

July 2016

Environmental Assessment

PROPOSED USE OF UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND

HURRICANE AND STORM DAMAGE REDUCTION PROJECT, MID-REACH SEGMENT

BREVARD COUNTY, FLORIDA



U.S. Army USACE
of Engineers
JACKSONVILLE
DISTRICT

**ENVIRONMENTAL ASSESSMENT
ON
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SAND
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SEGMENT
BREVARD COUNTY, FLORIDA**

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1 PROJECT PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Army Corps of Engineers, Jacksonville District (USACE), is proposing to periodically nourish the beach and/or rebuild the dune within the Mid-Reach Segment, Brevard County, Florida. A detailed description of this project can be found in the *Final Integrated General Reevaluation Report and Supplemental Environmental Impact Statement, Brevard County, Florida, Mid-Reach Segment, Hurricane and Storm Damage Reduction Project* (2011, revised 2014). In summary, this report recommended a small-scale beach fill varying from a 0-foot to 20-foot extension of the mean high water line plus advanced nourishment to maintain the design volume. The recommended source of sand would be the offshore borrow site known as Canaveral Shoals. Sand from the shoals would be placed at a dredged material management area on Cape Canaveral Air Force Station (CCAFS), and then truck-hauled to the Mid-Reach Beach. Approximately 3.0 acres of nearshore hardbottom would be directly and/or indirectly impacted by sand placement activities. This loss would be offset by constructing 4.8 acres of artificial reef comprised of articulated concrete mattresses. Subsequent to completion of the report, the USACE and Brevard County, the Non-Federal Sponsor for this project, further investigated the possibility of using sand from upland quarries as well as Canaveral Shoals to nourish the Mid-Reach Beach. This Environmental Assessment evaluates the use of upland quarries as an additional source of sand.

1.2 PROJECT AUTHORITY

A General Reevaluation Report (GRR) for the Brevard County, Hurricane and Storm Damage Reduction Project, Mid-Reach Segment (Mid-Reach Project) was authorized by Section 418 of the Water Resources Development Act (WRDA) of 2000 (see below).

SEC. 418 BREVARD COUNTY, FLORIDA

“The Secretary shall prepare a general reevaluation report on the project for shoreline protection, Brevard County, Florida, authorized by section 101(b)(7) of the Water Resources Development Act of 1996 (110 Stat. 3667), to determine, if the project were modified to direct the Secretary to incorporate in the project any or all of the 7.1 mile reach of the project that was deleted from the south reach of the project, as described in

paragraph (5) of the Report of the Chief of Engineers, dated December 23, 1996, whether the project as modified would be technically sound, environmentally acceptable, and economically justified.”

Additional language concerning the Mid-Reach Project was included in the WRDA 2007:

SEC. 3045. BREVARD COUNTY, FLORIDA.

“(a) SHORELINE.—The project for shoreline protection, Brevard County, Florida, authorized by section 101(b)(7) of the Water Resources Development Act of 1996 (110 Stat. 3667), is modified to authorize the Secretary to include the mid-reach as an element of the project from the Florida department of environmental protection monuments R-75.4 to R-118.3, a distance of approximately 7.6 miles. The restoration work shall only be undertaken upon a determination by the Secretary, following completion of the general reevaluation report authorized by section 418 of the Water Resources Development Act of 2000 (114 Stat. 2637), that the shoreline protection is feasible.”

In response to section 418 of the WRDA of 2000 and section 3045 of WRDA 2007, the USACE prepared the GRR as well as a Supplemental Environmental Impact Statement (SEIS) for the proposed Mid-Reach Project. The GRR/SEIS, dated August 2010, (revised April 2011) and Addendum (April 2014) presented the results of this shoreline protection study. Based on the review of the GRR/SEIS and Addendum, it was determined (September 2014) that construction of the Mid-Reach Project is feasible, thus it is now Congressionally authorized pursuant to section 3045 of the WRDA of 2007.

1.3 PROJECT LOCATION.

The Mid-Reach Project area is located on the east coast of Florida just south of Cape Canaveral. It includes the Atlantic shoreline from the south end of Patrick Air Force Base (PAFB) to just north of the city of Indialantic (from Florida Department of Environmental Protection [FDEP] monument R-75.4 to R-119, from north to south). This length is approximately 7.8 miles. There are three municipalities (Satellite Beach, Indian Harbour Beach, and Melbourne) and portions of unincorporated Brevard County located within the project area (see Figure 1, Location Map).

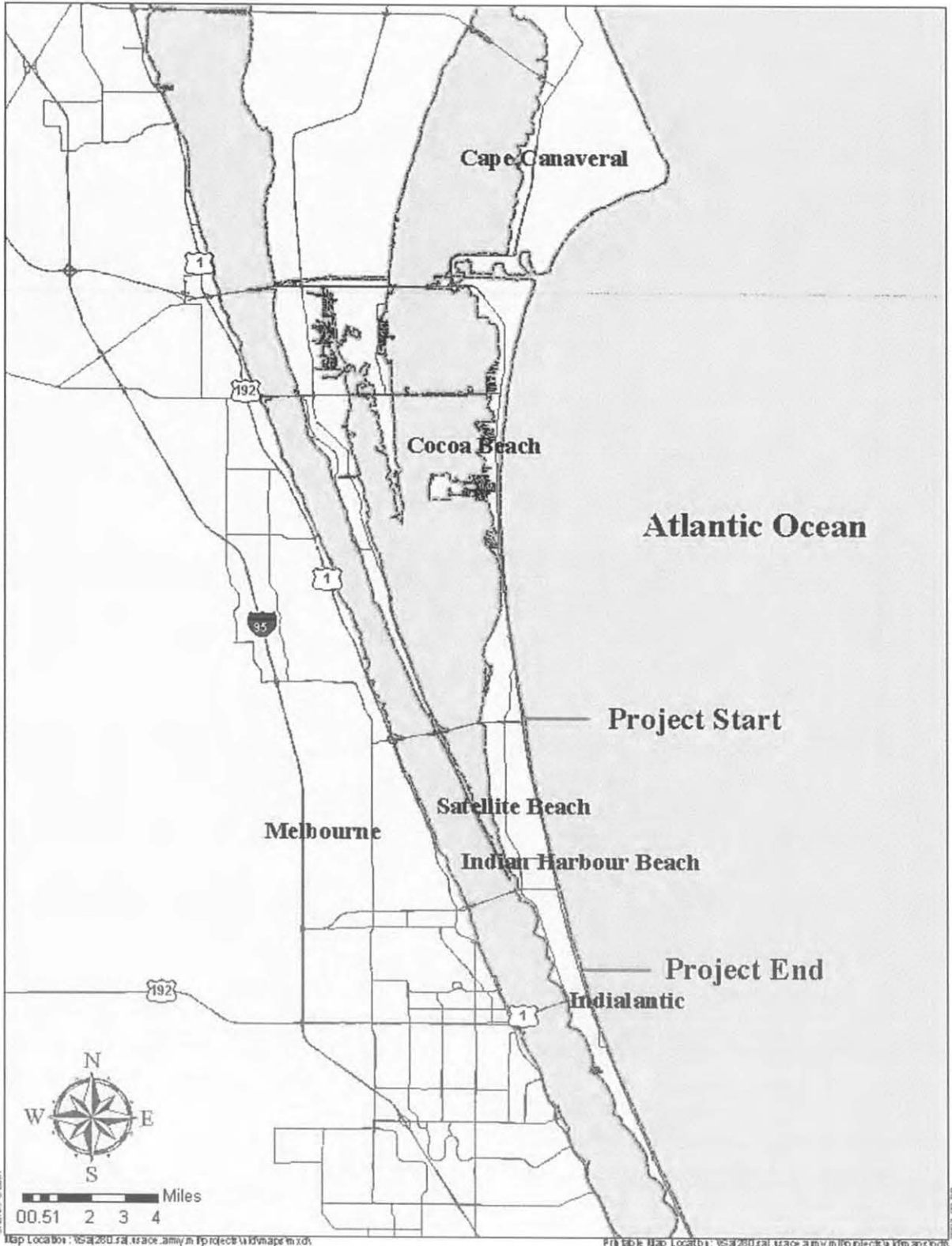


FIGURE 1: LOCATION MAP

1.4 PROJECT NEED OR OPPORTUNITY.

The Mid-Reach Beach is steep and narrow. This has been caused by both long-term erosion and storm-induced recession. Erosion has rendered upland development in the Mid-Reach area increasingly vulnerable to damages from tropical and extra-tropical storms. Shorefront structures have seen losses year after year in front of the structure, with little natural recovery. The structures closest to the shoreline have experienced damage to seawalls, pools, and in a few cases to the structure itself making it uninhabitable. Sea level rise and coastal storms continue to exacerbate the erosion pressures in the Mid-Reach area. Additional problems associated with the eroding shoreline include impacts to tourism, recreation, and sea turtle nesting habitat loss.

1.5 AGENCY GOAL OR OBJECTIVE.

The goal of the Mid-Reach Project is to reduce the damages caused by erosion and coastal storms to shorefront structures. The following objectives were outlined based on the project problems, opportunities, goals, and Federal and State objectives and regulations.

- 1) Reduce storm damages to coastal structures within the Mid-Reach area over the 50-year planning period.
- 2) Maintain the Mid-Reach recreational beach, including ensuring access to the public beach and a dry beach area free from man-made obstructions over the life of the project.
- 3) Maintain opportunities for recreational use of the nearshore areas in the Mid-Reach and adjacent areas, including surfing, fishing, and snorkeling over the life of the project.
- 4) Maintain environmental quality in the Mid-Reach and adjacent areas, for human and natural use, including air and water quality, habitat, and aesthetics over the life of the project.

1.6 RELATED DOCUMENTS.

Summaries of prior Federal studies relevant to this project are as follows:

- a. Final Integrated General Reevaluation Report and Supplemental Environmental Impact Statement, Brevard County, Florida, Hurricane and Storm Damage Reduction Project, Mid-Reach Segment (August 2010, Revised April 2011, and Addendum April 2014). This report recommended a small-scale beach fill varying from a 0-foot to 20-foot extension of the mean high water line plus advanced nourishment to maintain the design volume. The source of sand would be the offshore borrow site known as Canaveral Shoals. Approximately 3.0 acres of nearshore hardbottom would be impacted and mitigated by constructing 4.8 acres of reef comprised of articulated concrete mattresses.

b. Limited Reevaluation Report and Environmental Assessment, North Jetty Sand-Tightening and Jetty Extension, Canaveral Harbor, Florida. US Army Corps of Engineers, Jacksonville (2003). This report recommended permanent sand tightening and north jetty extension to maximize the positive benefit of sand management at the harbor entrance and to reduce maintenance dredging. The project is designed to maintain impounding of sand north of the north jetty consistent with sand bypassing operations.

c. Limited Reevaluation Report, Brevard County, Florida, Shore Protection Project. US Army Corps of Engineers, Jacksonville (1999). This report added project refinements of an access lane to Borrow Area I, two alternative borrow areas, two nearshore disposal and sand re-handling areas, and updated benefits, costs and cost sharing.

d. Feasibility Report with Final Environmental Impact Statement. US Army Corps of Engineers, Jacksonville (1996). This study recommended beach nourishment along two reaches: (1) North Reach; and (2) South Reach. PAFB was removed from the study at their own request. The North Reach extended 9.4 miles from Port Canaveral Entrance to PAFB (FDEP Monuments R-1 to R-53). The South Reach extended approximately 11 miles from PAFB to Spessard Holland Park North (R-75.3 to R-138). Of this original South Reach, the northern 7.8 miles were found to have nearshore outcrops of coquina rock and isolated patches of sabellariid worm rock from about R-75.3 to R-118. Beach nourishment along this 7.8-mile long area would result in potential impact (burial) of up to 31 acres of rock hardgrounds. Brevard County and the USACE jointly elected to delete this reach of shoreline. The South Reach was modified to the limits R-119 to R-138.

e. Reconnaissance Report, Brevard County, Florida. US Army Corps of Engineers, Jacksonville (1992). The intent of this reconnaissance study was to assess the shoreline along the Brevard County being impacted by beach erosion. Federal participation was recommended for four reaches: Cocoa Beach, PAFB, Satellite-Indian Harbour Beach, and Indianlantic-Melbourne Beach. PAFB was removed from further study by their own request.

f. Design Memorandum, Canaveral Harbor, Florida. US Army Corps of Engineers, Jacksonville (1992). This report recommended deepening the Inner Entrance Channel to 40 feet and deepening portions of the Middle Turning Basin and West Access Channel to 39 feet.

g. Supplement to the General Design Memorandum, Sand Bypass System, Canaveral Harbor, Florida. US Army Corps of Engineers, Jacksonville (1991). This report recommended using a dredge to move sand from the north side of the north jetty to beaches on the south side of the south jetty as the most cost effective and technically feasible method of bypassing. The analysis used an annual bypassing volume of 106,000 cubic yards, and recommended dredging every five years at a quantity of 530,000 cubic yards each event.

h. General and Detail Design Memorandum Addendum: Brevard County, Florida. US Army Corps of Engineers, Jacksonville (1978). This report provided the engineering, design and cost/benefit analyses for the 2.0 mile Indialantic segment including sand source.

i. General and Detail Design Memorandum: Brevard County, Florida. US Army Corps of Engineers, Jacksonville (1972). This report provided results of the engineering, design, and cost/benefit analyses for the Cape Canaveral segment and Indialantic segments of the beach nourishment project. A segment of 2.1 miles at Cape Canaveral was recommended using material from Canaveral Harbor dredging. The 2.0 mile segment at Indialantic was deferred until an economical sand source could be found.

j. Beach Erosion Control Study on Brevard County, Florida (1967). This report recommended Federal participation in a 2.8 mile beach nourishment project just south of Canaveral Harbor and for 2.0 miles at Indialantic-Melbourne Beach.

Summaries of prior non-Federal studies relevant to the project are as follows:

a. Assessment of Nearshore Rock and Shore Protection Alternatives along the "Mid-Reach" of Brevard County, Florida. Olsen Associates (2003). The intent of this study was to "identify (1) the physical abundance and character of nearshore rock outcrops, (2) the severity of beach erosion impacts and (3) potential alternatives for shore protection along approximately 7.6 miles of the Brevard County shoreline between PAFB and the existing northern boundary of the Brevard County Federal Shore Protection Project, South Reach, near Indialantic." The report describes numerous alternatives, including hydraulic fill from R-99 to R-118.3, truck haul beach fill from R-94.2 to R-99, and truck haul dune fill from R-85.4 to R-89 and R-75.4 to R-81.

b. Independent Study Report, Brevard County, Florida Shore Protection Project. D. Kriebel, R. Weggel, R. Dalrymple. (2002). Also known as the Brevard County Independent Coastal Expert (ICE) Report. This report analyzed the effects of the Canaveral Harbor Federal Navigation Project on erosion of adjacent shorelines. 6 This study concluded that the Federal navigation project has caused erosion damages to the shoreline of Brevard County over a distance of 10 to 15 miles south of Canaveral Harbor. The report concluded that the entire amount of sand fill planned during the 50-year lifetime of the North Reach of the Brevard County Shore Protection Project should be considered as mitigation for the effects of the Navigation Project and should be constructed at 100% Federal cost.

