



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
1520 ROYAL PALM SQUARE BLVD., SUITE 310
FORT MYERS, FLORIDA 33919

September 3, 2013

REPLY TO
ATTENTION OF

Fort Myers Section
SAJ-2012-00198(IP-MJD)

Lee County Natural Resources Division
Mr. Steve Boutelle
1500 Monroe Street
Ft. Myers, Florida 33901

Dear Mr. Boutelle:

The U.S. Army Corps of Engineers (Corps) is pleased to enclose the Department of the Army permit, which should be available at the construction site. Work may begin immediately but the Corps must be notified of:

- a. The date of commencement of the work,
- b. The dates of work suspensions and resumptions of work, if suspended over a week, and
- c. The date of final completion.

This information should be mailed to the Special Projects and Enforcement Branch of the Regulatory Division of the Jacksonville District at 1520 Royal Palm Square Blvd., Suite 310, Ft. Myers, Florida 33919. The Special Projects and Enforcement Branch is also responsible for inspections to determine whether Permittees have strictly adhered to permit conditions.

IT IS NOT LAWFUL TO DEVIATE FROM
THE APPROVED PLANS ENCLOSED.

Sincerely,

for

A handwritten signature in cursive script that reads "Donald W. Kinard".

Donald W. Kinard
Chief, Regulatory Division

Enclosures

Copies Furnished:

Lois Edwards (Agent, via email)

FWS, Vero Beach

EPA, West Palm Beach

NMFS, St. Petersburg

CESAJ-RD-PE

DEPARTMENT OF THE ARMY PERMIT

Permittee: Lee County Natural Resources Division
c/o Steve Boutelle
1500 Monroe Street
Ft. Myers, Florida 33901

SEP 3 2013

Permit No: SAJ-2012-00198-(IP-MJD)

Issuing Office: U.S. Army Engineer District, Jacksonville

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: Place dredged beach quality sand on two separate beach areas in coastal Lee County. For each nourishment event, hydraulic dredge and either floating or submerged pipelines will be used to place approximately 116,000 cubic yards of beach quality sand on 3,922 linear feet between beach monuments R-226.5 to R-230 on Little Hickory Island and approximately 345,000 cubic yards of beach quality sand on approximately 5,808 linear feet from 500 feet north of R-215 to 500 feet south of R-220 on Lovers Key. The borrow areas are located in the ebb tidal shoal of Big Carlos Pass, between Estero Island and Big Hickory Island. To improve the performance of the constructed beach profile (stability of placed material over time), additional renourishment may occur over two renourishment events and/or a fifteen year period for two separate beaches that were previously nourished. The project will be monitored during construction and during the post-construction period. The work described above is to be completed in accordance with the 16 pages of drawings [and 7 attachments] affixed at the end of this permit instrument.

Project Location: The project is located on the beach and in the nearshore waters off Big Carlos Pass (borrow areas), Lover's Key and Little Hickory Island in the Gulf of Mexico off the west coast of Lee County. The site is located in Bonita Beach, in Sections 10, 11, 14, 24, and 25, Township 47 South, Range 24 East, Lee County.

Directions to site: Bonita Beach: From I-75 South take exit 116, merge onto Bonita Beach Road SE (becomes Hickory Blvd. as it turns north after approximately 5.8 miles). Stay straight approximately 2.1 miles to Beach Access #10 (Little Hickory Island Beach Park) on your left. Lovers Key: From Bonita Beach Access #10, exit to the right and then take the first left onto Estero Blvd. and in 2.6 miles turn left into the Lovers Key Park entrance.

Latitude & Longitude:

Lover's Key-	(North Limit)	Latitude: 26° 23'39.84" North
		Longitude: 81° 53'01.97" West
	(South Limit)	Latitude: 26° 22'55.14" North
		Longitude: 81° 52'20.19" West
Bonita Beach-	(North Limit)	Latitude: 26° 21'51.27" North
		Longitude: 81° 51'47.89" West
	(South Limit)	Latitude: 26° 21'17.95" North
		Longitude: 81° 51'26.87" West

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on **September 3, 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 one 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 and the mailing address 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 conditions 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. **Reporting Address:** All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Regulatory Division, Enforcement Section, 1520 Royal Palm Square Blvd., Suite 310, Ft Myers, FL 33919. The Permittee shall reference this permit number, SAJ-2012-00198(IP-MJD).

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

3. **As-Builts:** Within 60 days of completion of each completed nourishment - the authorized work or at the expiration of the construction authorization of this permit, whichever occurs first, the Permittee shall submit as-built drawings of the authorized work and a completed As-Built Certification Form (Attachment 3) to the Corps. The drawings shall be signed and sealed by a registered professional engineer and include the following:

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

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

c. The Department of the Army Permit number.

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

4. **Regulatory Agency Changes:** Should any other regulatory agency require changes to the work authorized or obligated by this permit, the Permittee is advised that a modification to this

permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification of this permit from the Ft. Myers Regulatory Office.

5. Preconstruction Meeting: The Permittee shall conduct a pre-construction meeting prior to commencement of construction operations in order to notify in-house staff, field crews, contractors, subcontractors, and all persons involved in the construction of the conditions of this permit. The Permittees shall inform staff members and contractors of the construction area boundaries, and the location of any adjacent seagrass beds to be avoided. The Permittee shall inform contractor personnel of the potential presence of threatened and endangered species in the project area, the need for precautionary measures, and the Endangered Species Act prohibition on taking listed species. Construction contractors will be trained and briefed on how to identify the piping plover, manatee, sea turtles, and smalltooth sawfish. Copies of the permit and specific conditions shall be available at the construction site.

6. Manatee Conditions: The Permittee shall comply with the "Standard Manatee Conditions for In-Water Work – 2011" provided in Attachment 4 of this permit.

7. Sea Turtle and Smalltooth Sawfish Conditions: The Permittee shall comply with National Marine Fisheries Service's "Sea Turtle and Smalltooth Sawfish Construction Conditions" dated March 23, 2006 and provided in Attachment 5 of this permit.

8. Assurance of Navigation and Maintenance: The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, 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.

9. Biological Opinion: This Corps permit does not authorize the Permittee to take an endangered species, in particular the piping plover (*Charadrius melodus*). In order to legally take a listed species, the Permittee must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a BO under ESA Section 7, with "incidental take" provisions with which the Permittee must comply). The enclosed US Fish and Wildlife Service (FWS) Biological Opinion (BO) (Attachment 6) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Authorization under this Corps permit is conditional upon compliance with all of 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 this Corps permit. The FWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

10. Biological Opinion: The Permittee has reviewed the Reasonable and Prudent Measures, Terms and Conditions of the State Programmatic Biological Opinion for planning and regulatory sand placement Activities dated August 22, 2011 and agreed to follow the measures included to minimize impacts to nesting sea turtles. The FWS provided concurrence that the maintenance dredge activities and sand placement activities are consistent with the State Programmatic Biological Opinion, provided the permittee follows the terms and conditions contained therein. The permittee shall follow the appropriate Reasonable and Prudent Measures A1-17, (omit A18-20 related to beach mice) A21-23, Terms and Conditions, All Beaches – A1-A17, A22-23 (pages 102-120). The referenced Nesting Beach Survey Protocols (App B,) Lighting Inspections (App C) and Predator Proof Trash Receptacles (App D) and a copy of the applicable Terms and Conditions is included in Attachment 7.

11. Endangered Species: The Permittee agrees to comply with the following measures to minimize impacts to sea turtles:

a. Nighttime construction will be limited to no more than 500 linear feet of beach to contain and minimize disturbances. This will allow for approximately 90% of each of the project shorelines to remain open and unobstructed for the turtles.

b. All lighting on both the beach construction area and the dredge will be reduced and/or shielded to minimize disorientation lighting effects to hatchlings leaving their nests and entering the ocean.

c. The pipeline transporting sand from the dredge to the beach will not be moved at night during sea turtle nesting season to minimize disturbance to sea turtles in the area.

d. The steel pipe approaching the beach will be submerged to minimize obstacles in the water for hatchlings leaving the beach. During sea turtle nesting season, the beach fill area will not be extended more than 500 feet (or other agreed upon length) between dusk and the time of completion of the following days of nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

12. Cultural Resources/Historic Properties:

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

b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous

cultural resources assessment survey (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work in the vicinity and notify the Corps. The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

c. A cultural resources assessment may be required of the permit area, if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO and the Corps.

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

13. Fill Material: The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, debris, automotive parts, asphalt, construction materials, concrete block with exposed reinforcement bars, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act. All sand fill required for the project shall be consistent and compatible with the existing sand found in the project area.

14. Dredge Activities: Any construction vessels shall operate within waters of sufficient depth to preclude bottom scouring and prop dredging resources.

15. Transportation of Dredge Material: The Permittee must ensure that a copy of this permit is available on the vessel used for the authorized transportation and disposal of dredged material.

16. Navigation:

a. The Permittee shall mark each pipeline corridor with a minimum of four navigational aids to notify mariners of the location of pipelines.

b. Prior to commencement of work, the Permittee shall notify the United States Coast Guard, Sector St. Petersburg of operations and request that a Notice to Mariners be published at least 7 days prior to commencing dredging operations.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899
(33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

() Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

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 projects.

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 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.

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PERMITTEE: Lee County Department of Natural Resources
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When the structures or work authorized by this permit 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.

(SIGNATURE) (DATE) _____ (TRANSFEREE-

(NAME-PRINTED)

(ADDRESS)

(CITY, STATE, AND ZIP CODE)

PERMIT NUMBER: SAJ 2012-00198 (IP-MJD)
PERMITTEE: Lee County Department of Natural Resources
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*Attachments to Department of the Army
Permit Number SAJ-2012-00198(IP-MJD)*

1. PERMIT DRAWINGS: 16 pages, dated January 22, 2013
2. WATER QUALITY CERTIFICATION: Specific Conditions of the water quality permit/certification in accordance with General Condition number 5 on page 2 of this DA permit. 27 (30 including variance) pages.
3. As-Built Certification: 2 Pages
4. Standard Manatee Conditions for In-Water Work, 2011: 2 Pages
5. Sea Turtle and Sawfish Construction Precautions: March 23, 2006, 1 page
6. FWS Biological Opinion: March 8, 2013, 65 pages
7. State Programmatic Sand Placement BO, Applicable Reasonable & Prudent Measure, Terms & Conditions, Appendices B-D: 30 pages

ATTACHMENT 1: Permit Drawings

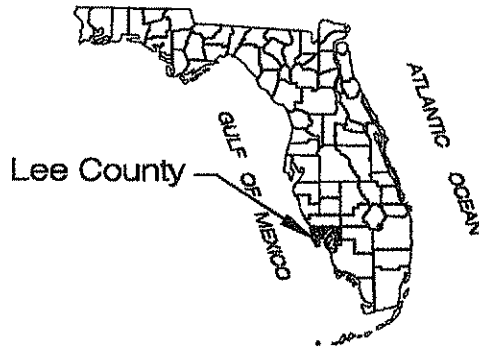
Page 1 through 16 of 16
Dated September 3, 2013

Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida

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JAN 25 2013

EACHES
SYSTEMS




INDEX OF SHEETS

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2.....	Location Map
3.....	Plan View - Lovers Key Fill Area
4.....	Plan View - Lovers Key Fill Area
5.....	Profiles - Lovers Key Fill Template
6.....	Profiles - Lovers Key Fill Template
7.....	Profiles - Lovers Key Fill Template
8.....	Profiles - Lovers Key Fill Template
9.....	Plan View - Bonita Beach Fill Area
10.....	Profiles - Bonita Beach Fill Template
11.....	Profiles - Bonita Beach Fill Template
12.....	Profiles - Bonita Beach Fill Template
13.....	Plan View - Borrow Area 1&2
14.....	Cross-Sections A1-A1' & B1-B1' Borrow Area 1
15.....	Cross-Sections A2-A2' & B2-B2' Borrow Area 2
16.....	General Notes

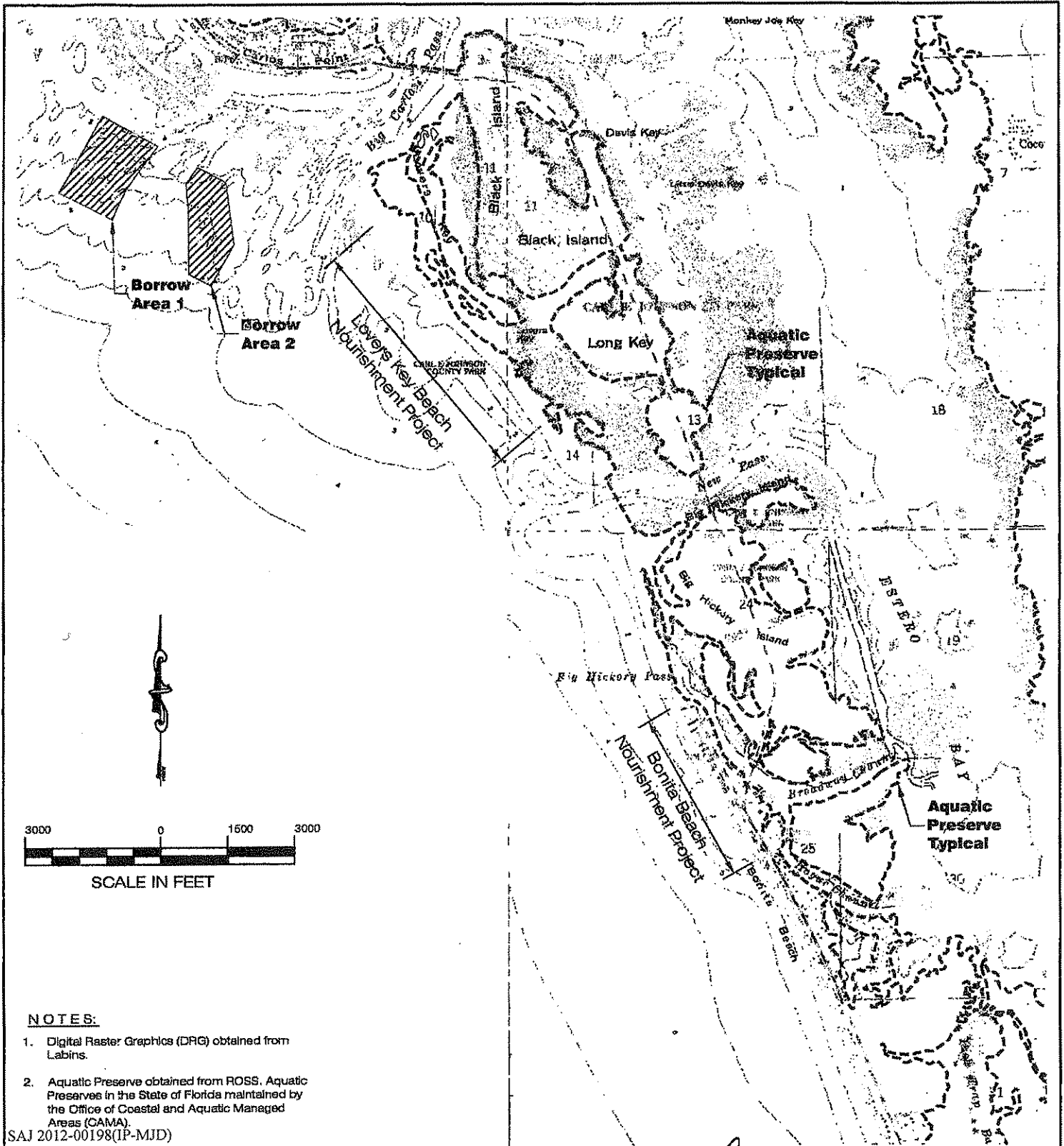
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Bonita Beach/Lovers Key
Beach Re-nourishment
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September 3, 2013

Clifford L. Truitt 1/24/13

CLIFFORD L. TRUITT, PE DATE
FLORIDA P.E. LICENSE NUMBER 21194

 COASTAL TECH <small>Certificate of Authorization Number: 00004195 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SARASOTA MELBOURNE AUSTIN</small>	Cover Sheet	ENGR CT	DRAWN AQN	SHEET 1
	Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida	LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



NOTES:

1. Digital Raster Graphics (DRG) obtained from Labins.
2. Aquatic Preserve obtained from ROSS. Aquatic Preserves in the State of Florida maintained by the Office of Coastal and Aquatic Managed Areas (CAMA).

SAJ 2012-00198(IP-MJD)

Bonita Beach/Lovers Key


Beach Re-nourishment

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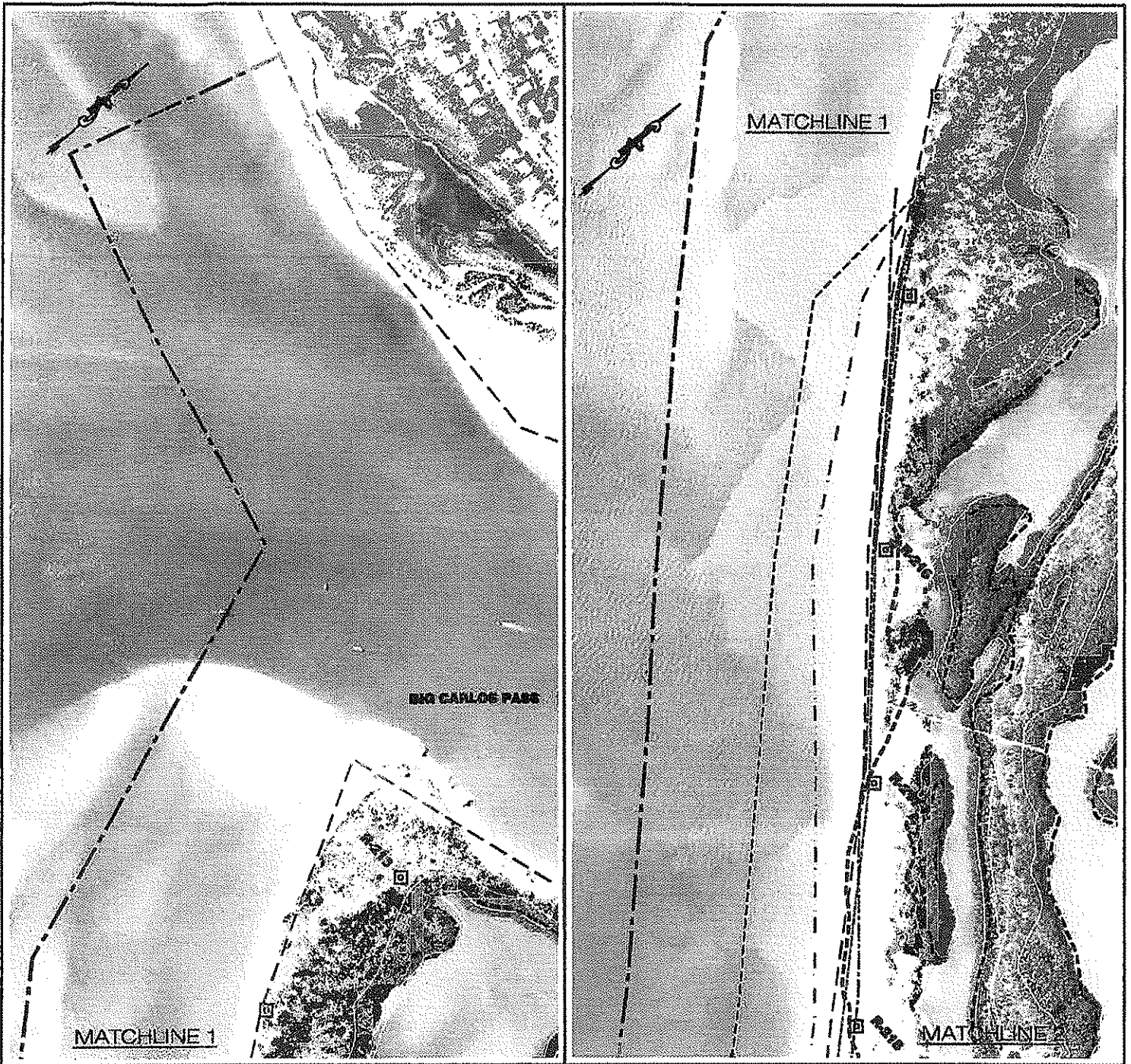
September 3, 2013

Clifford L. Truitt 1/24/13

CLIFFORD L. TRUITT, PE DATE
FLORIDA P.E. LICENSE NUMBER 21194

 COASTAL TECH Certificate of Authorization Number: 00004193 3625 20th Street, Vero Beach, Florida 32950 VERO BEACH SARASOTA MELBOURNE AUSTIN	Location Map - Bonita Beach & Lovers Key		ENGR CT	DRAWN AQN	SHEET 2
	Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida		LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



SCALE IN FEET

NOTES:

1. Aerial Photography obtained from Lee County dated October 4, 2011.
2. Mangrove delineation obtained from FFWCC/FWRI.
3. Aquatic Preserve obtained from ROSS. Aquatic Preserves in the State of Florida maintained by the Office of Coastal and Aquatic Managed Areas (CAMA).
4. Existing Mean High Water Line (MHWL) March 2010 from FDEP profile data.
5. Erosion Control Line (ECL) established May 25, 2001 per LABINS.org.

Legend

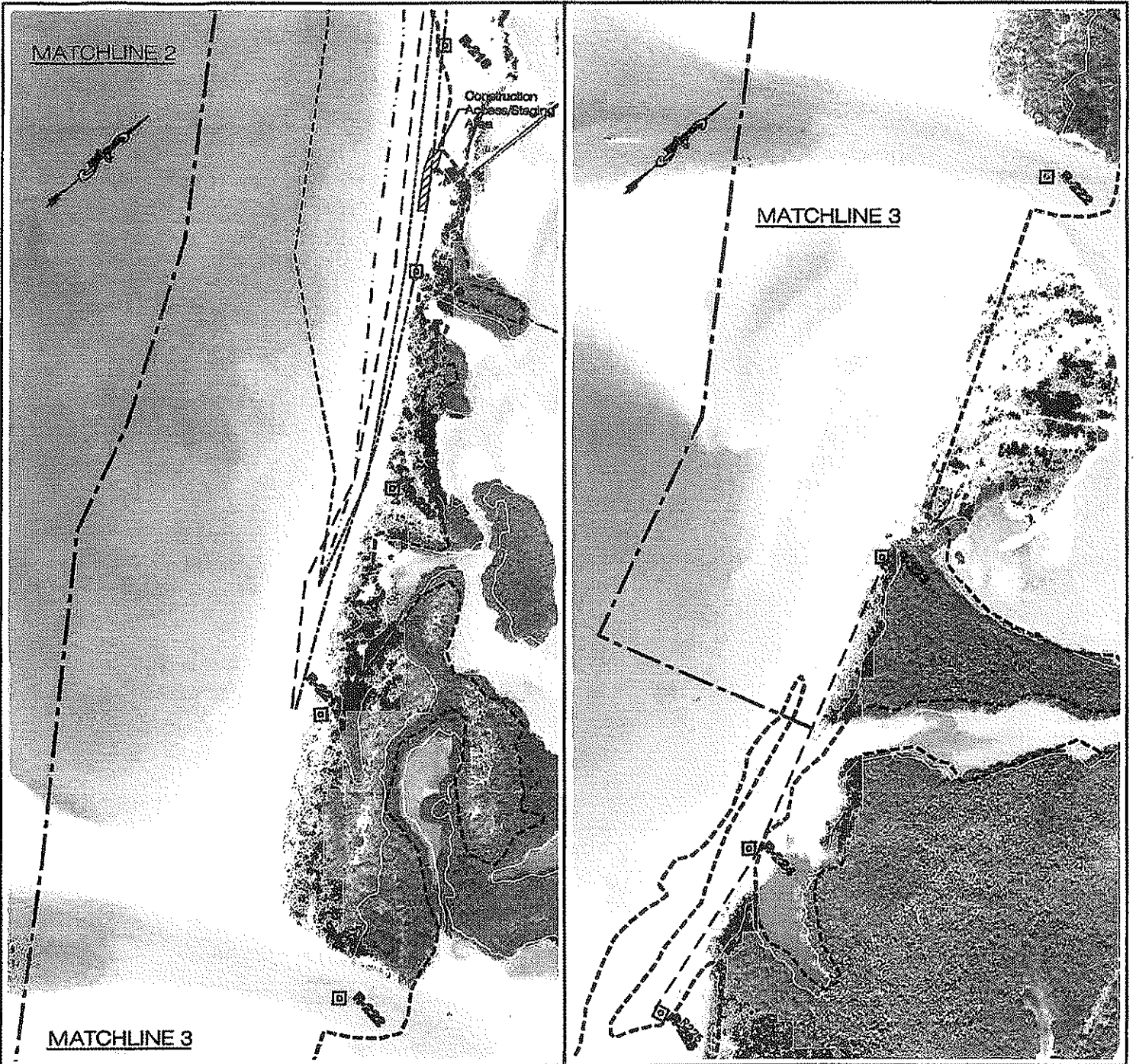
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| Proposed Upland Limits of Fill | Existing Mean High Water Line (MHWL) March 2010 |
| Seaward Edge of Top of Dune | Erosion Control Line |
| Landward Edge of Berm | Mangroves |
| Seaward Edge of Berm | Aquatic Preserve |
| Equilibrated Toe of Fill | R-monument |
| Mixing Zone | |
| Construction Access/Staging Area | |

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 Bonita Beach/Lovers Key
 Beach Re-nourishment
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 September 3, 2013

Clifford L. Truitt
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH Certificate of Authorization Number: 00004195 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SARASOTA MELBOURNE AUSTIN	Plan View - Lovers Key Fill Area Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida	ENGR CT	DRAWN AQN	SHEET 3
		LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



SCALE IN FEET

NOTES:

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 Bonita Beach/Lovers Key
 Beach Re-nourishment
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 September 3, 2013

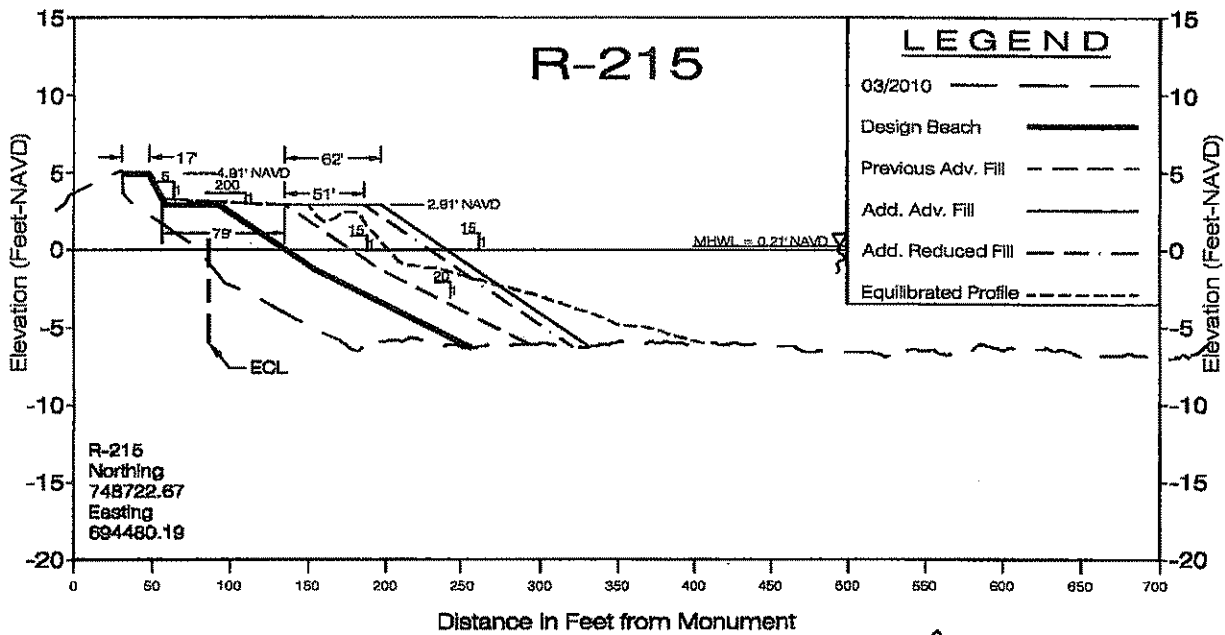
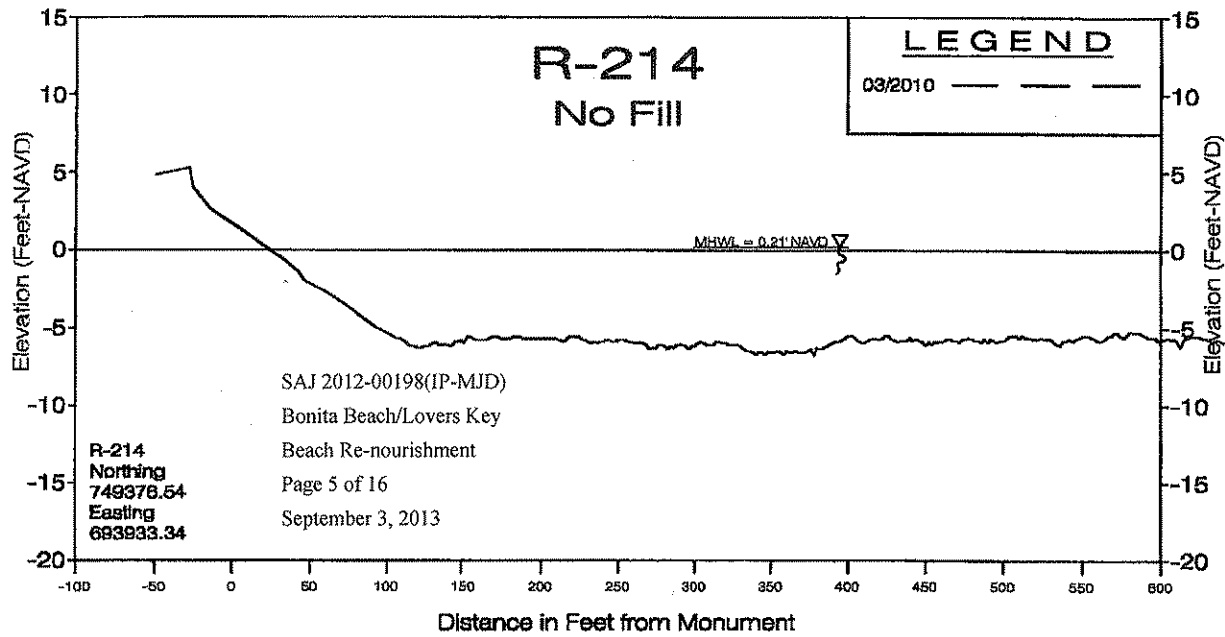
Clifford L. Truitt
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH
 Certificate of Authorization Number: 00094195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH SARASOTA MELBOURNE AUSTIN

Plan View - Lovers Key Fill Area
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

ENGR CT	DRAWN AQN	SHEET 4
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



NOTES:

1. March 2010 profile data and reference monument coordinates from FDEP.
2. Design Beach and Previous Advanced Fill from July 21, 2000 permit sketches prepared by Coastal Planning & Engineering, Inc.

Clifford L. Truitt 1/24/13

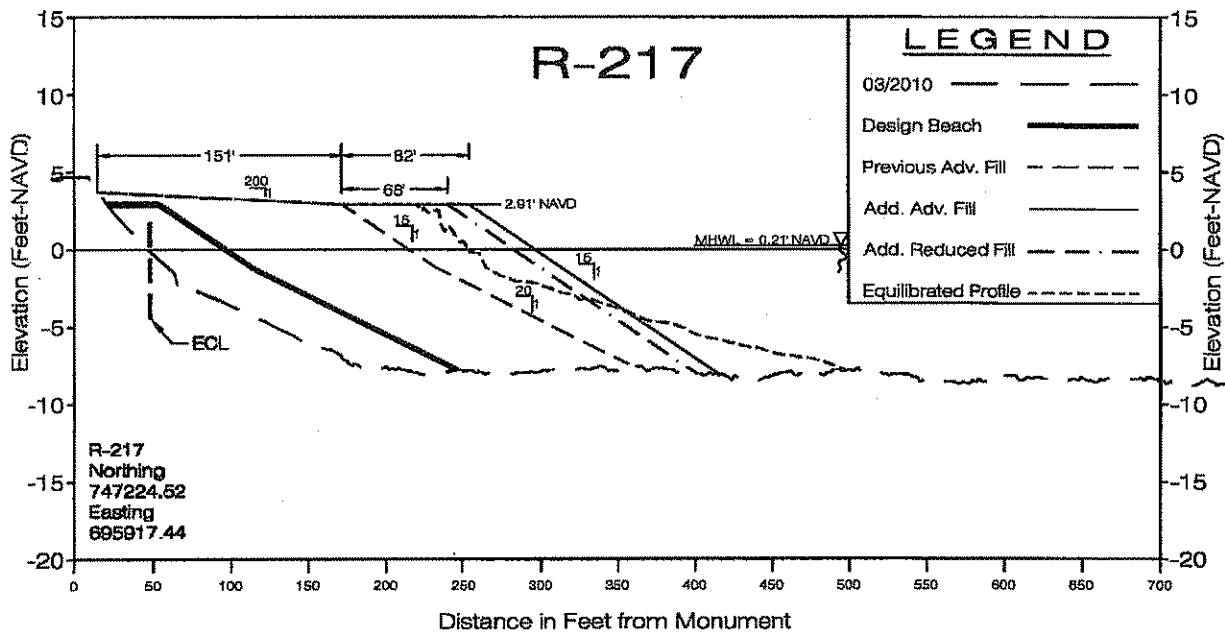
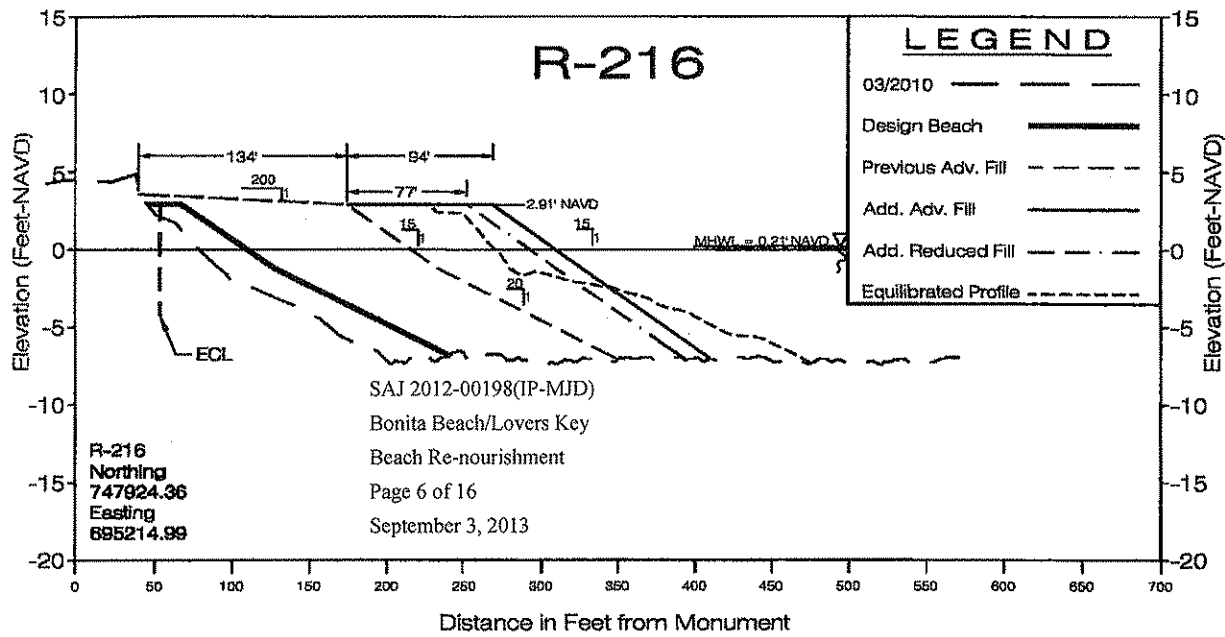
CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH
 Certificate of Authorization Number: 00004195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH SARASOTA MELBOURNE AUSTIN

Profiles - Lovers Key Fill Template
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

ENGR CT	DRAWN AQN	SHEET 5
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



NOTES:

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2. Design Beach and Previous Advanced Fill from July 21, 2000 permit sketches prepared by Coastal Planning & Engineering, Inc.

