# ADDENDUM NUMBER 1

## DAUPHIN ISLAND EAST END BEACH AND DUNE RESTORATION

FOR

THE TOWN OF DAUPHIN ISLAND

GMC PROJECT NO. CMOB230030

**1. Revisions to Project Manual**

1.1 The following revisions are hereby added as Addendum No.1 to the referenced Project Manual and shall be considered when preparing bids.

**1.1.1 Section 00 31 46, Permits - shall be replace in its entirety with the attached "00 31 46 Permits - Addendum 1". (2 Sheets)**

**1.1.2 Appendices Section, Appendix B - Project Permits and Approvals – Permits, Page 10 through Page 20 – shall be replace in its entirety with the attached USACE Fully Executed Permit (SAM-2022-00150) 9.8.2023 - Addendum 1". (98 Sheets)**

**2. Revisions to Plan Sheets**

**2.1** The following revisions are hereby added as Addendum No. 1 to the referenced Project Plans and shall be considered when preparing bids.

**2.1.1 Sheet 16, Borrow Area Detail - shall be replace in its entirety with the attached "Sheet 16 Borrow Area Detail - Addendum 1". (1 Sheet)**

3. **Questions/Requests for Clarification**

**3.1 None**

4. **Acknowledgement**

4.1 Receipt of Addendum No. 1 shall be acknowledged in two ways:

4.1.1 Article 5, Paragraph 5.03 of Section 00 41 13 Bid Form of the Project Manual – Bidder acknowledges receipt of "Addendum No. 1 dated September 15.

4.1.2 EMAIL BARBARA.GARNER@GMCNETWORK.COM and confirm that ADDENDUM 1 has been received.

# SECTION 00 31 46

# PERMITS

## ARTICLE 1—PERMITS

1.01 *Existing Permits*

Contractor shall comply with all requirements under the terms and conditions set out in all Permits applicable to the Work. Owner has received the following Permits and approvals specifically for the Project. Specifically, Contractor shall familiarize themselves with conditions contained in the permits.

| Permit | Date of Permit | Copy Provided |
|---|---|---|
| USACE: SAM-2022-00150-DCH | 09-08-2023 | Appendix B |
| ADEM WQC: 2022-155-WQC-COE-LOP | 03-02-2023 | Appendix B |
| ADEM CCC: 2022-155-FC-FLP-COE-LOP | 03-02-2023 | Appendix B |
| USFWS BO: 2022-0086419 | 05-30-2023 | Appendix B |
| USDHS-USCG: HSCG82-23-6-0028 | 08-01-2023 | Appendix B |
| ACDNR: Beach Permit | 09-01-2023 | Appendix B |
| Private Landowner Construction Easements | Multiple | Appendix B |

The Contractor shall furnish all labor, materials, and equipment, and perform all Work required to comply with the Permits, which the Contractor is required to review in their entirety prior to commencement of the work.

Prior to and during construction, the Contractor will specifically comply with and fulfill all terms and conditions prescribed by the U.S. Fish and Wildlife Service Biological Opinion (2022-0086419), U.S. Department of Homeland Security – U.S. Coast Guard Revocable License for Non-Federal Use of Federal Real Property (HSCG82-23-6-0028), ADEM Water Quality Certification (2022-155-WQC-COE-LOP) and Coastal Consistency Determination (2022-155-FC-FLP-COE-LOP) both dated March 2, 2023 and the U.S. Army Corps of Engineers (USACE) Individual Permit (SAM-2022-00150-DCH) dated September 8, 2023 for the Project except as will be addressed by the Town or Engineer as related to:

- USACE Permit:
  - Transfer of the USACE authorization per General Condition 2 and 4,
  - Post-Construction maintenance of the Work per Special Condition 9 - after Town or Engineer acceptance of the Work,
  - Structure removal per Special Condition 3.
- U.S. Fish and Wildlife Service Biological Opinion:
  - Post-Construction compaction monitoring per Term & Condition 14 - after Town or Engineer acceptance of the Work,
  - Post-Construction escarpment survey per Term & Condition 15 - after Town or Engineer acceptance of the Work,
  - Summary Turtle report per Term & Condition 17,
  - Post-Construction lighting surveys per Term & Condition 19,
  - Post-Construction nesting surveys per Term & Condition 20,

- Obtainment of Alabama Department of Conservation & Natural Resources State Lands Division authorization per the USACE permit.

Compliance and fulfillment by the Contractor with the ADEM and USACE permits shall include compliance and fulfillment with the following as applicable:

- Code of Alabama 335-8-2.12 Discharges to Coastal Waters, and
- Sediment QC/QA Plan dated August 18, 2023.

1.02 *Notification*

The Contractor shall immediately notify the Town or Engineer of any non- compliance with the Permits, easements or terms and conditions of this Contract including the Contractor's Environmental Protection Plan. Any non-compliance noted by the Town or Engineer shall be brought to the attention of the Contractor and the appropriate regulatory agencies will be notified. The regulatory agency will determine the action to be taken and the Town or Engineer will notify the Contractor. Such actions may include discontinuing construction of the Project until the Contractor complies with the Environmental Protection Plan. The Contractor shall comply, and require all sub-Contractors to comply, with all applicable Federal, State or local laws or regulations, Permits, easements and all elements of the Environmental Protection Plan. The Contractor shall be liable for any actions or delays resulting from any violation or non-compliance with the conditions of the Permits, easements and terms of this Contract attributable to their personnel and/or sub-Contractors.

1.03 *Other Permits*

See 00 72 00 General Conditions Section 7.09.

**--END OF SECTION--**

**DEPARTMENT OF THE ARMY**
**U.S. ARMY CORPS OF ENGINEERS, MOBILE DISTRICT**
**P.O. BOX 2288**
**MOBILE, AL 36628-0001**

**September 8, 2023**

Special Projects Branch
Regulatory Division

SUBJECT: Department of the Army Permit Application Number SAM-2022-00150-DCH, Town of Dauphin Island, Dauphin Island East End Beach Renourishment Project, Mobile County, AL

Town of Dauphin Island
Attention: Mayor Jeff Collier
1011 Beinville Boulevard
Dauphin Island, AL 36528

Dear Mayor Collier,

**PLEASE READ THIS LETTER CAREFULLY AND COMPLY WITH ITS PROVISIONS**

There is enclosed a Department of the Army (DA) permit authorizing you to perform the work specified therein in accordance with the plans shown on the drawings enclosed thereto. This permit is issued under provision of the Federal laws for the protection and preservation of the navigable waters of the United States. These laws provide that after the proposed work has been approved by issuance of a DA permit,

**IT SHALL NOT BE LAWFUL TO DEVIATE FROM SUCH PLANS EITHER BEFORE OR AFTER COMPLETION OF THE WORK,**

unless modification of said plans has previously been submitted to and received the approval of the DA.

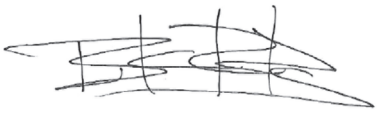
You should study and carefully adhere to all the terms and conditions of the permit. The District Engineer must be notified of the commencement and completion of the permitted work. The enclosed forms may be used for that purpose. Also enclosed is a "NOTICE OF AUTHORIZATION" which must be conspicuously displayed at the site during construction of the permitted work.

If for any reason it becomes necessary to make a material change in location or plans for this work, revised plans should be submitted promptly to the District Engineer in order that the revised plans may receive the approval required by law before work is begun. Compliance with this and other conditions of the permit is essential. Failure to submit the notices requested may result in its revocation.

An electronic copy of this permit is being provided to your agent, Ms. Lois Edwards of Ardea Environmental Consultants, LLC at lois@ardeaenvironmental.com.

Please contact Mr. Bryan Roden-Reynolds at (251) 721-2552 or e-mail at bryan.k.roden-reynolds@usace.army.mil should you have any questions. For additional information about our Regulatory Program, please visit our web site at www.sam.usace.army.mil/Missions/Regulatory.aspx. Also, please take a moment to complete our customer satisfaction survey located under the Menu tab on the right side of our webpage. Your responses are appreciated and will help us improve our services.

Sincerely,



Bryan Roden-Reynolds
Team Lead
Special Projects Branch
Mobile District, Regulatory Division

Attachments

# DEPARTMENT OF THE ARMY PERMIT

Permittee: **Town of Dauphin Island**

Permit No.: **SAM-2022-00150-DCH**

Issuing Office: **MOBILE DISTRICT**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description**: The permittee is authorized to dredge and fill waters of the U.S. for the restoration and enhancement of the intertidal shoreline, beach, and dune habitat along 1.6 miles of Gulf-fronting coastline at the east end of Dauphin Island. The beach restoration work will commence at the easternmost end of Dauphin Island and extend 8,000 linear feet to the west. An estimated 1.2 million cubic yards of sediment would be dredged from the previously approved 83.8-acre Area of Interest (AOI)/Borrow Area by a hydraulic cutterhead-suction dredge and/or trailing-suction hopper dredge. Sediment is expected to be pumped through a series of submerged pipelines, to rest on the seafloor, which would extend from the AOI to the fill areas. The dredge pipeline will be marked for navigational safety, as required by the U.S. Coast Guard.**

**Attached:**

1. **Permit Area Maps;**
2. **Preliminary Master Plan;**
3. **Alabama Department of Environmental Management Coastal Consistency Concurrence dated March 2, 2023; and**
4. **Alabama Department of Environmental Management Water Quality Certification dated March 2, 2023**

Project Location**: The proposed beach renourishment project is comprised of waterbottoms and shorelines fronting the east end of Dauphin Island; within Section 28, Township 8 South, Range 2 West; beginning at Latitude 30.246102° North and Longitude -88.077206° West; ending at Latitude 30.242474° North and Longitude -88.102097° West. The proposed borrow area is located offshore approximately 4.6 miles southeast of Dauphin Island and 1 mile south/southwest of Sand Island Lighthouse; at Latitude 30.178584° North and Longitude -88.063899° West.**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2028**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 1 month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special condition to this permit. For your convenience, a copy of the certification is

attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **Compliance with all terms and general and special conditions of this Permit is mandatory.**

2. **It is the permittee's responsibility to ensure that the contractors working on this project are aware of all general and special permit conditions.**

3. **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 U.S. Army Corps of Engineers (USACE), 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.**

4. **The permittee will comply with the Alabama Department of Environmental Management's Coastal Zone Management Area Consistency Concurrence determination letter and Water Quality Certification letter, dated March 2, 2023.**

5. **Should previously unknown resources be encountered during project activities, work shall cease and the USACE, Mobile District and the Alabama State Historical Preservation Officer (SHPO) be immediately notified. If archeological materials are encountered during construction, the procedures codified at 36 CFR 800.13(b) will apply. In addition, if human remains are encountered, the provisions of the Alabama Burial Act (Code of Alabama 1975, Sections 13A-7-23.1, as amended; Alabama Historical Commission Administrative code Chapter 460-X-10 Burials) should be followed. This stipulation shall be placed on the construction plans, and it is the permittee's responsibility to ensure contractors are aware of this requirement. SHPO contact information: Alabama Historical Commission, 468 South Perry Street, Montgomery, Alabama 36130-0900, or telephone (334) 230-2692. The ACH tracking number is 2019-0933.**

6. **The attached U.S. Fish and USFWS Biological Opinion BO [i.e., Final Biological Opinion Dauphin Island East End Beach and Dune Restoration Project Mobile County, Alabama (FWS Ecosphere #2022-0086419)] contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with the "incidental take" that is also specified in the BO. Your authorization under this Department of the Army (DA) permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with the DA permit. However, the USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, as well as the Endangered Species Act (ESA). For further clarification on this point, you should contact the USFWS. Should the USFWS determine that the conditions of the BO have been violated, normally the USFWS will enforce the violation of the ESA, or refer the matter to the Department of Justice.**

7. **The permittee will fully implement and abide by the terms, conditions, and reasonable and prudent measures provided by the National Marine Fisheries Service (NMFS) Gulf Regional Biological Opinion for Hopper Dredging in the Gulf of Mexico (GRBO), dated November 19, 2003, Consultation Number F/SER/2000/01287 (including Revision No. 1 dated June 24, 2005 and the superseding Revision No. 2, dated January 9, 2007), as well as the attached Hopper Dredge and Trawling specifications used for USACE, Mobile District civil works projects, National Dredging Quality Management Program (DQM) Hopper Dredge Regulatory specifications, and additional conditions required by the Mobile District as follows:**

    a. **The permittee shall employ the use of the DQM (formerly Silent Inspector) on the hopper dredge**

**which will remain operational at all times during dredging.**

**b. The permittee shall allow inspections by USACE personnel of the dredge, drag arm, and the DQM. The contractor is required to have a current certification from DQM for the hopper dredge instrumentation system to be used under this permit. Criteria for certification shall be based on the most recent specification posted on the DQM website (https://dqm.usace.army.mil/Specifications/Index.aspx).**

**c. The permittee shall have 24-hour coverage by approved overflow observers on the dredge as stated in condition 6 of the terms and conditions of the GRBO.**

**d. Use of a relocation trawler will be required to clear borrow sites for a minimum of twelve hours prior to initiation of dredging. Additional trawling in conjunction with dredging should be utilized if it is determined the action would further minimize potential for adverse impacts to threatened and endangered species. All activities must abide by the terms, conditions, and reasonable and prudent measures provided by the NMFS GRBO.**

**e. Prior to commencement of trawling activities, the permittee shall coordinate scheduling with the USACE GRBO Executive Advisory Group (EAG) District point of contact, Ms. Lekesha Reynolds at (251) 690-3260, or Lekesha.W.Reynolds@usace.army.mil; or Ms. Jennifer Jacobson at (251) 690-2724, or Jennifer.L.Jacobson@usace.army.mil; and the Mobile District, Regulatory Division, Attention: Mr. Bryan Roden-Reynolds, at bryan.k.roden-reynolds@usace.army.mil, or (251) 721-2552.**

