ST. JOHNS COUNTY, FLORIDA SOUTH PONTE VEDRA BEACH, VILANO BEACH, AND SUMMER HAVEN REACHES COASTAL STORM RISK MANAGEMENT PROJECT FINAL INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, DEPARTMENT OF DEFENSE

TRANSMITTING

THE CORPS' REPORT ON ST. JOHNS COUNTY, FLORIDA SOUTH PONTE VEDRA BEACH, VILANO BEACH, AND SUMMER HAVEN REACHES COASTAL STORM RISK MANAGEMENT PROJECT FINAL INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT FOR MARCH 2017



JULY 27, 2018.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

---

U.S. GOVERNMENT PUBLISHING OFFICE

30–906 WASHINGTON : 2018

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

HOUSE DOCUMENT NUMBER 115-143

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

MAR 22 2018

Honorable Paul Ryan
Speaker of the House of Representatives
U.S. Capitol Building, Room H-232
Washington, DC 20515-0001

Dear Mr. Speaker:

In response to House Resolution 2646, adopted June 21, 2000 by the Committee on Transportation and Infrastructure of the United States House of Representatives, the Secretary of the Army supports the authorization and construction of a coastal storm risk management project for St Johns County, Florida. The proposal is described in the report of the Chief of Engineers, dated August 8, 2017, which includes other pertinent documents. The Secretary of the Army plans to implement the project at the appropriate time, considering National priorities and the availability of funds.

The project study was conducted to analyze and formulate plans for reducing coastal storm damages along the shoreline of St Johns County, Florida. The recommended plan is the National Economic Development plan and includes the following elements:

a) Construction of a 60-foot berm extension along 2.6 miles of shoreline with a dune feature that reflects the average 2015 dune position.

b) Periodic nourishments planned at 12 year intervals.

Based on October 2017 (FY 2018) price levels, the total nourishment cost is estimated to be $80,551,000, which includes the project first cost of initial construction of $25,524,000 and a total of three periodic nourishments at a total cost of $55,026,000. The Federal share of the initial construction would be $5,871,000, and the non-Federal share would be $19,653,000, which equates to 23 percent Federal and 77 percent non-Federal. The Federal share of the periodic nourishments would be $9,740,000, and the non-Federal share would be $45,286,000, which equates to 17.7 percent Federal and 82.3 percent non-Federal. The costs of lands, easements, rights-of-way, relocations and dredged or excavated material disposal areas are estimated at $987,000.

Based on FY 2018 price levels, a discount rate of 2.75 percent, and a 50-year period of economic analysis, the total equivalent average annual costs of the project are estimated to be $2,065,000, including operation, maintenance, repair, replacement and rehabilitation (OMRR&R). St. Johns County would be the non-Federal sponsor responsible for OMRR&R of the project after construction, at an estimated average annual cost of $35,000. The recommended plan would reduce average annual coastal

storm damages by about $1,954,000. The equivalent average annual benefits, which include incidental recreation, are estimated to be $2,669,000 with net average annual benefits of $604,000.The benefit-to-cost ratio is 1.3 to 1.

An Environmental Assessment and a Finding of No Significant Impact was prepared in accordance with the National Environmental Policy Act. All practicable means to avoid and minimize adverse environmental effects have been incorporated into the recommended plan. The Corps will take additional measures to minimize effects to threatened and endangered sea turtles in accordance with the US Fish and Wildlife Service Biological Opinion. The recommended plan will not adversely modify designated critical habitat, and will have beneficial effects to protected species habitat within the project area. Therefore, no compensatory mitigation is required.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress. However, OMB indicated that the project is not consistent with the policy and programs of the President and also noted that the project would need to compete with with other proposed investments for funding in future budgets. A copy of OMB's letter, dated February 28, 2018, is enclosed. I am providing a copy of this transmittal and the OMB letter to the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure, and the Subcommittee on Energy and Water Development of the House Committee on Appropriations. I am also providing an identical letter to the President of the Senate.

R.D. James
Assistant Secretary of the Army
(Civil Works)

Enclosures

1. Report of the Chief of Engineers, August 8, 2017
2. OMB Clearance Letter, February 28, 2018
3. Feasibility Report and Environmental Assessment, March 2017

DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

AUG 08 2017

DAEN

SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management at St. Johns County, Florida. It is accompanied by the report of the district and division engineers. This report is an interim response to House Resolution 2646 adopted June 21, 2000 by the Committee on Transportation and Infrastructure of the United States House of Representatives. The resolution requested the Secretary of the Army, acting through the Chief of Engineers, "*to survey the shores of St. Johns County, Florida, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of hurricane protection, storm damage reduction, beach erosion control, and other related purposes.*" Pre-construction engineering and design activities for the project will continue under the authority cited above.

2. The reporting officers recommend a project that will contribute to economic efficiency for providing coastal storm risk management. Based on an evaluation of alternative plan costs and economic benefits the recommended plan is the National Economic Development (NED) plan. The non-federal sponsor, St. Johns County, supports the NED plan.

a. The recommended plan includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60- foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline.

b. Initial construction will require approximately 1,310,000 cubic yards of sand, and each periodic nourishment event will require approximately 866,000 cubic yards. The periodic nourishment interval is expected to be approximately 12 years, equaling an estimated 3 periodic nourishment events in addition to initial construction over the 50-year period of federal participation.

ENCL 1

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

c. The sand source identified for the project is the St. Augustine Inlet system, located adjacent to the project area to the south. There is approximately 6.5 million cubic yards (MCY) of beach quality sand in the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is approximately 866,000 cubic yards every 12 years. The Florida Department of Environmental Protection's inlet management plan for St. Augustine Inlet states a bypassing objective of 278,000 cubic yards per year of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 MCY would be available to meet the 866,000 cubic yard need for a periodic nourishment event.

d. Native vegetation will be planted on areas of the existing dune disturbed by construction, as well as the newly constructed dune to stabilize the fill. It is assumed that dune planting will only be necessary for initial construction and that vegetation will naturally grow and spread to any areas that are nourished in the future.

e. A portion of the project is located in the Coastal Barrier Resource System (CBRS) unit P04A. In accordance with the Coastal Barrier Resources Act (CBRA), no federal funds will be expended for this portion of the project. The cost share for this area is a non-federal responsibility for both initial construction and periodic nourishment.

3. St. Johns County is the non-federal cost sharing sponsor for all features. Based on Fiscal Year 17 price levels, the estimated total nourishment cost of the NED Plan is $78,417,000, which includes the project first cost of initial construction of $24,834,000 and three periodic nourishments at a total cost of $53,583,000. The three periodic nourishments are estimated to occur at 12-year intervals. Since the final nourishment is estimated to occur at year 36 following initial construction, the estimated cost of periodic nourishments accounts for approximately two years' worth of additional volume being placed during that final nourishment. Cost sharing is applied in accordance with the provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 215 of WRDA 1999, as follows:

a. The federal share of the project first cost for initial construction would be approximately $5,712,000 and the non-federal share would be approximately $19,122,000, which equates to 23 percent federal and 77 percent non-federal. The non-federal costs include the value of lands, easements, rights-of-way, relocations and dredged or excavated material disposal areas (LERRD) estimated to be $943,000.

b. The federal share of future periodic nourishment is estimated to be $9,484,000 and the non-federal share is estimated to be $44,099,000 which equates to 17.7 percent federal and 82.3 percent non-federal.

c. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs are estimated to be $35,000 annually. OMRR&R costs are a 100% non-federal responsibility.

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

4. Based on a 2.875 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $2,031,000. All project costs are allocated to the authorized purpose of coastal storm risk management. The selected plan would reduce average annual coastal storm damages by approximately $1,961,000. The equivalent average annual benefits, inclusive of recreation benefits, are estimated to be $2,653,000 with net average annual benefits of $622,000. The benefit to cost ratio is approximately 1.3 to 1. The project would reduce coastal damages including reduction of damage to a key piece of critical infrastructure, State Road (SR) A1A. In addition to functioning as a hurricane evacuation route, SR A1A also serves as a primary post storm emergency response and recovery route for the area. Thus, protection of A1A could potentially reduce loss of life pre- and post hurricane. The project would also establish at least 3.2 acres of beach habitat that will provide suitable nesting habitat for federally threatened and endangered species such as loggerhead, green, Kemp's ridley, hawksbill, and leatherback sea turtles and piping plover and rufa red knot shorebirds along approximately 3 miles of shoreline.

5. Risk and uncertainty has been explicitly factored into the economic analysis of this project. A statistical risk based model, Beach-fx, was used in this study to formulate and evaluate the project in a life-cycle approach. Beach-fx integrates the engineering and economic analyses and incorporates uncertainty in both physical parameters and environmental forcing, which enables quantification of risk with respect to project evolution and economic costs and benefits of project implementation. The application of Beach-fx in this study is to estimate future without project damages and quantify the damages prevented by various storm damage reduction alternatives for St. Johns County over the 50 year project life. The project is intended to address erosion and prevent damages to structures and infrastructure; it is not intended to, nor will it, reduce the risk to loss of life during major storm events. Loss of life can only be prevented by residents and visitors following the local evacuation plans that are already in place. These residual risks have been communicated to the residents of St. Johns County.

6. In accordance with the Corps Engineering Regulation (ER 1100-2-8162) on sea level change, the study performed a sensitivity analysis to evaluate the effects that different rates of sea level change could have on the recommended plan. The NED plan was formulated using the historical or low rate of sea level change. Beach-fx was used to model the performance of the NED plan for what the ER defines as intermediate and high rates of sea level rise. The benefits of the project increase significantly in the intermediate and high sea level rise scenarios, but the costs also increase. Thus, the project performance (in terms of the benefit-cost ratio) is relatively constant throughout the three scenarios. As both costs and benefits are increasing, the net benefits actually increase with increasing rates of sea-level rise. Overall, these results suggest that the NED plan is both effective and robust in all three simulated sea level rise scenarios. Adaptive management will be used including adjusting the timing of periodic nourishments and project volume requirements based on monitoring reports to compensate for any significant accelerated sea level rise beyond the historical or low rate should it become necessary.

7. In accordance with the Corps Engineering Circular (EC 1165-2-214) on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and

rigorous review process to ensure technical quality. This included District Quality Control review, Agency Technical Review (ATR), Major Subordinate Command (MSC) review and a Corps Headquarters policy and legal review. All concerns of the ATR have been addressed and incorporated into the final report. The requirement to perform Independent External Peer Review was waived by Corps Headquarters since there was no Environmental Impact Statement for the study, it had negligible adverse impacts to the environment and is not controversial. All comments from the above referenced reviews have been addressed and incorporated into the final documents. Overall, the reviews resulted in improvements to the technical quality of the report.

8. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the 1983 U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation studies and complies with other administrative and legislative policies and guidelines. Also the views of interested parties, including federal, state and local agencies have been considered.

9. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce hurricane and storm damages for St. Johns County, Florida is authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of $78,417,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing and other applicable requirements of federal and state laws and policies, including Section 103 of WRDA 1986, as amended by Section 215 of WRDA 1999. The non-federal sponsor would provide the non-federal cost share and all LERRD. Further, the non-federal sponsor would be responsible for all OMRR&R. This recommendation is subject to the non-federal sponsor agreeing to comply with all applicable federal laws and policies.

a. Provide 35% of design and initial construction costs assigned to coastal storm risk management plus 100% of costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of the costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and as further specified below:

1) Provide, during design, 35 percent of design costs;

2) Provide all lands, easements, and rights-of-way, perform or ensure the performance of any relocations, and provide all relocation assistance determined by the federal government to be necessary for the initial construction, periodic nourishment, and operation and maintenance of the project, all in compliance with applicable provisions of the Uniform Relocation and

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 CFR Part 24.;

3) Pay, during construction, any additional amounts necessary to make its contribution equal to 35% of initial project costs assigned to hurricane and storm damage reduction, plus 100% of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. Operate, maintain, and repair the completed project, or functional portion of the project, at no cost to the federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal laws and regulations, and any specific directions prescribed by the federal government;

c. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the projects, except for damages due to the fault or negligence of the United States or its contractors;

d. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

e. Assume, as between the federal government and the non-federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

f. Agree, as between the federal government and the non-federal sponsor, that the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

g. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

h. Inform affected interests, at least annually, of the extent of risk reduction afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of WRDA 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with the project;

i. For shores, other than federal shores, protected using federal funds, ensure continued conditions of public use of such shores compatible with the authorized purpose of the project;

j. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms; and

k. At least annually, and after storm events, perform surveillance of the project, at no cost to the government, to determine losses of material and provide the results of such surveillance to the federal government.

10. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. These recommendations do not reflect program and budgeting priorities inherent in the formulation of the national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the non-federal sponsor, the state, interested federal agencies and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

Proud to Be able to finalize "Chief's Report" on this Critical Project!

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

February 28, 2018

The Honorable R.D. James
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

Dear Mr. James:

As required by Executive Order 12322, the Office of Management and Budget has reviewed a March 2017 Army Corps of Engineers Final Integrated Feasibility Study and Environmental Assessment for a Coastal Storm Management Project in St. Johns County, Florida. The report estimates total nourishment costs of $78,417,000 (October 2016 price level), with project first cost of initial construction of $24,834,000, and total periodic nourishment costs of $53,583,000.

According to the information provided in the report, the benefit-cost ratio of the project is 1.30 to 1 with recreation benefits, and 0.97 to 1 without recreation benefits at a discount rate of 2.875 percent, which is the discount rate the Corps is required to use for FY 2017 under section 80 of the Water Resources Development Act of 1974. The Corps estimates the benefit-cost ratio with recreation benefits is 1.0 to 1 at a seven percent discount rate, which is the discount rate that the Administration uses in the Budget to measure the performance of Corps construction projects whose primary purpose is to provide an economic return to the Nation. Using either discount rate, the Corps is relying on the use of recreation benefits to justify the project's construction. As a matter of Federal investment policy, a Federal flood damage reduction project must have enough flood damage reduction and related benefits to justify its construction on its own, independent of any recreation benefits.

The Office of Management and Budget does not object to you submitting this report to the Congress. However, when you do so, please advise the Congress that the project is not consistent with the policy and programs of the President because its costs exceed its benefits from a National investment perspective. In addition, should the Congress authorize this project for construction, it would need to compete with other proposed investments in future Budgets.

Sincerely,

John Pasquantino
Deputy Associate Director
Energy, Science, and Water

ENCL 2

DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

AUG 08 2017

DAEN

SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management at St. Johns County, Florida. It is accompanied by the report of the district and division engineers. This report is an interim response to House Resolution 2646 adopted June 21, 2000 by the Committee on Transportation and Infrastructure of the United States House of Representatives. The resolution requested the Secretary of the Army, acting through the Chief of Engineers, "*to survey the shores of St. Johns County, Florida, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of hurricane protection, storm damage reduction, beach erosion control, and other related purposes.*" Pre-construction engineering and design activities for the project will continue under the authority cited above.

2. The reporting officers recommend a project that will contribute to economic efficiency for providing coastal storm risk management. Based on an evaluation of alternative plan costs and economic benefits the recommended plan is the National Economic Development (NED) plan. The non-federal sponsor, St. Johns County, supports the NED plan.

a. The recommended plan includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60- foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline.

b. Initial construction will require approximately 1,310,000 cubic yards of sand, and each periodic nourishment event will require approximately 866,000 cubic yards. The periodic nourishment interval is expected to be approximately 12 years, equaling an estimated 3 periodic nourishment events in addition to initial construction over the 50-year period of federal participation.

c. The sand source identified for the project is the St. Augustine Inlet system, located adjacent to the project area to the south. There is approximately 6.5 million cubic yards (MCY) of beach quality sand in the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is approximately 866,000 cubic yards every 12 years. The Florida Department of Environmental Protection's inlet management plan for St. Augustine Inlet states a bypassing objective of 278,000 cubic yards per year of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 MCY would be available to meet the 866,000 cubic yard need for a periodic nourishment event.

d. Native vegetation will be planted on areas of the existing dune disturbed by construction, as well as the newly constructed dune to stabilize the fill. It is assumed that dune planting will only be necessary for initial construction and that vegetation will naturally grow and spread to any areas that are nourished in the future.

e. A portion of the project is located in the Coastal Barrier Resource System (CBRS) unit P04A. In accordance with the Coastal Barrier Resources Act (CBRA), no federal funds will be expended for this portion of the project. The cost share for this area is a non-federal responsibility for both initial construction and periodic nourishment.

3. St. Johns County is the non-federal cost sharing sponsor for all features. Based on Fiscal Year 17 price levels, the estimated total nourishment cost of the NED Plan is $78,417,000, which includes the project first cost of initial construction of $24,834,000 and three periodic nourishments at a total cost of $53,583,000. The three periodic nourishments are estimated to occur at 12-year intervals. Since the final nourishment is estimated to occur at year 36 following initial construction, the estimated cost of periodic nourishments accounts for approximately two years' worth of additional volume being placed during that final nourishment. Cost sharing is applied in accordance with the provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 215 of WRDA 1999, as follows:

a. The federal share of the project first cost for initial construction would be approximately $5,712,000 and the non-federal share would be approximately $19,122,000, which equates to 23 percent federal and 77 percent non-federal. The non-federal costs include the value of lands, easements, rights-of-way, relocations and dredged or excavated material disposal areas (LERRD) estimated to be $943,000.

b. The federal share of future periodic nourishment is estimated to be $9,484,000 and the non-federal share is estimated to be $44,099,000 which equates to 17.7 percent federal and 82.3 percent non-federal.

c. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs are estimated to be $35,000 annually. OMRR&R costs are a 100% non-federal responsibility.

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

4. Based on a 2.875 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $2,031,000. All project costs are allocated to the authorized purpose of coastal storm risk management. The selected plan would reduce average annual coastal storm damages by approximately $1,961,000. The equivalent average annual benefits, inclusive of recreation benefits, are estimated to be $2,653,000 with net average annual benefits of $622,000. The benefit to cost ratio is approximately 1.3 to 1. The project would reduce coastal damages including reduction of damage to a key piece of critical infrastructure, State Road (SR) A1A. In addition to functioning as a hurricane evacuation route, SR A1A also serves as a primary post storm emergency response and recovery route for the area. Thus, protection of A1A could potentially reduce loss of life pre- and post hurricane. The project would also establish at least 3.2 acres of beach habitat that will provide suitable nesting habitat for federally threatened and endangered species such as loggerhead, green, Kemp's ridley, hawksbill, and leatherback sea turtles and piping plover and rufa red knot shorebirds along approximately 3 miles of shoreline.

5. Risk and uncertainty has been explicitly factored into the economic analysis of this project. A statistical risk based model, Beach-fx, was used in this study to formulate and evaluate the project in a life-cycle approach. Beach-fx integrates the engineering and economic analyses and incorporates uncertainty in both physical parameters and environmental forcing, which enables quantification of risk with respect to project evolution and economic costs and benefits of project implementation. The application of Beach-fx in this study is to estimate future without project damages and quantify the damages prevented by various storm damage reduction alternatives for St. Johns County over the 50 year project life. The project is intended to address erosion and prevent damages to structures and infrastructure; it is not intended to, nor will it, reduce the risk to loss of life during major storm events. Loss of life can only be prevented by residents and visitors following the local evacuation plans that are already in place. These residual risks have been communicated to the residents of St. Johns County.

6. In accordance with the Corps Engineering Regulation (ER 1100-2-8162) on sea level change, the study performed a sensitivity analysis to evaluate the effects that different rates of sea level change could have on the recommended plan. The NED plan was formulated using the historical or low rate of sea level change. Beach-fx was used to model the performance of the NED plan for what the ER defines as intermediate and high rates of sea level rise. The benefits of the project increase significantly in the intermediate and high sea level rise scenarios, but the costs also increase. Thus, the project performance (in terms of the benefit-cost ratio) is relatively constant throughout the three scenarios. As both costs and benefits are increasing, the net benefits actually increase with increasing rates of sea-level rise. Overall, these results suggest that the NED plan is both effective and robust in all three simulated sea level rise scenarios. Adaptive management will be used including adjusting the timing of periodic nourishments and project volume requirements based on monitoring reports to compensate for any significant accelerated sea level rise beyond the historical or low rate should it become necessary.

7. In accordance with the Corps Engineering Circular (EC 1165-2-214) on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and

rigorous review process to ensure technical quality. This included District Quality Control review, Agency Technical Review (ATR), Major Subordinate Command (MSC) review and a Corps Headquarters policy and legal review. All concerns of the ATR have been addressed and incorporated into the final report. The requirement to perform Independent External Peer Review was waived by Corps Headquarters since there was no Environmental Impact Statement for the study, it had negligible adverse impacts to the environment and is not controversial. All comments from the above referenced reviews have been addressed and incorporated into the final documents. Overall, the reviews resulted in improvements to the technical quality of the report.

8. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the 1983 U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation studies and complies with other administrative and legislative policies and guidelines. Also the views of interested parties, including federal, state and local agencies have been considered.

9. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce hurricane and storm damages for St. Johns County, Florida is authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of $78,417,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing and other applicable requirements of federal and state laws and policies, including Section 103 of WRDA 1986, as amended by Section 215 of WRDA 1999. The non-federal sponsor would provide the non-federal cost share and all LERRD. Further, the non-federal sponsor would be responsible for all OMRR&R. This recommendation is subject to the non-federal sponsor agreeing to comply with all applicable federal laws and policies.

a. Provide 35% of design and initial construction costs assigned to coastal storm risk management plus 100% of costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of the costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting areas within the CBRS when such costs are not excepted from the CBRA's limitation on federal expenditures and 100% of costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and as further specified below:

1) Provide, during design, 35 percent of design costs;

2) Provide all lands, easements, and rights-of-way, perform or ensure the performance of any relocations, and provide all relocation assistance determined by the federal government to be necessary for the initial construction, periodic nourishment, and operation and maintenance of the project, all in compliance with applicable provisions of the Uniform Relocation and

Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 CFR Part 24.;

3) Pay, during construction, any additional amounts necessary to make its contribution equal to 35% of initial project costs assigned to hurricane and storm damage reduction, plus 100% of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. Operate, maintain, and repair the completed project, or functional portion of the project, at no cost to the federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal laws and regulations, and any specific directions prescribed by the federal government;

c. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the projects, except for damages due to the fault or negligence of the United States or its contractors;

d. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

e. Assume, as between the federal government and the non-federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

f. Agree, as between the federal government and the non-federal sponsor, that the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

DAEN
SUBJECT: St. Johns County, Florida - South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches - Coastal Storm Risk Management Project

g. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

h. Inform affected interests, at least annually, of the extent of risk reduction afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of WRDA 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with the project;

i. For shores, other than federal shores, protected using federal funds, ensure continued conditions of public use of such shores compatible with the authorized purpose of the project;

j. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms; and

k. At least annually, and after storm events, perform surveillance of the project, at no cost to the government, to determine losses of material and provide the results of such surveillance to the federal government.

10. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. These recommendations do not reflect program and budgeting priorities inherent in the formulation of the national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the non-federal sponsor, the state, interested federal agencies and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

PROUD TO BE ABLE TO FINALIZE THE "CHIEF'S REPORT" ON THIS CRITICAL PROJECT.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers

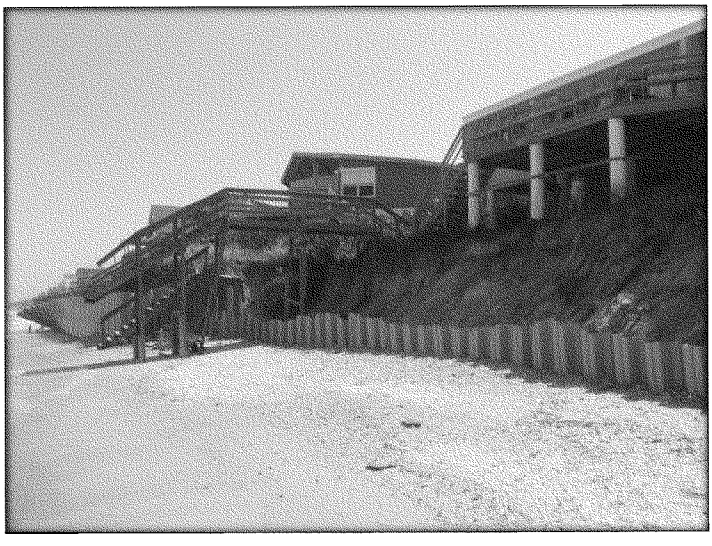
ST. JOHNS COUNTY, FLORIDA

South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches

COASTAL STORM RISK MANAGEMENT PROJECT

FINAL INTEGRATED FEASIBILITY STUDY

AND ENVIRONMENTAL ASSESSMENT



March 2017

ST. JOHNS COUNTY, FLORIDA
South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches
Coastal Storm Risk Management Project

RESPONSIBLE AGENCY: U.S. Army Corps of Engineers, Jacksonville District

Using this Document

Report Reference Materials: To ease navigation through the report, a fold-out map (Figure 1-1) has been provided at the end of the report to be used while reading the document to serve as a reference with key points and landmarks.

Organization of this report follows Exhibit G-7 (Feasibility Report Content) provided in Appendix G of ER 1105-2-100 (30 June 2004), documenting the iterative **U.S. Army Corps of Engineers (USACE) Plan Formulation Process.** The planning process consists of six major steps:

(1) Specification of problems and opportunities

(2) Inventory, forecast, and analysis of existing conditions within the study area

(3) Formulation of alternative plans

(4) Evaluation of the effects of the alternative plans

(5) Comparison of the alternative plans

(6) Selection of the Recommended Plan based upon the comparison of the alternative plans

Steps may be repeated as problems become better understood and new information becomes available.

Steps 1 and 2 are discussed in **Chapters 1-2**, and provide the foundation for developing alternative plans and selection of a Recommended Plan outlined in **Chapter 3**.

Each chapter, summary graphic, as well as the executive summary describes plan development as it progresses through the integrated environments that shape a Coastal Storm Risk Management (CSRM) project: the **physical environment** (currents, tides, sea level rise, etc.) and the **economic environment** (infrastructure and its vulnerability to damages). Concerns relative to plan formulation and National Environmental Policy Act (NEPA) review are summarized and encapsulated in the discussions of these environments.

The recommended format of an **Environmental Assessment (EA)** is provided in 40 CFR 1502.10 and has been integrated into this Feasibility Report.

Note that sections pertinent to the NEPA analysis are denoted with an asterisk.

TABLE OF CONTENTS

* Items required for an Environmental Assessment by the National Environmental Policy Act

1 INTRODUCTION* **1-1**

1.1 FEDERAL PROJECT PURPOSE* 1-1

1.2 STUDY BACKGROUND AND LOCATION* 1-1

1.3 STUDY SPONSOR 1-6

1.4 STUDY PURPOSE AND NEED* 1-6

1.5 STUDY AUTHORITIES* 1-7

1.6 RELATED DOCUMENTS* 1-8

1.6.1 RELATED USACE STUDIES 1-8
1.6.2 RELATED NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) STUDIES 1-10
1.6.3 PRIOR NON-FEDERAL STUDIES 1-11
1.7 FEDERAL PROJECTS NEAR STUDY AREA 1-12

2 EXISTING AND FUTURE WITHOUT-PROJECT CONDITIONS **2-1**

2.1 GENERAL SETTING* 2-1

2.2 PHYSICAL ENVIRONMENT (CONDITIONS)* 2-2

2.2.1 STUDY REACHES 2-2
2.2.2 HURRICANE EVACUATION ROUTES 2-9
2.2.3 GEOLOGY 2-10
2.2.4 NATIVE BEACH 2-11
2.2.5 SAND SOURCES 2-11
2.2.6 SHORELINE CHANGE AND EROSION RATES 2-12
2.2.7 WINDS 2-13
2.2.8 WAVES 2-13
2.2.9 ASTRONOMICAL TIDES 2-14
2.2.10 CURRENTS 2-16
2.2.11 STORM EFFECTS 2-16
2.2.12 STORM SURGE 2-18
2.2.13 SEA LEVEL CHANGE 2-19
2.2.14 EFFECTS OF OTHER COASTAL STORM RISK MANAGEMENT (CSRM) AND NAVIGATION PROJECTS 2-28
2.2.15 PUBLIC ACCESS AND PARKING 2-29
2.3 NATURAL (GENERAL) ENVIRONMENT* 2-31

2.3.1 VEGETATION 2-31
2.3.2 FISH AND WILDLIFE RESOURCES (OTHER THAN THREATENED AND ENDANGERED SPECIES) 2-31

2.3.3 THREATENED AND ENDANGERED SPECIES 2-32
2.3.4 ESSENTIAL FISH HABITAT (EFH) 2-40
2.3.5 COASTAL BARRIER RESOURCES 2-47
2.3.6 WATER QUALITY 2-49
2.3.7 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE 2-50
2.3.8 AIR QUALITY 2-51
2.3.9 NOISE 2-51
2.3.10 AESTHETIC RESOURCES 2-51
2.3.11 RECREATION RESOURCES 2-52
2.3.12 NAVIGATION 2-52
2.3.13 CULTURAL RESOURCES AND HISTORIC PROPERTIES 2-53
2.3.14 NATIVE AMERICANS 2-55
2.4 ECONOMIC ENVIRONMENT 2-56
2.4.1 DAMAGE ELEMENTS - STRUCTURE & CONTENTS VALUE 2-56
2.4.2 STRUCTURE INVENTORY 2-57
2.4.3 BEACH-FX MODEL SET-UP 2-59
2.4.4 BEACH-FX MODEL ASSUMPTIONS 2-59
2.4.5 BEACH-FX FUTURE WITHOUT-PROJECT DAMAGE RESULTS 2-60
3 PLAN FORMULATION 3-1
3.1 PLAN FORMULATION RATIONALE 3-1
3.2 SCOPING* 3-2
3.2.1 FEDERAL 3-2
3.2.2 AGENCY AND PUBLIC FEEDBACK 3-2
3.3 PROBLEMS AND OPPORTUNITIES* 3-2
3.3.1 PROBLEMS 3-3
3.3.2 OPPORTUNITIES 3-3
3.4 CONSTRAINTS 3-4
3.4.1 PLANNING CONSTRAINTS 3-4
3.4.2 LOCAL CONSTRAINTS 3-4
3.5 OBJECTIVES 3-5
3.5.1 FEDERAL OBJECTIVES 3-5
3.5.2 STATE AND LOCAL OBJECTIVES 3-7
3.6 SUMMARY OF MANAGEMENT MEASURES 3-8
3.6.1 IDENTIFICATION OF MANAGEMENT MEASURES 3-8
3.7 SCREENING OF MANAGEMENT MEASURES 3-12
3.7.1 PRELIMINARY SCREENING 3-12
3.7.2 FORMULATION STRATEGY 3-28
3.8 ALTERNATIVES MILESTONE 3-30

3.9 SECONDARY SCREENING: SCREENING WITH ROUGH ORDER OF MAGNITUDE COSTS 3-31

3.9.1 FINAL SCREENING: FUTURE WITH PROJECT MODELING IN BEACH-FX 3-37
3.10 THE RECOMMENDED PLAN 3-40

3.10.1 INCREMENTAL JUSTIFICATION OF THE RECOMMENDED PLAN 3-40
4 RECOMMENDED PLAN 4-1

4.1 PROJECT DESIGN 4-1

4.1.1 PROJECT DUNE 4-1
4.1.2 PROJECT BERM 4-2
4.1.3 PROJECT BEACH SLOPES 4-3
4.1.4 PROJECT VOLUMES 4-4
4.1.5 PROJECT CONSTRUCTION 4-4
4.1.6 RENOURISHMENT EVENTS 4-4
4.1.7 PROJECT MONITORING 4-5
4.1.8 OPERATIONS AND MAINTENANCE CONSIDERATIONS 4-5
4.2 RECOMMENDED PLAN SAND SOURCE 4-6

4.3 SEA LEVEL RISE CONSIDERATIONS 4-8

4.4 LAND LOSS AND RECREATION BENEFITS 4-8

4.5 RECOMMENDED PLAN BENEFITS TO HURRICANE EVACUATION ROUTE SR A1A .. 4-10

4.6 COMPLIANCE WITH EXECUTIVE ORDER (EO) 11988 4-11

4.7 FEDERAL IMPLEMENTATION RESPONSIBILITIES 4-12

4.8 NON-FEDERAL IMPLEMENTATION RESPONSIBILITIES 4-13

4.9 RECOMMENDED PLAN COST SHARING 4-13

4.10 RECOMMENDED PLAN COSTS 4-15

4.11 HURRICANE MATTHEW (2016) EROSION IMPACT ANALYSIS 4-17

4.12 FINANCIAL ANALYSIS OF NON-FEDERAL SPONSOR'S CAPABILITIES 4-22

4.13 VIEWS OF NON-FEDERAL SPONSOR 4-22

5 EFFECTS OF THE RECOMMENDED PLAN* 5-1

5.1 GENERAL ENVIRONMENTAL EFFECTS* 5-1

5.2 NATURAL (GENERAL) ENVIRONMENT* 5-1

5.2.1 GENERAL CONDITIONS 5-1
5.2.2 VEGETATION 5-2

5.2.3 FISH AND WILDLIFE RESOURCES (OTHER THAN THREATENED AND ENDANGERED SPECIES) 5-2
5.2.4 THREATENED AND ENDANGERED SPECIES 5-3
5.2.5 ESSENTIAL FISH HABITAT (EFH) 5-8
5.2.6 COASTAL BARRIER RESOURCES 5-9
5.2.7 WATER QUALITY 5-9
5.2.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE 5-9
5.2.9 AIR QUALITY 5-10
5.2.10 NOISE 5-14
5.2.11 AESTHETIC RESOURCES 5-15
5.2.12 RECREATION RESOURCES 5-15
5.2.13 NAVIGATION 5-15
5.2.14 CULTURAL RESOURCES AND HISTORIC PROPERTIES 5-16
5.2.15 NATIVE AMERICANS 5-17
5.2.16 NATURAL OR DEPLETABLE RESOURCES 5-17
5.2.17 CUMULATIVE IMPACTS 5-17
5.2.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 5-20
5.2.19 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS 5-20
6 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS* 6-1
6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) 6-1
6.1.1 SCOPING AND ISSUES 6-1
6.1.2 AGENCY COORDINATION AND COOPERATING AGENCIES 6-2
6.1.3 LIST OF RECIPIENTS 6-2
6.1.4 COMMENTS RECEIVED AND RESPONSE 6-2
6.2 ENDANGERED SPECIES ACT OF 1973 6-2
6.3 FISH AND WILDLIFE COORDINATION ACT OF 1958 6-3
6.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (*INTER ALIA*) 6-3
6.5 CLEAN WATER ACT OF 1972 6-3
6.6 CLEAN AIR ACT OF 1972 6-3
6.7 COASTAL ZONE MANAGEMENT ACT OF 1972 6-4
6.8 FARMLAND PROTECTION POLICY ACT OF 1981 6-4
6.9 WILD AND SCENIC RIVER ACT OF 1968 6-4
6.10 MARINE MAMMAL PROTECTION ACT OF 1972 6-4
6.11 ESTUARY PROTECTION ACT OF 1968 6-5
6.12 FEDERAL WATER PROJECT RECREATION ACT 6-5
6.13 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976 6-5

6.14 SUBMERGED LANDS ACT OF 1953 6-5

6.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990 6-5

6.16 RIVERS AND HARBORS ACT OF 1899 6-6

6.17 ANADROMOUS FISH CONSERVATION ACT 6-6

6.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT ... 6-6

6.19 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT (OCEAN DUMPING ACT) 6-7

6.20 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970. 6-7

6.21 EXECUTIVE ORDER (EO) 11990, PROTECTION OF WETLANDS 6-7

6.22 E.O 11988, FLOOD PLAIN MANAGEMENT 6-7

6.23 E.O. 12898, ENVIRONMENTAL JUSTICE 6-8

6.24 E.O. 13045, DISPARATE RISKS INVOLVING CHILDREN 6-8

6.25 E.O. 13112, INVASIVE SPECIES 6-8

6.26 ENVIRONMENTAL OPERATING PRINCIPLES 6-9

7 RECOMMENDATION 7-1

7.1 ITEMS OF LOCAL COOPERATION 7-4

7.2 DISCLAIMER 7-7

7.3 CERTIFICATION OF PUBLIC ACCESSIBILITY 7-7

8 LIST OF PREPARERS* 8-1

8.1 PREPARERS 8-1

8.2 REVIEWERS 8-1

9 REFERENCES AND INDEX* 9-3

9.1 REFERENCES 9-3

9.2 INDEX 9-7

Appendices

APPENDIX A – ENGINEERING

APPENDIX B – COST ENGINEERING AND RISK ANALYSIS

APPENDIX C – ECONOMIC ANALYSIS

APPENDIX D – GEOTECHNICAL

APPENDIX E – REAL ESTATE PLAN

APPENDIX F – PUBLIC ACCESS AND COST SHARING

APPENDIX G – NEPA

ATTACHMENT 1 – 404

ATTACHMENT 2 – CZMA

ATTACHMENT 3 – PERTINENT CORRESPONDENCE

EXECUTIVE SUMMARY

Introduction

Infrastructure along the St. Johns County shoreline is subject to damage from waves, erosion, and inundation caused by coastal storms. Developed areas, as well as portions of State Road A1A (SR A1A), the major evacuation route for the region, are vulnerable. This study investigates alternatives for a unified plan that addresses these vulnerabilities, as well as incidental opportunities for maintenance of environmental habitat and recreation for three reaches along the Atlantic shoreline of St. Johns County, Florida.

Purpose and Need

This report is an interim response to the study authority. This single purpose Coastal Storm Risk Management (CSRM) study will focus on the erosion problems and potential storm damage susceptibility of structures along three reaches of the Atlantic Ocean shoreline in St. Johns County, Florida as follows: South Ponte Vedra Beach, Vilano Beach, and Summer Haven. The non-federal sponsor is St. Johns County, Florida, represented by the Board of County Commissioners.

There is Federal interest in a Recommended Plan with a Benefit-to-Cost Ratio (BCR) of 1.3.

Study Area

All 42 miles of the St. Johns County shoreline are authorized for study in the interest of coastal storm risk management. Reaches within the study area currently experiencing coastal storm damages were selected as project reaches. The three reaches in this study include, from north to south:

- South Ponte Vedra Beach: R84 – R104 (3.8 miles)
- Vilano Beach: R104 to R117 (2.6 miles) and R117 to St. Augustine Inlet North Sand Trap Groin (1.1 miles)
- Summer Haven: R197 – R209 (2.3 miles)

*R monuments refer to Florida Department of Environmental Protection (FDEP) survey monuments used for geographic reference.

The boundaries of all of the subject reaches and FDEP R monuments are illustrated in Figure 1-1 on the fold-out map located on the back page of this report. The existing Federal CSRM project constructed in St. Augustine Beach is also shown in Figure 1-1 for reference.

Problems and Opportunities

It is projected that storm-induced erosion, inundation, and wave attack in the study area will continue damaging infrastructure and limiting habitat. Without a Federal project, it is likely that the sponsor and private homeowners would take steps to combat erosion and property loss, risking that these efforts might not be coordinated in a holistic fashion or incorporate regional concerns, such as sediment movement and environmental/habitat considerations.

Seawalls, or other protective armor, have been constructed along portions of all three, and it is anticipated that more will be constructed in the coming years. Such structures often protect one property while causing accelerated erosion to adjacent, unarmored properties, while cutting off the vital exchange of sand from dunes to the beach during storm events. By accelerating erosion and cutting off the dunes, the structures also negatively impact the habitat of species such as nesting sea turtles.

Without a project, certain portions of the study area, such as Summer Haven, may require abandonment and retreat in order to protect lives and property. Continued erosion, breaching, and overwash of Summer Haven may eventually impact the Intracoastal Waterway (IWW) which follows the Matanzas River to the east of Summer Haven (Figure 1-1).

Storm damages, especially erosion, throughout most of the project area could jeopardize SR A1A, which is designated as a National Scenic and Historic Coastal Byway and is the only evacuation route for the region and a major north-south thoroughfare for the area. After the 2008 hurricane season, areas of the dune were eroded to within five feet of SR A1A in portions of the Vilano Beach reach. SR A1A has already been relocated westward within the Summer Haven reach due to erosion. Additional detail is provided in Chapter 2 – Existing and Future Without-Project Conditions.

Existing problems in the study area include:

- Storm damages due to erosion, inundation, and waves threatening infrastructure
- Loss of natural habitat
- Shoreline erosion threatening recreational opportunities
- Shoreline erosion threatening hurricane evacuation route (SR A1A)
- Beach/dune interaction limited or eliminated

Opportunities are positive conditions in the study area that may result from implementation of a Federal project such as:

- Reduce storm damage to infrastructure
- Protect/enhance habitat/environmental resources
- Retain recreation

- Protect hurricane evacuation route, SR A1A
- Protect/enhance beach/dune interaction
- Implement recommendations in the FDEP St. Augustine Inlet Management Plan to use the St. Augustine Inlet as a sand source for beaches to the north of the inlet

Alternative Plans and the Recommended Plan

A number of structural and non-structural management measures were considered to address problems and realize opportunities listed above. A Recommended Plan has been developed to manage coastal risk in an environmentally acceptable and engineeringly-feasible manner. The non-federal sponsor, St. Johns County, has not opted for a Locally Preferred Plan. Therefore, the National Economic Development (NED) plan is the Recommended Plan of which the sponsor is in support.

The Recommended Plan includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60-foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum (NAVD88) contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature varying in height between +14.0 to +20.0 feet NAVD88, reflecting the average 2015 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along three miles of shoreline.

The St. Augustine Inlet system will be the sand source for the Recommended Plan. Currently, there is approximately 6.5 million cubic yards of beach-quality sand available within the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is approximately 866,000 cubic yards every 12 years. The FDEP St. Augustine Inlet Management Plan states that the bypassing objective is 278,000 cubic yards per year of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 million cubic yards would be available to meet the 866,000 cubic yard need for a periodic nourishment event.