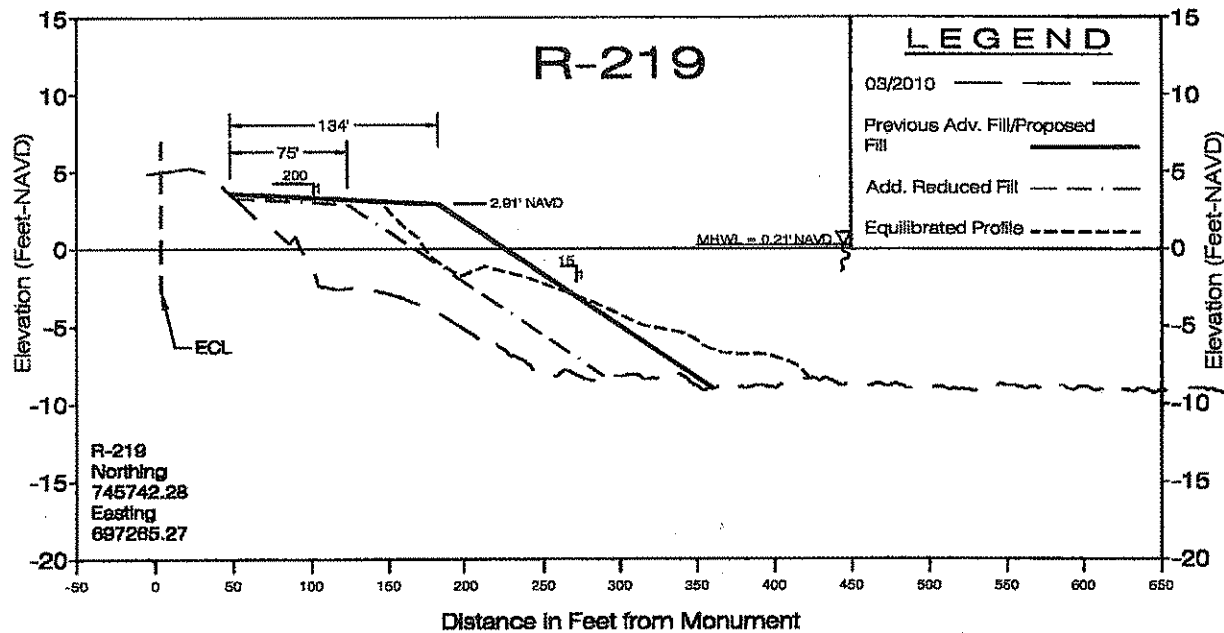
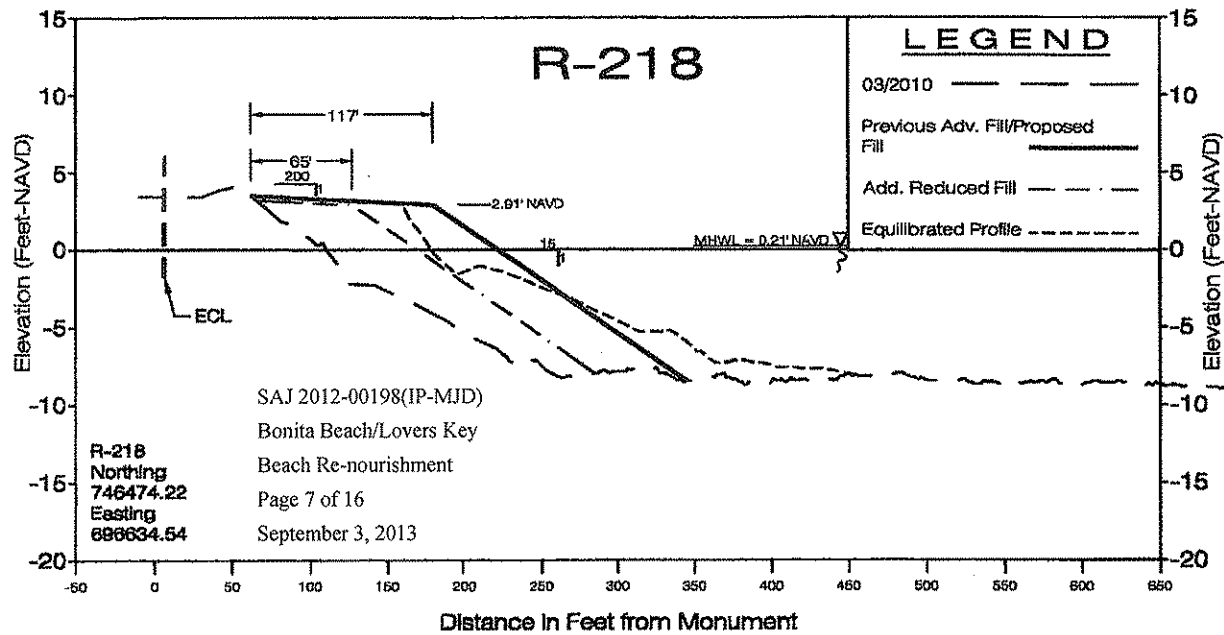
CLIFFORD L. TRUITT, PE DATE
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COASTAL TECH
 Certificate of Authorization Number: 00004157
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH SARASOTA MELBOURNE AUSTIN

Profiles - Lovers Key Fill Template
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

ENGR CT	DRAWN AQN	SHEET 6
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001



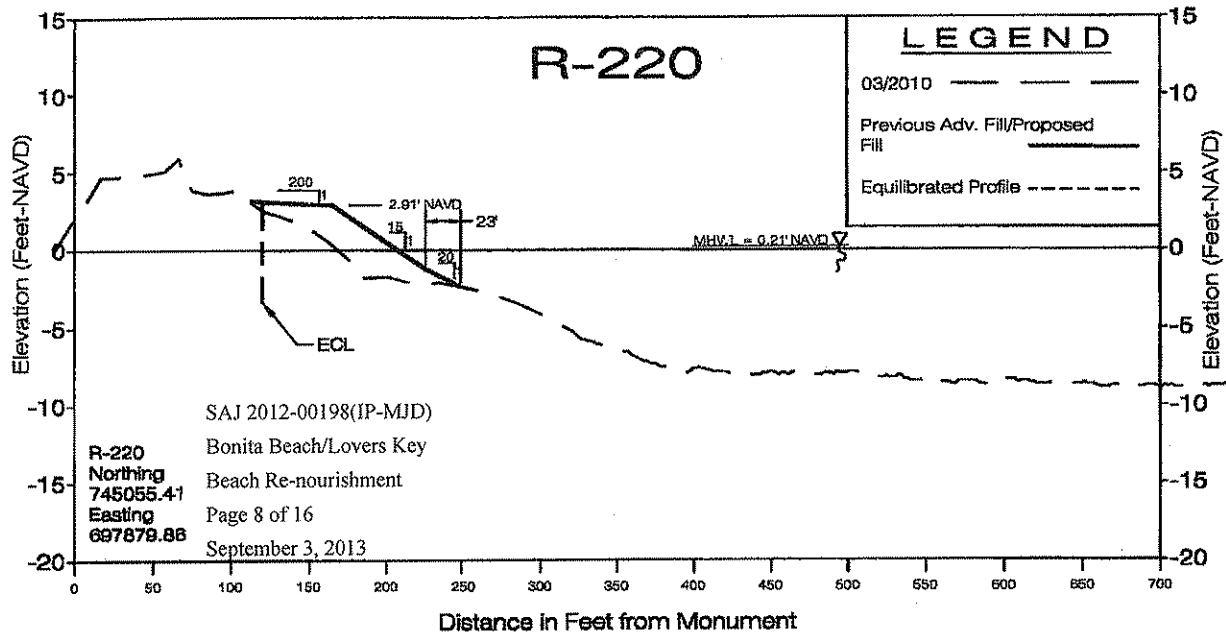
NOTES:

1. March 2010 profile data and reference monument coordinates from FDEP.
2. Design Beach and Previous Advanced Fill from July 21, 2000 permit sketches prepared by Coastal Planning & Engineering, Inc.
3. Advanced Fill only from R-217.5 to R-220.5. No design beach fill required in this area.

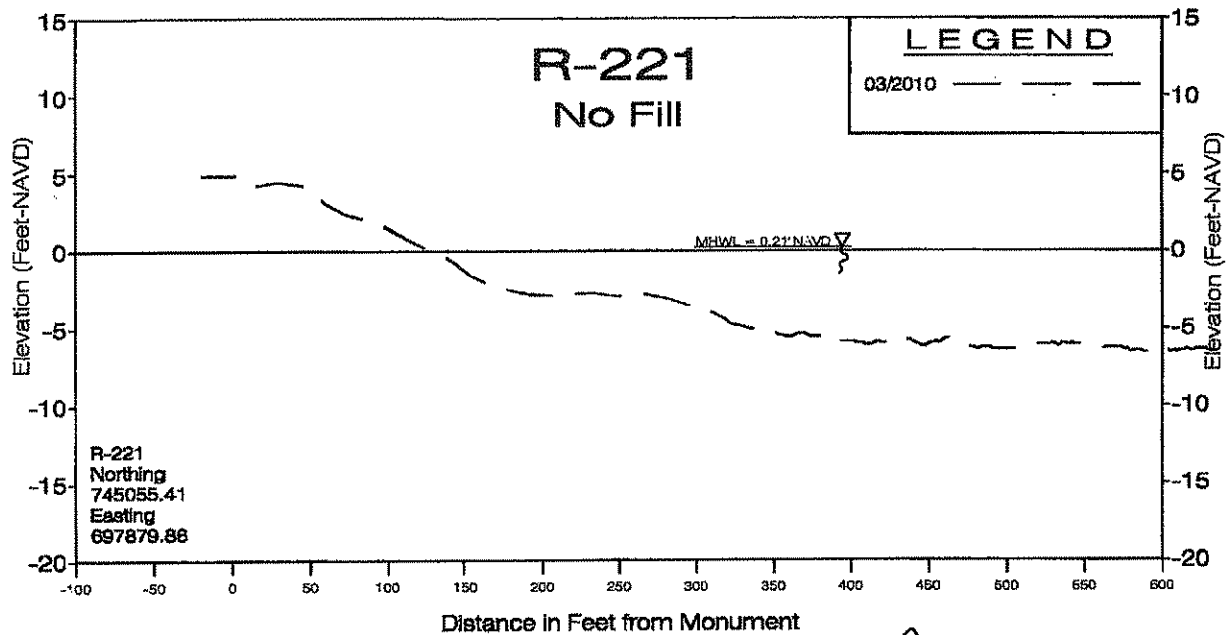
Clifford L. Truitt, PE
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH Certificate of Authorization Number: 00004186 3825 20th Street, Vero Beach, Florida 32960 VERO BEACH SARASOTA MELBOURNE AUSTIN	Profiles - Lovers Key Fill Template Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida		ENGR CT	DRAWN AQN	SHEET 7
			LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS 29500

PERMIT # 311811001



SAJ 2012-00198(IP-MJD)
 R-220 Bonita Beach/Lovers Key
 Northing Beach Re-nourishment
 745055.41 Page 8 of 16
 Easting September 3, 2013
 697879.88



R-221
 Northing
 745055.41
 Easting
 697879.88

NOTES:

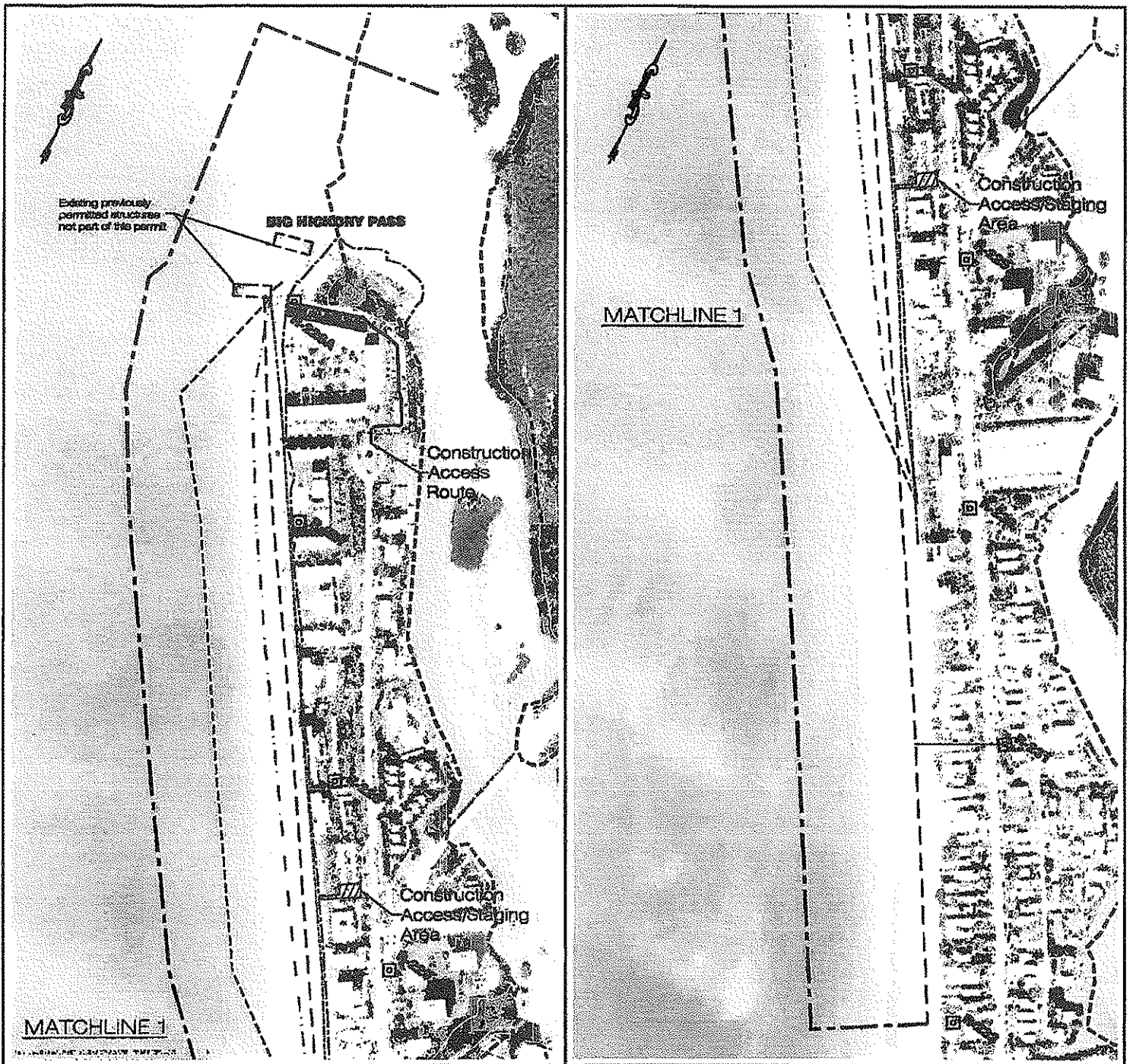
1. March 2010 profile data and reference monument coordinates from FDEP.
2. Design Beach and Previous Advanced Fill from July 21, 2000 permit sketches prepared by Coastal Planning & Engineering, Inc.
3. Advanced Fill only from R-217.5 to R-220.5. No design beach fill required in this area.

Clifford L. Truitt 1/24/13

CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH <small>Certificate of Authorization Number: 00004185 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH S.R./SOTA MELBOURNE AUSTIN</small>	Profiles - Lovers Key Fill Template	ENGR CT	DRAWN AQN	SHEET 8
	Bonita Beach & Lovers Key Beach Nourishment Project	LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS 29500
	Lee County, Florida			

PERMIT # 311811001



MATCHLINE 1

MATCHLINE 1



SCALE IN FEET

NOTES:

1. Aerial Photography obtained from Lee County dated October 4, 2011.
2. Mangrove delineation obtained from FFWCC/FWRI.
3. Aquatic Preserve obtained from ROSS. Aquatic Preserves in the State of Florida maintained by the Office of Coastal and Aquatic Managed Areas (CAMA).
4. Existing Mean High Water Line (MHWL) March 2010 from FDEP profile data.
5. Erosion Control Line (ECL) established March 9, 1995 per LABINS.org.

Legend

- Proposed**
 - Landward Edge of Berm
 - Seaward Edge of Berm
 - Equilibrated Toe of Fill
 - Construction Access Route
 - Mixing Zone
- Existing**
 - Mean High Water Line (MHWL) March 2010
 - Erosion Control Line
- Mangroves
- Aquatic Preserve
- Re-nourishment
- Construction Access/Staging Area

SAJ 2012-00198(IP-MJD)
 Bonita Beach/Lovers Key
 Beach Re-nourishment
 Page 9 of 16

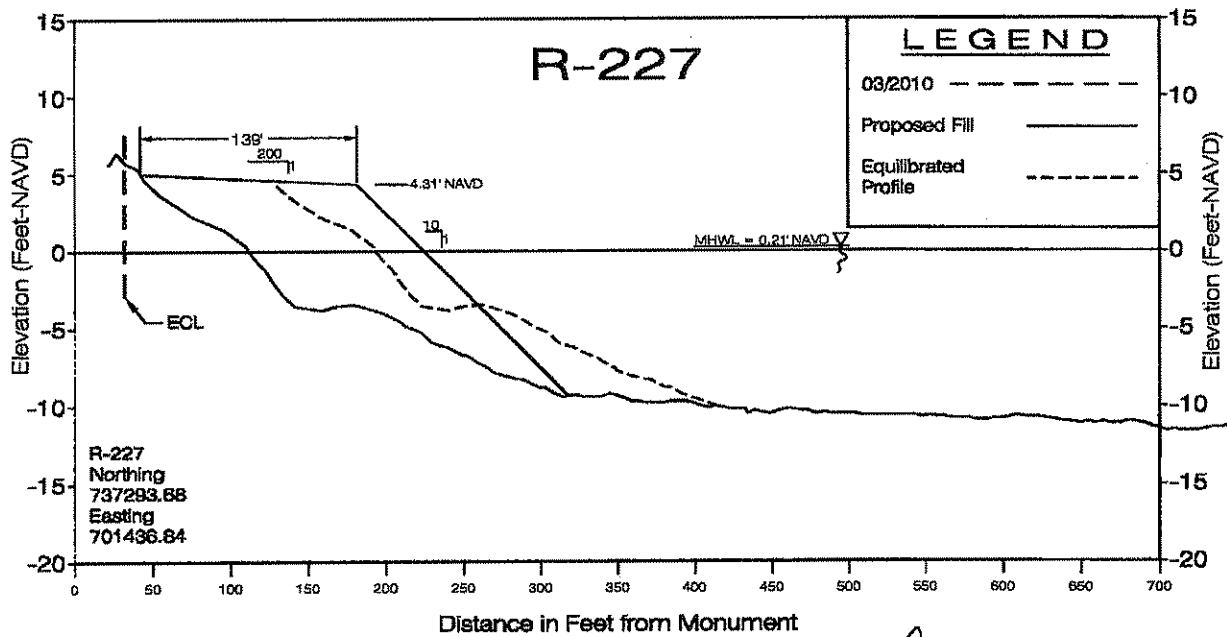
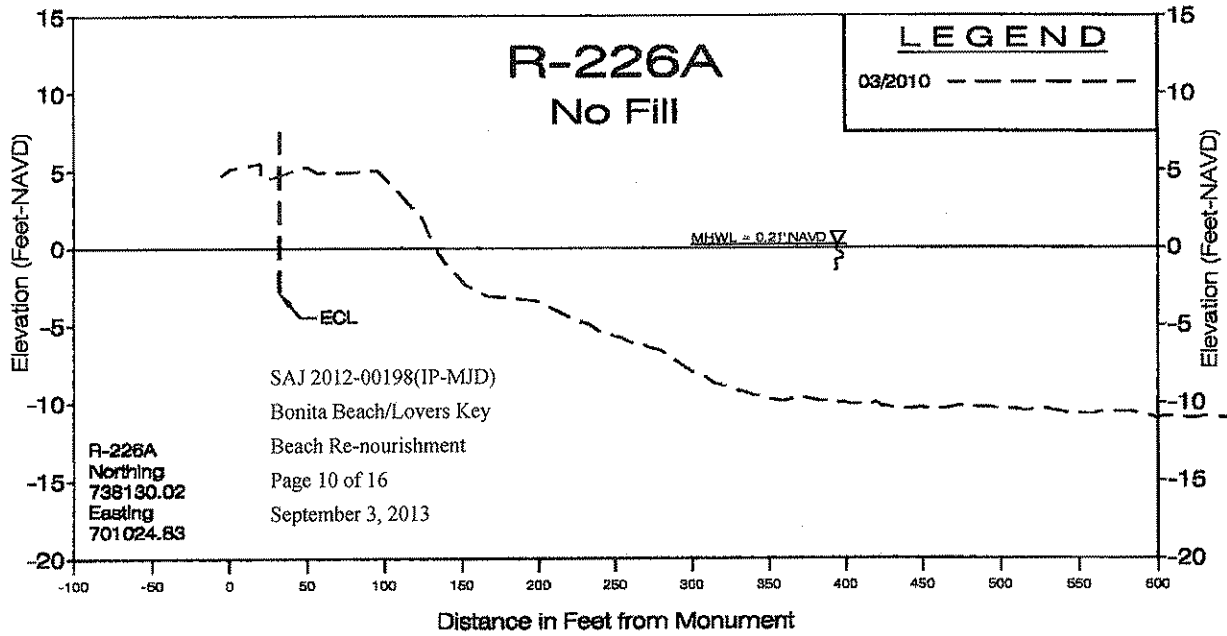
Clifford L. Truitt
 CLIFFORD L. TRUITT, PE DATE 1/24/13
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH
 Certificate of Authorization Number: 00004195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH E. RASOTA MELBOURNE AUSTIN

September 3, 2013
Plan View - Bonita Beach Fill Area
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

ENGR CT	DRAWN AQN	SHEET 9
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 15 SHEETS JOB NO. 29500

PERMIT # 311811001



NOTES:

1. March 2010 profile data and reference monument coordinates obtained from Lee County.
2. Proposed fill template modified from June 2002 permit sketches by Applied Technology & Management, Inc.
3. Design Beach constitutes the March 2010 profile. No design beach fill template reflected in Bonita Beach Project Area.

Clifford L. Truitt 2/24/13
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194



COASTAL TECH

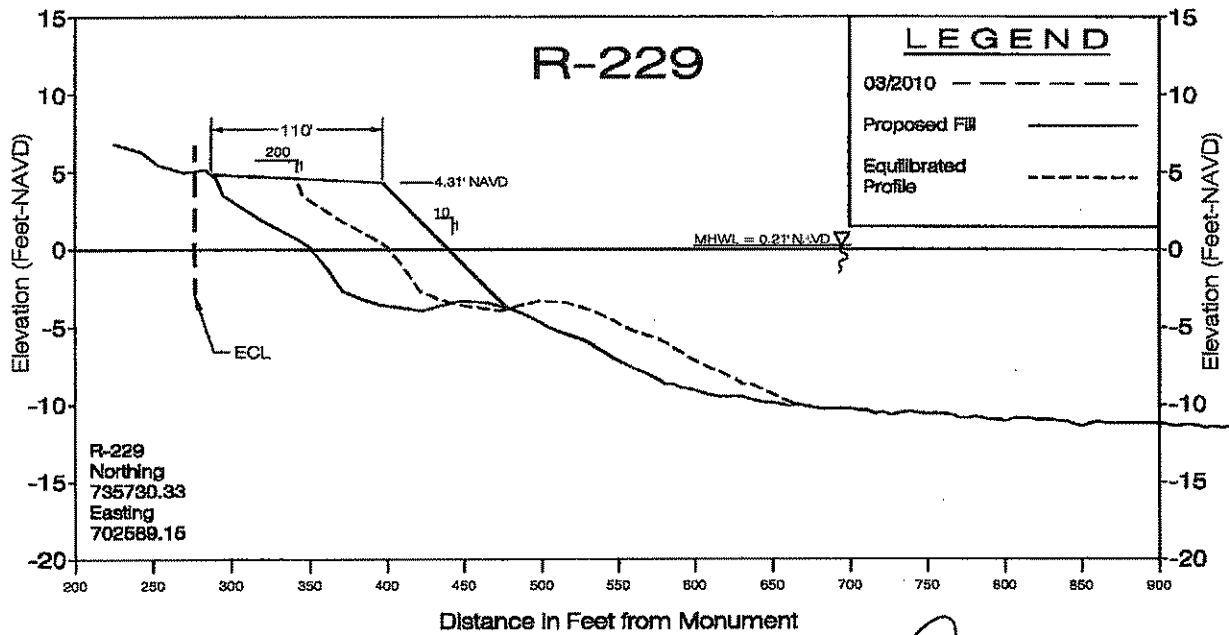
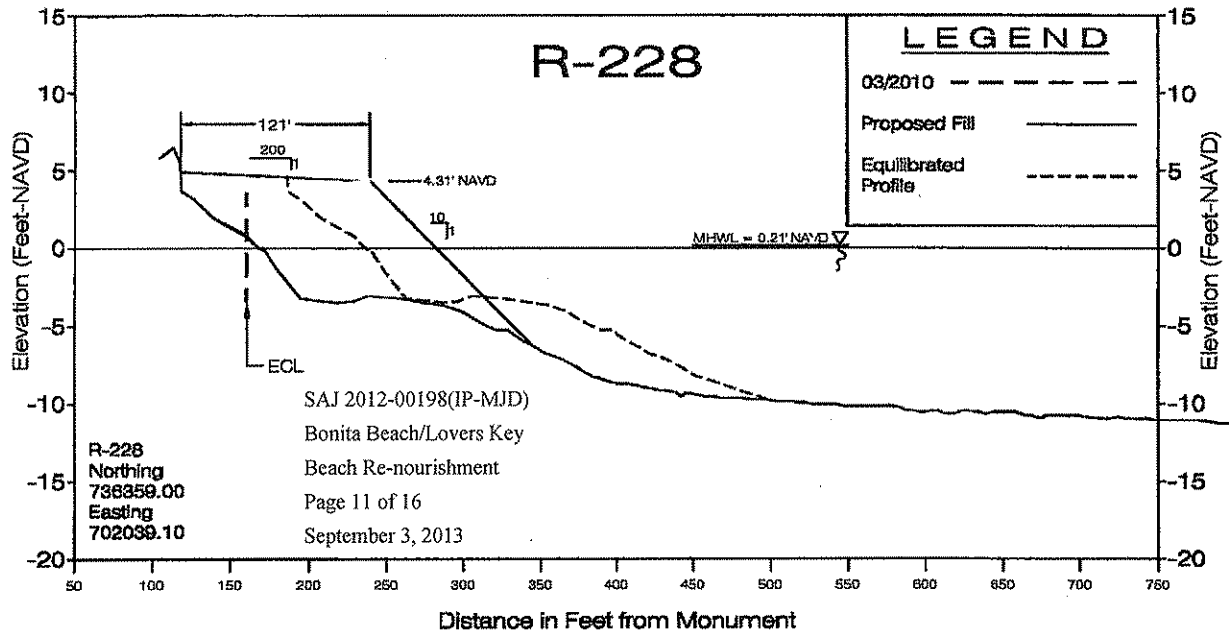
Certificates of Authorization Number: 00004195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH S. FLORIDA MELBOURNE AUSTIN

Profiles - Bonita Beach Fill Template

Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

ENGR CT	DRAWN AQN	SHEET 10
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500


PERMIT # 311211001



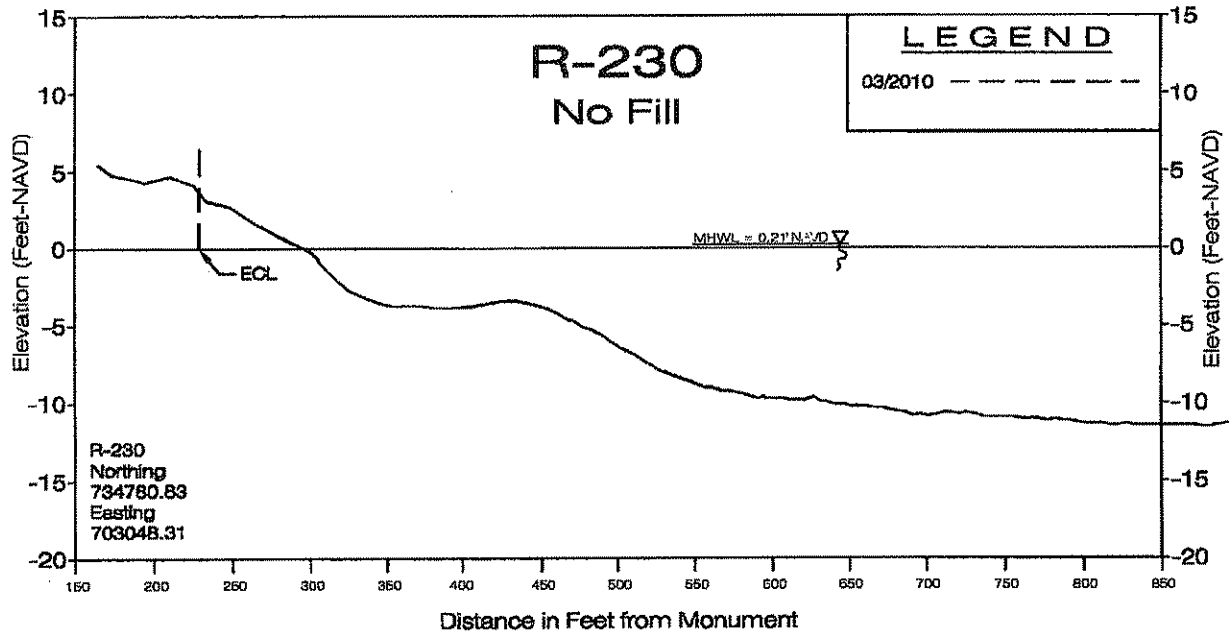
NOTES:

1. March 2010 profile data obtained and reference monument coordinates from Lee County.
2. Proposed fill template modified from June 2002 permit sketches by Applied Technology & Management, Inc.
3. Design Beach constitutes the March 2010 profile. No design beach fill template reflected in Bonita Beach Project Area.


 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

 COASTAL TECH <small>Certificate of Authorization Number: 00004195 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SAR:SOYA MEL:OURNE AUG:TV</small>	Profiles - Bonita Beach Fill Template Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida	ENGR CT	DR./WIN AQN	SHEET 11 <small>OF 16 SHEETS</small>	
		LAST REVISION DATE	01/22/2013	05/08/2012	JOB NO. 29500

PERMIT # 311811001



SAJ 2012-00198(IP-MJD)
 Bonita Beach/Lovers Key
 Beach Re-nourishment
 Page 1 2 of 16
 September 3, 2013

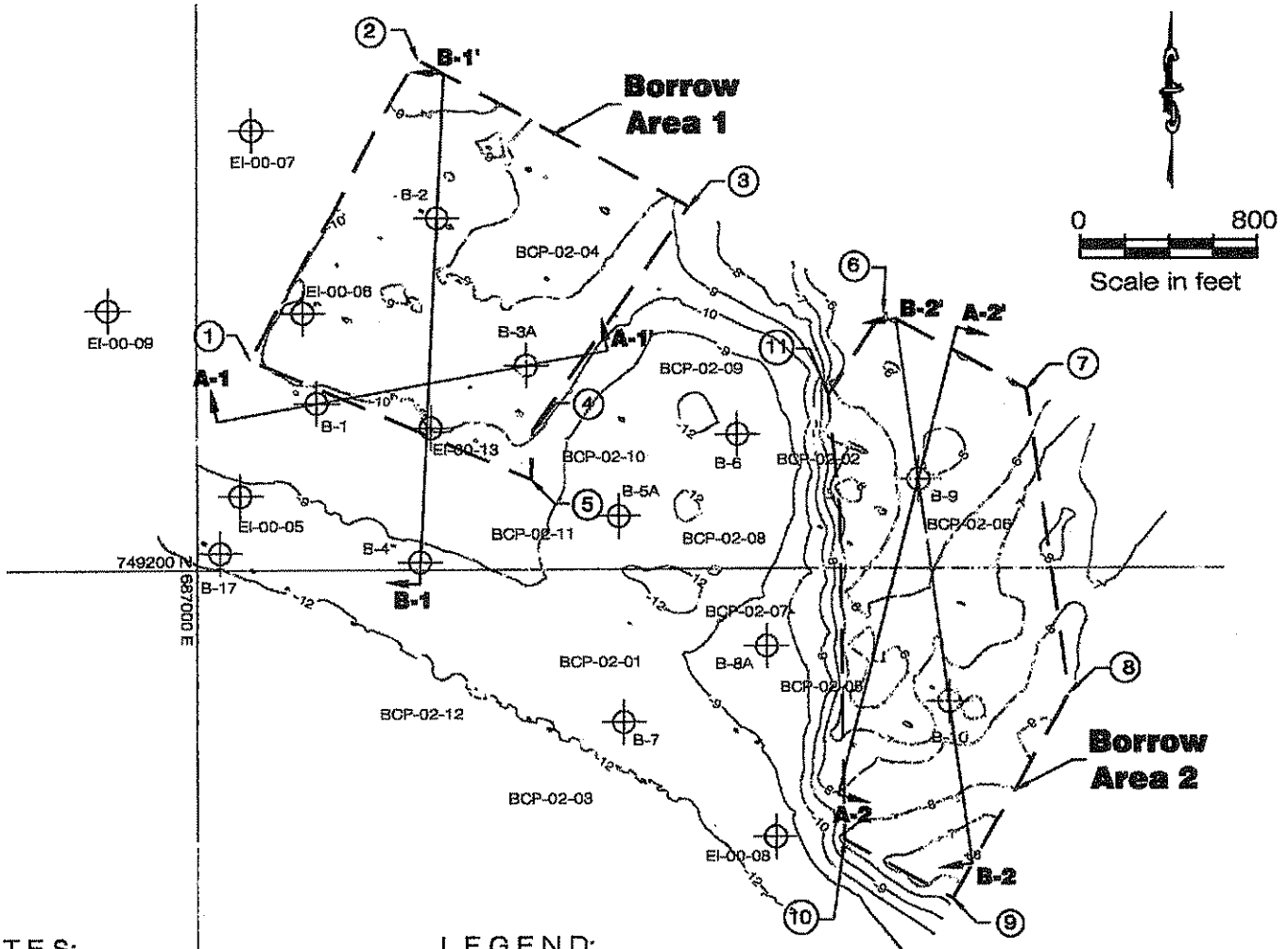
NOTES:

1. March 2010 profile data and reference monument coordinates obtained from Lee County.
2. Proposed fill template modified from June 2002 permit sketches by Applied Technology & Management, Inc.
3. Design Beach constitutes the March 2010 profile. No design beach fill template reflected in Bonita Beach Project Area.

Clifford L. Truitt 1/24/13
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH <small>Certificate of Authorization Number: 00004195 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SARASOTA MELBOURNE AUSTIN</small>	Profiles - Bonita Beach Fill Template Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida	ENGR	DRAWN	SHEET
		CT	AQN	12
		LAST REVISION	DATE	OF 16 SHEETS
		01/22/2013	05/08/2012	JOB NO.
				29500

PERMIT # 311811001



NOTES:

1. Contours prepared by Coastal Tech from bathymetric survey conducted by Morgan & Eklund, February 2012.
2. Coordinates are in feet based on Florida State Plane Coordinate System, West Zone, North American Datum of 1983 (NAD83).
3. Elevations (U.S. Feet) are referenced to the North American Vertical Datum 1988 (NAVD88).
4. The Contractor shall dredge fill material from the proposed borrow areas and transfer via pipeline to the Project Fill Areas by a hydraulic dredge.

LEGEND:

- 2012 Coastal Tech Vibracore
- 2002 ATM Vibracore
- 2000 CPE Vibracore
- Proposed Borrow Area Limits
- Elevation Contour (Feet NAVD)
- Borrow Area Corner

Coordinates of Borrow Area Corners				
Corners	Northing	Easting	Latitude	Longitude
1	750153	687247	N026° 23' 50.74"	W081° 54' 18.15"
2	751523	688009	N026° 24' 04.30"	W081° 54' 09.79"
3	750848	688264	N026° 23' 57.11"	W081° 53' 56.11"
4	748829	688530	N026° 23' 47.52"	W081° 54' 04.05"
5	749610	688523	N026° 23' 45.33"	W081° 54' 04.15"
6	750364	680147	N026° 23' 52.80"	W081° 53' 46.25"
7	750015	680791	N026° 23' 49.34"	W081° 53' 39.21"
8	748632	680973	N026° 23' 35.54"	W081° 53' 37.22"
9	747695	680454	N026° 23' 26.37"	W081° 53' 42.94"
10	747053	689956	N026° 23' 29.03"	W081° 53' 48.35"
11	748989	688862	N026° 23' 48.05"	W081° 53' 49.10"

SAJ 2012-00198(IP-MJD)
 Bonita Beach/Lovers Key
 Beach Re-nourishment
 Page 13 of 16
 September 3, 2013

Clifford L. Truitt
 CLIFFORD L. TRUITT, PE DATE 7/24/13
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH
 Certificate of Authorization Number: 00004195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH SARASOTA MELBOURNE AUSTIN

Plan View - Borrow Area 1&2
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

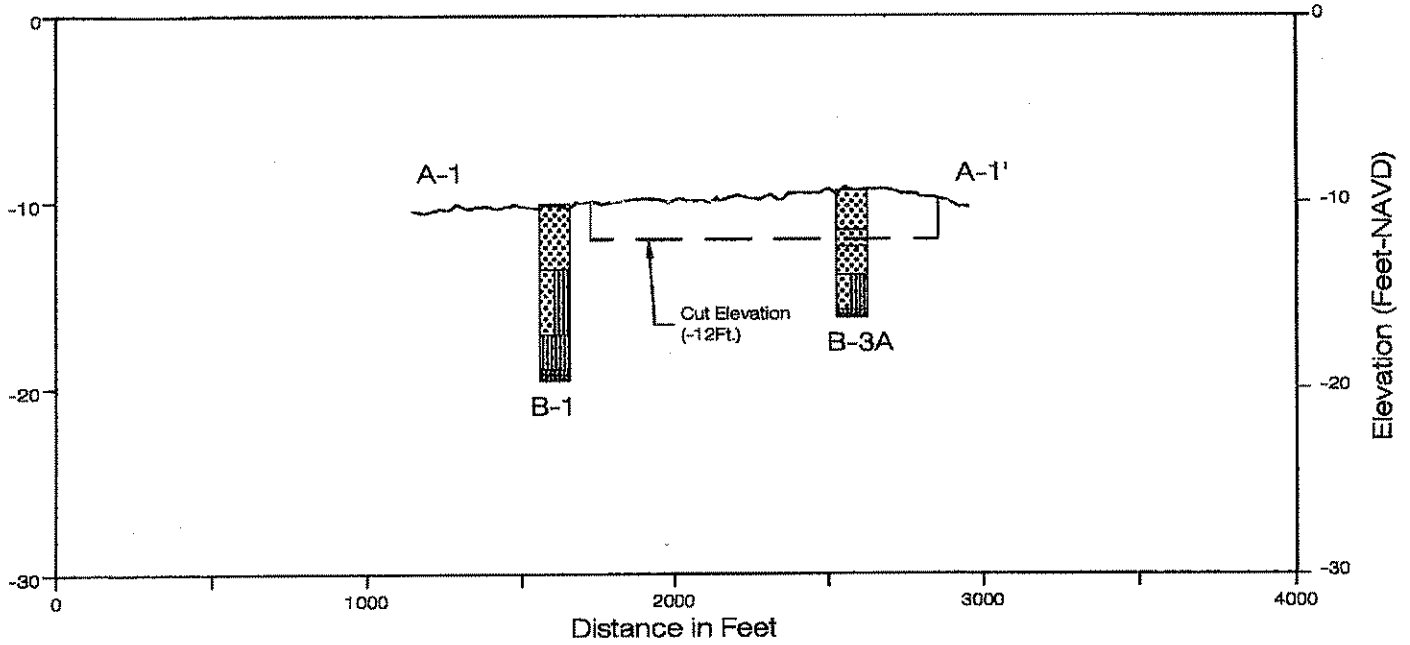
ENGR
 CT
 LAST REVISION
 01/22/2013

DRAWN
 AQN
 DATE
 05/08/2012

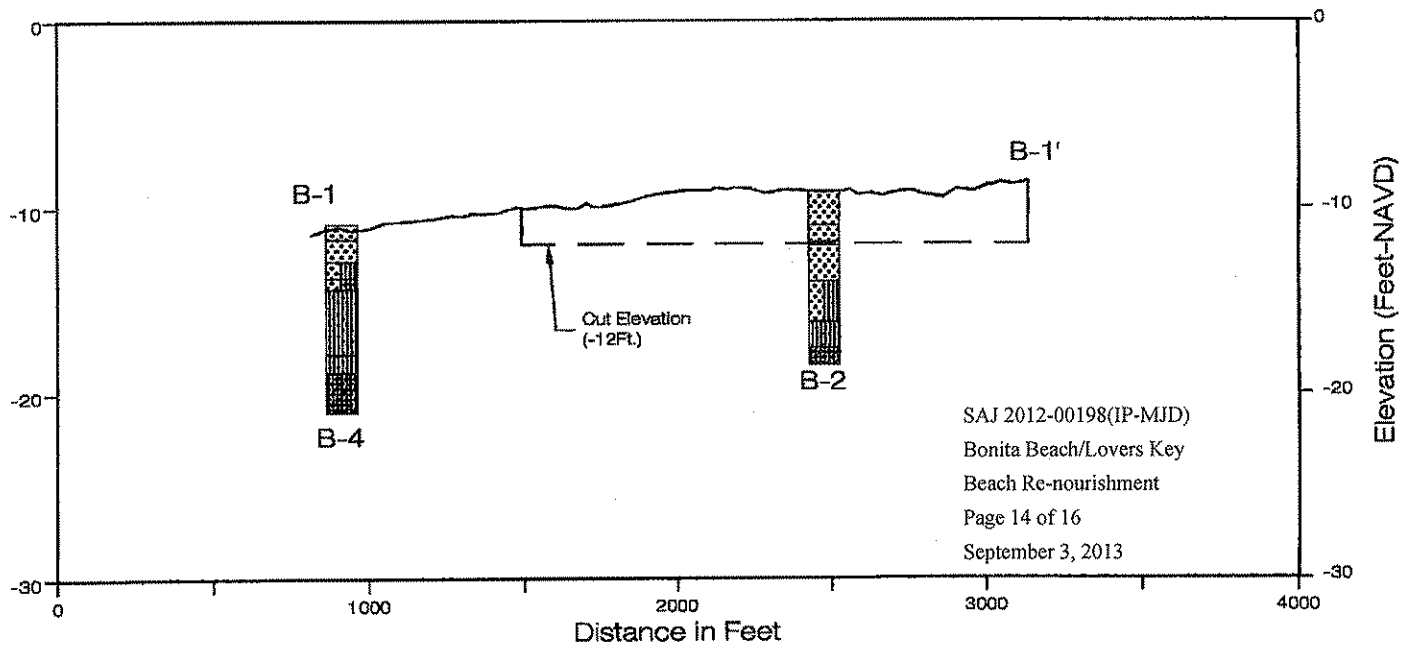
SHEET 13
 OF 16 SHEETS
 JOB NO.
 29500

PERMIT # 31181700

Section A-1 A-1'



Section B-1 B-1'

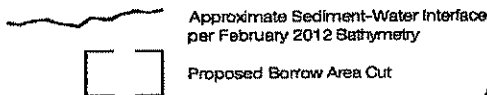


SAJ 2012-00198(IP-MJD)
 Bonita Beach/Lovers Key
 Beach Re-nourishment
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 September 3, 2013

LEGEND:

Actual Layer USC Code

	GM		SP
	GW-GM		SM
	LS		SW
	ML		SW-SM
	SP-SM		SW-SM with Gravel



NOTES:

1. Bathymetry data from a survey by Morgan & Eklund dated February 2012.
2. Elevations (U.S. Feet) are referenced to the North American Vertical Datum 1988 (NAVD88).