**f. Immediate notification shall be made to the USACE GRBO EAG District point of contact, Ms. Lekesha Reynolds, at (251) 690-3260 or Lekesha.W.Reynolds@usace.army.mil; or Ms. Jennifer Jacobson at (251) 690-2724, or Jennifer.L.Jacobson@usace.army.mil; and the Mobile District, Regulatory Division, attention: Mr. Bryan Roden-Reynolds, at bryan.k.roden-reynolds@usace.army.mil, or (251) 721-2552, to document any activity concerning any listed species, especially sea turtles or Gulf Sturgeon. Additionally, copies of all observer trawl relocation reports, overall screening reports, and DQM reports shall be provided weekly to the above individuals.**

**g. Upon each take of a sea turtle or Gulf sturgeon on the project, work shall cease and a risk management assessment will be performed by the permittee or its designated consultant and the results provided to the USACE. Once the risk assessment is completed, and the results implemented, dredging may continue with USACE concurrence. The risk assessment will include a review of the circumstances which contributed to the take, a review of DQM data, and a physical inspection of the dredge and its operating procedures. A risk management plan will be developed. This plan will address what occurred and provide suggested changes to the hopper dredge operations in order to minimize the likelihood of additional sea turtle/Gulf sturgeon takes and to ensure compliance with the terms and conditions of the GRBO. Email notification of recommendations and documentation will be sufficient.**

**8. It is the responsibility of the permittee to coordinate this activity with the State Lands Division of the Alabama Department of Conservation and Natural Resources (ADCNR), for any riparian rights issues or leases that may be required for impacting state water bottoms. ADCNR, State Lands Division, 31115 Five Rivers Boulevard, Spanish Fort, Alabama 36527, phone number (251) 621-1238.**

**9. The permittee shall implement the 2023 East End Beach and Dune Restoration Post-Construction Monitoring Plan Post-Construction Physical Monitoring Plan. This Post-Construction Monitoring Plan will be the same as the 2016 project with the addition of post-construction sediment testing of the fill area.**

**10. The permittee will provide the Mobile District, Navigation Section and the U.S. Coast Guard a work schedule for offshore work, at least 60 days in advance, so that a "Notice to Mariners" can be issued.**

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State or local authorizations required by law.
b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.
d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
d. Design or construction deficiencies associated with the permitted work.
e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.
b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
c. Significant new information surfaces which this office did not consider in reaching the original public interest decision. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

9-8-2023

(PERMITTEE) **Jeff Collier, Mayor**
**Town of Dauphin Island**
**1011 Bienville Boulevard**
**Dauphin Island, AL 36528**

(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

**CHAPMAN, JEREMY J.**
**COLONEL, DISTRICT COMMANDER**

BY: Allison Monroe Digitally signed by Allison Monroe Date: 2023.09.08 13:14:36 -05'00'

(DATE)

**Deputy District Chief**
**Mobile District, Regulatory Division**

When the structures or work authorized by this permit (**SAM-2022-00150-DCH**) are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE) (DATE)

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

| Applicant: Jeff Colier, Town of Dauphin Island | File Number: SAM-2022-00150-DCH | Date: 9/8/2023 |
|---|---|---|

| Attached is: | | See Section below |
|---|---|---|
| ☐ | INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission) | A |
| ☒ | PROFFERED PERMIT (Standard Permit or Letter of permission) | B |
| ☐ | PERMIT DENIAL WITHOUT PREJUDICE | C |
| ☐ | PERMIT DENIAL WITH PREJUDICE | D |
| ☐ | APPROVED JURISDICTIONAL DETERMINATION | E |
| ☐ | PRELIMINARY JURISDICTIONAL DETERMINATION | F |

**SECTION I**

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable
You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial
You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable
You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

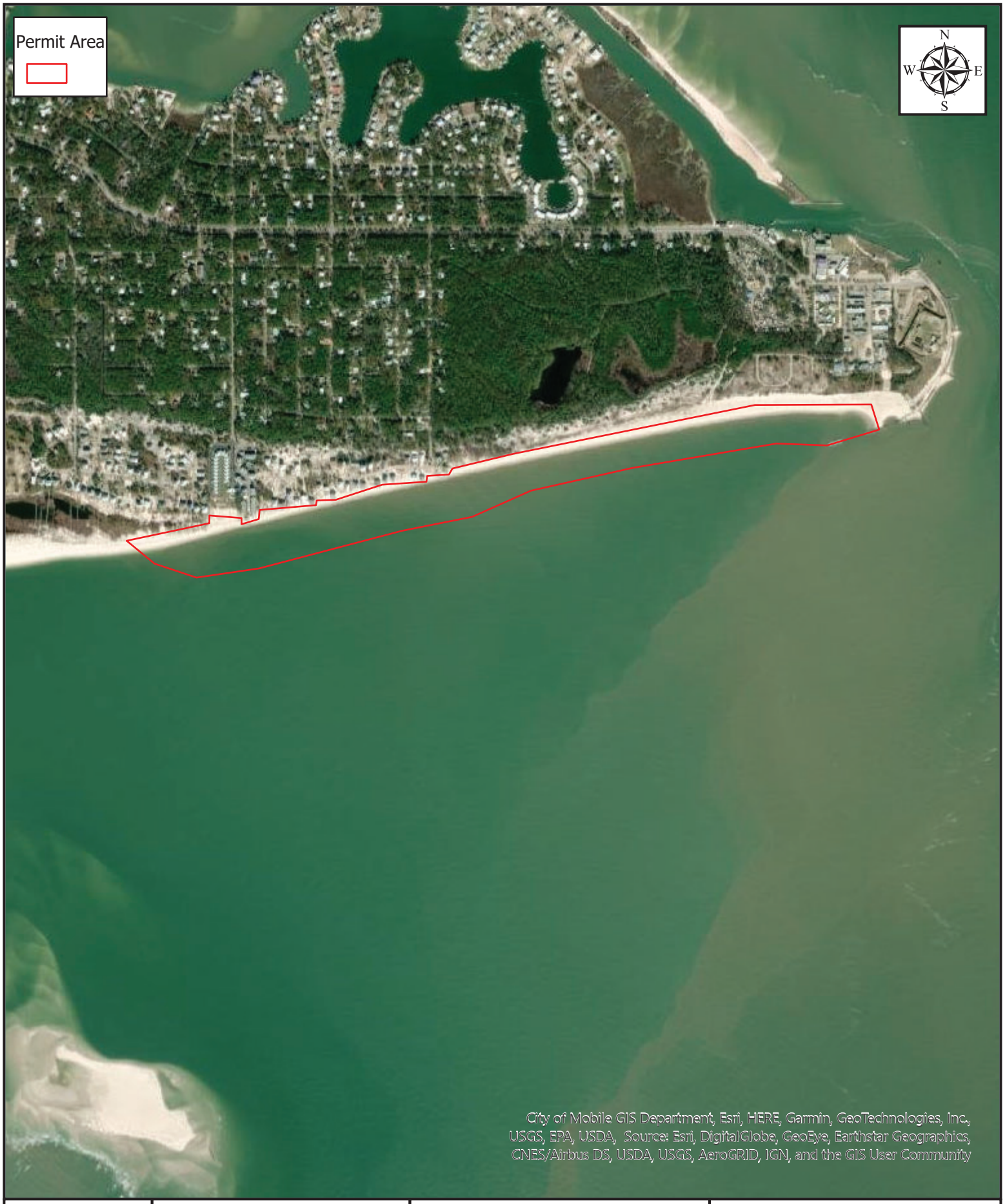
| If you have questions regarding this decision you may contact: | If you have questions regarding the appeal process, or to submit your request for appeal, you may contact: |
|---|---|
| District Engineer, Mobile Regulatory Division<br>Attn: Bryan Roden-Reynolds<br>Mobile District U.S. Army Corps of Engineers<br>Post Office Box 2288<br>Mobile, Alabama 36628 | Philip Shannin<br>Regulatory Administrative Appeal Review Officer<br>U.S. Army Corps of Engineers<br>South Atlantic Division<br>60 Forsyth Street, Room M9<br>Atlanta, Georgia 30303-8801<br><br>Phone: (404) 562-5136<br>Email: philip.a.shannin2@usace.army.mil |

**SECTION II – REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

| | |
|---|---|
| RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations. | |
| _____<br>Signature of appellant or agent. | Date: |
| Email address of appellant and/or agent: | Telephone number: |




**SAM-2022-00150-EAH**

0 0.13 0.25 0.5

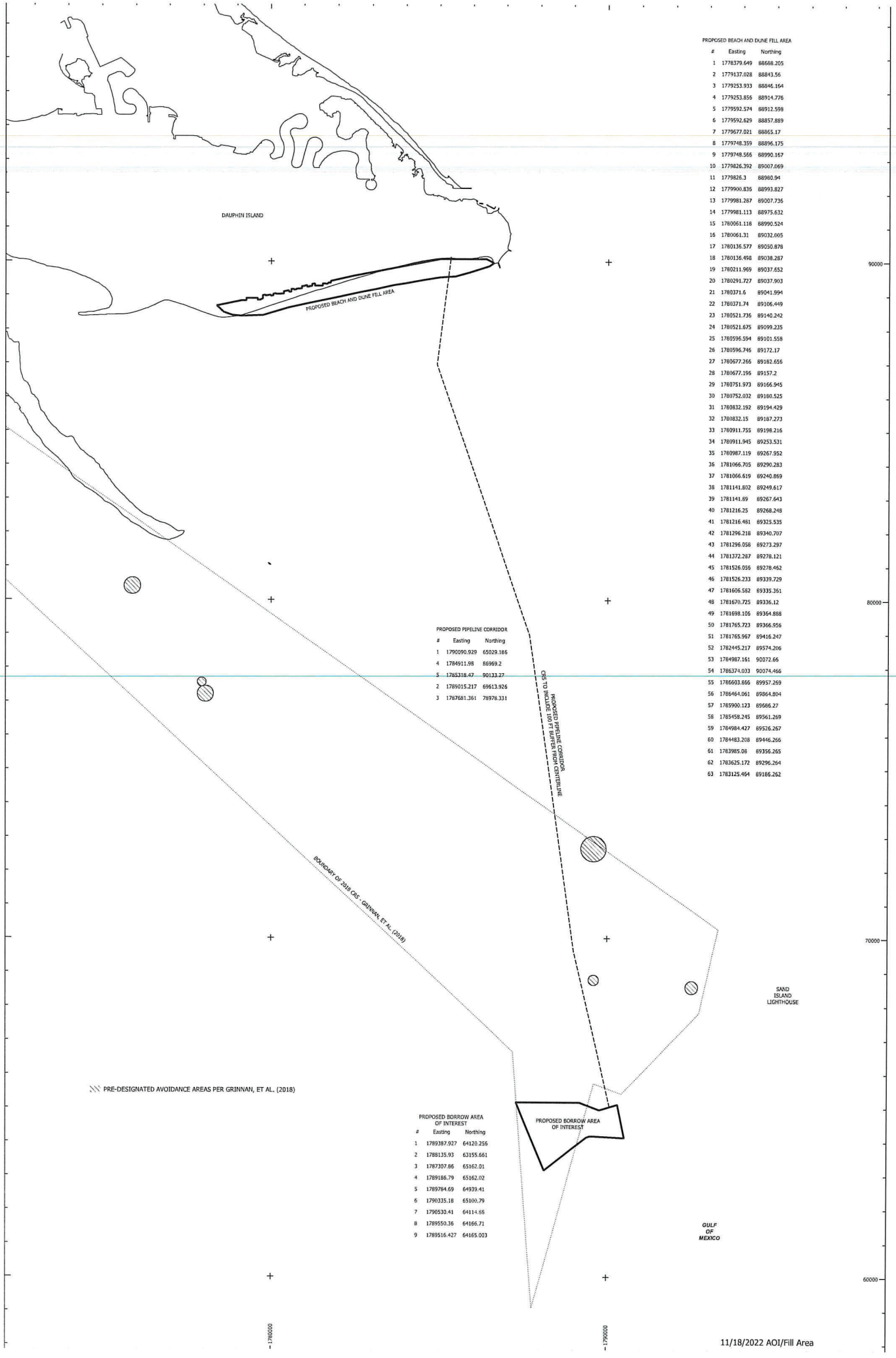
mi

Map Center: 88.089591°W 30.240728°N

Map Created by: PM NAME

Date: 10/17/2022

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere




PROPOSED BEACH AND DUNE FILL AREA

| # | Easting | Northing |
|---|---|---|
| 1 | 1778379.649 | 88668.205 |
| 2 | 1779137.028 | 88843.56 |
| 3 | 1779253.933 | 88846.164 |
| 4 | 1779253.856 | 88914.776 |
| 5 | 1779592.574 | 88912.598 |
| 6 | 1779592.629 | 88857.889 |
| 7 | 1779677.021 | 88865.17 |
| 8 | 1779748.359 | 88896.175 |
| 9 | 1779748.565 | 88990.167 |
| 10 | 1779826.392 | 89007.069 |
| 11 | 1779826.3 | 88980.94 |
| 12 | 1779900.836 | 88993.827 |
| 13 | 1779981.287 | 89007.736 |
| 14 | 1779981.113 | 88975.632 |
| 15 | 1780061.118 | 88990.524 |
| 16 | 1780061.31 | 89032.005 |
| 17 | 1780136.577 | 89050.878 |
| 18 | 1780136.498 | 89038.287 |
| 19 | 1780211.969 | 89037.652 |
| 20 | 1780291.727 | 89037.903 |
| 21 | 1780371.6 | 89041.994 |
| 22 | 1780371.74 | 89106.449 |
| 23 | 1780521.736 | 89140.242 |
| 24 | 1780521.675 | 89099.235 |
| 25 | 1780596.594 | 89101.558 |
| 26 | 1780596.746 | 89172.17 |
| 27 | 1780677.266 | 89182.656 |
| 28 | 1780677.196 | 89157.2 |
| 29 | 1780751.973 | 89166.945 |
| 30 | 1780752.032 | 89180.525 |
| 31 | 1780832.192 | 89194.429 |
| 32 | 1780832.15 | 89187.273 |
| 33 | 1780911.755 | 89198.216 |
| 34 | 1780911.945 | 89253.531 |
| 35 | 1780987.119 | 89267.952 |
| 36 | 1781066.705 | 89290.283 |
| 37 | 1781066.619 | 89240.869 |
| 38 | 1781141.802 | 89249.617 |
| 39 | 1781141.89 | 89267.643 |
| 40 | 1781216.25 | 89268.248 |
| 41 | 1781216.481 | 89325.535 |
| 42 | 1781296.218 | 89340.707 |
| 43 | 1781296.058 | 89273.297 |
| 44 | 1781372.287 | 89278.121 |
| 45 | 1781526.056 | 89278.462 |
| 46 | 1781526.233 | 89339.729 |
| 47 | 1781606.582 | 89335.361 |
| 48 | 1781670.725 | 89336.12 |
| 49 | 1781698.106 | 89364.888 |
| 50 | 1781765.723 | 89366.956 |
| 51 | 1781765.967 | 89416.247 |
| 52 | 1782445.217 | 89574.206 |
| 53 | 1784987.161 | 90072.66 |
| 54 | 1786374.033 | 90074.466 |
| 55 | 1786603.866 | 89957.269 |
| 56 | 1786464.061 | 89864.804 |
| 57 | 1785900.123 | 89686.27 |
| 58 | 1785458.245 | 89561.269 |
| 59 | 1784984.427 | 89526.267 |
| 60 | 1784483.208 | 89446.266 |
| 61 | 1783985.08 | 89356.265 |
| 62 | 1783625.172 | 89296.264 |
| 63 | 1783125.464 | 89186.262 |