Use of the inlet system would implement a Regional Sediment Management (RSM) strategy where the Recommended Plan's sand needs can be combined with maintenance of the St. Augustine Inlet Federal navigation channel and potentially the renourishment of the existing Federal Shore Protection Project at St. Augustine Beach, south of the inlet (see foldout on final page of this report). Such a strategy would realize significant cost savings and minimize potential environmental impacts from multiple dredge mobilizations as outlined in the Engineer Research and Development Center (ERDC) 2016 technical report, *Regional Sediment Management Strategies for the Vicinity of St. Augustine Inlet, St. Johns County, Florida.*

The existing Federal Shore Protection Project at St. Augustine Beach uses a hydraulic dredge to acquire sand from the St. Augustine Inlet system, and the Recommended Plan could potentially use the same

dredge. Dredging of the St. Augustine Inlet Federal navigation channel also typically uses a hydraulic dredge. Therefore three Federal projects in the same vicinity could potentially use the same dredge for construction or maintenance. Each time construction or maintenance of the projects could be combined would result in minimization of environmental impacts and a cost savings of at least $4,000,000 by combining three separate dredge mobilizations into one.

Environmental Considerations

Most of the adverse effects of the Recommended Plan would be temporary in nature, and would primarily occur during, or within one year, of construction. Ultimately, the Recommended Plan would have a beneficial effect on sea turtle nesting habitat through the maintenance of a nesting beach and the prevention of seawall structures being constructed along this stretch of shoreline. USACE has developed measures through continued coordination with resource agencies throughout the state to minimize the temporary effects to nesting sea turtles resulting from beach placement of sand. The Recommended Plan also maintains nesting and foraging habitat for shorebirds and seabirds. Effects to Essential Fish Habitat would be temporary in nature due to turbidity during construction, and there are no hardbottom habitats in the project area that would be affected.

Cost Estimate and Implementation

Total project first costs and cost share breakdown in FY17 price levels are tabulated in Tables ES-1 and ES-2. The Project First Costs are $78,417,000 over 50 years. Initial construction will be cost shared at 23% Federal and 77% non-federal. Periodic nourishments will be cost shared at 17.7% Federal and 82.3% non-federal.

ES-1: Recommended Plan Cost Summary (Project First Cost) (FY17 Price Levels).

	Cost Summary (Project First Costs) (FY17 Price Levels) St. Johns County, FL CSRM Project R102.5 - R117.5 (total placement area, including tapers)			
WBS		INITIAL CONSTRUCTION		PERIODIC NOURISHMENT
	Item	Total Item Cost		Total Item Cost
017	Mob/Demob	$3,052,000		$9,147,000
017	Beach Fill	$10,110,000		$21,138,000
017	Associated General Items	$254,000		$597,000
	Subtotal	$13,416,000		$30,882,000
01	Real Estate			
	- lands and damages	$0		$0
	- administrative	$2,514,000		$0
	- Federal admin.	$1,571,000		$0
	- non-federal admin.	$943,000		$0
30	PED	$1,203,000		$4,884,000
31	Construction Management	$1,096,000		$2,574,000
017	Dune vegetation	$1,009,000		$3,027,000
30	Post-Project Monitoring	$164,000		$493,000
	Subtotal	$5,986,000		$10,978,000
	Contingency (28%)	$5,432,000		$11,721,000
	Total	**$24,834,000**		**$53,583,000**
	Total Project Cost for 50 year period of Federal participation = $78,417,000			

ES-2: Recommended Plan Cost Sharing (Project First Cost) (FY17 Price Levels).

St. Johns County, FL CSRM Project **Summary of Project Cost Sharing (Project First Costs) (FY17 Price Levels)** **R102.5 - R117.5 (total placement area, including tapers)**					
Initial Construction					
Item	Federal Cost Share	Federal Cost	Non-federal Cost Share	Non-federal Cost	Project First Cost
Coastal Storm Risk Management Costs	23.0%	$5,712,000	77.0%	$19,122,000	$24,834,000
Non-federal LERRD Contribution*	0.0%	$0	100.0%	$943,000	
Non-federal Cash Contribution				$18,179,000	
Periodic Nourishment					
Periodic Nourishment	17.7%	$9,484,000	82.3%	$44,099,000	$53,583,000
Initial Construction + Periodic Nourishment					
Final Project Cost Share and Cost (50 years)	-	$15,196,000	-	$63,221,000	$78,417,000
* Includes non-federal admin costs only NOTE: Dollar values are rounded					

The average annual costs and benefits, shown in Table ES-3, of the Recommended Plan in FY17 price levels and 2.875% discount rate, are $2,031,000 and $2,653,000 respectively. The average annual net benefits for the recommended plan are $622,000 and the benefit cost ratio (BCR) is 1.3 to 1.

ES-3: Economic Summary of the Recommended Plan.

Economic Summary	Primary Storm Damage Reduction Benefits	Primary Storm Damage Reduction + Incidental Recreation Benefits
Price Level	FY17	FY17
FY17 Water Resources Discount Rate	2.875%	2.875%
Average Annual Structure & Contents Damage & Armor Costs Benefits	$1,683,000	$1,683,000
Average Annual Land Loss Benefits	$278,000	$ 278,000
Average Annual Incidental Recreation Benefits	$ -	$ 692,000
Average Annual Total Benefits	$1,961,000	$ 2,653,000
Average Annual Costs	$2,031,000	$2,031,000
Average Annual Net Benefits	**($70,000)**	**$622,000**
Benefit Cost Ratio	**0.97**	**1.3**

Table ES-4 displays additional benefit and cost information including Interest During Construction (IDC), OMRR&R, and Benefit to Cost ratios at 2.875%.

ES-4: Equivalent Annual Benefits and Costs.

Equivalent Annual Benefits and Costs **October 2016 (FY17) Price Level, 50-Year Period of Analysis, 2.875% Discount Rate**	
Initial Construction	$ 24,834,000
1st Renourishment	$ 16,926,000
2nd Renourishment	$ 16,926,000
3rd Renourishment	$ 18,521,000
3rd Renourishment to Project End	$ 1,209,000
Total First Cost[1]	$ 78,416,000
Interest During Construction (IDC)	$ 47,000
Total Investment Cost	**$ 78,463,000**
Average Annual Investment Cost	$ 1,996,000
Annual OMRR&R (100% non-federal)	$ 35,000
Total Average Annual Cost	**$ 2,031,000**
Average Annual Storm Damage Reduction Benefits (Including Land Loss)	$ 1,961,000
Average Annual Recreation Benefits	$ 692,000
Average Annual Total Benefits	$ 2,653,000
Average Annual Net Benefits	**$ 622,000**
Benefit-Cost Ratio (computed at 2.875%)	1.3

[1]Does not match Total Project Cost Summary (TPCS) exactly due to rounding.

Coordination with Agencies and the Public

An initial scoping period for the project was conducted from August 17, 2005 through September 17, 2005. As the study progressed, USACE anticipated that an Environmental Impact Statement (EIS) might be required. A second scoping period was held from September 16, 2008 to October 16, 2008. A notice of intent to draft an EIS was published in the Federal Register on April 5, 2010. Subsequently, it became evident that no significant impacts to the human or natural environments were anticipated. USACE decided to initially prepare an Environmental Assessment (EA), rather than continue with the previous plans to draft an EIS. The draft EA and draft Finding of No Significant Impact (FONSI) were made available to the public for a 45-day public comment period from February 17, 2016 to April 4, 2016.

This proposed project has been coordinated with the following agencies: U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (EPA), Florida

State Clearinghouse, Florida State Historic Preservation Office (SHPO), and FDEP. The FDEP, Bureau of Beaches and Coastal Systems, National Marine Fisheries Service (NMFS) Habitat Conservation Division, and the Bureau of Ocean and Energy Management (BOEM) have all accepted USACE's invitations to participate as cooperating agencies in this study.

Residual Risk

The proposed project would greatly reduce, but not completely eliminate, future coastal storm risk and damages. Coastal storm damages, caused primarily by erosion, are reduced by approximately 71% (not including prevention of land loss) in the location of the Recommended Plan over the 50-year period of analysis; therefore, the residual damages would be 29% in this area. The greatest residual risk remains in the South Ponte Vedra Beach reach, where justifiable improvements could be made if public access was made available.

Most of the benefits are associated with reductions in damage to single-family residences and reductions to future armor costs to protect ocean front residences and SR A1A.

The Recommended Plan will reduce damages but does not have a specific design level. In other words, the project is not designed to fully withstand a certain category of hurricane or a certain frequency storm event. The project is not claiming any benefits beyond 500 feet inland from the Mean High Water (MHW) line; damages to structures past this extent were not calculated. Notably, infrastructure on the backside of the barrier island on which the project area is located, albeit outside of the project area, are susceptible to impacts from sea level rise in the future. Structures within the project area would continue to be subject to damage from hurricane winds and windblown debris. Even new construction is not immune to damage, especially from these processes. The project purpose is coastal storm risk management, and the Recommended Plan is not designed to prevent loss of life.

Public safety risks can be reduced by actions taken at the local, state, and Federal levels. Table ES-5 describes the actions that can be taken by the entities associated with this project to improve public safety, as well as the limitations of their actions. The greatest level of public safety is achieved when concerted action is taken at local, state, and Federal levels to improve public safety in a comprehensive manner. Table ES-6 describes pertinent project information for the Recommended Plan.

Table ES-5: Roles for Public Safety.

	Can Do	Can Not Do
St. Johns County	• Can implement non-structural risk reduction efforts including building and zoning regulations. • Can implement emergency management plans and strategies. • Can sponsor and cost share in a Federal Recommended Plan.	• Cannot conduct a coastal storm risk management study in a systems context encompassing all engineering and environmental considerations on their own.
State of Florida	• Can implement non-structural risk reduction efforts including building and zoning regulations. • Can implement emergency management plans and strategies. • Can perform maintenance of SR A1A and repair on an emergency basis.	• Cannot conduct a coastal storm risk management study in a systems context encompassing all engineering and environmental considerations on their own.
U.S. Army Corps of Engineers	• Can implement a cost-shared Recommended Plan that reduces coastal risk and damage to infrastructure, providing additional protection to critical evacuation route SR A1A beyond what the county and state can provide.	• Cannot enforce building and zoning regulations. • Cannot implement local emergency management plans or strategies.

Pertinent Project Information for the Recommended Plan

Table ES-6: Pertinent Project Information.

Recommended Plan Description	The Recommended Plan includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60-foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum (NAVD88) contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline. A dredge will be used to fill the template with sand from the St. Augustine Inlet system.
Average # Nourishment Events	1 initial construction event, 3 periodic nourishment events
Average Volume of Initial Construction	1,310,000 cubic yards
Average Volume of Each Periodic Nourishment	866,000 cubic yards
Average Periodic Nourishment Interval	12 years
Initial Construction Duration	approximately 3.3 month
Recommended Plan Total Project Cost (including contingency)	$78,417,000 (FY17 price levels)
Cost sharing	Initial construction: 23.0% Federal / 77.0% non-federal Periodic nourishments: 17.7% Federal / 82.3% non-federal
Benefit-to-Cost Ratio (BCR)	1.3

CHAPTER 1
INTRODUCTION

1 INTRODUCTION*

1.1 FEDERAL PROJECT PURPOSE*

The Water Resources Development Act (WRDA) of 1986 assigns costs of Federal Coastal Storm Risk Management (CSRM) projects to appropriate purposes. Project reaches that provide hurricane and storm damage reduction are assigned a maximum Federal share of 65% for initial construction. Specifically for beach renourishment projects, WRDA 1999 assigned a 50% Federal share for future renourishments. Project reaches that provide for separable recreation are not federally cost shared. The Federal government does not participate in work realizing separable recreation benefits such as constructing a beach only for recreational purposes (and not hurricane and storm damage reduction purposes) or constructing recreation facilities. Recreation is not considered to be a high priority output or primary project output under current Department of Army policy, as described in ER 1105-2-100. This policy precludes Federal funds to support construction of CSRM projects which depend on separable recreation benefits for economic justification, or for which incidental recreation benefits greater than 50% are needed for justification (ER 1105-2-100 section 3-4.b(4)(a)).

1.2 STUDY BACKGROUND AND LOCATION*

Infrastructure along the St. Johns County shoreline is subject to damages from waves, erosion, and storm surge caused by coastal storms. Developed areas, as well as portions of State Road A1A (SR A1A), a major evacuation route for the region and designated National Scenic and Historic Coastal Byway, are vulnerable. All 42 miles of the St. Johns County shoreline are authorized for study in the interest of Coastal Storm Risk Management.

The Reconnaissance Report (Section 905(b) Analysis) for St. Johns County, Florida, Shore Protection (USACE 2004) recommended evaluation of 3.8 miles of St. Johns County's 42 miles of shoreline in a feasibility study. The 3.8 miles were composed of 1.4 miles in Vilano Beach and 2.4 miles in Summer Haven. These areas were selected based on the following: the shoreline lengths were designated as critically eroded by the State of Florida, other portions of the St. Johns County shoreline had authorized Federal CSRM projects such as St. Augustine Beach, or other portions of shoreline did not include infrastructure susceptible to damage. Between 2004 and 2008, additional areas were threatened by erosion causing the State of Florida to deem South Ponte Vedra as critically eroded. This reach was then added to the feasibility study. Additionally, the Vilano Beach reach in the feasibility study was expanded south to St. Augustine Inlet, beyond the bounds of the state's designated critical erosion area, at the sponsor's request, in order to fully evaluate this section of the county shoreline as a contiguous system.

This St. Johns County CSRM Feasibility Study and Environmental Assessment (EA) investigates alternatives for a unified plan that addresses coastal storm risk management, as well as incidental opportunities for

maintenance of environmental habitat and recreation for three reaches along the Atlantic shoreline of St. Johns County, Florida. The non-federal sponsor is St. Johns County, Florida.

The three reaches in this study comprise 9.8 miles and include, from north to south:

- South Ponte Vedra: R84 – R104 (3.8 miles)
- Vilano Beach: R104 to R117 (2.6 miles) and R117 to St. Augustine Inlet north sand trap groin (1.1 miles) totaling 3.7 miles
- Summer Haven: R197 – R209 (2.3 miles)

*R-monuments refer to Florida Department of Environmental Protection (FDEP) survey monuments used for geographic reference.

The St. Augustine Beach reach, separate from the above reaches and not included in this study, has previously been studied and authorized for Federal participation in coastal storm risk management for a period of 50 years of Federal participation. The St. Augustine Beach reach spans 2.5 miles of St. Johns County Atlantic Ocean shoreline between FDEP R monuments R137 through R150, including the southern portion of Anastasia State Park and the northern portion of the City of St. Augustine Beach.

The boundaries of all of the subject reaches and the FDEP R monuments are illustrated in Figure 1-1 located on the following page. Figure 1-1 has also been included as a foldout on the last page of the report to aid periodic reference of study area boundaries, and other key reference points, while reading this document.

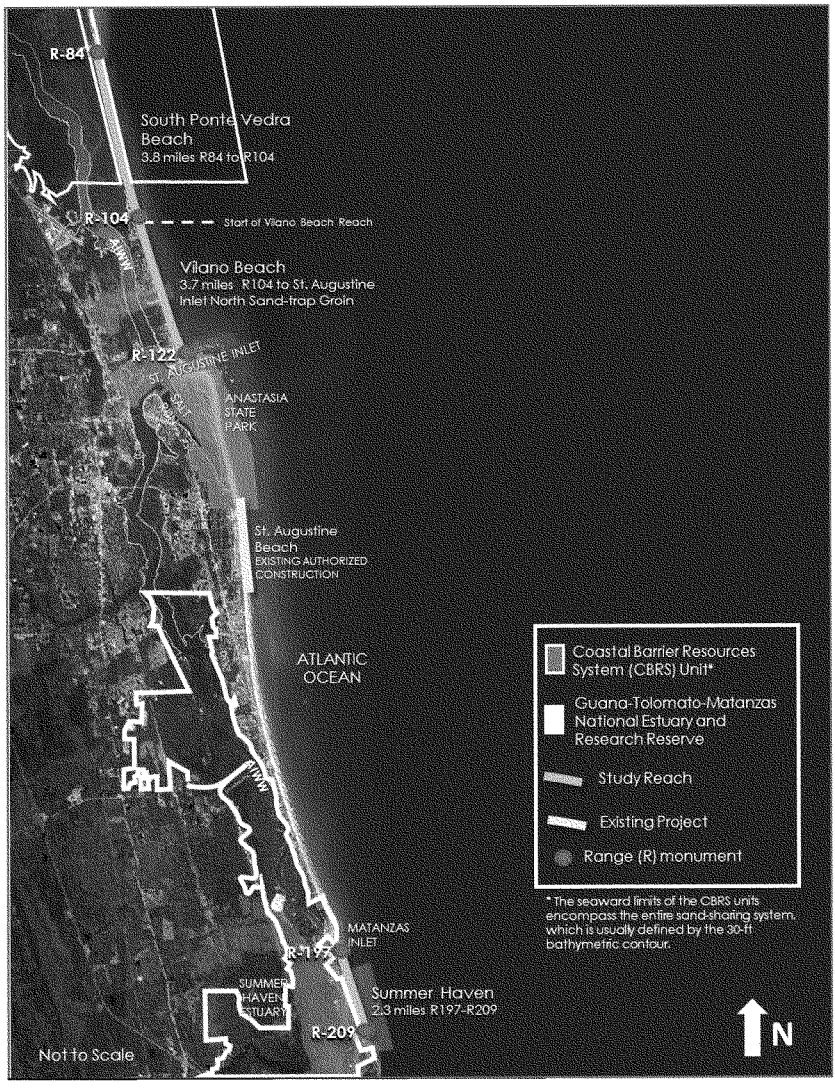


Figure 1-1. Project Map with Key Boundaries and Reference Points.

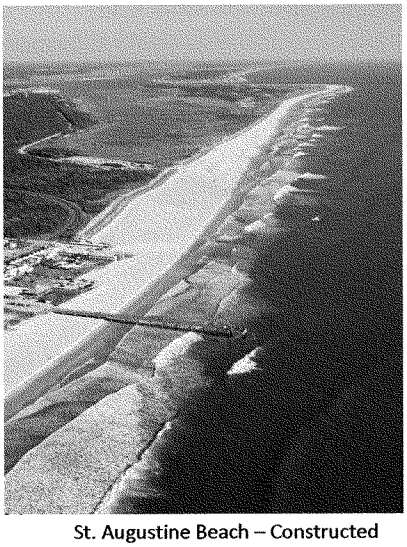
In recent years, both South Ponte Vedra Beach and Vilano Beach have experienced erosion and infrastructure damage prompting state assistance. Impacts to homes and infrastructure since 2004 have resulted in the construction of temporary structures, such as seawalls, by property owners. Summer Haven has experienced significant erosion and threats to infrastructure since the mid-1900s, resulting in the construction of a protective rock revetment and landward relocation of SR A1A.



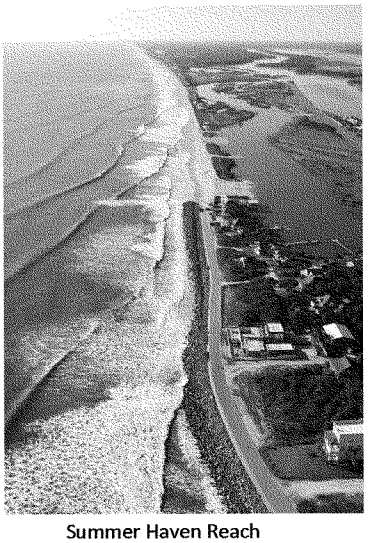
South Ponte Vedra Beach Reach



Vilano Beach Reach



St. Augustine Beach – Constructed



Summer Haven Reach

Figure 1-2: South Ponte Vedra Beach, Vilano Beach, and Summer Haven reaches of the project area. The constructed St. Augustine Beach project, located south of St. Augustine Inlet, is also shown.

St. Johns County is located in the northeast Atlantic coast of Florida, midway between the Florida/Georgia state line and Cape Canaveral. The county is bounded to the north by Duval County and to the south by

Flagler County. The county has approximately 42 miles of Atlantic coastal shoreline composed of three barrier islands separated by St. Augustine Inlet and Matanzas Inlet. The South Ponte Vedra Beach and Vilano Beach reaches are located north of the St. Augustine Inlet, and the Summer Haven reach is located south of the Matanzas Inlet as shown in Figure 1-1 and Figure 1-2.

Combined, the three reaches total 9.8 miles of shoreline. On average, the study area extends approximately 500 feet inland from the Mean High Water (MHW) line. The St. Johns County, Florida, General Reevaluation Report (GRR) (USACE 1998), which recommended beach nourishment along St. Augustine Beach, determined 300 feet to be the approximate extent of shoreline recession from a 100-year storm. The extent of shoreline recession in the current study area is expected to be similar since geographic characteristics and wave climate closely resemble those discussed in the 1998 GRR. To ensure adequate data collection, an additional 200 feet was added to the 100-year storm recession. This data collection "buffer" ensures that sufficient data is collected for input into the economic model, Beach-fx, being applied to this study. Beach-fx measures damages to infrastructure from waves, erosion, and inundation.

Development along the Atlantic coast of St. Johns County began in the early 1900s. Of the three reaches included in the study area, Summer Haven was the first to be developed. Its early beach cottages eventually washed away, and between 1960 and today, additional homes were built resulting in 27 homes that remain along the landward side of Old SR A1A[1]. Substantial development in South Ponte Vedra Beach and Vilano Beach began around 1950. Shore protection efforts were initiated in these two areas soon after development, when damages from hurricanes and coastal storms began to threaten infrastructure.