Clifford L. Truitt
 CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

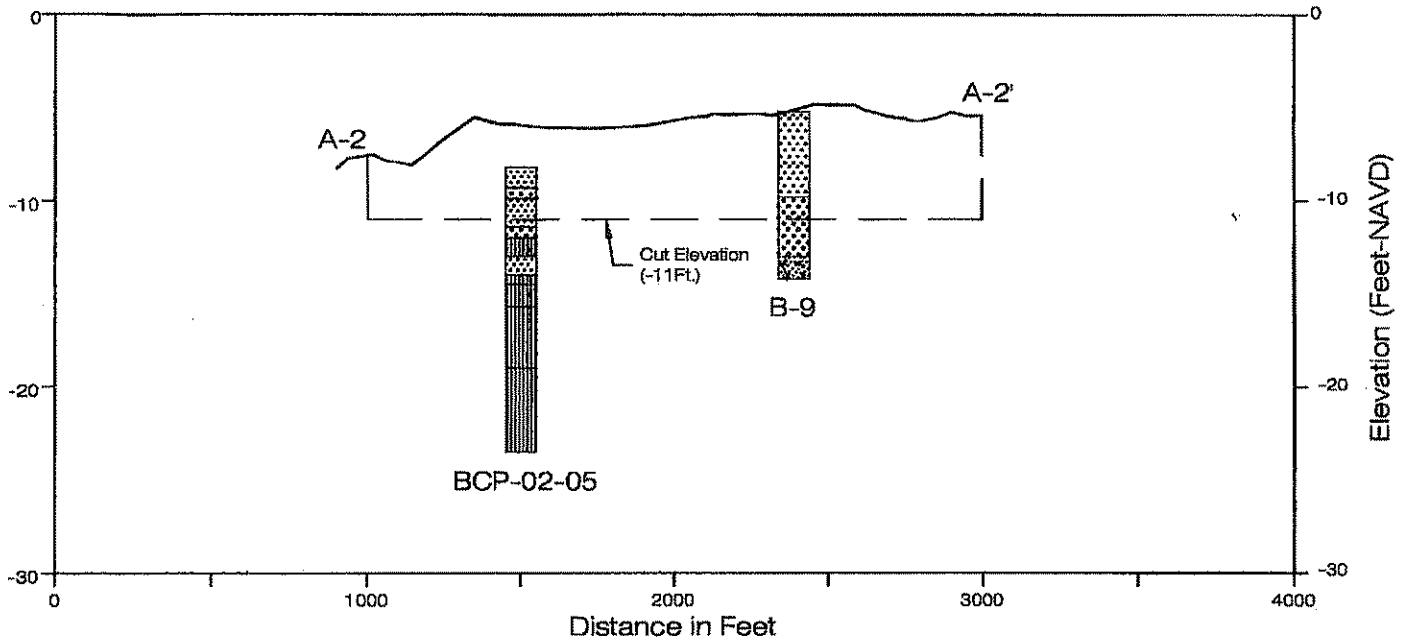
COASTAL TECH
 Certificate of Authorization Number: 00004195
 3625 20th Street, Vero Beach, Florida 32960
 VERO BEACH SARASOTA MELBOURNE AUSTIN

Cross-Sections A-1 A-1' & B-1 B-1' Borrow Area 1
 Bonita Beach & Lovers Key
 Beach Nourishment Project
 Lee County, Florida

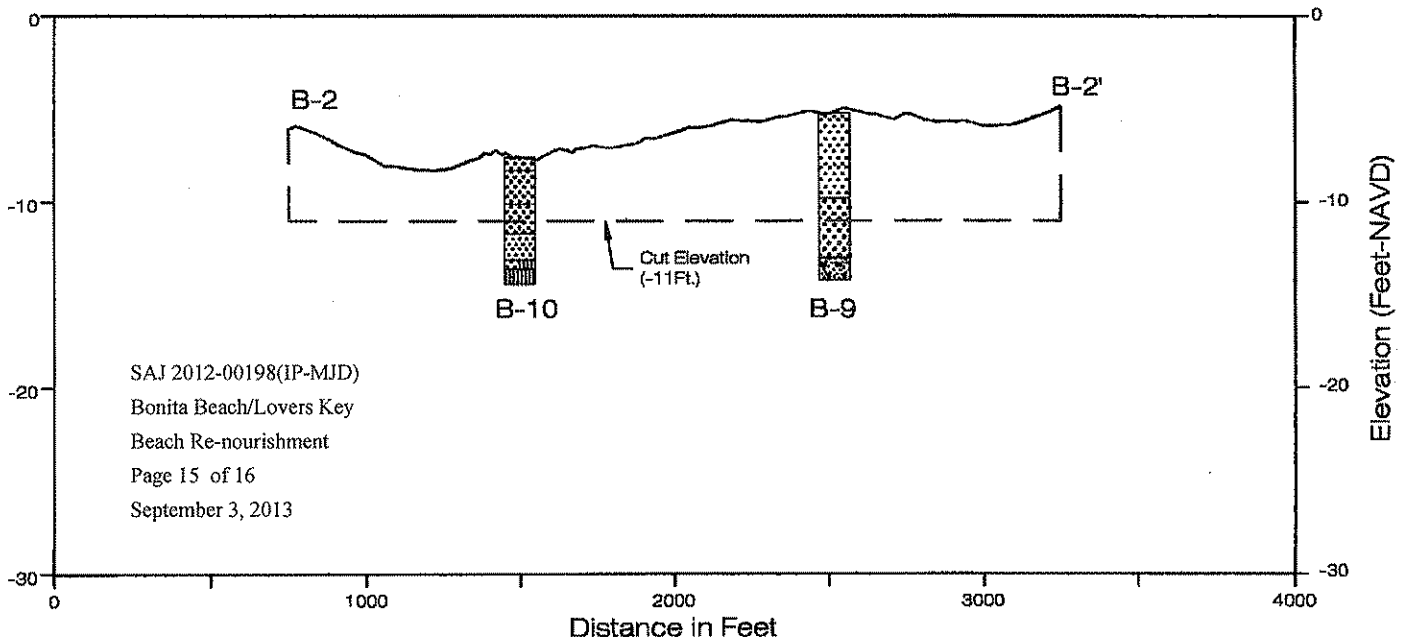
ENGR CT	DRAWN AQN	SHEET 14
LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001

Section A-2 A-2'



Section B-2 B-2'



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 Bonita Beach/Lovers Key
 Beach Re-nourishment
 Page 15 of 16
 September 3, 2013

LEGEND:

Actual Layer LSC Code

- | | | | | |
|--|-------|--|-------------------|---|
| | GM | | SP | Approximate Sediment-Water Interface per February 2012 Bathymetry
Proposed Borrow Area Cut |
| | GW-GM | | SM | |
| | LS | | SW | |
| | ML | | SW-SM | |
| | SP-SM | | SW-SM with Gravel | |

NOTES:

- Bathymetry data from a survey by Morgan & Eldund dated February 2012. Elevations (U.S. Feet) are referenced to the North American Vertical Datum 1988 (NAVD88).

Clifford L. Truitt
 1/24/13

CLIFFORD L. TRUITT, PE DATE
 FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH Certificate of Authorization Number: 00004163 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SARASOTA MELBOURNE AUSTIN	Cross-Sections A-2 A-2' & B-2 B-2' Borrow Area 2		ENGR CT	DRA'ING AQN	SHEET 15
	Bonita Beach & Lovers Key Beach Nourishment Project Lee County, Florida		LAST REVISION 01/22/2013	DATE 05/08/2012	OF 16 SHEETS JOB NO. 29500

PERMIT # 311811001

GENERAL NOTES

1. These drawings are "Permit Sketches" intended to facilitate the evaluation of the proposed Bonita Beach and Lovers Key Beach Nourishment Projects for Lee County, Florida. THESE DRAWINGS ARE NOT FOR CONSTRUCTION.
 2. Elevations refer to North American Vertical Datum (NAVD 88).
 3. Approximately 460,000 cubic yards of sand (345,000 cubic yards for Lovers Key and 116,000 cubic yards for Bonita Beach) are proposed to be dredged from two offshore sand sources (Borrow Area 1 & Borrow Area 2) and placed onto the beach. The Project Areas extend approximately 1.9 miles along Lee County shoreline from FDEP Monuments (a) R-214.5 to R-220.5 (1.1 miles, Lovers Key) and (b) from R-226A to R-230 (0.8 miles, Bonita Beach).
 4. The Contractor shall dredge fill material from the proposed borrow areas and transfer the material via pipeline to the Project Fill Areas by a hydraulic dredge. A temporary shore-parallel dike (expected to be approximately 10' to 20' wide), as required to meet State Water Quality standards, comprised of sand shall be constructed by the contractor to confine and accommodate settlement of the beach fill material from the pipeline discharge during dredging operations. The dike will be advanced along the beach as the pipeline discharge point advances. The Contractor shall maintain the dike so that at least 100 meters of dike exists ahead of the pipeline discharge point. Proposed equipment may be stored and staged on upland Construction Access/Staging Areas and may include: one construction trailer, bulldozers, front end loaders and other similar earth moving equipment.
 - 4a) Borrow Area 1 contains approximately 201,000 cubic yards of beach compatible material. Of the 201,000 cubic yards of beach compatible material in Borrow Area 1 approximately:
 - 116,000 cubic yards is proposed to be used to construct the Bonita Beach renourishment project and
 - 85,000 cubic yards is proposed to be used to construct a portion of Lovers Key renourishment project.
 - 4b) Borrow Area 2 contains approximately 342,500 cubic yards of beach compatible material. 191,210 cubic yards will be used for the remaining portion of the Lovers Key renourishment project
 5. A Construction sequence shall be employed to construct Bonita Beach and Lovers Key in the following order:
 - Bonita Beach will be constructed utilizing Borrow Area 1
 - Lovers Key reduced template will be constructed utilizing remainder of Borrow Area 1 and Borrow Area 2
 6. Upland Construction Access / Staging Areas are as reflected in the permit sketches. The actual area within each designated location to be used by the Contractor will be at the discretion of the Contractor subject to complete restoration of any site used, as approved by the Engineer.
- A Construction Access Route located at the north end of the Bonita Beach Project Area (Bonita Beach Club Condominium) as reflected in the permit sketches shall be limited to light vehicle (and similar) access to the Project Area. The Contractor shall only use this Construction Access Route for light vehicles such as cars, trucks, or all-terrain vehicles. The Access Route shall not be used to store or stage any equipment. The Contractor shall utilize the Construction Access/Staging Area immediately south of R-228 for storage and/or staging of any heavy equipment.
- Prior to and during construction, the Contractor shall (a) implement and maintain all sediment control measures required to retain sediment on-site and to prevent violations of state water quality standards and (b) for protection of any dune vegetation not directly buried by the Project and adjacent to potential Upland Construction Access/Staging Areas.
7. Bonita Beach: The offshore limit of the mixing zone is 150 meters from the point of discharge into the Ocean. The down current mixing zone is 650 meters from the point of discharge.
Lovers Key: The offshore limit of the mixing zone is 300 meters from the point of discharge into the Ocean. The down current mixing zone is 2500 meters from the point of discharge.

Clifford L. Truitt 1/24/13

CLIFFORD L. TRUITT, PE DATE
FLORIDA P.E. LICENSE NUMBER 21194

COASTAL TECH <small>Certificate of Authorization Number: 00004195 3625 20th Street, Vero Beach, Florida 32960 VERO BEACH SAFASOTA MELBOURNE AUSTIN</small>	General Notes	ENGR CT	DRAWN AQN	SHEET 16 OF 16 SHEETS
	Bonita Beach & Lovers Key Beach Nourishment Project	LAST REVISION 01/22/2013	DATE 05/08/2012	JOB NO. 29500
	Lee County, Florida			

PERMIT # 311811001



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

CONSOLIDATED JOINT COASTAL PERMIT AND SOVEREIGN SUBMERGED LANDS AUTHORIZATION

PERMITTEE:

Lee County Natural Resources Division
c/o Steven Boutelle
1500 Monroe Street
Ft. Myers, Florida 33901

PERMIT INFORMATION:

Permit Number: 0311811-001-JC

Project Name: Bonita Beach and Lovers Key
Beach Nourishment

AGENT:

Coastal Technology Corporation
c/o Lois Edwards
3625 20th Street
Vero Beach, Florida 32960

County: Lee

Issuance Date: June 24, 2013

Expiration Date: June 24, 2028

REGULATORY AUTHORIZATION:

This permit is issued under the authority of Chapter 161 and Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.). Pursuant to Operating Agreements executed between the Department of Environmental Protection (Department) and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

PROJECT DESCRIPTION:

The project consists of nourishing 0.8 miles of Bonita Beach and 1.1 miles of Lovers Key Beach using beach compatible material from 2 borrow areas. The borrow areas are part of the Big Carlos Pass ebb shoal complex. These borrow areas are only authorized for one nourishment event.

PROJECT LOCATION:

The nourishment site on Lovers Key extends from 500 feet north of DEP Reference Monument R-215 to 500 feet south of R-220. The nourishment site on Bonita Beach extends from 50 feet south of R-226 to R-230, on Little Hickory Island. The borrow areas are located in the ebb tidal shoal of Big Carlos Pass, between Estero Island and Big Hickory Island. Both of the borrow areas, and the sand placement areas extending seaward from the Erosion Control Line, are on state owned sovereign submerged lands in the Gulf of Mexico, Class III Waters. The project is located in Lee County, Sections 10, 11, 14, 24 and 25, Township 47 South, Range 24 East.

PROPRIETARY AUTHORIZATION:

This activity also requires a proprietary authorization, as the activity is located on sovereign submerged lands held in trust by the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Sections 253.002 and 253.77, F.S. The activity is not exempt from the need to obtain a proprietary authorization. The Board of Trustees delegated, to the Department, the responsibility to review and take final action on this request for proprietary authorization in accordance with Section 18-21.0051, F.A.C., and the Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C. This proprietary authorization has been reviewed in accordance with Chapter 253, Chapter 18-21, F.A.C., and the policies of the Board of Trustees.

As staff to the Board of Trustees, the Department has reviewed the project described above, and has determined that the dredging activity qualifies for a Letter of Consent to use sovereign, submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and conditions herein. Therefore, consent is hereby granted, pursuant to Chapter 253.77, F.S., to perform the activity on the specified sovereign submerged lands.

COASTAL ZONE MANAGEMENT:

This permit constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

WATER QUALITY CERTIFICATION:

This permit constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341.

OTHER PERMITS:

Authorization from the Department does not relieve you from the responsibility of obtaining other permits (Federal, State, or local) that may be required for the project. When the Department received your permit application, a copy was sent to the U.S. Army Corps of Engineers (Corps) for review. The Corps will issue their authorization directly to you, or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date that your application was received by the Department, contact the nearest Corps regulatory office for status and further information. Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.

AGENCY ACTION:

The above named Permittee is hereby authorized to construct the work outlined in the activity description and activity location of this permit and shown on the approved permit drawings, plans and other documents attached hereto. This agency action is based on the

information submitted to the Department as part of the permit application, and adherence with the final details of that proposal shall be a requirement of the permit. **This permit and authorization to use sovereign submerged lands are subject to the General Conditions and Specific Conditions, which are a binding part of this permit and authorization.** Both the Permittee and their Contractor are responsible for reading and understanding this permit (including the permit conditions and the approved permit drawings) prior to commencing the authorized activities, and for ensuring that the work is conducted in conformance with all the terms, conditions and drawings.

GENERAL CONDITIONS:

1. All activities authorized by this permit shall be implemented as set forth in the plans and specifications approved as a part of this permit, and all conditions and requirements of this permit. The Permittee shall notify the Department in writing of any anticipated deviation from the permit prior to implementation so that the Department can determine whether a modification of the permit is required pursuant to section 62B-49.008, Florida Administrative Code.
2. If, for any reason, the Permittee does not comply with any condition or limitation specified in this permit, the Permittee shall immediately provide the Bureau of Beaches and Coastal Systems and the appropriate District office of the Department with a written report containing the following information: a description of and cause of noncompliance; and the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.
3. This permit does not eliminate the necessity to obtain any other applicable licenses or permits that may be required by federal, state, local, special district laws and regulations. This permit is not a waiver or approval of any other Department permit or authorization that may be required for other aspects of the total project that are not addressed in this permit.
4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of sovereignty land of Florida seaward of the mean high-water line, or, if established, the erosion control line, unless herein provided and the necessary title, lease, easement, or other form of consent authorizing the proposed use has been obtained from the State. The Permittee is responsible for obtaining any necessary authorizations from the Board of Trustees of the Internal Improvement Trust Fund prior to commencing activity on sovereign lands or other state-owned lands.
5. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be

**Joint Coastal Permit
Bonita Beach and Lovers Key Beach Nourishment
Permit No. 0311811-001-JC
Page 4 of 27**

considered specifically approved unless a specific condition of this permit or a formal determination under section 373.421(2), F.S., provides otherwise.

6. This permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee. The issuance of this permit does not convey any vested rights or any exclusive privileges.
7. This permit or a copy thereof, complete with all conditions, attachments, plans and specifications, modifications, and time extensions shall be kept at the work site of the permitted activity. The Permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.
8. The Permittee, by accepting this permit, specifically agrees to allow authorized Department personnel with proper identification and at reasonable times, access to the premises where the permitted activity is located or conducted for the purpose of ascertaining compliance with the terms of the permit and with the rules of the Department and to have access to and copy any records that must be kept under conditions of the permit; to inspect the facility, equipment, practices, or operations regulated or required under this permit; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules. Reasonable time may depend on the nature of the concern being investigated.
9. At least forty-eight (48) hours prior to commencement of activity authorized by this permit, the Permittee shall submit to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer) and the appropriate District office of the Department a written notice of commencement of construction indicating the actual start date and the expected completion date and an affirmative statement that the Permittee and the contractor, if one is to be used, have read the general and specific conditions of the permit and understand them.
10. If historic or archaeological artifacts, such as, but not limited to, Indian canoes, arrow heads, pottery or physical remains, are discovered at any time on the project site, the Permittee shall immediately stop all activities in the immediate area that disturb the soil in the immediate locale and notify the State Historic Preservation Officer and the Bureau of Beaches and Coastal Systems (JCP Compliance Officer). In the event that unmarked human remains are encountered during permitted activities, all work shall stop in the immediate area and the proper authorities notified in accordance with Section 872.02, F.S.
11. Within 30 days after completion of construction or completion of a subsequent maintenance event authorized by this permit, the Permittee shall submit to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer) and the appropriate District office of the Department a written statement of completion and certification by a

**Joint Coastal Permit
Bonita Beach and Lovers Key Beach Nourishment
Permit No. 0311811-001-JC
Page 5 of 27**

registered professional engineer. This certification shall state that all locations and elevations specified by the permit have been verified; the activities authorized by the permit have been performed in compliance with the plans and specifications approved as a part of the permit, and all conditions of the permit; or shall describe any deviations from the plans and specifications, and all conditions of the permit. When the completed activity differs substantially from the permitted plans, any substantial deviations shall be noted and explained on two paper copies and one electronic copy of as-built drawings submitted to the Bureau of Beaches and Coastal Systems (JCP Compliance Officer).

SPECIFIC CONDITIONS:

1. No work shall be conducted until and unless the Department issues a Final Order of Variance (File No. 00311811-002-EV) from Rule 62-4.244(5)(c), F.A.C. to establish expanded mixing zones for this project.
2. All reports or notices relating to this permit shall be electronically submitted to the JCP Compliance Officer at JCP.Compliance@dep.state.fl.us.
3. The Permittee shall not store or stockpile tools, equipment, materials, etc., within surface waters of the state without prior written approval from the Department. Storage, stockpiling or access of equipment on, in, over or through wetland, hardbottom, seagrass or other aquatic vegetation) beds is prohibited unless within a work area or ingress/egress corridor specifically approved by this permit. Anchoring or spudding of vessels and barges within beds of aquatic vegetation or over hardbottom areas is also prohibited.
4. The Permittee shall not conduct project operations or store project-related equipment in, on or over dunes, or otherwise impact dune vegetation, outside the approved staging, beach access and dune restoration areas designated in the attached permit drawings.
5. No work shall be conducted under this permit until the Permittee has received a written **Notice to Proceed** from the Department. At least 45 days prior to the requested date of issuance of the notice to proceed, the Permittee shall submit a written request for a Notice to Proceed and the following items for review and approval by the Department:
 - a. Final plans and specifications;
 - b. Documentation that the person(s) conducting the turbidity monitoring has had formal training in water quality monitoring, has professional experience monitoring turbidity for beach nourishment projects, and has experience using the Department's protocol for Field Measurement of Turbidity:
<http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf>
 - c. A Scope of Work for turbidity monitoring to ensure that the right equipment is available to accurately measure turbidity and access the appropriate sampling locations (including sites that may be in or landward of the surf).

6. **Pre-Construction Conference.** The Permittee shall conduct a pre-construction conference to review the specific conditions and monitoring requirements of this permit with the Permittee's contractors, the engineer of record, the turbidity monitoring personnel and the JCP Compliance Officer (or designated alternate) prior to each construction event. In order to ensure that appropriate representatives are available, at least twenty-one (21) days prior to the intended commencement date for the permitted construction, the Permittee is advised to contact the Department, and the other agency representatives listed below:

JCP Compliance Officer
phone: (850) 414-7716
e-mail: JCP.Compliance@dep.state.fl.us

DEP South District Office
Submerged Lands & Environmental Resources
2295 Victoria Avenue, Suite 364
Ft. Myers, Florida 33901-3881
phone: (239) 332-6975

Imperiled Species Management Section
Florida Fish & Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600
phone: (850) 922-4330
fax: (850) 921-4369 or email: marineturtle@myfwc.com

The Permittee is also advised to schedule the pre-construction conference at least a week prior to the intended commencement date. At least seven (7) days in advance of the pre-construction conference, the Permittee shall provide written notification, advising the participants (listed above) of the **agreed-upon** date, time and location of the meeting, and also provide a meeting agenda and a teleconference number.

7. When discharging slurried sand onto the beach from a pipeline, the Permittee shall employ best management practices (BMPs) to reduce turbidity. At a minimum, these BMPs shall include the following:
- a. Use of shore-parallel sand dikes on the beach berm, seaward of the pipeline discharge point, to maximize settlement of suspended sediment on the beach before return water from the dredged discharge reenters the Gulf of Mexico; and
 - b. A pipeline discharge point that is located at least 50 feet from open water, or at the landward edge of the beach berm (if the berm width is less than 50 feet).

MONITORING REQUIRED:

8. Water Quality - Turbidity shall be monitored as follows:

Units: Nephelometric Turbidity Units (NTUs).

Frequency: Three (3) times per day, at least 4 hours apart, during all dredging and filling operations and any re-grading below the MHW line. Sampling shall be conducted **while the highest project-related turbidity levels are crossing the edge of the mixing zone**. Since turbidity levels can be related to pumping rates, the dredge pumping rates shall be recorded, and provided to the Department upon request. The compliance samples and the corresponding background samples shall be collected at approximately the same time, i.e., one shall immediately follow the other.

Location: Background: At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom, clearly outside the influence of any artificially generated turbidity plume or the influence of an outgoing inlet plume.

Dredge Site: Samples shall be collected at least 300 meters up-current from the source of turbidity at the dredge site.

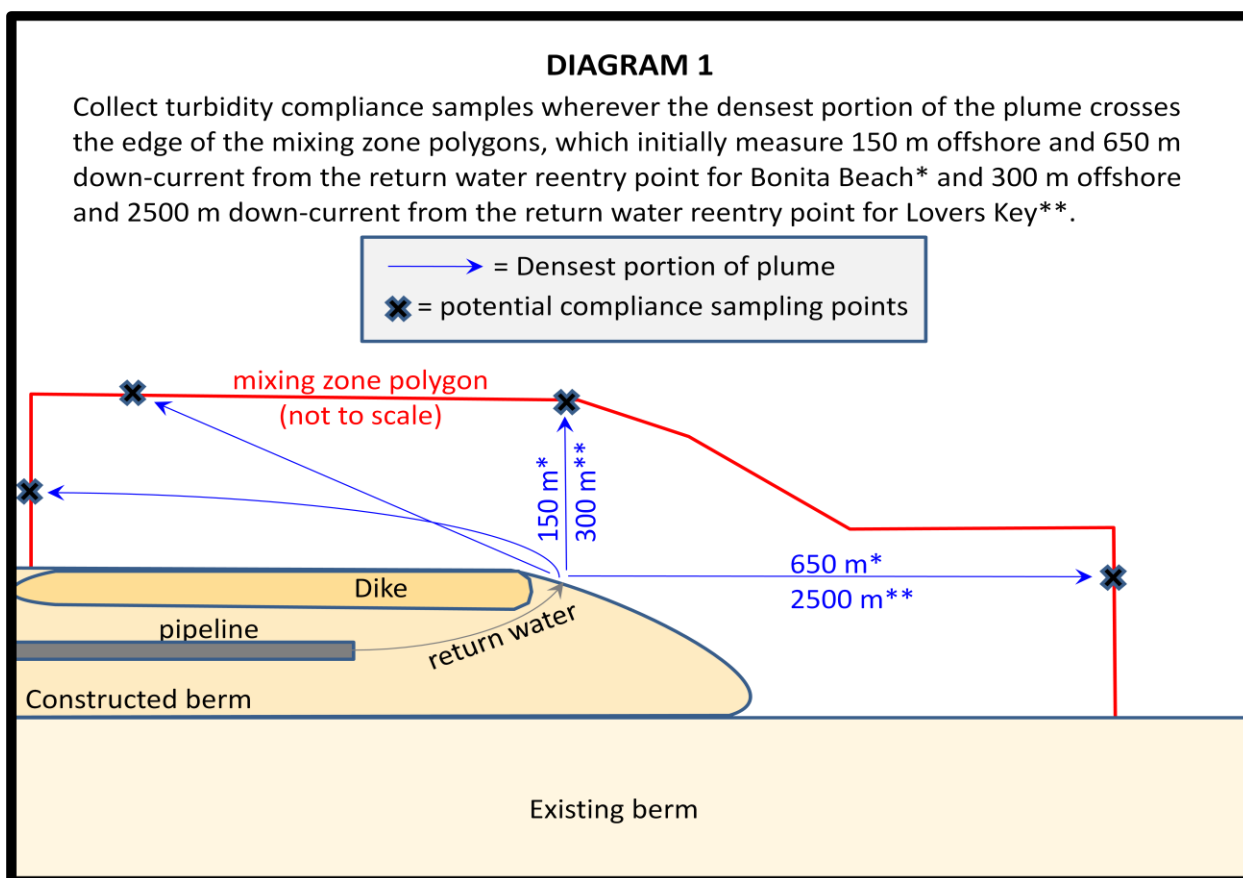
Beach Site: Samples shall be collected at least 500 meters up-current from any portion of the beach that has been, or is being, filled during the current construction event, at the same distances offshore as the associated compliance and intermediate samples.

Compliance: At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom.

Dredge Site: Samples shall be collected 150 meters down-current from the cutterhead, **and** from any other source of turbidity generated by the dredge, in the densest portion of any visible turbidity plume. If no plume is visible, follow the likely direction of flow.

Beach Site: Samples shall be collected where the densest portion of the turbidity plume crosses the edge of the mixing zone polygon. For **Bonita Beach**, the mixing zone polygon measures up to 150 meters offshore and up to 650 meters alongshore from the point where the return water from the dredged discharge reenters the Gulf of Mexico. For **Lovers Key**, the mixing zone polygon measures up to 300 meters offshore and up to 2500 meters alongshore from the point where the return water from the dredged discharge reenters the Gulf of Mexico.

For each sampling event, compliance samples shall be collected within the area of highest turbidity at **both** the rip current location and the longshore drift location. *Note: If the plume flows parallel to the shoreline, the densest portion of the plume may cross the mixing zone polygon at a distance less than the maximum offshore dimension of the mixing zone. In that case, it may be necessary to access the sampling location from the shore, in water that is too shallow for a boat. If the plume flows offshore, it may cross the mixing zone polygon at a distance less than the maximum alongshore dimension of the mixing zone, and the sample would be collected at that point. See Diagram 1.*



Intermediate Monitoring: Samples shall be collected in the densest portion of the turbidity plume, at the surface, mid-depth and (for sites with depths greater than 25 feet) 2 meters from the bottom. The intermediate sampling points at the Bonita Beach nourishment site shall be approximately 150 meters, 300 meters and 500 meters down-current from the point where the return water from the dredged discharge reenters the Gulf of Mexico (if those points are located inside the mixing zone). The

intermediate sampling points for the Lovers Key nourishment site shall be 150 meters, 500 meters, 1000 meters, 1500 meters and 2000 meters down-current from the point where the return water from the dredged discharge reenters the Gulf of Mexico (if those points are located inside the mixing zone). These measurements will be used to calibrate the size of the mixing zone for future nourishment events.

Analysis of turbidity samples shall be performed in compliance with DEP-SOP-001/01 FT 1600 Field Measurement of Turbidity:

<http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf>

Calibration: The instruments used to measure turbidity shall be fully calibrated with primary standards within one month of the commencement of the project, and at least once a month throughout the project. Calibration with secondary standards shall be verified each morning prior to use, after each time the instrument is turned on, and after field sampling using two secondary turbidity “standards” that bracket the anticipated turbidity samples. If the post-sampling calibration value deviates more than 8% from the previous calibration value, results shall be reported as estimated and a description of the problem shall be included in the field notes.

If the turbidity monitoring protocol specified above prevents the collection of accurate data, the person in charge of the turbidity monitoring shall contact the JCP Compliance Officer to establish a more appropriate protocol. Once approved in writing by the Department, the new protocol shall be attached to the permit and shall be implemented without the need for a permit modification.

9. The **compliance** locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals turbidity levels at the **compliance** sites that are greater than 29 NTUs above the corresponding background turbidity levels, construction activities shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. Any such occurrence shall also be immediately reported to the JCP Compliance Officer via email at JCP.Compliance@dep.state.fl.us. The subject line of the email shall state “TURBIDITY EXCEEDANCE”. Also notify the Department’s South District office.

Any project-associated turbidity source other than dredging or fill placement for beach nourishment (e.g., scow or pipeline leakage) shall be monitored as close to the source as possible. If the turbidity level exceeds 29 NTUs above background, the construction activities related to the exceedance shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. This turbidity monitoring shall continue every hour until background turbidity levels are

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restored or until otherwise directed by the Department. The Permittee shall notify the Department, by separate email to the JCP Compliance Officer, of such an event within 24 hours of the time the Permittee first becomes aware of the discharge. The subject line of the email shall state "PROJECT-ASSOCIATED DISCHARGE-OTHER".

When reporting a turbidity exceedance of either type, the following information shall also be included:

- a. the Project Name;
- b. the Permit Number;
- c. location and level (NTUs above background) of the turbidity exceedance;
- d. the time and date that the exceedance occurred; and
- e. the time and date that construction ceased.

Prior to re-commencing the construction, a report shall be emailed to the Department with the same information that was included in the "Exceedance Report", plus the following information:

- a. turbidity monitoring data collected during the shutdown, documenting the decline in turbidity levels and achievement of acceptable levels;
- b. corrective measures that were taken; and
- c. cause of the exceedance.

10. **Turbidity Reports.** All turbidity monitoring data shall be submitted within one week of analysis. The data shall be presented in tabular format, indicating the measured turbidity levels at the compliance sites for each depth, the corresponding background levels at each depth and the number of NTUs over background at each depth. Any exceedances of the turbidity standard (29 NTUs above background) shall be highlighted in the table. In addition to the raw and processed data, the reports shall also contain the following information:

- a. time of day samples were taken;
- b. dates of sampling and analysis;
- c. GPS location of sample
- d. depth of water body;

- e. depth of each sample;
- f. antecedent weather conditions, including wind direction and velocity;
- g. tidal stage and direction of flow;
- h. water temperature;
- i. a map (overlaid on an aerial photograph) indicating the sampling locations, dredging and discharge locations, and direction of flow;
- j. a statement describing the methods used in collection, handling, storage and analysis of the samples;
- k. a statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, calibration of the meter and accuracy of the turbidity and GPS data;
- l. When samples cannot be collected, include an explanation in the report. If unable to collect samples due to severe weather conditions, include a copy of a current report from a reliable, independent source, such as an online weather service.

Monitoring reports shall be submitted by email to the JCP Compliance Officer. In the subject line of the reports, on the cover page to the submittal and at the top of each page, include the Project Name, Permit Number and the dates of the monitoring interval. Failure to submit reports in a timely manner constitutes grounds for revocation of the permit.

PHYSICAL MONITORING

11. Pursuant to 62B-41.005(16), F.A.C., physical monitoring of the project is required through acquisition of project-specific data to include, at a minimum, topographic and bathymetric surveys of the beach, offshore, and borrow site areas, and engineering analysis. The monitoring data is necessary in order for both the project sponsor and the Department to regularly observe and assess, with quantitative measurements, the performance of the project, any adverse effects which have occurred, and the need for any adjustments, modifications, or mitigative response to the project. The scientific monitoring process also provides the project sponsor and the Department with information necessary to plan, design and optimize subsequent follow-up projects, potentially reducing the need and cost of unnecessary work, as well as potentially reducing any environmental impacts that may have occurred or be expected.

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The Permittee shall conduct the activities as specified in the attached *Bonita Beach and Lovers Key 2012 Nourishment Physical Monitoring Plan*, dated May 2012, and in accordance with the following additional guidance:

- a. The monitoring surveys shall be conducted during a spring or summer month and repeated as close as practicable during that same month of the year, **allowing for coordination of physical monitoring activities to coincide at all beach and inlet management within the county, at the discretion of Lee County**. If the time period between the immediate post-construction survey and the first annual monitoring survey is less than six months, then the Permittee may request a postponement of the first monitoring survey until the following spring/summer. The request should be submitted as part of the cover letter for the post-construction report. A prior design survey of the beach and offshore may be submitted for the pre-construction survey if consistent with the other requirements of this condition.
- b. **For the borrow sites, bathymetric surveys of the entire shoal complex, including any attachment bars, shall be conducted.** In all other aspects, work activities and deliverables shall be consistent with the *BBCS Monitoring Standards for Beach Erosion Control Projects, Section 01200*.
- c. The Permittee shall submit an engineering report and the monitoring data to the JCP Compliance Officer within 90 days following completion of the post-construction survey and each annual or biennial monitoring survey.

The report shall summarize and discuss the data, the performance of the beach fill project, and identify erosion and accretion patterns within the monitored area. In addition, the report shall include a comparative review of project performance to performance expectations and identification of adverse impacts attributable to the project. It shall also include graphical representation of pre and post-construction monitoring survey MHW shoreline positions in the project monitoring area relative to the design shoreline. **The analysis of data in the report shall include the effect of all 4 borrow areas.** Appendices shall include plots of survey profiles and graphical representations of volumetric and shoreline position changes for the monitoring area. Results shall be analyzed for patterns, trends, or changes between annual surveys and cumulatively since project construction.

- d. One electronic copy of the monitoring report, and one electronic copy of the survey data shall be submitted to the JCP Compliance Officer. Failure to submit reports and data in a timely manner constitutes grounds for revocation of the permit. When submitting any monitoring information to the Bureau, please include a transmittal cover letter clearly labeled with the following at the top of each page: **"This monitoring information is submitted in accordance with Item No. [XX] of the approved Monitoring Plan for Permit No. [XX] for the monitoring period [XX]."**

The approved Monitoring Plan can be revised at any later time by written request of the Permittee and with the written approval of the Department. If subsequent to approval of the Monitoring Plan there is a request for modification of the permit, the Department may require revised or additional monitoring requirements as a condition of approval of the permit modification.