PROPOSED PIPELINE CORRIDOR

| # | Easting | Northing |
|---|---|---|
| 1 | 1790090.929 | 65029.186 |
| 4 | 1784911.98 | 86969.2 |
| 5 | 1785318.47 | 90133.27 |
| 2 | 1789015.217 | 69613.926 |
| 3 | 1787681.361 | 78978.331 |

PROPOSED BORROW AREA OF INTEREST

| # | Easting | Northing |
|---|---|---|
| 1 | 1789387.927 | 64120.256 |
| 2 | 1788135.93 | 63155.661 |
| 3 | 1787307.86 | 65162.01 |
| 4 | 1789186.79 | 65162.02 |
| 5 | 1789784.69 | 64939.41 |
| 6 | 1790335.18 | 65100.79 |
| 7 | 1790530.41 | 64114.66 |
| 8 | 1789550.36 | 64166.71 |
| 9 | 1789516.427 | 64165.003 |

11/18/2022 AOI/Fill Area

**LANCE R. LEFLEUR**
DIRECTOR

**KAY IVEY**
GOVERNOR

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March 2, 2023

The Honorable Jeff Collier
Mayor of The Town of Dauphin Island
c/o Lois A. Edwards
Ardea Environmental Consultants
130 South Indian River Drive, Suite 202
Fort Pierce, Florida 34950

RE: State of Alabama Water Quality Certification (WQC) Pursuant to Clean Water Act (CWA) §401(a)
Dauphin Island Shoreline Restoration Project, Dauphin Island, Mobile County, Alabama
U.S. Army Corps of Engineers (USACE) File No. SAM-2022-00150-DCH
Alabama Department of Environmental Management (ADEM) Tracking Code: ADEM-2022-155-WQC-COE-LOP

Dear Mayor Collier:

On April 11, 2022, the ADEM, Alabama's 401 certifying authority, received the Town's request for certification. The ADEM has completed its review of all submitted materials related to the restoration and enhancement of the intertidal shoreline, beach, and dune habitat along 1.6 miles of Gulf-fronting coastline at the east-end of Dauphin Island targeting the historic elevations of the 1990 shoreline. The project includes the dredging of approximately 1.2 million cubic yards of sediment from an 83.8 acre proposed borrow area (AOI) previously approved by USACE. The sediment is expected to be pumped through a series of submerged pipelines resting on the seafloor from the AOI to the fill area. The intertidal shoreline is planned to be constructed at a slope of 1:12 until it intercepts the existing submerged grade. Approximately 594,000 cubic yards of beach-compatible dredged material will be deposited below the plane of Mean High Water (MHW) within the 72.85 acre fill area, and the remaining dredged material will be utilized to restore and enhance hummocky and high dune features above the plane of MHW. The dune features are proposed to include a hummocky dune feature extending east to west approximately 4,300 linear feet along the shoreline, a high dune feature continuing westward 2,370 linear feet, and a second hummocky dune feature continuing westward a final 350 linear feet. Each dune would be planted with native dune vegetation. In total, the project should restore approximately 14 acres of dune habitat and 72 acres of intertidal shoreline and beach habitat. The project reviewed is as described in USACE's September 15, 2022, Joint Public Notice SAM-2022-00150-DCH.

Action pertinent to WQC is required by CWA §401(a)(1), 33 U.S.C. §1251, et. seq. If conducted in accordance with the conditions prescribed herein, there is reasonable assurance that the discharge resulting from the proposed activities will not violate applicable water quality standards established under §303 of the CWA and §22-22-9(g), Code of Alabama (1975). By this letter all are hereby notified that CWA §401 WQC is granted. This WQC is limited to the approved activities described in the USACE's September 15, 2022, Joint Public Notice SAM-2022-00150-DCH and terminates concurrently with the expiration of any resulting permit, but in no case shall this WQC exceed a maximum of five years from the date the USACE issues the permit unless specifically authorized in response to a written request. Any significant deviation from the approved project design **must not** be implemented without prior written notice and approval from the ADEM. Upon such notice, the Director may require the submission of additional information and/or a new permit application, and additional fees may be required.

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This certification does not authorize dredging any area of State waterbottoms containing submersed grassbeds - defined at ADEM Admin. Code r. 335-8-1-.02(iii). If grasses are encountered during dredging activities, dredging must immediately cease and the resource agencies must be notified of the infringement in a timely manner.

In recognition that projects are site specific in nature and conditions can change during project implementation, the ADEM reserves the right to require the submission of additional information or require additional management measures to be implemented, as necessary on a case-by-case basis, in order to ensure the protection of water.

ADEM certifies that there are no applicable effluent limitations under §301 and §302 nor applicable standards under §306 and §307 of the CWA in regard to the activities specified. However, this WQC does not address the requirements of regulations promulgated by the EPA for pollutant discharge permits (i.e., NPDES permits) which may be applicable.

By accepting this WQC from the State of Alabama, any duly authorized employee of the ADEM or its contractors, or Attorney General or District Attorney must be allowed to enter upon the premises on which this project is occurring for the purposes of ascertaining compliance with ADEM's Administrative Code.

Liability and responsibility for compliance with this concurrence are not delegable by contract or otherwise. Any agent, contractor, subcontractor, or other person employed to work on the project must understand the approved project design and associated activities. Any violations of the ADEM's Administrative Code may be considered violations of this WQC and may result in an enforcement action.

This WQC only addresses potential discharges to state waters resulting from approved activities and does not authorize any activity or result therefrom not specified herein, nor does this WQC convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, trespass, or any infringement of Federal, State, or local laws or regulations and in no way purports to vest in any person title to lands now owned by the State of Alabama nor shall it be construed as acquiescence by the State of Alabama of lands owned by the State that may be in anyone's possession. This WQC does not obviate the responsibility to acquire all other needed permits nor does this WQC, in any way, imply that the proposed activities comply with the requirements of any other jurisdictional entity nor does it imply that the project can or should be approved by any other jurisdictional entity.

This WQC is not transferable without prior written notice and approval of the ADEM.

Adherence to the following conditions is required in order to ensure protection of water quality.

1. Pursuant to the requirements of ADEM Admin. Code r. 335-6-10-.04(3), effective Best Management Practices (BMPs) must be implemented for prevention and control of nonpoint sources of pollutants, including sediment loss, originating on site during and after site development activities to prevent fill material from entering wetland areas and/or State waters in which disposal of fill has not been authorized by the ADEM. Effective erosion control measures, sediment control measures, and other site pollution management practices are required to be designed, implemented, and continually maintained consistent with the Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas. This condition is necessary to assure that any discharges resulting

from land disturbance activities during project implementation will not result in excessive turbidity in the receiving water so as to cause the receiving water to fail to meet its water use criterion.

2. Pursuant to the requirements of ADEM Admin. Code r. 335-6-10-.06(a), appropriate BMPs to minimize turbidity impacts to the maximum extent practicable shall be implemented. This condition is necessary to assure that State waters will be free from substances attributable to sewage, industrial wastes or other wastes that could settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use.

3. Pursuant to the requirements of ADEM Admin. Code r. 335-6-10-.09, turbidity generated during dredging activities must not cause substantial visible contrast nor result in an increase of more than fifty (50) Nephelometric turbidity units above background in state waters. This condition is necessary to assure that any discharges during project implementation will not result in excessive turbidity in the receiving water so as to cause the receiving water to fail to meet its water use criterion.

4. Pursuant to the requirements of ADEM Admin. Code r. 335-6-12-.35(11), upon the loss or failure of any treatment facility, BMP, or other management control measure as identified by responsible on-site staff during day-to-day operations or as identified by ADEM technical staff during site inspections, work/activity and all discharges shall, where necessary to maintain compliance with this WQC, be suspended, halted, reduced, or otherwise controlled until effective treatment is restored. This condition is necessary to assure that any discharges resulting from land disturbance activities during project implementation will not result in excessive turbidity in the receiving water so as to cause the receiving water to fail to meet its water use criterion.

5. Pursuant to the requirements of ADEM Admin. Code r. 335-6-10-.06(b), effective solid waste management practices shall be implemented at the site. All miscellaneous debris (e.g., excess project materials, trash, garbage) must be contained while on-site and regularly removed and disposed of in an approved manner. There shall be regular monitoring and removal of any debris or wastes in State waters or adjacent offsite areas. This condition is necessary to assure that any discharges resulting from the activities during project implementation will not result in excessive turbidity in the receiving water so as to cause the receiving water to fail to meet its water use criterion. This condition is necessary to assure that State waters will be free from substances attributable to sewage, industrial wastes or other wastes that could settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use.

6. Pursuant to the requirements of ADEM Admin. Code r. 335-8-2-.02(5), all materials used as fill shall be non-toxic, non-leaching, non-acid forming, and free of solid waste or other debris. This condition is necessary to assure that State waters will be free from substances which could cause a contravention of any water use criteria.

Contact the Mobile-Coastal office anytime with questions. Always include the ADEM tracking code above when corresponding on this matter. Mark Rainey is the Mobile-Coastal office contact for this project; he may be reached by phone at 251.304.1176 or by e-mail at mark.rainey@adem.alabama.gov.

Sincerely,

Anthony Scott Hughes, Chief
Field Operations Division

ASH/jsb/mr

cc: USACE | Mobile District, Elizabeth A. Hamilton - (Elizabeth.A.Seavoy@usace.army.mil)
DCNR.Coastal@dcnr.alabama.gov

File: CZCERT/TBD

**LANCE R. LEFLEUR**
DIRECTOR

**KAY IVEY**
GOVERNOR

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March 2, 2023

The Honorable Jeff Collier
Mayor of The Town of Dauphin Island
c/o Lois A. Edwards
Ardea Environmental Consultants
130 South Indian River Drive, Suite 202
Fort Pierce, Florida 34950

RE: State of Alabama Coastal Consistency Concurrence
Dauphin Island Shoreline Restoration Project, Dauphin Island, Mobile County, Alabama
U.S. Army Corps of Engineers (USACE) File No. SAM-2022-00150-DCH
Alabama Department of Environmental Management (ADEM) Tracking Code: ACAMP-2022-155-FC-FLP-COE-LOP

Dear Mayor Collier:

On April 11, 2022, the ADEM received the Town's certification that the proposal referenced above is consistent with the Alabama Coastal Area Management Program (ACAMP). The ADEM has completed its review of all submitted materials related to the restoration and enhancement of the intertidal shoreline, beach, and dune habitat along 1.6 miles of Gulf-fronting coastline at the east-end of Dauphin Island targeting the historic elevations of the 1990 shoreline. The project includes the dredging of approximately 1.2 million cubic yards of sediment from an 83.8 acre proposed borrow area (AOI) previously approved by USACE. The sediment is expected to be pumped through a series of submerged pipelines resting on the seafloor from the AOI to the fill area. The intertidal shoreline is planned to be constructed at a slope of 1:12 until it intercepts the existing submerged grade. Approximately 594,000 cubic yards of beach-compatible dredged material will be deposited below the plane of Mean High Water (MHW) within the 72.85 acre fill area, and the remaining dredged material will be utilized to restore and enhance hummocky and high dune features above the plane of MHW. The dune features are proposed to include a hummocky dune feature extending east to west approximately 4,300 linear feet along the shoreline, a high dune feature continuing westward 2,370 linear feet, and a second hummocky dune feature continuing westward a final 350 linear feet. Each dune would be planted with native dune vegetation. In total, the project should restore approximately 14 acres of dune habitat and 72 acres of intertidal shoreline and beach habitat. Public noticing requirements of Title 15 C.F.R. §930.61 have been completed.

As required by Title 15 C.F.R. §930.62, by this letter all are hereby notified that the ADEM concurs with the Town's certification, conditional upon continued compliance with the ACAMP. This concurrence is limited to approved activities described in the USACE's September 15, 2022, Joint Public Notice SAM-2022-00150-DCH. Any significant deviation from the approved project design must not be implemented without prior written notice and approval from the ADEM as a supplemental coastal consistency certification may be required – pursuant to Title 15 C.F.R. §930.66. In such a case, the Director may require the submission of additional information and/or a new permit application, and additional fees may be required.

In recognition that projects are site specific in nature and conditions can change during project implementation, the ADEM reserves the right to require the submission of additional information or require additional

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management measures to be implemented, as necessary on a case-by-case basis, in order to ensure the protection of water quality and coastal resources.