Frequent northeast storms (nor'easters) impact this coast in the fall and winter, while tropical storms and hurricanes impact the area from June through November. While hurricanes generate damaging waves and storm surge, these storms are typically short-lived. On the other hand, nor'easters are generally more damaging due to their longer duration. The county has a history of damaging storms. Between 1830 and the present, an average of one tropical storm system has passed within 50 miles of the study area every three years.

Various types of hard structures such as seawalls and revetments have been constructed along the coast since 1892. In response to the Ash Wednesday storm of 1962, the Federal Office of Emergency Planning authorized 1,800 feet of granite revetment and 1,130 feet of road pavement at Summer Haven. Two years later, after Hurricane Dora (1964), Federal emergency funds were provided for more stabilization at Summer Haven.

[1]Old SR A1A refers to approximately 2,700 and 3,600 feet of the original SR A1A, which has been relocated landward following frequent storm damage.

Protection of SR A1A is of major importance since it is the only hurricane evacuation route leading to roads off the islands. Dependence on this one artery for evacuation makes safe escape from coastal storms difficult for residents in the project area. Maintenance of SR A1A in Summer Haven became so problematic that the road was relocated landward in 1979. In areas of Vilano Beach, erosion of the protective dunes reached within five feet of SR A1A in 2008.

The project area was defined, and expanded upon as necessary, by the FDEP designation of critically eroded beaches in the area. The FDEP defines a "critically eroded area" as "...a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost," (FDEP 2015). Gaps between critically eroded areas may also be deemed critical if their inclusion is needed to maintain design integrity of beach management projects. South Ponte Vedra Beach was designated as a critically eroded area in 2007, Vilano Beach in 2006, and Summer Haven in 1989.

1.3 STUDY SPONSOR

The non-federal sponsor is St. Johns County, Florida.

1.4 STUDY PURPOSE AND NEED*

The purpose of this study is to determine whether there is economic justification and Federal interest in coastal storm risk management in additional reaches of St. Johns County. If it is found that there is a Federal interest, the further purpose of the study is to analyze alternatives and formulate a recommended plan for coastal storm risk management to include incidental opportunities for maintenance of environmental habitat within the South Ponte Vedra Beach, Vilano Beach, and Summer Haven reaches of the St. Johns County coastline.

Problems and opportunities within the study area are summarized below and described in detail in Chapter 3. Specific problems in the study area include:

- Storm damages due to erosion, inundation, and waves threatening infrastructure
- Loss of natural habitat
- Shoreline erosion threatening recreational opportunities
- Shoreline erosion threatening a hurricane evacuation route (SR A1A)
- Beach/dune interaction limited or eliminated

Opportunities exist to:

- Reduce storm damages to infrastructure within the study area
- Protect/enhance habitat/environmental resources
- Retain recreation
- Protect a hurricane evacuation route (SR A1A)
- Protect/enhance beach/dune interaction
- Implement recommendations in the FDEP St. Augustine Inlet Management Plan to use the St. Augustine Inlet as a sand source for beaches to the north

An array of alternatives will be analyzed in order to arrive at a recommended plan that addresses the above problems and maximizes opportunities while being technically sound, environmentally acceptable, and economically justified. Examples of management measures considered and combined into alternatives include: no action (doing nothing), retreat, changes to zoning and building codes, shore protection using hard structures (seawalls, revetments, groins, etc.), shore protection using soft structures (beach nourishment, etc.), and combinations of the above.

1.5 STUDY AUTHORITIES*

Section 110 of the Rivers and Harbors Act of 1962 (Public Law 87-874) gave the Secretary of the Army broad authorization to survey coastal areas of the United States and its possessions in the interest of beach erosion control, hurricane protection, and related purposes, provided that surveys of particular areas would be authorized by appropriate resolutions.

As a result, portions of the St. Johns County shoreline experiencing severe erosion were studied extensively. The St. Johns County, Florida, General Reevaluation Report (GRR) (USACE 1998) recommended beach nourishment along St. Augustine Beach, and initial construction was completed in January 2003.

Relative to this feasibility study, on June 21, 2000, House Resolution 2646 granted authority for a survey of the St. Johns County study area, which reads as follows:

> *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That in accordance with Section 110 of the Rivers and Harbors Act of 1962, the Secretary of the Army, acting through the Chief of Engineers, is requested to survey the shores of St. Johns County, Florida, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of hurricane protection, storm damage reduction, beach erosion control, and other related purposes."*

This resolution authorized a reconnaissance report which was completed in 2004 and concluded that there was a Federal interest in conducting a feasibility study for the beaches of St. Johns County. The

study area for the reconnaissance report included the entire St. Johns coastline, but focused on the Vilano Beach and Summer Haven reaches because those were designated as critically eroded areas by the FDEP at that time. The South Ponte Vedra Beach reach was added to the study area after the reconnaissance report was completed in 2004. Its addition was requested by the sponsor due to increased erosion occurring around R90 in 2007. Significant and rapid loss of beach width and dunes protecting several structures led to FDEP designating R84 to R94 (2 miles) a critically eroded area due to threats to private development and SR A1A. South Ponte Vedra Beach's geographic proximity to the Vilano Beach reach, as well as its similar development and storm damage issues, made its inclusion in this feasibility study reasonable. The southern boundary of the South Ponte Vedra Beach reach was extended to R104 to abut the Vilano Beach reach and to investigate the feasibility of providing uninterrupted shore protection along the coast.

1.6 RELATED DOCUMENTS*

1.6.1 RELATED USACE STUDIES

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

a. 1965 – Beach Erosion Control (BEC) Study, St. Johns County, Florida (USACE 1965). The report was completed in response to a resolution of the Committee on Public Works of the U.S. Senate, adopted January 7, 1963, and a resolution of the Committee on Public Works of the House of Representatives, adopted June 19, 1963. The report recommended protective and recreational beaches with periodic nourishment (60 feet wide at 11 feet above mean sea level) for 2.2 miles of shoreline at South Ponte Vedra Beach, 1.4 miles at Anastasia State Park and St. Augustine Beach, and 1.4 miles at Crescent Beach. The Benefit-to-Cost Ratio (BCR) ratio was 1.2. The Board of County Commissioners of St. Johns County advised that the local share of the cost of the considered improvements was entirely prohibitive, therefore the District and Division Engineers recommended that no improvements for beach erosion control be undertaken by the U.S. Army Corps of Engineers (USACE) at that time (negative report – no sponsor support).

b. 1977 (Revised 1979) – St. Johns County Beach Erosion Control (BEC) Project Feasibility Report (USACE 1979). The study area included the entire St. Johns County coastline. Study efforts, after preliminary investigation of the county's Atlantic coastline, were concentrated primarily on the problem area along the ocean shoreline of St. Augustine Beach and Anastasia State Recreation Area. The report recommended construction of a sand beach width of 60 feet at elevation 12 feet above mean low water from "A" Street north to include the southern 4,000 feet of the recreation area. The total length of the coastline to be protected, including transitions, would be 2.5 miles. The BCR equaled 1.25. A significant portion of the project benefits were associated with predicted increases in recreational output. Sec. 501 (Title V) of WRDA 1986 authorized the project as

recommended by the Chief of Engineers Report, dated February 26, 1980, at a total cost of $18,200,000.

c. 1982 – Section 14 Study, Summer Haven, St. Johns County, Florida (USACE 1982). The study was completed in response to a request from St. Johns County for Federal assistance in the construction of shore protection measures for the county road, Old SR A1A, along the coastline in Summer Haven.

d. 1990 – Special Report for the St. Johns County Beach Erosion Control (BEC) Project (USACE 1990). The report was prepared in accordance with WRDA'86 which limited Federal participation in recreation projects. Maximization of net primary benefits identified the National Economic Development (NED) plan as an 80-foot berm extension along 2.5 miles of the St. Johns County shoreline (St. Augustine Beach) with three groins required to reduce future nourishment costs. The BCR for this project was 0.61 (less than 1) resulting in an unfavorable recommendation of no Federal participation at that time.

e. 1994 – Economic Update (EU) Report (USACE 1994). The report was conducted at the direction of the U.S. Congress utilizing General Investigation (GI) funds. The EU was conducted in accordance with special instructions provided with the fiscal year 1994 work allowance. The EU, dated November 1994, was approved in March 1995 and found that Federal participation in the authorized shore protection project on St. Augustine Beach was economically justified at that time. Subsequently, Congress appropriated money to proceed with a General Reevaluation Report (GRR) for the project as part of the pre-construction, engineering, and design (PED) phase.

f. 1997 – St. Johns County, Florida Shore Protection Project: General Reevaluation Report (GRR) – Technical Review Conference (USACE 1997). The report summarized the general reevaluation of the federally-authorized shore protection project, which became the 1998 GRR for St. Augustine Beach. Modifications to the project were investigated in the interest of reducing total project costs.

g. 1998 – St. Johns County, Florida Shore Protection Project: General Reevaluation Report (GRR) with Final Environmental Assessment (USACE 1998). The report recommended the construction of a 60 foot berm extension from the Mean High Water line along St. Augustine Beach between R monuments R137 and R150. The BCR equaled 1.9.

h. 1998 – Post Authorization Change Report (USACE 1998). The recommended plan in the 1998 GRR for St. Augustine Beach exceeded the cost authorized by Section 501 of WRDA 1986 beyond the maximum cost increase provisions in Section 902 of WRDA'86 (PL 99-662). The 902 limit was $39,649,000, whereas the total project cost of the selected plan was $190,500,000. The report justified the cost increase.

i. 2004 – Reconnaissance Report (905(b) Analysis) St. Johns County, Florida, Shore Protection Project (USACE 2004). Authorized by 2000 H.Res. 2646, the report recommends that the St. Johns County, Florida, Shore Protection Study proceed into the feasibility stage. Authority for the report authorized a survey of the shores of St. Johns County with particular reference to the advisability of providing beach erosion control works in the areas north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines. The report focused on Vilano Beach and Summer Haven.

j. 2005 – Project Information Report - Rehabilitation Effort for the St. Johns County Erosion Control and Hurricane Protection Project, St. Johns County, Florida (USACE 2005). The report determined that the project area (St. Augustine Beach) was eligible for emergency renourishment due to impacts from the 2004 hurricane season.

k. 2006 – Project Information Report - Rehabilitation Effort for the St. Johns County, Erosion Control and Hurricane Protection Project, St. Johns County, Florida (USACE 2006). The report determined that the project area (St. Augustine Beach) did not meet key criteria related to a significant storm event and therefore was not eligible for emergency renourishment.

l. 2016 - Regional Sediment Management Strategies for the Vicinity of St. Augustine Inlet, St. Johns County, Florida – Engineer Research and Development Center (ERDC) Technical Report, ERDC/CHL TR-16-12 (USACE 2016).

1.6.2 RELATED NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) STUDIES

a. 1998 – General Reevaluation Report (GRR) with Final Environmental Assessment (EA) and Findings of No Significant Impact (FONSI), St. Johns County, Florida, Shore Protection Project. The EA evaluated the construction of a 60- foot berm at a location approximately 2.7 miles south of St. Augustine Inlet, with placement extending to the south approximately 2.5 miles along the shoreline of St. Augustine Beach. The sand source for the project was the St. Augustine Inlet ebb tide shoal and navigation channel.

b. 2010 – Final Environmental Assessment (EA) and Findings of No Significant Impact (FONSI), Maintenance Dredging, St. Augustine Inlet and Adjacent Intracoastal Waterway, St. Johns County, Florida. This document evaluates maintenance dredging of the St. Augustine Inlet and the adjacent Intracoastal Waterway (IWW), including IWW Cuts SJ-28 to SJ-30, a portion of the inlet flood shoal, and a portion of the inlet entrance channel along Porpoise Point. The placement location for beach-quality material is the shoreline within Anastasia State Park and St. Augustine Beach between R132 and R152. The placement location for non-beach-compatible material would be placed in a nearshore placement area between R141 and R146. There was a FONSI associated with this document signed on January 19, 2011.

c. 2015 – Final Supplemental Environmental Assessment (EA) and Findings of No Significant Impact (FONSI), Maintenance Dredging, St. Augustine Inlet and Adjacent Intracoastal Waterway, St. Johns County, Florida. The Supplemental EA evaluated maintenance dredging of the St. Augustine Inlet and the adjacent Intracoastal Waterway. Beach-compatible material was proposed to be placed along the shorelines of South Ponte Vedra Beach and Vilano Beach. Non-beach-compatible material was proposed to be placed in the nearshore area north of the inlet.

1.6.3 PRIOR NON-FEDERAL STUDIES

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

a. 1975 – Independent study by the St. Johns County Board of Commissioners of possible solutions to the county's erosion problems – *St. Johns County Beach Erosion Control Study* by Florida Coastal Engineers, Inc., of Jacksonville, Florida.

b. 2001 – Strategic Beach Management Plan for the Northeast Atlantic Coast Region (Florida Department of Environmental Protection, October 2001). This report presents data, analysis, and recommendations for managing the northeast Florida coastline, specifically the Sea Islands, and the St. Johns, Flagler, and Volusia county beaches and inlets. Special attention is placed on determining strategies for inlets and critically eroded beaches.

c. 2009 – St. Johns County Shore Stabilization Feasibility Study for South Ponte Vedra and Vilano Beach Regions (PBS&J 2009). A private homeowners' organization, South Ponte Vedra-Vilano Beach Restoration Association, Inc. (SPVV), partnered with St. Johns County and the State of Florida to gain an overall understanding of the coastal processes affecting the study area and to recommend a shore stabilization solution. Draft conclusions of the study stated that the recent significant shoreline recession and erosion are most likely attributable to increases in storm activity, and that adjacent infrastructure and habitable structures are vulnerable to future storm impacts. Furthermore, the study indicated that the condition was unlikely to adequately recover naturally within the foreseeable future, and that shoreline remediation is warranted to protect upland infrastructure. Specifically, the study recommended beach nourishment with 2,527,100 cubic yards of sand from R84 to R117 (6.5 miles) and renourishment every five to six years. The project would include a 100-foot wide berm at +10 feet NAVD88 and a dune feature with a 10-foot crest width. The dune feature was proposed to mitigate for historical dune losses and enhance the protection of upland areas.

d. 2014 – St. Augustine Inlet Management Implementation Plan (FDEP 2014). This implementation plan was developed in coordination with USACE, Jacksonville District to modify sand bypassing recommendations contained in the original, 1997, inlet management plan. Key to the study area, the plan states that a portion of sediment dredged from the inlet should be placed on beaches

north of the inlet. This plan is not a USACE report and does not authorize new Federal actions or modify any existing authorizations. The Federal St. Johns County Shore Protection Project uses St. Augustine Inlet as its authorized, least cost, sand source, thereby accomplishing a portion of the sand bypassing described in the report. This feasibility study also proposes to use the inlet as the most economical sand source. Such use would be in keeping with the state's plan, accomplishing sand bypassing to the north of the inlet. Sand bypassing to the north, within the Recommended Plan area, does not currently occur and would not occur without authorization of the Recommended Plan and is therefore not included in the existing condition or the future without-project condition.

e. 2015 – Strategic Beach Management Plan for the Northeast Atlantic Coast Region (Florida Department of Environmental Protection, June 2015). The report presents data, analysis, and recommendations for managing the northeast Florida coastline, specifically St. Johns, Flagler, and Volusia counties' beaches and inlets. Special attention is placed on determining strategies for inlets and critically eroded beaches.

f. 2015 – Critically Eroded Beaches in Florida (FDEP 2015). This report provides an inventory of Florida's erosion problem areas, including areas within this report's study area.

1.7 FEDERAL PROJECTS NEAR STUDY AREA

Projects near the study area include:

a. St. Johns County, Florida Shore Protection Project, St. Augustine Beach, Florida. The project area is comprised of the 2.5 miles of St. Johns County Atlantic Ocean shoreline located between FDEP R monuments R137 through R150. The project area includes the southern portion of Anastasia State Park and the northern portion of St. Augustine Beach. The Recommended Plan consists of beach-fill with 600-foot transition sections at the northern and southern limits of the project. The design template berm elevation is +12.0 feet (MLW) and would result in extension of the pre-project Mean High Water shoreline by 60 feet (USACE 1998). At the location of the seaward extent of the design berm, the design template slopes 1V:20H seaward to the location of the MLW line and 1V:30H out to the intersection with the existing profile. Initial construction of the project required placement of approximately 2,100,000 cubic yards of design fill and 1,600,000 cubic yards of advance material; 3,700,000 cubic yards total. During initial construction, additional material was dredged and placed north of the project area within Anastasia State Park. This work was funded by FDEP. The primary borrow source for construction was the St. Augustine Inlet ebb shoal located approximately 4.5 miles from the center of the project area. Periodic nourishment would be provided every five years over the 50-year period of Federal participation using about 1,600,000 cubic yards of material per event. The project was completed in January 2003 and renourished in 2005 and 2012.

b. St. Augustine Harbor. This project includes a channel 16 feet deep by 200 feet wide along the best natural alignment across the inlet bar; a 12-feet deep channel to the Intracoastal Waterway; a sand trap groin (about 1,880 feet long; built in 1941) on the north side of the inlet extending seaward from the shore of Vilano Beach; a sand-tight jetty (about 3,695 feet long; built in 1957) on the south side of the channel extending seaward from the shore of Conch Island parallel to and coextensive with the groin (future landward extension of the groin and jetty - deferred); and a channel 10 feet deep by 100 feet wide in the San Sebastian River from the Intracoastal Waterway to the King Street bridge, with a turning area near the upper end. The project sponsor is the St. Augustine Port, Waterway, and Beach Commission. The inlet (St. Augustine Inlet) is an improved tidal inlet connecting the Tolomato and Matanzas Rivers (part of the Intracoastal Waterway) to the Atlantic Ocean. Originally a natural inlet called Salt Run, the natural inlet was located about 400 yards south of its current location until it was relocated in 1940. Beach-quality maintenance material from inlet and channel dredging is placed on the beaches located south of the inlet and, as of 2015, in the nearshore zone north of the inlet.

c. Intracoastal Waterway (IWW). The Intracoastal Waterway is part of the Atlantic Intracoastal Waterway system that provides an inland navigation channel from New York to Miami. By 1965 the United States had completed the project from Jacksonville to Fort Pierce, Florida, including St. Johns County, to the authorized depth of 12 feet and a width of 125 feet. The Florida Inland Navigation District (FIND) provides the items of local cooperation for the waterway and performs maintenance in the absence of Federal funding. The principal items of local cooperation are lands, easements, rights-of-way, and dredged material disposal areas. In view of recent limited Federal funding for annual waterway maintenance, FIND currently pays most of the maintenance dredging costs for the waterway. The IWW near Matanzas Inlet is subject to shoaling and must be regularly dredged to maintain navigation. Maintenance dredging of this area is between 150,000 to 200,000 cubic yards per year (personal communication FIND, 2003). This material can be pumped into the dredged material management area, MSA SJ-1, until the 800,000 cubic yard capacity is reached. In 1999, approximately 765,000 cubic yards was pumped from MSA SJ-1 and the IWW onto the beach at Summer Haven. The dredged material has been pumped directly onto the beach at Summer Haven since 2007. This sand is fine grained with a low percentage of fine material (less than 5% passing a #200 sieve.) The fine sand placed on Summer Haven tends to migrate rapidly from the beach (FDEP 2000). Beach-quality sand dredged from the IWW near St. Augustine Inlet is typically placed on the beaches south of the inlet.

CHAPTER 2

EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS

2 EXISTING AND FUTURE WITHOUT-PROJECT CONDITIONS

2.1 GENERAL SETTING*

This chapter describes conditions as they currently exist, and as they are projected to exist if a project is not implemented, within the South Ponte Vedra Beach, Vilano Beach, and Summer Haven reaches. Information gathered in this step helps to describe the problems and opportunities, and forecast future conditions. The future without-project (FWOP) condition is the most likely condition of the study area without construction of a Federal project over the next 50 years.

It is projected that storm-induced erosion, inundation, and wave attack in the study area will continue damaging infrastructure, limiting habitat, and jeopardizing storm evacuation and relief efforts. Without a Federal project, it is likely that the sponsor and private homeowners would take steps to combat erosion and loss of property; running the risk that these efforts might not be coordinated in a holistic fashion, or incorporate regional concerns, such as sediment movement and environmental/habitat considerations.

The St. Johns County coastline totals 42 miles, spanning three island segments that vary in width from 750 feet to three miles. The islands are separated from the mainland by the Matanzas River, Guana River, Salt Run, and the Tolomato River. The Intracoastal Waterway (IWW) follows the Matanzas and Tolomato Rivers. A dune system backs much of the shoreline, varying in height from 10 to 21 feet, relative to the North American Vertical Datum of 1988 (NAVD88). This is approximately equal to 10.5 to 21.5 feet above Mean Sea Level (MSL).