12. Sediment quality shall be assessed as outlined in the attached Sediment QA/QC plan, dated December 18, 2012. Any occurrences of placement of material not in compliance with the Plan shall be handled according to the protocols set forth in the Sediment QA/QC plans. The sediment testing result shall be submitted to the JCP Compliance Officer within 90 days following the completion of beach construction.
 - a. The Sediment QC/QA plans include the following:
 - b. If during construction, the Permittee or Engineer determines that the beach fill material does not comply with the sediment compliance specifications, measures shall be taken to avoid further placement of noncompliant fill, and the sediment inspection results shall be reported to the JCP Compliance Officer.
 - c. The Permittee shall submit post-construction sediment testing results and an analysis report as outlined in the Sediment QC/QA plan to the JCP Compliance Officer within 90 days following beach construction. The sediment testing results will be certified by a P.E. or P.G. from the testing laboratory. A summary table of the sediment samples and test results for the sediment compliance parameters as outlined in Table 1 of the Sediment QC/QA plan shall accompany the complete set of laboratory testing results. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the geotechnical investigation shall be included in the sediment testing results report.
 - d. A post-remediation report containing the site map, sediment analysis, and volume of noncompliant fill material removed and replaced shall be submitted to the JCP Compliance Officer within 7 days following completion of remediation activities.
13. ***Manatee, Marine Turtle, and Shorebird Protection Conditions.*** During all construction authorized by this permit the Permittee shall comply with the following conditions intended to protect manatees, marine turtles and shorebirds from direct project effects:
 - a. All personnel associated with the project shall be instructed about the presence of marine turtles, manatees and manatee speed zones, and the need to avoid collisions with (and injury to) these protected marine species. The Permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

- b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels shall follow routes of deep water whenever possible.
- c. If Siltation or turbidity barriers are used, they shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid entanglement or entrapment. Barriers must not impede manatee or marine turtle movement.
- d. All on-site project personnel are responsible for observing water-related activities for the presence of marine turtles and manatee(s). **All in-water operations, including vessels, shall be shutdown if a marine turtle or manatee comes within 50 feet of the operation.** Activities shall not resume until the animal(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the animal(s) has not reappeared within 50 feet of the operation. Animals shall not be herded away or harassed into leaving.
- e. Any collision with or injury to a marine turtle or manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service (FWS) in Jacksonville at 1-904-731-3336.
- f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the Permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters - Watch for Manatees* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shutdown of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. The approved signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.
- g. All personnel associated with the project shall be instructed about the potential presence of nesting shorebirds and the need to avoid take of (including disturbance to) these protected species.
- h. All vehicles shall be operated in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (<http://myfwc.com/conservation/you-protect/wildlife/beach-driving/>). Specifically, the vehicle must be operated at a slow speed and run near or below the high-tide line. If beach conditions require

driving above the high tide line, avoid those areas with known sea turtle nests or shorebird breeding areas.

Fish and Wildlife Protection Conditions for Dredging Activities:

14. ***Hopper Dredging.*** In the event a hopper dredge is utilized, the following requirements shall be met in addition to the Terms and Conditions of the applicable NMFS Regional Biological Opinion for Hopper Dredging (Gulf of Mexico):
 - a. Handling of captured sea turtles or sea turtle shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities through a valid Marine Turtle Permit issued by the FWC, pursuant to Chapter 68E-1, F.A.C.
 - b. Standard operating procedure shall be that dredging pumps shall be disengaged by the operator, or the draghead bypass valve shall be open and in use when the dragheads are not firmly on the bottom, to minimize impingement or entrainment of sea turtles within the water column. This precaution is especially important during the cleanup phase of dredging operations.
 - c. A state-of-the-art rigid deflector draghead must be used on all hopper dredges in all channels at all times of the year.
 - d. The Sea Turtle Stranding and Salvage Network (STSSN) Coordinator shall be notified at 1-904-573-3930 or via e-mail at Allen.Foley@myfwc.com of the start-up and completion of hopper dredging operations. In the event of capturing or recovering marine turtles or marine turtle parts, the STSSN should be contacted at 1-888-404-FWCC (3922).
 - e. Relocation trawling or non-capture trawling shall be implemented in accordance with the applicable NMFS Biological Opinion and Incidental Take authorization. Any activity involving the use of nets to harass and/or to capture and handle marine turtles in Florida waters requires a Marine Turtle Permit from FWC.
 - i. The Permittee or their contractor shall e-mail (MTP@MyFWC.com) weekly reports to the Imperiled Species Management section on Friday each week that trawling is conducted in Florida waters. These weekly reports shall include: the species and number of turtles captured in Florida waters, general health, and release information. A summary (FWC provided Excel spreadsheet) of all trawling activity, including non-capture trawling, and all turtles captured in Florida waters, including all measurements, the latitude and longitude (in decimal degrees) of captures and tow start-stop points, and times for the start-stop points of the tows, including those tows on which no turtles

are captured, shall be submitted to MTP@myfwc.com by January 15 of the following year or at the end of the project.

15. ***Seabirds and Shorebirds.*** In cases where dredging activities have the potential to erode beaches or disturb Seabird or Shorebird breeding activities, such as this, *Fish and Wildlife Protection Conditions for Beach Placement of Material* apply.

Fish and Wildlife Protection Conditions for Beach Placement of Dredge Material:

16. ***Beach Maintenance.*** All derelict concrete, metal, and coastal armoring material and other debris shall be removed from the beach to the maximum extent practicable prior to any fill placement. If debris removal activities will take place during shorebird breeding or sea turtle nesting seasons, the work shall be conducted during daylight hours only and shall not commence until completion of daily seabird, shorebird or sea turtle surveys each day. All excavations and temporary alterations of the beach topography shall be filled or leveled to the natural beach profile prior to 9 p.m. each day unless otherwise authorized.
17. ***Pre-Construction Meeting.*** A meeting between representatives of the contractor, the FWS, the FWC, the permitted sea turtle surveyor and Bird Monitors (as appropriate), shall be held prior to commencement of work on projects. 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 protection measures as well as additional guidelines when construction occurs during nesting season, such as staging equipment and reporting within the work area as well as follow up meetings during construction.
18. ***Nesting Seabird and Shorebird Protection Conditions:*** Nesting seabird and shorebird (i.e. shorebird) surveys should be conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. A list of candidate Bird Monitors with their contact information, summary of qualifications including bird identification skills, and avian survey experience shall be provided to the FWC. This information will be submitted to the FWC regional biologist (contact information attached) prior to any construction or hiring for shorebird surveys for revision and consultation. Bird Monitors shall use the following survey protocols:
 - a. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and implement data entry procedures outlined on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). An outline of data to be collected, including downloadable field data sheets, is available on the website.
 - b. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September.

The following dates are based on the best available information regarding ranges and habitat use by species around the state:

All Gulf Coast counties: February 15 – September 1

Breeding season surveys shall begin on the first day of the breeding season or 10 days prior to project commencement (including surveying activities and other pre-construction presence on the beach), whichever is later. Surveys shall be conducted through August 31st or until all breeding activity has concluded, whichever is later.

- c. Breeding season surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. Portions of the project in which there is no potential for project-related activity during the nesting season may be excluded. One or more shorebird survey routes shall be established in the FSD website to cover the potential beach nesting areas.
- d. During the pre-construction and construction phases of the project, surveys for detecting breeding activity and the presence of flightless chicks will be completed on a daily basis prior to movement of equipment, operation of vehicles, or other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young.
- e. Surveys shall be conducted by walking the length of the project area and visually surveying for the presence of shorebirds exhibiting breeding behavior, shorebird/seabird chicks, or shorebird/seabird juveniles as outlined in the FSD *Breeding Bird Protocol for Shorebirds and Seabirds*. Use of binoculars is required.
 - i. If an ATV or other vehicle is needed to cover large project areas, operators will adhere to the FWC's Best Management Practices for Operating Vehicles on the Beach (<http://myfwc.com/conservation/you-protect/conservation/wildlife/beach-driving/>). Specifically, the vehicle must be operated at a speed <6 mph and run at or below the high-tide line. The Bird Monitor will stop at no greater than 200 meter intervals to visually inspect for breeding activity.
- f. Once breeding is confirmed by the presence of a scrape, eggs, or young, the Bird Monitor will notify the FWC Regional Species Conservation Biologist (**contact information attached**) within 24 hours. All breeding activity shall be reported to the FSD website within one week of data collection.

19. *Seabird and Shorebird Buffer Zones and Travel Corridors.* Within the project area, the Permittee shall establish a disturbance-free buffer zone around any location where shorebirds have been engaged in breeding behavior, including territory defense. A 300-foot-wide buffer is considered adequate, based on published studies. However, a smaller, site-specific buffer may be implemented upon approval by the FWC Regional Species Conservation Biologist (**contact information attached**) as needed. All sources of human disturbance (including pedestrians, pets, and vehicles) shall be prohibited in the buffer zone.
- a. The Bird Monitor shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the width of the buffer zone shall be increased immediately to a sufficient size to protect breeding birds.
 - b. Reasonable and traditional pedestrian access should not be blocked where breeding birds will tolerate pedestrian traffic. This is generally the case with lateral movement of beach-goers walking parallel to the beach at or below the highest tide line. Pedestrian traffic may also be tolerated when breeding was initiated within 300 feet of an established beach access pathway. The Permittee shall work with the FWC Regional Species Biologist to determine if pedestrian access can be accommodated without compromising nesting success.
 - c. Designated buffer zones must be marked with posts, twine, and signs stating “Do Not Enter, Important Nesting Area” or similar language around the perimeter which includes the name and a phone number of the entity responsible for posting. Posts should not exceed 3 feet in height once installed. Symbolic fencing (twine, string, or rope) should be placed between all posts at least 2.5 feet above the ground and rendered clearly visible to pedestrians. If pedestrian pathways are approved by the FWC Regional Species Conservation Biologist within the 300-foot buffer zone, these should be clearly marked. The posting shall be maintained in good repair until breeding is completed or terminated. Although solitary nesters may leave the buffer zone with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.
 - d. No construction activities, pedestrians, movement of vehicles, or stockpiling of equipment shall be allowed within the buffer area.
 - e. Travel corridors shall be designated and marked outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may transit past breeding areas in these corridors. However, other activities such as stopping or turning shall be prohibited within the designated

travel corridors adjacent to the breeding site. When flightless chicks are present within or adjacent to travel corridors, movement of vehicles shall be accompanied by the Bird Monitor who will ensure no chicks are in the path of the moving vehicle and no tracks capable of trapping flightless chicks result.

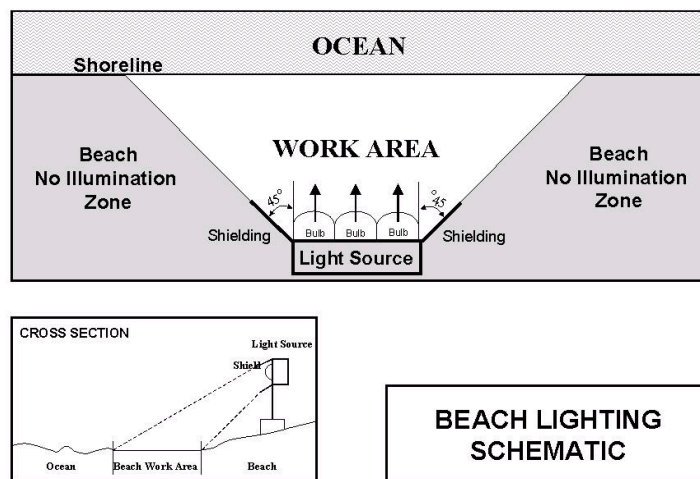
- f. To the maximum extent possible within the travel corridor, all ruts shall be filled or leveled to the natural beach profile prior to completion of daily construction during shorebird nesting season.
 - g. To discourage nesting within the travel corridor, it is recommended that the Permittee should maintain some activity within these corridors on a daily basis, without disturbing any nesting shorebirds documented on site or interfering with sea turtle nesting, especially when those corridors are established prior to commencement of construction.
20. **Notification.** If shorebird breeding occurs within the project area, a bulletin board shall be placed and maintained in the construction staging area with the location map of the construction site showing the bird breeding areas and a warning, clearly visible, stating that “NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS”.
21. **Marine Turtle Nest Surveys and Relocation.** For sand placement projects that occur during the period from May 1 through October 31, daily early morning (before 9 a.m.) surveys shall be conducted and eggs shall be relocated per the requirements below (21a to 21c) until completion of the project. Sea turtle nesting surveys shall be conducted as indicated below.

Marine turtle nesting surveys shall be initiated by April 15 and shall comply with the following requirements.

- a. Nesting surveys and nest marking shall only be conducted by persons with prior experience and training in these activities and who are authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC’s Marine Turtle Management Program in Tequesta at MTP@myfwc.com for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. The contractor shall not initiate work until daily notice has been received from the marine turtle permit holder that the morning survey has been completed. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary marine turtle protection measures.

- b. Only those nests in the area where sand placement will occur shall be relocated. Nests relocation shall not occur upon completion of sand placement. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, or subject to artificial lighting. Nest relocations in association with construction activities shall cease when sand placement activities no longer threaten nests.
 - c. Nests deposited within areas, where construction activities have ceased or will not occur for 65 days or nests laid in the nourished berm prior to tilling, shall be marked and left in place unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and/or a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity shall occur within this area nor shall any activities occur which could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.
22. ***Marine Turtle or Nest Encounters.*** 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, applicant, and/or local sponsor shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922). Care shall be taken in handling injured sea turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.
23. ***Equipment Storage and Placement.*** All construction pipes that are placed on the beach shall be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune. Temporary storage of pipes shall be off the beach to the maximum extent possible. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes should be placed landward of the site before birds are active in that area. No pipe shall be stored or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.
24. ***Project Lighting.*** Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during the sea turtle nesting season and shall comply

with safety requirements. Lighting on offshore or onshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (**Figure below**).



25. **Fill Restrictions.** During the sea turtle nesting season, the contractor shall not extend the beach fill more than 500 feet along the shoreline between dusk and 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 permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500-foot limit is not feasible for the project, the FWC may establish an alternative distance during the preconstruction meeting. 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, at which time the 500-foot length limitation shall apply.
26. **Compaction Sampling.** Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to April 15th for three (3) subsequent years and shall be monitored in accordance with a protocol agreed to by the FWS, FWC, and the Permittee. The requirement for compaction monitoring can be eliminated if the decision is made to till, regardless of post-construction compaction

levels. Out-year compaction monitoring and remediation are not required if placed material no longer remains on the beach.

At a minimum, the protocol provided under a and b below shall be followed. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area shall be tilled immediately prior to the following date listed above. 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 FWC or FWS 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.

- a. Compaction sampling stations shall be located at 500-foot intervals along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).
- b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches, three times for each depth (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports shall include all 18 values for each transect line, and the final 6 averaged compaction values.
- c. No compaction sampling shall occur within 300 feet of any shorebird nest.
- d. Any vehicles operated on the beach in association with compaction surveys shall operate in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (<http://myfwc.com/conservation/you- conserve/wildlife/beach-driving/>).

27. ***Tilling Requirements.*** If tilling is required as specified above, the area shall be tilled to a depth of 24 inches. All tilling activity shall be completed prior to the marine turtle nesting season. If tilling occurs during shorebird nesting season (See 18b above), shorebird surveys prior to tilling shall be required per the Shorebird Conditions included within this document. It is the responsibility of the contractors to avoid tilling, scarp removal, or dune vegetation planting in areas where nesting birds are present. Each pass of the tilling equipment shall be overlapped to allow thorough and even tilling. If the project is completed during the marine turtle nesting season, tilling will not be performed in areas where nests have been left in place or relocated. If compaction measurements

are taken, a report on the results of the compaction monitoring shall be submitted electronically to FWC at marineturtle@myfwc.com prior to any tilling actions being taken.

- a. No tilling shall occur within 300 feet of any shorebird nest.
 - b. If flightless shorebird young are observed within the work zone or equipment travel corridor, a Shorebird Monitor shall be present during the operation to ensure that equipment does not operate within 300 feet of the flightless young.
 - c. A relatively even surface, with no deep ruts or furrows, shall be created during tilling. To do this, chain-linked fencing or other material shall be dragged over those areas as necessary after tilling.
 - d. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3foot buffer around the vegetated areas. The slope between the mean high water line and the mean low water line must be maintained in such a manner as to approximate natural slopes.
 - e. Any vehicles operated on the beach in association with tilling shall operate in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (<http://myfwc.com/conservation/you-serve/wildlife/beach-driving/>).
28. ***Escarpment Surveys.*** Weekly visual surveys for escarpments along the project area shall be made immediately after completion of the sand placement project, during sea turtle nesting season, and during the period from March 15 to April 15, for three (3) subsequent years if sand from the project area still remains on the beach.

Escarpments that interfere with sea turtle nesting, or that exceed 18 inches in height for a distance of at least 100 feet, shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by April 15. Any escarpment removal shall be reported (by location) to the FWC. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. FWC shall be contacted immediately if subsequent reformation of escarpments occurs during the nesting and hatching season, and the escarpments are expected to either interfere with sea turtle nesting or exceed 18 inches in height for a distance of 100 feet. The FWC would then determine the required action to be taken by the Permittee. If it is determined that escarpment leveling is required during the nesting or hatching season, the FWS or FWC will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted electronically to marineturtle@myfwc.com along with the annual summary as described below. If escarpment removal occurs during shorebird breeding season (see 28b), shorebirds surveys shall be required (per the *Shorebird*

Conditions included within this document) prior to removal. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the dry beach).

- a. No heavy equipment shall operate within 300 feet of any shorebird nest.
- b. If flightless shorebird young are observed within the work zone or equipment travel corridor, a Shorebird Monitor shall be present during the operation to ensure that equipment does not operate within 300 feet of the flightless young.
- c. Any vehicles operated on the beach in association with escarpment surveys or removal shall operate in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (<http://myfwc.com/conservation/you-protect/wildlife/beach-driving/>).

Post-construction Shorebird Protection Conditions:

29. If beach cleaning will occur on the nourished beach, a minimum of 30% of the biotic material within the wrack line shall be left on the beach post-cleaning at the strand line in a natural configuration to ensure that the nourished beach re-establishes its function as foraging habitat for shorebirds. This shall occur for as long as the placed sand remains on the beach.

Post-construction Monitoring and Reporting Marine Turtle Protection Conditions:

30. Reports on all marine turtle nesting activity shall be provided to the FWC for the initial marine turtle nesting (*May 1 through September 15*) and hatching (*through October 31*) season and for up to three additional nesting seasons as follows:
 - a. For the initial nesting season, the number and type of emergences (nests or false crawls) shall be reported per species in accordance with the **Table below**.
 - b. For the initial nesting season, reproductive success shall be reported per species in accordance with the **Table below**. Reproductive success shall be reported for all sea turtle nests if possible. Otherwise a statistically significant number of nests for each species shall be reported.
 - c. Monitoring of nesting activity in the seasons following construction shall include daily surveys and any additional measures authorized by the FWC. Summaries shall include all crawl activity, nesting success rates, hatching success of all relocated nests, hatching success of a representative sampling of nests left in place (if any) by species, project name and applicable project permit numbers and dates of construction.

- d. Post Construction year-two surveys shall only need to record nest numbers and nesting success.

Data shall be reported for the nourished areas in accordance with the **Table below** and shall include number of nests lost to erosion or washed out. Summaries of nesting activity shall be submitted in electronic format (Excel spreadsheets) to the FWC Imperiled Species Management section at MTP@myfwc.com. All summaries shall be submitted by January 15 of the following year. The FWC Excel spreadsheet is available upon request from MTP@myfwc.com.

31. Two lighting surveys shall be conducted of all artificial lighting visible from the nourished berm. The first survey shall be conducted between May 1 and May 15 during the first nesting season following construction, or immediately after placement if construction is not completed until after May 15, and a second survey shall be conducted between July 15 and August 1 during the same nesting season as the first survey. The survey shall be conducted by the Permittee or local sponsor and should be conducted to include a landward view from the top of the foreshore slope. The survey should follow standard techniques for such a survey and include number and type of visible lights, location of lights and photo documentation. For each light source visible, it must be documented that the property owner(s) have been notified of the problem light with recommendations for correcting the light. Recommendations must be in accordance with the Florida Model Lighting Ordinance for Marine Turtle Protection (Chapter 62B-55, F.A.C.) and local lighting restrictions. In addition to local code enforcement, actions must be taken by the Permittee to ensure that no lights or light sources are visible from the newly elevated beach within their respective areas. A report summarizing all lights visible shall be submitted to FWC Imperiled Species Management Section at marineturtle@myfwc.com by the 1st of the month following the survey. A summary report documenting what corrective actions have been taken, and all compliance and enforcement actions, shall also be submitted by December 15 of that year. After the annual report is completed, a meeting shall be set up with the Permittee or local sponsor, county or municipality, FWC and the FWS to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area.

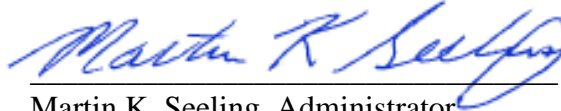
**Joint Coastal Permit
Bonita Beach and Lovers Key Beach Nourishment
Permit No. 0311811-001-JC
Page 26 of 27**

Table. Marine Turtle Monitoring:

Metric	Duration	Variable	Criterion
Nesting Success	Year of construction, one year to two or three 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 emergences by day by species	40% or greater
Hatching Success	Year of construction and one to three years post construction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of hatchlings by species to completely escape egg	Average of 60% or greater (data must include washed out nests)
Emergence Success	Year of construction and one to three years 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	Average must not be significantly different than the average hatching success
Disorientation	Year of construction and one to three years post construction if placed sand remains on beach	Number of nests and individuals that misorient or disorient	
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	100% reduction in lights visible from nourished berm within one to two month period
Compaction	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 up to 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

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION



Martin K. Seeling, Administrator
Beaches, Inlets and Ports Program

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to Section 120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.



6/24/13

Deputy Clerk

Date

Prepared by: Liz Yongue.

Attachments: Approved Permit Drawings (15 pages)
QA/QC Plan (approved on January 24, 2013)
Bonita Beach and Lovers Key 2012 Nourishment Physical Monitoring Plan
(dated May 2012)



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

FINAL ORDER OF VARIANCE

GRANTEE:

Lee County Natural Resources Division
c/o Steven Boutelle
1500 Monroe Street
Ft. Myers, Florida 33901

AGENT:

Coastal Technology Corporation
c/o Lois Edwards
3625 20th Street
Vero Beach, Florida 32960

PROJECT INFORMATION:

Variance No. 0311811-002-BV

Issuance Date: June 24, 2013

Expiration Date: Same as expiration date of
Permit No. 0311811-001-JC

County: Lee

Project: Bonita Beach and Lover's Key
Beach Nourishment

FINAL ORDER BY THE DEPARTMENT:

The Department of Environmental Protection (Department) hereby grants, to Lee County, a variance from the requirements of Rule 62-4.244(5)(c), Florida Administrative Code (F.A.C.), to establish a temporary mixing zone greater than 150 meters.

This variance will temporarily establish an expanded mixing zone of up to 650 meters downcurrent and 150 meters offshore for the nourishment site at Bonita Beach, and another expanded mixing zone of up to 2,500 meters downcurrent and 300 meters offshore for the nourishment site at Lover's Key. This temporary variance shall only be valid during the construction activities authorized in Permit No. 0311811-001-JC and shall expire when the permit expires on May 16, 2023, unless the permit is modified to grant a time extension.

The associated joint coastal permit (No. 0311811-001-JC) is to nourish 0.8 miles of Bonita Beach and 1.1 miles of Lover's Key Beach using beach compatible material from borrow areas in the Big Carlos Pass ebb shoal complex.

After reviewing the Petition for Variance, the Department concluded that it satisfied the requirements and criteria set forth in Section 403.201, Florida Statutes (F.S.), and Rule 62-110, F.A.C.

The *Consolidated Notice of Intent to Issue Joint Coastal Permit, Variance and Authorization to Use Sovereign Submerged Lands* notified Lee County of the Department's proposed agency action and advised them of their right to a hearing pursuant to Sections 120.569 and 120.57, F.S. On May 1, 2013, notice was given in the Fort Myers News-Press and on May 1, 2013, notice was given in the Florida Administrative Register informing the public of the Department's intended action and offering an opportunity for hearing pursuant to Sections 120.569 and 120.57, F.S. A copy of the notice is attached as Exhibit A.

The Grantee and interested parties, having been advised of their rights under Chapter 120, F.S., and having failed or declined to file a Petition pursuant to Sections 120.569 and 120.57, F.S., are hereby deemed to have waived those rights. Acceptance of the variance constitutes notice and agreement that the Department will periodically review this variance for compliance, including site inspections where applicable, and may initiate enforcement action for violation of the conditions and requirements thereof. It is therefore:

ORDERED by the State of Florida, Department of Environmental Protection, that the Petition of Lee County requesting a variance be and is hereby granted, subject to the conditions specified by the Department in Permit No. 0311811-001-JC.

Any Party to this Order has the right to seek judicial review of the Order Pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of the Appellate Procedure, with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Order is filed with the clerk of the Department.

DONE AND ORDERED this 24 day of June, 2013, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION



Danielle H. Irwin, Deputy Division Director
Division of Water Resource Management

Final Order of Variance
Variance No. 0311811-002-BV
Permit No. 0311811-001-JC
Bonita Beach and Lover's Key Beach Nourishment
Page 3 of 3

Copies furnished to:

Lucy Blair, DEP, South District
Robert Brantly, DEP DWRM
Subarna Malakar, DEP DWRM
Vladimir Kosmynin, DEP DWRM
Alex Reed, DEP DWRM
Vince George, DEP DWRM
Robbin Trindell, FWC ISMS
Luke Davis, FWC ISMS

Jenny Cowart, DEP DWRM
Marshall Flake, DEP Parks
Sri Tammisetti, DEP Parks
Gloria Beauchamp, Lovers Key State Park
FWCConservationPlanningServices@myfwc.com
Tunis McElwain, U.S. Army Corps of Engineers
DWRM Permit File
DWRM Compliance Officer

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to Section 120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Lauren Wild

6/24/13

Deputy Clerk

Date

Prepared by: Liz Yongue

**ATTACHMENT 3:
As Built Conditions**

2 pages

AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Submit this form and one set of as-built engineering drawings to the U.S. Army Corps of Engineers, Special Projects and Enforcement Branch, 1520 Royal Palm Square Blvd., Suite 310, Ft. Myers, Florida 33919. If you have questions regarding this requirement, please contact the Special Projects and Enforcement Branch at 239-334-1975 X 24.

1. Department of the Army Permit Number: SAJ-2012-00198(IP-MJD)

2. Permittee Information:

Name _____

Address _____

3. Project Site Identification:

Physical location/address _____

4. As-Built Certification:

I hereby certify that the authorized work, including any mitigation required by Special Conditions to the permit, has been accomplished in accordance with the Department of the Army permit with any deviations noted below. This determination is based upon on-site observation, scheduled and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

Signature of Engineer Name (Please type)

(FL, PR or VI) Reg. Number Company Name

Address

City State ZIP

(Affix Seal)

Date Telephone Number

Attachment 4
Standard Manatee Conditions
For In-Water Work (2011)
2 pages

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK

2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

- a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.
- b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.
- c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.
- d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.
- e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com
- f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:



Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

Attachment 5
Sea Turtle and Smalltooth Sawfish
Construction Conditions
Revised March 23, 2006
1 page



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.
- d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.
- g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc





United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960



March 8, 2013

Colonel Alan M. Dodd
District Commander
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service CPA Activity Code: 2012-CPA-0204
Corps Application No.: SAJ-2012-00198 (IP-MJD)
Date Received: July 16, 2012
Formal Consultation Initiation Date: October 26, 2012
Project: Lovers Key/Little Hickory Island
Sand Placement
Applicant: Lee County Department of Natural
Resources
County: Lee County

Dear Colonel Dodd:

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion to the U.S. Army Corps of Engineers (Corps) based on our review of a proposal to place beach compatible dredge material along the shorelines at Little Hickory Island (Bonita Beach) and Lovers Key State Park (Lovers Key), Lee County, Florida. This document will address potential effects of the proposed project on the threatened piping plover (*Charadrius melodus*), threatened loggerhead sea turtle (*Caretta caretta*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered green sea turtle (*Chelonia mydas*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), and endangered West Indian manatee (*Trichechus manatus*). This document is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) share Federal jurisdiction for sea turtles under the Act. The Service has the responsibility for sea turtles on the nesting beaches and NOAA Fisheries has jurisdiction for sea turtles in the marine environment. Our analysis will only address activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NOAA Fisheries will assess and consult with the Corps concerning potential impacts to sea turtles in the marine environment.

In the Corps' letter dated July 12, 2012, the Corps determined the proposed project "may affect, not likely to adversely affect," the piping plover and requested concurrence. Given that piping plover

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critical habitat unit FL-26 is located north of the proposed project area and piping plover optimal habitat occurs within and adjacent to the project area, the Service did not concur with the Corps' determination. Therefore, in a letter dated August 28, 2012, the Corps determined the proposed project "may affect" the piping plover and requested initiation of formal consultation.

This Biological Opinion is based on information provided in Corps letters dated July 12 and August 28, 2012, Public Notice dated July 12, 2012, supplemental documents, and correspondence with the Corps, NOAA Fisheries, and the Florida Fish and Wildlife Conservation Commission (FWC). A complete administrative record of this consultation is on file at the South Florida Ecological Services Office, Vero Beach, Florida.

FISH AND WILDLIFE RESOURCES

Hardbottom reef habitat and seagrasses

The proposed project could affect approximately 23.9 and 44.2 acres of marine unconsolidated substrate community within the project template along Bonita Beach and Lovers Key, respectively. These acreages were estimated by calculating the area between the mean high water line (MHWL) and the projected equilibrated toe of fill. It is a mineral-based (rather than floral or faunal-based) community that is characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. The project area encompasses the non-vegetated beach from the MHWL to the open waters of the Gulf of Mexico. No hardbottom habitat or seagrass exist within the project area based on sand placement projects conducted in 1995 and 2004, and aerial surveys conducted in October 2011. This permit does not authorize impacts to seagrass and all dredging is restricted to unvegetated areas. Prior to pipeline placement, visual seagrass surveys shall be conducted to verify the pipeline is located over unvegetated barren areas.

No seagrass impacts are anticipated as a result of the proposed project, such as, but not limited to propeller scouring, pipeline placement, vessel or barge anchoring, grounding, or spudding. Lee County Department of Natural Resources (Applicant) shall be liable for any unauthorized impacts. For any impacts caused by construction activities, seagrass restoration or mitigation may be required which will be coordinated through the Corps, NOAA Fisheries, and the Service.

The Corps will continue to consult with the NOAA Fisheries whom will assess all potential effects to hardbottom reef habitat and seagrasses within the dredge template and sand placement fill template.

Consultation History

On July 16, 2012, the Service received a copy of the Corps' letter dated July 12, 2012, and Public Notice concerning the proposed sand placement project at Lovers Key and Little Hickory Island, Lee County, Florida.

On August 22, 2012, the Service e-mailed the Corps a request for additional information.

On August 28, 2012, the Service received a letter from the Corps revising their determination for both nesting sea turtles and piping plovers to "may affect" and requested initiation of formal consultation.

On September 4, 2012, the Service received the requested additional information from the consultant.

On October 11, 2012, the Service e-mailed the Corps a second request for additional information.

On October 17, 2012, the Service received the requested additional information from the consultant.

On October 26, 2012, the Service completed their review of the proposed project and initiated formal consultation with the Corps concerning the potential effects of the proposed project on piping plovers.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Applicant proposes to dredge approximately 460,000 cubic yards (cy) of beach compatible sand from two offshore borrow areas and place it along 1.9 miles of shoreline in Lee County, Florida (Figure 1). Approximately 345,000 cy and 116,000 cy of dredge material will be placed along Lovers Key (Florida Department of Environmental Protection [DEP] reference monument R-214.5 to R-220.5) and Bonita Beach (DEP reference monument R-226.5 to R-230), respectively. Dredge material will be hydraulically pumped from the borrow areas to the fill templates through a pipeline which will be floated on the surface and/or submerged on the bottom as necessary and appropriate for conditions. The contractor may elect to run pipe the length of Lovers Key and extend the pipe across New Pass to the Bonita Beach segment. The absence of benthic resources of concern should eliminate the need for designated pipeline corridors. Fill will be discharged by the pipeline onto the beach within diked work areas in compliance with the approved turbidity control plan and to comply with mixing zone requirements. A temporary shore-parallel dike (approximately 10 feet x 20 feet wide) comprised of sand, will be constructed to confine and accommodate settlement of the beach fill material as required to meet State of Florida Water Quality standards. As the pipeline discharge point advances, the dike will be advanced along the shoreline. The dike shall be maintained so that at least 300 feet of dike exists ahead of the pipeline discharge point. All beach compatible dredge material placed within the sand placement templates will be graded using heavy equipment to the permitted design fill profiles as follows:

Bonita Beach

1. No dune feature
2. Berm design
 - 2a. Width ranges between 105 to 134 feet.
 - 2b. Crest slope of 1 vertical foot: 200 horizontal feet.
 - 2c. Seaward top of berm crest elevation at +4.3 feet North American Vertical Datum (NAVD).
 - 2d. Seaward berm face slope of 1 vertical foot: 15 horizontal feet down to the existing profile.

Lovers Key

1. Dune feature at DEP reference monument R-215 at an elevation of +4.9 feet NAVD with a seaward dune face slope of 1 vertical foot: 5 horizontal feet.
2. Berm design
 - 2a. Width ranges between 49 to 151 feet.
 - 2b. Crest slope of 1 vertical foot: 200 horizontal feet.
 - 2c. Seaward top of berm crest elevation at +2.9 NAVD.
 - 2d. Seaward berm face slope of 1 vertical foot: 15 horizontal feet down to the existing profile.

All sand placed within the beach fill template must be approved by the DEP and meet all requirements as outlined in the Florida Administrative Code subsection 62B-41.007. The purpose of the Bonita Beach project is to restore the originally constructed project to provide storm damage protection and a recreational beach. The purpose of the Lovers Key project is to maintain and preserve the environmental habitat and recreational beach width via reconstruction of the original project.

All beach corridors, staging areas, and pipeline corridors will be selected to avoid affects to upland habitat. Construction vehicles and equipment must traverse or be stored within these designated areas, corridors, and/or within the pipeline corridor. In addition, all construction pipes will be placed parallel to the shoreline and positioned as far landward as possible up to the vegetated dune line. The construction access and staging area at Bonita Beach is located at County Beach Access #10 which is a public parking area. A small amount of vegetation (primarily seagrapes, sea oats, and Spanish bayonet) will be removed to allow construction equipment access to the fill template. The Lovers Key access and staging area is located between DEP reference monument R-218 and R-219 and devoid of vegetation. Any existing vegetated habitat at these sites and corridors shall be protected to the maximum extent practicable. Any affected vegetation at each of these sites and corridors shall be restored to pre-construction conditions. In addition, if heavy equipment and vehicles are required to traverse the dry beach above the MHWL, the path will be tilled to a depth of 3 feet to avoid compaction effects prior to the following sea turtle nesting season.

The proposed sand placement project along Bonita Beach and Lovers Key is scheduled to occur between April 1 and June 30, 2013, and July 1 and October 31, 2013, respectively. Dredging and sand placement activities will take place 24 hours per day, 7 days a week.

The Lovers Key component of the proposed project area lies within Coastal Barrier Resources Act (CBRA) Unit P17, Lovers Key Complex. This unit is part of the Coastal Barrier Resources System (System) which supports suitable habitat for species listed under the Act. The purposes of CBRA are to minimize the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife, and other natural resources associated with units of the System. Because there is no Federal funding allocated for the proposed project, there are no CBRA-related restrictions.

Action area

The action area is defined as all areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action. The Service identifies the action area to include the offshore borrow areas and dredge template, beach fill template (a total of approximately 1.84 miles), pipeline corridors, beach access corridors, staging areas, and downdrift area. The project is located along the Gulf of Mexico, Lee County, Florida, at latitude 26.3642 and longitude -81.8633 (Bonita Beach north limit) and latitude 26.3944 and longitude -81.8839 (Lovers Key north limit).

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

The piping plover is a small, pale sand-colored shorebird, about 7 inches long with a wingspan of about 15 inches (Palmer 1967). On January 10, 1986, the piping plover was listed as endangered in the Great Lakes watershed and threatened elsewhere within its range, including migratory routes outside of the Great Lakes watershed and wintering grounds (Service 1985). Piping plovers were listed principally because of habitat destruction and degradation, predation, and human disturbance. Protection of the species under the Act reflects the species' precarious status range-wide. Three separate breeding populations have been identified, each with its own recovery criteria: the northern Great Plains (threatened), the Great Lakes (endangered), and the Atlantic Coast (threatened). The piping plover winters in coastal areas of the U.S. from North Carolina to Texas, and along the coast of eastern Mexico and on Caribbean islands from Barbados to Cuba and the Bahamas (Haig and Elliott-Smith 2004). Piping plover subspecies are phenotypically indistinguishable, and most studies in the nonbreeding range report results without regard to breeding origin. Although a recent analysis shows strong patterns in the wintering distribution of piping plovers from different breeding populations, partitioning is not complete and major information gaps persist. Therefore, information summarized here pertains to the species as a whole (*i.e.*, all three breeding populations), except where a particular breeding population is specified.

Critical habitat

The Service has designated critical habitat for the piping plover on three occasions. Two of these designations protected different piping plover breeding populations. Critical habitat for the Great Lakes breeding population was designated May 7, 2001 (66 Federal Register [FR] 22938, Service 2001a), and critical habitat for the northern Great Plains breeding population was designated September 11, 2002 (67 FR 57637, Service 2002). The Service designated critical habitat for wintering piping plovers on July 10, 2001 (66 FR 36038; Service 2001a). Wintering piping plovers may include individuals from the Great Lakes and northern Great Plains breeding populations as well as birds that nest along the Atlantic Coast. The three separate designations of piping plover critical habitat demonstrate diversity of constituent elements between the two breeding populations as well as diversity of constituent elements between breeding and wintering populations.

Designated wintering piping plover critical habitat originally included 142 areas (the rule states 137 units; this is an error) encompassing approximately 1,793 miles of mapped shoreline and 165,211 acres of mapped areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. Since the designation of wintering critical habitat, 19 units (TX-3, 4, 7-10, 14-19, 22, 23, 27, 28, and 31-33) in Texas have been vacated and remanded back to the Service for reconsideration by Court order (*Texas General Land Office vs. U.S. Department of Interior* [Case No. V-06-CV-00032]). On May 19, 2009, the Service published a final rule designating 18 revised critical habitat units in Texas, totaling approximately 139,029 acres (74 FR 23476).

The Courts vacated and remanded back to the Service for reconsideration, four units in North Carolina (*Cape Hatteras Access Preservation Alliance vs. U.S. Department of Interior* [344 F. Supp. 2d 108 D.D.C. 2004]). The four critical habitat units vacated were NC-1, 2, 4, and 5, and all occurred within Cape Hatteras National Seashore. A revised designation for these four units was published on October 21, 2008 (73 FR 62816). On February 6, 2009, Cape Hatteras Access Preservation Alliance and Dare and Hyde Counties, North Carolina, filed a legal challenge to the revised designation. A final decision has not been made on the North Carolina challenge to date.