Pursuant to Title 15 C.F.R. §930.65, the ADEM and the USACE cooperate in the effort to monitor authorized activities to verify that those activities continue to conform to both federal and state requirements. By accepting this concurrence, any duly authorized employee of the ADEM or its contractors, or Attorney General or District Attorney must be allowed to enter upon the premises on which this project is occurring for the purposes of ascertaining compliance with ADEM's Administrative Code. Any violations of the ADEM's Administrative Code may be considered violations of this concurrence and may result in an enforcement action.

Liability and responsibility for compliance with this concurrence are not delegable by contract or otherwise. Any agent, contractor, subcontractor, or other person employed to work on the project must understand the approved project design and associated activities.

This coastal consistency concurrence only addresses the approved activities which are regulated under the enforceable policies of the ACAMP as codified in ADEM Admin. Code R. 335-8. This concurrence does not authorize any activity or result therefrom not specified herein, nor does this concurrence convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, trespass, or any infringement of Federal, State, or local laws or regulations and in no way purports to vest in any person title to lands now owned by the State of Alabama nor shall it be construed as acquiescence by the State of Alabama of lands owned by the State that may be in anyone's possession. This concurrence does not obviate the responsibility to acquire all other needed permits nor does this concurrence, in any way, imply that the proposed activities comply with the requirements of any other jurisdictional entity nor does it imply that the project can or should be approved by any other jurisdictional entity.

This concurrence is not transferable without prior written notice and approval of the ADEM.

Adherence to the following conditions is required in order to ensure continued compliance with the ACAMP.

1. Pursuant to ADEM Admin. Code r 335-8-2-.02(1[c]) this certification does not authorize dredging any area of State waterbottoms containing submersed grassbeds - defined at ADEM Admin. Code r. 335-8-1-.02(iii). If grasses are encountered during dredging activities, dredging must immediately cease, and the resource agencies must be notified of the infringement in a timely manner.

2. Pursuant to the requirements of ADEM Admin. Code r. 335-8-2-.02(5), all materials used as fill shall be non-toxic, non-leaching, non-acid forming, and free of solid waste or other debris.

3. Pursuant to the requirements of ADEM Admin. Code r. 335-8-2-.01, should cultural resources be encountered during the course of conducting the activities authorized herein, construction activities must cease and the ADEM and the Alabama Historical Commission must be immediately notified of any historical, cultural, or archaeological resources that are discovered. This condition should be placed on the site construction plans to ensure contractors are aware of it.

Contact the Mobile-Coastal office anytime with questions. Always include the ADEM tracking code above when corresponding on this matter. Mark Rainey is the Mobile-Coastal office contact for this project; he may be reached by phone at 251.304.1176 or by e-mail at mark.rainey@adem.alabama.gov.

Sincerely,

Anthony Scott Hughes, Chief
Field Operations Division

ASH/jsb/mr

cc: USACE | Mobile District, Elizabeth A. Hamilton - (Elizabeth.A.Seavoy@usace.army.mil)
DCNR.Coastal@dcnr.alabama.gov

File: CZCERT/TBD

# Final Biological Opinion

## Dauphin Island East End Beach and Dune Restoration Project
## Mobile County, Alabama

**FWS Ecosphere # 2022-0086419**

Prepared by:
U.S. Fish and Wildlife Service
Alabama Field Office
Daphne, Alabama

_____
William J. Pearson, Field Supervisor
Alabama Ecological Services Field Office

Colonel Jeremy J. Chapman
District Commander
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628

Dear Sir:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the proposed project in which the Town of Dauphin Island, Alabama (applicant) is proposing to excavate approximately 1.2 million cubic yards (cy) of material from two borrow sites in the Gulf of Mexico and place it along a 1.52 mile of Dauphin Island Gulf of Mexico shoreline, extending east from monument DI-26 to DI-33+150, located in Mobile County, Alabama. According to the U.S. Army Corps of Engineers (USACE) the purpose of this project is to complement the 2016 Dauphin Island nourishment project (BO# 2012-F-0240), to protect the remaining upland area, and minimize saltwater intrusion into freshwater areas. This document represents the Service's biological opinion of the effects of the action on the threatened loggerhead sea turtle (*Caretta caretta*) and green sea turtle (*Chelonia mydas*), and the endangered Kemp's ridley sea turtle *(Lepidochelys kempii*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). Your request for formal consultation was received on January 27, 2023.

This biological opinion is based on information provided in the December 2022 biological assessment, the Corps public notice, field investigations, telephone conversations, and other sources of information. A complete administrative record of this consultation is on file at the Alabama Ecological Services Field Office.

## CONSULTATION HISTORY

March 24, 2022: Pre-application meeting between the Corps, South Coast Engineers, LLC. (SCE), Ardea Environmental Consultants, LLC (Ardea), and the Service.

January 27, 2023: The Corps requested formal consultation.

February 8, 2023: The Service responded to the Corps' formal consultation initiation request, indicating that sufficient information had been provided to begin formal consultation.

March 27, 2023: The Service provided the first draft BO to the Corps.

April 4, 2023: The Service received comments on the draft BO from Ardea and the Corps.

April 27, 2023: A meeting was held between the Service, Ardea, SCE, and the Alabama Department of Conservation and Natural Resources (ADCNR) to discuss project planning and minimization efforts.

Xxx: The final BO provided to the Corps.

## BIOLOGICAL OPINION

## DESCRIPTION OF THE PROPOSED ACTION

The Town of Dauphin Island proposes to perform maintenance beach nourishment of the east end of Dauphin Island. The Town of Dauphin Island East End Beach and Dune Restoration Project was initially permitted by the Corps in 2014, after consultation with the Service (BO #2012-F-0240), and completed in 2016. The project included approximately 0.92 miles of Dauphin Island beach nourishment, extending from monuments DI-28 to DI-33.

This project would extend the 2016 project by 3,000 linear feet, for a total of 8,000 linear feet (1.52 miles) of Dauphin Island shoreline along the Gulf of Mexico, extending east from monument DI-26 to DI-33+150 (Fig. 1). The project includes placement of up to 1.2 million cubic yards of beach compatible fill which will be hydraulically dredged from one offshore borrow site, located within the 2014 permitted borrow area, about a mile south-southwest of the Sand Island Lighthouse. Transport of excavated material from the borrow area to the project area will occur through a series of submerged pipeline. The project design includes a berm crest of +6.0 feet, NAVD with an irregular hummocky dune system placed behind it to an elevation of +9.0 feet. A high dune feature with a crest elevation of +13.0 feet, NAVD will be created near the landward extent of placed fill from approximately DI-28+100 west to DI-27. To aid in stabilization, the dune features will be planted with native pioneer dune vegetation. The project is estimated to restore 14 acres of dune habitat and 72 acres of beach habitat.

*Action Area*

The action area for the project, as described by the Corps, includes the borrow site areas where dredging would take place and the proposed beach fill placement area spanning 1.52 miles of shoreline on Dauphin Island, AL. The Service has described the action area for purposes of this biological opinion to include the 1.52 miles of beach extending east from monument DI-26 to DI-33+150, for reasons that will be explained and discussed in the “Effects of the Action” section of this consultation.

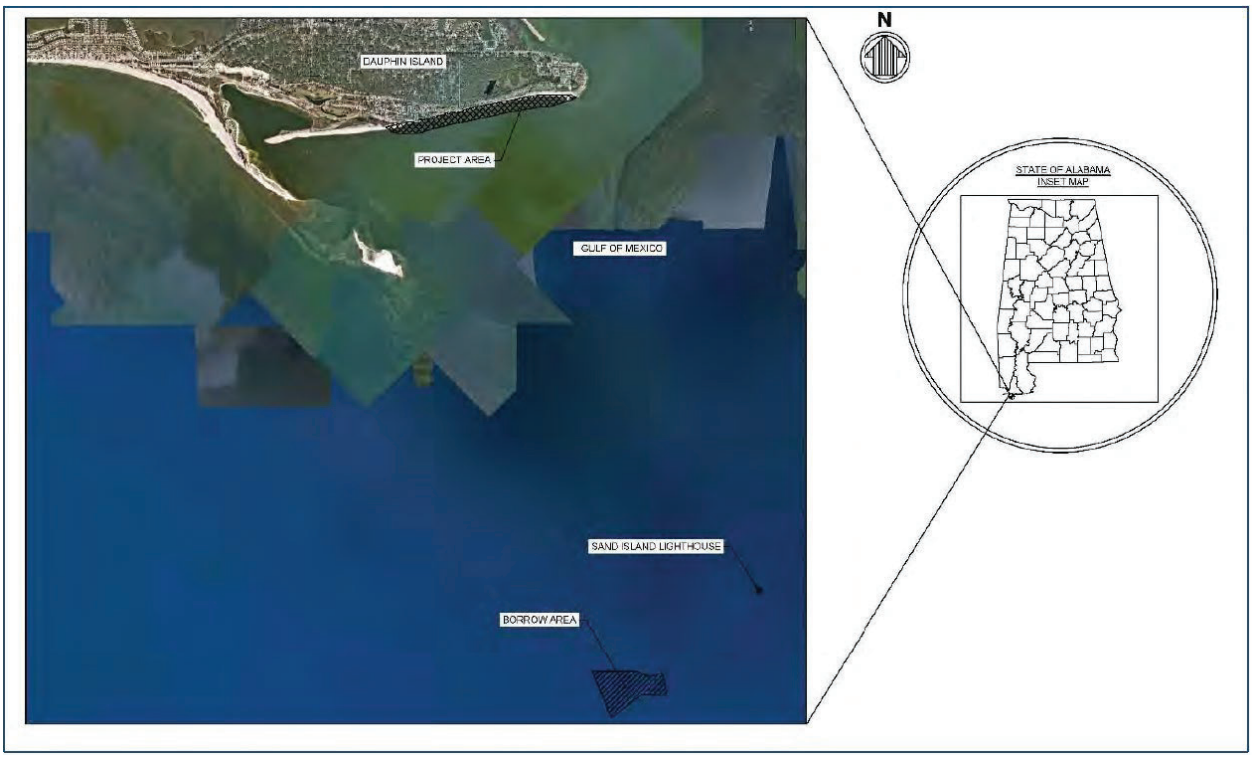


**Figure 1. Proposed Project Area and Borrow Area for Dauphin Island East End Beach and Dune Restoration Project. Drawing courtesy of South Coast Engineers, LLC.**

## STATUS OF THE SPECIES/CRITICAL HABITAT

### Species/critical habitat description

The Service has responsibility for sea turtles on the nesting beach. The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) has jurisdiction over sea turtles in the marine environment. This BO 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.

*Loggerhead Sea Turtle*

The loggerhead sea turtle, which occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans, was federally listed worldwide as a threatened species on July 28, 1978 (43 Federal Register (FR) 32800). On September 22, 2011, the loggerhead sea turtle's listing under the Act was revised from a single threatened species to nine distinct population segments (DPS) listed as either threatened or endangered. The nine DPSs and their statuses are:

Northwest Atlantic Ocean DPS – threatened
Northeast Atlantic Ocean – endangered
Mediterranean Sea DPS – endangered
South Atlantic Ocean DPS – threatened
North Pacific Ocean DPS – endangered
South Pacific Ocean DPS – endangered
North Indian Ocean DPS – endangered
Southwest Indian Ocean – threatened
Southeast Indo-Pacific Ocean DPS – threatened

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 (National Marine Fisheries Service (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 United States 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).

Designated Critical Habitat: The Service has designated terrestrial critical habitat for Northwest Atlantic loggerhead population on July 10, 2014. 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: https://ecos.fws.gov/ecp/species/C00U#crithab.

*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. On April 6, 2016, the green sea turtle's listing under the Act was revised from a single threatened species to eleven DPS listed as either threatened or endangered. The eleven DPSs and their statuses are:

North Atlantic DPS – threatened
Mediterranean DPS – endangered
South Atlantic DPS – threatened
Southwest Indian DPS – threatened
North Indian DPS – threatened

East Indian-West Pacific – threatened
Central West Pacific DPS – endangered
Southwest Pacific DPS- threatened
Central South Pacific DPS- endangered
Central North Pacific DPS- threatened
East Pacific DPS- 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 4 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.

Within the North Atlantic DPS, 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). Nests have been documented, in smaller numbers, north of these Counties, from Volusia through Nassau Counties in Florida, as well as in Georgia, South Carolina, North Carolina, and as far north as Delaware in 2011. Nests have been documented in smaller numbers south of Broward County in Miami-Dade. Nesting also has been documented along the Gulf coast of Florida from Escambia County through Franklin County in northwest Florida and from Pinellas County through Monroe County in southwest Florida (FWC/FWRI 2015).

Green sea turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The green turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. 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.

*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 and olive ridleys are the smallest sea turtles in the world. The weight of an adult Kemp's ridley is generally between 70 to 108 pounds with a carapace measuring approximately 24 to 26 inches in length (Heppell *et al*. 2005). The carapace is almost as wide as it is long. The species' coloration changes significantly during development from the grey-black dorsum and plastron of hatchlings, a grey-black dorsum with a yellowish-white plastron as post-

pelagic juveniles and then to the lighter grey-olive carapace and cream-white or yellowish plastron of adults. Their diet consists mainly of swimming crabs, but may also include fish, jellyfish, and an array of mollusks.

The Kemp's ridley has a restricted distribution. Nesting is essentially limited to the beaches of the western Gulf of Mexico, primarily in Tamaulipas, Mexico (NMFS *et al*. 2011). Nesting also occurs in Veracruz and a few historical records exist for Campeche, Mexico (Marquez-Millan 1994). Nesting also occurs regularly in Texas and infrequently in a few other U.S. states. However, historic nesting records in the U.S. are limited to south Texas (Werler 1951, Carr 1961, Hildebrand 1963).