Adjacent Projects include the following:

a. Brevard County Federal Shore Protection Project. This project includes two reaches, described as the North Reach and the South Reach. The North Reach is bounded by Port Canaveral to the north and PAFB to the south. The South Reach begins near the town of Indialantic and extends southward to Spessard Holland Park. PAFB and the previously constructed South Reach beach fills bound the present 'Mid-Reach' study area. The North Reach project fill area includes 9.4 miles of shoreline from Florida

Department of Environmental Protection (FDEP) Monument R-03 to R-53. Initial construction was completed in April 2001 and placed approximately 3.1 million cubic yards of material. The Air Force funded a nourishment of its beaches from R-53 to R-70, which was constructed in conjunction with the North Reach and placed 0.6 million cubic yards of fill. The South Reach project was initially nourished in two segments due to permit restrictions concerning turtle nesting season; the first segment (R-122.5 to R-139) was completed in April 2002 and the second segment (R-118.3 to R-123.5) was completed in April 2003. Total fill in the South Reach was approximately 1.6 million cubic yards. The final construction template consisted of a zero-foot design berm plus an advance fill of an additional 50 to 65 feet of berm width depending on the location. The nourishment interval for the North and South Reaches is six-years.

b. Canaveral Harbor Federal Navigation Project. Port Canaveral is located at the north end of Brevard County, approximately 14 miles north of the north limit of the Mid-Reach study area. The entrance channel and jetties are maintained through a Federal Navigation Project. Concerns over the impact of the channel and jetties to downdrift beaches led to an independent study of the effects of Canaveral Harbor completed in September 2002. The findings of the study stated that Canaveral Harbor contributed to the erosion of downdrift beaches up to 10 to 15 miles south of the channel. The Federal Navigation Project includes a bypassing feature, wherein approximately 936,000 cubic yards of material are moved by dredge every 6 years from the north side of the channel to the south side of the channel as mitigation for the channel impacts.

c. Patrick Air Force Base. The US Air Force has constructed beach fill projects on the Atlantic shoreline of Patrick Air Force Base (PAFB). Recent additions of material were placed in a beach nourishment and a dune construction project in 2001 and 2005. In 2001, approximately 598,300 cubic yards of sand were placed from R-53 to R-70 from the Canaveral Shoals II offshore borrow area via direct hopper dredge pump-out. Material in the amount of 321,500 cubic yards was placed between monuments R-54.4 and R-75.3 in conjunction with the Brevard County North Reach Federal shore protection project in 2005. Placements within the southernmost two miles of the base, where nearshore rock outcroppings exist, was limited to placement above water and in the dune area. The material was obtained from the Canaveral Shoals II borrow area. Based upon the as-built sediment samples along the project area, all of the sand placed was well within State requirements for beach fill. The fines fraction was less than 1% throughout and monitored turbidity levels at both the PAFB and adjacent areas were low (well below maximum allowances) and nearly identical to the levels measured prior to the dredging activities (Olsen 2005c).

d. Brevard County Dune Restoration. In winter 2004/2005, Brevard County completed a dune restoration project in association with the FEMA emergency berm project and the state interim dune project following hurricane damages. The project aimed to provide restoration of the dunes with a placement ranging from 5 to 10 cubic yards per linear foot of shoreline using sand from upland sources. Approximately 307,300 cubic yards of material were placed in the Mid-Reach and another 252,200 cubic yards placed along the south beaches. In spring 2006, FEMA funded a restoration of 127,584 cubic yards in

the Mid-Reach and 47,770 cubic yards along the south beaches. In the spring of 2008 another project was funded by the County and State of Florida, without FEMA funding, to place 95,777 cubic yards in the Mid-Reach and 31,948 cubic yards along the south beaches. In 2009 FEMA funded another 91,822 cubic yards in the Mid-Reach and 69,132 cubic yards in the south beaches. The most recent project, funded by the County and State of Florida, placed 191,770 cubic yards in the Mid-Reach and 47,262 cubic yards in the south beaches. Together these emergency response dune projects have placed 814,253 cubic yards in the Mid-Reach and 447,312 cubic yards in the south beaches between 2005 and 2014. All of these projects used upland sand sources.

1.7 DECISIONS TO BE MADE.

This Environmental Assessment supplements the GRR/SEIS, and specifically evaluates the effects of using quarries as an additional source of sand to maintain the Mid-Reach Beach.

1.8 SCOPING AND ISSUES.

1.8.1 ISSUES EVALUATED.

The following issues were identified to be relevant to the proposed use of quarries as an additional source of sand: (1) native beach composition and requirements for quarried sand; (2) Threatened and Endangered species (i.e., nesting sea turtles, piping plover, red knot, Florida scrub-jay, eastern indigo snake, gopher tortoise); (3) Essential Fish Habitat; (4) migratory birds; (5) other wildlife resources; (6) wetlands; (7) cultural, historic and archaeological resources; (8) water quality; (9) aesthetics; (10) recreation; (11) hazardous, toxic, and radioactive waste (HTRW); (12) air quality; (13) noise; (14) energy requirements and conservation; (15) natural or depletable resources; (16) Native Americans; (17) re-use and conservation potential.

1.8.2 ISSUES ELIMINATED FROM FURTHER ANALYSIS.

The following issues were determined to be adequately treated in the GRR/SEIS, or are not relevant to this assessment, and therefore eliminated from further analysis: (1) Threatened and Endangered species (i.e. sea turtles in the water, manatee, northern right whale); (2) physical conditions (shoreline change, winds, tides and currents, waves, storm effects, sea level rise, effects of other shore protection/navigation projects; (3) hardbottom mitigation plan; (4) dune vegetation; (5) coastal barrier resources; (6) socio-economics; (7) scientific resources; (8) solid waste; (9) drinking water; (10) urban quality.

Please use the following link to access the GRR/SEIS for more information on these issues:

<http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Brevard>

1.9 PERMITS, LICENSES, AND ENTITLEMENTS.

A State permit (No. 0254479-001-JC) for this project has been issued by the Florida Department of Environmental Protection (FDEP). Pursuant to the permit, an upland sand source shall be identified (by the Non-Federal Sponsor) if applicable, and the sediment characterization of that source provided to the FDEP for review and approval. This will allow the FDEP to approve use of that source should additional material be needed. This coordination would be performed prior to the use of quarried sand. All quarry and beach placement activities would be performed in compliance with State of Florida water quality standards. In accordance with the Coastal Zone Management Act, the proposed work has also been reviewed by the State and has been determined to be consistent with the Coastal Zone Management Plan.

2 ALTERNATIVES

The Alternatives Section is perhaps the most important component of the Environmental Assessment. This section describes the no-action alternative, the proposed action, and other reasonable alternatives. The beneficial and adverse environmental effects of the alternatives are presented in comparative form, providing a clear basis for choice for the decisionmaker and the public. A preferred alternative was selected based on the information and analysis presented in the sections on the Affected Environment and Probable Impacts.

2.1 DESCRIPTION OF ALTERNATIVES.

2.1.1 NO-ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach Project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. Not being able to utilize quarried sand would restrict when Mid-Reach Beach nourishment could occur. Specifically, if Canaveral Shoals is the sole source of sand, then initial nourishment of the Mid-Reach would only occur when the North or South Reach Beaches were also being nourished. During this initial nourishment, sand would also be stockpiled within a Dredged Material Management Area at Cape Canaveral Air Force Station and would be used to renourish the Mid-Reach Beach between dredge events. It would be cost prohibitive to nourish only the Mid-Reach Beach with sand from the shoals. Barring significant erosion caused by a storm, the next renourishment of the North or South Reach Beaches is not scheduled until 2020. If upland quarries were available, then the Mid-Reach Beach could be nourished prior to 2020 pending the appropriation of Federal and/or Non-Federal funding.

2.1.2 ALTERNATIVE A: USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND

Existing upland quarries would be used as an additional source of sand. In this case, sand from existing quarries, as well as sand from Canaveral Shoals, could be used to periodically nourish the beach and/or rebuild the dune. Sand would be truck hauled from the quarries to the Mid-Reach Beach using established access routes. This alternative would provide greater flexibility to nourish the Mid-Reach Beach since there would no longer be a dependence on North or South Reach Beach nourishment. The USACE has determined that identification of specific quarries is not necessary. However, sand from any quarries selected would need to meet the acceptance criteria described in Section 4 of this document.

2.1.3 ALTERNATIVE B: USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND

New or expanded upland quarries would be used as an additional source of sand. Sand would be truck hauled from the quarries to the Mid-Reach Beach using established access routes. Similar to existing quarries, sand from new or expanded quarries, as well as sand from Canaveral Shoals, could be used to periodically nourish the beach and/or

rebuild the dune. This alternative would likewise provide greater flexibility for nourishing the Mid-Reach Beach. Sand from new or expanded quarries would also need to meet the acceptance criteria described in Section 4.

2.2 ISSUES AND BASIS FOR CHOICE

Both Alternatives A and B, the use of upland quarries as additional sources of sand, would provide greater flexibility in nourishing the Mid-Reach Beach. This flexibility would further reduce the risk of hurricane and storm damage along the project shoreline. As proposed, Alternative A would use sand from existing upland quarries whereas Alternative B would use sand from new or expanded quarries. Using existing quarries would result in fewer environmental impacts as compared to creating new or expanding existing quarries. Creating new or expanding existing quarries would most likely result in the clearing, grubbing, and excavation of additional land, and could only be performed in compliance with State statutes and/or Federal law. Appropriate natural and cultural resource surveys would need to be performed prior to construction, and, if necessary, mitigation implemented to offset potential adverse impacts.

2.3 PREFERRED ALTERNATIVE(S)

Alternative A, the use of existing upland quarries as an additional source of sand is the preferred alternative. However, in the event that existing quarries have insufficient sand to meet project needs, then Alternative B, creating new or expanding existing quarries would also be acceptable. As previously mentioned, activities associated with Alternative B would need to comply with applicable laws including performing resource surveys prior to construction.

2.4 COMPARISON OF ALTERNATIVES

Table 1 lists alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

Table 1: Summary of Direct and Indirect Impacts

ALTERNATIVE ENVIRONMENTAL FACTOR	Alternative A: Existing upland quarries would be used as an Additional Source of Sand	Alternative B: New or Expanded Quarries would be used as an Additional Source of Sand	No Action* Status Quo (Authorized Mid-Reach Project would be built with sand from Canaveral Shoals)
NATIVE BEACH AND QUARRIED SAND COMPOSITION	Quarried sand would be required to meet State and Federal (acceptance) criteria.	Quarried sand would be required to meet State and Federal (acceptance) criteria.	Authorized project would be built pursuant to previously issued State and Federal (acceptance) criteria.
NESTING SEA TURTLES	Beach placement activities may affect nesting sea turtles. Use of quarried sand would result in similar effects, i.e. alteration of the beach face, as using sand from Canaveral Shoals. Nesting areas would increase in areas with nourishment activities, providing a potential positive impact. Work would be performed in compliance with USFWS and State permit requirements including sand quality.	Beach placement activities may affect nesting sea turtles. Use of quarried sand would result in similar effects, i.e. alteration of the beach face, as using sand from Canaveral Shoals. Nesting areas would increase in areas with nourishment activities, providing a potential positive impact. Work would be performed in compliance with USFWS and State permit requirements including sand quality.	Authorized project would be built pursuant to issued USFWS biological opinion and State permit requirements.
PIPING PLOVER	Beach placement activities may affect, but are not likely to adversely affect the plover. Use of quarried sand would result in similar effects, i.e. potential temporary disturbance and alteration of the beach face (foraging habitat), as using sand from Canaveral Shoals. Work would be performed in compliance with USFWS and State permit requirements.	Beach placement activities may affect, but are not likely to adversely affect the plover. Use of quarried sand would result in similar effects, i.e. potential temporary disturbance and alteration of the beach face (foraging habitat), as using sand from Canaveral Shoals. Work would be performed in compliance with USFWS and State permit requirements.	Authorized project would be built pursuant to issued USFWS biological opinion and State permit requirements.
RED KNOT	Beach placement activities may affect, but are not likely to adversely affect the knot. Use of quarried sand would result in similar effects, i.e. potential temporary disturbance and alteration of the beach face (foraging habitat), as using sand from Canaveral Shoals. Work would be performed in compliance with USFWS and State permit requirements.	Beach placement activities may affect, but are not likely to adversely affect the knot. Use of quarried sand would result in similar effects, i.e. potential temporary disturbance and alteration of the beach face (foraging habitat), as using sand from Canaveral Shoals. Work would be performed in compliance with USFWS and State permit requirements.	Authorized project would be built pursuant to issued USFWS biological opinion and State permit requirements.
FLORIDA SCRUB-JAY	No effect.	Surveys prior to quarry construction may be required to determine effect. Mitigation may also be required. Work would be performed in compliance with USFWS and State permit requirements.	No effect.