The primary constituent elements (PCEs) for piping plover wintering habitat are those biological and physical features that are essential to the conservation of the species. The PCEs are those habitat components that support foraging, roosting, and sheltering, and the physical features necessary for maintaining the natural processes that support these habitat components. PCEs typically include those coastal areas that support intertidal beaches and flats, and associated dune systems and flats above annual high tide (Service 2001b). PCEs of wintering piping plover critical habitat include sand or mud flats or both with no or sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers (Service 2001b). Important components of the beach/dune ecosystem include surf-cast algae, sparsely vegetated back beach and salterns, spits, and washover areas. Washover areas are broad, unvegetated zones, with little or no topographic relief, that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action. The units designated as critical habitat are those areas that have consistent use by piping plovers and that best meet the biological needs of the species. The amount of wintering habitat included in the designation appears sufficient to support future recovered populations, and the existence of this habitat is essential to the conservation of the species. Additional information on each specific unit included in the designation can be found at 66 FR 36038 (Service 2001b).

Feeding areas

Plovers forage on moist substrate features such as intertidal portions of ocean beaches, washover areas, mudflats, sand flats, algal flats, shoals, wrack lines, sparse vegetation, and shorelines of coastal ponds, lagoons, and ephemeral pools, and adjacent to salt marshes (Gibbs 1986; Zivojnovich 1987; Nicholls 1989; Coutu et al. 1990; Nicholls and Baldassarre 1990a; Nicholls and Baldassarre 1990b; Hoopes et al. 1992; Loegering 1992; Goldin 1993a; Elias-Gerken 1994; Wilkinson and Spinks 1994; Zonick 1997; Service 2001b). Studies have shown that the relative importance of various feeding habitat types may vary by site (Gibbs 1986; Coutu et al. 1990;

McConnaughey et al. 1990; Loegering 1992; Goldin 1993a; Hoopes 1993). Cohen et al. (2008) documented more abundant prey items and biomass on sound island and sound beaches than the ocean beach. Ecological Associates Incorporated [EAI] (2009) observed that during piping plover surveys conducted at St Lucie Inlet, Martin County, Florida, intertidal mudflats and/or shallow subtidal grassflats appeared to have greater value as foraging habitat than the unvegetated intertidal areas of a flood shoal.

Foraging/food

Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging (Nicholls and Baldassarre 1990a; Drake 1999a, 1999b). Feeding activities may occur during all hours of the day and night (Staine and Burger 1994; Zonick 1997), and at all stages in the tidal cycle (Goldin 1993a; Hoopes 1993). Wintering plovers primarily feed on invertebrates such as polychaete marine worms, various crustaceans, fly larvae, beetles, and occasionally bivalve mollusks (Bent 1929; Cairns 1977; Nicholls 1989; Zonick and Ryan 1996) found on top of the soil or just beneath the surface.

Habitat

Wintering piping plovers prefer coastal habitats that include sand spits, islets (small islands), tidal flats, shoals (usually flood tidal deltas), and sandbars that are often associated with inlets (Harrington 2008). Sandy mud flats, ephemeral pools, and overwash areas are also considered primary foraging habitats. These substrate types have a richer infauna than the foreshore of high energy beaches and often attract large numbers of shorebirds (Cohen et al. 2008). Wintering plovers are dependent on a mosaic of habitat patches and move among these patches depending on local weather and tidal conditions (Nicholls and Baldassarre 1990a).

Recent study results in North Carolina, South Carolina, and Florida, complement information from earlier investigations in Texas and Alabama (summarized in the 1996 Atlantic Coast and 2003 Great Lakes Recovery Plans) regarding habitat use patterns of piping plovers in their coastal migration and wintering range. As documented in Gulf Coast studies, nonbreeding piping plovers in North Carolina primarily used sound (bay or bayshore) beaches and sound islands for foraging and ocean beaches for roosting, preening, and being alert (Cohen et al. 2008). The probability of piping plovers being present on the sound islands increased with increasing exposure of the intertidal area (Cohen et al. 2008). Maddock et al. (2009) observed shifts to roosting habitats and behaviors during high-tide periods in South Carolina.

Seven years of surveys, two to three times per month, along 8 miles of Gulf of Mexico (ocean-facing) beach in Gulf County, Florida, cumulatively documented nearly the entire area used at various times by roosting or foraging piping plovers. Birds were reported using the midbeach to the intertidal zone. Numbers ranged from 0 to 39 birds on any given survey day (Eells unpublished data).

As observed in Texas studies, Lott et al. (2009) identified bay beaches (bay shorelines as opposed to ocean-facing beaches) as the most common landform used by foraging piping plovers in southwest Florida. However in northwest Florida, Smith (2007) reported landform use by foraging piping plovers about equally divided between Gulf of Mexico (ocean-facing) and bay

beaches. Exposed intertidal areas were the dominant foraging substrate in South Carolina (accounting for 94 percent of observed foraging piping plovers; Maddock et al. 2009) and in northwest Florida (96 percent of foraging observations; Smith 2007). In southwest Florida, Lott et al. (2009) found approximately 75 percent of foraging piping plovers on intertidal substrates.

Recent geographic analysis of piping plover distribution on the upper Texas coast noted major concentration areas at the mouths of rivers, washover passes (low, sparsely vegetated barrier island habitats created and maintained by temporary, storm-driven water channels), and major bay systems (Arvin 2008). Earlier studies in Texas have drawn attention to washover passes, which are commonly used by piping plovers during periods of high bayshore tides and during the spring migration period (Zonick 1997, 2000). Elliott-Smith et al. (2009) reported piping plover concentrations on exposed seagrass beds and oyster reefs during seasonal low water periods in 2006.

Atlantic Coast and Florida studies highlighted the importance of inlets for nonbreeding piping plovers. Almost 90 percent of roosting piping plovers at ten coastal sites in southwest Florida were on inlet shorelines (Lott et al. 2009). Piping plovers were among seven shorebird species found more often than expected ($p = 0.0004$; Wilcoxon Test Scores) at inlet locations versus noninlet locations in an evaluation of 361 International Shorebird Survey sites from North Carolina to Florida (Harrington 2008).

Bird populations in and adjacent to the project areas for Lovers Key State Park and Bonita Beach are monitored by volunteers. Launched in 2002, by the Cornell Lab of Ornithology and National Audubon Society, eBird provides data concerning bird abundance and distribution at a variety of spatial and temporal scales. eBird is sponsored in part by several Service programs, research groups, non-government offices, and the University of the Virgin Islands. In 2011, three piping plovers were reported along the interiors of Lovers Key State Park. In 2013, piping plovers were reported from areas north of Big Carlos Pass on Fort Myers Beach. In addition, piping plover PCEs are present throughout the proposed action area.

The effects of dredge material deposition merit further study. Drake et al. (2001) concluded conversion of southern Texas mainland bayshore tidal flats to dredged material impoundments results in a net loss of habitat for wintering piping plovers because impoundments eventually convert to upland habitat not utilized by piping plovers. Zonick et al. (1998) reported dredged material placement areas along the intracoastal waterway in Texas were rarely used by piping plovers, and noted concern that dredge islands block wind-driven water flows which are critical to maintaining important shorebird habitats. By contrast, most of the sound islands used by foraging piping plovers at Oregon Inlet were created by the Corps through deposition of dredged material in the subtidal bay bottom, with the most recent deposition ranging from 28 to less than 10 years prior to the study (Cohen et al. 2008).

Mean home range size (95 percent of locations) for 49 radio-tagged piping plovers in southern Texas in 1997 through 1998 was 3,113 acres, mean core area (50 percent of locations) was 717 acres, and the mean linear distance moved between successive locations (1.97 ± 0.04 days apart) averaged across seasons, was 2.1 miles (Drake 1999a; Drake et al. 2001). Seven radio-tagged piping plovers used a 4,967-acre area (100 percent minimum convex polygon) at Oregon

Inlet in 2005 and 2006, and piping plover activity was concentrated in 12 areas totaling 544 acres (Cohen et al. 2008). Noel and Chandler (2008) observed high fidelity of banded piping plovers along a 0.62 and 2.8 mile section of beach on Little St. Simons Island, Georgia.

Migration

Plovers depart their breeding grounds for their wintering grounds between July and late August, but southward migration extends through November. Piping plovers use habitats in Florida primarily from July 15 through May 15. Both spring and fall migration routes of Atlantic Coast breeders are believed to occur primarily within a narrow zone along the Atlantic Coast (Service 1996). The pattern of both fall and spring counts at many Atlantic Coast sites demonstrates that many piping plovers make intermediate stopovers lasting from a few days up to 1 month during their migrations (Noel and Chandler 2005; Stucker and Cuthbert 2006). Some midcontinent breeders travel up or down the Atlantic Coast before or after their overland movements (Stucker and Cuthbert 2006). Use of inland stopovers during migration is also documented (Pompei and Cuthbert 2004). The source breeding population of a given wintering individual cannot be determined in the field unless it has been banded or otherwise marked. Information from observation of color-banded piping plovers indicates that the winter ranges of the breeding populations overlap to a significant degree. See the *Status and Distribution* section for additional information pertaining to population distribution on the wintering grounds. While piping plover migration patterns and needs remain poorly understood and occupancy of a particular habitat may involve shorter periods relative to wintering, information about the energetics of avian migration indicates that this might be a particularly critical time in the species' life cycle.

Natural protection

Cryptic coloration is a primary defense mechanism for piping plovers where nests, adults, and chicks all blend in with their typical beach surroundings. Piping plovers on wintering and migration grounds respond to intruders (e.g., pedestrian, avian, and mammalian) usually by squatting, running, and flushing (flying).

Roosting

Several studies identified wrack (organic material including seaweed, seashells, driftwood, and other materials deposited on beaches by tidal action) as an important component of roosting habitat for nonbreeding piping plovers. Lott et al. (2009) found greater than 90 percent of roosting piping plovers in southwest Florida in old wrack with the remainder roosting on dry sand. In South Carolina, 18 and 45 percent of roosting piping plovers were in fresh and old wrack, respectively. The remainder of roosting birds used intertidal habitat (22 percent), backshore (defined as the zone of dry sand, shell, cobble and beach debris from the mean high water line up to the toe of the dune; 8 percent), washover (2 percent), and ephemeral pools (1 percent) (Maddock et al. 2009). Thirty percent of roosting piping plovers in northwest Florida were observed in wrack substrates with 49 percent on dry sand and 20 percent using intertidal habitat (Smith 2007). In Texas, seagrass debris (bayshore wrack) was an important feature of piping plover roosting sites (Drake 1999a). Mean abundance of two other plover species in California, including the listed western snowy plover, was positively correlated with an abundance of wrack during the nonbreeding season (Dugan et al. 2003).

Life history

Piping plovers live an average of 5 years, although studies have documented birds as old as 11 (Wilcox 1959) and 15 years. Piping plover breeding activity begins in mid-March when birds begin returning to their nesting areas (Coutu et al. 1990; Cross 1990; Goldin et al. 1990; MacIvor 1990; Hake 1993). Plovers are known to begin breeding as early as 1 year of age (MacIvor 1990; Haig 1992); however, the percentage of birds that breed in their first adult year is unknown. Piping plovers generally fledge only a single brood per season, but may re-nest several times if previous nests are lost.

The most consistent finding in the various population viability analyses conducted for piping plovers (Ryan et al. 1993; Melvin and Gibbs 1996; Plissner and Haig 2000; Wemmer et al. 2001; Larson et al. 2002; Amirault et al. 2005; Calvert et al. 2006; Brault 2007) indicates even small declines in adult and juvenile survival rates will cause increases in extinction risk. A banding study conducted between 1998 and 2004 in Atlantic Canada concluded lower return rates of juvenile (first year) birds to the breeding grounds than was documented for Massachusetts (Melvin and Gibbs 1994), Maryland (Loegering 1992), and Virginia (Cross 1996) breeding populations in the mid-1980s and very early 1990s. This is consistent with failure of the Atlantic Canada population to increase in abundance despite high productivity (relative to other breeding populations) and extremely low rates of dispersal to the U.S. over the last 15 plus years (Amirault et al. 2005). This suggests maximizing productivity does not ensure population increases.

Efforts to partition survival within the annual cycle are beginning to receive more attention, but current information remains limited. Drake et al. (2001) observed no mortality among 49 radio-tagged piping plovers (total of 2,704 transmitter days) in Texas in 2007 and 2008. Cohen et al. (2008) documented no mortality of 7 radio-tagged wintering piping plovers at Oregon Inlet from December 2005 to March 2006. They speculate their high survival rate was attributed to plover food availability much of the day as well as the low occurrence of days below freezing and infrequent wet weather. Analysis of South Carolina resighting data for 87 banded piping plovers (78 percent Great Lakes breeders) in 2006 and 2007, and 2007 and 2008, found 100 percent survival from December to April (Cohen 2009). However, of those birds, one unique and one nonuniquely banded piping plover were seen in the first winter and resighted multiple times in the second fall at the same location, but not seen during the second winter. Whether these two birds died in the fall or shifted their wintering location is unknown (Maddock et al. 2009). Noel et al. (2007) inferred two winter (November to February) mortalities among 21 banded (but not radio-tagged) overwintering piping plovers in 2003 through 2004, and 9 mortalities among 19 overwintering birds during the winter of 2004 through 2005 at Little St. Simons Island, Georgia. Noel et al. (2007) inferred mortality if a uniquely banded piping plover with multiple November to February sightings on the survey site disappeared during that time and was never observed again in either its nonbreeding or breeding range. Note that most of these birds were from the Great Lakes breeding population, where detectability during the breeding season is very high. LeDee (2008) found higher apparent survival rates during breeding and southward migration than during winter and northward migration for 150 adult (*i.e.*, after-hatch year) Great Lakes piping plovers. "Apparent survival" does not account for permanent emigration. If marked individuals leave a survey site, apparent survival rates will be lower than true survival. If a survey area is sufficiently large, such that emigration out of the site is unlikely, apparent survival will approach true survival.

Mark-recapture analysis of resightings of uniquely banded piping plovers from seven breeding areas by Roche et al. (2009) found apparent adult survival declined in four populations and did not increase over the life of the studies (data were analyzed for 3 to 11 years per breeding area between 1998 and 2008). Some evidence of correlation in year-to-year fluctuations in annual survival of Great Lakes and eastern Canada populations, both of which winter primarily along the southeastern U.S. Atlantic Coast, suggests shared over-wintering and/or migration habitats may influence annual variation in survival. Further concurrent mark-resighting analysis of color-banded individuals across piping plover breeding populations has the potential to shed light on threats that affect survival in the migration and wintering range.

Population dynamics

The 2006 International Piping Plover Breeding Census, the last comprehensive survey throughout the breeding grounds, documented 3,497 breeding pairs with a total of 8,065 birds throughout Canada and the U.S, and a total of 454 in Florida (Elliott-Smith et al. 2009). The surveys covered approximately 760.5 miles and included 186 sites (Elliott-Smith et al 2009). As the Atlantic Coast is not included in the action area, the breakdown for the Gulf Coast of Florida is: 321 piping plovers at 117 sites covering approximately 522 miles of suitable habitat (Elliott-Smith et al 2009).

Numbers for Florida can be further broken down into 3 regions along the Gulf Coast. The northwest Florida census area in the panhandle extends from the Alabama line to Jefferson County, the north Florida census area from Taylor County south to Manatee County, and southwest Florida from Sarasota County south to Key West National Wildlife Refuge. Northwest Florida numbers for the 2006 International Piping Plover Census were 111 with an increased survey effort from previous years. This represents an increase from the 53 piping plovers sighted in the 2001 effort. North Florida reported 96 birds and estimated an additional 40 from missing data sheets. There were 74 piping plovers located in southwest Florida as compared to 50 in the 2001 effort (Elliott-Smith et al 2009). The mainland portion of Monroe County is, technically, on the Gulf Coast of Florida; however, the predominant habitat is mangrove shoreline and no piping plovers were sighted at the survey location on Pavilion Key.

Atlantic Coast population

The Atlantic Coast piping plover breeds on coastal beaches from Newfoundland and southeastern Quebec to North Carolina. Historical population trends for the Atlantic Coast piping plover have been reconstructed from scattered, largely qualitative records. Nineteenth-century naturalists, such as Audubon and Wilson, described the piping plover as a common summer resident on Atlantic Coast beaches (Haig and Oring 1987). However, by the beginning of the twentieth century, egg collecting and uncontrolled hunting, primarily for the millinery trade, had greatly reduced the population, and in some areas along the Atlantic Coast, the piping plover was close to extirpation. Following passage of the Migratory Bird Treaty Act (MBTA) in 1918, and changes in the fashion industry that no longer exploited wild birds for feathers, piping plover numbers recovered to some extent (Haig and Oring 1985).

Available data suggest the most recent population decline began in the late 1940s or early 1950s (Haig and Oring 1985). Reports of local or statewide declines between 1950 and 1985 are numerous, and many are summarized by Cairns and McLaren (1980) and Haig and Oring (1985). While Wilcox (1939) estimated more than 500 pairs of piping plovers on Long Island, New York, the 1989 population estimate was 191 pairs (Service 1996). There was little focus on gathering quantitative data on piping plovers in Massachusetts through the late 1960s because the species was commonly observed and presumed to be secure. However, numbers of piping plover breeding pairs declined 50 to 100 percent at seven Massachusetts sites between the early 1970s and 1984 (Griffin and Melvin 1984). Piping plover surveys in the early years of the recovery effort found counts of these cryptically colored birds sometimes increased with increased census effort, suggesting some historic counts of piping plovers by one or more observers may have underestimated the piping plover population. Thus, the magnitude of the species decline may have been more severe than available numbers imply.

The New England recovery unit population has exceeded (or been within three pairs of) its 625-pair abundance goal since 1998, attaining a postlisting high of 711 pairs in 2008. The New York-New Jersey recovery unit reached 586 pairs in 2007, surpassing its 575-pair goal for the first time; however, in 2008, abundance dipped to 554 pairs. The Southern recovery unit, which attained 333 and 331 pairs in 2007 and 2008, respectively, has not yet reached its 400-pair goal.

The Eastern Canada recovery unit has experienced the lowest population growth (9 percent net increase between 1989 and 2008), despite higher overall productivity than in the U.S. The highest postlisting abundance estimate was 274 pairs in 2002, with a 2008 estimate of 253 pairs, placing this recovery unit furthest from its goal (400 pairs).

Great Lakes population

The Great Lakes plovers once nested on Great Lakes beaches in Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and Ontario. Great Lakes piping plovers nest on wide, flat, open, sandy or cobble shoreline with very little grass or other vegetation. Reproduction is adversely affected by human disturbance of nesting areas and predation by foxes, gulls, crows and other avian species. Shoreline development, such as the construction of marinas, breakwaters, and other navigation structures, has adversely affected nesting and brood rearing.

The Recovery Plan (Service 2003a) set a population goal of at least 150 pairs (300 individuals), for at least 5 consecutive years, with at least 100 breeding pairs (200 individuals) in Michigan and 50 breeding pairs (100 individuals) distributed among sites in other Great Lakes states. In 2008, the current Great Lakes piping plover population was estimated at 63 breeding pairs (126 individuals). Of these, 53 pairs were found nesting in Michigan, while 10 were found outside the state, including six pairs in Wisconsin and four in Ontario. The 53 nesting pairs in Michigan represent approximately 50 percent of the recovery criterion. The 10 breeding pairs outside Michigan in the Great Lakes basin, represents 20 percent of the goal, albeit the number of breeding pairs outside Michigan has continued to increase over the past 5 years. The single breeding pair discovered in 2007 in the Great Lakes region of Canada represented the first confirmed piping plover nest there in over 30 years, and in 2008 the number of nesting pairs further increased to four.

Northern Great Plains population

The Northern Great Plains plover breeds from Alberta to Manitoba, Canada and south to Nebraska; although some nesting has recently occurred in Oklahoma. Currently, the most westerly breeding piping plovers in the U.S. occur in Montana and Colorado. The decline of piping plovers on rivers in the Northern Great Plains has been largely attributed to the loss of sandbar island habitat and forage base due to dam construction and operation. Nesting occurs on sand flats or bare shorelines of rivers and lakes, including sandbar islands in the upper Missouri River system, and patches of sand, gravel, or pebbly-mud on the alkali lakes of the northern Great Plains. Plovers do nest on shorelines of reservoirs created by the dams, but reproductive success is often low and reservoir habitat is not available in many years due to high water levels or vegetation. Dams operated with steady constant flows allow vegetation to grow on potential nesting islands, making these sites unsuitable for nesting. Population declines in alkali wetlands are attributed to wetland drainage, contaminants, and predation.

The International Piping Plover Census, conducted every 5 years, also estimates the number of piping plover pairs in the Northern Great Plains. None of the International Piping Plover Census estimates suggest the Northern Great Plains population has yet satisfied the recovery criterion of 2,300 pairs (Table 1).

The International Piping Plover Census results in prairie Canada reported 1,703 adult birds in 2006, well short of the goal of 2,500 adult piping plover as stated in the Service's Recovery Plan (Service 1988).

Status and distribution

Nonbreeding (migrating and wintering)

Piping plovers spend up to 10 months of their life cycle on their migration and at wintering grounds, generally July 15 through as late as May 15. Piping plover migration routes and habitats overlap breeding and wintering habitats, and, unless banded, migrants passing through a site usually are indistinguishable from breeding or wintering piping plovers. Migration stopovers by banded piping plovers from the Great Lakes have been documented in New Jersey, Maryland, Virginia, and North Carolina (Stucker and Cuthbert 2006). Migrating breeders from eastern Canada have been observed in Massachusetts, New Jersey, New York, and North Carolina (Amirault et al. 2005). As many as 85 staging piping plovers have been tallied at various sites in the Atlantic breeding range (Perkins 2008), but the composition (*e.g.*, adults that nested nearby and their fledged young of the year versus migrants moving to or from sites farther north), stopover duration, and local movements are unknown. In general, distance between stopover locations and duration of stopovers throughout the coastal migration range remains poorly understood.

Review of published records of piping plover sightings throughout North America by Pompei and Cuthbert (2004) found more than 3,400 fall and spring stopover records at 1,196 sites. Published reports indicated piping plovers do not concentrate in large numbers at inland sites and they seem to stop opportunistically. In most cases, reports of birds at inland sites were single individuals.

Piping plovers migrate through and winter in coastal areas of the U.S. from North Carolina to Texas and in portions of Mexico and the Caribbean. Data based on four rangewide mid-winter (late January to early February) population surveys, conducted at 5-year intervals starting in 1991, show that total numbers have fluctuated over time, with some areas experiencing increases and others decreases (Table 2). Regional and local fluctuations may reflect the quantity and quality of suitable foraging and roosting habitat, which vary over time in response to natural coastal formation processes as well as anthropogenic habitat changes (*e.g.*, inlet relocation, dredging of shoals and spits). Fluctuations may also represent localized weather conditions (especially wind) during surveys, or unequal survey coverage. For example, airboats facilitated first-time surveys of several central Texas sites in 2006 (Elliott-Smith et al. 2009). Similarly, the increase in the 2006 numbers in the Bahamas is attributed to greatly increased census efforts; the extent of additional habitat not surveyed remains undetermined (Elliott-Smith et al. 2009).

Changes in wintering numbers may also be influenced by growth or decline in the particular breeding populations that concentrate their wintering distribution in a given area. Opportunities to locate previously unidentified wintering sites are concentrated in the Caribbean and Mexico (Elliott-Smith et al. 2009). Further surveys and assessment of seasonally emergent habitats (*e.g.*, seagrass beds, mudflats, oyster reefs) within bays lying between the mainland and barrier islands in Texas are also needed.

Midwinter surveys may underestimate the abundance of nonbreeding piping plovers using a site or region during other months. In late September 2007, 104 piping plovers were counted at the south end of Ocracoke Island, North Carolina (National Park Service [NPS] 2007), where none were seen during the 2006 International Piping Plover Winter Census (Elliott-Smith et al. 2009). Noel et al. (2007) observed up to 100 piping plovers during peak migration at Little St. Simons Island, Georgia, where approximately 40 piping plovers wintered in 2003 to 2005. Differences among fall, winter, and spring counts in South Carolina were less pronounced, but inter-year fluctuations (*e.g.*, 108 piping plovers in spring 2007 versus 174 piping plovers in spring 2008) at 28 sites were striking (Maddock et al. 2009). Even as far south as the Florida Panhandle, monthly counts at Phipps Preserve in Franklin County ranged from a midwinter low of four piping plovers in December 2006, to peak counts of 47 in October 2006 and March 2007 (Smith 2007). Pinkston (2004) observed much heavier use of Texas Gulf Coast (ocean-facing) beaches between early September and mid-October (approximately 16 birds per mile) than during December to March (approximately 2 birds per mile).

Local movements of non-breeding piping plovers may also affect abundance estimates. At Deveaux Bank, one of South Carolina's most important piping plover sites, 5 counts at approximately 10-day intervals between August 27 and October 7, 2006, oscillated from 28 to 14 to 29 to 18 to 26 (Maddock et al. 2009). Noel and Chandler (2008) detected banded Great Lakes piping plovers known to be wintering on their Georgia study site in 73.8 ± 8.1 percent of surveys over 3 years.

Abundance estimates for non-breeding piping plovers may also be affected by the number of surveyor visits to the site. Preliminary analysis of detection rates by Maddock et al. (2009) found 87 percent detection during the midwinter period on core sites surveyed three times a month during fall and spring and one time per month during winter, compared with 42 percent detection on sites surveyed three times per year (Cohen 2009).

Gratto-Trevor et al. (2009) found strong patterns (but no exclusive partitioning) in winter distribution of uniquely banded piping plovers from four breeding populations (Figure 2). All eastern Canada and 94 percent of Great Lakes birds wintered from North Carolina to southwest Florida. However, eastern Canada birds were more heavily concentrated in North Carolina, and a larger proportion of Great Lakes piping plovers were found in South Carolina and Georgia. Northern Great Plains populations were primarily seen farther west and south, especially on the Texas Gulf Coast. Although the great majority of Prairie Canada individuals were observed in Texas, particularly southern Texas, individuals from the U.S. Great Plains were more widely distributed on the Gulf Coast, from Florida to Texas.

The findings of Gratto-Trevor et al. (2009) provide evidence of differences in the wintering distribution of piping plovers from these four breeding areas. However, the distribution of birds by breeding origin during migration remains largely unknown. Other major information gaps include the wintering locations of the U.S. Atlantic Coast breeding population (banding of U.S. Atlantic Coast piping plovers has been extremely limited) and the breeding origin of piping plovers wintering on Caribbean islands and in much of Mexico.

Banded piping plovers from the Great Lakes, Northern Great Plains, and eastern Canada breeding populations showed similar patterns of seasonal abundance at Little St. Simons Island, Georgia (Noel et al. 2007). However, the number of banded plovers originating from the latter two populations was relatively small at this study area.

This species exhibits a high degree of intra- and interannual wintering site fidelity (Nicholls and Baldassarre 1990a; Drake et al. 2001; Noel and Chandler 2005; Stucker and Cuthbert 2006). Gratto-Trevor et al. (2009) reported that 6 of 259 banded piping plovers observed more than once per winter moved across boundaries of the seven U.S. regions. Of 216 birds observed in different years, only eight changed regions between years, and several of these shifts were associated with late summer or early spring migration periods (Gratto-Trevor et al. 2009). Total number of individuals observed on the wintering grounds was 46 for Eastern Canada, 150 for the U.S. Great Lakes, 169 for the U.S. Great Plains, and 356 for Prairie Canada.

Local movements are more common. In South Carolina, Maddock et al. (2009) documented many cross-inlet movements by wintering banded piping plovers as well as occasional movements of up to 11.2 miles by approximately 10 percent of the banded population. Larger movements within South Carolina were seen during fall and spring migration. Similarly, eight banded piping plovers that were observed in two locations during 2006 and 2007 surveys in Louisiana and Texas were all in close proximity to their original location (Maddock 2008).

In 2001, 2,389 piping plovers were located during a winter census, accounting for only 40 percent of the known breeding birds recorded during a breeding census (Ferland and Haig 2002). About 89 percent of birds that are known to winter in the U.S. do so along the Gulf Coast (Texas to Florida), while 8 percent winter along the Atlantic Coast (North Carolina to Florida).

The status of piping plovers on winter and migration grounds is difficult to assess, but threats to piping plover habitat used during winter and migration identified by the Service during its designation of critical habitat continue to affect the species. Unregulated motorized and

pedestrian recreational use, inlet and shoreline stabilization projects, beach maintenance and nourishment, and pollution affect most winter and migration areas. Conservation efforts at some locations have likely resulted in the enhancement of wintering habitat.

The 2004 and 2005 hurricane seasons affected a substantial amount of habitat along the Gulf Coast. Habitats such as those along Gulf Islands National Seashore have benefited from increased washover events which created optimal habitat conditions for piping plovers. Conversely, hard shoreline structures are put into place following storms throughout the species range to prevent such shoreline migration (see *Factors Affecting the Species Habitat within the Action Area*). Four hurricanes between 2002 and 2005 are often cited in reference to rapid erosion of the Chandeleur Islands, a chain of low-lying islands in Louisiana where the 1991 International Piping Plover Census tallied more than 350 piping plovers. Comparison of imagery taken 3 years before and several days after Hurricane Katrina found that the Chandeleur Islands lost 82 percent of their surface area (Sallenger et al. in review), and a review of aerial photography prior to the 2006 Census suggested little piping plover habitat remained (Elliott-Smith et al. 2009). However, Sallenger et al. (in review) noted that habitat changes in the Chandeleurs stem not only from the effects of these storms, but rather from the combined effects of the storms, long-term (greater than 1,000 years) diminishing sand supply, and sea level rise relative to the land.

The Service is aware of the following site specific conditions that affect the status of several habitats piping plover use while wintering and migrating, including critical habitat units. In Texas, one critical habitat unit was afforded greater protection due to the acquisition of adjacent upland properties by the local Audubon chapter. In another unit in Texas, vehicles were removed from a portion of the beach decreasing the likelihood of automobile disturbance to plovers. Exotic plant removal is occurring in another critical habitat unit in South Florida. The Service and other government agencies remain in a contractual agreement with the U.S. Department of Agriculture for predator control within limited coastal areas in the Florida panhandle, including portions of some critical habitat units. Continued removal of potential terrestrial predators is likely to enhance survivorship of wintering and migrating piping plovers. In North Carolina, one critical habitat unit was afforded greater protection when the local Audubon chapter agreed to manage the area specifically for piping plovers and other shorebirds following the relocation of a nearby inlet channel.

Recovery criteria

Northern Great Plains population (Service 1988, 1994)

1. Increase the number of birds in the U.S. northern Great Plains states to 2,300 pairs (Service 1994).
2. Increase the number of birds in the prairie region of Canada to 2,500 adult piping plovers (Service 1988).
3. Secure long term protection of essential breeding and wintering habitat (Service 1994).

Great Lakes population (Service 2003a)

1. At least 150 pairs (300 individuals), for at least 5 consecutive years, with at least 100 breeding pairs (200 individuals) in Michigan and 50 breeding pairs (100 individuals) distributed among sites in other Great Lakes states.
2. Five-year average fecundity within the range of 1.5 to 2.0 fledglings per pair, per year, across the breeding distribution, and 10-year population projections indicate the population is stable or continuing to grow above the recovery goal.
3. Protection and long-term maintenance of essential breeding and wintering habitat is ensured, sufficient in quantity, quality, and distribution to support the recovery goal of 150 pairs (300 individuals).
4. Genetic diversity within the population is deemed adequate for population persistence and can be maintained over the long-term.
5. Agreements and funding mechanisms are in place for long-term protection and management activities in essential breeding and wintering habitat.

Atlantic Coast population (Service 1996)

1. Increase and maintain for 5 years a total of 2,000 breeding pairs, distributed among 4 recovery units.

<u>Recovery Unit</u>	<u>Minimum Subpopulation</u>
Atlantic (eastern) Canada	400 pairs
New England	625 pairs
New York-New Jersey	575 pairs
Southern (DE, MD, VA, NC)	400 pairs

2. Verify the adequacy of a 2,000 pair population of piping plovers to maintain heterozygosity and allelic diversity over the long term.
3. Achieve a 5-year average productivity of 1.5 fledged chicks per pair in each of the 4 recovery units described in criterion 1, based on data from sites that collectively support at least 90 percent of the recover unit's population.
4. Institute long-term agreements to assure protection and management sufficient to maintain the population targets and average productivity in each recovery unit.
5. Ensure long-term maintenance of wintering habitat, sufficient in quantity, quality, and distribution to maintain survival rates for a 2,000-pair population.

Threats to Piping plovers

In the following sections, threats to piping plovers in their migration and wintering range are provided. This information has been updated since the 1985 listing rule, the 1991 status review, and the three breeding population recovery plans. Previously identified and new threats are discussed. With minor exceptions, this analysis is focused on threats to piping plovers within the continental U.S. portion of their migration and wintering range. Threats in the Caribbean and Mexico remain largely unknown.

Present or threatened destruction, modification, or curtailment of its habitat or range

The 1985 final rule stated the number of piping plovers on the Gulf of Mexico coastal wintering grounds might be declining as indicated by preliminary analysis of the Christmas Bird Count data. Independent counts of piping plovers on the Alabama coast indicated a decline in numbers between the 1950s and early 1980s. At the time of listing, the Texas Parks and Wildlife Department stated that 30 percent of wintering habitat in Texas had been lost over the previous 20 years. The final rule also stated in addition to extensive breeding area problems, the loss and modification of wintering habitat was a significant threat to the piping plover.

The three recovery plans stated that shoreline development throughout the wintering range poses a threat to all populations of piping plovers. The plans further stated beach maintenance and nourishment, inlet dredging, and artificial structures such as jetties and groins, could eliminate wintering areas and alter sedimentation patterns leading to the loss of nearby habitat.

Priority I actions in the 1996 Atlantic Coast and 2003 Great Lakes Recovery Plans identify tasks to protect natural processes that maintain coastal ecosystems and quality wintering piping plover habitat, and to protect wintering habitat from shoreline stabilization and navigation projects. The 1988 Northern Great Plains Plan states as winter habitat is identified, current and potential threats to each site should be determined.

Important components of ecologically sound barrier beach management include perpetuation of natural dynamic coastal formation processes. Structural development along the shoreline or manipulation of natural inlets upsets the dynamic processes and results in habitat loss or degradation (Melvin et al. 1991). Throughout the range of migrating and wintering piping plovers, inlet and shoreline stabilization, inlet dredging, beach maintenance and nourishment activities, and seawall installations continue to constrain natural coastal processes. Dredging of inlets can affect spit formation adjacent to inlets and directly remove or affect ebb and flood tidal shoal formation. Jetties, which stabilize an island, cause island widening and subsequent growth of vegetation on inlet shores. Seawalls restrict natural island movement and exacerbate erosion. As discussed in more detail below, all these efforts result in loss of piping plover habitat. Construction of these projects during months when piping plovers are present also causes disturbance that disrupts the birds' foraging efficiency and hinders their ability to build fat reserves over the winter and in preparation for migration, as well as their recuperation from migratory flights. Additional investigation is needed to determine the extent to which these factors cumulatively affect piping plover survival and how they may impede conservation efforts for the species.

Any assessment of threats to piping plovers from loss and degradation of habitat must recognize that up to 24 shorebird species migrate or winter along the Atlantic Coast and almost 40 species of shorebirds are present during migration and wintering periods in the Gulf of Mexico region (Helmert 1992). Continual degradation and loss of habitats used by wintering and migrating shorebirds may cause an increase in intra-specific and inter-specific competition for remaining food supplies and roosting habitats. For example, in Florida approximately 825 miles of coastline and parallel bayside flats (unspecified amount) were present prior to the advent of high human densities and beach stabilization projects. We estimate only about 35 percent of the Florida coastline continues to support natural coastal formation processes, thereby concentrating

foraging and roosting opportunities for all shorebird species and forcing some individuals into suboptimal habitats. Thus, intra- and interspecific competition most likely exacerbates threats from habitat loss and degradation.

Exotic/invasive vegetation

A recently identified threat to piping plover habitat, not described in the listing rule or recovery plans, is the spread of coastal invasive plants into suitable piping plover habitat. Like most invasive species, coastal exotic plants reproduce and spread quickly and exhibit dense growth habits, often outcompeting native plant species. If left uncontrolled, invasive plants cause a habitat shift from open or sparsely vegetated sand to dense vegetation, resulting in the loss or degradation of piping plover roosting habitat, which is especially important during high tides and migration periods.

Beach vitex (*Vitex rotundifolia*) is a woody vine introduced into the southeastern U.S. as a dune stabilization and ornamental plant (Westbrooks and Madsen 2006). It currently occupies a very small percentage of its potential range in the U.S.; however, it is expected to grow well in coastal communities throughout the southeastern U.S. from Virginia to Florida, and west to Texas (Westbrooks and Madsen 2006). In 2003, the plant was documented in New Hanover, Pender, and Onslow counties in North Carolina, and at 125 sites in Horry, Georgetown, and Charleston counties in South Carolina. One Chesapeake Bay site in Virginia was eradicated, and another site on Jekyll Island, Georgia, is about 95 percent controlled (Suiter 2009). Beach vitex has been documented from two locations in northwest Florida, but one site disappeared after erosional storm events. The landowner of the other site has indicated an intention to eradicate the plant, but follow through is unknown (Farley 2009). Task forces formed in North and South Carolina in 2004 and 2005, have made great strides to remove this plant from their coasts. To date, about 200 sites in North Carolina have been treated, with 200 additional sites in need of treatment. Similar efforts are underway in South Carolina.

Unquantified amounts of crowfootgrass (*Dactyloctenium aegyptium*) grow invasively along portions of the Florida coastline. It forms thick bunches or mats that may change the vegetative structure of coastal plant communities and alter shorebird habitat.

The Australian pine (*Casuarina equisetifolia*) changes the vegetative structure of the coastal community in south Florida and islands within the Bahamas. Shorebirds prefer foraging in open areas where they are able to see potential predators, and tall trees provide good perches for avian predators. Australian pines potentially affect shorebirds, including the piping plover, by reducing attractiveness of foraging habitat and/or increasing avian predation.

The propensity of these exotic species to spread, and their tenacity once established, make them a persistent threat, partially countered by increasing landowner awareness and willingness to undertake eradication activities.

Groins

Groins (structures made of concrete, rip rap, wood, or metal built perpendicular to the beach in order to trap sand) are typically found on developed beaches with severe erosion. Although groins can be individual structures, they are often clustered along the shoreline. Groins act as

barriers to longshore sand transport and cause downdrift erosion, which prevents piping plover habitat creation by limiting sediment deposition and accretion (Hayes and Michel 2008). These structures are found throughout the southeastern Atlantic Coast, and although most were in place prior to the piping plover's 1986 Act listing, installation of new groins continues to occur.