In recent years, seawalls, or other protective armor, have been constructed along portions of the South Ponte Vedra Beach reach and the Vilano Beach reach, and it is anticipated that more will be constructed in the coming years. Such structures often protect one property while causing accelerated erosion to adjacent, unarmored properties, while cutting off the vital exchange of sand from dunes to the beach during storm events. By accelerating erosion and cutting off the dunes, the structures also negatively impact habitat of species such as nesting sea turtles. The South Ponte Vedra-Vilano Beach Restoration Association, Inc. (SPVV) has been created in order to evaluate shore protection opportunities available to the homeowners. The association in partnership with the county and state has completed the *St. Johns County Shore Stabilization Feasibility Study for South Ponte Vedra and Vilano Beach Regions* (PBS&J 2009) with results summarized in Chapter 1, under "prior non-federal Studies."

Without a project, certain portions of the study area, such as Summer Haven, may require abandonment and retreat in order to protect lives and property. Continued erosion, breaching, and

overwash of Summer Haven may eventually impact the Intracoastal Waterway (IWW), which follows the Matanzas River to the west of Summer Haven (Figure 1-1).

Storm damages, especially erosion, throughout most of the project area could jeopardize State Road A1A (SR A1A), which is designated as a National Scenic and Historic Coastal Byway, and is the only evacuation route for the region and a major north-south thoroughfare for the area. After the 2008 hurricane season, areas of the dune line were eroded to within five feet of SR A1A in portions of the Vilano Beach reach. SR A1A has already been relocated westward within the Summer Haven reach due to erosion.

2.2 PHYSICAL ENVIRONMENT (CONDITIONS)*

The study area consists of an open sandy coast subject to frequent storm events. Properties adjacent to the shoreline can be categorized as urban, and include residential, commercial, and recreational properties. Many factors influence the coastal processes characteristic to the St. Johns County, Florida shoreline. Natural factors include winds, tides, currents, waves, storm effects, and sea level rise. Human-related (anthropogenic) factors include other shore protection projects, navigation projects, and development. The role of each of these factors, and their contribution to beach erosion in St. Johns County, are briefly described in the following paragraphs. The county's population is approximately 220,000 and increases seasonally with tourist visits. An estimated 6.5 million tourists visit the county annually (sponsor-provided information) of which a large percentage visit the barrier islands and coastline.

2.2.1 STUDY REACHES

The 9.8 mile length of the study area is separated into three reaches referenced to FDEP R monuments:

- South Ponte Vedra: R84 – R104 (3.8 miles)
- Vilano Beach: R104 to R122 (3.7 miles)
- Summer Haven: R197 – R209 (2.3 miles)

2.2.1.1 SOUTH PONTE VEDRA BEACH

Census data are not available for South Ponte Vedra Beach. The website HomeTownLocator.com offers the following population information for the entire community of South Ponte Vedra Beach in which the study reach is located. South Ponte Vedra Beach has a population of 2,300. The population increases periodically throughout the year as vacationers visit the beach. 84% of housing units are occupied and 73% of these are occupied by the owner. The median household income is $146,000 (HomeTownLocator.com).

The South Ponte Vedra Beach reach begins at R84 (see Figure 1-1). This reach was added to the study area after the Reconnaissance Report was completed in 2004. Its addition was necessary due to increased erosion occurring around R90 in 2007. A significant and rapid loss of beach and dune width protecting several structures caused the Florida Department of Environmental Protection (FDEP) to designate R84 to R94 (2 miles) as a critically eroded area due to threats to infrastructure and SR A1A. The southern boundary of the reach was extended to R104 for this feasibility study to border the Vilano Beach reach and to investigate the feasibility of providing uninterrupted shore protection along the coast.



Figure 2-1: South Ponte Vedra Beach – May 11th, 2007.

To date, a number of homeowners have constructed temporary seawalls to protect their properties (Figure 2-1). The reach has a fairly narrow beach with a 15 to 20-foot natural dune. A single row of private homes is constructed on top of, or just landward of, the dune. SR A1A is sited landward of this single row of homes. Further landward of SR A1A, multiple rows of private homes are constructed

with a marsh bordering the western extent of construction. The northern end of the reach is surrounded by the Guana-Tolomato-Matanzas National Estuarine Research Reserve (GTMNERR), which extends, west to east, from the marsh into the Atlantic Ocean (Figure 2-2).

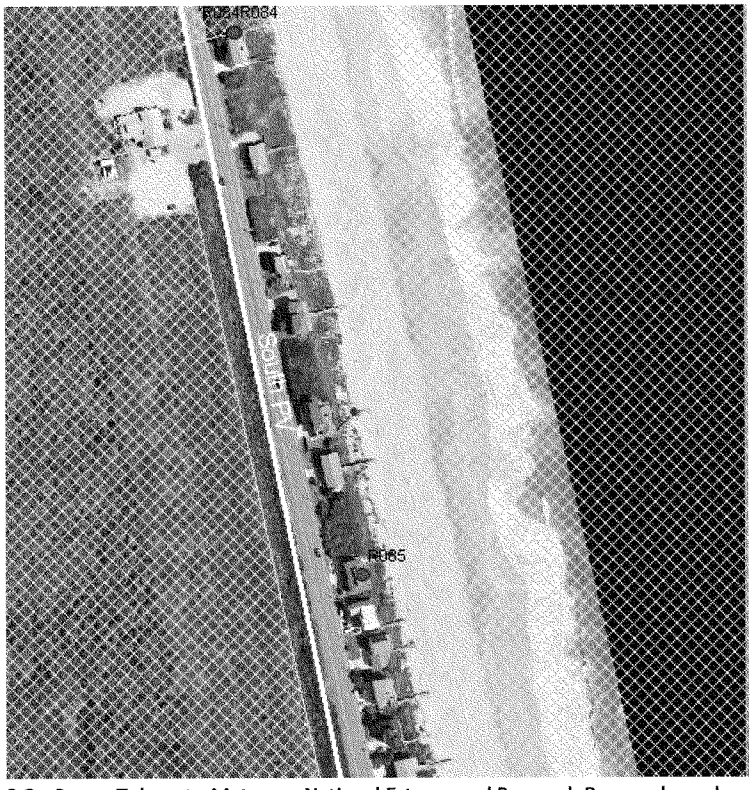


Figure 2-2. Guana-Tolomato-Matanzas National Estuary and Research Reserve boundary (green hatching) bordering the northern portion of the South Ponte Vedra Beach reach.

2.2.1.2 VILANO BEACH

According to the 2010 census, Vilano Beach has a population of 2,700 with a median age of 52. The population increases periodically throughout the year as vacationers visit the beach. Twenty-one percent of the population is over age 65, and 11.5% of the population is under age 15. Seventy-eight percent of housing units are occupied and 77% of these are occupied by the owner. The median household income is $52,000, and 11% of the population is below poverty level (2010-2014 American Community Survey Five-Year Estimates).

The Vilano Beach reach begins at R104, abutting the southern boundary of the South Ponte Vedra reach. The FDEP designated R109 – R117 (1.6 miles) as a critically eroded area in 2006 when rapid erosion began to threaten private development and SR A1A. Due to this erosion, several homes were condemned and five structures were granted permits to construct temporary shore protection structures around an erosional hotspot (an area of rapid and chronic erosion) in the vicinity of R114. Just south of this hotspot, the dune was eroded to within five feet of A1A after the passage of Tropical Storm Fay in 2008. As of 2015, the FDEP has designated R84 – R117 (6.5 miles) as critically eroded.



Figure 2-3. Vilano Beach – August 26th, 2008, including the erosional hotspot at R-114 following Tropical Storm Fay.

The shoreline from R117 to the sand trap groin at St. Augustine Inlet (approximately R122) was included as part of this study's Vilano Beach reach at the request of the local sponsor, St. Johns County. In general, this area has not seen the erosion apparent in the R104 to R117 area, possibly due to its proximity to the north sand trap groin of the St. Augustine Inlet, which inhibits the southward transport of sand.

The northern extent is geographically similar to the South Ponte Vedra reach with a narrow beach and a single row of private homes constructed on top of, or just landward of, a 20-foot high dune. The southern extent of the reach is typified by a 14-foot high dune (on average), multiple rows of development seaward of A1A, and a slightly wider beach north of St. Augustine Inlet. Throughout the reach, multiple rows of development are sited between SR A1A and the marsh.

2.2.1.3 SUMMER HAVEN

Census data is not available for Summer Haven. However, the population is much smaller than both the South Ponte Vedra Beach and Vilano reaches. Additionally, the population does not vary much during tourist seasons due to fewer rental properties, less available beach area, and lack of public beach access. There are approximately 60 structures, mainly single-family homes, within the Summer Haven reach.

The Summer Haven reach begins at R197, just south of the Matanzas Inlet. Development in this reach is sited on a narrow strip of land between a shallow marsh and the Atlantic Ocean. Shore protection of upland development has likely been necessary since original development occurred in the early 1900s. After severe nor'easters in 1962, the President declared St. Augustine Beach and Summer Haven disaster areas, and USACE constructed an 1,800-foot granite revetment along the northern portion of the reach between R197 and R200 (Figure 2-4). After Hurricane Dora in 1964, USACE added 1,070 linear feet of granite revetment to the existing revetment. This revetment fronts the majority of the upland development in the reach. South of the revetment, development is limited to one row of single-family residences. When possible, St. Johns County has been purchasing structures and lands in this southern area and not allowing further development.

SR A1A was originally built along the eastern edge of the reach, between the Atlantic Ocean and private homes. Frequent storm damage to the road prompted its re-siting landward to its current location. Approximately 2,700 feet and 3,600 feet of the original paved road (now called Old SR A1A) remain in the northern and southern extents of the reach respectively (Figure 2-4 and Figure 2-5).

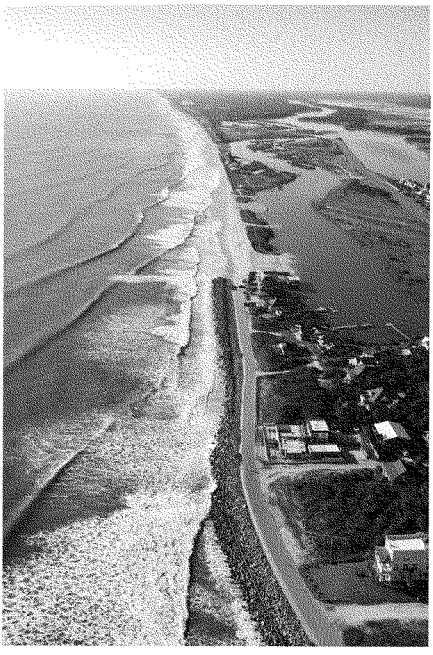


Figure 2-4. Summer Haven reach viewed from its northern end. Granite revetment protects paved sections of Old SR A1A.



Figure 2-5. Summer Haven reach viewed from its southern end. The entire reach is visible, with Matanzas Inlet in the upper right and Old SR A1A located just landward of the beach/dune.

As seen in Figure 1-1, the GTMNERR borders the western perimeter of the reach, but does not extend offshore of the reach as it does in South Ponte Vedra Beach. Figure 2-6 illustrates an example of the GTMNERR bordering a portion of the Summer Haven reach.



Figure 2-6. GTMNERR boundary (green hatching) bordering the Summer Haven reach.

A narrow beach is exposed at low- to mid-tide north of the revetment, however no significant beach exists seaward of the revetment. South of the revetment, a narrow beach and low dune system fronting private homes is periodically overwashed and breached by storm surge and waves. The most recent breaches occurred in September 2008 (Figure 2-7) during Tropical Storm Fay and October 2016 during Hurricane Matthew. The southern extent of the reach is fronted by a narrow beach exposed at low- and mid-tide and a constructed dune approximately five feet high.



Figure 2-7. Looking south along the Summer Haven reach (around R198). Granite revetment fronts the paved remnant of Old SR A1A. The breach at R200 is shown in the middle of the picture, just beyond the "Road Closed" sign.

2.2.2 HURRICANE EVACUATION ROUTES

EXISTING CONDITIONS

Storm damages, especially erosion, throughout most of the project area could jeopardize National Scenic and Historic Coastal Byway, SR A1A, which is the only evacuation route for the region and a major north-south thoroughfare for the area. After the 2008 hurricane season, areas of the dune line around R115, in the Vilano Beach reach, were eroded to within five feet of SR A1A. SR A1A has already been relocated westward within the Summer Haven reach due to erosion.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Without a project in place, SR A1A will likely be damaged in portions of the study area. The most vulnerable portion is approximately 500 feet north and 1,500 feet south of R115 in the Vilano Beach reach.

The Florida Department of Transportation (FDOT) has preliminary designs, but no permit or scheduled plans, to construct a seawall in this area for protection of the road. FWOP Beach-fx modeling for this study includes future construction of a seawall in this area. If the road were damaged, hurricane evacuation, emergency response, and storm recovery operations could be jeopardized. Compromising such operations could have life safety consequences.

Within the Summer Haven reach, SR A1A has been relocated landward and elevated, and the new location is west of the study area. Within the Summer Haven reach only, SR A1A is not considered subject to notable damage in its relocated position. However, approximately 2,700 feet and 3,600 feet of the original paved road (now called Old SR A1A) remain in the northern and southern extents of the reach and would be used by a limited number of locals during an evacuation. Old SR A1A is subject to erosion and inundation.

2.2.3 GEOLOGY

The St. Johns County barrier islands have inlets at St. Augustine and at Fort Matanzas. There are low tidal marshes and lagoons between the barrier islands and the mainland. The barrier islands are composed principally of quartz and carbonate sand, and are underlain by silty, clayey marsh deposits that formed at lower sea level stages. The sands are principally fine to medium-grained sand-sized quartz with variable amounts of shell and shell fragments.

Offshore of the beaches and modern barrier islands is the continental shelf. The continental shelf has a broad, shallow, low relief and extends approximately 80 miles offshore near St. Johns County. The shelf contains relic Pleistocene and Holocene terraces and submerged beach sand ridges. The wave climate and sediment transportation system creates a linear sandy coastline.

The northeast coast of Florida consists of a series of sandy barrier islands broken occasionally by inlets. The barrier islands are characterized by dunes and shore parallel beach ridges. Many of the islands display relic beach ridges formed during higher stands of sea level. The formations exposed at the surface are undifferentiated sediments and the Anastasia Formation of Pleistocene and Holocene age (Scott, et al., 2001). These deposits consist of fine to medium quartz sand and lenses of shell and clay of varying thickness. Thick shell beds and erosion of the outcrops of the Anastasia formation near the coast have been firmly cemented to form coquina rock (see Section 2.3.4 for additional information).

The quartz component of the modern barrier island sand has deposited from sand migrating southward along the Atlantic coast, from the reworking of the Pamlico Sand that was previously deposited over the entire region. The remaining component of coastal sediments are typically carbonates, locally produced by calcite-producing plants and animals. Additional carbonate materials are from reworked materials from outcropping Pleistocene formations offshore (Duane and Meisburger, 1969).

2.2.4 NATIVE BEACH

EXISTING CONDITIONS

The native sand on St. Johns County's beaches consists predominately of shelly, poorly sorted, fine to medium grained quartz and carbonate sand, with silt content that averages less than two percent, and ranges in color from light gray and white to brownish gray. The amount of visual shell varies from 3% to 84%, and generally is concentrated on the dry beach above Mean Low Water (MLW). The carbonate content originates from coquina rock outcrops of the Anastasia formation located in the surf zone. Due to the high content of shell, the sediments throughout the berm and mid-tide are significantly coarser than the rest of the beach profile. Some stretches of beach contain a high percentage of coquina shell fragments, which give the sand an orange hue.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of the native beach are similar to the existing conditions described above. No change to the sand composition of the native beach are anticipated to occur without the project. With respect to the habitat provided by the native beach in the future without-project condition, increased erosion could decrease the habitat available to nesting sea turtles and to wintering piping plover and red knot. In less developed areas, a potential overwash could increase habitat for piping plover.

2.2.5 SAND SOURCES

The study includes three separate potential sand sources for any necessary beach or dune placement material: the St. Augustine Inlet system, including the ebb, flood, Vilano Point shoals, and the Federal navigation channel; the North Offshore Borrow Area (NOBA); and the South Offshore Borrow Area (SOBA).

2.2.5.1 ST AUGUSTINE INLET SYSTEM SAND SOURCES: EBB, FLOOD, AND VILANO POINT SHOALS, AND FEDERAL NAVIGATION CHANNEL

EXISTING CONDITIONS

In conjunction with this investigation, a Regional Sediment Management (RSM) analysis incorporating navigation projects near the study area (Intracoastal Waterway and St. Augustine Inlet) and the constructed Federal shore protection project at St. Augustine Beach has sought to integrate current and future project sand needs around the inlet vicinity. This work is published in the Engineer Research and Development Center (ERDC) 2016 technical report, *Regional Sediment Management Strategies for the Vicinity of St. Augustine Inlet, St. Johns County, Florida*, ERDC/CHL TR-16-12. The technical report is based, in part, on investigations and modeling completed between 2010 and 2012 cited in the state's Inlet Management Plan for St. Augustine Inlet.

The St. Augustine Inlet system has approximately 6.5 million cubic yards of beach quality sand per FDEP permitting standards. FDEP permits any dredging that would be necessary to access this source. The FDEP

St. Augustine Inlet Management Plan states 278,000 cubic yards of sand can be dredged from the inlet system per year. The material obtained from the inlet system shall be distributed to the adjacent Atlantic Ocean fronting beaches with a placement ratio of approximately one third of material placement to the north and two thirds of material placement to the south. Further details on the inlet system sand sources are available in the Geotechnical Appendix.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Without a project, the channel and shoals of the St. Augustine Inlet will continue to require regular maintenance dredging as part of the authorized Federal navigation project. Accretion of sediment within the inlet system has the potential to increase habitat for wintering shorebirds that congregate on ephemeral, unvegetated shoals near inlets. In addition, the northern end of Anastasia State Park may migrate and change. This may affect beach mouse habitat if the dunes are altered, which could be either a positive or negative impact depending on the future morphology of the northern shoreline.

2.2.5.2 OFFSHORE SAND SOURCES

EXISTING CONDITIONS

The offshore sand sources are sand shoals on the Outer Continental Shelf. Additional details on the offshore sand sources are available in the Geotechnical Appendix. There are an estimated 400 million cubic yards of sand within the North Offshore Borrow Area (NOBA). Of this, 16 million cubic yards has been fully developed with core borings and related analysis. There are an estimated 130 million cubic yards of sand within the South Offshore Borrow Area (SOBA), of which 14 million cubic yards has been fully developed.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of the offshore borrow areas (NOBA and SOBA) are similar to the existing conditions described above.

2.2.6 SHORELINE CHANGE AND EROSION RATES

EXISTING CONDITIONS

Shoreline surveys dating back to 1952 indicate that the St. Johns County shoreline as a whole is experiencing erosion at a rate of 1.0 feet/year (FDEP 2000). Shoreline changes fluctuate over time along the study area. The shoreline of St. Johns County has fluctuated throughout history, with areas undergoing both advancement and recession of the Mean High Water (MHW) position. The analysis detailed in the Engineering Appendix showed that over the long term, from 1972 to 2015, the study area has been receding. In the time between 1972 and 2015, the MHW position in South Ponte Vedra receded an average of 1.3 feet/year. In the Vilano Beach 1 segment, the MHW position receded 1.7 feet/year on

average, while in the Vilano Beach 2 segment, directly north of the St. Augustine Inlet, the MHW position advanced seaward an average of 0.3 feet/year.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The shoreline should experience similar rates of erosion and accretion in the future without-project conditions as described in the existing conditions section above. However, sea level rise may accelerate coastal erosion rates and increase impacts resulting from erosion. Section 2.2.13 provides additional information on sea level change with respect to this study.

2.2.7 WINDS

EXISTING CONDITIONS

Local winds are the primary means of generating the small-amplitude, short period waves that are an important mechanism of sand transport along the study area shoreline. Winds that drive sediment transport from the east-southeast quadrant are generally mild in nature and occur in the spring and summer months. Elevated wind speeds from the north-northeast quadrant in fall and winter months occur during passage of nor'easters, which can cause extensive beach erosion and shorefront damage. Occasionally the area is impacted by the passage of tropical storms that can generate devastating winds, waves, and storm surge, which can cause direct damage to coastal structures and infrastructure.

The Engineering Appendix provides additional detail on winds.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of winds are similar to the existing conditions described above.

2.2.8 WAVES

EXISTING CONDITIONS

The wave energy dissipation that occurs as waves enter the nearshore zone and break is the principal driver for sediment transport. Wave height, period, and direction, in combination with tides and storm surge, are the most important factors influencing the behavior of the beach and dune system. The study area is exposed to both short period wind-waves and longer period open-ocean swells originating predominantly from the northeast during spring, fall, and winter months and from the northeast to the southeast during summer months.

Periodic erosion of the study area and associated damage to upland development is attributable to large storm waves produced primarily by nor'easters during the late fall and winter months, and by tropical disturbances, including hurricanes, during the summer months. Because the study area is fully exposed to the open ocean in all seaward directions, the coastline is vulnerable to wave attack from distant storms

(causing long period swells) and local storms (causing short period steep waves). Tropical storm passage is relatively frequent for the study area and even without landfall a system passing within several hundred miles may cause extensive erosion damage to the area. The Engineering Appendix provides additional detail on waves.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of waves are similar to the existing conditions described above.