ALTERNATIVE ENVIRONMENTAL FACTOR	Alternative A: Existing upland quarries would be used as an Additional Source of Sand	Alternative B: New or Expanded Quarries would be used as an Additional Source of Sand	No Action* Status Quo (Authorized Mid-Reach Project would be built with sand from Canaveral Shoals)
EASTERN INDIGO SNAKE	No effect.	Effect determination would be dependent on type and size of habitat to be disturbed. Protective measures may need to be implemented during quarry construction. Work would be performed in compliance with USFWS and State permit requirements.	Authorized project would be built pursuant to issued USFWS biological opinion and State permit requirements.
GOPHER TORTOISE	No effect.	Surveys prior to quarry construction may be required to determine effect. Relocation may be required. Work would be performed in compliance with State permit requirements.	Authorized project would be built pursuant to previously issued State permit requirements. Surveys and, if necessary, relocation of tortoises at CCAFS would be performed.
ESSENTIAL FISH HABITAT	Use of quarried sand would result in similar effects, i.e. temporary turbidity and burial of hardbottom (3.0 acres), as using sand from Canaveral Shoals. Turbidity would be monitored per State permit requirements and burial would be mitigated by construction of 4.8 acres of artificial reef.	Use of quarried sand would result in similar effects, i.e. temporary turbidity and burial of hardbottom (3.0 acres), as using sand from Canaveral Shoals. Turbidity would be monitored per State permit requirements and burial would be mitigated by construction of 4.8 acres of artificial reef.	Authorized project would be built. Coordination with NMFS has been previously completed.
MIGRATORY BIRDS	No effect at quarry site. Monitoring may need to be implemented during beach placement to avoid destruction of active nests. Work would be performed in compliance with Federal law (Migratory Bird Treaty Act) and State permit requirements.	Monitoring may need to be implemented during quarry construction and beach placement to avoid destruction of active nests. Work would be performed in compliance with Federal law (Migratory Bird Treaty Act) and State permit requirements.	Authorized project would be built in compliance with Federal law (Migratory Bird Treaty Act) and State permit requirements.
OTHER WILDLIFE RESOURCES	No effect at quarry site. Recovery of beach macroinvertebrates (i.e. sand fleas and clams) should occur in phase with normal seasonal recruitment.	Adverse impacts may occur due to quarry construction. Recovery of beach macroinvertebrates (i.e. sand fleas and clams) should occur in phase with normal seasonal recruitment.	Recovery of beach macroinvertebrates (i.e. sand fleas and clams) should occur in phase with normal seasonal recruitment.
WETLANDS	No effect.	Surveys prior to quarry construction may be required to determine effect. Mitigation may be required. Work would be performed in compliance with Federal and State requirements.	No effect.
CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES	No effect.	Surveys prior to quarry construction may be required to determine effect. Mitigation may be required. Survey results would be coordinated with the State Historic Preservation Officer (SHPO).	Offshore borrow areas have been investigated for archaeological sites and previously coordinated with SHPO. Any discovery of resources during construction shall be coordinated with SHPO.

ALTERNATIVE ENVIRONMENTAL FACTOR	Alternative A: Existing upland quarries would be used as an Additional Source of Sand	Alternative B: New or Expanded Quarries would be used as an Additional Source of Sand	No Action* Status Quo (Authorized Mid-Reach Project would be built with sand from Canaveral Shoals)
WATER QUALITY	Quarried sand placed on the Mid-Reach Beach would be required to meet State (acceptance) criteria. All work would be performed in compliance with the State permit.	Creation or expansion of quarry sites would be required to meet Federal and State water quality criteria. Quarried sand placed on the Mid-Reach Beach would be required to meet State (acceptance) criteria. All work would be performed in compliance with Federal and State permits.	Authorized project would be built pursuant to previously issued State (acceptance) permit.
AESTHETICS	Quarried sand would maintain existing beach aesthetics by preserving or improving sand dune and beach conditions.	Aesthetics of adjacent community may be affected by quarry construction. Quarried sand would maintain existing beach aesthetics by preserving or improving sand dune and beach conditions.	Authorized project would maintain existing beach aesthetics by maintaining or improving sand dune and beach conditions.
RECREATION	Temporary disruption and/or localized suspension of recreation at beach placement locations during construction activities. Quarried sand would improve existing recreational opportunities associated with dry beach by maintaining or increasing beach area.	Temporary disruption and/or localized suspension of recreation at beach placement locations during construction activities. Quarried sand would improve existing recreational opportunities associated with dry beach by maintaining or increasing beach area.	Temporary disruption and/or localized suspension of recreation at beach and at offshore dredging locations during construction activities. Authorized project would improve existing recreational opportunities associated with dry beach by maintaining or increasing beach area.
HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)	No effect.	HTRW assessment may be necessary prior to creation or expansion of quarries.	No known HTRW wastes occur in the authorized project areas.
AIR QUALITY	Short-term impact from emissions by construction equipment associated with quarry and beach placement activities will not significantly impact air quality.	Short-term impact from emissions by construction equipment associated with quarry and beach placement activities will not significantly impact air quality.	Short-term impact from emissions by the dredge and other construction equipment associated with the authorized project will not significantly impact air quality.
NOISE	Construction generated noise would temporarily raise the noise level at the quarry site, haul routes, and beach placement area.	Construction generated noise would temporarily raise the noise level at the quarry site, haul routes, and beach placement area.	Authorized project would temporarily raise the noise level in the areas of the dredge, haul routes, and the beach fill activity on the beach.
ENERGY REQUIREMENTS AND CONSERVATION	Expenditure of energy resources (fuel) would be required for quarry activities, truck-haul, and beach placement.	Expenditure of energy resources (fuel) would be required for quarry activities, truck-haul, and beach placement.	Expenditure of energy resources (fuel) would be required for authorized project construction through dredging, truck-haul, and beach placement.
NATURAL OR DEPLETABLE RESOURCES	Quarried sand is the only natural and depletable resource associated with this alternative.	Quarried sand is the only natural and depletable resource associated with this alternative.	Sand from Canaveral Shoals is the only natural and depletable resource associated with the authorized project.

ALTERNATIVE ENVIRONMENTAL FACTOR	Alternative A: Existing upland quarries would be used as an Additional Source of Sand	Alternative B: New or Expanded Quarries would be used as an Additional Source of Sand	No Action* Status Quo (Authorized Mid-Reach Project would be built with sand from Canaveral Shoals)
NATIVE AMERICANS	There are no lands belonging to Native Americans in the project area.	There are no lands belonging to Native Americans in the project area.	There are no lands belonging to Native Americans in the project area.
REUSE AND CONSERVATION POTENTIAL	There is no potential for reuse or conservation with this alternative.	There is no potential for reuse or conservation with this alternative.	There is no potential for reuse or conservation with the authorized project.

*Additional information can be found within the GRR/SEIS using the following link:

<http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Brevard>

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives. (The reader is encouraged to access the GRR/SEIS for additional information on the affected environment.)

3.1 GENERAL ENVIRONMENTAL SETTING

The Mid-Reach Beach is located on a coastal barrier island of central Brevard County on Florida's east coast, and is bound on the west by the extensive estuarine lagoon system of the Banana and Indian Rivers and on the east by the Atlantic Ocean. The beach placement area consists of approximately 7.8-miles of shoreline between Patrick Air Force Base and the community of Indialantic. It consists of an open sandy coast subject to frequent storm events. Adjacent properties to the shoreline can be categorized as urban and include residential, commercial, and recreational properties. Much of the coastal development is built atop the bluff, next to the beach, and is subject to damage from storm-induced erosion. The impacts of tropical storms and nor'easters on the Mid-Reach Beach causes erosion of the berm and undermining of the bluff, which causes sections of the steep bluff to slough. While the 30-year average shoreline change for the Mid-Reach study area represents a relatively small average recession (with significant longshore variation), the bluff is receding at an average rate of over half a foot per year, with localized maximums of more than one foot per year.

Nearshore rock outcrops are found along the Mid-Reach shoreline with the greatest density occurring to the north. The outcrops are composed of beach rock (coquina) of the Anastasia limestone formation, usually formed as wind-blown sand dunes during the Pleistocene era. These features parallel the present-day shoreline and are subject to frequent burial and erosion caused by high wave energy of the surf zone. Unless the features have appreciable relief, they will be variously inundated by sand.

The specific locations of upland quarries that would be used for project construction are not established at this time. Many factors would be considered in identifying specific quarries, i.e. proximity to the Mid-Reach Beach, road or rail transport options, volume and quality of sand, etc.

3.2 NATIVE BEACH COMPOSITION

The native sediments of the Mid-Reach Beach consist predominately of greenish or light grey colored, fine to medium grained quartz and carbonate sand with variable amount of

shell fragments. The median grain diameter (D₅₀) of its composite sample is 0.26 mm. The grain size statistics indicate the materials are poorly sorted. The silt contents (passing #230 sieve) in composite samples range from 1.8 percent to 3.6 percent with an average of 2.6 percent. The gravel contents vary from 0 to 4.7 percent with an average of 1.9 percent.

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 NESTING SEA TURTLES

The loggerhead, green, and leatherback sea turtles are known to nest on the Mid-Reach Beach (Meylan et al., 1995; Table 2). The hawksbill (*Eretmochelys imbricata*) and Kemp’s ridley (*Lepidochelys kempii*) sea turtles also occur in coastal waters off of Brevard County, but are not known to nest within the project area.

Table 2. Sea Turtle Species known to nest on the Mid-Reach Beach

Species are listed in order of relative abundance.

Common and Scientific Names	Status ^a	Life Stages Present	Abundance Within the Project Area	Seasonal Presence	Nesting Season
Loggerhead sea turtle (<i>Caretta caretta</i>)	T	Adults, subadults, juveniles, and hatchlings	Abundant	Year-round (most abundant during spring and fall migrations)	April-September
Green sea turtle (<i>Chelonia mydas</i>)	T/E ^b	Adults, subadults, juveniles, and hatchlings	Common	Year-round	July-September
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	E	Adults, subadults, juveniles, hatchlings	Rare	March-October	March-July

^a Status: E = endangered, T = threatened under the Endangered Species Act of 1973.

^b Green sea turtles are listed as threatened except for in Florida, where breeding populations are listed as endangered. Due to inability to distinguish between the two populations away from the nesting beach, green sea turtles are considered endangered wherever they occur in U.S. waters.

3.3.1.1 Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) is Federally Threatened due to loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; disease; and incidental take from channel dredging and commercial trawling, longline, and gill net fisheries (USFWS, 2015a). Critical habitat has been designated to help conserve this species and this designation includes the Mid-Reach Beach. Southeast Florida is one of only two loggerhead nesting aggregations with more than

10,000 females nesting per year (USFWS, 2015a). For 2015, there have been a total of 2,927 loggerhead nests recorded on the Mid-Reach Beach and South Area Beach through October (Solis and Seney, 2015), or approximately 225 nests/km.

3.3.1.2 Green Sea Turtle

Classified as a Federally Endangered species, the green sea turtle (*Chelonia mydas*) has declined due to commercial harvest for eggs and meat, disease, degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations (USFWS, 2015b). Critical habitat has been designated for this species, but does not overlap with the project area. The Florida green turtle nesting aggregation is recognized as a regionally significant colony (USFWS, 2015b). For 2015, there have been a total of 707 green turtle nests recorded on the Mid-Reach Beach and South Area Beach through October (Solis and Seney, 2015), or approximately 54 nests per km.

3.3.1.3 Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) is Federally Endangered due to exploitation by humans for eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific (USFWS, 2015c). Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes (USFWS, 2015c). Critical habitat has been designated for this species, but does not overlap with the project area. Important leatherback nesting areas include the Atlantic coast of Florida (USFWS, 2015c). For 2015, there have been a total of 5 leatherback nests recorded on the Mid-Reach Beach and South Area Beach through October (Solis and Seney, 2015), or approximately 0.4 nests per km.

3.3.2 PIPING PLOVER

Classified as Federally Threatened, the piping plover (*Charadrius melodus*) is a small shorebird that has declined due to habitat loss and degradation caused by coastal development, recreation, navigation, dredging and shoreline stabilization and replenishment projects (USFWS, 2007). Critical habitat has been designated for this species, but does not overlap with the project area. Piping plovers may occasionally occur along the Mid-Reach Beach primarily during spring and fall migrations but also during winter months.

3.3.3 RED KNOT

The red knot (*Caladris canutus rufa*) is a small shorebird that is Federally Threatened due to declines in food resources (horseshoe crab eggs), sea level rise, some shoreline projects, and coastal development (USFWS, 2014). Critical habitat has not been designated for this species. Red knots may occasionally occur along the Mid-Reach Beach primarily during spring and fall migrations but also during winter months.

3.3.4 FLORIDA SCRUB-JAY

The Florida scrub-jay (*Aphelocoma coerulescens*) is a Federally threatened bird species occurring on fire dominated oak scrub habitat and scrubby flatwoods of Florida (USFWS, 2015d). Critical habitat has not been designated for this species. Statewide, scrub has been significantly reduced by development activity and now typically occurs only in scattered and often small patches in peninsular Florida (Fitzpatrick *et al.* 1991). The estimated statewide population is between 7,000 to 11,000 individuals (Breininger 1989; Fitzpatrick *et al.* 1991; Fitzpatrick *et al.* 1994). One of the largest remaining populations is in Brevard County (especially coastal scrubs of Merritt Island National Wildlife Refuge and Kennedy Space Center; USFWS 2015d). In other parts of the county, scrub-jay populations have severely declined due to habitat loss caused by development (Audubon, 2015; Brevard County, 2015). This species may occur in the vicinity of upland quarries.

3.3.5 EASTERN INDIGO SNAKE

Eastern indigo snakes (*Drymarchon corais couperi*) are Federally threatened primarily due to loss of habitat, highway mortality, collecting, and deliberate persecution (FNAI, 2001). Critical habitat has not been designated for this species. This snake can occur in natural (i.e. pine flatwoods) as well as non-natural or disturbed habitat such as pasture land (Bauder, 2015), and may potentially be present in areas adjacent to upland quarries.

3.3.6 GOPHER TORTOISE

The eastern population of the gopher tortoise (*Gopherus polyphemus*), including Florida, is a candidate species for possible future listing as Federally threatened or endangered (USFWS, 2015e). Habitat alteration and land development pose the most serious threat to the gopher tortoise (Gopher Tortoise Council, 2015). It occurs throughout sandy and scrub habitats of Brevard County, including disturbed habitat. This species may occur in the vicinity of upland quarries.

MIGRATORY BIRDS

Unlike the Mid-Reach Beach placement area which primarily attracts shorebirds and seabirds, the upland quarry sites are likely to be located near upland habitats primarily used by passerine species, or perching birds. Common species of perching birds, i.e. northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), etc., often nest in natural as well as disturbed habitats.

3.4 ESSENTIAL FISH HABITAT

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1996, waters and substrate adjacent to the Mid-Reach Beach have been identified as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council (SAFMC, 1998). EFH is defined as those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. EFH adjacent to the Mid-Reach Beach includes demersal soft bottom, water column, and demersal hardbottom with their associated ichthyofaunal communities.

The demersal soft bottom fish assemblage that inhabits the open shelf off eastern Florida consists of 213 species and 53 families (Gilmore et al., 1981; Gilmore, 2001). Of the 13 total taxa collected adjacent to the Mid-Reach Beach, demersal soft bottom species ranked third (gulf kingfish), fourth (kingfish), and fifth (sand drum) in terms of abundance. Federally managed species that inhabit demersal soft bottom in the region include penaeid shrimps.