Inlet stabilization/relocation

Many navigable mainland or barrier island tidal inlets along the Atlantic and Gulf of Mexico coasts are stabilized with jetties, groins, seawalls, and/or adjacent industrial or residential development. Jetties are structures built perpendicular to the shoreline that extend through the entire nearshore zone and past the breaker zone (Hayes and Michel 2008) to prevent or decrease sand deposition in the channel. Inlet stabilization with rock jetties and associated channel dredging for navigation alter the dynamics of longshore sediment transport and affect the location and movement rate of barrier islands (Camfield and Holmes 1995), typically causing downdrift erosion. Sediment is then dredged and added back to islands which are subsequently widened. Once the island becomes stabilized, vegetation encroaches on the bayside habitat, thereby diminishing and eventually destroying its value to piping plovers. Accelerated erosion may compound future habitat loss, depending on the degree of sea level rise. Unstabilized inlets naturally migrate, reforming important habitat components, whereas jetties often trap sand and cause significant erosion of the downdrift shoreline. These combined actions affect the availability of piping plover habitat (Cohen et al. 2008).

Using Google Earth© (accessed April 2009), Service biologists visually estimated the number of navigable mainland or barrier island tidal inlets throughout the wintering range of the piping plover in the conterminous U.S. that have some form of hardened structure (Table 3). This includes seawalls or adjacent development, which lock the inlets in place.

Tidal inlet relocation can cause loss and/or degradation of piping plover habitat, although less permanent than construction of hard structures where effects can persist for years. For example, a project on Kiawah Island, South Carolina, degraded one of the most important piping plover habitats in the State by reducing the size and physical characteristics of an active foraging site, changing the composition of the benthic community, decreasing the tidal lag in an adjacent tidal lagoon, and decreasing the exposure time of the associated sand flats (Service and Town of Kiawah Island unpublished data). In 2006, preproject piping plover numbers in the project area recorded during four surveys conducted at low tide averaged 13.5 piping plovers. This contrasts with a postproject average of 7.1 plovers during eight surveys (four in 2007 and four in 2008) conducted during the same months (Service and Town of Kiawah Island unpublished data). Service biologists are aware of at least seven inlet relocation projects (two in North Carolina, three in South Carolina, two in Florida), but this number likely under represents the extent of this activity.

Sand mining/dredging

Sand mining, the practice of dredging sand from sand bars, shoals, and inlets in the nearshore zone, is a less expensive source of sand than obtaining sand from offshore shoals for beach nourishment. Sand bars and shoals are sand sources that move onshore over time and act as natural breakwaters. Inlet dredging reduces the formation of exposed ebb and flood tidal shoals considered to be primary or optimal piping plover roosting and foraging habitat. Removing

these sand sources can alter depth contours and change wave refraction as well as cause localized erosion (Hayes and Michel 2008). Exposed shoals and sandbars are also valuable to piping plovers, as they tend to receive less human recreational use (because they are only accessible by boat) and therefore provide relatively less disturbed habitats for birds. An accurate estimate of the amount of sand mining that occurs across the piping plover wintering range, or the number of inlet dredging projects that occur is not available. This number is likely greater than the number of total jettied inlets shown in Table 3, since most jettied inlets need maintenance dredging, but non-hardened inlets are often dredged as well.

Sand placement projects

In the wake of episodic storm events, managers of lands under public, private, and county ownership often protect coastal structures using emergency storm berms which are frequently followed by beach nourishment or renourishment activities (nourishment projects are considered “soft” stabilization versus “hard” stabilization such as seawalls). Berm placement and beach nourishment projects deposit substantial amounts of sand along Gulf of Mexico and Atlantic beaches to protect local property in anticipation of preventing erosion and what otherwise will be considered natural processes of overwash and island migration (Schmitt and Haines 2003).

Past and ongoing stabilization projects fundamentally alter the natural dynamic coastal processes that create and maintain beach strand and bayside habitats, including those habitat components that piping plovers rely upon. Although the effects may vary depending on a range of factors, stabilization projects may directly degrade or destroy piping plover roosting and foraging habitat in several ways. Front beach habitat may be used to construct an artificial berm that is densely planted in grass, which can directly reduce the availability of roosting habitat. Over time, if the beach narrows due to erosion, additional roosting habitat between the berm and the water can be lost. Berms can also prevent or reduce the natural overwash that creates roosting habitats by converting vegetated areas to open sand areas. The vegetation growth caused by impeding natural overwash can also reduce the maintenance and creation of bayside intertidal feeding habitats. In addition, stabilization projects may indirectly encourage further development of coastal areas and increase the threat of disturbance.

Lott et al. (in review) documented an increasing trend in sand placement events in Florida (Figure 3). Approximately 358 miles of 825 miles (43 percent) of Florida’s sandy beach coastline were nourished from 1959 to 2006 (Table 4), with some areas being nourished multiple times. In northwest Florida, the Service consulted on first time sand placement projects along 46 miles of shoreline in 2007 to 2008, much of which occurred on public lands (Gulf Islands National Seashore (Service 2007a), portions of St. Joseph State Park (Service 2007b), and Eglin Air Force Base (Service 2008a).

At least 668 of 2,340 coastal shoreline miles (29 percent of beaches throughout the piping plover winter and migration range in the U.S.) are bermed, nourished, or renourished, generally for recreational purposes and to protect commercial and private infrastructure. However, only approximately 54 miles or 2.31 percent of these effects have occurred within critical habitat. In Louisiana, sand placement projects are deemed environmental restoration projects by the Service because without the sediment many areas would erode below sea level.

Seawalls and revetments

Seawalls and revetments are vertical hard structures built parallel to the beach in front of buildings, roads, and other facilities to protect them from erosion. However, these structures often accelerate erosion by causing scouring in front of and downdrift from the structure (Hayes and Michel 2008) which can eliminate intertidal foraging habitat and adjacent roosting habitat. Physical characteristics that determine microhabitats and biological communities can be altered after installation of a seawall or revetment, thereby depleting or changing composition of benthic communities that serve as the prey base for piping plovers. At four California study sites, each comprised of an unarmored segment and a segment seaward of a seawall, Dugan and Hubbard (2006) found armored segments had narrower intertidal zones, smaller standing crops of macrophyte wrack, and lower shorebird abundance and species richness. Geotubes (long cylindrical bags made of high strength permeable fabric and filled with sand) are softer alternatives, but act as barriers by preventing overwash.

Wrack removal and beach cleaning

Wrack on beaches and baysides provides important foraging and roosting habitat for piping plovers (Drake 1999a; Smith 2007; Lott et al. 2009; Maddock et al. 2009) and many other shorebirds on their winter, breeding, and migration grounds. Because shorebird numbers are positively correlated with wrack cover and biomass of their invertebrate prey that feed on wrack (Tarr and Tarr 1987; Dugan et al. 2003; Hubbard and Dugan 2003), beach grooming will lower bird abundance (Defreo et al. 2009).

There is increasing popularity in the Southeast, especially in Florida, for beach communities to carry out "beach cleaning" and "beach raking" actions. Beach cleaning occurs on private beaches, where piping plover use is not well documented, and on some municipal or county beaches that are used by piping plovers. Most wrack removal on State and Federal lands is limited to poststorm cleanup and does not occur regularly. No wrack removal is performed by Park staff at Lovers Key. The Bonita Beach project area fronts private property and historically, there is no record that the DEP has issued any field permits for raking of the beach along this shoreline. Typically, if issued, the DEP field permit restricts raking of the beach to the area between 15 feet landward of the MHWL and 15 feet seaward of the dune vegetation line. As the wrack line is usually associated with the MHWL, any wrack on the beach will not be removed by raking.

Manmade beach cleaning and raking machines effectively remove seaweed, fish, glass, syringes, plastic, cans, cigarettes, shells, stone, wood, and virtually any unwanted debris (Barber Beach Cleaning Equipment 2011). These efforts remove accumulated wrack, topographic depressions, and sparse vegetation nodes used by roosting and foraging piping plovers. Removal of wrack also eliminates a beach's natural sand trapping abilities, further destabilizing the beach. In addition, sand adhering to seaweed and trapped in the cracks and crevices of wrack is removed from the beach. Although the amount of sand lost due to single sweeping actions may be small, it adds up considerably over a period of years (Nordstrom et al. 2006; Neal et al. 2007). Beach cleaning or grooming can result in abnormally broad unvegetated zones that are inhospitable to dune formation or plant colonization, thereby enhancing the likelihood of erosion (Defreo et al. 2009).

Tilling beaches to reduce soil compaction, as sometimes required by the Service for sea turtle protection after beach nourishment activities, has similar effects. Recently, the Service improved sea turtle protection provisions in Florida. These provisions now require tilling, when needed, to be conducted above the primary wrack line, not within it.

Currently, the DEP's Beaches and Coastal Management Systems section has issued 117 permits for beach raking or cleaning to multiple entities. The Service estimates that 240 of 825 miles (29 percent) of sandy beach shoreline in Florida are cleaned or raked on various (*i.e.*, daily, weekly, monthly) schedules (Teich 2009). Service biologists estimate that South Carolina mechanically cleans approximately 34 of its 187 shoreline miles (18 percent), and Texas mechanically cleans approximately 20 of its 367 shoreline miles (5.4 percent). The percentage of mechanical cleaning that occurs in piping plover critical habitat is unknown.

Overutilization for commercial, recreational, scientific or educational purposes

The 1985 final listing rule found no evidence to suggest this factor is a threat to piping plovers while on migration or winter grounds. The various recovery plans state hunting in the late 1800s may have severely reduced piping plover numbers. The plans did not identify hunting as an existing threat to piping plovers wintering in the U.S., as take is prohibited pursuant to the MBTA. No credible information indicates hunting is a threat in the U.S. or in other countries. Based on the current information, overutilization is not a threat to piping plovers on their wintering and migration grounds.

Disease and predation

Disease

Neither the final listing rule nor the recovery plans state disease is an issue for piping plover, and no plan assigns recovery actions to this threat factor. Based on information available to date, West Nile virus and avian influenza are a minor threat to piping plovers (Service 2009).

Predation

The effect of predation on migrating or wintering piping plovers remains largely undocumented. Except for one incident involving a cat in Texas (NY Times 2007), no predation of piping plovers during winter or migration has been noted. Avian and mammalian predators are common throughout the species' wintering range. Predatory birds are relatively common during fall and spring migration, and it is possible raptors occasionally take piping plovers (Drake et al. 2001). It has been noted, however, the behavioral response of crouching when in the presence of avian predators may minimize avian predation on piping plovers (Morrier and McNeil 1991; Drake 1999b; Drake et al. 2001).

The 1996 Atlantic Coast Recovery Plan summarized evidence that human activities affect types, abundance, and activity patterns of some predators, thereby exacerbating natural predation on breeding piping plovers. Nonbreeding piping plovers may reap some collateral benefits from predator management conducted for the primary benefit of other species. In 1997, the U.S. Department of Agriculture implemented a public lands predator control partnership in northwest Florida that included the Department of Defense, NPS, the State of Florida (state park lands), and the Service (National

Wildlife Refuges and Ecological Services). The program continues with all partners except Florida. In 2008, lack of funding precluded inclusion of Florida state lands; however, DEP staff do occasionally conduct predator trapping on state lands, although trapping is not implemented consistently.

The NPS and individual state park staff in North Carolina participate in predator control programs (Rabon 2009). The Service issued permit conditions for raccoon eradication to Indian River County staff in Florida as part of a coastal HCP (Adams 2009). Destruction of turtle nests by dogs or coyotes in Indian River County justified the need to amend the permit to include an education program targeting dog owners regarding the appropriate means to reduce affects to coastal species caused by their pets. The Service partnered with Texas Audubon and the Coastal Bend Bays and Estuaries Program in Texas to implement predator control efforts on colonial waterbird nesting islands (Cobb 2009). Some of these predator control programs may provide very limited protection to piping plovers should they use these areas for roosting or foraging (Table 5). The Service is not aware of any current predator control programs targeting protection of coastal species in Georgia, Alabama, Mississippi, or Louisiana.

Regarding predation, the magnitude of this threat to non-breeding piping plovers remains unknown, but given the pervasive, persistent, and serious effects of predation on other coastal reliant species, it remains a potential threat. Focused research to confirm these effects as well as to ascertain effectiveness of predator control programs may be warranted, especially in areas frequented by Great Lakes birds during migration and wintering months. The Service considers predator control on their wintering and migration grounds to be a low priority at this time. The threat of direct predation should be distinguished from the threat of disturbance to roosting and feeding piping plovers posed by dogs off leash.

Other natural or manmade factors affecting its continued existence

Accelerating sea-level rise

Over the past 100 years, the globally-averaged sea level has risen approximately 3.9 to 9.8 inches (Rahmstorf 2007), a rate that is an order of magnitude greater than that seen in the past several thousand years (Hopkinson et al. 2008). The Intergovernmental Panel of Climate Change (IPCC) suggests by 2080 sea level rise could convert as much as 33 percent of the world's coastal wetlands to open water (IPCC 2007). Although rapid changes in sea level are predicted, estimated time frames and resulting water levels vary due to the uncertainty about global temperature projections and the rate of ice sheets melting and slipping into the ocean (IPCC 2007; Climate Change Science Program [CCSP] 2008).

Potential effects of sea level rise on coastal beaches may vary regionally due to subsidence or uplift as well as the geological character of the coast and nearshore (Galbraith et al. 2002; CCSP 2009). For example, in the last century sea level rise along the U.S. Gulf Coast exceeded the global average by 5.1 to 5.9 inches because coastal lands west of Florida are subsiding (U.S. Environmental Protection Agency [EPA] 2009). Low elevations and proximity to the coast make all nonbreeding coastal piping plover foraging and roosting habitats vulnerable to the effects of rising sea level. Furthermore, areas with small astronomical tidal ranges (*e.g.*, portions of the Gulf Coast where intertidal range is greater than 3.2 feet) are the most vulnerable to loss of intertidal wetlands and flats induced by sea level rise (EPA 2009). Sea level rise was cited as a

contributing factor in the 68 percent decline in tidal flats and algal mats in the Corpus Christi area (*i.e.*, Lamar Peninsula to Encinal Peninsula) in Texas between the 1950s and 2004 (Tremblay et al. 2008). Mapping by Titus and Richman (2001) showed that more than 80 percent of the lowest land along the Atlantic and Gulf coasts was in Louisiana, Florida, Texas, and North Carolina, where 73.5 percent of all wintering piping plovers were tallied during the 2006 International Piping Plover Census (Elliott-Smith et al. 2009).

Inundation of piping plover habitat by rising seas could lead to permanent loss of habitat if natural coastal dynamics are impeded by numerous structures or roads, especially if those shorelines are also armored with hardened structures. Without development or armoring, low undeveloped islands can migrate toward the mainland, pushed by the overwashing of sand eroding from the seaward side and being redeposited in the bay (Scavia et al. 2002). Overwash and sand migration are impeded on developed portions of islands. Instead, as sea level increases, the ocean-facing beach erodes and the resulting sand is deposited offshore. The buildings and the sand dunes then prevent sand from washing back toward the lagoons, and the lagoon side becomes increasingly submerged during extreme high tides (Scavia et al. 2002), diminishing both barrier beach shorebird habitat and protection for mainland developments.

Modeling for three sea level rise scenarios (reflecting variable projections of global temperature rise) at five important U.S. shorebird staging and wintering sites predicted a loss of 20 to 70 percent of current intertidal foraging habitat (Galbraith et al. 2002). These authors estimated probabilistic sea level changes for specific sites partially based on historical rates of sea level change (from tide gauges at or near each site) which were then superimposed on projected 50 percent and 5 percent probability of global sea level changes by 2100 of 13.4 inches and 30.3 inches, respectively. The 50 percent and 5 percent probability sea level change projections were based on assumed global temperature increases of 35.6° F (50 percent probability) and 40.5° F (5 percent probability). The most severe losses were projected at sites where the coastline is unable to move inland due to steep topography or seawalls. The Galbraith et al. (2002) Gulf Coast study site, Bolivar Flats, Texas, is a designated critical habitat unit known to host high numbers of piping plovers during migration and throughout the winter (*e.g.*, 275 individuals were tallied during the 2006 International Piping Plover Census; Elliott-Smith et al. 2009). Under the 50 percent likelihood scenario for sea level rise, Galbraith et al. (2002) projected approximately 38 percent loss of intertidal flats at Bolivar Flats by 2050; however, after initially losing habitat, the area of tidal flat habitat was predicted to increase slightly by the year 2100, because Bolivar Flats lacks armoring, and the coastline at this site can thus migrate inland. Although habitat losses in some areas are likely to be offset by gains in other locations, Galbraith et al. (2002) noted time lags may exert serious adverse effects on shorebird populations. Furthermore, even if piping plovers are able to move their wintering locations in response to accelerated habitat changes, there could be adverse effects on the birds' survival rates or reproductive fitness.

In eight states that support wintering piping plovers, all have the potential for adjacent development and/or hardened shorelines to impede response of habitat to sea level rise (Table 6). Although complete linear shoreline estimates are not readily obtainable, almost all known piping plover wintering sites in the U.S. were surveyed during the 2006 International Piping Plover Census. To estimate effects at the census sites, as well as additional areas where piping plovers have been found outside of the census period, Service biologists reviewed satellite imagery and

spoke with other biologists familiar with the sites. Of 406 sites, 204 (50 percent) have adjacent structures that may prevent the creation of new habitat if existing habitat were to become inundated (Table 6). These threats will be perpetuated in places where damaged structures are repaired and replaced, and exacerbated where the height and strength of structures are increased. Data do not exist on the amount or types of hardened structures at wintering sites in the Bahamas, other Caribbean countries, or Mexico.

Sea level rise poses a significant threat to all piping plover populations during the migration and wintering portion of their life cycle. Ongoing coastal stabilization activities may strongly influence the effects of sea level rise on piping plover habitat. Improved understanding of how sea level rise may affect the quality and quantity of habitat for migrating and wintering piping plovers is an urgent need.

Contaminants

Contaminants have the potential to cause direct toxicity to individual birds or negatively affect their invertebrate prey base (Rattner and Ackerson 2008). Depending on the type and degree of contact, contaminants can have lethal and sub-lethal effects on birds, including behavioral impairment, deformities, and impaired reproduction (Rand and Petrocelli 1985; Gilbertson et al. 1991; Hoffman et al. 1996).

The Great Lakes plan states concentration levels of polychlorinated biphenol detected in Michigan piping plover eggs have the potential to cause reproductive harm. They further state analysis of prey available to piping plovers at representative Michigan breeding sites indicated breeding areas along the upper Great Lakes region are not likely the major source of contaminants to this population.

In 2000, mortality of large numbers of wading birds and shorebirds, including one piping plover, at Audubon's Rookery Bay Sanctuary on Marco Island, Florida, occurred following the County's aerial application of the organophosphate pesticide Fenthion for mosquito control purposes (Williams 2001). Fenthion, a known toxin to birds, was registered for use as an avicide by Bayer chemical manufacturer. Subsequent to a lawsuit filed against the EPA in 2002, the manufacturer withdrew Fenthion from the market, and the EPA declared all uses were to end by November 30, 2004 (American Bird Conservancy 2011). All other counties in the U.S. now use less toxic chemicals for mosquito control. It is unknown whether pesticides are a threat for piping plovers wintering in the Bahamas, other Caribbean countries, or Mexico.

Petroleum products are the contaminants of primary concern, as opportunities exist for petroleum to pollute intertidal habitats that provide foraging substrate. Beach-stranded 55-gallon barrels and smaller containers, which may fall from moving cargo ships or offshore rigs and are not uncommon on the Texas coast, contain primarily oil products (gasoline or diesel), as well as other chemicals such as methanol, paint, organochlorine pesticides, and detergents (Lee 2009). Federal and state land managers have protective provisions in place to secure and remove the barrels, thus reducing the likelihood of contamination. Effects to piping plovers from oil spills have been documented throughout their life cycle (Chapman 1984; Service 1996; Burger 1997; Massachusetts Audubon 2003; Amirault-Langlais et al. 2007; Amos 2009). This threat persists due to the high volume of shipping vessels (from which most documented spills have originated)

traveling offshore and within connected bays along the Atlantic Coast and the Gulf of Mexico. Additional risks exist for leaks or spills from offshore oil rigs, associated undersea pipelines, and onshore facilities such as petroleum refineries and petrochemical plants. Lightly oiled piping plovers have survived and successfully reproduced (Chapman 1984; Amirault-Langlais et al. 2007; Amos 2009). Chapman (1984) noted shifts in habitat use as piping plovers moved out of spill areas. This behavioral change was believed to be related to the demonstrated decline in benthic infauna (prey items) in the intertidal zone and may have decreased the direct effects to the species. To date, no plover mortality has been attributed to oil contamination outside the breeding grounds, but latent effects would be difficult to identify.

The Deepwater Horizon oil spill, which started April 20, 2010, discharged into the Gulf of Mexico through July 15, 2010. According to government estimates, the leak released between 100 and 200 million gallons of oil into the Gulf. The U.S. Coast Guard estimates that more than 50 million gallons of oil have been removed from the Gulf, or roughly a quarter of the spill amount. Additional effects to natural resources may be attributed to the 1.84 million gallons of dispersant applied to the spill. As of July 2010, approximately 625 miles of Gulf Coast shoreline was oiled (approximately 360 miles in Louisiana, 105 miles in Mississippi, 66 miles in Alabama and 94 miles in Florida) (Join Information Center 2010). These numbers reflect a daily snapshot of shoreline that experienced effects from oil; however, they do not include cumulative effects to date, or shoreline that has already been cleaned.

Piping plovers have continued to winter within the Gulf of Mexico shorelines. Researchers have and continue to document oiled piping plovers stemming from this spill. Oiling of designated piping plover critical habitat has been documented. Affects to the species and its habitat are expected, but their extent remains difficult to predict. The U.S. Coast Guard, the states, and responsible parties form the Unified Command, with advice from Federal and State natural resource agencies, initiated protective and cleanup efforts per prepared contingency plans to deal with petroleum and other hazardous chemical spills for each state's coastline. The contingency plans identify sensitive habitats, including all federally listed species' habitats, which receive a higher priority for response actions. Those plans allow for immediate habitat protective measures for cleanup activities in response to large contaminant spills. While such plans usually ameliorate the threat to piping plovers, it is yet unknown how much improvement will result in this case given the breadth of the effects associated with the Deepwater Horizon incident.

Based on all available data prior to the Deepwater Horizon oil spill, the risk of effects from contamination to piping plovers and their habitat was recognized, but the safety contingency plans were considered adequate to alleviate most of these concerns. The Deepwater Horizon incident has brought heightened awareness of the intensity and extent to fish and wildlife habitat from large-scale releases. In addition to potential direct habitat degradation from oiling of intertidal habitats and retraction of stranded boom, effects to piping plovers may occur from the increased human presence associated with boom deployment and retraction, cleanup activities, wildlife response, and damage assessment crews working along shorelines. Research studies are documenting the potential expanse of effects to the piping plover.

Military actions

Twelve coastal military bases are located in the Southeast (Table 7). To date, five bases have consulted with the Service under the Act, on military activities on beaches and baysides that may affect piping plovers or their habitat (Table 7). In 2002, Camp Lejeune in North Carolina consulted formally with the Service on troop activities, dune stabilization efforts, and recreational use of Onslow Beach. The permit conditions require bi-monthly (twice-monthly) piping plover surveys, use of buffer zones, and work restrictions within buffer zones.

Naval Station Mayport in Duval County, Florida, consulted with the Service on U.S. Marine Corps training activities that included beach exercises and use of amphibious assault vehicles. The affected area was not considered optimal for piping plovers and the consultation was concluded informally. Similar informal consultations have occurred with Tyndall Air Force Base (Bay County) and Eglin Air Force Base (Okaloosa and Santa Rosa Counties) in northwest Florida. Both consultations dealt with occasional use of motorized equipment on the beaches and associated baysides. Tyndall Air Force Base has minimal on-the-ground use, and activities, when conducted, occur on the Gulf of Mexico beach, which is not considered the optimal area for piping plovers within this region. Eglin Air Force Base conducts bi-monthly (twice-monthly) surveys for piping plovers, and habitats consistently documented with piping plover use are posted with avoidance requirements to minimize direct disturbance from troop activities. A 2001 consultation with the Navy for training exercises on the beach and retraction operations on Peveto Beach, Cameron Parish, Louisiana, concluded informally.

Overall, project avoidance and minimization actions currently reduce threats from military activities to wintering and migrating piping plovers to a minimal threat level. However, prior to removal of the piping plover from protection of the Act, Integrated Resource Management Plans or other agreements should clarify if and how a change in legal status would affect plover protections.

Recreational disturbance

Intense human disturbance in shorebird winter habitat can be functionally equivalent to habitat loss if the disturbance prevents birds from using an area (Goss-Custard et al. 1996), which can lead to roost abandonment and local population declines (Burton et al. 1996). Pfister et al. (1992) implicated anthropogenic disturbance as a factor in the long-term decline of migrating shorebirds at staging areas. Disturbance (*i.e.*, human and pet presence) that alters bird behavior can disrupt piping plovers as well as other shorebird species. Disturbance can cause shorebirds to spend less time roosting or foraging and more time in alert postures or fleeing from the disturbances (Johnson and Baldassarre 1988; Burger 1991, 1994; Elliott and Teas 1996; Lafferty 2001a, 2001b; Thomas et al. 2002), which limits the local abundance of piping plovers (Zonick and Ryan 1996; Zonick 2000). Shorebirds that are repeatedly flushed in response to disturbance expend energy on costly short flights (Nudds and Bryant 2000). Shorebirds are more likely to flush from the presence of dogs than people, and birds react to dogs from farther distances than people (Lafferty 2001a, 2001b; Thomas et al. 2002). Dogs off leash are more likely to flush piping plovers from farther distances than dogs on leash. Nonetheless, dogs both on and off leashes disturb piping plovers (Hoopes 1993). Pedestrians walking with dogs often go through flocks of foraging and roosting shorebirds; some even encourage their dogs to chase birds.

Off-road vehicles can significantly degrade piping plover habitat (Wheeler 1979) or disrupt the birds' normal behavior patterns (Zonick 2000). The 1996 Atlantic Coast recovery plan cites tire ruts crushing wrack into the sand, making it unavailable as cover or as foraging substrate (Goldin 1993b; Hoopes 1993). The plan also notes the magnitude of the threat from off-road vehicles is particularly significant because vehicles extend the effects to remote stretches of beach where human disturbance would otherwise be very slight. Lamont et al. (1997) postulated vehicular traffic along the beach may compact the substrate and kill marine invertebrates that are food for the piping plover. Zonick (2000) found the density of off-road vehicles negatively correlated with abundance of roosting piping plovers on the ocean beach. Cohen et al. (2008) found radio-tagged piping plovers using ocean beach habitat at Oregon Inlet in North Carolina were far less likely to use the north side of the inlet where off-road vehicle use is allowed, and recommended controlled management experiments to determine if recreational disturbance drives roost site selection. Ninety-six percent of piping plover detections were on the south side of the inlet even though it was farther away from foraging sites (1.1 miles from the sound side foraging site to the north side of the inlet versus 0.2 mile from the sound side foraging site to the north side of the inlet; Cohen et al. 2008).

Based on surveys with land managers and biologists, knowledge of local site conditions, and other information, the Service estimated the levels of eight types of disturbance at sites in the U.S. with wintering piping plovers. There are few areas used by wintering piping plovers that are devoid of human presence, and just under half have leashed and unleashed dog presence (Smith 2007; Lott et al. 2009; Maddock and Bimbi unpublished data; Table 8). Data are not available on human disturbance at wintering sites in the Bahamas, other Caribbean countries, or Mexico.

Although the timing, frequency, and duration of human and dog presence throughout the wintering range are unknown, studies in Alabama and South Carolina suggest that most disturbances to piping plovers occur during periods of warmer weather, which coincides with piping plover migration (Johnson and Baldassarre 1988; Lott et al. 2009; Maddock et al. 2009). Smith (2007) documented varying disturbance levels throughout the nonbreeding season at northwest Florida sites.

In South Carolina, 33 percent (13 out of 39) of sites surveyed during the 2007 and 2008 season had ≥ 5 birds. Of those 13 sites, 46.2 percent (6 out of 13) had ≥ 10 people present during surveys, and 61.5 percent (8 out of 13) allow dogs, indicating that South Carolina sites with the highest piping plover density are exposed to disturbance. Only 25.7 percent (9 out of 35) of sites in South Carolina prohibit dogs and restrict public access to the entire site or sections of sites used by piping plovers (Maddock and Bimbi unpublished data). Compliance with the restrictions at these sites is unknown.

LeDee (2008) collected survey responses in 2007 from 35 managers (located in seven states) at sites that were designated as critical habitat for wintering piping plovers. Ownership included Federal, state, and local governmental agencies and nongovernmental organizations managing national wildlife refuges; national, state, county, and municipal parks; state and estuarine research reserves; state preserves; state wildlife management areas; and other types of managed lands. Of 44 reporting sites, 40 allowed public beach access year-round and four sites were

closed to the public. Of the 40 sites that allow public access, 62 percent of site managers reported greater than 10,000 visitors during September through March, and 31 percent reported greater than 100,000 visitors. Restrictions on visitor activities on the beach included automobiles (81 percent), all-terrain vehicles (89 percent), and dogs (50 percent) during the winter season. Half of the survey respondents reported funding as a primary limitation in managing piping plovers and other threatened and endangered species at their sites. Other limitations included "human resource capacity" (24 percent), conflicting management priorities (12 percent), and lack of research (3 percent).

Disturbance can be addressed by implementing recreational management techniques such as vehicle and pet restrictions and symbolic fencing (usually sign posts and string) of roosting and feeding habitats. In implementing conservation measures, managers need to consider a range of site specific factors, including the extent and quality of roosting and feeding habitats, and the types and intensity of recreational use patterns. In addition, educational materials such as informational signs or brochures can provide valuable information so that the public understands the need for conservation measures.

In summary, although there is some variability among states, disturbance from human beach recreation and pets pose a moderate to high and escalating threat to migrating and wintering piping plovers. Systematic review of recreation policy and beach management across the nonbreeding range will assist in better understanding cumulative effects. Site specific analysis and implementation of conservation measures should be a high priority at piping plover sites that have moderate or high levels of disturbance, and the Service and state wildlife agencies should increase technical assistance to land managers to implement management strategies and monitor their effectiveness.

Storm events

Although coastal piping plover habitats are storm-created and maintained, the 1996 Atlantic Coast Recovery Plan also noted that storms and severe cold weather may take a toll on piping plovers, and the 2003 Great Lakes Recovery Plan postulated that loss of habitats such as overwash passes or wrack, where birds shelter during harsh weather, poses a threat.

Storms are a component of the natural processes that form coastal habitats used by migrating and wintering piping plovers, and positive effects of storm-induced overwash and vegetation removal have been noted in portions of the wintering range. For example, Gulf Islands National Seashore habitats in Florida benefited from increased washover events that created optimal habitat conditions during the 2004 and 2005 hurricane seasons, with biologists reporting piping plover use of these habitats within 6 months of the storms (Nicholas 2005). In 2005, Hurricane Katrina overwashed the mainland beaches of Mississippi, creating many tidal flats where piping plovers were subsequently observed (Winstead 2008). Hurricane Katrina also created a new inlet and improved habitat conditions on some areas of Dauphin Island, Alabama (LeBlanc 2009). Conversely, localized storms, since Katrina, have induced habitat losses on Dauphin Island (LeBlanc 2009).

Noel and Chandler (2005) suspect changes in habitat caused by multiple hurricanes along the Georgia coastline altered the spatial distribution of piping plovers and may have contributed to winter mortality of three Great Lakes piping plovers. Following Hurricane Ike in 2008, Arvin (2009) reported decreased numbers of piping plovers at some heavily eroded Texas beaches in the center of the storm affected area and increases in plover numbers at sites about 100 miles to the southwest. However, piping plovers were observed later in the season using tidal lagoons and pools that Ike created behind the eroded beaches (Arvin 2009).

The adverse effects on piping plovers attributed to storms are sometimes due to a combination of storms and other environmental changes or human use patterns. For example, four hurricanes between 2002 and 2005 are often cited in reference to rapid erosion of the Chandeleur Islands, a chain of low-lying islands in Louisiana where the 1991 International Piping Plover Census tallied more than 350 piping plovers. Comparison of imagery taken 3 years before and several days after Hurricane Katrina found the Chandeleur Islands lost 82 percent of their surface area (Sallenger et al. in review), and a review of aerial photography prior to the 2006 Census suggested little piping plover habitat remained (Elliott-Smith et al. 2009). However, Sallenger et al. (in review) noted habitat changes in the Chandeleur Islands stem not only from the effects of these storms, but rather from the combined effects of the storms, long-term (greater than 1,000 years) diminishing sand supply, and sea level rise relative to the land.

Other storm-induced adverse effects include poststorm acceleration of human activities such as beach nourishment, sand scraping, and berm and seawall construction. Such stabilization activities can result in the loss and degradation of feeding and resting habitats. Storms can also cause widespread deposition of debris along beaches. Removal of debris often requires large machinery, which can cause extensive disturbance and adversely affect habitat elements such as wrack. Another example of indirect adverse effects linked to a storm event is the increased access to Pelican Island (LeBlanc 2009) due to merging with Dauphin Island following a 2007 storm (Gibson et al. 2009).

Recent climate change studies indicate a trend toward increasing hurricane numbers and intensity (Emanuel 2005; Webster et al. 2005). When combined with predicted effects of sea level rise, there may be increased cumulative effects from future storms.

In summary, storms can create or enhance piping plover habitat while causing localized losses elsewhere in the wintering and migration range. Available information suggests some birds may have resiliency to storms and move to unaffected areas without harm, while other reports suggest birds may perish from storm events. Significant concerns include disturbance to piping plovers and habitats during cleanup of debris, and poststorm acceleration of shoreline stabilization activities which can cause persistent habitat degradation and loss.

Summary

Habitat loss and degradation on winter and migration grounds from shoreline and inlet stabilization efforts, both within and outside of designated critical habitat, remains a serious threat to all piping plover populations. In some areas, beaches that abut private property are needed by wintering and migrating piping plovers. However, residential and commercial developments that typically occur along private beaches may pose significant challenges for

efforts to maintain natural coastal processes. The threat of habitat loss and degradation, combined with the threat of sea level rise associated with climate change, raise serious concerns regarding the ability of private beaches to support piping plovers over the long term.

Future actions taken on private beaches will determine whether piping plovers continue to use these beaches or whether the recovery of piping plovers will principally depend on public property. As Lott (2009) concludes, "The combination of development and shoreline protection seems to limit distribution of non-breeding piping plovers in Florida. If mitigation or habitat restoration efforts on barrier islands fronting private property are not sufficient to allow plover use of some of these areas, the burden for plover conservation will fall almost entirely on public land managers."

While public lands may not be at risk of habitat loss from private development, significant threats to piping plover habitat remain on many municipal, state, and federally owned properties. These public lands may be managed with competing missions that include conservation of imperiled species, but this goal frequently ranks below providing recreational enjoyment to the public, readiness training for the military, or energy development projects.

Public lands remain the primary places where natural coastal dynamics are allowed. Of recent concern are requests to undertake beach nourishment actions to protect coastal roads or military infrastructure on public lands. If project design does not minimize impediments to shoreline overwash which are necessary to help replenish bayside tidal flat sediments and elevations, significant bayside habitat may become vegetated or inundated, thereby exacerbating the loss of preferred piping plover habitat. Conversely, if beach fill on public lands is applied in a way that allows for "normal" system overwash processes, and sediment is added back to the system, projects may be less injurious to barrier island species that depend on natural coastal dynamics.

Maintaining wrack for food and cover in areas used by piping plovers may help offset effects that result from habitat degradation due to sand placement associated with berm and beach nourishment projects and ensuing human disturbance. Leaving wrack on private beaches may improve use by piping plovers, especially during migration when habitat fragmentation may have a greater effect on the species. In addition, using recreation management techniques, Great Lakes recovery action 2.14 may minimize the effects of habitat loss. Addressing off-road vehicles and pet disturbance may increase the suitability of existing piping plover habitat.

Analysis of the species/critical habitat likely to be affected

Within the Corps' letter dated July 12, 2012, the Corps determined the proposed project "may affect, but not likely to adversely affect" the threatened loggerhead sea turtle, endangered leatherback sea turtle, endangered green sea turtle, endangered hawksbill sea turtle, endangered Kemp's ridley sea turtle, endangered West Indian manatee, and threatened piping plover. On August 22, 2012, the Service informed the Corps via e-mail that we could not concur with their determination for nesting sea turtles and piping plovers. In a letter dated August 28, 2012, the Corps revised the sea turtle and shorebird/piping plover determinations to "may affect".

On August 22, 2011, the Service issued a Statewide Programmatic Biological Opinion (SPBO) to the Corps to address potential adverse effects to nesting sea turtles and the West Indian manatee as a result of sand placement activities proposed along the coast of Florida (Service 2011). The SPBO includes avoidance and minimization measures, Reasonable and Prudent Measures, and Terms and Conditions to ensure adverse effects to the covered species are avoided and minimized to the maximum extent practicable. Since the proposed activities associated with the renourishment of Bonita Beach and Lovers Key are covered in the SPBO and the Applicant has agreed to implement the protection measures described in the SPBO, the Service has determined the proposed project is consistent with the SPBO, and the Service concurs with the Corps' determinations. The Reasonable and Prudent Measures and Terms and Conditions in section A of the SPBO will apply to the Corps and Applicant. The Applicant requested an exception to Terms and Conditions A6 concerning dune restoration. Dune restoration is proposed at DEP reference monument R-215 on Lovers Key where a small berm will be constructed at an elevation of +4.9 feet NAVD with a seaward dune face slope of 1 vertical foot: 5 horizontal feet. Upon completion of our review of the proposed project, the requested exception is authorized by the Service. This concludes our consultation for nesting sea turtles and West Indian manatees. Beach mice are not present in the action area. Based on this information, the Service concurs with the Corps' determinations listed above.

Please note the provisions of this consultation do not apply to sea turtles in the marine environment such as swimming juveniles and adult sea turtles. If applicable, you are required to consult with NOAA Fisheries concerning this project. For further information on Act compliance with NOAA Fisheries, please contact Ms. Cathy Tortorici, Chief of the Interagency Cooperation Branch by e-mail at cathy.tortorici@noaa.gov or by phone at (727) 209-5953.

The proposed action has the potential to adversely affect wintering and migrating piping plovers and their habitat from all three populations that may use the action area. The Atlantic Coast nesting population of piping plover is a component of the entity listed as threatened, which encompasses all breeding piping plovers (Great Plains and Atlantic) except the Great Lakes breeding population. Therefore, this Biological Opinion considers the potential effects of this project on this species and its designated critical habitat.

This Biological Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

ENVIRONMENTAL BASELINE

Status of the species/critical habitat within the action area

There is no federally designated piping plover critical habitat within the project area. The closest critical habitat unit for wintering piping plovers is unit FL-26. Unit FL-26 is located on Estero Island in Lee County, less than 1 mile north of the project area.