Most Kemp's ridley nests located in the U.S. have been found in south Texas, especially Padre Island (Shaver and Caillouet 1998; Shaver 2002, 2005). Nests have been recorded elsewhere in Texas (Shaver 2005, 2006a, 2006b, 2007, 2008), and in Florida (Johnson *et al*. 1999, Foote and Mueller 2002, Hegna *et al*. 2006, FWC/FWRI 2010b), Alabama (J. Phillips, Service, personal communication, 2007 cited in NMFS *et al*. 2011; J. Isaacs, Service, personal communication, 2008 cited in NMFS *et al*. 2011), Georgia (Williams *et al*. 2006), South Carolina (Anonymous 1992), and North Carolina (Marquez *et al*. 1996), but these events are less frequent. Kemp's ridleys inhabit the Gulf of Mexico and the Northwest Atlantic Ocean, as far north as the Grand Banks (Watson *et al*. 2004) and Nova Scotia (Bleakney 1955). They occur near the Azores and eastern north Atlantic (Deraniyagala 1938, Brongersma 1972, Fontaine *et al*. 1989, Bolten and Martins 1990) and Mediterranean (Pritchard and Marquez 1973, Brongersma and Carr 1983, Tomas and Raga 2007, Insacco and Spadola 2010).

Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico. Most Kemp's ridley post-hatchlings likely remain within the Gulf of Mexico. Others are transported into the northern Gulf of Mexico and then eastward, with some continuing southward in the Loop Current, then eastward on the Florida Current into the Gulf Stream (Collard and Ogren 1990, Putman *et al*. 2010). Juvenile Kemp's ridleys spend on average 2 years in the oceanic zone (NMFS SEFSC unpublished preliminary analysis, July 2004, as cited in NMFS *et al*. 2011) where they likely live and feed among floating algal communities. They remain here until they reach about 7.9 inches in length (approximately 2 years of age), at which size they enter coastal shallow water habitats (Ogren 1989); however, the time spent in the oceanic zone may vary from 1 to 4 years or perhaps more (Turtle Expert Working Group (TEWG) 2000, Baker and Higgins 2003, Dodge *et al*. 2003).

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. 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, 2005, Musick 1999).

The generalized life history of Atlantic loggerheads is shown in **Figure 2** (from Bolten 2003).

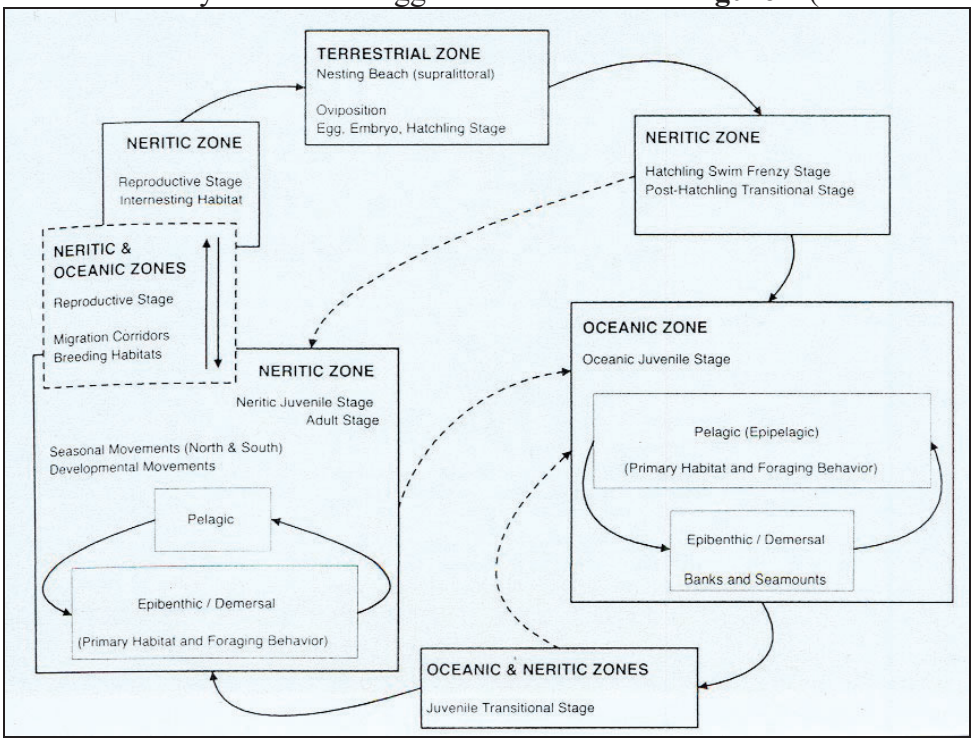


**Figure 2. Life history stages of a loggerhead turtle. The boxes represent life stages and the corresponding ecosystems, solid lines represent movements between life stages and ecosystems, and dotted lines are speculative (Bolten 2003).**

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 1** summarizes key life history characteristics for loggerheads nesting in the U.S.

**Table 1. 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).

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).

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 (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 1- to 3-day interval and move upward and out of the nest over a 2- to 4-day interval (Christens 1990). The time from pipping to emergence ranges from 4 to 7 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 and Shettleworth 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).

*Kemp's Ridley*

Nesting occurs primarily from April into July. Nesting often occurs in synchronized emergences, known as "arribadas" or "arribazones," which may be triggered by high wind speeds, especially north winds, and changes in barometric pressure (Jimenez *et al*. 2005). Nesting occurs primarily during daylight hours. Clutch size averages 100 eggs and eggs typically take 45 to 58 days to hatch depending on incubation conditions, especially temperatures (Marquez-Millan 1994, Rostal 2007).

Females lay an average of 2.5 clutches within a season (TEWG 1998) and inter-nesting interval generally ranges from 14 to 28 days (Donna Shaver, Padre Island National Seashore, personal communication, 2007 as cited in NMFS et al. 2011). The mean remigration interval for adult females is 2 years, although intervals of 1 and 3 years are not uncommon (Marquez *et al*. 1982; TEWG 1998, 2000). Males may not be reproductively active on an annual basis (Wibbels *et al*. 1991). 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 (Dodd 1988). 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, Margaritoulis *et al.* 2003): Peninsular 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 the U.S. has fluctuated between 49,000 and 90,000 nests per year from 1999-2010 (NMFS and Service 2008, FWC/FWRI 2010a). 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, Baldwin *et al.* 2003). Based on standardized daily surveys of the highest nesting beaches and weekly surveys on all remaining island nesting beaches, approximately 50,000, 67,600, and 62,400 nests, were estimated in 2008, 2009, and 2010, respectively (Conant *et al*. 2009). 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*

There are an estimated 150,000 females that nest each year in 46 sites throughout the world (NMFS and Service 2007). In the U.S. Atlantic, there are about 100 to 1,000 females estimated to nest on beaches in Florida annually (FWC 2009c). 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 1998). 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).

*Kemp's Ridley*

Most Kemp's ridleys nest on the beaches of the western Gulf of Mexico, primarily in Tamaulipas, Mexico. Nesting also occurs in Veracruz and Campeche, Mexico although a small number of Kemp's ridleys nest consistently along the Texas coast (NMFS *et al*. 2011). 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 2010). In 2011, a total of 20,570 nests were documented in Mexico, 81 percent of these nests were documented in the Rancho Nuevo beach (Burchfield and Peña. 2011). In addition, 153 and 199 nests were recorded during 2010 and 2011, respectively, 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 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).

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 2010).

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 recovery unit within the Northwest Atlantic Ocean DPS. Annual nest totals from northern beaches averaged 5,215 nests from 1989-2008, a period of near-complete surveys of NRU nesting beaches, representing approximately 1,272 nesting females per year (4.1 nests per female, Murphy and Hopkins 1984) (NMFS and Service 2008). In 2008, nesting in Georgia reached what was a new record at that time (1,646 nests), with a downturn in 2009, followed by yet another record in 2010 (1,760 nests). South Carolina had the

two highest years of nesting in the 2000s in 2009 (2,183 nests) and 2010 (3,141 nests). The previous high for that 11-year span was 1,433 nests in 2003. North Carolina had 847 nests in 2010, which is above the average of 715. The Georgia, South Carolina, and North Carolina nesting data come from the seaturtle.org Sea Turtle Nest Monitoring System, which is populated with data input by the State agencies. The loggerhead nesting trend from daily beach surveys was declining significantly at 1.3 percent annually from 1983 to 2007 (NMFS and USFWS, 2008). 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 from 1980-2007. Overall, there is strong statistical data to suggest the NRU has experienced a long-term decline (NMFS and Service 2008). Currently, however, nesting for the NRU is showing possible signs of stabilizing (76 FR 58868, September 22, 2011).

The PFRU is the largest loggerhead recovery unit within the Northwest Atlantic Ocean DPS and represents approximately 87 percent of all nesting effort in the DPS (Ehrhart *et al*. 2003). A near-complete nest census of the PFRU undertaken from 1989 to 2007 revealed 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 2008b, NMFS and Service 2008). 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).

Using INBS nest counts, a significant declining trend was documented for the Peninsular Florida Recovery Unit, where nesting declined 26 percent over the 20-year period from 1989–2008, and declined 41 percent over the period 1998–2008 (NMFS and USFWS 2008). However, with the addition of nesting data through 2010, the nesting trend for the PFRU did not show a nesting decline statistically different from zero (76 FR 58868, September 22, 2011).

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 2008b, NMFS and Service 2008). 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. Using Florida INBS data for the NGMRU (FWC 2008b), a log-linear regression showed a significant declining trend of 4.7 percent annually from 1997-2008 (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 was undertaken from 1995 to 2004, excluding 2002, (9

years surveyed) revealed 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 2008b, NMFS and Service 2008). 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. A simple linear regression of 1995-2004 nesting data, accounting for temporal autocorrelation, revealed no trend in nesting numbers. Because of the annual variability in nest totals, it was determined that 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 and is the third largest recovery unit within the Northwest Atlantic Ocean DPS, with the majority of nesting at Quintana Roo, Mexico. 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, TEWG (2009) reported a greater than 5 percent annual decline in loggerhead nesting from 1995-2006 at Quintana Roo.

Recovery Criteria (only the Demographic Recovery Criteria are presented below; for the Listing Factor Recovery Criteria, 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.

*Green Sea Turtle*

Annual nest totals documented as part of the Florida SNBS program from 1989-2010 have ranged from 435 nests laid in 1993 to 13,225 in 2010. 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

(1989-2010). Green sea turtle nesting in Florida is increasing based on 22 years (1989-2010) of INBS data from throughout the state ((FWC/FWRI 2010b). 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 (NMFS and Service 2007).

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.

*Kemp's Ridley*

Nesting aggregations of Kemp's ridleys at Rancho Nuevo were discovered in 1947, and the adult female population was estimated to be 40,000 or more individuals based on a film by Andres Herrera (Hildebrand 1963, Carr 1963). Within approximately 3 decades, the population had declined to 924 nests and reached the lowest recorded nest count of 702 nests in 1985. Since the mid-1980s, the number of nests observed at Rancho Nuevo and nearby beaches has increased 15 percent per year (Heppell et al. 2005), allowing cautious optimism that the population is on its way to recovery. This increase in nesting can be attributed to full protection of nesting females and their nests in Mexico resulting from a bi-national effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, the requirement to use Turtle Excluder Devices (TEDs) in shrimp trawls both in the U.S. and Mexico, and decreased shrimping effort (NMFS *et al*. 2011, Heppell *et al*. 2005).

Recovery Criteria

The recovery goal is to conserve and protect the Kemp's ridley sea turtle so that protections under the Act are no longer necessary and the species can be removed from the List of Endangered and Threatened Wildlife. Biological recovery criteria form the basis from which to gauge whether the species should be reclassified to threatened (i.e., downlisted) or delisted, whereas the listing factor criteria ensure that the threats affecting the species are controlled or eliminated.

Downlisting Criteria

1. A population of at least 10,000 nesting females in a season (as measured by clutch frequency per female per season) distributed at the primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) in Mexico is attained. Methodology and capacity to implement and ensure accurate nesting female counts have been developed.

2. Recruitment of at least 300,000 hatchlings to the marine environment per season at the three primary nesting beaches (Rancho Nuevo, Tepehuajes, and Playa Dos) in Mexico is attained to ensure a minimum level of known production through *in situ* incubation, incubation in corrals, or a combination of both.

Delisting Criteria

1. An average population of at least 40,000 nesting females per season (as measured by clutch frequency per female per season) over a 6-year period distributed among nesting beaches in Mexico and the U.S. is attained. Methodology and capacity to ensure accurate nesting female counts have been developed and implemented.

2. Ensure average annual recruitment of hatchlings over a 6-year period from *in situ* nests and beach corrals is sufficient to maintain a population of at least 40,000 nesting females per nesting season distributed among nesting beaches in Mexico and the U.S into the future. This criterion may rely on massive synchronous nesting events (i.e., arribadas) that will swamp predators as well as rely on supplemental protection in corrals and facilities.

**Analysis of the species/critical habitat likely to be affected**

*Sea Turtles*

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. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities, disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting, 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.

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 sand placement action 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 project.

With regard to indirect loss of eggs and hatchlings, on most beaches, nesting success typically declines for the first year or two following sand placement, even though more nesting habitat is available for turtles (Trindell *et al*. 1998, Ernest and Martin 1999, Herren 1999). Reduced nesting success on constructed beaches has been attributed to increased sand compaction, escarpment formation, and changes in beach profile (Nelson *et al*. 1987, Crain *et al*. 1995, Lutcavage *et al*. 1997, Steinitz et al. 1998, Ernest and Martin 1999, Rumbold *et al*. 2001). In addition, even though constructed beaches are wider, nests deposited there may experience higher rates of wash out than those on relatively narrow, steeply sloped beaches (Ernest and Martin 1999). This occurs because nests on constructed beaches are more broadly distributed than those on natural beaches, where they tend to be clustered near the base of the dune. Nests laid closest to the waterline on constructed beaches may be lost during the first year or two following construction as the beach undergoes an equilibration process during which seaward portions of the beach are lost to erosion. As a result, the sand project is 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 missed nests are not always accounted for. 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. 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, for example, the number of missed nests approaches twice the rate mentioned above, 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) not all eggs in all unmarked nests will produce hatchlings, and 2) destruction and/or failure of a missed nest 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, predation, accretion of sand, and erosional processes.