The major coastal pelagic families occurring in inshore and coastal waters of eastern Florida are requiem sharks (*Carcharhinidae*), eagle and cownose rays (*Myliobatidae*), ladyfish (*Elopidae*), tarpon (*Megalopidae*), anchovies (*Engraulidae*), herrings (*Clupeidae*), mackerels (*Scombridae*), jacks and pompanos (*Carangidae*), mullets (*Mugilidae*), bluefish (*Pomatomidae*), and cobia (*Rachycentridae*). Within the Mid-Reach project area, smaller coastal pelagic species such as false pilchard occurred in the surf zone inside edge of the hardbottom, whereas larger species such as sharks and eagle rays were observed just outside of the hardbottom features. Coastal pelagic species managed by the SAFMC are cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel, and little tunny (*Euthynnus alletteratus*) (SAFMC, 1998). Life stages of all of these species may occur in the project area.

Hardbottom habitats support the most diverse assemblages of fishes off eastern Florida. Of the 19 species observed adjacent to the Mid-Reach Beach, 6 (black margate, porkfish, lane snapper [*Lutjanus synagris*], gray snapper, Atlantic spadefish [*Chaetodipterus faber*], and sheepshead [*Archosargus probatocephalus*]) are members of the reef fish management unit (SAFMC, 1998). Another species, the nurse shark, is managed by the National Marine Fisheries Service (1999). Striped croaker (*Bairdiella sanctaeluciae*) is considered a species of special concern by the State of Florida (Gilmore and Snelson, 1992). Many reef fish species not managed by the SAFMC also utilize nearshore hardbottom in the project area. During field surveys, other species such as wrasses (*Halichoeres bivittatus*, *H. poeyi*), clingfish (*Gobiesox strumosus*), sergeant major (*Abudefduf saxatilis*), night sergeant (*Abudefduf taurus*), and hairy blenny (*Labrisomus nuchipinnis*) were observed in shallow tide pools.

3.5 OTHER WILDLIFE RESOURCES

CSA Ocean Sciences Inc. (2014) found that epibiota within intertidal strata from their first Mid-Reach sample location was dominated by wormrock (mean cover = 92.7%). Subtidal strata supported more algae, which collectively accounted for a mean cover of just over 40%. Turf algae and the green alga *Caulerpa prolifera* were dominant taxa, contributing mean cover of 25% and 11.5%, respectively. The predominant substrate type in subtidal samples was sediment over hard bottom (mean cover = 49.5%).

Mean cover for all algal taxa combined in the second area sampled was just over 60%. Mean wormrock cover was 14.3% in these samples. Unidentified macroalgae and *C. prolifera* were responsible for most of the algal cover. Sediment over hard bottom and sand accounted for mean cover of 12.4% and 2.2%, respectively. In subtidal

strata, turf algae and *C. prolifera* contributed a mean cover of 42.8%. Sand and sediment over hard bottom composed most substrate cover (mean = 2.9% and 51.1%, respectively) found in this area.

The third area sampled was dominated by fleshy green algae and turf algae (mean = 18.5% and 57.4%, respectively). Sediment over hardbottom and exposed hard substrate accounted for mean cover of 13.0% and 3.2%, respectively. In the subtidal strata, sampled via *in situ* quadrats, the red algae *Bryocladia cuspidata*, turf algae, and unidentified macroalgae were responsible for most of the algal cover (mean = 16.8%, 7.5%, and 7.3%, respectively). Sediment over hard bottom and sand were the dominant substrate cover (mean = 42.5% and 13.5%, respectively).

Mean cover in subtidal samples from the Reference Area was dominated by turf algae and *C. prolifera* (mean cover = 37.7% and 9.1%, respectively). Sediment over hard bottom accounted for mean cover of 50.6%.

The terrestrial or upland habitat surrounding quarry sites is likely to support macroinvertebrates as well as common species of mammals and reptiles. If wetlands or other water bodies are nearby, then species such as amphibians, fish, and aquatic invertebrates may also be present.

3.6 WETLANDS

The USACE defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” According to the National Wetlands Inventory, wetlands that occur within the interior of Brevard County include, but are not necessarily limited to, wet prairies, freshwater marshes, mixed shrub-scrub, and hydric pine flatwoods. Wetlands may occur in the vicinity of quarry sites.

3.7 CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES

The USACE has successfully utilized existing sand quarries in other parts of the state and has been able to document through consultation that existing quarries have avoided and minimized effects to cultural, historic and archaeological resources. However, the use of new or expanded quarries is problematic in that it has the potential to adversely affect potential resources that may be eligible or are listed in the National Register of Historic Places. In the case where an existing quarry is operating and will simply be expanded consideration of the effects of such expansion may have already occurred. With the development of new mine or expansion areas for the sole purpose of providing material for this project there would be a potential that the project may affect cultural resources as numerous sites are known to exist within the County and such places where quarries are situated often present the same environmental conditions that were suitable to Native American habitation.

3.8 WATER QUALITY

The waters off the coast of Brevard County, as well as the interior of the County, are listed as Class III waters by the State of Florida. Class III waters are suitable for fish consumption; recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

3.9 AESTHETIC RESOURCES

The shoreline along the Mid-Reach project area features medium- to low-density, mixed-use commercial and residential development, interspersed among numerous public beach parks and undeveloped properties with substantial, mostly natural dune vegetation and tree canopy. Buildings are mostly 1- to 3-stories, with several higher story hotels and condominiums. The natural beach dune (or bluff) habitat mostly exists along the shoreline, along with coastal hammock in many locations, excepting several properties that are armored by seawalls or for which the buildings/lawns are very close to the beach. Storm erosion of the beach results in significant scarping of the bluff, loss of vegetation, and damage to dune walkovers and other structures. There are 13 storm water drain outfalls located on the back beach along the mid-reach shoreline, of which six are mostly or wholly buried in dune and are rarely seen, or known to flow rarely onto the beach, except after severe hurricane impacts. At least two of the outfalls feature fairly significant flow after rainfall, creating some trenching of the beach (Jones-Edmunds, 2007; Brevard County NRMO, March 2008).

Land uses within the interior of the County include agriculture (primarily citrus and livestock), commercial and residential development. In addition to wetlands, other significant natural areas such as scrub, pine flatwoods, and hammock are also present.

3.10 RECREATION RESOURCES

Common beach- and water-related activities along the project area include sunbathing, shell collecting, surf- and boat-fishing, swimming, surfing, wind- and kitesurfing, boating and kayaking and occasionally snorkeling when the water is clear. The public has substantial access to the Mid-Reach Beaches through 30 public parks and beach access paths, along with access through extensive hotel facilities and rental condominiums, etc. at least seven large public parks include extensive parking and restroom facilities (Olsen, 2003). Beach recreation is central to most local business interests in the area. Public recreational opportunities on quarries do not exist as these are private properties with on-going construction activities.

3.11 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

There are no known sources of hazardous, toxic, or radioactive wastes (HTRW) within or adjacent to the Mid-Reach Beach. HTRW includes any material listed as a "hazardous substance" under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Since the exact locations of the upland quarries are unknown at this time, it is not possible to determine if HTRW may be present on these properties.

3.12 AIR QUALITY

Ambient air quality along coastal Brevard County as well as the interior of the County is generally good due to prevalent ocean breezes from the northeast through the southeast, and due to the general lack of significant industrial development. Brevard County is classified as an attainment area for all Federal Air Quality Standards.

3.13 NOISE

Ambient noise levels along coastal Brevard County are generally low to moderate and are typical of recreational environments, with occasional exceptions related to military aircraft landing and take-off operations at Patrick Air Force Base, immediately north of the Mid-Reach. Otherwise, the major noise producers include the breaking surf, adjacent and residential areas, and vehicular traffic along State Route A1A. Noise levels within the interior of the County, where sand quarries may be found, also range from low to moderate levels, and are associated with traffic, small industries, with some exceptions related to small airports.

3.14 ENERGY REQUIREMENTS AND CONSERVATION

Quarry and truck-haul operations potentially associated with the project will require temporary investments of fuel energy.

3.15 NATURAL OR DEPLETABLE RESOURCES

The beach quality sand obtained from existing upland quarries is the only natural and depletable resource associated with the project.

3.16 NATIVE AMERICANS

There are no lands which belong to Native Americans within the project area.

3.17 REUSE AND CONSERVATION POTENTIAL

There is no potential for reuse or conservation associated with the proposed project activities.

4 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See Table 1 in section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. (The reader is encouraged to access the GRR/SEIS for additional information on environmental effects associated with the No-Action Alternative, construction of the authorized project.)

4.1 GENERAL ENVIRONMENTAL EFFECTS

4.1.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The principle elements of the proposed action include the following:

- (a) truck-haul transfer of beach quality sand from existing quarries to the Mid-Reach Beach;
- (b) placement of sand using construction equipment as dune and/or beach face fill along the shoreline.

The beneficial effects from the placement of sand fill along the proposed project areas include the establishment of a buffer area for protection against storms and flooding. Direct and indirect effects to hardbottom resulting from sand placement would be mitigated. All work shall be performed in compliance with the State permit, US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) biological opinions, and NMFS Essential Fish Habitat conservation recommendations.

4.1.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.1.1. However, this alternative also includes creation of new or the expansion of upland quarries.

4.1.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach Project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.2 NATIVE BEACH AND QUARRIED SAND COMPOSITION

4.2.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

In order to ensure compliance with State and Federal criteria, all sand from upland quarries would be required to meet the following specifications. This exceeds the requirements of the Quality Assurance/Quality Control Plan (QA/QC Plan) approved by the Florida Department of Environmental Protection (see Appendix D to view the

complete permit and QA/QC plan). The specifications will ensure that quarried sand placed on the Mid-Reach Beach will have grain size distributions similar to the native beach and/or the Canaveral Shoals borrow area.

- Less than 0.5% retained on ¾" sieve;
- Less than 5% retained on #4 sieve;
- Less than 10% retained on #10 sieve;
- Between 55% and 85% passing #35 sieve (0.5 mm);
- Between 15% and 45% passing #50 sieve (0.3 mm),
- Less than 10% passing #80 sieve,
- Less than 3% passing #230 sieve,
- Allowable mean grain size = 0.33 to 0.55 mm; ideally, mean = 0.45 mm and/or median = 0.36 mm,
- Color: 7.5 YR or 10 YR, greater than or equal to 6.0 Value, less than or equal to 2.0 Chroma, and Carbonate Content = 20% to 50% (30% to 35% would be ideal).

The QA/QC Plan also requires inspections of the beach area and sediment quality by the Non-Federal sponsor (Brevard County) and/or an Engineer representative. These inspectors shall have prior training or experience in beach nourishment and construction inspection, testing, and shall be knowledgeable of the project design, State permit conditions, and requirements for acceptable sediment quality. The plan includes methods of remediation in the event of non-beach-compatible material being placed on the beach. Remediation methods may include, but not limited to, excavating the non-beach compatible material and removing it to a permitted upland location; mixing the non-beach compatible material with compatible material so that it does comply with project sand requirements; or screening the non-beach compatible material and removing non-compatible material to a permitted upland location.

4.2.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.2.1.

4.2.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach Project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.3 THREATENED AND ENDANGERED SPECIES

The USACE has determined that placement of sand from upland quarries onto the Mid-Reach Beach may affect nesting sea turtles and may affect, but is not likely to adversely affect, the piping plover and red knot. These effects should be similar to the effects of using sand from Canaveral Shoals. All placement activities would be performed in

compliance with the terms and conditions of the Statewide Programmatic Biological Opinion (2015) and the Programmatic Piping Plover Biological Opinion (2013) issued by the U.S. Fish and Wildlife Service (USFWS). The use of existing upland quarries as an additional source of sand should have no effect on the Florida scrub-jay, eastern indigo snake or gopher tortoise. Consideration of potential effects should have occurred on any currently operating quarry. However, the USACE has determined that the creation of new quarries or the expansion of existing quarries, depending on the type of habitat present, may affect, but is not likely to adversely affect the jay, indigo snake, or tortoise. In the event that new quarries were to be created or existing quarries expanded, then coordination with the USFWS in accordance with the Endangered Species Act would be required. The USACE final determination relative to project impacts as well as the need for protective and mitigation measures is subject to review by and coordination with the USFWS.

4.3.1 NESTING SEA TURTLES

4.3.1.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The placement of quarried sand on the Mid-Reach Beach may affect nesting sea turtles by altering the beach face, resulting in potential adverse impact to nesting and hatching success, (including effects from grade changes, sediment material, over-compaction, escarpment formation, and artificial lighting during construction). Compatibility of quarried sand with the native beach is one of the requirements of the USFWS biological opinion, which states that “beach-compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Fill material shall comply with FDEP requirements pursuant to the Florida administrative code (FAC) subsection 62b-41.005(15). If a variance is requested from FDEP, the USFWS must be contacted to discuss whether the project falls outside of the biological opinion. A quality control plan shall be implemented pursuant to FAC rule 62b-41.008(1) (k) 4.b.” The USACE has determined that the sand specifications provided in Section 4.2.1 would meet these requirements.

4.3.1.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.3.1.1.

4.3.1.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. The project would be

built pursuant to the previously issued USFWS biological opinion and State permit requirements.

4.3.2 PIPING PLOVER AND RED KNOT

4.3.2.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The placement of quarried sand on the Mid-Reach Beach may affect, but is not likely to adversely affect, the piping plover and red knot. The Mid-Reach Beach does not meet the criteria to be considered an Optimal Piping Plover Area. However, it may at times be utilized by both the plover and the knot. Beach placement effects may include the disturbance of normal activities such as feeding and roosting during construction; degradation of wintering habitat or habitat used during migration by altering the natural sediment composition, and; depressing the invertebrate base in some areas. For eroded beaches, sand placement may also have a beneficial effect on the habitat's ability to support the plover and the knot. As stated earlier, placement activities would be performed in compliance with biological opinions issued by the USFWS, and this includes the use of compatible fill material as described in 4.3.1.1.

4.3.2.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.3.2.2.

4.3.2.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. The project would be built pursuant to the previously issued USFWS biological opinions and State permit requirements.

4.3.3 FLORIDA SCRUB-JAY, EASTERN INDIGO SNAKE, AND GOPHER TORTOISE

4.3.3.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand would have no effect on the Florida scrub-jay, eastern indigo snake, or gopher tortoise. This assumes that vegetation has been previously cleared and grubbed from the site and that excavation of sand has commenced.

4.3.3.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may affect, but is not likely to adversely affect, the Florida scrub-jay, eastern indigo snake, or gopher tortoise. Effects may include alteration of potential habitat, through clearing and grubbing of vegetation, as well as potential take of these species. Appropriate surveys prior to construction activities would be required to determine their

status on the lands in question. Mitigation may be required to offset impacts. If surveys indicate that the tortoise is present, then a State permit would be obtained to relocate them to an approved recipient site. The creation of new or the expansion of existing upland quarries would be coordinated with the USFWS.

4.3.3.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. This action would have no effect on the Florida scrub-jay. In regard to the eastern indigo snake and gopher tortoise, the authorized project (which includes stock piling beach quality material at an upland site) would be built pursuant to the previously issued USFWS biological opinion and State permit requirements.