2.2.9 ASTRONOMICAL TIDES

EXISTING CONDITIONS

Astronomical tides are created by the gravitational pull of the moon and sun and are well understood and predictable in magnitude and timing. The National Oceanic and Atmospheric Administration (NOAA) regularly publishes tide tables for selected locations along the coastlines of the United States and selected locations around the world. These tables provide times of high and low tides, as well as predicted tidal amplitudes.

Tides in St. Johns County area are semidiurnal, meaning two high tides and two low tides occur per tidal day. Tidal datums for St. Augustine Beach (NOAA station 8720587) and Vilano Beach ICWW (NOAA station 8720554) are summarized in Table 2-1 and Table 2-2, respectively. The St. Augustine Beach water level station is located on the St. Augustine Beach pier and represents open ocean water levels while the Vilano Beach water level station is located in the Intracoastal Waterway on the SR A1A bridge and represents tides affecting the marsh side of the barrier islands. The difference between Mean High Water (MHW) and Mean Low Water (MLW), known as the mean tide range, equals 4.61 feet at St. Augustine Beach and 4.24 feet at Vilano Beach, Intracoastal Waterway gage.

Table 2-1. Tidal Datums for St. Augustine Beach, FL on the Atlantic Ocean Coast.

Tidal Datum	Elevation Relative to NAVD88 (feet)
Mean Higher High Water (MHHW)	2.01
Mean High Water (MHW)	1.64
North American Vertical Datum (NAVD88)	0.00
Mean Sea Level (MSL)	-0.70
Mean Low Water (MLW)	-2.97
Mean Lower Low Water (MLLW)	-3.13

Table 2-2. Tidal Datums for Vilano Beach, FL on the Marsh Side of the Island.

Tidal Datum	Elevation Relative to NAVD88 (feet)
Mean Higher High Water (MHHW)	1.86
Mean High Water (MHW)	1.53
North American Vertical Datum (NAVD88)	0.00
Mean Sea Level (MSL)	-0.56
Mean Low Water (MLW)	-2.71
Mean Lower Low Water (MLLW)	-2.89

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of tides are similar to the existing conditions described above.

2.2.10 CURRENTS

EXISTING CONDITIONS

Nearshore currents affect the supply and distribution of sediment on the sandy beaches of St. Johns County and are composed of alongshore and cross-shore components. Alongshore currents, induced by oblique wave energy, generally determine the long-term direction and magnitude of littoral transport. Cross-shore currents may have a more short-term impact, but can result in both temporary and permanent erosion. The magnitude of these currents is determined by the wave characteristics, angle of waves from offshore, configuration of the beach, and the nearshore profile. For St. Johns County beaches, the net sediment transport is from north to south. This is due to the dominant wave activity from the northeast during the fall and winter months, particularly nor'easter storms.

Adjacent to the St. Augustine Inlet, currents are affected by the ebb and flood tidal flow through the inlet. The terminal groin structure on the north side of St. Augustine Inlet also provides varying degrees of influence on nearshore currents depending on its exposure level.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of currents are similar to the existing conditions described above.

2.2.11 STORM EFFECTS

EXISTING CONDITIONS

The beaches of St. Johns County are influenced by tropical systems during the summer and fall and by nor'easters during the late fall, winter, and spring. Although hurricanes typically generate larger waves and storm surge, nor'easters typically have a greater cumulative impact on the shoreline due to longer storm duration and greater frequency of event occurrence. Periodic and unpredictable hurricanes and coastal storms, with their energetic breaking waves and elevated water levels, can change the width and elevation of beaches and accelerate erosion as depicted in Figure 2-8.

The shoreline is expected to naturally modify its beach profile during storms. Storms erode and transport sediment from the subaerial beach into the active zone of storm waves. Once caught in the waves, this sediment is carried along the shore and redeposited farther down the beach, or is carried offshore and stored temporarily in submerged sand bars.

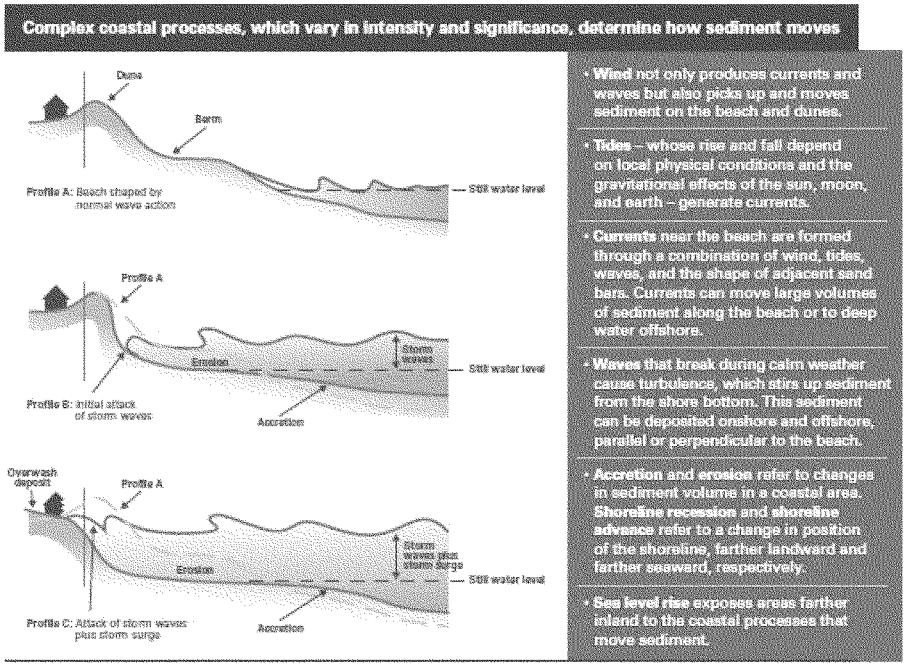


Figure 2-8. Typical coastal processes (from Shore Protection Assessment primer published by USACE-Engineer Research Development Center-ERDC).

After storms pass, waves usually return sediment from the sand bars to the beach, which is restored gradually to its natural equilibrium profile. However, extreme storm events may cause sediment to leave the beach system entirely, sweeping it into inlets, into the back bay (overwash), or moving it far offshore into deep water where waves cannot return it to the beach. This causes the shoreline to recede, or move farther landward.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of storms are similar to the existing conditions described above. As sea level in the study area rises in the future, storm effects will be occurring on top of that elevated water level. This will result in storm effects reaching further inland.

2.2.12 STORM SURGE

EXISTING CONDITIONS

Storm surge is defined as the rise of the ocean surface above its astronomical tide level due to physical forces. Surges occur primarily as a result of atmospheric pressure gradients and surface stresses created by wind blowing over a water surface. Strong onshore winds pile up water near the shoreline, resulting in elevated water levels along the coastal region and inland waterways. In addition, the lower atmospheric pressure which accompanies storms also contributes to a rise in water surface elevation. Extremely high wind velocities coupled with low barometric pressures (such as those experienced in tropical storms, hurricanes, and very strong nor'easters) can produce very high damaging water levels. Water level (with storm surge) time series are critical for input into shoreline response and coastal storm risk modeling applications. An increase in water depth may increase the potential for coastal flooding and allow larger storm waves to attack the shore.

The return period storm surge events can provide insight into the vulnerabilities of a given location through comparison with the existing topography. Table 2-3 provides peak storm surge heights by return period for St. Augustine Inlet, Florida. Storm surge levels versus frequency of occurrence presented in Table 2-3 were obtained from data compiled by the University of Florida for the Florida Department of Transportation (Sheppard and Miller, 2003).

Table 2-3. Peak Storm Tide Elevations.

Storm Return Period	Peak Storm Surge Height		
(years)	ft-NGVD29	ft-NAVD88	ft-MSL
10	3.6	2.5	1.8
20	5.4	4.3	3.6
50	9.6	8.5	7.8
100	12.3	11.2	10.5
200	14.5	13.4	12.7
500	16.9	15.8	15.1

FUTURE WITH-OUT PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of storm surge are similar to the existing conditions described above. As sea level in the study area rises in the future, storm surge will be occurring on top of that elevated water level. This will result in higher observed total water levels associated with storm surge events.

2.2.13 SEA LEVEL CHANGE

EXISTING CONDITIONS

It is anticipated that the global mean sea level will rise within the next 100 years. To incorporate the direct and indirect physical effects of projected future sea level change (SLC) on design, construction, operation, and maintenance of coastal projects, USACE has provided guidance in the form of Engineer Regulation, ER 1100-2-8162, and Engineer Technical Letter (ETL) 1100-2-1. Three estimates are required by the guidance; a baseline (or "low") estimate, which is based on historic sea level rise (SLR) and represents the minimum expected SLC, an intermediate estimate, and a high estimate representing the maximum expected SLC.

The study area is located between 30 and 45 miles from NOS gage #8720218 at Mayport, Florida. The historical sea level rise rate taken from this gage was determined to be 2.40 mm/year (0.0079 feet/year) (http://corpsclimate.us/ccaceslcurves.cfm). Given a project base year of 2020, a table of SLC rates was produced for each of the three required scenarios through the 50-year planning horizon and up to the year 2120. Additional detail on sea level change is provided in the Engineering Appendix.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Figure 2-9 provides a graphic representation of the three levels of projected future SLC over a 100-year period. The project area can expect to see sea level rise 0.4 to 2.4 feet above its current position within the 50-year planning horizon, as predicted by the low and high SLC rates, respectively.

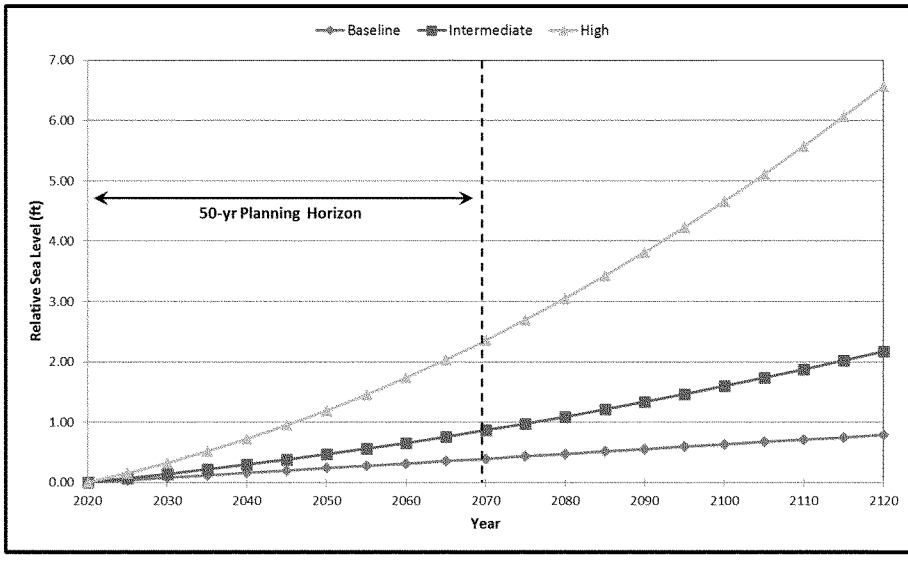


Figure 2-9. Relative Sea Level Change, St. Johns County, FL.

2.2.13.1 SHORELINE CHANGE RESULTING FROM SEA LEVEL RISE

An estimate of the rate of shoreline recession can be based on the local rate of SLC in some cases. With a change in sea level, the beach profile will attempt to reestablish the same bottom depths relative to the surface of the sea that existed prior to sea level change. That is, the natural profile will be translated upward and shoreward to maintain equilibrium. If the longshore littoral transport in and out of a given shoreline is equal, then the quantity of material required to reestablish the nearshore slope must be derived from erosion of the shore.

The above estimation is applicable to long straight sandy beaches with an uninterrupted supply of sand and should only be used for estimating long-term changes. Additional detail is given in the Engineering Appendix. Figure 2-10 provides an estimate of the potential shoreline changes within the project area attributable to projected changes in sea level.

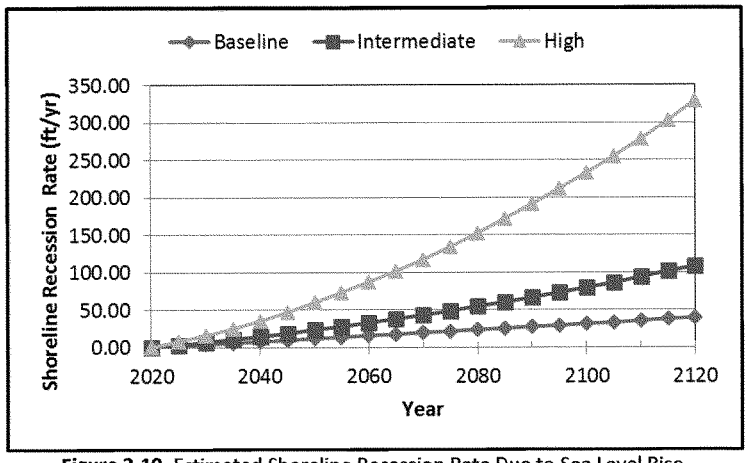


Figure 2-10. Estimated Shoreline Recession Rate Due to Sea Level Rise.

2.2.13.2 VOLUMETRIC CHANGE RESULTING FROM SEA LEVEL RISE

Engineering Manual (EM) 1110-2-3301 (USACE, 1995) gives guidance on how to calculate beach volume based on berm height, depth of closure, and translation of the shoreline (in this case, shoreline recession). Figure 2-11 provides an estimate of the shoreline volume loss as a result of the three SLR scenarios.

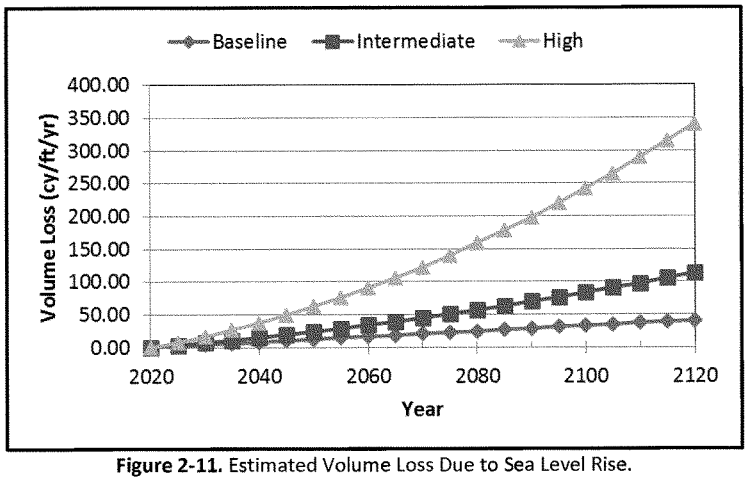


Figure 2-11. Estimated Volume Loss Due to Sea Level Rise.

2.2.13.3 INCORPORATION OF ER 1100-2-8162 AND ETL 1100-2-1: GUIDANCE FOR SEA LEVEL CHANGE

The SLC ETL 1100-2-1, supporting ER 1100-2-8162, suggests a tiered analysis to determine the risk of potential SLC and resulting incorporation into the plan formulation process. Incorporation of potential SLC into the USACE planning process will require active focus on risk-based scoping to define pertinent needs, opportunities, and the appropriate level of detail for conducting investigations. In particular, close attention is needed at the beginning of each study in order to screen planning/scoping decisions. The tiered analysis for SLC is incorporated into the six-step planning process used in this report. Mean Sea Level (MSL) is used as an elevation reference in this section of the report, as it is generally more intuitive for readers when describing changes to existing water elevations.

In order to evaluate SLC impacts to infrastructure, critical resources, and the population residing in the study area, a qualitative matrix was developed in Table 2-4. Resources evaluated in the matrix were based on those identified by the USACE Coastal Systems Portfolio Initiative (CSPI). CSPI describes the resource risk in a project area relative to the density of the resource, the population density that the resource serves, or in the case of environment, habitat, and recreation, the value placed on the resource. See http://navigation.usace.army.mil/CSPI for more information. The evaluation criteria shown in the table is from, *Technical Review of Coastal Projects: Storm Risk Management, Navigation and Ecosystem Restoration for Nation's Coastlines* (USACE, Spring 2012.)

The qualitative matrix shown in Table 2-4 evaluates the resources on which the study area depends. In addition to the CSPI evaluation criteria, Table 2-4 evaluates the vulnerability to resources from potential SLC, or SLR in the case of the study area. Averaging the "Vulnerability from SLR" to resources gives an average of 1.2, equating to a relatively low vulnerability of resources. This indicates that SLR is not a major contributor to overall resource vulnerability within the 50-year period of analysis.

Table 2-4. Qualitative Matrix describing vulnerability of resources from potential accelerations in sea level change.

Resource	Risk Rating from CSPI - Value or density of resource or dependent population (3=high, 2=med., 1=low, X=none present)	Description	Vulnerability from SLR (3=high, 2=med., 1=low, X=none present)	Description
Residential/commercial structures	2	Mostly residential (single-family and multi-family homes.) Most ground floor elevations of structures vary between 10.5 and 20.5 feet above existing Mean Sea Level (MSL) throughout the study area. Most ground floor elevations within the Tentatively Selected Plan (TSP) area are approximately 15.5 feet above existing MSL.	1	Projected high scenario SLC would not place Mean Sea Level (MSL) near infrastructure within the 50 year planning horizon and would increase the flood frequency very minimally. Typical surge experienced in the project area from large coastal storms is between 2.5 to 4.3 feet (10 and 20 year return period, respectively.) This indicates that SLR is not a major contributor to future damages over the 50 year planning horizon.
Environment and Habitat	3	Beach/dune habitat. Fairly narrow, steep beach backed by average 15.5 feet high dunes. Where no dune exists, seawalls of varying quality have been constructed.	2	Beach berm and dune system is located between 10.5 and 20.5 feet above MSL throughout the study area. Sub aerial habitat is located throughout this system.
Infrastructure (roads, water/sewer lines, boardwalks, navigation structures)	2	Water/sewer lines, septic tanks, seawalls and dune walkovers exist. State Road A1A is located between 10.5 and 20.5 feet above MSL throughout the study area. The road is located approximately 15.5 feet above MSL within the TSP area. Most other infrastructure would not be impacted until water level, including storm surge, reached above this point. The 10-year return period storm tide level is equal to 1.8 feet above MSL, including tide and effects from waves wave setup.	1	By the end of the 50 year planning horizon, State Road A1A remains adequately elevated above MSL under any SLC scenario. Other infrastructure located at, or above, this elevation is also adequately elevated. Wooden boardwalks (typically built over the dunes to allow beach access) have portions lower than this elevation and are more subject to damage. However, they are not high value, or critical, infrastructure.
Critical Facilities (police, fire, schools, hospitals, and nursing homes)	1	low density of critical facilities	1	Elevation of most critical facilities remains above MSL under any SLC scenario by the end of the 50-year planning horizon.
Evacuation Routes	3	State Road A1A is the main north/south evacuation route, located approximately 15.5 feet above MSL within the TSP area.	1	By the end of the 50 year planning horizon, State Road A1A remains adequately elevated above MSL under any SLC scenario. Even under the high SLC scenario, a 13-foot difference would remain between MSL and A1A within the TSP area.
Recreation	3	significant recreational use of beaches	1	Beach berm is between 10.5 and 20.5 feet above current MSL throughout the study area. Recreational use of beach is high around public access points.
		average =	1.2	**Low Vulnerability**

Overall, the initial analysis above indicates that the project area vulnerability to SLC is relatively low. A relatively low risk from SLC in the project area, combined with high uncertainty over potential accelerations in the rate of SLC, lead to an adaptive management strategy as shown in Figure 2-12.

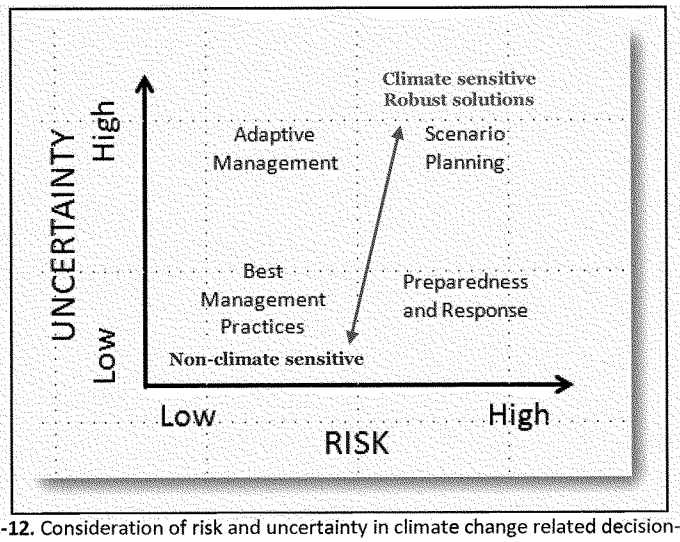


Figure 2-12. Consideration of risk and uncertainty in climate change related decision-making.

Elevations within the study area (Atlantic Ocean side of the island) are some of the highest on the barrier island, about 14.5 to 20.5 feet above Mean Sea Level (MSL). Elevations on the marsh side of the island are significantly lower. Although the marsh side of the island is not within the current study area, stakeholders should be aware of increased risk to infrastructure there as sea level rises. Cross-island profiles were taken at three points throughout the study area, shown in Table 2-5. As reflected in the table, the profiles of the island slope downward from the dune, located on the Atlantic Ocean, to the marsh side of the island where structures are generally located around 5.5 to 6.5 feet above current MSL. There may be other locations with lower elevations. However, these cross-island profiles represent the general topography within, and adjacent to, the study area.