In the U.S., consultations with the Service have included military missions and operations, beach nourishment and other shoreline protection, and actions related to protection of coastal development on sandy beaches of along the coast. Much of the Service's section 7 consultation involves beach nourishment projects. 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.

## ENVIRONMENTAL BASELINE

### Status of the species within the action area

*Loggerhead, Green, and Kemp's Ridley sea turtle*

The loggerhead sea turtle nesting and hatching season for Alabama extends from May 1 through October 31. Incubation ranges from about 45 to 95 days. Green sea turtle nesting and hatching season for Alabama extends from May 15 through October 31. Incubation ranges from 45 to 75 days.

Volunteers permitted by the Service have monitored sea turtle nesting along portions of Dauphin Island beaches, including the areas to be affected by this project, since 2001. Compared to other areas of Alabama coastline, the east end of Dauphin Island is considered an area of low sea turtle nesting density. Since 2018, there have been 115 nests documented on Dauphin Island out of 447 total documented nests in Alabama confirmed by the monitoring program. Nesting activity is concentrated on the west end of the island, with lower numbers of nests observed annually on the east end (Fig. 3). In 2022, 28 nests were observed on Dauphin Island, with the majority occurring on the west end (Table 2). Nests were also observed on the central coastline of the island, as well as on Pelican Peninsula of Dauphin Island. Since 2018, two nests have been observed within the project area of the east end beach nourishment.

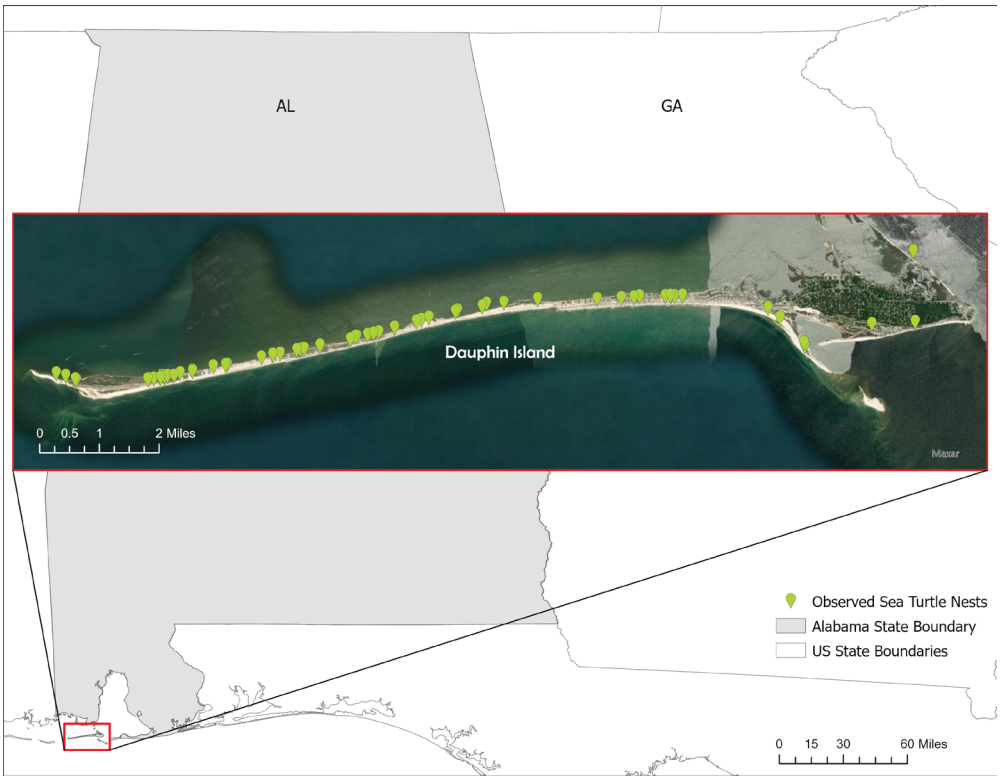


**Figure 3. Sea turtle nest observations from Share the Beach between 2018-2022 (Share the Beach annual reports 2018, 2020, 2021, and 2022*). *Nest localities were not documented in the 2019 report, therefor, were not included on this map.**

**Table 2. Turtle nesting activity since 2018 on Dauphin Island in Mobile County, Alabama. Numbers represent total nests observed on Dauphin Island out of total nests observed on Alabama coasts.**

| YEAR | LOGGERHEAD SEA TURTLE NESTS | KEMPS RIDLEY SEA TURTLE NESTS | GREEN SEA TURTLE NESTS |
|---|---|---|---|
| 2018 | 17/92 | 0/1 | 0/0 |
| 2019 | 29/114 | 0/0 | 0/1 |
| 2020 | 21/98 | 0/0 | 0/1 |
| 2021 | 20/64 | 0/2 | 0/0 |
| 2022 | 28/68 | 0/0 | 0/6 |

**Factors affecting the species environment within the action area**

*Coastal Development*

Loss of nesting habitat related to coastal development has had the greatest impact on nesting sea turtles in Alabama. 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, all of 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 loss of sea turtle nests, either by erosion or washing away of the nests by wave action and inundation or "drowning" of the eggs or pre-emergent hatchlings within the nest, or indirectly by causing the 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). The manner in which hurricanes affect sea turtle nesting also depends on their 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 immediate 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 pre-storm locations can result in a loss of nesting habitat.

*Erosion*

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 because, 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 must be an existing threat to or loss of one of four specific interests – upland development, recreation, wildlife habitat, or important cultural resources.

*Beachfront Lighting*

Artificial lights along a beach can deter females from coming ashore to nest or misdirect females trying to return to the surf after a nesting event. A significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington 1992). Artificial beachfront lighting may also 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. In addition, research has documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington 1992). During the 2010 sea turtle nesting season in Florida, over 47,000 turtle hatchlings were documented as being disoriented (FWC/FWRI 2011).

*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 (*Procyon lotor*), feral hogs (*Sus scrofa*), foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), coyotes (*Canis latrans*), armadillos (*Dasypus novemcinctus*), and fire ants (*Solenopsis invicta*) (Dodd 1988). 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).

*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 hatchlings attempting to reach the ocean, and vehicle tracks traversing the beach that 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 pre-emergent 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, lowering the trail. 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.

*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 Interior (DOI) requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007).

In the southeastern U.S., climatic change 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.

Temperatures are predicted to rise from 1.6ºF to 9ºF 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.

*Recreational Beach Use*

There is increasing popularity in the southeastern United States, especially in Florida, for beach communities to carry out beach cleaning operations to improve the appearance of beaches for visitors and residents. Beach cleaning occurs on private beaches and on some municipal or

county beaches that are used for nesting by loggerhead sea turtles. Beach cleaning activities effectively remove "seaweed, fish, glass, syringes, plastic, cans, cigarettes, shells, stone, wood, and virtually any unwanted debris" (Barber and Sons 2012). Removal of wrack material (organic material that is washed up onto the beach by surf, tides, and wind) reduces the natural sand-trapping abilities of beaches and contributes to their destabilization. As beach cleaning vehicles and equipment move over the sand, sand is displaced downward, lowering the substrate. Although the amount of sand lost due to single sweeping actions may be small, it adds up considerably over a period of years (Neal *et al.* 2007). In addition, since the beach cleaning vehicles and equipment also inhibit plant growth and open the area to wind erosion, the beach and dunes may become unstable. Beach cleaning "can result in abnormally broad unvegetated zones that are inhospitable to dune formation or plant colonization, thereby enhancing the likelihood of erosion" (Defeo *et al.* 2009). This is also a concern because dunes and vegetation play an important role in minimizing the impacts of artificial beachfront lighting, which causes disorientation of sea turtle hatchlings and nesting turtles, by creating a barrier that prevents residential and commercial business lighting from being visible on the beach.

Human presence on the beach at night during the nesting season can reduce the quality of nesting habitat by deterring or disturbing and causing nesting turtles to avoid otherwise suitable habitat. In addition, human foot traffic can make a beach less suitable for nesting and hatchling emergence by increasing sand compaction and creating obstacles to hatchlings attempting to reach the ocean (Hosier *et al.* 1981).

The use and storage of lounge chairs, cabanas, umbrellas, catamarans, and other types of recreational equipment on the beach at night can also make otherwise suitable nesting habitat unsuitable by hampering or deterring nesting by adult females and trapping or impeding hatchlings during their nest to sea migration. The documentation of non-nesting emergences (also referred to as false crawls) at these obstacles is becoming increasingly common as more recreational beach equipment is left on the beach at night. Sobel (2002) describes nesting turtles being deterred by wooden lounge chairs that prevented access to the upper beach.

*Sand Placement*

Sand placement projects 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)

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 24 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 only up to 1 year. Thus, multi-year beach compaction monitoring and, if necessary, tilling would help to 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.

## EFFECTS OF THE ACTION

### Factors to be considered

*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, and Kemp's ridley nesting females, their nests, and hatchling sea turtles.

*Distribution*: Sand placement activities that may impact nesting and hatchling sea turtles, and sea turtle nests would occur along the Gulf of Mexico coast.

*Timing*: The timing of the sand placement activities could directly and indirectly impact nesting females, their nests, and hatchling sea turtles when conducted between May 1 and October 31.

*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 cause reduced 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 the southeastern United States.

*Duration*: The initial sand placement activity is estimated to take between 1-3 months but could take up to 6 months depending upon hurricane and episodic storm events. Additional short-term maintenance and periodic nourishment may take place and will be authorized for a subsequent 4 years after initial nourishment, the Corps' typical authorization for nourishment- related activities is five years. The vegetation component of this project will be performed following sand placement. The direct effects related to this project 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. The impacts to existing beach access corridors would be temporary and will be restored to pre-project conditions.

*Disturbance frequency*: Sea turtle populations in the southeastern United States may experience decreased nesting success, hatching success, and hatchling emerging 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 intensity and severity*: Depending on the need (including post-disaster work) and the timing of the sand placement activities during sea turtle nesting season, effects to the sea turtle populations in the southeastern United States 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 and hatchling sea turtles 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.

Direct Effects

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 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

1. 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.

2. 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 nesting turtle on the beach, headlights disorienting or misorienting emergent hatchlings, vehicles running over hatchlings attempting to reach the ocean, and vehicle ruts on the beach interfering with hatchlings crawling to the ocean. Apparently, hatchlings become diverted not because they cannot physically climb out of a 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 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, emergence by hatchlings, as well as directly kill pre-emergent hatchlings (Mann 1977, Nelson and Dickerson 1987, Nelson 1988).

Depending on duration of the project, 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 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, the areas for the truck transport and bulldozer/bobcat equipment to work in should be designated and marked.

3. 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 2007). 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 pre-nourishment reports (Trindell 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).

Indirect Effects

Many of the direct effects of beach nourishment may persist over time and become indirect impacts. These indirect 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, and future sand migration.

1. 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).

2. 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 that 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.

3. 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 3).**

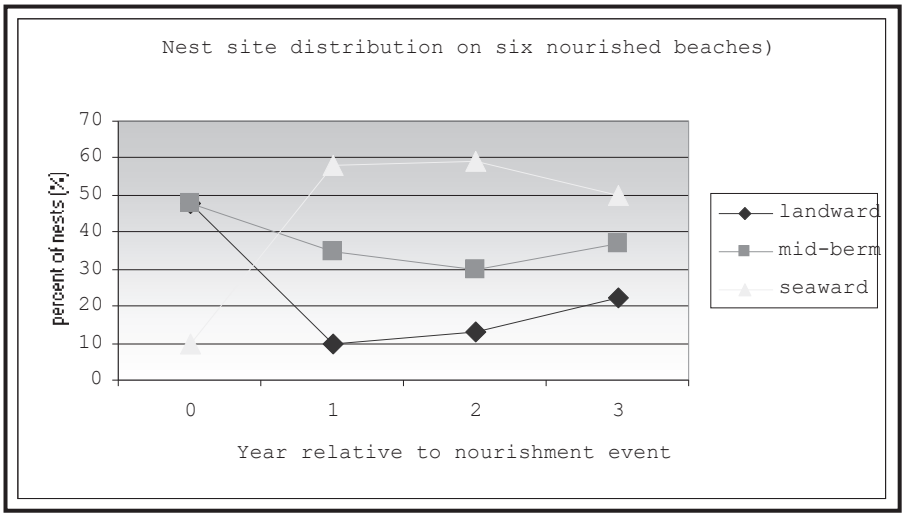


**Figure 3. Review of sea turtle nest site selection following nourishment (Trindell 2005).**

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 24

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 only up to 1 year. Thus, multi-year beach compaction monitoring and, if necessary, tilling would help to 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.

4. Escarpment formation

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984, Nelson *et al.* 1987). 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.

**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 pre-nourished 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 24 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.

## 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 biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any cumulative effects in the project area.

## CONCLUSION

After reviewing the current status of the loggerhead, green, and Kemp's ridley sea turtles, the environmental baseline for the action area, the effects of the proposed beach nourishment, and the cumulative effects, it is the Service's biological opinion that the beach nourishment project, as proposed, is not likely to jeopardize the continued existence of the loggerhead, green, and Kemp's ridley sea turtle, and is not likely to destroy or adversely modify designated loggerhead critical habitat. No critical habitat exists within the project area; therefore, none will be affected.

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. One of the five loggerhead recovery units in the Northwest Atlantic occurs within the action area, including the NGMRU.

The five-year average (2008-2012) for the NGMRU was 966 nests. Northwest Florida accounts for approximately 92 percent of nesting within this recovery unit and consists of approximately 234 miles of nesting shoreline. Of the available nesting habitat within the NGMRU, sand placement activities will occur on 16.7 miles of beach proposed for nourishment.

Generally, green, 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. The proposed project will affect only 16.7 miles of 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 or two 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.