4.4 MIGRATORY BIRDS

4.4.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand would have no effect on migratory birds at the quarry site. This assumes that vegetation has been previously cleared and grubbed from the site and that excavation of sand has commenced. However, placement of quarried sand on the Mid-Reach Beach may impact nesting species (i.e. least tern, Wilson's plover). These effects should be similar to the effects of using sand from Canaveral Shoals. Appropriate monitoring and protection measures would be required during the nesting season to ensure that construction activities remain compliant with the Migratory Bird Treaty Act and do not result in the destruction of eggs, chicks, or adult birds.

4.4.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may impact nesting species of migratory birds (common passerine species, i.e. northern mockingbird, northern cardinal, etc.). Effects may include alteration of potential habitat, through clearing and grubbing of vegetation, as well as potential take of active nests. Placement of quarried sand on the Mid-Reach Beach may also impact nesting seabird or shorebird species (i.e. least tern, Wilson's plover). These effects should be similar to the effects of using sand from Canaveral Shoals. Appropriate monitoring and protection measures would be required during the nesting season to ensure that construction activities remain compliant with the Migratory Bird Treaty Act and do not result in the destruction of eggs, chicks, or adult birds.

4.4.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. Appropriate monitoring and protection measures would be required during the nesting season to

ensure that construction activities remain compliant with the Migratory Bird Treaty Act and do not result in the destruction of eggs, chicks, or adult birds.

4.5 ESSENTIAL FISH HABITAT (EFH)

4.5.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand would result in similar effects, i.e. temporary turbidity and burial of hardbottom (3.0 acres), as using sand from Canaveral Shoals. Turbidity would be monitored per State permit requirements and burial would be mitigated by construction of 4.8 acres of artificial reef. Quarried sand would also be required to be compatible with native beach materials as stated in Sections 4.2.1 and 4.3.3.1.

4.5.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.5.1.

4.5.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. The authorized project would be built in accordance with the EFH conservation recommendations provided by the NMFS.

4.6 OTHER WILDLIFE RESOURCES

4.6.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand would have no effect on other wildlife resources at the quarry site. This assumes that vegetation has been previously cleared and grubbed from the site and that excavation of sand has commenced. However, placement of quarried sand on the Mid-Reach Beach may impact other wildlife resources (i.e. arthropods [sand fleas] and mollusks [clams]) that inhabit the beach. These effects should be similar to the effects of using sand from Canaveral Shoals (i.e. sedimentation and temporary turbidity). Recovery should occur in phase with normal seasonal recruitment patterns documented for the project area (Lachar moise et al., in preparation).

4.6.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may impact other wildlife resources (i.e. macroinvertebrates, common species of reptiles, amphibians, small mammals, etc.). Effects may include alteration of potential habitat, through clearing and grubbing of vegetation, as well as potential take of these

species. Placement of sand from new or expanded quarries onto the Mid-Reach Beach would result in the same impacts as described in Section 4.6.1.

4.6.1 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune. Recovery of beach macroinvertebrates (i.e. sand fleas and clams) should occur in phase with normal seasonal recruitment.

4.7 WETLANDS

4.7.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand would have no effect on wetlands. This assumes that vegetation has been previously cleared and grubbed from the site and that excavation of sand has commenced. Consideration of potential effects should have occurred on any currently operating quarry.

4.7.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may impact wetlands. Effects may include alteration of hydrology, clearing and grubbing of vegetation, excavation or filling. Appropriate surveys prior to construction activities would be required to identify and delineate any jurisdictional wetlands that may be affected by quarry construction. In accordance with Section 404 of the Clean Water Act, State statutes, and Executive Order 11990, all applicable Federal and State permits would be required prior to construction and, if necessary, mitigation to ensure no net loss of wetland functions.

4.7.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.8 CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES

4.8.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of sand from existing upland sand quarries would have no effect on historic properties listed on or eligible for listing on the National Register of Historic Places. Consideration of potential effects should have occurred on any currently operating quarry.

4.8.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may affect cultural, historic, and archaeological properties. Proposed quarries where no previously authorized uses or permitting exist would have to undergo all steps needed to obtain sufficient documentation to demonstrate adequate consideration of effects. However, such use for the sole purpose of this project would constitute a new Federal undertaking as specified under 36 CFR 800. Documentation of and consideration of effects under Florida Statutes would no longer be sufficient to permit such use of materials that were not adequately considered. A “no historic properties affected” would not be achievable within a new quarry as the effects would not be known prior to creation of an undertaking. Such a determination would only be permitted after proper investigations (cultural resource surveys) and consultation as specified in the 36 CFR 800 were completed.

4.8.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.9 WATER QUALITY

4.9.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand should not result in increased effects to adjacent water quality. Operation of existing quarries should be in compliance with applicable Federal laws and State statutes. However, placement of quarried sand on the Mid-Reach Beach may affect water quality. These effects should be similar to the effects of using sand from Canaveral Shoals (i.e. temporary turbidity in nearshore waters). Turbidity would be monitored per State permit requirements.

4.9.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may impact water quality. Therefore, all applicable Federal and State permits would be required prior to construction. Placement of sand from new or expanded quarries onto the Mid-Reach Beach would result in the same impacts as described in Section 4.9.1.

4.9.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.10 AESTHETIC RESOURCES

4.10.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries as an additional source of sand should have no increased effect on aesthetics. This assumes that vegetation has been previously cleared and grubbed from the site and that excavation of sand has commenced. Placement of quarried sand on the Mid-Reach Beach would maintain existing aesthetics by preserving or improving the sand dune and beach conditions.

4.10.2 USE OF NEW OR EXPANDED UPLAND SAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of existing upland quarries as an additional source of sand may affect aesthetics of the adjacent community. Construction would be required to comply with local ordinances and State statutes. Placement of quarried sand on the Mid-Reach Beach would maintain existing aesthetics by preserving or improving the sand dune and beach conditions.

4.10.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.11 RECREATION RESOURCES

4.11.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

Placement of quarried sand on the Mid-Reach Beach would result in temporary disruption and/or localized suspension of beach recreation during construction activities. However, quarried sand would improve existing recreational opportunities associated with the beach by maintaining or increasing beach area. These effects should be similar to the effects of using sand from Canaveral Shoals.

4.11.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as Section 4.11.1.

4.11.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.12 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

4.12.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES, ALTERNATIVE A

There should be no risk of encountering HTRW within existing upland quarries. This assumes that a Phase 1 Survey, in accordance with CERCLA, has been completed prior to construction and use of the quarry.

4.12.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of upland quarries as an additional source of sand may result in the discovery of HTRW. Therefore, a Phase 1 Survey, in accordance with CERCLA, shall be required prior to construction and use of the quarry. In the event that HTRW is identified, then the HTRW shall be properly remediated (e.g. removed) prior to use or a new site shall be selected.

4.12.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.13 AIR QUALITY

4.13.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries would result in low level emissions from construction equipment operating at the quarry, haul trucks, and equipment used to spread the sand at the Mid-Reach Beach. Exhaust emissions from the construction equipment would have a temporary effect on air quality, but no permanent impacts are expected. These effects should be similar to the effects of using sand from Canaveral Shoals.

4.13.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of upland quarries would result in a minor increase in emissions while vegetation is cleared and grubbed. Otherwise the effects would be the same as described in Section 4.13.1.

4.13.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.14 NOISE

4.14.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The use of existing upland quarries would temporarily raise the noise level in the vicinity of the quarry and at the Mid-Reach Beach. Noise associated with the beach fill activity would specifically include the transport of sand by truck-haul along the roadways and beach, in addition to mechanical grading equipment and back-up alarms. Beach fill construction activity and the attendant noise impacts would be limited to daylight hours. These effects should be similar to the effects of using sand from Canaveral Shoals.

4.14.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of upland quarries would result in a minor increase in noise levels while vegetation is cleared and grubbed. Otherwise the effects would be the same as described in Section 4.14.1.

4.14.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.15 ENERGY REQUIREMENTS AND CONSERVATION

4.15.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

Energy requirements associated with the use of existing upland quarries would be confined to the fuel used to operate construction equipment at the quarry, truck-haul transport, and spreading of sand at the Mid-Reach Beach. Energy expenditures are not expected to exceed the No-Action Alternative (use of Canaveral Shoals).

4.15.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

The creation of new or the expansion of upland quarries would result in a minor increase in fuel consumption while vegetation is cleared and grubbed. Otherwise the effects would be the same as described in Section 4.15.1.

4.15.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.16 NATURAL OR DEPLETABLE RESOURCES

4.16.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

The beach quality sand obtained from existing upland quarries is a depletable resource. The proposed action would result in a permanent removal, or transfer, of sand from the quarry site to the nearshore littoral zone along the project beach area. Sand from Canaveral Shoals could also be utilized. The combination of these sources would exceed the required volume of sand over the 50-year project life.

4.16.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as described in Section 4.16.1.

4.16.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.17 NATIVE AMERICANS

4.17.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

None of the proposed project activities occur on land belonging to Native Americans. Therefore implementation of the proposed project would not result in any impacts to Native Americans or land belonging to Native Americans.

4.17.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as described in Section 4.17.1.

4.17.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.18 REUSE AND CONSERVATION POTENTIAL

4.18.1 PROPOSED ACTION, USE OF EXISTING UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE A

There is no potential for reuse associated with the proposed project activities, therefore this is not applicable to the proposed action. Energy requirements for the proposed alternatives would be confined to fuel for construction equipment as stated in Section 4.15.

4.18.2 USE OF NEW OR EXPANDED UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND, ALTERNATIVE B

Same as described in Section 4.18.1.

4.18.3 NO ACTION ALTERNATIVE (STATUS QUO)

Upland quarries would not be used as an additional source of sand. In this case, and in accordance with the authorized Mid-Reach project, sand from Canaveral Shoals would be used to periodically nourish the beach and/or rebuild the dune.

4.19 CUMULATIVE IMPACTS

Cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Table 3 summarizes the impact of such cumulative actions by identifying the past, present, and reasonably foreseeable future condition of the various resources which are directly or indirectly impacted by the proposed action and its alternatives. The table also illustrates the with-project and without-project condition (the difference being the incremental impact of the project). Also illustrated is the future condition with any reasonable alternatives (or range of alternatives). The time boundary condition for this analysis has been set from pre-development to 2016. The space boundary condition has been set from Cape Canaveral to San Sebastian Inlet, with an emphasis on the Mid-Reach Beach as well as the interior of Brevard County where upland quarries are located.

TABLE 3: SUMMARY OF CUMULATIVE IMPACTS

	Past (baseline condition)	Present (existing condition)	Future with Proposed Action, Alternative A (Use of Existing Upland Quarries)	Future with Alternative B (Use of New or Expanded Upland Quarries)	No-Action Alternative (Authorized Project, use of Canaveral Shoals)
Native Beach Composition	Beach quality sand from Canaveral Shoals has been placed north and south of the Mid-Reach Beach. Beach quality sand from quarries has also been used to rebuild the dune along the Mid-Reach Beach.	The Mid-Reach Beach remains critically eroded and vulnerable to storm effects.	Mid-Reach Beach nourishment using sand from existing quarries would be required to meet State and Federal acceptance criteria to ensure compatibility with the native beach. The use of quarried sand would provide greater flexibility to nourish the Mid-Reach Beach and reduce storm effects.	Mid-Reach Beach nourishment using sand from new or expanded quarries would be required to meet State and Federal acceptance criteria to ensure compatibility with the native beach. The use of quarried sand would provide greater flexibility to nourish the Mid-Reach Beach and reduce storm effects.	The authorized project would be built using sand from Canaveral Shoals. Under this alternative, the Mid-Reach Beach would be nourished only when the North or South Reach Beaches are also nourished.
Protected Species and Habitats Threatened and Endangered Species (nesting sea turtles, piping plover, red knot, Florida scrub-jay, eastern indigo snake, gopher tortoise); Essential Fish Habitat (i.e. water column, hardbottoms [rock habitat], wetlands, etc.); Migratory Birds; Other Wildlife Resources	Populations were significantly greater prior to human development. Declines are attributed to loss or degradation of habitat as well as other human related factors.	Education and enforcement of relevant laws have resulted in some population increases (i.e. nesting sea turtles within the Mid-Reach project area). Habitat has also improved in some cases due to land conservation, pollution abatement, and regulatory practices.	Habitat alteration due to climate change effects (i.e. sea level rise), continued loss or degradation of habitat due to development, and other human related factors will pose significant future challenges in protecting these species and their habitats. Mid-Reach Beach nourishment would be performed in compliance with all applicable laws, and would help provide habitat for coastal species. Mitigation would offset impacts to hardbottom habitat.	Habitat alteration due to climate change effects (i.e. sea level rise), continued loss or degradation of habitat due to development, and other human related factors will pose future significant challenges in protecting these species and their habitats. Mid-Reach Beach nourishment would be performed in compliance with all applicable laws, and would help provide habitat for coastal species. Mitigation would offset impacts to hardbottom habitat.	Habitat alteration due to climate change effects (i.e. sea level rise), continued loss or degradation of habitat due to development, and other human related factors will pose future significant challenges in protecting these species. The authorized project would be performed in compliance with all applicable laws, and would help provide habitat for coastal species.
Cultural, Historic, and Archaeological Resources	Cultural resources have been degraded or lost due to development, private collecting, and other factors.	Education and enforcement of relevant laws have helped conserve cultural resources.	The Mid-Reach Beach has been previously surveyed for cultural resources and it is assumed that effects were considered prior to excavation of existing quarries. The project would not contribute to the loss or degradation of cultural resources.	The Mid-Reach Beach has been previously surveyed for cultural resources and surveys shall be conducted prior to creation or expansion of new quarries. The project would not contribute to the loss or degradation of cultural resources.	The Mid-Reach Beach and Canaveral Shoals have been previously surveyed for cultural resources. Protection measures (i.e. buffers around known sites) shall be implemented.

