feet wide. Dredged material would be placed in the previously constructed St. Lucie Sediment Impoundment Basin located about 2 miles east of OWW Cut 1. Shoaling in the proposed dredge area is preventing safe navigation of the federal waterway.

The preferred alternative consists of dredging the shoaled areas the authorized depth of 8 feet MLW, with an allowable overdepth of 2 feet. The shoaling quantity to be dredged is approximately 10,000 cubic yards of sand. It is most likely that a Currituck Class Split Hopper Dredge would be used to complete this work which would take approximately 2 weeks.

After reviewing available data, the Corps has determined that the proposed project may effect, but is not likely to adversely affect the endangered West Indian (Florida) manatee (*Trichechus manatus latirostris*). The Corps made this determination based on implementation of the standard manatee conditions for in-water work in our plans and specifications for the project. In addition, the project will not affect designated critical habitat of the Florida manatee.

Based on the information provided in this letter, we request that you concur with this finding.

Florida Manatee (*Trichecus manatus*)	may effect/not likely to adversely affect

If you have any questions, please contact Dr. Clay McCoy at (904) 232-3657 or by email at Clay.A.McCoy@usace.army.mil.

Sincerely,

Jason J. Spinning
Acting Chief, Environmental Branch

Enclosure

FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Mr. Eric Summa
Jacksonville USACE, Environmental Branch
701 San Marco Boulevard
Jacksonville, Florida 32207

January 21, 2016

Re: DHR Project: 2015-6053/ Received by DHR: December 17, 2015
Applicant: U.S. Army Corps of Engineers/ Planning and Policy Division, Environmental Branch
Project: Channel Maintenance Dredging of Okeechobee Waterway (OWW) Cut 1
Near Entrance of St. Lucie Inlet, Dredged Material Disposal at St. Lucie Impoundment Basin, Martin County

Dear Mr. Summa:

This office reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

It is the opinion of this office that the proposed project is unlikely to affect historic properties. However, the permit, if issued, should include the following special condition regarding unexpected discoveries:

- If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The applicant shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section at (850)-245-6333. Project activities shall not resume without verbal and/or written authorization. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, *Florida Statutes*.

For any questions concerning our comments, please contact Robin Jackson, Historic Preservationist, Compliance and Review, by electronic mail at robin.jackson@dos.myflorida.com, or at 850.245.6333, or 800.847.7278.

Sincerely

Timothy A. Parsons, Ph.D.,
Interim Director, Division of Historical Resources
& Deputy State Historic Preservation Officer

Hi Clay.

I've reviewed the project and spoken with my management. We will not be providing EFH conservation recommendations.

Brandon
Brandon Howard - NOAA

On Fri, Feb 5, 2016 at 12:11 PM, Mccoy, Clay SAJ <Clay.A.Mccoy@usace.army.mil <mailto:Clay.A.Mccoy@usace.army.mil> > wrote:

Brandon,
This was an expedited emergency action and we were looking to get it out in <30 days. We consider it a minor action considering we have EFH recommendations. Sorry for any confusion. Please let me know when you anticipate being able to provide comments.

Thanks,
Clay

Clay McCoy, PhD
Coastal Section
Environmental Branch
Planning & Policy Division
USACE Jacksonville District
904-232-3657 <tel:904-232-3657>