Table 2-5. Key Elevations along Cross-Island Profiles.

	Ground elevations in feet (MSL)*			
R-monument of Profile	**Dune**	**State Road A1A**	**Atlantic Ocean-side Structures**	**Marsh-side Structures**
R-97	18.5	18.5	18.5	6.5
R-110	24.5	20.5	20.5	6.5
R-119	14.5	10.5	12.5	5.5

*elevations are approximate, based on 2015 bare-earth LiDAR given in NAVD88. Difference between NAVD88 and MSL on ocean side is -0.7 ft. Difference between NAVD88 and MSL on marsh side is -0.6 ft.

The island profile taken at R110 is shown in Figure 2-13. Marsh side areas of the island will likely be impacted by inundation more frequently than the ocean side as sea level rises, especially during extreme high tide events. In the study area, the majority of the oceanfront area is fronted by relatively high dunes as shown in Figure 2-13.

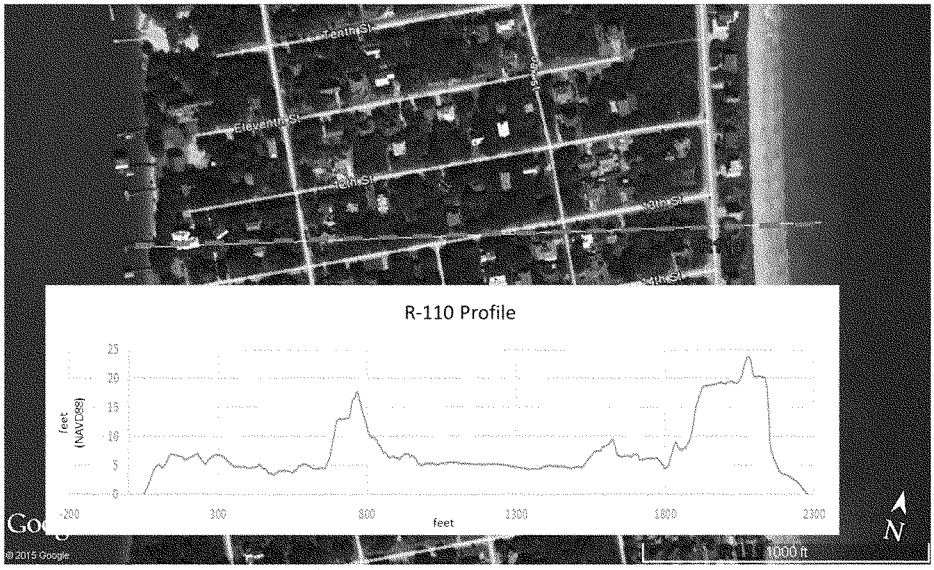


Figure 2-13. Cross-island profile taken at R110. Elevations are relative to NAVD88.

A key question, when assessing the vulnerability of the study area to SLC, is when critical thresholds will be crossed, if at all, by potential SLC. Throughout the study area, the dune crest height represents a critical threshold. The average dune height from Table 2-5 is 19 feet (MSL). SR A1A, and other infrastructure, is located slightly lower, on average, at 17 feet (MSL). Since the dune lies between the ocean and infrastructure, the dune height (19 feet) will be used as the ocean side critical elevation.

The maximum 50-year storm tide elevation in the study area is given as 7.8 feet MSL in Table 2-3. Water elevations during such storm events could reach the top of the dunes (19 feet MSL) once sea level increases by about 11.2 feet (7.8 feet storm tide + 11.2 feet sea level increase = 19 feet). This estimate does not take erosion of the dune height into consideration, which could occur over time. At the end of 50 years, sea level may increase by 2.4 feet under the high SLR scenario, significantly below the threshold of 11.2 feet.

ETL 1100-2-1 recommends that systems related to, but existing outside the study area, should also be evaluated for vulnerability to SLC. The marsh side of the island does not contain any critical infrastructure on which the study area depends, such as hospitals or emergency services. However, although the study area is not dependent on marsh side infrastructure, the marsh side of the island is potentially vulnerable to SLC. Infrastructure on the marsh side is generally built at, or above, 6 feet MSL as seen in Table 2-5. This side of the island is mainly affected by tides, not storm surge. Tidal range on the marsh side of the island is smaller than the ocean side.

Table 2-2 shows that Mean Higher High Water (MHHW) is equal to 2.4 feet MSL. Infrastructure could be periodically impacted once sea level increases by about 3.6 feet (2.4 feet + 3.6 feet sea level increase = 6 feet). At the end of 50 years, sea level may increase by 2.4 feet under the high SLR scenario, which is below the threshold of 3.6 feet. The high scenario is predicted to surpass this threshold in approximately 85 years after the base year, as seen in Figure 2-14. In such a case, infrastructure on the back side of the island could be impacted during higher high tide events, dependent on current and future construction to protect against elevated water levels such as seawalls and bulkheads.

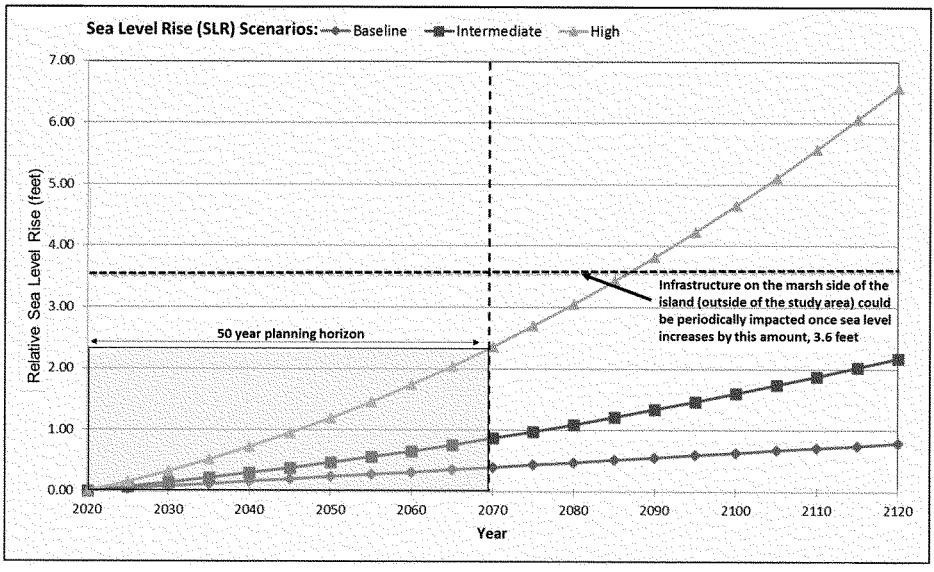


Figure 2-14. Threshold vulnerability on the marsh side of the island to relative sea level rise.

The existing Coastal Vulnerability Index (CVI) developed by the United States Geological Survey (USGS) is a useful indicator of a project area's natural vulnerability to SLC. Population, and infrastructure type, or density, are not parameters used in the assessment. The USGS used six input parameters to assess the CVI for geographic areas along the nation's shoreline. Parameters used include geomorphology, coastal slope, relative SLC, shoreline erosion/accretion, mean tide range, and mean wave height (USGS 2000). Figure 2-15 shows the CVI for the study area is rated as moderate to high based on the area being part of an erosional barrier island surrounded by sandy beaches and salt marsh.

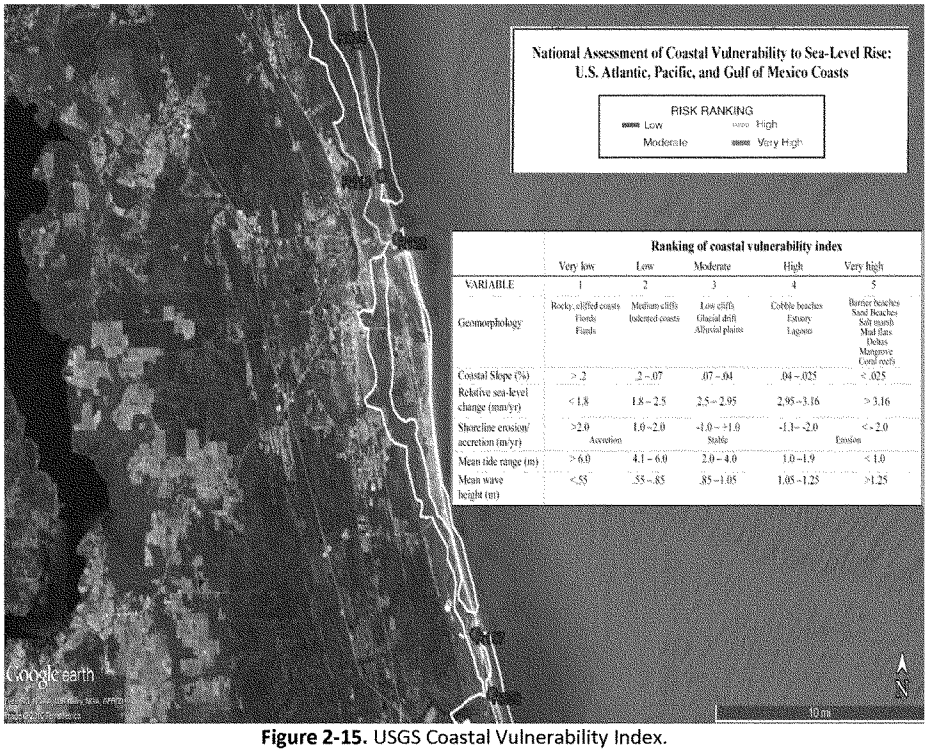


Figure 2-15. USGS Coastal Vulnerability Index.

2.2.14 EFFECTS OF OTHER COASTAL STORM RISK MANAGEMENT (CSRM) AND NAVIGATION PROJECTS

EXISTING CONDITIONS

St. Augustine Harbor Federal Navigation Project is located adjacent to the southern end of the Vilano Beach reach. The harbor inlet is stabilized by a northern sand trap groin and southern jetty. Both of the structures act to impound material. Sediment transport around the tip of the north sand trap groin is visible in the form of nearshore shoaling in an area referred to alternately as Vilano Point, Vilano Shoal, or Porpoise Point. The inlet itself acts as an effective sediment sink, experiencing accretion in the channel, as well as the developing ebb and flood shoals. Throughout this report all of these accretional areas, including the shoals and inlet channel, are referred to as the, "inlet system."

The ebb tide shoal of St. Augustine Inlet was used as a sand source for the initial beach nourishment of the St. Johns County Shore Protection Project (SPP) at St. Augustine Beach in 2001, as well as for subsequent nourishments. In 2012, portions of the inlet system, including the entrance channel, ebb shoal, and Vilano Shoal, were dredged as a sand source for renourishment of the project. These actions benefit the navigation mission by maintaining a navigable depth within the inlet. The Engineering Appendix offers additional information on the effects of adjacent projects.

Matanzas Inlet is not maintained for navigation. The inlet has a history of migrating to the south, but is now held in place by the south abutment of the SR A1A bridge over the inlet.

The IWW near Matanzas Inlet is subject to shoaling and must be regularly dredged to maintain navigation. Maintenance dredging of the channel is between 150,000 to 200,000 cubic yards per year (personal communication, FIND 2003). This material can be pumped into the dredged material management area, MSA SJ-1, until the 800,000 cubic yard capacity is reached. In 1999, approximately 765,000 cubic yards of material was pumped from MSA SJ-1 and the IWW onto the beach at Summer Haven. SJ-1 was last used in 2004, however in 2007 and 2011, the dredged material was pumped directly onto the beach at Summer Haven. This sand is fine grained with a low percentage of fine material (less than 5% passing a #200 sieve). A 2016 maintenance event is planned with approximately 400,000 cubic yards expected to be dredged and placed onto the beach at Summer Haven.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions of other CSRM and navigation projects are similar to the existing conditions described above. The Federal navigation channel would continue to be used as a sand source for the authorized and previously constructed St. Johns County Shore Protection Project (SPP) at St. Augustine Beach. Inlets are dynamic features, and the shoreline morphology at the northern end of Anastasia State Park may change in the without-project condition. As will be described later in this report, the inlet system will be used as a sand source for the Recommended Plan.

2.2.15 PUBLIC ACCESS AND PARKING

EXISTING CONDITIONS

Federal participation in CSRM projects involving placement of sand is limited to shorelines open to public use. Guidance is provided in ER 1105-2-100 and ER 1165-2-130. Cost sharing for any recommended plan is based on shoreline ownership, use, and the availability of public access.

The South Ponte Vedra reach (R84-R104) contains only two signed public access points with parking, which significantly limits any Federal participation in a potential project. At the time of this writing, the non-federal sponsor does not intend to add public access or parking in the near future. The Vilano Beach reach (R104-R122) has signed public access at least every ½ mile with several, but not all, of the accesses having adequate public parking. The Summer Haven reach (R197-R209) contains no maintained public access

or signed public parking, severely limiting any Federal participation in a potential project. In the northern extent of the reach, unofficial public parking is available on the shoulder of Old SR A1A between the revetment and the road between R198 and R199. However, no signs indicate "public parking."

Figure 2-16 depicts signed public access and parking within the South Ponte Vedra Beach and Vilano Beach reaches. The green points are existing public access locations with free public parking recorded by FDEP and verified by USACE, Jacksonville District. Pink points indicate public accesses without parking.



Figure 2-16. Public access and parking within the South Ponte Vedra Beach and Vilano Beach Reaches.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE*)

Public access and parking are not expected to change between the existing and future without-project conditions.

2.3 NATURAL (GENERAL) ENVIRONMENT*

2.3.1 VEGETATION

EXISTING CONDITIONS

Coastal development has limited the dune system to relatively small portions of the three reaches. The intact dunes are dominated by a mixture of sea oats, beach pennywort, gaillardia, saltwort, sea rocket, railroad vine, prickly-pear cactus, and beach tea. In addition, a colony of the invasive exotic suckering Australian pine (*Casuarina glauca*) was located on Summer Haven beach at the southern terminus of the September 2008 breach. The majority of the three reaches are heavily developed, and the dune environment is degraded or non-existent. This is due to the construction of homes, hotels, restaurants, and condominiums, and to the continuing erosion of the beach and foredune. In these areas, there are landscape plantings that include native and exotic ornamental species. Finally, extensive expanses of salt marsh, dominated by cordgrass (*Spartina alterniflora*) and needle rush (*Juncus roemerianus*), occur inland of the three reaches.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE*)

Without the proposed project, the dune will continue to erode and eventually be eliminated, along with the associated dune vegetation, in the developed portions of the shoreline. Salt marsh vegetation will remain unchanged in the future without-project condition.

If an overwash or breach of the island were to occur in the Summer Haven reach, there could be a temporary negative impact on the marsh and seagrass habitat. Overwash is a natural dynamic of barrier islands as sea level rises. Marsh and seagrass habitats can tolerate a certain level of disturbance due to the dynamic nature of these environments. It would be expected that these habitats would recover on a relatively short timescale.

2.3.2 FISH AND WILDLIFE RESOURCES (OTHER THAN THREATENED AND ENDANGERED SPECIES)

EXISTING CONDITIONS

The biological communities found in the project area are well adapted to highly dynamic intertidal zones, and must cope with being aerially exposed during normal tidal cycles, as well as being subjected to the high energy of the ocean waves. These habitats can have low species diversity due to the harshness of the environmental conditions. However, animals that are able to successfully adapt to these dynamic

conditions are faced with very little competition from other organisms. Receding waves tend to wash amphipods (shrimp-like crustaceans) and isopods (small crustaceans such as woodlice) out of their burrows and suspend these organisms in the water column where they serve as an important food source for a variety of nearshore fish, including species among the snapper-grouper complex. A variety of polychaete worms that are also adapted to this highly dynamic and stressful environment can be found within the intertidal zone of the St. Johns County beaches. These intertidal organisms provide an important food source for foraging shore and wading birds, including least tern (*Sternula antillarum*), Wilson's plover (*Charadrius wilsonia*), black skimmer (*Rynchops niger*), and American oystercatcher (*Haematopus palliates*). The dominant invertebrate found along the shoreline of St. Johns County is the Atlantic coquina clam, *Donax variabilis*. Highly visible decapod crustaceans of the St. Johns County swash zone also include the ghost crab (*Ocypode quadrata*), mole crab (*Emerita talpoida*), and Atlantic fiddler crab (*Uca pugilator*). These organisms are highly motile, and burrow into the moist sand for refuge and to retard water evaporation from their bodies during aerial exposure. Coastal inlets provide migration routes for larvae entering nursery areas, and for sub-adults leaving nursery areas to mature and spawn offshore. Important species utilizing the St. Augustine Inlet and its ebb shoal include king mackerel (*Scomberomorus cavalla*), Atlantic Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*).

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Species that utilize the beach environment may decrease in number due to continued erosion of the beach and dune system in the future without-project condition. No changes to fish and wildlife resources that reside below the swash zone would occur in the future without-project condition.

2.3.3 THREATENED AND ENDANGERED SPECIES

Threatened and endangered species that may occur in the project area and be affected by the proposed work are found in Table 2-6.

Table 2-6. Species protected under the Endangered Species Act that are located in the project area and that may be affected by the proposed project.

Common Name	Scientific Name	Federal Listing Status under ESA
Green Turtle	*Chelonia mydas*	Endangered
Loggerhead Turtle	*Caretta caretta*	Threatened
Leatherback Turtle	*Dermochelys coriacea*	Endangered
Kemp's Ridley Turtle	*Lepidochelys kempii*	Endangered
Hawksbill Turtle	*Eretmochelys imbricata*	Endangered
West Indian Manatee	*Trichechus manatus*	Endangered
Piping Plover	*Charadrius melodus*	Threatened
Red Knot	*Calidris canutus*	Threatened

Anastasia Island Beach Mouse	*Peromyscus polionotus phasma*	Endangered
North Atlantic Right Whale	*Eubalaena glacialis*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter catadon macrocephalus*	Endangered

2.3.3.1 SEA TURTLES

EXISTING CONDITIONS

The loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) sea turtles can occur within the project area. All of these species are federally endangered except the loggerhead, which is designated as threatened. Loggerheads, greens, and leatherbacks regularly nest within the project area. The nesting season in St. Johns County is between April 2 and October 24. Adult loggerhead females inhabit nearshore waters during the summer months between nesting attempts, typically laying three to six clutches in two week intervals. Sub-adults may use nearshore waters year-round for foraging.

The Florida Fish and Wildlife Conservation Commission manages the Statewide Nesting Beach Survey, which is a statewide program of sea turtle nesting surveys. The program reaches located in the study area are shown on **Figure 2-17**. Loggerhead nesting typically exceeds nesting by green and leatherback turtles. The study area has experienced an increase in loggerhead nesting since 2009, which has been observed statewide. Nesting data for the study area is provided in Table 2-7, Table 2-8, and Table 2-9.

The only sea turtle species for which U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have designated critical habitat is the loggerhead. The project is located in designated loggerhead nearshore reproductive critical habitat (see Figure 2-18).

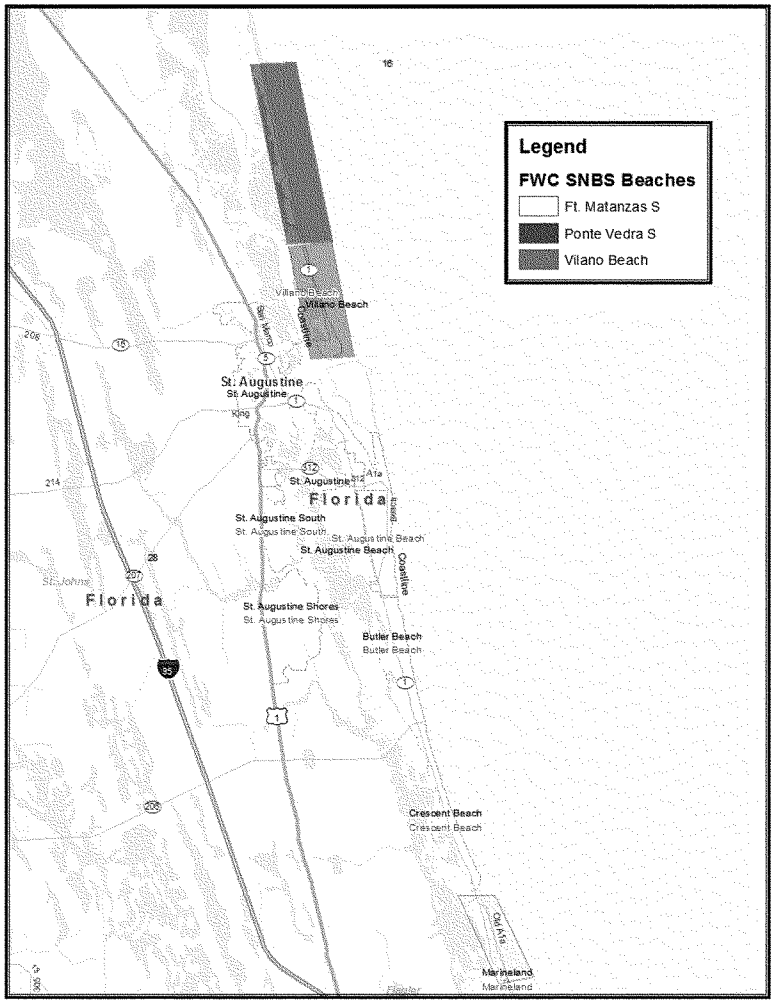


Figure 2-17. Map showing the location of the three Statewide Nesting Beach Survey (SNBS) reaches in the study area.