Water Quality	Prior to Federal and State laws being enacted and enforced, water quality had significantly declined due to human related factors (i.e. turbidity caused by upland runoff, septic tank leachate, etc.).	Present day water quality has significantly improved due to local, State, and Federal pollution abatement programs.	Placement of beach quality sand from existing quarries may result in some temporary turbidity. However, this should not exceed background levels and would not result or contribute to long-term water quality impacts. All work would be performed in compliance with State Water Quality Certification/permit.	Placement of beach quality sand from existing quarries may result in some temporary turbidity. However, this should not exceed background levels and would not result or contribute to long-term water quality impacts. All work would be performed in compliance with State Water Quality Certification/permit.	The authorized project would be built using sand from Canaveral Shoals. All work would be performed in compliance with State Water Quality Certification/permit.
Aesthetics	Urban development along the shoreline has affected the aesthetics of the area.	The Mid-Reach shoreline is primarily built out. However, numerous local beachside parks have been established. The beach remains narrow and vulnerable to erosion.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach would reduce the risk of damage to shoreline infrastructure (buildings and parks) and should generally improve the appearance of the beach.	Placement of beach quality sand from new or expanded quarries onto the Mid-Reach Beach would reduce the risk of damage to shoreline infrastructure (buildings and parks) and should generally improve the appearance of the beach. Creation or expansion of quarries would be performed in accordance with local ordinances.	The authorized project would be built using sand from Canaveral Shoals and would reduce the risk of damage to shoreline infrastructure (buildings and parks) and should generally improve the appearance of the beach.
Recreation	Opportunities for beach recreation have been affected by shoreline development as well as storm induced erosion.	Numerous beach access routes have been established. However, opportunities for recreation are at risk due to erosion, or loss of beach area.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach would preserve and protect many recreational opportunities. Construction would temporarily affect recreation.	Placement of beach quality sand from new or expanded quarries onto the Mid-Reach Beach would preserve and protect many recreational opportunities. Construction would temporarily affect recreation.	The authorized project would be built using sand from Canaveral Shoals and would preserve and protect many recreational opportunities. Construction would temporarily affect recreation.
Hazardous, Toxic, and Radioactive Waste (HTRW)	There are no known HTRW locations in the project area.	There are no known HTRW locations in the project area.	There should be no risk of encountering HTRW within existing quarries.	HTRW surveys would be conducted prior to construction of new or expanded quarries.	The authorized project would be built using sand from Canaveral Shoals. There are no known HTRW sites in the project area.

Air Quality	Prior to Federal and State laws being enacted and enforced, air quality may have declined.	Present day air quality has significantly improved due to local, State, and Federal pollution abatement programs. The area remains in attainment with air quality criteria.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach may result in additional temporary and minor impacts to air quality but these would not be permanent.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach may result in additional temporary and minor impacts to air quality but these would not be permanent.	The authorized project would be built using sand from Canaveral Shoals and may result in additional temporary and minor impacts to air quality but these would not be permanent.
Noise	Noise levels have likely remained unchanged for some time due the urbanized environment.	Noise levels continue to be typical for this urbanized project area.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach would result in additional temporary and minor noise. No nighttime placement would occur.	Placement of beach quality sand from new or expanded quarries onto the Mid-Reach Beach would result in additional temporary and minor noise. No nighttime placement would occur Construction of new quarries would be performed in compliance with local ordinances.	The authorized project would be built using sand from Canaveral Shoals. Beach placement would result in additional temporary and minor noise. No nighttime placement would occur.
Energy Requirements and Conservation	Past beach nourishment in the project area requires insignificant uses of energy.	Beach nourishment or dune construction continues to require insignificant uses of energy.	Placement of beach quality sand from existing quarries onto the Mid-Reach Beach would result in an insignificant increase in the use of energy (fuel).	Placement of beach quality sand from new or expanded quarries onto the Mid-Reach Beach would result in an insignificant increase in the use of energy (fuel).	The authorized project would be built using sand from Canaveral Shoals. This would result in an insignificant increase in the use of energy (fuel).
Natural or Depletable Resources	Past beach nourishment in the project area requires the use of sand, which is a depletable natural resource.	Present day beach nourishment in the project area requires the use of sand, which is a depletable natural resource.	The use of sand from existing quarries onto the Mid-Reach Beach would contribute to the depletion of upland sources of this natural resource.	The use of sand from new or expanded quarries onto the Mid-Reach Beach would contribute to the depletion of upland sources of this natural resource.	The authorized project would be built using sand from Canaveral Shoals. This would contribute to the depletion of offshore sources of this natural resource.
Native Americans	There are no Native American lands in the project area.	There are no Native American lands in the project area.	There are no Native American lands in the project area.	There are no Native American lands in the project area.	There are no Native American lands in the project area.
Reuse and Conservation Potential	There is no potential for reuse associated with the proposed project activities.	There is no potential for reuse associated with the proposed project activities.	There is no potential for reuse associated with the proposed project activities.	There is no potential for reuse associated with the proposed project activities.	There is no potential for reuse associated with the proposed project activities.

4.20 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.20.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. As previously stated, sand from quarries is a depletable resource and, therefore, the use of quarried sand is also considered an irreversible commitment of resources.

4.20.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. Irretrievable loss of nearshore (rock) resources resulting from the project will be mitigated through the implementation of a program of nearshore artificial reef construction.

4.21 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Most of the beach sand infauna (i.e. sand fleas, etc.) will be unavoidably lost as a result of sand placement activities. However, these losses are not expected to have a long-term, significant adverse impact on the surrounding environment since infauna outside of the fill areas and borrow areas will recolonize the disturbed sandy areas within one to three seasons after construction, respectively, and changes in macroinfaunal community assemblages should result in a minimal loss of productivity.

4.22 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Shoreline protection using beach quality material with periodic nourishment is an ongoing effort. Beach nourishment projects have a temporary and short-term impact on local offshore and nearshore biological resources. Most motile organisms (fishes, crabs, and some sand dwelling organisms) within the borrow area and nearshore zone should be able to escape these areas during construction. Some less-motile individuals that are unable to escape from construction will be lost, but are expected to recolonize after project completion. Short-term reductions in primary productivity and reproductive and feeding success of invertebrate species and fish are expected. The sustainability of these populations should not be negatively affected given the minority scale of impacts relative to the remaining resource and provided the creation of suitable replacement habitat as associated with the project's mitigation reef.

4.23 INDIRECT EFFECTS.

The existing project shoreline is already developed with a mix of commercial (lodging), residential, and public beach park facilities. There is relatively limited opportunity for future densification of development, however the presence of shore protection and decreased storm losses would conceivably act to at least maintain the density of existing development and improve investments therein. The studies describing growth in development associated with beach nourishment have typically examined or presumed beach nourishment projects that are large in scale.

These cases do not necessarily characterize the present project, wherein the proposed beach fill placement is relatively small in scale (i.e., dune-only and 10- to 30-ft advances in beach width). Accordingly, the degree to which project indirectly affects the nature or growth of development along the shoreline can be anticipated to be relatively small.

4.24 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The Federal objective is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Federal planning concerns other than economic include environmental protection and enhancement, human safety, social wellbeing, and cultural and historical resources. Federal, State and County objectives include (1) the reduction of expected storm damages through beach nourishment and other project alternatives; (2) maintaining beaches as suitable recreational areas; (3) maintaining suitable beach habitat for nesting sea turtles, invertebrate species, and shorebirds; (4) maintaining commerce associated with beach recreation in Brevard County, and (5) avoidance or minimization of adverse impacts to sensitive environmental marine resources, including habitat associated with the nearshore rock hardgrounds along the project area. The proposed project activity is consistent with Federal and Local objectives and with the State's Coastal Zone Management Plan.

4.25 CONFLICTS AND CONTROVERSY

There are no known conflicts or controversy associated with using beach quality material from upland quarries as an additional source of sand to nourish the Mid-Reach Beach.

4.26 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS

There are no uncertain, unique or unknown risk associated with beach quality material from upland quarries as an additional source of sand to nourish the Mid-Reach Beach.

4.27 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS.

The proposed activities are consistent with, and/or adaptations of, prior permitted activities conducted by the USACE, Brevard County and the U.S. Air Force. These include prior beach nourishment and periodic nourishment along the North Reach and South Reach of the Brevard County Federal Shore Protection Project, Patrick Air Force Base and emergency dune restoration along the Mid-Reach by Brevard County.

4.28 ENVIRONMENTAL COMMITMENTS

The U.S. Army USACE of Engineers and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

1. Protective measures for threatened and endangered species shall be enforced in accordance with the USFWS Statewide Programmatic Biological Opinion (2015), the USFWS Programmatic Piping Plover Biological Opinion (2013), and the State permit.

2. All water quality terms and conditions of the State permit shall be implemented.
3. Migratory birds (adult birds, eggs and chicks) shall be protected during construction activities.
4. Essential Fish Habitat conservation recommendations shall be implemented.
5. In the event that cultural resources are discovered (i.e. at new or expanded upland quarries), then protective measures shall be utilized.
6. In the event that jurisdictional wetlands are identified within the footprint, or adjacent to, proposed new or expanded quarries, then protective measures shall be implemented and, if necessary, mitigation performed to offset impacts.
7. All beach placement work by truck-haul shall be conducted during daylight hours only. Therefore, adjacent residents will not be subjected to any nighttime construction noise.
8. Air emissions such as vehicular exhaust and dust shall be controlled.
9. The contracting officer would notify the contractor in writing of any observed noncompliance with Federal, state, or local laws or regulations, permits and other elements of the contractor's Environmental Protection Plan.
10. The contractor would train his personnel in all phases of environmental protection.
11. The environmental resources within the project boundaries and those affected outside the limits of permanent work would be protected during the entire period of work.
12. An oil spill prevention plan shall be required.

4.29 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.29.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and this Environmental Assessment (EA) has been prepared. A scoping letter on the use of upland quarries as an additional source of sand to nourish the Mid-Reach Beach was mailed out to all Federal, State, and local agencies and all adjacent homeowners on February 11, 2015. A Notice of Availability dated March 4, 2016 of the draft EA was coordinated with interested stakeholders for review and comment. The project is in full compliance with the National Environmental Policy Act.

4.29.2 ENDANGERED SPECIES ACT OF 1973

The proposed work would be performed in accordance with the USFWS Statewide Programmatic Biological Opinion (2015) and the USFWS Programmatic Piping Plover Biological Opinion (2013). If new quarries are created or existing quarries expanded then appropriate surveys for threatened and endangered species may be required. A coordination letter will be sent to the USFWS prior to initiating any construction work. This project shall be fully coordinated under the Endangered Species Act and shall therefore, be in full compliance with the Act.

4.29.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

A Coordination Act Report (CAR) dated November 2008 was submitted by the USFWS. However, the use of upland quarries as an additional source of sand to nourish the Mid-Reach Beach was not considered in the CAR. This change has been coordinated with the USFWS through the NEPA process and will also be considered during ESA consultation. This project shall be in full compliance with the Act.

4.29.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

The USACE determined that the proposed action may affect historic properties included in or eligible for inclusion in the National Register of Historic places, but this determination depends on whether new quarries are created or expanded and whether site surveys discover cultural resources. Consultation with the Florida State Historic Preservation Officer (SHPO) was initiated in accordance with the National Historic Preservation Act of 1966, as amended, and as part of the requirements and consultation processes contained within the NHPA implementing regulations of 36 CFR 800.

The proposed activity shall also be in compliance with the following:

- Archeological Resources Protection Act (96-95)
- Native American Graves Protection Act (PL 101-601 [if actions on Federal Property])
- American Indian Religious Freedom Act (PL 95-341)
- Executive Order 11593 (Protection and Enhancement of the Cultural Environment)
- Executive Order 13007 (Indian Sacred Sites)

- Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)
- Presidential Memo of 1994 on Government to Government Relations with Native American Tribal Governments
- Abandoned Shipwrecks Act
- Native American Graves Protection and Repatriation Act
- Archeological Resources Protection Act

4.29.5 CLEAN WATER ACT OF 1972

The project shall be in compliance with this Act. A Section 401 water quality certification has been issued by the Florida Department of Environmental Protection (DEP permit #0254479-001-JC; extended till December 30, 2016 by letter dated August 4, 2014). All State water quality standards would be met. A Section 404(b) evaluation is included in this report as Appendix A.

4.29.6 CLEAN AIR ACT OF 1972

No air quality permits would be required for this project. This project has been coordinated with U.S. Environmental Protection Agency (EPA) and is in compliance with Section 309 of the Act.

4.29.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. The State has determined that the proposed work, including the use of upland quarries is consistent with the State's Coastal Zone Management Program.

4.29.8 FARMLAND PROTECTION POLICY ACT OF 1981

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

4.29.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

4.29.10 MARINE MAMMAL PROTECTION ACT OF 1972

The use of quarries as an additional source of sand to nourish the Mid-Reach Beach would not impact marine mammals. This act does not apply.

4.29.11 ESTUARY PROTECTION ACT OF 1968

No designated estuary would be affected by project activities. This act is not applicable.

4.29.12 FEDERAL WATER PROJECT RECREATION ACT

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, have been fulfilled by complying with the recreation cost sharing criteria as

outlined in Section 2 (a), paragraph (2). Another area of compliance includes the public beach access requirement on which the renourishment project hinges (Section 1, (b)).

4.29.13 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The project shall be coordinated with the State and shall be in compliance with the act.

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

There are no designated coastal barrier resources in the project area that would be affected by this project. These acts are not applicable.

4.29.15 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The project is in full compliance.

4.29.16 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species would not be affected. The project shall be coordinated with the National Marine Fisheries Service and is in compliance with the act.

4.29.17 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

Protective measures shall be implemented so that no migratory birds would be affected by project activities. The project shall be in compliance with these acts.

4.29.18 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (33 U.S.C. 1402) (f) does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than disposal (i.e. placement of rock material as an artificial reef or the construction of artificial reefs as mitigation). Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this EA have been evaluated under Section 404 of the Clean Water Act.

4.29.19 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

An Essential Fish Habitat Assessment on placement of sand from Canaveral Shoals onto the Mid-Reach Beach has been submitted to the National Marine Fisheries Service (NMFS). The use of upland quarries as an additional source of sand shall also be coordinated with NMFS. The NMFS stated by letter dated March 30, 2016 that "the NMFS agrees EFH impacts from using quarry sand are within the scope of those evaluated in the GRR/SEIS. Further, the NMFS encourages use of quarry sand in lieu of sand from Canaveral Shoals to the extent feasible provided the quarry sand is compatible with the native beach."

4.29.20 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970.

The purpose of PL 91-646 is to ensure that owners of real property to be acquired for Federal and Federally assisted projects are treated fairly and consistently and that persons displaced as a direct result of such acquisition will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. The proposed work should not involve real property acquisition and/or displacement of property owners or tenants. This act does not apply.

4.29.21 E.O. 11990, PROTECTION OF WETLANDS

In the event that jurisdictional wetlands are identified within the footprint, or adjacent to, proposed new or expanded quarries, then protective measures shall be implemented and, if necessary, mitigation performed to offset impacts. This project shall be in compliance with the goals of this Executive Order.

4.29.22 E.O. 11988, FLOOD PLAIN MANAGEMENT

The project is in the base flood plain (100-year flood) and has been evaluated in accordance with this Executive Order. Project is in compliance.