## 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 must 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 require the applicant 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 must 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 TAKE

The Service anticipates that no more than 1.52 miles of Alabama beach shoreline would receive maintenance nourishment during the permit application. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found 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 can be anticipated by the disturbance and renourishment of suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach renourishment will likely occur during a portion of the nesting season; (3) the renourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter and/or misdirect nesting hatchling turtles.

The Service anticipates that 1.52 miles of nesting beach habitat in Alabama could be taken as a result of this proposed action. The 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 proposed project; (2) destruction of all nests deposited from October 1 through February 28 (or 29 as applicable) when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (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 construction area or on adjacent beaches as a result of 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) misdirection of nesting sea turtles or hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of lights from beachfront development that reach the elevated berm postconstruction (7) 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 (8) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service.

**EFFECT OF THE TAKE**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

**REASONABLE AND PRUDENT MEASURES**

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead, green, and Kemp's ridley sea turtles.

1. Beach quality sand free of contaminants and suitable for sea turtle nesting, successful incubation, and hatchling emergence must be used on the project site.

2. All derelict material or other debris must be removed from the beach prior to any sand placement.

3. Daily early morning surveys for sea turtle nests will be required if any portion of the beach nourishment project occurs during the period from 1 May - 30 September.

4. The beach profile template for the sand placement project should be designed to mimic native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest.

5. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. If nests are deposited in the area of beach nourishment, the eggs must be relocated. Nest relocation will be on a selected area of beach that is not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, predation, or subject to artificial lighting. Nesting surveys and relocation must be initiated 70 days prior to nourishment activities or by May 1, whichever is later.

6. During the nesting season, construction equipment and materials must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.

7. During the nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and misdirecting nesting and/or hatchling sea turtles.

8. Prior to the beginning of the project, the Applicant shall submit a lighting plan for the dredge that will be used in the project. The plan shall include a description of each light source that will be visible from the beach and the measures implemented to minimize the lighting.

9. If a dune system is already part of the project design, the placement and design of the dune must emulate the natural dune system to the maximum extent possible, including the dune configuration and shape.

10. Predator-proof trash receptacles must be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles.

11. A meeting between representatives of the Applicant's or Corps, contractor, Service, the permitted sea turtle surveyor, and other species surveyors, as appropriate, must be held prior to the commencement of work on this project.

12. Sand compaction must be monitored and tilling must be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.

13. Escarpment formation must be monitored and leveling must be conducted if needed to

reduce the likelihood of impacting nesting and hatchling sea turtles.

14. During the sea turtle nesting season, the contractor must not extend the beach fill more than 500 feet 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.

15. A report describing the actions taken must be submitted to the Service following completion of the proposed work for each year when the activity has occurred.

16. The Service must be notified if a sea turtle adult, hatchling, or egg is harmed or destroyed as a direct or indirect result of the project.

17. A post construction survey(s) of all artificial lighting visible from the project beach must be completed by the Applicant or the Corps.

18. Daily nesting surveys must be conducted by the Applicant for two nesting seasons following construction if the new sand still remains on the beach.

19. Efforts will be made to minimize the amount of habitat disturbance and take associated with use of the access corridors. The access corridors must be restored to pre-project conditions.

**TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Beach compatible fill must 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. Beach compatible fill must be sand solely of natural sediment and shell material, containing no construction debris, toxic material or other foreign matter. The beach compatible fill must be similar in both color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the native material in the project area and not result in cementation of the 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.

2. All derelict concrete, metal, and coastal armoring geotextile material and other debris must be removed from the beach prior to any sand placement to the maximum extent possible. If debris removal activities take place during the peak sea turtle nesting season the work must be conducted during daylight hours only and must not commence until completion of the sea turtle nesting survey each day.

3. Daily early morning surveys for sea turtle nests are required if any portion of the beach nourishment project occurs during the period from May 1 through October 31, or to a date determined by the marine turtle permit holder in coordination with the Service.

4. The beach profile template for the sand placement project should be designed to mimic, the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest. If this is not possible, due to the width of the beach or additional impacts to nearshore hardbottom, the Applicant must contact the FWS to coordinate an alternative template that would include features to minimize impacts to sea turtle nesting success. The template design must minimize the potential for ponding and escarpment formation for that beach. Prior to drafting the plans and specifications for a beach nourishment project, the Applicants must meet with the Service, and the ADCNR to discuss the beach profile surveys 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.

5. Conservation Measures included in the permit application/project plans should be implemented in the proposed project. This includes timing the proposed project to avoid the period of peak sea turtle egg laying and egg hatching as much as possible, to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

6. If nests are constructed in the area of sand placement, the eggs must be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation. For sand placement projects that occur during the period from May 1 through October 31, daily early morning (before 9 a.m.) surveys and egg relocation must be conducted. If nests are laid in areas where they may be affected by construction activities, eggs must be relocated per the requirements listed in a through d.

    a. Nesting surveys must be initiated 70 days prior to sand placement activities or by May 1, whichever is later. Nesting surveys and relocation must continue through the end of the project or through August 31, whichever is earlier. 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 must be relocated per the requirements listed in b through d.

    b. 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 the Service. Nesting surveys must be conducted daily between sunrise and 9 a.m.

    c. Only those nests that may be affected by sand placement activities will be relocated. Nest relocation must not occur upon completion of the project. Nests requiring relocation must 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 must not be placed in organized

groupings. Relocated nests must 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 subject to artificial lighting. Nest relocations in association with construction activities must cease when construction activities no longer threaten nests.

d. Nests deposited within areas where construction activities have ceased or will not occur for 70 days or nests laid in the nourished berm prior to tilling must be marked for avoidance and left in situ unless other factors threaten the success of the nest. Nests must be marked with four stakes at a 10-foot distance around the perimeter of the nest for the buffer zone. The turtle permit holder must 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 activities that could result in impacts to the nest will occur within the marked area. Nest sites must be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

7. From May 1 through October 31, staging areas for construction equipment must be located off the beach. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach must be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune must be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes must be off the beach to the maximum extent possible. If the pipes are stored on the beach, they must be placed in a manner that will minimize the impact to nesting habitat and must not compromise the integrity of the dune systems.

8. Direct lighting of the beach and nearshore waters must be limited to the immediate construction area during peak nesting season (May 1 through October 31) and must comply with safety requirements. Lighting on all equipment must 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 must be reduced to the minimum standard required by OSHA for General Construction areas, in order to not misdirect sea turtles. Shields must be affixed to the light housing and be large enough to block light from all on-beach lamps from being transmitted outside the construction area or to the adjacent sea turtle nesting beach (**Figure 3**).

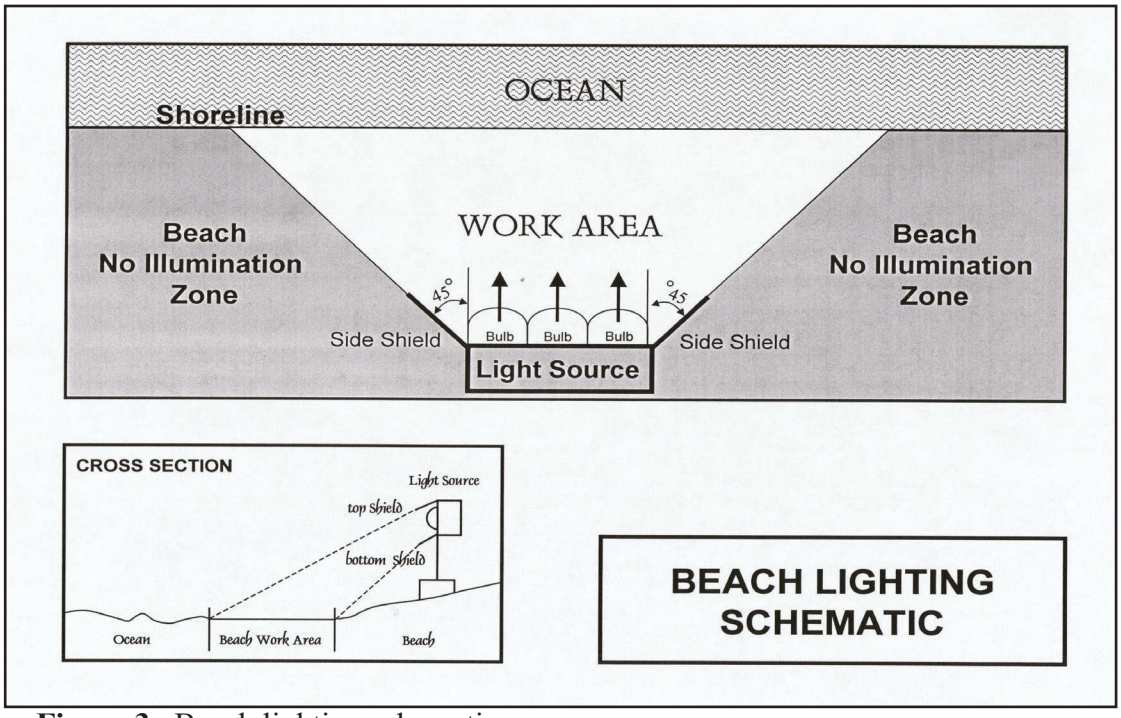


**Figure 3.** Beach lighting schematic.

9. Prior to the beginning of the project, the applicant shall submit a lighting plan for the dredge that will be used in the project to both the Service and the Corps for review, and obtain both agencies approval prior to the beginning of dredging operations. The plan shall include a description of each light source that will be visible from the beach and the measures implemented to minimize this lighting.

10. Dune restoration or creation included in the profile design (or project) must 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 4)** or a 4:1 slope (**Figure 5**) on a low erosion beach. If another slope is proposed for use, the Corps must consult the Service.

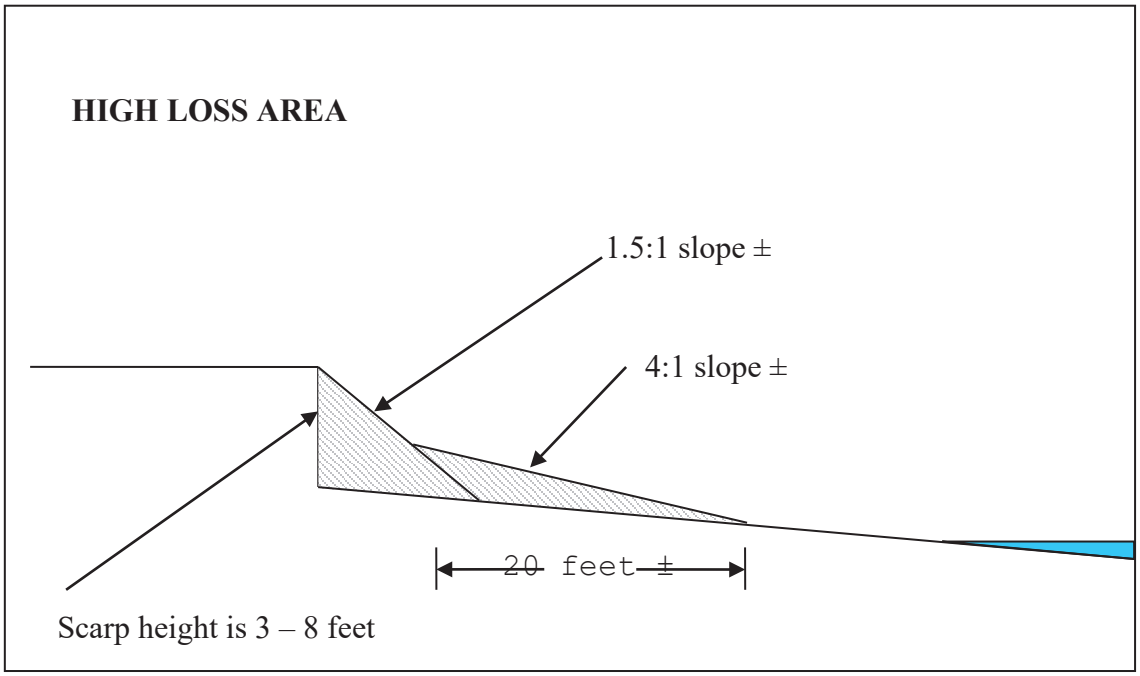


**Figure 4. Recommended slope on a high erosion beach for sand placement projects that include the creation of a dune.**

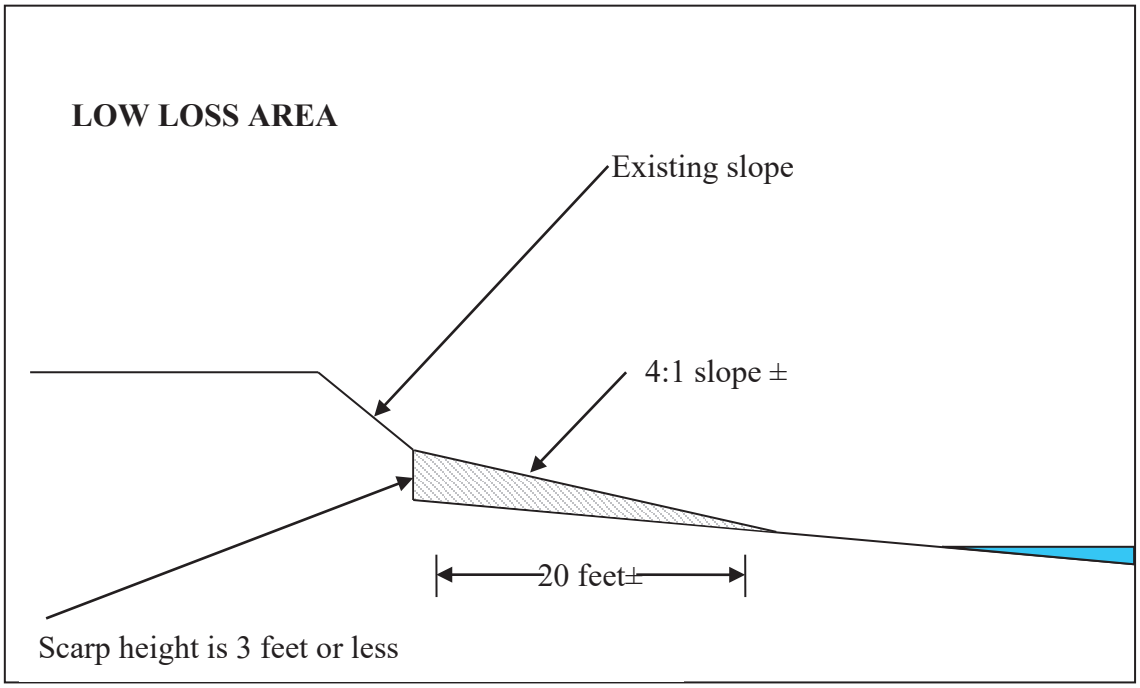


**Figure 5. Recommended slope on a low erosion beach for sand placement projects that include the creation of a dune.**

11. Predator-proof trash receptacles must 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 (**Appendix A**). The contractors conducting the work

must provide predator-proof trash receptacles for the construction workers. All contractors and their employees must be briefed on the importance of not littering and keeping the project area trash and debris free.