Bird populations in and adjacent to the project areas for Lovers Key State Park and Bonita Beach are monitored by volunteers. Launched in 2002, by the Cornell Lab of Ornithology and National Audubon Society, eBird provides data concerning bird abundance and distribution at a variety of spatial and temporal scales. eBird is sponsored in part by several Service programs, research groups, non-government offices, and the University of the Virgin Islands. In 2011, three piping plovers were reported along the interior of Lovers Key State Park. In 2013, piping plovers were reported from areas north of Big Carlos Pass on Fort Myers Beach. In addition, piping plover PCEs are present throughout the proposed action area.

Efforts to avoid and reduce adverse effects

The Service often requests post-project surveys and eradication of coastal exotic plant species in Florida as permit conditions for beach berm or nourishment projects to reduce affects to piping plover habitat. Four recent Biological Opinions for sand placement events in Florida included requirements that restricted the removal of wrack to minimize project effects (Service 2007b, 2008c, 2008d, 2008e). A statewide consultation with the Federal Emergency Management Agency to minimize emergency berm repair and construction projects in Florida was completed in 2008 (Service 2008c).

Section 10(a)(2)(A) of the Act requires an applicant for an incidental take permit to submit a conservation plan that specifies, among other things, the effects that are likely to result in the taking and the measures the applicant will undertake to minimize and mitigate such effects.

Coordinated efforts for several large projects are currently underway. Florida Service field offices are engaged in statewide programmatic consultations on Florida coastal Corps projects and permitting (dredging, jetty maintenance, and nourishment). Also, DEP and FWC are drafting a statewide HCP for coastal actions permitted through the DEP. The primary purpose of this plan is to minimize or mitigate habitat affects associated with wrack removal, seawall installation, and geotube placement.

As noted above, some project sponsors have incorporated recommended avoidance and minimization measures. Nonetheless, considerable challenges remain. Other project sponsors have not reacted positively to Service recommendations, citing financial costs and engineering restrictions.

Several projects have resulted in formal consultation for piping plovers or their designated critical habitat in Florida (Table 9).

Factors affecting the species environment within the action area

Since 1995, approximately 1,260,000 cy of beach compatible material has been dredged from five borrow areas and placed within the sand placement template extending between DEP reference monuments R-214.5 and R-220.5 (Lovers Key), and R-226.5 and R-230 (Bonita Beach). The most recent dredging and sand placement event took place in 2004. The proposed sand placement template is consistent with the historical fill template for both sites.

Based on maintenance dredging and sand placement activities, piping plovers have the potential to be affected due to habitat loss, sand placement, wrack removal, predation, contaminants, recreational disturbance, and storm events within the action area.

EFFECTS OF THE ACTION

Factors to be considered

Beach topography and morphology

The geomorphic characteristics of barrier islands, peninsulas, beaches, dunes, overwash fans, and inlets are critical to a variety of natural resources, and the geomorphic characteristics influence a barrier beach's ability to respond to wave action, including storm overwash and sediment transport. However, the protection or persistence of these important natural land forms, processes, and wildlife resources is often in conflict with shoreline projects. The manufactured berms and sand fill may impede overwash thereby causing successional advances in the habitat that will reduce sand flat formation, and therefore, its use by piping plovers in the project area.

Distribution

The Applicant proposes dredging of two borrow areas offshore of Big Carlos Pass with sand placement activities within previously authorized fill templates along the shoreline between DEP reference monuments R-214.5 and R-220.5 (Lovers Key), and R-226.5 and R-230 (Bonita Beach). The Service expects the proposed construction activities could directly and indirectly affect the distribution of migrating and wintering piping plovers to roosting and foraging habitat within the action area.

Disturbance frequency and intensity

The proposed action has the potential to adversely affect piping plovers within the proposed action area during dredging and sand placement activities. Dredging and sand placement activities for the 2013 event are scheduled to take place in the summer and fall. The second event may also take place during shorebird and sea turtle nesting season.

The Service anticipates construction activities to have short-term and temporary effects on the piping plover populations. Piping plovers located within the action area are expected to move outside of the construction zone due to disturbance.

Duration

The timeframe associated with completion of each dredging and sand placement event at Bonita Beach and Lovers Key is expected to be approximately 3 and 4 months, respectively. That said, the timeframe may vary depending on the amount of work necessary, weather conditions, and equipment mobilization and maintenance. Commencement of the next dredge and sand placement event at Bonita Beach is scheduled in late spring 2013, and Lovers Key to commence immediately following completion of Bonita Beach.

Nature of the effect

Although the Service expects short-term effects from disturbance during project construction, we anticipate the action will result in direct, indirect and long term effects to piping plovers. The Service expects there may be morphological changes to piping plover habitat due to the effects to loafing and foraging habitat. Activities that affect or alter the use of optimal habitat, or increase disturbance to the species may decrease the survival and recovery potential of the piping plover.

Timing

The timing of the proposed dredging and sand placement project may occur completely or partially during the migration and wintering period for piping plovers (July 15 to May 15). The Service expects indirect effects to occur later in time.

Analyses for effects of the action

The proposed project includes dredging approximately 461,000 cy of beach compatible material from two authorized borrow areas offshore of Big Carlos Pass and placing it along 1.85 miles of shoreline. If the dredged material is placed on the beach, it has the potential to elevate the beach berm and widen the beach providing storm protection and increasing recreational space. Sand placement may occur in and adjacent to habitat that appears suitable for roosting and foraging piping plovers or that will become more optimal with time. Project construction may overlap with portions of piping plover winter and migration seasons. Short-term and temporary construction effects to piping plovers will occur if the birds are roosting and feeding in the area during a migration stopover. The deposition of sand may temporarily deplete the intertidal food base along the shoreline and temporarily disturb roosting birds during project construction. Tilling to loosen compaction of the sand (required to minimize sea turtle effects) may affect wrack that has accumulated on the beach. This affects feeding and roosting habitat for piping plovers since they often use wrack for cover and foraging.

Direct effects

The construction window (*i.e.*, sand placement, dredging) for each dredging event will extend through a portion of one piping plover migration and winter season. If the dredged material is placed on the beach, heavy machinery and equipment (*e.g.*, trucks and bulldozers), location of the dredge pipeline, and sand placement, may adversely affect migrating and wintering piping plovers in the action area by disturbing and disrupting normal activities such as roosting and feeding, and possibly forcing birds to expend valuable energy reserves to seek available habitat in adjacent areas along the shoreline. In addition, suffocation of invertebrate species will occur. Impacts will affect the entire fill template (1.85 miles) along the project area. Timeframes projected for benthic recruitment and re-establishment following sand placement are between 6 months and 2 years, depending on actual recovery rates. Effects will occur even if sand placement activities occur outside the piping plover migration and wintering seasons.

Indirect effects

The proposed project includes placing beach-compatible material dredged from two authorized borrow areas offshore of Big Carlos Pass along 1.85 miles of shoreline between DEP reference

monuments R-214.5 and R-220.5, and R-226.5 and R-230. Indirect effects of reducing the potential for the formation of optimal habitats, especially along the shoreline, pose a concern to piping plover survival and recovery within the action area.

Eventually the shoreline within the fill template will reestablish and provide some feeding habitat for piping plovers, but these feeding areas are considered inferior to natural overwash and emergent shoal habitat that is likely to form within sections of the action area absent the proposed project.

Natural barrier islands need storms and overwash in order to maintain the physical and biological environments they support (Young et al. 2006). The removal of overwash processes will accelerate the successional state of the flats such that they will likely become vegetated within a few years (Leatherman 1988), thereby reducing the area's value to foraging and roosting piping plovers. The proposed project will perpetuate and contribute to the widespread activities that prevent the formation of these preferred early successional overwash habitats. The piping plover's rapid response to habitats formed by washovers from the hurricanes in 2004 and 2005 in the Florida panhandle at Gulf Islands National Seashore and Eglin Air Force Base's Santa Rosa Island and similar observations of their preferences for overwash habitats at Phipps Preserve and Lanark Reef in Franklin County, Florida, and elsewhere in their range, demonstrate the importance of optimal habitats for wintering and migrating piping plovers.

At the same time the proposed project limits the creation of optimal foraging and roosting habitat it will likely increase recreational pressures within the project area. Recreational activities that have the potential to adversely affect piping plovers include disturbance by increased pedestrian use, often with dogs. Long-term effects could include a decrease in piping plover use of habitat due to increased disturbance levels.

Sand placement along Bonita Beach and Lovers key will potentially increase the recreational beach width. Recreational activities, the associated pedestrian and possible domestic canine presence, may adversely affect the foraging and roosting behavior of piping plovers.

Beneficial effects

There are no known beneficial effects to piping plovers or piping plover habitat from the proposed project.

Species' response to the proposed action

The Service bases this Biological Opinion on anticipated direct and indirect effects to piping plovers (wintering and migrating) as a result of borrow area dredging and sand placement, which prevents the maintenance or formation of habitat that piping plovers consider optimal for foraging and roosting. Heavy machinery and equipment, the placement of the dredge pipeline along the beach, and sand disposal may adversely affect migrating and wintering piping plovers in the project area by disturbance and disruption of normal activities such as roosting and foraging, and possibly forcing piping plovers to expend valuable energy reserves to seek available habitat elsewhere. In addition, foraging in suboptimal habitat by migrating and wintering piping plovers may reduce the fitness of individuals.

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 Applicant does not anticipate conducting additional activities in the project action area that could affect federally listed species other than the dredging and sand placement events outlined in this Biological Opinion. Any other activities in the action area would require a Corps permit. Therefore, no cumulative effects are expected.

CONCLUSION

The 1.85 mile of shoreline represents approximately 0.08 percent of the 2,340 miles of sandy beach shoreline miles available (although not necessarily suitable) throughout the piping plover wintering range within the conterminous U.S. The Service estimates 29 percent (668 miles pre-project) have permits for sand placement events.

After reviewing the current status of the northern Great Plains, Great Lakes, and Atlantic Coast wintering piping plover populations, the environmental baseline for the dredging, sand placement, associated construction activities, and the cumulative effects, it is the Service's biological opinion that implementation of the project, as proposed, is not likely to jeopardize the continued existence of the piping plover, and no critical habitat will be affected.

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 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 nondiscretionary, and must be implemented by the Corps so they become binding conditions of any permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the Terms and Conditions or, (2) fails to adhere to the Terms and Conditions of the incidental take statement

through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. In order to monitor the effects of incidental take, the Corps must report the progress of the action and its effects on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

It is difficult for the Service to estimate the exact number of piping plovers that could be migrating through or wintering within the proposed action area at any one point in time or place during project construction. Therefore, the Service considers the disturbance to shoreline miles as a measurable way to estimate take because disturbance to suitable habitat within the action area would affect the ability of any given number of piping plovers to find foraging and roosting habitat throughout the migrating and wintering periods of any given year. The Service anticipates that an unspecified number of piping plovers occupying 1.85 miles of shoreline (between DEP reference monuments R-214.5 and R-220.5, and R-226.5 and R-230) could be taken in the form of harm (*e.g.*, death, injury) and harassment as a result of the proposed project.

The amount or extent of incidental take for piping plovers will be considered exceeded if the frequency of dredging and sand placement events over the course of the 15-year Corps permit exceeds more than two each at Bonita Beach and Lovers Key. This incidental take statement will expire 15 years from the date of Corps permit issuance. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

EFFECT OF THE TAKE

In this Biological Opinion, the Service determined the proposed project is not likely to result in jeopardy to piping plovers or 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 nonbreeding piping plovers in the proposed action area.

1. The Applicant shall minimize and monitor the effects of the proposed project on piping plovers.
2. After project completion, the Applicant shall protect wrack and inlet shorelines for roosting and foraging piping plovers.
3. Pre-construction project information collected in Term and Condition #1 shall be submitted to the South Florida Ecological Services Office.
4. Prior to construction, avoidance signs shall be installed around optimal piping plover habitat features.
5. Driving on the beach shall be limited to that necessary and within a travel corridor.

6. Post-construction signage will be placed within the action area to protect piping plover habitat features.
7. The Applicant shall educate the public to minimize disturbance to piping plovers.
8. The Applicant shall comply with the MBTA and FWC's shorebird guidelines.
9. The Applicant shall minimize the presence of predators.
10. The Corps shall ensure communication between all parties is carried out.

TERMS AND CONDITIONS

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

1. Three months prior to construction and for the 3 years following each dredging and sand placement event, the Applicant must conduct bi-monthly (twice-monthly) surveys for piping plovers in the beach fill and dredging templates within the action area covering the nonbreeding season for plovers (July 15 to May 15 of each year) to monitor and quantify the level of take associated with the project and to evaluate the potential effects of future projects of similar nature. At least one of the bi-monthly surveys should be conducted on a weekend during each of the months of October, November, March and April.

Piping plover identification, especially when in non-breeding plumage, can be difficult. Qualified professionals with shorebird/habitat survey experience must conduct the required field work.

The following will be collected and reported:

- a. Negative and positive survey data.
- b. The amount and type of recreational use (*e.g.*, people, dogs on-off leash, vehicles, kite-boarders).
- c. Piping plover locations with a Global Positioning System (decimal degrees preferred).
- d. Habitat feature(s) used by piping plovers when observed (*e.g.*, intertidal, fresh wrack, old wrack, dune, mid-beach, vegetation).
- e. Landscape feature(s) where piping plovers are located (*e.g.*, inlet spit, tidal creek, shoals, lagoon shoreline).
- f. Substrate used by piping plovers (*e.g.*, sand, mud/sand, mud, algal mat).
- g. Behavior of piping plovers (*e.g.*, foraging, roosting, preening, bathing, flying, aggression, walking).
- h. Color bands observed on piping plovers.
- i. All other shorebirds/waterbirds seen within the survey area.

All information shall be incorporated into a database. Submit pre-and post-construction piping plover monitoring results (datasheets, maps, database) on standard electronic media (*e.g.*, CD, DVD) to the FWC, and to the Service's South Florida Ecological Services Office (1339 20th

Street, Vero Beach, Florida 32960-3559; 772-562-3909). All reports will be due by December 1 following the end of the nonbreeding season for plovers (July 15) of each year.

2. To preserve piping plover feeding and roosting habitat, the Applicant shall limit mechanical cleaning of the dry sand portion of the beach to areas landward of the primary wrack (organic material) line as reasonable determined by the Applicant for the life of the project. This has been identified as important foraging and roosting habitat by piping plovers as well as an abundance of other shorebirds for wintering and migrating. Trash and litter within the wrack line area may be manually removed. Mechanical removal of wrack may be authorized when the Applicant documents a fish kill event, or when the health of humans may be affected. The Applicant will notify the Service via phone or electronic mail when wrack removal is necessary.
3. Prior to construction, the Applicant shall submit to the South Florida Ecological Services Office, a project design which incorporates the information collected in Term and Condition #1 documenting how project impacts have been minimized to the maximum extent practicable.
4. Prior to construction, the Applicant shall post avoidance signs around any optimal piping plover habitat features identified in Term and Condition #1 within the project area, and protect these areas from sediment fill to the maximum extent practicable. Obvious identifiers (*e.g.*, pink flagging tape on metal poles) shall be used to clearly mark the boundaries to prevent accidental impacts to these areas.
5. If project construction requires driving on the beach outside of the project area, driving on the beach for construction shall be limited to the minimum necessary with a travel corridor established to above the primary wrack line.
6. Post-construction signage shall be placed within the action area to protect the habitat features documented as used by piping plovers. When County pet ordinances are in place, that information shall be integrated into the signage. If possible, warnings and citations will be issued when appropriate to minimize harassment of piping plovers and other shorebirds protected under the MBTA.
7. The Applicant shall produce piping plover and wrack-oriented educational materials to be placed on the County's website and television channel. The goal of these outreach activities is to educate the public about piping plover optimal habitat, the role of natural coastal processes in creating and maintaining piping plover habitat, and the importance of wrack. Some of the educational information will be included in a pre-construction news release.
8. Due to the potential for the proposed project to affect piping plovers, the Applicant shall comply with the MBTA and follow FWC's standard guidelines to protect against effects to nesting shorebirds during implementation of the proposed project from February 15 to August 31. In part, these guidelines include the establishment of buffer zones in locations where shorebirds have been engaged in nesting behavior, including territory defense.
9. The Applicant shall ensure the contractors conducting the work provide predator proof trash receptacles for all construction workers. All contractors and their employees shall be briefed on the importance of not littering and keeping the project area trash and debris

free. Predator proof trash receptacles shall be installed and maintained at all access points, eating areas, and restroom areas.

10. The Corps shall submit a report describing the actions taken to implement the terms and conditions of this incidental take statement to the FWC, Imperiled Species Management Section, Tallahassee office and the Service's South Florida Ecological Services Office, Vero Beach, Florida within 60 days post-construction of each event.
11. The Corps must arrange a meeting between representatives of the contractor, the Service, the FWC, and the shorebird surveyor(s) prior to the commencement of the project and prior to each future event.

Upon locating a dead, injured, or sick threatened or endangered specimen, initial notification must be made to the Service's Office of Law Enforcement (20501 Independence Boulevard, Groveland, Florida 34736; 352-429-1037). Additional notification must be made to FWC at 1-888-404-3922 and the Service's South Florida Ecological Services Office (1339 20th Street, Vero Beach, Florida 32960-3559; 772-562-3909). Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

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.

- To further protect piping plover habitat and reduce beach erosion, the Applicant should consider protecting the wrack throughout the project area in perpetuity.

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

THE MIGRATORY BIRD TREATY ACT

The MBTA implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the provisions of the MBTA, it is unlawful "by any means or manner to pursue, hunt, take, capture or kill any migratory bird except as permitted by regulations issued by the Service. The term "take" is not defined in the MBTA, but the Service has defined it by regulation to mean to pursue, hunt, shoot, wound, kill, trap, capture or collect any migratory bird, or any part, nest or egg or any migratory bird covered by the conventions or to attempt those activities.

In order to comply with the MBTA and due to the potential for this project to affect nesting shorebirds, the Corps and Sponsor should follow FWC's standard guidelines to protect against effects to nesting shorebirds during implementation of this project from February 15 to August 31.

The Service will not refer the incidental take of piping plover for prosecution under the MBTA of 1918, as amended (16 U.S.C. 703-712), if such take is in compliance with the terms and conditions specified in the incidental take statement above.

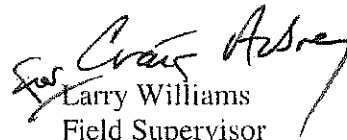
REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this 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.
4. A new species is listed or critical habitat designated that may be affected by the action.

Thank you for your cooperation in the effort to protect fish and wildlife resources. Should you have additional questions or require clarification, please contact Jeff Howe at 772-469-4283.

Sincerely yours,



Larry Williams
Field Supervisor
South Florida Ecological Services Office

cc: electronic only
Corps, Fort Myers, Florida (Monika Dey)
DEP, Tallahassee, Florida (Liz Yongue)
EPA, West Palm Beach, Florida (Ron Miedema)
FWC, Tallahassee, Florida (Robbin Trindell)
NOAA Fisheries, St. Petersburg, Florida (Mark Sramek)
Service, Panama City, Florida (Patty Kelly)
Service, St. Petersburg, Florida (Anne Marie Lauritsen)
Service, Atlanta, Georgia (Ken Graham)
USGS, Gainesville, Florida (Susan Walls)

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Table 1. The number of adult piping plovers and breeding pairs reported in the U.S. Northern Great Plains by the International Piping Plover Census efforts.

Year	Adults	Pairs Reported by the Census
1991	2,023	891
1996	1,599	586
2001	1,981	899
2006	2,959	1,212

Source: Plissner and Haig 1997; Ferland and Haig 2002; Elliot-Smith et al. 2009.

Table 2. Results of the 1991, 1996, 2001, and 2006 International Piping Plover Winter Censuses (Haig et al. 2005; Elliott-Smith et al. 2009).

Location	1991	1996	2001	2006
Virginia	Not surveyed	Not surveyed	Not surveyed	1
North Carolina	20	50	87	84
South Carolina	51	78	78	100
Georgia	37	124	111	212
Florida	551	375	416	454
Atlantic	70	31	111	133
Gulf	481	344	305	321
Alabama	12	31	30	29
Mississippi	59	27	18	78
Louisiana	750	398	511	226
Texas	1,904	1,333	1,042	2,090
Puerto Rico	0	0	6	Not surveyed
U.S. Total	3,384	2,416	2,299	3,355
Mexico	27	16	Not surveyed	76
Bahamas	29	17	35	417
Cuba	11	66	55	89
Other Caribbean Islands	0	0	0	28
GRAND TOTAL	3,451	2,515	2,389	3,884
Percent of Total International Piping Plover Breeding Census	62.9	42.4	40.2	48.2

Table 3. Number of hardened inlets by state as of 2009. An asterisk (*) represents an inlet at the state line, in which case half an inlet is counted in each state.

State	Visually estimated number of navigable mainland and barrier island inlets per state	Number of hardened inlets	Percent of inlets affected
North Carolina	20	2.5*	12.5
South Carolina	34	3.5*	10.3
Georgia	26	2	7.7
Florida	82	41	50
Alabama	14	6	42.9
Mississippi	16	7	43.8
Louisiana	40	9	22.5
Texas	17	10	58.8
Overall Total	249	81	32.5

Table 4. Summary of the extent of nourished beaches in piping plover wintering and migrating habitat within the conterminous U.S. From Service unpublished data.

State	Sandy beach shoreline miles available	Sandy beach shoreline miles nourished to date (within critical habitat units)	Percent of sandy beach shoreline affected (within critical habitat units)
North Carolina	301 ¹	117 ³ (unknown)	39 (unknown)
South Carolina	187 ¹	56 (0.6)	30 (0.32)
Georgia	100 ¹	8 (0.4)	8 (0.40)
Florida	825 ²	404 (6) ⁶	49 (0.72)
Alabama	53 ¹	12 (2)	23 (3.77)
Mississippi	110 ³	≥6 (0)	5 (0)
Louisiana	397 ¹	Unquantified (usually restoration-oriented)	Unknown
Texas	367 ⁴	65 (45)	18 (12.26)
Overall Total	2,340 (does not include Louisiana)	≥ 668 does not include Louisiana (54)	29 (≥2.31)

Data from ¹www.50states.com; ² Clark 1993; ³Winstead 2008; ⁴ www.surfrider.org; ⁵ Hall 2009; ⁶ partial data from Lott et al. (in review).

Table 5. Summary of predator control programs that may benefit piping plovers on winter and migration grounds.

State	Entities with Predator Control Programs
North Carolina	State Parks, Cape Lookout and Cape Hatteras National Seashores.
South Carolina	As needed throughout the state-targets raccoons and coyotes.
Georgia	No known programs.
Florida	Merritt Island NWR, Cape Canaveral AFS, Indian River County, Eglin AFB, Gulf Islands NS, northwest Florida state parks (up until 2008), St. Vincent NWR, Tyndall AFB.
Alabama	Late 1990's Gulf State Park and Orange Beach for beach mice, none current.
Mississippi	No known programs.
Louisiana	No known programs.
Texas	Aransas NWR (hog control for habitat protection). Audubon (mammalian predator control on colonial waterbird islands that have occasional piping plover use).

Table 6. Number of sites surveyed during the 2006 winter International Piping Plover Census with hardened or developed structures adjacent to the shoreline.

State	Number of sites surveyed during the 2006 winter Census	Number of sites with some armoring or development	Percent of sites affected
North Carolina	37 (+2) ¹	20	51
South Carolina	39	18	46
Georgia	13	2	15
Florida	188	114	61
Alabama	4 (+2) ¹	3	50
Mississippi	16	7	44
Louisiana	25 (+2) ¹	9	33
Texas	78	31	40
Overall Total	406	204	50

¹ Indicates additional piping plovers sites not surveyed in the 2006 Census.

Table 7. Military bases that occur within the wintering/migration range of piping plovers and contain piping plover habitat. Five bases (indicated with an asterisk [*]) conduct activities that may affect piping plovers or their habitat.

State	Coastal Military Bases
North Carolina	Camp Lejeune*
South Carolina	No coastal beach bases
Georgia	Kings Bay Naval Base
Florida	Key West Base, Naval Station Mayport*, Cape Canaveral Air Force Station, Patrick AFB, MacDill AFB, Eglin AFB*, Tyndall AFB*
Alabama	No coastal beach bases
Mississippi	Keesler AFB
Louisiana	U.S. Navy* operations on Peveto Beach
Texas	Corpus Christi Naval Air Station

Table 8. Percent of known piping plover winter and migration habitat locations, by state, where various types of anthropogenic disturbance have been reported.

Disturbance Type	Percent by State							
	AL	FL	GA	LA	MS	NC	SC	TX
ATVs	0	35	0	25	0	17	25	30
Bikes	0	19	63	25	0	0	28	19
Boats	33	65	100	100	0	78	63	44
Dogs on leash	67	69	31	25	73	94	25	25
Dogs off leash	67	81	19	25	73	94	66	46
Kite surfing	0	10	0	0	0	33	0	0
ORVs	0	21	0	25	0	50	31	38
Pedestrians	67	92	94	25	100	100	88	54

Table 9. Biological Opinions issued for all projects that had adverse effects to the piping plovers on non-breeding grounds in Florida.

SPECIES Piping plover	YEAR	Habitat Impacted	PROJECT STATUS
		(miles or acres)	
East Pass re-opening	2001	2.0 miles	Completed
Amended Biological Opinion for south jetty extension in Ponce De Leon Navigation Inlet.	2003	Shoal habitat	Completed
Terminal groin and nearshore breakwater on the south end of Amelia Island, Nassau, Florida.	2004	Shoal habitat	Completed
Navarre beach nourishment emergency consultation and amendments 1-6.	2005	4.1 miles	Project completed, consultation incomplete.
Eglin AFB INRMP	2007-2011	17 miles (disturbance/monitoring)	Completed
Tyndall AFB INRMP	2007-2011	18 miles (disturbance/monitoring)	Completed
St. Joseph Peninsula beach restoration	2007	7.5 miles	Consultation complete, project completed.
Alligator Point beach nourishment	2007	2.9 nourished, add 1.5 disturbed (miles)	Consultation complete, project cancelled.
NAS Pensacola pass dredging and spoil placement	2007	10.6 miles	Consultation ongoing.
FEMA emergency berm repair for Florida coast	2008	50 miles (statewide)	Consultation complete.
Eglin AFB nourishment	2008	7.3 miles	Consultation complete, project pending.
Perdido Key beach nourishment; Escambia County.	2008	6.5 miles	Consultation complete, project pending.
Beach nourishment, Walton County	2008	14.1 miles	Consultation complete, project pending.
East Pass Destin Navigation Project	2009	Inlet dredge and 2.1 miles of shoreline.	Consultation complete, project pending.
Matanzas Pass Re-opening	2009	3.6 acres of Critical Habitat Unit FL-25.	Consultation complete, project pending.
Hideaway Beach Erosion Control Project	2009	2.5 acres of Critical Habitat Unit FL-27.	Consultation and project completed.
St. Lucie Inlet Dredging and Sand Placement	2011	3.8 acres of Critical Habitat Unit FL-33, and 8.5 miles.	Consultation complete.
Panama City Beach Erosion Control and Storm Damage Reduction	2012	18.5 miles of shoreline	Consultation and project completed.
Walton County Beach Hurricane and Storm Damage Reduction Project	2012	26.0 miles of shoreline	Consultation complete.
Matanzas Pass Dredging	2012	3.2 acres of Critical Habitat Unit FL-25 and 1.1 miles of shoreline.	Consultation complete.
Sailfish Point Channel Dredging and Sand Placement		0.95 mile of shoreline.	Consultation complete.
Captiva & Sanibel Islands Sand Placement	2012	6.4 miles of shoreline.	Consultation complete.
Clam Pass Dredging and Sand Placement		0.60 mile of shoreline.	Consultation ongoing.
Hideaway Beach Sand Placement and Groin Construction			Consultation ongoing.
Sebatian Inlet Sand Trap Dredging and Sand Placement			Consultation ongoing.
Lovers Key & Little Hickory Island Sand Placement		1.85 miles of shoreline.	Consultation ongoing.

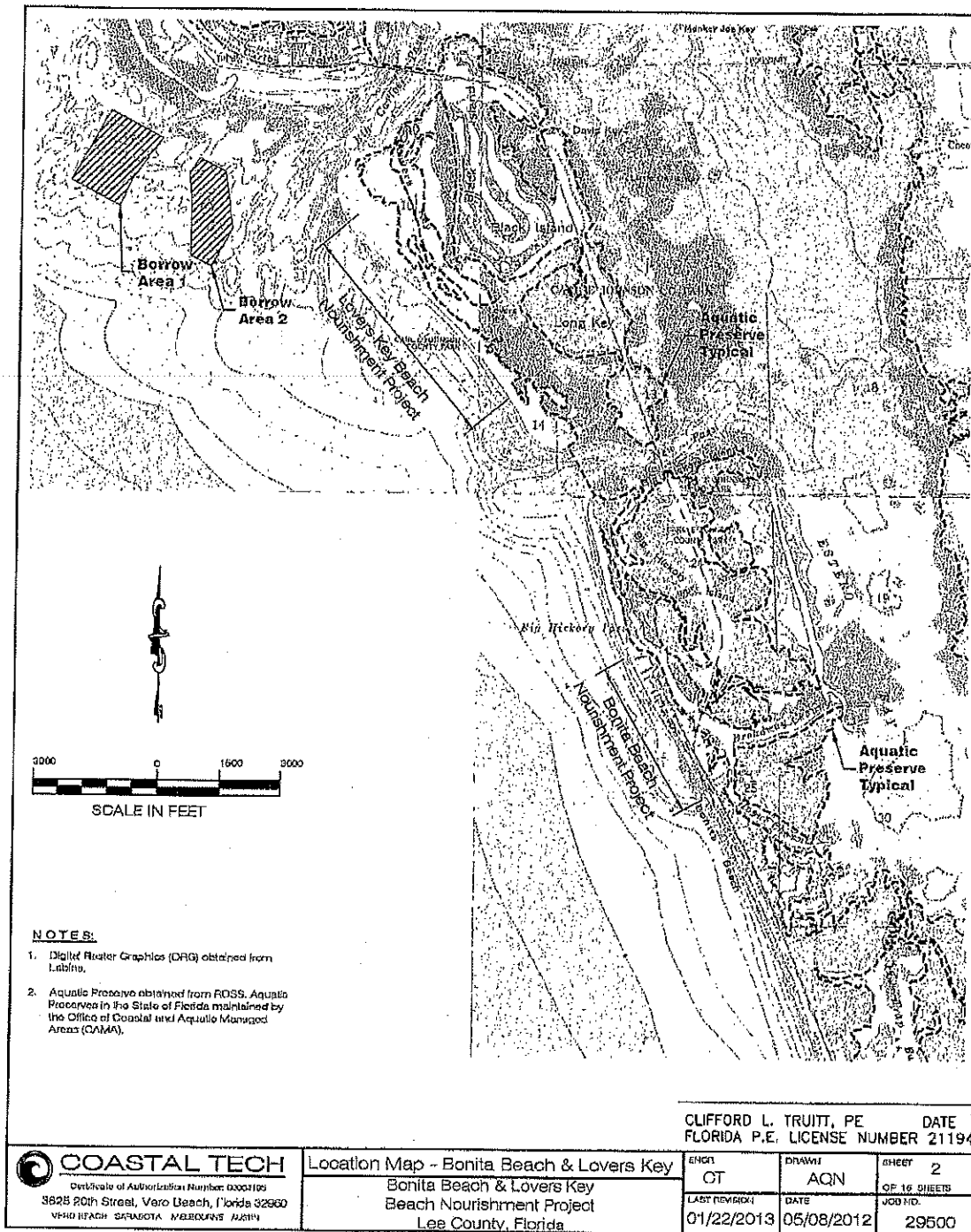


Figure 1. Location of the proposed sand placement project along Lovers Key and Little Hickory Island (Bonita Beach), Lee County, Florida.

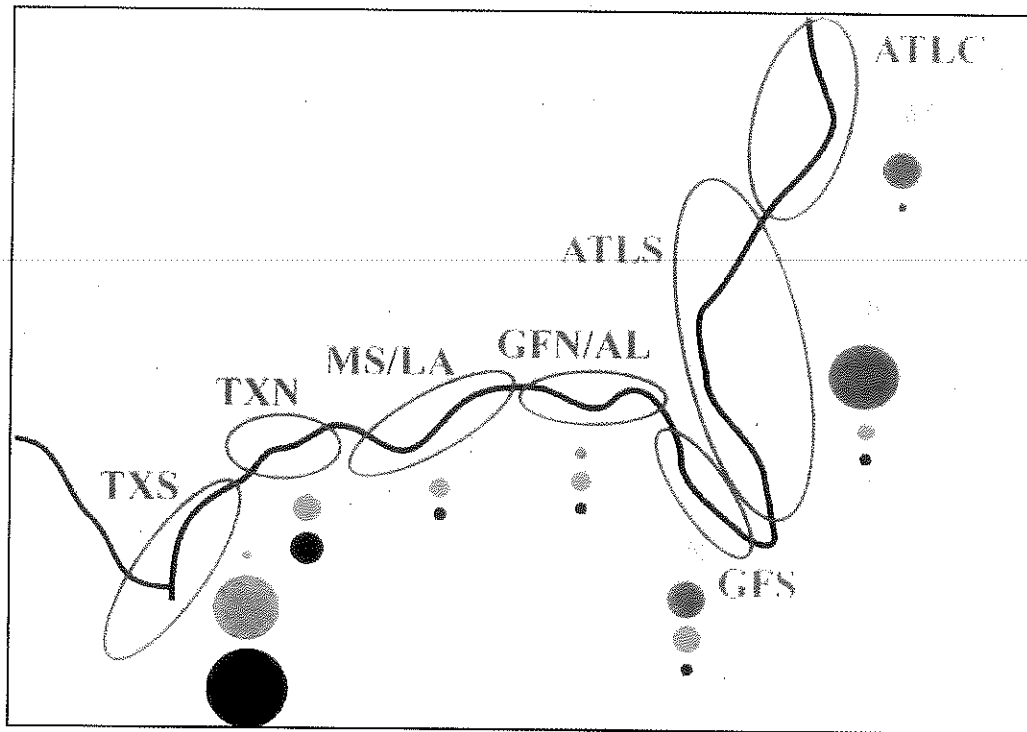


Figure 2. Breeding population distribution in the wintering/migration range. Grey circles represent Eastern Canada birds, Orange U.S. Great Lakes, Green U.S. Great Plains, and Black Prairie Canada. ATLC=Atlantic (eastern) Canada; GFS=Gulf Coast of southern Florida; GFN=Gulf Coast of north Florida; AL=Alabama; MS/LA=Mississippi and Louisiana; TXN=northern Texas; and TXS=southern Texas. From Gratto-Trevor et al. 2009; reproduced by permission.

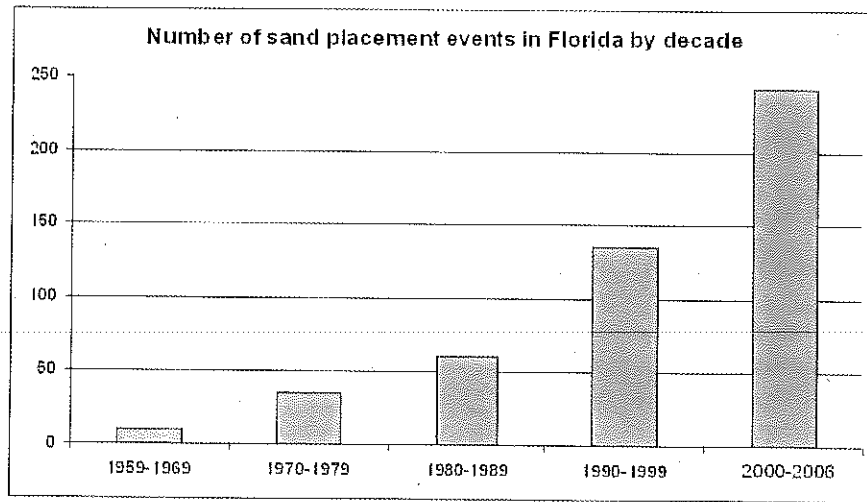


Figure 3. Number of sand placement events in Florida between 1959 and 2006.

Attachment 7

US FWS Service

State Programmatic Biological Opinion

Planning and Regulatory

Sand Placement Activities in Florida

(FWS Log No. 41910-2011-F-0170)

Dated April 19, 2011

Reasonable & Prudent Measures,

Terms & Conditions

Appendices B-D

31 pages

REASONABLE AND PRUDENT MEASURES

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize take of the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles; SEBM, AIBM, CBM, PKBM, and SABM in the action area for the following activities:

- A. Sand placement from beach nourishment, sand bypass, and sand back pass activities;
- B. Sand placement from navigation channel maintenance; and
- C. Groin and jetty repair or replacement.

If the Corps is unable to comply with the Reasonable and Prudent Measures and Terms and Conditions, the Corps as the construction agent or regulatory authority may:

- 1. Inform the Service why the term and condition is not reasonable and prudent for the specific project or activity and request exception under the SPBO or
- 2. Initiate consultation with the Service for the specific project or activity. The Service may respond by either of the following:
 - a. Allowing an exception to the terms and conditions under the SPBO or
 - b. Recommending or accepting initiation of consultation (if initiated by the Corps) for the specific project or activity.

REASONABLE AND PRUDENT MEASURES for:

A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection shall include the following measures:

- A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.
- A2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.
- A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching, to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties, sand placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte counties, sand placement shall not occur from June 1 through September 30. In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia counties, Florida, sand placement may occur during the sea turtle nesting season.

- A4. All derelict material or other debris shall be removed from the beach prior to any sand placement.
- A5. The Corps shall continue to work with FDEP, FWC and the Service to create a sea turtle friendly beach profile for placement of material during construction.
- A6. If a dune system is already part of the project design, the placement and design of the dune shall emulate the natural dune system to the maximum extent possible, including the dune configuration and shape.
- A7. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice.
- A8. A meeting between representatives of the Applicant's or local sponsor's contractor, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.
- A9. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. Surveys for early and late nesting sea turtles shall be conducted where appropriate. If nests are constructed in the area of sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.
- A10. A post construction survey(s) of all artificial lighting visible from the project beach shall be completed by the Applicant or local sponsor.
- A11. Daily nesting surveys shall be conducted by the Applicant or local sponsor for two nesting seasons following construction if the new sand still remains on the beach.
- A12. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.
- A13. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles.
- A14. Construction equipment and materials shall be stored in a manner that will minimize impacts to nesting and hatchling sea turtles and beach mice.
- A15. Lighting associated with the project construction shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatchling sea turtles and nocturnal activities of beach mice.
- A16. During the sea turtle nesting season, the contractor shall not extend the beach fill more than 500 feet (or other agreed upon length) between dusk and the time of completion the following day's nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

- A17. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice.
- A18. Beach mouse habitat shall be avoided when selecting sites for storage and staging of equipment to the maximum extent possible.
- A19. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.
- A20. Existing vegetated habitat at beach access points and travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access corridor.
- A21. Expanded or newly created beach access points shall be restored following construction.
- A22. A report describing the actions taken shall be submitted to the Service following completion of the proposed work for each year when the activity has occurred.
- A23. The Service and the FWC shall be notified if a sea turtle adult, hatchling, or egg, or beach mouse is harmed or destroyed as a direct or indirect result of the project.