4.29.23 E.O. 12898, ENVIRONMENTAL JUSTICE

The District has determined that there are no minority or low-income populations present in the project area, therefore, the proposed work would not result in adverse impacts to any populations specified in E.O. 12898. Additionally, the proposed project would not result in adverse human health or environmental effects, nor would the activity impact subsistence consumption of fish and wildlife within the region. The project is in compliance with this executive order.

4.29.24 E.O. 13089, CORAL REEF PROTECTION

The EO refers to "those species, habitats, and other natural resources associated with coral reefs." There are no coral reefs in the project area. This EO does not apply.

4.29.25 E.O. 13112, INVASIVE SPECIES

The proposed activity does not include actions that would introduce invasive species.

4.29.26 E.O. 13186, MIGRATORY BIRDS.

This Executive Order requires, among other things, a Memorandum of Understanding (MOU) between the Federal Agency and the U.S. Fish and Wildlife Service concerning migratory birds. Neither the Department of Defense MOU nor the USACE' Draft MOU clearly address migratory birds on lands not owned or controlled by the USACE. For many USACE civil works projects, the real estate interests are provided by the non-Federal sponsor. Control and ownership of the project lands remain with a non-Federal interest. Measures to avoid the destruction of migratory birds and their eggs or hatchlings shall be implemented.

4.30 PUBLIC INTEREST FACTORS.

Factors were considered in determining whether a regulatory permit for this action would be in the public interest (33 CFR 325.3(C)). While the USACE does not issue itself a permit under the Clean Water Act or the Ocean Dumping Act, the USACE is required to apply “the same criteria, procedures, and requirements which apply to the issuance of permits” (33 CFR 335.2 and ER 1105-2-100 Appendix C, part C-6). The proposed action, on balance, would not be contrary to the public interest.

5 LIST OF PREPARERS

5.1 PREPARERS

Preparer	Discipline	Role
Paul Stodola, U.S. Army Corps of Engineers	Biologist	Principal Author
Daniel Hughes, U.S. Army Corps of Engineers	Archaeologist	Cultural Resources

5.2 REVIEWERS

This Environmental Assessment was reviewed by the USACE Jacksonville District supervisory chain of the Environmental Branch and Planning Division as well as Project Management of the USACE, and Office of Counsel Jacksonville District.

6 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers Regulation, a scoping letter dated February 11, 2015 was issued for this proposed action. Also, a Notice of Availability (NOA) dated March 4, 2016 of the draft EA and draft Finding of No Significant Impact (FONSI) was sent to interested stakeholders (see scoping letter and NOA in Appendix C).

6.2 AGENCY COORDINATION

Coordination has been conducted with appropriate agencies and is described in this document. Agency coordination letters and documents can be found in Appendix D.

6.3 COMMENTS RECEIVED AND RESPONSE

Comments received in response to the scoping letter and NOA are summarized below. All comment letters or emails received can be found in Appendices C or D.

Public Comments

- Several different comments were expressed regarding the use of upland quarries as an additional source of sand to nourish the Mid-Reach Beach, including the following:
 - Support for the use of quarried sand;
 - Quarried sand should be used but only if it is compatible with beach sand;
 - The use of sand from quarries should not be used as a substitute for sand from Canaveral Shoals, sand from the shoals would be more compatible.

RESPONSE: Quarried sand would be required to meet State and Federal (acceptance) criteria before being placed on the Mid-Reach Beach. Please refer to Sections 4.2.1 and 4.3.1.1 of this document for more information.

- Concerns were expressed regarding on-going beach erosion and the schedule for placing sand on the Mid-Reach Beach.

RESPONSE: The Mid-Reach Project has been Congressionally authorized, however, Federal construction funds have not been appropriated. Based on the current budget cycle, the earliest Federal construction funds could be appropriated in a bill is Fiscal Year 2017. On the other hand, State and/or local funds could be advanced for construction in Fiscal Year 2016. Also, the use of quarries as additional sources of sand would provide greater flexibility in nourishing the Mid-Reach Beach. Please refer to Section 2.1 of this document for more information.

- Placement of sand on the Mid-Reach Beach would be a temporary protective measure and would cause harm to beach flora and fauna as well as the hardbottom (rock) resource. This project should not be undertaken. Other alternatives (i.e. purchase of the most vulnerable properties) should be considered.

RESPONSE: The authorized plan consists of a 10-foot extension of the mean high water line plus advanced nourishment to maintain that design fill volume in Reach 1 (R-119 to R-109), a 20-foot extension of the mean high water line plus advanced nourishment to maintain that design fill volume in Reaches 2 and 3 (R-109 to R-99), a 10-foot extension of the mean high water line plus advanced nourishment to maintain that design fill volume in Reaches 4 and 5 (R-99 to R-83), and a dune fill consisting of advanced nourishment in Reach 6 (R-83 to R-75.4). The source of sand would be Canaveral Shoals or upland quarries. This plan would provide the greatest net benefits and all environmental coordination has been previously completed. Impacts to the rock resource would be mitigated. Additional information on the plan formulation process, including the array of alternatives considered, can be found in Chapter 5 of the *Final Integrated General Reevaluation Report and Supplemental Environmental Impact Statement, Brevard County, Florida, Mid-Reach Segment, Hurricane and Storm Damage Reduction Project (2011, revised 2014)*. This report can be accessed at the following website:

<http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#Brevard>

- The Mid-Reach Project is unnecessary as the mean high water (MHW) line in this area is already moving seaward. The Florida Department of Environmental Protection states “based on approximately 30 years of Department’s MHW shoreline position data between 1978 and 2010, the average historical shoreline change rate in this area is computed to be approximately +0.25 feet per year. Hence, the ranking score for severity of erosion is zero points.” The North and South Reach Projects act as feeder beaches for the Mid-Reach.

RESPONSE: According to the report entitled “Critically Eroded Beaches in Florida,” prepared in 2015 by the Division of Water Resource Management, Florida Department of Environmental Protection, the portion of the Brevard County coastline “from Canaveral Inlet extending 36.5 miles to the south is a long coastal segment (R1-R202) designated as critically eroded.” The Mid-Reach Project area is located between Florida Department of Environmental Protection monuments R-75.4 to R-119. The Department’s report can be accessed by using the following link:

<https://www.dep.state.fl.us/beaches/publications/pdf/CriticalErosionReport.pdf>

- A public meeting should be held to address concerns of this ill-conceived project.

RESPONSE: The Mid-Reach Project has been Congressionally authorized. Therefore, another public meeting to discuss this project will not be scheduled.

University of Central Florida

- Use of beach-appropriate quarry sand is not likely to have a significantly different impact on sea turtle nesting or reproductive success compared to offshore sand, assuming compaction levels are appropriate.

RESPONSE: Comment noted.

State Historic Preservation Officer

- If the quarries need to be established or expanded, effects to historic properties must be considered as part of the Corps' responsibilities under Section 106 of the National Historic Preservation Act of 1966.

RESPONSE: Concur. If necessary, a Cultural Resources Assessment Survey shall be performed.

National Marine Fisheries Service

- The NMFS agrees EFH impacts from using quarry sand are within the scope of those evaluated in the GRR/SEIS. Further, the NMFS encourages use of quarry sand in lieu of sand from Canaveral Shoals to the extent feasible provided the quarry sand is compatible with the native beach.

RESPONSE: Comment noted.

US Environmental Protection Agency

- On page 10, Section 2.1, USACE states, "It would be cost prohibitive to nourish only the Mid-Reach Beach with sand from the shoals." The USACE does not provide any economic justification as to why this would be cost prohibitive and this paragraph lacks significant explanation as to why this option would be too expensive. RECOMMENDATION: The EPA recommends the USACE better explain and provide more detail regarding the reasons why this would be cost prohibitive.

RESPONSE: Nourishment of the Mid-Reach Beach with sand from Canaveral Shoals would only occur when nourishment of the North or South Reach Beaches was also scheduled. Combining these projects would result in

significant savings; specifically, dredge mobilization costs would prohibit nourishing only the Mid-Reach Beach.

- Page 14 (Water Quality entry): The USACE states, “All work would be performed in compliance with the State permit.” However, the USACE does not adequately explain what type of permit it refers to (NPDES or 401 certification, etc).
RECOMMENDATION: The EPA recommends the USACE precisely describe the type of permit they are refer to in Table 1.

RESPONSE: The State permit referred to in Table 1 is in reference to the State Permit (pursuant to Section 401 of the Clean Water Act). An NPDES permit for this type of activity would not be appropriate.

- Page 15 (Native American entry): The USACE states, “There are no lands belonging to Native Americans in the project area.” The EPA understands that Alternative B might not impact Native American owned lands; however, the expansion of existing quarries might lead to impacts to Native American resources such as artifacts or burial grounds. Depending on the situation, the Native American Graves Protection and Repatriation Act (NAGPRA) might apply and the USACE should better describe how this alternative might apply to NAGPRA. RECOMMENDATION: The EPA recommends the USACE consider impacts to NAGPRA resources and other potential impacts to Native American resources.

RESPONSE: NAGPRA resources and other potential impacts to Native American resources would be considered. Also, if necessary, a cultural resource survey would be performed in the event that new quarries were proposed or existing quarries expanded.

- On page 29, Section 4.5.3, the USACE states, “The authorized project would be built in accordance with the EFH conservation recommendations provided by the NMFS.” The USACE does not provide a discussion regarding these EFH recommendations nor provide a citation of these recommendations.
RECOMMENDATION: The EPA recommends the USACE briefly discuss these EFH recommendations or at least provide a citation or cross reference to other parts of the draft EA.

RESPONSE: As previously stated, the NMFS stated that EFH impacts from using quarry sand are within the scope of those evaluated in the GRR/SEIS. Further, the NMFS encourages use of quarry sand in lieu of sand from Canaveral Shoals to the extent feasible provided the quarry sand is compatible with the native beach.

- The EPA notes that there is no Climate Change section within Chapter 4 (Environmental Effects). *Executive Order (EO) 13653-Preparing the United States for the Impacts of Climate Change* (Nov 6, 2013) directs Federal agencies to develop climate resiliency and adaption plans. In response to this EO, the USACE developed the *Climate Change Adaption Plan* (June 2014), which discusses the USACE's climate resiliency and adaptation strategy. Also, the *Engineering Technical Letter (ETL) 1100-2-1: Procedures to Evaluate Sea Level Change: Impacts, Responses and Adaptation* (June 30, 2014) outlines the USACE's procedures for evaluating climate change impacts and adaption measures throughout the USACE's SMART planning process; however, the USACE makes no mention of this guidance or its applicability to this project. RECOMMENDATION: The EPA recommends the USACE consider following ETL 1100-2-1 guidance and evaluate the project's potential climate resiliency and adaption measures. The EPA also recommends the USACE consider disclosing this information within the EA.

RESPONSE: Consideration of ETL 100-2-1 was previously described in the GRR/EIS. This EA tiers off of this document.

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APPENDIX A - SECTION 404(B) EVALUATION

**SECTION 404(b) EVALUATION
ENVIRONMENTAL ASESMENT
ON
PROPOSED USE OF UPLAND QUARRIES AS AN ADDITIONAL SOURCE OF SAND
HURRICANE AND STORM DAMAGE REDUCTION PROJECT, MID-REACH
SEGMENT
BREVARD COUNTY, FLORIDA**

I. Project Description

- a. Location. The proposed work will be performed along the Atlantic Ocean shoreline of Brevard County, Florida. Project locations specifically include upland quarries, truck hauling routes (to the Mid-Reach Beach), and placement of quarried sand along 7.8 miles of shoreline between Patrick Air Force Base and Indialantic, between FDEP reference monument locations R75.4 and R119. See Figure 1 in the main text.
- b. General Description. The project includes the following principal activities. Beach-quality sand will be excavated from existing, new, or expanded upland quarries. The excavated sand will then be truck hauled to the Mid-Reach Beach where it will be placed and graded to the desired berm width and height using construction equipment. The anticipated renourishment requirement for the fill placement is in approximately three year intervals after initial construction. Placement of sand fill will be in the form of dune restoration and maintenance along the northern 1.4 miles of the Mid Reach shoreline ("Reach 6") and dune- and beach-face fill along the southern 6.2 miles of Mid Reach shoreline ("Reaches 1 through 5"). The latter will widen the beach by between 10 and 30 feet, depending upon location.
- c. Authority. A general re-evaluation report for Brevard County, Florida was authorized by the Water Resources Development Act (WRDA) of 2000, which stated

SEC. 418 BREVARD COUNTY, FLORIDA

"The Secretary shall prepare a general reevaluation report on the project for shoreline protection, Brevard County, Florida, authorized by section 101(b)(7) of the Water Resources Development Act of 1996 (110 Stat. 3667), to determine, if the project were modified to direct the Secretary to incorporate in the project any or all of the 7.1 mile reach of the project that was deleted from the south reach of the project, as described in paragraph (5) of the Report of the Chief of Engineers, dated December 23, 1996, whether the project as modified would be technically sound, environmentally acceptable, and economically justified."

Additional language concerning the Mid-Reach was included in the Water Resources Development Act of 2007, as follows.

SEC. 3045. BREVARD COUNTY, FLORIDA.

"(a) SHORELINE.—The project for shoreline protection, Brevard County, Florida, authorized by section 101(b)(7) of the Water Resources Development Act of 1996 (110 Stat. 3667), is modified to authorize the Secretary to include the mid-reach as an element of the project from the Florida department of environmental protection monuments R-75.4 to R-118.3, a distance of approximately 7.6 miles. The restoration work shall only be undertaken upon a determination by the Secretary, following completion of the general reevaluation report (GRR) authorized by section 418 of the Water Resources Development Act of 2000 (114 Stat. 2637), that the shoreline protection is feasible."

In response to section 418 of the WRDA of 2000 and section 3045 of WRDA 2007, the USACE prepared the GRR as well as a Supplemental Environmental Impact Statement (SEIS) for the proposed Mid-Reach Project. The GRR/SEIS, dated August 2010, (revised April 2011) and Addendum (April 2014) presented the results of this shoreline protection study. Based on the review of the GRR/SEIS and Addendum, it was determined (September 2014) that construction of the Mid-Reach Project is feasible, thus it is now Congressionally authorized pursuant to section 3045 of the WRDA of 2007.

d. General Description of Fill Material.

- (1) General Characteristics of Material. Quarried sand will be required to meet State and Federal (acceptance) criteria. The proposed criteria can be reviewed in Sections 4.2.1 and 4.3.1.1 of this document.
- (2) Quantity of Material. The total project requirement for the proposed beach fill activity along the Mid Reach is estimated to be about 3.2 million cubic yards, of which up to about 580,000 cubic yards is to be placed for initial construction.
- (3) Source of Material. Sand will be excavated from existing, new, or expanded upland quarries.

e. Description of the Proposed Discharge Site.