12. The applicants and their contractor are prohibited from supporting the presence of free-roaming cats by providing food, shelter or any other life support elements. The applicants agree to report any observations of free-roaming cats to local animal control authorities and to the Service. If feral or free roaming cats are reported, the applicants shall immediately institute a cat trapping program. Trapped animals will be transported to the nearest animal shelter or adoption facility and not allowed to return to the project area. Trapping will continue until the surveys fails to document the presence of free roaming cats within the project area.

13. A meeting between representatives of the contractor, the Service, the Corps, the permitted sea turtle surveyor, and other species surveyors, as appropriate, must be held prior to the commencement of work. At least 10 business days advance notice must be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the sea turtle protection measures, as well as additional guidelines when construction occurs during the sea turtle nesting season, such as storing equipment, minimizing driving, and reporting within the work area, as well as follow-up meetings during construction. At that meeting, the Corps must provide the Service with specific information on the actual project that is going to proceed (form on the following web link: http://www.fws.gov/northflorida/SeaTurtles/Docs/Corp%20of%20Engineers%20Sea%20Turtle%20Permit%20Information.pdf) and emailed to the Service at seaturtle@fws.gov.

14. Sand compaction must be monitored in the area of sand placement immediately after completion of the project and prior to May 1 for 3 subsequent years.

If tilling is needed, the area must be tilled to a depth of 24 inches. Each pass of the tilling equipment must be overlapped to allow more thorough and even tilling. All tilling activity must be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring must be submitted to the Alabama Ecological Services Field Office 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), shorebird surveys prior to tilling are required per the Migratory Bird Treaty Act; see http://myfwc.com/docs/Conservation/FBCI_BNB_SeaTurtleMonitors.pdf)

a. Compaction sampling stations must be located at 500-foot intervals along the sand placement template. One station must be at the seaward edge of the dune/bulkhead

line (when material is placed in this area), and one station must be midway between the dune line and the high water line (normal wrack line).

b. At each station, the cone penetrometer must 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 must 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 must 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 must be tilled immediately prior to May 1.

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 must 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.

15. Visual surveys for escarpments along the project area must be made immediately after completion of the sand placement and within 30 days prior to May 1 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 must be leveled and the beach profile must be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal must 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 must 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 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 must be submitted to the Alabama Field Office.

16. During the period May 1 through October 31, the contractor must not extend the beach fill more that 500 feet 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 hatchling sea turtles are present within the extended work area. Once the beach has been cleared and the necessary nest relocations have been completed, the contractor will be allowed to proceed with the placement of fill during daylight hours until dusk. If a nesting turtle is sighted on the beach within the immediate construction area, activities must cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

17. A report with the information listed in the following **table** must be submitted to the Alabama Field Office within three months of the year following construction.
    i. A summary of the information listed in Table 3 for construction
    ii. A summary of the information listed in Table 4 for post-construction

**Table 3. Information to include in the report following the project completion.**

| | |
|---|---|
| All projects | Project location (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 nesting surveys for nourished and non-nourished areas) |
| | Descriptions and locations of self-release beach sites |
| | Sand compaction, escarpment formation, and lighting survey results must be reported to the Service. |
| | Success rate of vegetation of restoration |

**Table 4.** 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% 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% 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 | Not significantly different than hatching success (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.

18. Upon locating a dead or injured sea turtle adult, hatchling, or egg that may have been harmed or destroyed as a direct or indirect result of the project, the Corps or the Applicant must be responsible for notifying the Alabama Field Office at 251-441-5836**.** Care must be taken in handling injured sea turtles or sea turtle eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

19. Two post constructing lighting surveys must be conducted of all lighting visible from the beach placement area by the Applicant or the Corps, using standard techniques for such a survey (**Appendix B**), in the year following construction. The first survey must be conducted between May 1 and May 15 and a brief summary provided to the Service. The second survey must be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, must be submitted to the Service within three months after the last survey is conducted. After the annual report is completed, a meeting must be set up with the Applicant, county or municipality, 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 contractor may conduct the lighting surveys during the year of construction.

20. Daily nesting surveys must be conducted for two nesting seasons post-construction in accordance with the following Nesting Beach Survey Protocol (**Appendix C**) if placed material still remains on the beach. Post construction year-one surveys must record the number of nests, nesting success, reproductive success, and lost nests due to erosion and/or inundation. Post construction year-two surveys must only need to record nest numbers and

nesting success. This information will be provided to the Alabama Field Office by within three months of the year following the end of the nesting season and 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.

The Service believes that incidental take will be limited to the 1.52 miles 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 proposed project; (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 proposed project; (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 construction area or on adjacent beaches as a result of construction activities; (5) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (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 Fish and Wildlife Service.

## 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. Construction activities for this project and similar future projects should be planned to take place outside the main part of the sea turtle nesting and hatching season.

2. Appropriate native salt-resistant dune vegetation should be established on the restored dunes.

3. Surveys for nesting success of sea turtles should be continued for a minimum of 3 years following beach nourishment to determine whether sea turtle nesting success has been adversely impacted.

4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

**Migratory Birds**

Nesting season surveys should be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities during the nesting season. Portions of the project in which there is no potential for project-related activity during the nesting season may be excluded.

If shorebird nesting activity is discovered within the project area, the Corps or applicants should establish a 300 ft-wide buffer zone around any location where shorebirds have been engaged in nesting behavior, including territory defense. Any and all construction activities, including movement of vehicles, should be prohibited in the buffer zone.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

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. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the cooperation of the Corps during this consultation. We look forward to working with you and your staff regarding this project. For further coordination please contact Ms. Brittany Barker-Jones of my staff at (251) 401-8974.

Sincerely,

William J. Pearson
Field Supervisor
Alabama Ecological Services Field office

cc: ADEM, Coastal, Mobile, AL
USFWS, St. Petersburg, FL (Attn: Ann Marie Lauritsen)
USFWS, Atlanta, GA (Attn: Ken Graham)
South Coast Engineers (Attn: Scott Douglass)
Ardea Environmental Consultants (Attn: Lois Edwards)

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## Appendix A

## 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.

## Appendix B

# 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

**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; Appendix A), style of fixture (Appendix E), 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?

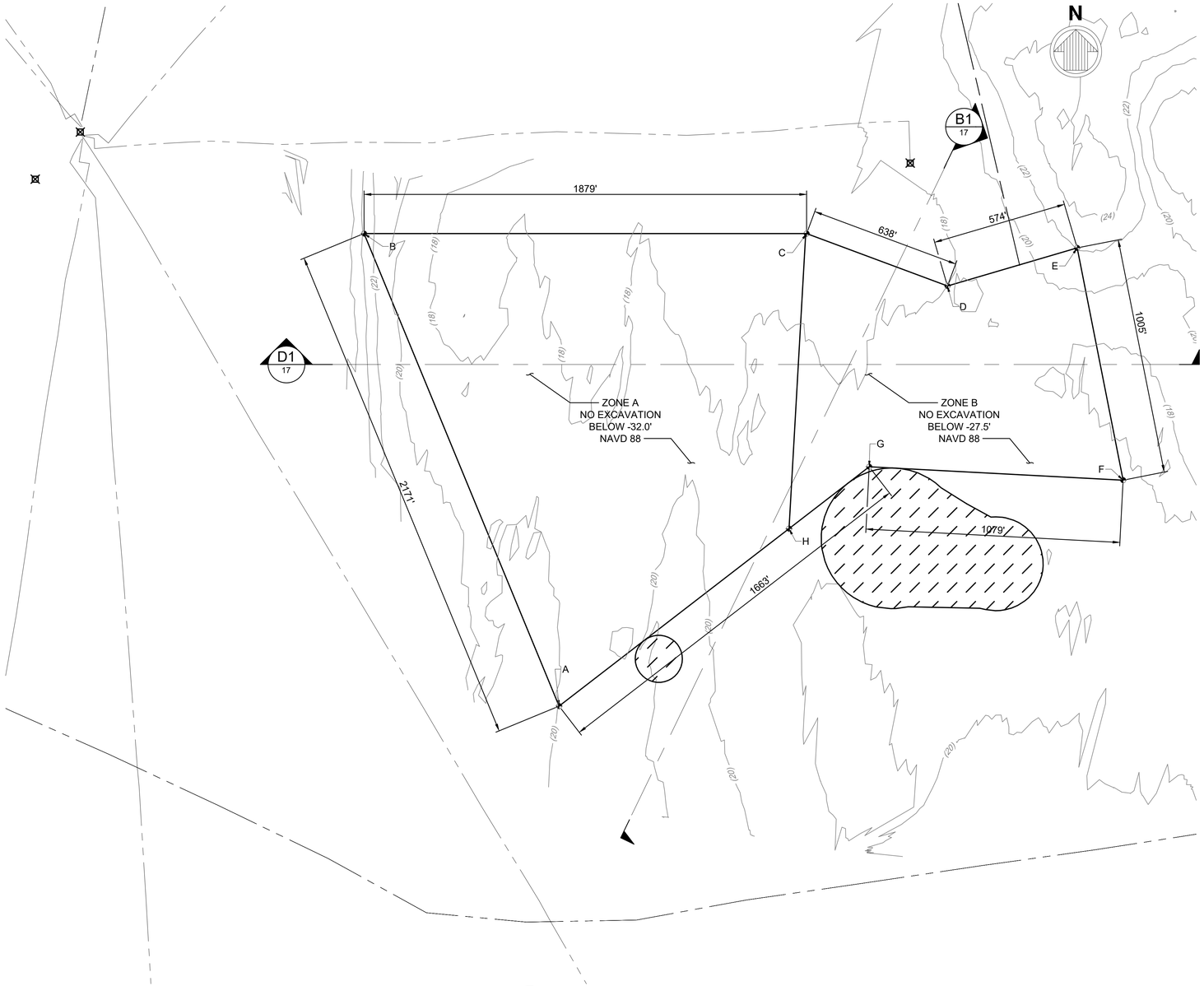
Although no specific authority is required to conduct lighting inspections, property managers, tenants, and owners are more likely to be receptive if the individual making recommendations represent a recognized conservation group, research consultant, or government agency. When local ordinances regulate 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 C**

| CHARACTERISTIC | PARAMETER | MEASUREMENT | VARIABLE |
|---|---|---|---|
| Nesting Success | False crawls - number | Visual assessment of all false crawls | Number and location of false crawls in nourished areas and non-nourished areas: any interaction of turtles with obstructions, such as groins, seawalls, or scarps, should be noted. |
| | False crawl - type | Categorization of the stage at which nesting was abandoned | Number in each of the following categories: emergence-no digging, preliminary body pit, abandoned egg chamber. |
| | Nests | Number | The number of sea turtle nests in nourished and non-nourished areas should be noted. If possible, the location of all sea turtle nests must be marked on a project map, and approximate distance to seawalls or scarps measured in meters. Any abnormal cavity morphologies should be reported as well as whether turtle touched groins, seawalls, or scarps during nest excavation. |
| | Nests | Lost nests | The number of nests lost to inundation or erosion or the number with lost markers. |
| | Nests | Relocated nests | The number of nests relocated and a map of the relocation area(s). The number of successfully hatched eggs per relocated nest. |
| | Lighting impacts | Disoriented sea turtles | The number of disoriented hatchlings and adults (Appendix B). |




A1 / 8 BORROW AREA DETAIL
SCALE: 1"=250'

| COORDINATES OF BORROW AREA CORNERS (NAD 83) | | |
|---|---|---|
| POINT | NORTHING | EASTING |
| A | 63155.66 | 1788135.93 |
| B | 65162.01 | 1787307.86 |
| C | 65162.02 | 1789186.79 |
| D | 64939.41 | 1789784.69 |
| E | 65100.79 | 1790335.18 |
| F | 64114.86 | 1790530.41 |
| G | 64171.74 | 1789452.48 |
| H | 63909.07 | 1789112.14 |

LEGEND:

- OIL AND GAS PIPELINE
- PERMITTED DREDGE PIPELINE CORRIDOR
- OIL AND GAS PLATFORM
- NO DREDGING/ANCHORING

NOTES:

1. BATHYMETRY CONTOURS SHOWN IN FEET REFERENCED TO NAVD 88 ARE BASED ON SURVEYS PERFORMED BY APTIM SEPTEMBER 29 TO OCTOBER 2, 2021 AND CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS AT THE TIME OF SURVEY.
2. CONTRACTOR SHALL MAKE EVERY REASONABLE EFFORT TO DEPLETE THE BORROW AREA FROM NORTH TO SOUTH.
3. NO DREDGING OR ANCHORING ZONE IS DUE TO MAGNETOMETER ANOMALIES.
4. THE CENTERLINE OF THE PERMITTED DREDGE PIPELINE CORRIDOR IS SHOWN. THE PERMITTED DREDGE PIPELINE CORRIDOR IS 200 FEET.

250' 0' 250' 500'
SCALE: 1"=250'

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DAUPHIN ISLAND EAST END BEACH AND DUNE RESTORATION
DAUPHIN ISLAND, AL

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BORROW AREA DETAIL

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