TERMS AND CONDITIONS

All conservation measures described in the Corps' PBA are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline required reporting/monitoring requirements. For Corps civil works projects, post construction monitoring (A10 to A13) and corrective measures that are the responsibility of the non-Federal sponsor will commit to at least one of the following:

1. An executed agreement between the Corps and the non-Federal sponsor (Project Partnership Agreement, Project Cost Sharing Agreement, Project Cooperation Agreement, Local Cooperation Agreement, etc.);
2. An executed agreement between the non-Federal sponsor and FDEP (normally associated with a FDEP permit issued to the Corps); or
3. A permit issued to the non-Federal sponsor by FDEP or the Corps for which the sponsor remains responsible.

These Terms and Conditions are nondiscretionary.

TERMS AND CONDITIONS for:

- A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection shall include the following conditions:**

All beaches

- A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.
- A2. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.
- A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.
- a. Sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes may be placed and/or stored on the beach.
 - b. Sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties may occur during the sea turtle nesting season except on publicly owned conservation lands such as state parks and areas where such work is prohibited by the managing agency or under applicable local land use codes (see exceptions in A3.c below).
 - c. For higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key located in Sarasota and Charlotte counties, sand placement shall not occur during the main part of the nesting season (June 1 through September 30). These beaches include St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte counties.

The Service shall be contacted for coordination, on a project-by-project basis, if sand placement is needed on publicly owned conservation lands and in these higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key in Sarasota and Charlotte counties during the above exclusionary period. The Service will determine whether work (1) may proceed in accordance with the Terms and Conditions; (2) proceed in accordance with the Terms and Conditions and other requirements as developed by the Service; or (3) would require that an individual emergency consultation be conducted.

- A4. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall 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 (Tables 15 and 16), the work shall be conducted during daylight hours only and shall not commence until completion of the sea turtle nesting survey each day.

Table 15. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends	Beach Placement Window	Early Season Relocation *	Late Season Relocation*	Nesting Season Monitoring
Brevard, Indian River, St. Lucie, and Broward Counties	25 Feb – 11 Nov	15 Jan	1 Nov – 30 Apr	1 Mar – 30 Apr In St. Lucie County, nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to 1 Nov (28 Aug) (or prior to start of construction **)	1 Mar – 15 Oct
Martin and Palm Beach Counties	12 Feb – 16 Oct	20 Dec	1 Nov – 30 Apr	1 Mar – 30 Apr In Martin and Palm Beach Counties, nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to 1 Nov (28 Aug) (or prior to start of construction **)	1 Mar – 15 Oct

Table 16. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Outside of Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends	Beach Placement Window	Nesting Season Monitoring and Relocation
Nassau, Duval, St. Johns, Flagler, and Volusia Counties	27 Apr – 3 Oct	30 Nov	All Year	15 Apr – 30 Sep
Miami-Dade County	30 Mar – 25 Sep	30 Nov	All Year	1 Apr – 30 Sep
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) and Franklin County (St. George Island)	1 May – 4 Sep	15 Nov	1 Oct – 31 May	1 May – 15 Sep
All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	11 May – 5 Sep	15 Nov	All Year	1 May – 31 Aug
Sarasota and Charlotte Counties (Manasota Key)	27 Apr – 7 Sep	15 Nov	1 Nov – 30 Apr	15 Apr – 15 Sep
All other beaches in Sarasota and Charlotte Counties	27 Apr – 7 Sep	15 Nov	All Year	15 Apr – 15 Sep
Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	24 Apr – 11 Sep	15 Nov	All Year	15 Apr – 15 Sep

- A5. The Corps shall continue to work with FDEP, FWC and the Service in conducting the second phase of testing on the sea turtle friendly profile during project construction. This includes exploring options to include a dune system in the project design for existing authorized projects and new non-Federal projects and how the existing sand placement template may be modified.
- A6. Dune restoration or creation included in the profile design (or project) shall have a slope of 1.5:1 followed by a gradual slope of 4:1 for approximately 20 feet seaward on a high erosion beach (**Figure 13**) or a 4:1 slope (**Figure 14**) on a low erosion beach. If another slope is proposed for use, the Corps shall consult the Service.

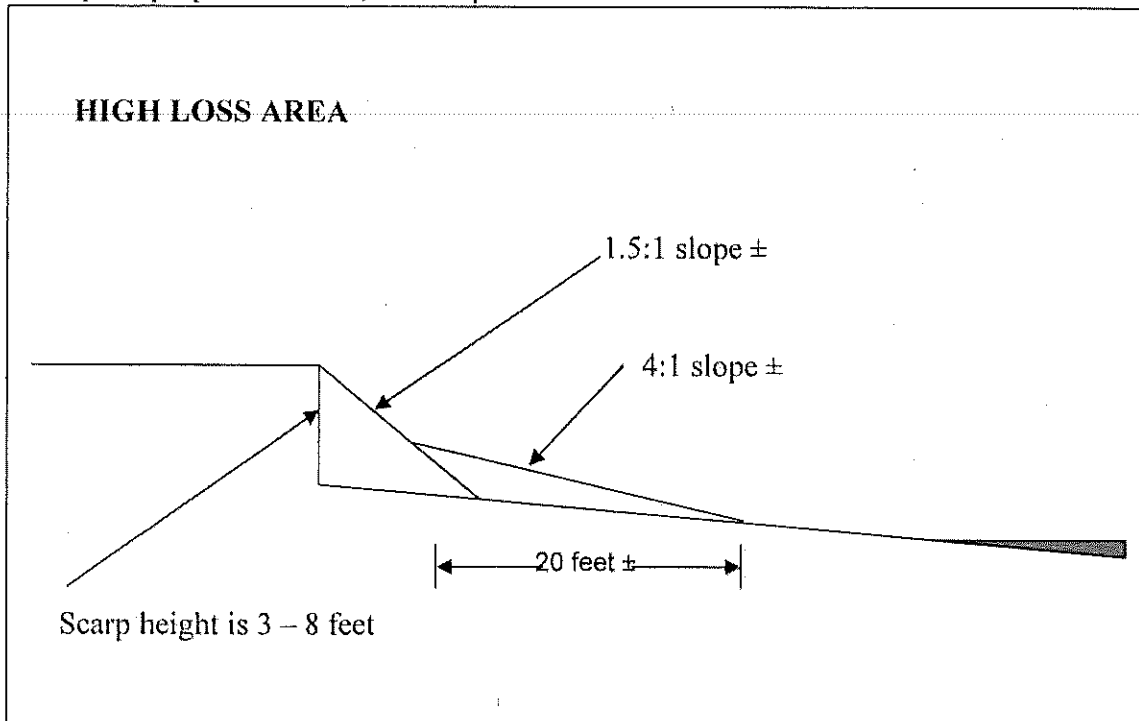


Figure 13. Recommended slope on a high erosion beach for sand placement projects that include the creation of a dune.

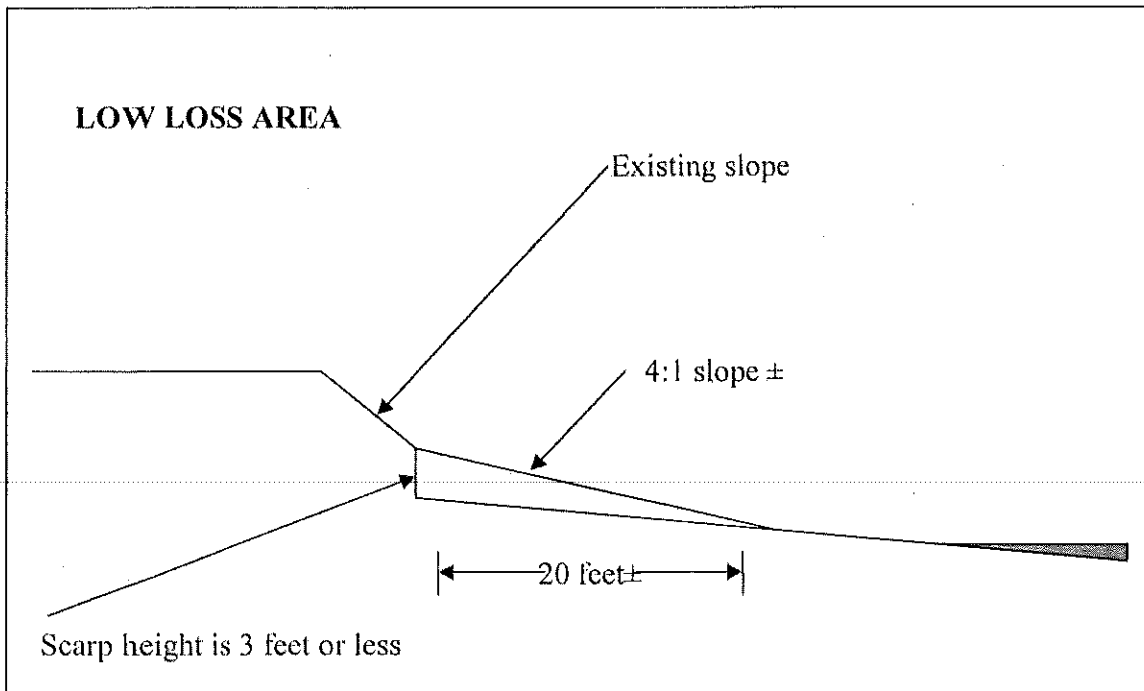


Figure 14. Recommended slope on a low erosion beach for sand placement projects that include the creation of a dune.

- A7. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix C**). The contractors conducting the work shall provide predator-proof trash receptacles for the construction workers. All contractors and their employees shall be briefed on the importance of not littering and keeping the project area trash and debris free.
- A8. A meeting between representatives of the contractor, the Service, the FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on projects. At least 10 business days advance notice shall be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the sea turtle and beach mouse protection measures as well as additional guidelines when construction occurs during the sea turtle nesting season, such as storing equipment, minimizing driving, free-roaming cat observation, and reporting within the work area, as well as follow up meetings during construction (**Table 3**).

Sea Turtle Protection

- A9. Daily early morning surveys for sea turtle nests shall be required as outlined in **Tables 15 and 16 (Nesting Season Monitoring)**. If nests are constructed in the area of sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation as outlined in a through f.
- a. For sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties that occur during March 1 through April 30, daily early morning surveys and egg relocation shall be conducted for sea turtle nests

until completion of the project (whichever is earliest). Eggs shall be relocated per the following requirements. For sand placement projects that occur during the period from November 1 through November 30, daily early morning sea turtle nesting surveys shall be conducted 65 days prior to project initiation and continue through November 30, and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

- i. Nesting surveys and egg relocations will only be conducted by persons with prior experience and training in these activities and who are duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at (561) 575-5407 for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones).
- ii. Only those nests that may be affected by sand placement activities will be relocated. Nest relocation shall not occur upon completion of the project. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, predation, or subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.
- iii. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished berm prior to tilling shall be marked and left in situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity will occur within this area nor will any activities occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

During the period from March 1 through April 30, daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

- b. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties that occur during the period from May 1 through October 31, daily early morning (before 9 a.m.) surveys and egg relocation shall be conducted. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin, Gulf, Sarasota, and Charlotte Counties in A9.d. below).
- c. For Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, nesting surveys shall be initiated 70 days prior to sand placement activities (incubation periods are longer in these counties) or by May 1 whichever is later. Nesting surveys and relocation shall 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 shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin and Gulf Counties in A9.d. below).
- d. For St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties, sand placement activities shall not occur from June 1 through September 30, the period of peak sea turtle egg laying and egg hatching for this area. If nests are laid between May 1 and May 31 in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.
- e. For Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier, and Monroe Counties, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by April 15 whichever is later. Nesting surveys and egg relocation shall continue through the end of the project or through September 30 whichever is earlier. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Sarasota and Charlotte Counties in A9.d. above).
- f. For Miami-Dade County, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by April 1 whichever is later. Nesting surveys and egg relocation shall continue through the end of the project or through September 30 whichever is earlier. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii
- g. For Volusia, Flagler, St. Johns, Duval, and Nassau Counties, nesting surveys shall be initiated 65 days prior to sand placement activities or by April 15 whichever is later. Nesting surveys and egg relocation shall continue through the end of the project or through September 30 whichever is earlier. If nests are laid in areas

where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

- A10. Daily nesting surveys shall be conducted for two nesting seasons in accordance with the FWC's Statewide Nesting Beach Survey Protocol (**Appendix B**) by the Applicant or local sponsor following construction if placed material still remains on the beach (**Table 17**). Post construction year-one surveys shall record the number of nests, nesting success, reproductive success, and lost nests due to erosion and/or inundation. Post construction year-two surveys shall only need to record nest numbers and nesting success. This information will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting.

Table 17. Post-Construction Sea Turtle Monitoring.

Region	Nest Laying Season	Years 1 and 2 Post-Construction Monitoring
Brevard, Indian River, St. Lucie, and Broward Counties	25 Feb – 11 Nov	Bi-weekly surveys: 1 Mar – 30 Apr and from 15 Oct – 15 Nov Daily surveys: 1 May – 15 Oct
Martin and Palm Beach Counties	12 Feb – 16 Oct	Daily surveys: 1 Mar – 15 Oct
Nassau, Duval, St. Johns, Flagler, and Volusia Counties	27 Apr – 3 Oct	Daily surveys: 1 May – 30 Sep
Miami-Dade County	30 Mar – 25 Sep	Daily surveys: 1 Apr – 30 Sep
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) and Franklin County (St. George Island)	1 May – 4 Sep	Daily surveys: 1 May – 31 Aug
All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	11 May – 5 Sep	Daily surveys: 1 May – 31 Aug
Sarasota and Charlotte Counties (Manasota Key)	27 Apr – 7 Sep	Daily surveys: 1 May – 15 Sep
All other beaches in Sarasota and Charlotte Counties	27 Apr – 7 Sep	Daily surveys: 1 May – 15 Sep
Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	24 Apr – 11 Sep	Daily surveys: 1 May – 15 Sep

- A11. Two surveys shall be conducted of all lighting visible from the beach placement area by the Applicant or local sponsor, using standard techniques for such a survey (**Appendix C**), in the year following construction. The first survey shall be conducted between May 1 and May 15 and a brief summary provided to the Service. The second survey shall be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, shall be submitted to the Service by December 1 of the year in which surveys are conducted. After the annual report is completed, a meeting shall be set up with the Applicant or local sponsor, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area. If the project is completed during the nesting season and prior to May 1, the contractor may conduct the lighting surveys during the year of construction.
- A12. Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to the dates in **Table 18** for 3 subsequent years.

Table 18. Dates for Compaction Monitoring and Escarpment Surveys by County.

County where project occurs	Date
Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward	March 1
Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, Volusia, Flagler, St. Johns, Duval, Nassau, Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier	April 15
Miami-Dade, Monroe	April 1

If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring shall be submitted to the appropriate Service Field Office (**Table 3**) 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 http://myfwc.com/docs/Conservation/FBCI_BNB_SeaTurtleMonitors.pdf)

- a. Compaction sampling stations shall be located at 500-foot intervals along the sand placement template. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).
- b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering

exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

- c. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area shall be tilled immediately prior to the appropriate date listed in **Table 18**.
- d. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.
- e. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3 square foot buffer around the vegetated areas.

- A13. Visual surveys for escarpments along the project area shall be made immediately after completion of the sand placement and within 30 days prior to the start dates for Nesting Season Monitoring in **Tables 15 and 16** for 3 subsequent years if sand in the project area still remains on the dry beach.

Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal shall be reported by location. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service or FWC will provide a brief written authorization within 30 days that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the appropriate Service Field Office (**Table 3**).

- A14. If available, staging areas for construction equipment shall be located off the beach during early (March 1 through April 30) and late (November 1 through November 30) nesting season for Brevard through Broward counties and peak nesting season (May 1 through October 31) for the remaining counties. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the

beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems.

- A15. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during early (March 1 through April 30) and late (November 1 through November 30) nesting season for Brevard through Broward counties and peak nesting season (May 1 through October 31) for the remaining counties, and shall comply with safety requirements. Lighting on all equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, Corps EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area or to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

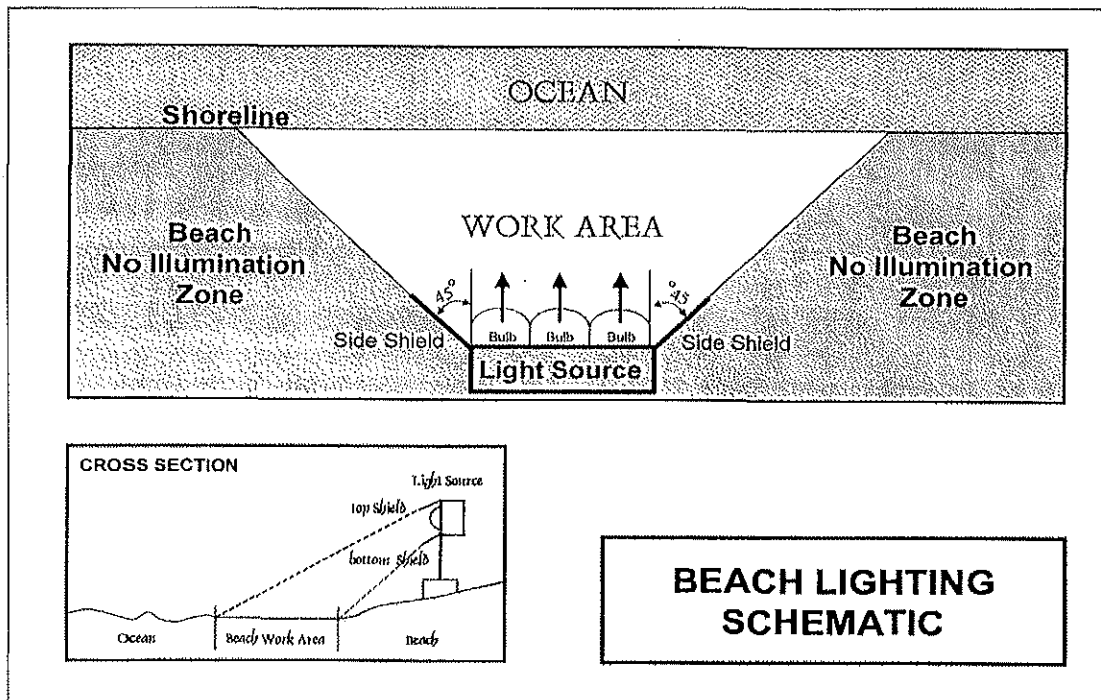


Figure 15. Beach lighting schematic.

- A16. During the period during early (March 1 through April 30) and late (November 1 through November 30) nesting season for Brevard through Broward counties and peak nesting season (May 1 through October 31) for the remaining counties, the contractor shall not extend the beach fill more than 500 feet (or other agreed upon length) along the shoreline between dusk and dawn of the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is a permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500 feet is not feasible for the

project, an agreed upon distance will be decided on during the preconstruction meeting. Once the beach has been cleared and the necessary nest relocations have been completed, the contractor will be allowed to proceed with the placement of fill during daylight hours until dusk at which time the 500-foot length (or other agreed upon length) limitation shall apply. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

Dune Planting

- A17. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice. Dune vegetation planting may occur during the sea turtle nesting season under the following conditions.
- a. Daily early morning sea turtle nesting surveys (before 9 a.m.) shall be conducted during the period from May 1 through October 31 for all counties in Florida where sea turtle nesting occurs. If the planting is conducted in Brevard, Indian River, St. Lucie, Martin, Palm Beach, or Broward Counties, daily early morning surveys shall be extended to include March 1 through April 30 and November 1 through November 30. Nesting surveys shall only be conducted by personnel with prior experience and training in nesting surveys. Surveyors shall have a valid FWC permit. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (all times). No dune planting activity shall occur until after the daily turtle survey and nest conservation and protection efforts have been completed. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys;
 - b. Any nests deposited in the dune planting area not requiring relocation for conservation purposes shall be left in place. The turtle permit holder shall install an on-beach marker at the nest site and a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 3-foot radius around the nest. No planting or other activity shall occur within this area nor will any activities be allowed that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the planting activity;
 - c. If a nest is disturbed or uncovered during planting activity, the contractor, Applicant, or the Applicant's contractors shall cease all work and immediately contact the project turtle permit holder. If a nest(s) cannot be safely avoided during planting, all activity within 10 feet of a nest shall be delayed until hatching and emerging success monitoring of the nest is completed;
 - d. All dune planting activities shall be conducted by hand and only during daylight hours;
 - e. All dune vegetation shall consist of coastal dune species native to the local area; (*i.e.*, native to coastal dunes in the respective county and grown from plant stock

from that region of Florida). Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material for the plant size;

- f. No use of heavy equipment shall occur on the dunes or seaward for planting purposes. A lightweight (all-terrain type) vehicle, with tire pressures of 10 psi or less may be used for this purpose; and
- g. Irrigation equipment, if needed, shall be authorized under a FDEP permit.

Beach Mouse Protection

- A18. Beach mouse habitat shall be avoided when selecting sites for equipment, pipes, vehicle storage and staging to the maximum extent possible. Suitable beach mouse habitat constitutes the primary dunes (characterized by sea oats and other grasses), secondary dunes (similar to primary dunes, but also frequently includes such plants as woody goldenrod, false rosemary), and interior or scrub dunes.
- A19. Equipment placement or storage shall be excluded in the area between 5 to 10 feet seaward of the existing dune toe or 10 percent of the beach width (for projects occurring on narrow eroded beach segments) seaward of the dune toe in areas of occupied beach mouse habitat (**Figure 16**). The toe of the dune is where the slope breaks at the seaward foot of the dune.

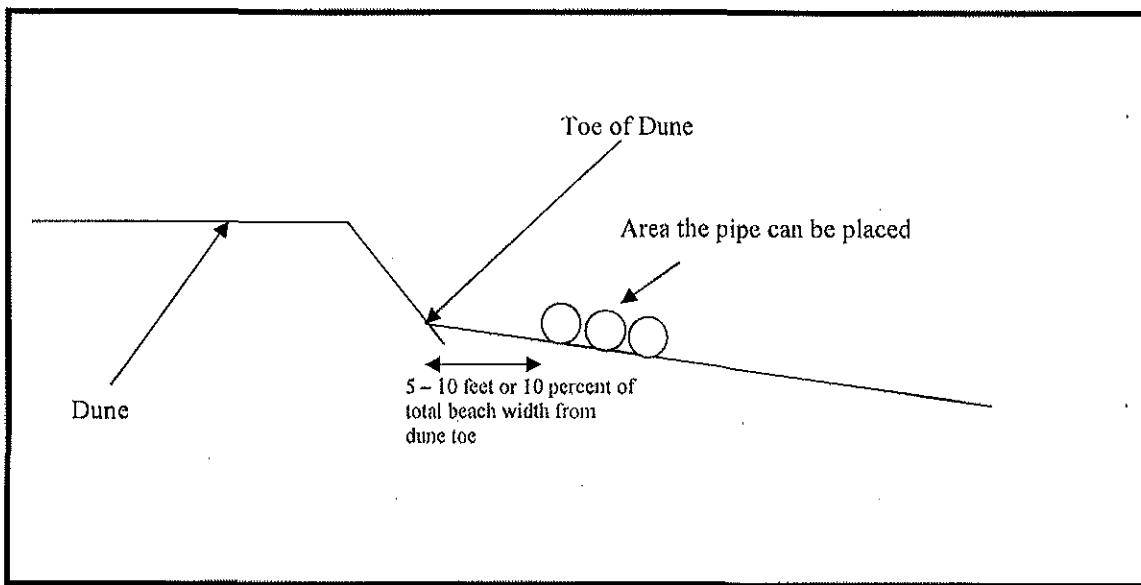


Figure 16. Equipment placement for projects occurring in beach mouse occupied habitat.

- A20. Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be fully restored to the preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts

to existing habitat and transporting workers along the beachfront.

- A21. The location of new or expanded existing beach access corridors for vehicles and equipment within beach mouse habitat consisting of vegetated dunes shall be spaced no closer than every four miles. The distribution of access areas will result in the least number of access areas within beach mouse habitat as possible and delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be (1) no more than 25 feet wide for vehicles and (2) no more than 50 feet wide for equipment. Expanded or new beach access points that impact vegetated dunes shall be restored within 3 months following project completion. Habitat restoration shall consist of restoring the dune to preconstruction conditions with planting of at least three species of appropriate native dune vegetation (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Seedlings shall be at least one inch square with a 2.5-inch pot. Planting shall be on 18-inch centers throughout the created dune; however, 24-inch centers may be acceptable depending on the area to be planted. Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material, as appropriate, for the plant size. No sand stabilizer material (coconut matting or other material) shall be used in the dune restoration. The plants may be watered without installing an irrigation system. In order for the restoration to be considered successful, 80 percent of the total planted vegetation shall be documented to survive six months following planting of vegetation. If the habitat restoration is unsuccessful, the area shall be replanted following coordination with the Service.

Reporting

- A22. An excel sheet with the information listed in **Table 19** shall be submitted to the Service (**Table 3**) by July 31 of the following year of construction. The excel sheet shall be available on the Service's website.

A report with the information listed in **Table 20** shall be submitted to the Service by the local sponsor or Applicant by December 31 of the year following construction.

Table 19. Information to include in the report following the project completion.

All projects	Project location (include Florida DEP R-monuments and latitude and longitude coordinates)
	Project description (include linear feet of beach, actual fill template, access points, and borrow areas)
	Dates of actual construction activities
	Names and qualifications of personnel involved in sea turtle nesting surveys and relocation activities (separate the nests surveys for nourished and non-nourished areas)
	Descriptions and locations of self-release beach sites
	Sand compaction, escarpment formation, and lighting survey results by project shall be reported as listed in the Terms and Conditions by December 31 to the FWC and appropriate Service Field Office (Table 3)
Beach mice	Acreage of new or widened access areas affected in beach mouse habitat
	Vegetation completed for new or widened access areas
	Success rate of vegetation of restoration

Table 20. Sea turtle monitoring following sand placement activity.

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 the turtle 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 shall 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.
		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 relocation area on a map of the areas. The number of successfully hatched eggs per relocated nest.
	Lighting Impacts	Disoriented sea turtles	The number of disoriented hatchlings and adults shall be documented and reported in accordance with existing FWC protocol for disorientation events.

A23. In the event a sea turtle nest is excavated during construction activities, the project turtle permit holder responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.

Upon locating a dead or injured sea turtle adult, hatchling, egg, or beach mouse that may have been harmed or destroyed as a direct or indirect result of the project, the Corps, Applicant, or local sponsor shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the appropriate Service Field Office immediately (**Table 3**).

Care shall be taken in handling injured sea turtles, eggs or beach mice to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

REASONABLE AND PRUDENT MEASURES for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

- B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.
- B2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.
- B3. For dredged material placement on the beach, sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties, dredged material placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties, dredged material placement shall not occur from June 1 through September 30. In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape Sand Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, sand placement may occur during the sea turtle nesting season (**Table 15 and Table 16**).
- B4. For dredged material placement in the swash zone (at or below the MHWL) or submerged littoral zone, sand placement will be conducted at or below the +3-foot contour. The swash zone is that region between the upper limit of wave run-up (approximately one-foot above MHW) and the lower limit of wave run-out (approximately one-foot below MLW. Material will not be stacked too high that the material is above the water during low tide.

- B5. For dredged material placement in the swash zone (at or below the MHWL) or submerged littoral zone, sand placement will be conducted at or below the +3-foot contour.
- B6. All derelict material or other debris shall be removed from the beach prior to any sand placement.
- B7. The Corps shall continue to work with FDEP, FWC, and the Service to create a sea turtle friendly beach profile for placement of material during construction.
- B8. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice.
- B9. A meeting between representatives of the contractor, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.
- B10. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. Surveys for early and late nesting sea turtles shall be conducted where appropriate. If nests are constructed in the area of sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.
- B11. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities. Not required for dredged material placement in the swash and littoral zone.
- B12. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatching sea turtles. Not required for dredged material placement in the swash and littoral zone.
- B13. Construction equipment and materials shall be stored in a manner that will minimize impacts to nesting and hatching sea turtles and beach mice.
- B14. Lighting associated with the project construction shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatching sea turtles and nocturnal activities of beach mice.
- B15. During the sea turtle nesting season, the contractor shall not extend the beach fill more than 500 feet (or other agreed upon length) 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.
- B16. Beach mouse habitat shall be avoided when selecting sites for storage and staging of equipment to the maximum extent possible.
- B17. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.

B18. Existing vegetated habitat at beach access points and along shoreline travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access and travel corridors.

B19. Expanded or newly created beach access points shall be restored.

B20. A report describing the actions taken shall be submitted to the Service following completion of the proposed work for each year when the activity has occurred.

B21. The Service and the FWC shall be notified if a sea turtle adult, hatchling, or egg, or beach mouse is harmed or destroyed as a direct or indirect result of the project.

TERMS AND CONDITIONS for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement of Corps civil works project shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

All beaches

B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

B2. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

B3. Dredged material placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

- a. Dredged material placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes may be placed and/or stored on the beach.

Appendix B

**FWC FISH AND WILDLIFE RESEARCH INSTITUTE
STATEWIDE NESTING BEACH SURVEY PROTOCOL**

1. **Survey Period:** There is no set period for Statewide nesting beach surveys, but ideally, all nesting activity is encompassed. Beaches with leatherback nesting usually begin by 1 March.
2. **Survey Time:** Surveys must be conducted in the early morning hours, preferably beginning at dawn in order to optimize crawl interpretation.
3. **Survey Frequency:** Most Statewide nesting beach surveys are conducted seven days a week, but some beaches, particularly remote ones, are surveyed on a less frequent basis. Ideally, survey frequency should remain constant. All crawls should be marked or "erased" daily to avoid duplicate counts on subsequent survey days. If surveys are not conducted seven days/wk, only emergences made during the preceding 24 hours should be counted on a survey day.
4. **Survey Boundaries:** Survey boundaries should remain the same from year to year. If changes are necessary, please contact FWC well before the nesting season begins. Boundaries should be permanent physical features.
5. **Crawl Identification:** All fresh crawls are identified to species and as either nests or false crawls based on observable crawl characteristics.
6. **Crawl Verification:** When a crawl does not have characteristics clearly indicating whether it is a nest or a false crawl, surveyors may dig with their hands at the probable location of the eggs to find the soft sand directly above the eggs. Digging should be a rare event. Probing for eggs is not permitted nor is the use of shovels.
7. **Data Reporting:** Data are reported on annual report forms supplied by FWC. The deadline for filing this report is 30 November.
8. **Significant Events:** If significant events occur that may affect turtles or their nests, please let FWC know about them. Significant events include habitat alterations such as beach nourishment, the placement of armoring or beach-access ramps, or erosion due to storms. Indicate date(s) and type of event in the comments section of the data form.
9. **Assistance:** Should questions arise or problems occur, contact Beth Brost at 1-727-896-8626, extension 1914, Fax 727-896-9176.

Appendix C

**ASSESSMENTS: DISCERNING PROBLEMS
CAUSED BY ARTIFICIAL LIGHTING**

LIGHTING INSPECTIONS

WHAT ARE LIGHTING INSPECTIONS?

During a lighting inspection, a complete census is made of the number, types, locations, and custodians of artificial light sources that emit light visible from the beach. The goal of lighting inspections is to locate lighting problems and to identify the property owner, manager, caretaker, or tenant who can modify the lighting or turn it off.

WHICH LIGHTS CAUSE PROBLEMS?

Although the attributes that can make a light source harmful to sea turtles are complex, a simple rule has proven to be useful in identifying problem lighting under a variety of conditions:

An artificial light source is likely to cause problems for sea turtles if light from the source can be seen by an observer standing anywhere on the nesting beach.

If light can be seen by an observer on the beach, then the light is reaching the beach and can affect sea turtles. If any glowing portion of a luminaire (including the lamp, globe, or reflector) is directly visible from the beach, then this source is likely to be a problem for sea turtles. But light may also reach the beach indirectly by reflecting off buildings or trees that are visible from the beach. Bright or numerous sources, especially those directed upward, will illuminate sea mist and low clouds, creating a distinct glow visible from the beach. This "urban skyglow" is common over brightly lighted areas. Although some indirect lighting may be perceived as nonpoint-source light pollution, contributing light sources can be readily identified and include sources that are poorly directed or are directed upward. Indirect lighting can originate far from the beach. Although most of the light that sea turtles can detect can also be seen by humans, observers should realize that some sources, particularly those emitting near-ultraviolet and violet light (e.g., bug-zapper lights, white electric-discharge lighting) will appear brighter to sea turtles than to humans. A human is also considerably taller than a hatchling; however, an observer on the dry beach who crouches to the level of a hatchling may miss some lighting that will affect turtles. Because of the way that some lights are partially hidden by the dune, a standing observer is more likely to see light that is visible to hatchlings and nesting turtles in the swash zone.

HOW SHOULD LIGHTING INSPECTIONS BE CONDUCTED?

Lighting inspections to identify problem light sources may be conducted either under the purview of a lighting ordinance or independently. In either case, goals and methods should be similar.

GATHER BACKGROUND INFORMATION

Before walking the beach in search of lighting, it is important to identify the boundaries of the area to be inspected. For inspections that are part of lighting ordinance enforcement efforts, the jurisdictional boundaries of the sponsoring local government should be determined. It will help to have a list that includes the name, owner, and address of each property within inspection area so that custodians of problem lighting can be identified. Plat maps or aerial photographs will help

surveyors orient themselves on heavily developed beaches.

PRELIMINARY DAYTIME INSPECTIONS

An advantage to conducting lighting inspections during the day is that surveyors will be better able to judge their exact location than they would be able to at night. Preliminary daytime inspections are especially important on beaches that have restricted access at night. Property owners are also more likely to be available during the day than at night to discuss strategies for dealing with problem lighting at their sites.

A disadvantage to daytime inspections is that fixtures that are not directly visible from the beach will be difficult to identify as problems. Moreover, some light sources that can be seen from the beach in daylight may be kept off at night and thus present no problems. For these reasons, daytime inspections are not a substitute for nighttime inspections. Descriptions of light sources identified during daytime inspections should be detailed enough so that anyone can locate the lighting. In addition to a general description of each luminaire (e.g., HPS floodlight directed seaward at top northeast corner of the building at 123 Ocean Street), photographs or sketches of the lighting may be necessary. Descriptions should also include an assessment of how the specific lighting problem can be resolved (e.g., needs turning off; should be redirected 90° to the east). These detailed descriptions will show property owners exactly which luminaires 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 D

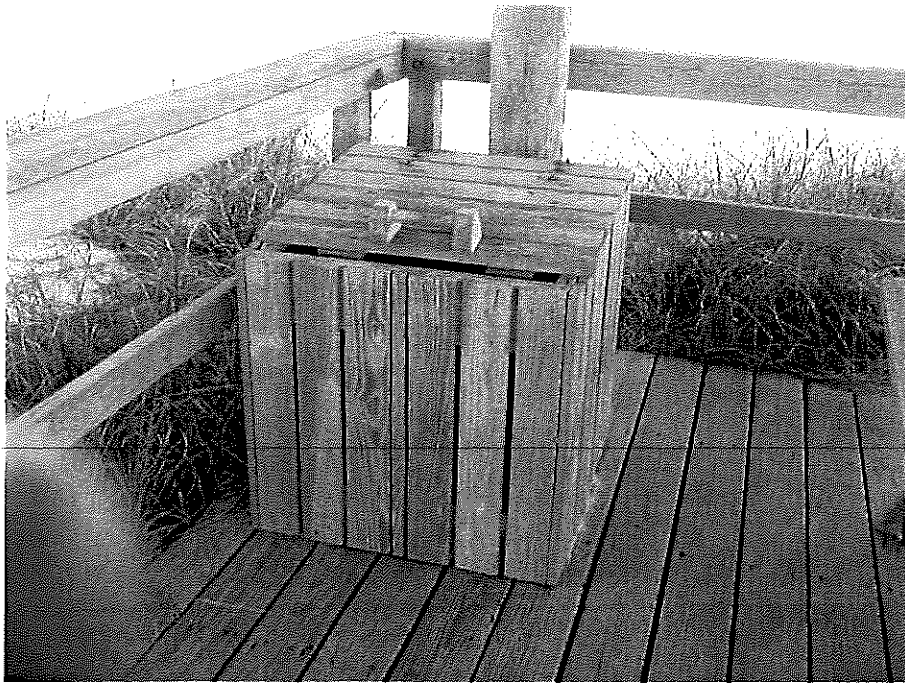
EXAMPLES OF PREDATOR PROOF TRASH RECEPTACLES



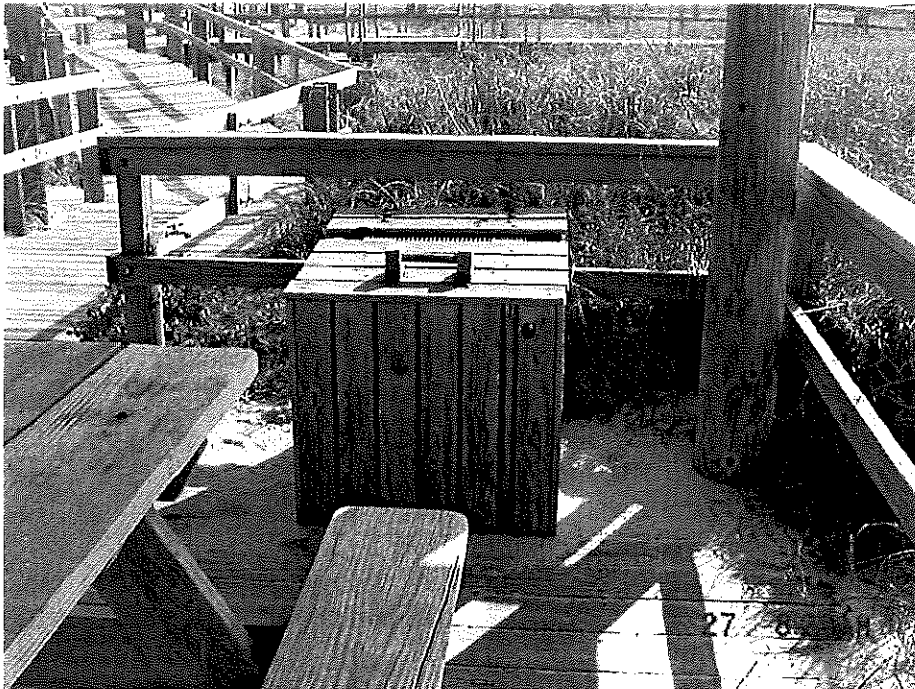
Example of predator proof trash receptacle at Gulf Islands National Seashore. Lid must be tight fitting and made of material heavy enough to stop animals such as raccoons.



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.