- (1) Location. Quarried sand will be transported by truck-haul to the Mid-Reach Beach, and placed as dune and/or beach-face fill along the 7.8-mile Atlantic Ocean shoreline of the Mid Reach, between FDEP reference monuments R75.4 (south end of Patrick AFB) and R119 (north end of existing Brevard County Shore Protection Project, South Reach).
- (2) Size. The total project beach fill area comprises 7.8 miles of shoreline.
- (3) Type of Site. Placement (truck-haul placement) of the sand will occur on segments of eroded, sandy, recreational beach with naturally occurring

rock hardbottom that are variously exposed along and seaward of the low water shoreline.

(4) Type of Habitat. The beach fill disposal site is a supratidal dry beach and high energy intertidal environment.

(5) Timing and Duration of Discharge. The exact timing of initial construction is not known. It is anticipated that construction will take approximately 12 to 24 months to complete. Placement of sand to the beach project area will be limited to November 1 through April 30, with special conditions for environmental protection implemented for construction from March 1 through April 30, and from November 1 through 30 (early and late marine turtle nesting season, respectively).

f. Description of Disposal Method. Sand will be excavated from quarries, transported to the Mid-Reach Beach and placed and graded along the beach project area by truck-haul and other mechanical grading equipment.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. Details will be available with the final design.

(2) Sediment Type. Quarried sand will be required to meet criteria described in Sections 4.2.1 and 4.3.1.1 of this document.

(3) Dredge/Fill Material Movement. The fill material will be subject to cross-shore erosion by waves with alongshore movement to both the north and south, and with principal net movement of fill material to the south.

(4) Physical Effects on Benthos. The placement of sand on the beach face will result in the burial and loss of most of the beach infauna. Key components of these assemblages are surf clams and sand fleas. With adequate recruitment, surf zone infauna including surf clams and sand fleas should recover within one year after completion of construction if the sedimentary characteristics of the restored beach are adequate and as described above and indicated by prior analogous use of the proposed borrow area sediments.

b. Water Circulation, Fluctuation and Salinity Determination.

- (1) Water Column Effects. Fill placement will not have long-term or significant impacts, if any, on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication.
- (2) Current Patterns and Circulation. Currents in the project area are both tidal and longshore. Net movement of water due to the longshore current is typically from the north to the south.
- (3) Normal Water Level Fluctuations and Salinity Gradients. Tides in the project area are semi-diurnal. Elevations of mean high water and mean low water tidal datum in Brevard County are approximately 2 feet above and 1.9 feet below the NGVD'29 vertical datum.

c. Suspended Particulate/Turbidity Determinations.

- (1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. There will be a potential temporary increase in turbidity levels in the waters adjacent to the Mid Reach project area shoreline during mechanical placement of the sediment to the beach face. Turbidity will be short-term and localized and no significant adverse impacts are expected. State standards for turbidity should not be exceeded during construction.
- (2) Effects on the Chemical and Physical Properties of the Water Column.
 - (a) Light Penetration. The placement and spread of fill on the beach will increase turbidity in the nearshore area during construction. Because the immediate nearshore area is a high wave energy system and subject to naturally occurring elevated turbidity and sediment, increases due to project construction should not be significant. A nearshore turbidity monitoring program with a plume mixing zone of 150 meters from the placement sites will be implemented during construction. Turbidity will be monitored during construction, and State standards for turbidity should not be exceeded. A nearshore monitoring program will be implemented to assess the potential secondary impacts of sedimentation and turbidity to nearshore hardbottom communities adjacent to the equilibrium toe of fill.
 - (b) Dissolved Oxygen. Dissolved oxygen levels will not be altered by this project.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens will be released by the project.

(d) Aesthetics. Aesthetic quality will be reduced during that period when work is occurring. There will be a long term increase in aesthetic quality of the beach once the work is completed.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. The level of suspended particles will temporarily increase in the surf zone during construction. Suspended material will prevent light from reaching existing algae temporarily restricting photosynthesis and primary productivity in local areas. Potential secondary impacts of chronic turbidity and sedimentation will be assessed for the nearshore hardbottom communities during the post-construction monitoring.

(b) Suspension/Filter Feeders. Suspension feeders will experience short-term impacts during construction, but no long-term adverse impact.

(c) Sight Feeders. Visual feeders will experience short term impacts, but no long-term adverse impact.

(d) Contaminant Determinations. Deposited fill material will not introduce, relocate, or increase contaminants.

(e) Aquatic Ecosystem and Organism Determinations. The grain size characteristics and composition exhibited by the proposed fill material shall be similar to those of the existing beach sediments. Therefore, no sediment related impacts are expected. The proposed fill material meets the exclusion criteria, therefore, no additional chemical-biological testing will be required.

(1) Effects on Plankton. Although short term effects (e.g., clogging of feeding appendages) on plankton are likely, no adverse long term impacts to planktonic organisms are anticipated.

(2) Effects on Benthos. Adverse long-term impacts to non-motile or motile benthic invertebrates on nearshore hardbottom habitat and soft bottom habitat are anticipated. Impacts to hardbottom habitat will be offset by the installation of suitable mitigative (replacement) reef habitat.

- (3) Effects on Nekton. No adverse long-term impacts to nektonic species are anticipated.
- (4) Effects on the Aquatic Food Web. No adverse long-term impacts to any trophic group in the food web are anticipated.
- (5) Effects on Special Aquatic Sites.
 - (a) Coral Reefs. There are no coral reefs located within the placement areas.
 - (b) Sanctuaries and Refuges. There are no sanctuaries or wildlife refuges located within the proposed placement areas.
 - (c) Wetlands. There are no wetlands located within the proposed placement areas.
 - (d) Mud Flats. There are no mud flats located within the proposed placement areas.
 - (e) Vegetated Shallows. There are no seagrass beds located within or adjacent to the beach placement sites.
- (6) Endangered and Threatened Species. There will be no significant impacts on any threatened or endangered species from the proposed project or to designated critical habitat for the loggerhead sea turtle. Sea turtle nesting may occur in the project area during the time that beach placement takes place. If construction occurs during the nesting season, a nest monitoring and relocation program will be implemented as recommended by the USFWS. Protection measures for shorebirds, Florida scrub-jay, gopher tortoise, and indigo snake will be followed to minimize the potential for harm to these species.
- (7) Other Wildlife. No significant adverse impacts to small foraging mammals, reptiles, wading birds, or wildlife in general are expected.
- (8) Actions to Minimize Impacts. All practical safeguards will be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area.

f. Proposed Disposal Site Determinations.

- (1) Mixing Zone Determination. The fill material will not cause unacceptable changes in the mixing zone specified in the Water Quality Certification in relation to: depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents.
- (2) Determination of Compliance with Applicable Water Quality Standards. Because of the inert nature of the fill material, State water quality standards will not be violated. Turbidity monitoring will be implemented as stipulated by State permits.
- (3) Potential Effects on Human Use Characteristics.
 - (a) Municipal and Private Water Supplies. No municipal or private water supplies will be impacted by the implementation of the project.
 - (b) Recreational and Commercial Fisheries. Recreational and commercial fisheries will not be permanently impacted by the placement of quarried material on the beach. Minor or temporary adverse impacts to recreational fishing along the beach fill area may result from impacts to the nearshore hardbottom immediately along the shoreline; however, this may be evident as a seaward translocation of the fishing resource coincident with the addition of beach fill. There may be minor increased, or new, opportunity for recreational fishing associated with the mitigation reef structures constructed along the shoreline.
 - (c) Water Related Recreation. Beach recreation will be enhanced by the nourishment of the beach. Nearshore snorkeling and fishing may be temporarily affected by increased turbidity in the vicinity of fill sites. The presence of construction-related equipment will create public safety risks at the beach sites. The creation of 4.8 acres of nearshore mitigative reef should provide alternate snorkeling/SCUBA habitat accessible from the beach. Adverse impacts to swimming and surfing are not anticipated because of the narrow scale of beach fill to be placed immediately along the beach face, landward of locations where swimming and surfing occur. The presence of the mitigation reefs may result in a minor, but not significant, effect to surfing conditions associated with the structures' slight elevation of the seabed well seaward of the normal zone of wave breaking.

(d) Aesthetics. The stabilization of an eroding beach will improve aesthetics of the beach.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. There are numerous non-Federal beach recreation areas, including parks and facilities, located along the beach fill project area. The proposed activity is anticipated to maintain or improve beach recreation opportunities associated with these parks. There are no other national and historic monuments, national seashores, wilderness areas, research sites and similar preserves located within the project areas.

(f). Determination of Cumulative Effects on the Aquatic Ecosystem. As long as the characteristics (low proportion of fines) of fill material remain consistent with previous projects, there will be no significant cumulative impacts that result in a major impairment of water quality of the existing aquatic ecosystem as a result of placement of fill at the project site. The construction of 4.8 acres of mitigation reef will compensate for anticipated impacts to 3.0 acres of existing nearshore hardbottom along the project area shoreline. Previous monitoring has indicated no net cumulative, adverse effect to the exposure of existing nearshore hardbottom along or adjacent to prior beach nourishment activities conducted since at least 2005. No cumulative impacts to turtles, fish or wildlife have been documented.

(g). Determination of Secondary Effects on the Aquatic Ecosystem. No adverse secondary effects of the placement of the fill material are anticipated. Long-term monitoring will document potential secondary impacts of turbidity and sedimentation upon adjacent hardbottom habitats.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

- a. No significant adaptations of the guidelines were made relative to this evaluation.
- b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the State of Florida and/or United States.
- c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
- d. The Mid Reach Project will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.
- e. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

On the basis of the guidelines, the proposed placement site for the discharge of quarried sand is specified as complying with the requirements of these guidelines.

APPENDIX B - COASTAL ZONE MANAGEMENT CONSISTENCY

**FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES**

**PROPOSED USE OF UPLAND QUARRIES AS AN ADDITIONAL SOURCE
OF SAND
HURRICANE AND STORM DAMAGE REDUCTION PROJECT, MID-REACH
SEGMENT
BREVARD COUNTY, FLORIDA**

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information have been submitted to the State in compliance with this chapter.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan which sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project have been coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves the placement of beach compatible material onto an eroding beach as a protective means for residents, development, and infrastructure located along the Atlantic shoreline within Brevard County. Therefore, this project would be consistent with the efforts of Division of Emergency Management. Appropriate mitigation for unavoidable impacts to nearshore hardbottom habitat has been proposed.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands;

mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed beach nourishment would create increased recreational beach and potential sea turtle nesting habitat. No seagrass beds; mineral resources; unique natural features; spoil islands; and artificial reefs are expected to occur within or adjacent to the areas proposed for quarrying, beach fill placement, or mitigation. In the event that the proposed work results in the creation or expansion of upland quarries, then appropriate surveys for resources such as, but not necessarily limited to, wetlands shall be undertaken. Appropriate protective measures and, if necessary, mitigation shall be implemented. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: No land acquisition is proposed in this project.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: There are no state parks or preserves that are expected to occur within or along the project area.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: No significant impacts to historical properties are expected from construction of the proposed project based upon the results of site investigations and this coordination. In the event that the proposed work results in the creation or expansion of upland quarries, then appropriate surveys for potential cultural resources shall be undertaken. Appropriate protective measures and, if necessary, mitigation shall be implemented.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed beach nourishment would provide more space for recreation and the protection of recreational facilities along the receiving beach. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Public Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed project is expected to impact approximately 3 acres of nearshore hardground by the placement, and subsequent movement, of sand fill along the existing beach. These impacts are expected to be located along the southern 6.4 miles of the 7.6-mile long Mid Reach shoreline. The anticipated impact area (3 acres) represents approximately 7% of the total area of exposed hardgrounds comprising about 31.3 acres along the Mid-Reach and an additional, adjacent 11.2 acres along the southern mile of the Patrick Air Force Base shoreline. Adverse impacts to saltwater living resources shall result along that portion of the existing hardgrounds that are impacted (i.e., by burial or sedimentation) by the project. The habitat and biota along the existing nearshore hardgrounds are characterized by an area of naturally high turbidity, sedimentation, and large temporal variations in rock exposure and burial. The impacts from the proposed project are anticipated to occur mainly along the inshore (landward) portion of the hardgrounds which typically features the greatest natural degree of sedimentation. Impacts from the project are anticipated to be temporal; i.e., decreasing from about 3 acres to less than 2 acres between beach renourishment events, anticipated to occur in approximately 3-year cycles.

The project formulation has sought to avoid, minimize and mitigate impacts to the nearshore hardbottom and associated saltwater living resources. To compensate for the estimated 3-acres of impacts to the nearshore rock hard grounds, the project will construct approximately 4.8 acres of mitigation reef along the project area. The mitigation reef will consist of articulated concrete mats with coquina-rock surface, intended to emulate the physical relief and surface of the naturally occurring rock hardgrounds. The reef structures will be constructed in approximately 15 ft water depth, about 1000-feet from the Mid Reach shoreline. The placement depth of the reef was established as far landward (in shallow water) as concluded to be possible in view of practical, physical limitations. Observations and measurements on pilot-project reef structures, placed in the same water depths and locations proposed for the mitigation structures, indicate that the mitigation reef is reasonably expected to foster recruitment and coverage of algae, worm-rock and other epifauna that is similar to that of the impacted nearshore rock. Overall, it is estimated that the mitigation reefs should restore about 75% of the lost ecological functions across that portion of the hard grounds that

will be impacted. Multi-year biological and physical monitoring shall be conducted to assess impacts to hard ground and performance of the mitigation reef relative to project expectations.

The beach fill material (sediment) proposed for the project is quarried sand. Quarried sand used to rebuild dunes along the beach has demonstrated suitability for marine turtle nesting and hatching success. Prior use of quarried sand has not resulted in turbidity levels that approach or exceed State water quality standards. Placement of the fill material to the beach project area shall be by mechanical (truck-haul) means. There are no pipelines, anchors or other physical structures to be placed along the nearshore hardgrounds during construction. This shall further minimize the effects of turbidity and/or direct mechanical impacts to the existing nearshore hardgrounds and associated saltwater living resources.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project is expected to have no significant effect on freshwater aquatic life or wild animal life. In the event that the proposed work results in the creation or expansion of upland quarries, then appropriate surveys for freshwater resources (i.e. wetlands) shall be undertaken. Appropriate protective measures and, if necessary, mitigation shall be implemented.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development.

Response: The proposed renourishment project will not have any regional impact on resources in the area. Therefore, the project is consistent with the goals of this chapter.

16. Chapter 388, Arthropod Control. This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. Coordination with the Florida Department of Environmental Protection shall occur prior to construction. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not expected to occur near or on agricultural lands; therefore, this chapter does not apply.

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