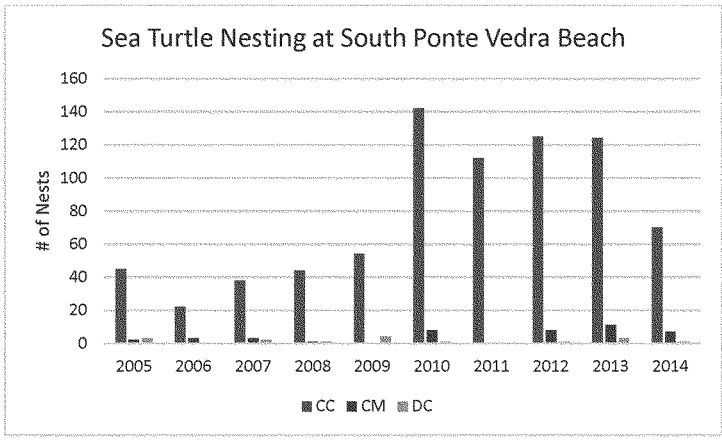


Table 2-7. Sea turtle nesting data for South Ponte Vedra Beach (identified as Ponte Vedra S according to the Statewide Nesting Beach Survey program) for loggerheads (CC), greens (CM), and leatherbacks (DC) from 2005 to 2014. Data obtained from the Florida Fish and Wildlife Conservation Commission.

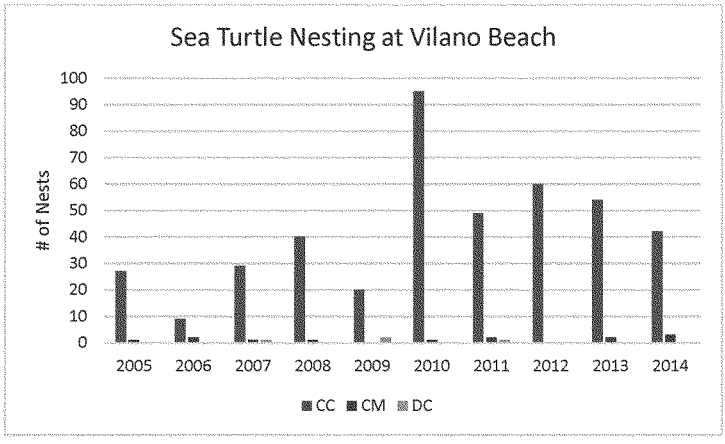


Table 2-8. Sea turtle nesting data for Vilano Beach for loggerheads (CC), greens (CM), and leatherbacks (DC) from 2005 to 2014. Data obtained from the Florida Fish and Wildlife Conservation Commission.

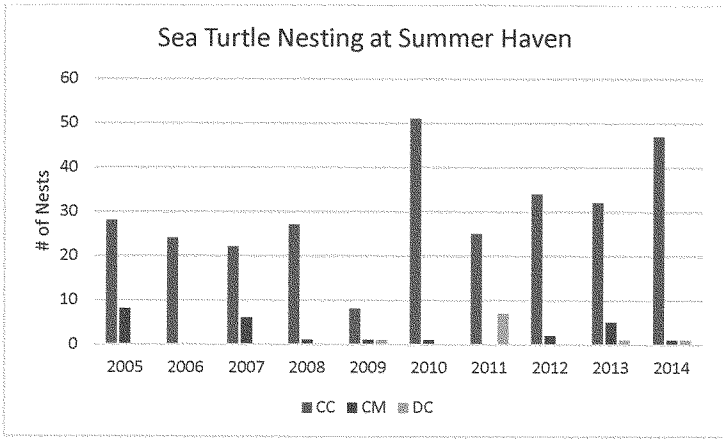


Table 2-9. Sea turtle nesting data for Summer Haven (identified as Ft. Matanzas South by the Statewide Nesting Beach Survey program) for loggerheads (CC), greens (CM), and leatherbacks (DC) from 2005 to 2014. Data obtained from the Florida Fish and Wildlife Conservation Commission.



Figure 2-18. Location of loggerhead nearshore reproductive critical habitat in the project area.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

In the future without-project condition, it is projected that the beach will continue to erode. This will reduce the shoreline area available for nesting sea turtles. It will also increase turtle nest vulnerability to storm washout, as nests would be located closer to the Mean High Water (MHW) line. As adjacent shorelines are currently available for nesting, it is unknown whether the overall nesting would be affected. In addition to increased erosion, it is likely that the length of shoreline hardened by structures would increase. This could further decrease the area available for nesting sea turtles due to the fact that the hard structures constructed would likely be seawalls and revetments. Seawalls and revetments could negatively impact the width of beach available for nesting sea turtles.

2.3.3.2 WEST INDIAN MANATEE

EXISTING CONDITIONS

Manatees are found throughout St. Johns County, including the study area. They primarily use the IWW and the estuary to migrate and forage for food. The closest designated manatee critical habitat is located in the St. Johns River, approximately 30 miles north of the study area.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The future without-project conditions for the West Indian manatee are not expected to be different from the existing conditions described above.

2.3.3.3 PIPING PLOVER AND RED KNOT

EXISTING CONDITIONS

The *rufa* red knot (*Calidris canutus rufa*) is a medium-sized shorebird about 9 to 11 inches in length. The piping plover (*Charadrius melodus*) is a small shorebird about 6 to 7 inches in length. Both species are designated as threatened species under the Endangered Species Act, and they overwinter in Florida between November and April. Both the piping plover and the red knot prefer to forage in coastal habitats that include sand flats adjacent to inlets or passes, sandy mud flats along prograding spits (areas where the land rises with respect to the water level), ephemeral pools, and overwash areas. These substrate types have a richer infauna than the foreshore of high energy beaches and often attract large numbers of shorebirds.

While piping plover and red knot are known to occur in the North Florida area, they are more likely to be found either north of the study area in the GTMNERR or south of the study area at Matanzas Pass. The closest designated piping plover critical habitat is located north of the mouth of the St. Johns River, approximately 30 miles north of the study area. The USFWS has not yet designated critical habitat for the *rufa* red knot.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The continued erosion of the shoreline in the proposed placement area may reduce some habitat currently utilized by piping plover and red knot; however, the infrequent usage of these areas by these species suggests that the future without-project conditions would be similar to the existing conditions with respect to these species.

Allowing sediment to overtop the dune and create overwash fans in the Summer Haven reach would have a beneficial effect by enhancing habitat for piping plover and red knot.

2.3.3.4 ANASTASIA ISLAND BEACH MOUSE

The endangered Anastasia Island beach mouse (*Peromyscus polionotus phasma*) inhabits the primary and secondary dune systems within a 14.5 mile length of Anastasia Island and sections of the GTMNERR (Figure 2-19).

EXISTING CONDITIONS

The Anastasia Island beach mouse may have ranged from Florida's St. John's River in Duval County, south to Anastasia Island in St. Johns County. The beach mouse currently occurs on Anastasia Island, primarily on the north (Anastasia State Park) and south (Fort Matanzas National Monument) ends of the island. In 1992, mice from these two populations were reintroduced into suitable historical habitat between Ponte Vedra Beach and South Ponte Vedra Beach in north St. John's County at the GTMNERR. The reintroduced population is surviving, although in low numbers (USFWS, 2015). There is no evidence of beach mice utilizing the study reaches.

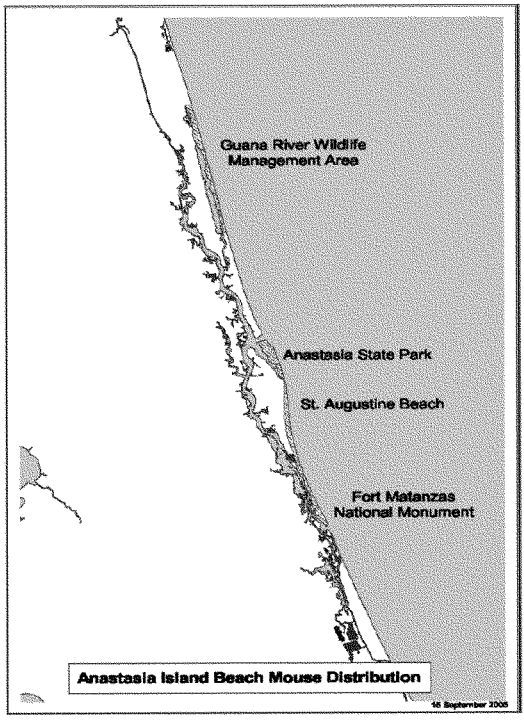


Figure 2-19. Location of Anastasia Island Beach Mouse habitat in the study area.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Although not currently inhabited, potential beach mouse habitat is decreasing due to erosion in the study area. While there is a potential for beach mice to reoccupy this area if suitable habitat existed there, it is unlikely that the beach mouse will be significantly affected by the future without-project condition.

2.3.3.5 WHALES

EXISTING CONDITIONS

Five whale species listed as federally endangered occur in the Atlantic Ocean along the county's coastline during certain times of the year. These species include the 1) North Atlantic right whale (*Eubalaena glacialis*), 2) Sei Whale (*Balaenoptera borealis*), 3) Fin Whale (*Balaenoptera physalus*), 4) Humpback Whale (*Megaptera novaeangliae*), and 5) Sperm Whale (*Physeter catadon macrocephalus*). Portions of the offshore sand-source boundaries are located in North Atlantic right whale critical habitat.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The presence of whales in the study area is not likely to be altered from the existing conditions if the project were not constructed.

2.3.4 ESSENTIAL FISH HABITAT (EFH)

Waters and substrate within the project area have been identified as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council (SAFMC; SAFMC 1998). EFH is defined as those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. Pursuant to the 1999 Finding between USACE and NMFS, USACE's Notice of Availability of the draft EA initiated USACE's consultation under the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA). NMFS provided comments on the draft EA on April 4, 2016, which are incorporated into this document. This section describes the existing conditions of the EFH in the project area, as well as the individual and cumulative impacts of the No Action Alternative. Section 5.2.5 describes the individual and cumulative impacts of the Recommended Plan and other reasonable alternatives. This NEPA document satisfies the coordination requirement for EFH under the MSFCMA (see also Section 6.13).

2.3.4.1 HABITAT AREAS OF PARTICULAR CONCERN

2.3.4.1.1 Coastal Migratory Pelagics

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the Gulf Stream; The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and Hurl Rocks (South Carolina); The Point off Jupiter Inlet (Florida); Phragmatopoma (worm reefs) reefs off the central east coast of Florida; nearshore hard bottom south of Cape Canaveral; The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; Pelagic Sargassum; and Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the Estuarine Living Marine Resources Program. Estuaries meeting this criteria for Spanish mackerel include Bogue Sound and New River, North Carolina; Bogue Sound, North Carolina (Adults May-September salinity >30 ppt); and New River, North Carolina (Adults May-October salinity >30 ppt). For Cobia; Broad River, South Carolina (Adults & juveniles May-July salinity >25ppt).

The project area is considered EFH for Coastal Migratory Pelagics, which include king mackerel (*Scomberomorus cavalla*), Atlantic Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*).

2.3.4.1.2 Tidal Inlets

The SAFMC designates tidal inlets (including their ebb and flood tide shoals) as EFH-HAPCs for penaeid shrimp and species within the snapper-grouper complex, as well as EFH for coastal migratory pelagic species. The ecological function of tidal inlets (including their ebb and flood tide shoals) is widely recognized for its contributions to spawning, egg and larval dispersal, juvenile recruitment, and as foraging habitat.

2.3.4.2 FISH UTILIZATION

The SAFMC has designated areas of vegetated and non-vegetated bottoms, live bottoms, and water columns within the study area as Essential Fish Habitat (EFH) in compliance with the MSFCMA, as amended by the Sustainable Fisheries Act of 1996. The Atlantic Ocean in the study area also provides essential forage, cover, and nursery habitats for other species that are commercially and recreationally important. Additional information for important species in the project area is included below.

Table 2-10. St Augustine Inlet Complex EFH Species/Management Units.

Species/Management Unit	Lifestage(s) Found at Location
Spinner Shark	ALL
Scalloped Hammerhead Shark	Neonate
Bonnethead Shark	Neonate, Adult
Lemon Shark	Juvenile, Neonate
Finetooth Shark	Juvenile, Adult
Nurse Shark	Adult, Juvenile
Tiger Shark	Neonate, Juvenile
Blacktip Shark	Neonate, Juvenile
Atlantic Sharpnose Shark	ALL
Coastal Migratory Pelagics	ALL
Blacknose Shark	ALL
Bull Shark	Adult
Dusky Shark	Neonate
White Shark	Juvenile
Snapper Grouper	ALL
Great Hammerhead Shark	ALL
Summer Flounder	Larvae, Juvenile, Adult
Penaeid Shrimp (Brown Shrimp, Pink Shrimp, White Shrimp)	ALL

Source: National Oceanic and Atmospheric Administration (NOAA) EFH Mapper tool (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html).

Spinner Shark

The spinner shark (*Carcharhinus brevipinna*) is a common, coastal-pelagic, warm-temperate and tropical shark of the continental and insular shelves (Compagno, 1984). It is often seen in schools, leaping out of the water while spinning. It is a migratory species, but its patterns are poorly known. EFH for all lifecycles of the spinner shark exists in the St. Augustine Inlet system sand source area.

Scalloped Hammerhead Shark

The scalloped hammerhead (*Sphyrna lewini*) is a very common, large, schooling hammerhead of warm waters. It is the most common hammerhead in the tropics and is readily available in abundance to inshore artisanal and small commercial fisheries as well as offshore operations (Compagno, 1984). It migrates seasonally north-south along the eastern United States. Scalloped hammerhead sharks are widely distributed, but they are also dependent on discrete coastal nursery areas (Duncan et al., 2006). Neonate and Young-of-the-Year (YOY) would be more common within and near the St. Augustine Inlet during the summer months. EFH for all lifecycles of the scalloped hammerhead exists in the St. Augustine Inlet system sand source area.

Bonnethead Shark

The Bonnethead (*Sphyrna tiburo*) is a small hammerhead shark that inhabits shallow coastal waters where it frequents sandy or muddy bottoms. It is confined to the warm waters of the western hemisphere (Castro, 1983). Bonnethead sharks feed mainly on benthic prey such as crustaceans and mollusks. They do not appear to exhibit long distance migratory behavior and thus, little or no mixing of populations (Lombardi-Carlson, 2007). EFH for all lifecycles of the Bonnethead shark exists in the project area.

Lemon Shark

The lemon shark (*Negaprion brevirostris*) is common in the American tropics, inhabiting shallow coastal areas, especially around coral reefs. During migration, this species can be found in oceanic waters but tends to stay along the continental and insular shelves (Morgan, 2008). Lemon sharks are reported to use coastal mangroves as nursery habitats, although this is not well documented in the literature. EFH for all lifecycles of the Lemon shark exists in the project area.

Finetooth Shark

The Finetooth shark (*Carcharhinus isodon*) is a common inshore species of the western Atlantic. It ranges from North Carolina to Brazil. It is abundant along the southeastern United States and the Gulf of Mexico (Castro, 1983). Finetooth sharks generally prefer water temperatures reach 22°C (mid-May) and remain until water temperatures drop to 20°C (October). EFH for all lifecycles of the Finetooth shark exists in the project area.

Nurse Shark

The Nurse shark (Ginglymostoma cirratum) inhabits littoral waters in both sides of the tropical and subtropical Atlantic, ranging from tropical West Africa and the Cape Verde Islands in the east, and from Cape Hatteras, North Carolina to Brazil in the west. It is also found in the eastern Pacific, ranging from the Gulf of California to Panama and Ecuador (Bigelow and Schroeder, 1948). It is a shallow water species, often found lying motionless on the bottom under coral reefs or rocks. It often congregates in large numbers in shallow water (Castro, 1983; Pratt and Carrier, 2001). Generally, nurse sharks are not usually far ranging in their movements and most individuals spend their entire life cycle within a few hundred square kilometers (Carrier and Luer, 1990; Kohler et al., 1998). EFH for all lifecycles of the Nurse shark exists in the project area.

Tiger Shark

The Tiger shark (*Galeocerdo cuvier*) inhabits warm waters in both deep oceanic and shallow coastal regions (Castro, 1983). In the western North Atlantic Ocean, tiger sharks occur in coastal and offshore waters from approximately 40° to 0°N, and have been documented to make transoceanic migrations (Driggers et al., 2008). In the North Atlantic they are rarely encountered north of the Mid-Atlantic Bight (Skomal, 2007). A study by Heithaus et al. (2002) on tiger sharks in Australia showed they preferred shallow seagrass habitats, and this was influenced by prey availability, which is greater in shallow waters. The tiger shark is one of the larger species of sharks, reaching over 550 cm TL and over 900 kg. Its characteristic tiger-like markings and unique teeth make it one of the easiest sharks to identify. It is one of the most dangerous sharks and is believed to be responsible for many attacks on humans (Castro, 1983).

Blacktip Shark

The blacktip shark (*Carcharhinus limbatus*) is circumtropical in shallow coastal waters and offshore surface waters of the continental shelves. In the southeastern United States it ranges from Virginia to Florida and the Gulf of Mexico. The blacktip shark is a fast moving shark that is often seen at the surface, frequently leaping and spinning out of the water. It often forms large schools that migrate seasonally northsouth along the coast and exhibit a strong diel pattern in their aggregations thought to be related to predator avoidance or improved feeding efficiency (Heupel and Simpendorfer, 2005). EFH for all lifecycles of the Blacktip shark exists in the project area.

Atlantic Sharpnose Shark

The Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) is a small coastal carcharhinid, inhabiting the waters of the northeast coast of North America. It is a common year-round resident along the coasts of South Carolina, Florida, and in the Gulf of Mexico and an abundant summer migrant off Virginia. Frequently, these sharks are found in schools of uniform size and sex (Castro, 1983). EFH for all lifecycles of the Atlantic sharpnose shark exists in the project area.

Coastal Migratory Pelagics

The St. Augustine Inlet is considered EFH for Coastal Migratory Pelagics, which include king mackerel (*Scomberomorus cavalla*), Atlantic Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*). The ecological function of tidal inlets (including their ebb and flood tide shoals) is widely recognized for its contributions to spawning, egg and larval dispersal, juvenile recruitment, and as foraging habitat.

Blacknose Shark

The blacknose shark (*Carcharhinus acronotus*) is a common coastal species that inhabits the western north Atlantic from North Carolina to southeast Brazil (Bigelow and Schroeder, 1948). It is very abundant in coastal waters from the Carolinas to Florida and the Gulf of Mexico during summer and fall (Castro, 1983). Schwartz (1984) hypothesized that there are two separate populations in the West Atlantic. EFH for all lifecycles of the blacknose shark exists in the project area.

Bull Shark

The bull shark (*Carcharhinus leucas*) is a large, shallow water shark that is cosmopolitan in warm seas and estuaries (Castro, 1983). It often enters fresh water, and may penetrate hundreds of kilometers upstream; bull sharks are the only shark species that is known to be physiologically capable of spending extended periods in freshwater (Thorson et al., 1973). EFH for all lifecycles of the bull shark exists in the project area.

Dusky Shark

The dusky shark (*Carcharhinus obscurus*) is common in warm and temperate continental waters throughout the world. It is a migratory species which moves north-south with the seasons. This is one of the larger species found from inshore waters to the outer reaches of continental shelves. It used to be important as a commercial species and a game fish, but is currently prohibited. The dusky shark is taken as bycatch in the swordfish and tuna fisheries. The dusky shark is one of the slowest growing requiem sharks and is often caught on both bottom and pelagic longlines, making it highly vulnerable to overfishing. Dusky sharks are currently prohibited and are a candidate for listing under the ESA. Neonate and adult life cycle stages are most likely to be found in the project area.

White Shark

The white shark (*Carcharodon carcharias*) is the largest of the lamnid, or mackerel, sharks. It is a poorly known apex predator found throughout temperate, subtropical, and tropical waters. Its presence is usually sporadic throughout its range, although there are a few localities (e.g., off California, Australia, and South Africa) where it is seasonally common. Large adults prey on seals and sea lions and are sometimes found around their rookeries. The white shark is also a scavenger of large dead whales. It has been described as the most voracious of the fish-like vertebrates and has been known to attack bathers,

divers, and even boats. EFH for juveniles is located in the project area; however, insufficient data exists for neonates and adults to identify EFH for those life stages.

Snapper Grouper

Essential fish habitat for snapper-grouper species includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (but to at least 2000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including Sargassum, required for larval survival and growth up to and including settlement.

For specific life stages of estuarine dependent and nearshore snapper-grouper species, essential fish habitat includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom. EFH for snapper grouper exists in the project area.

Summer Flounder

Summer flounder (*Paralichthys dentatus*) are found in inshore and offshore waters from Nova Scotia, Canada to the east coast of Florida, and are most abundant in the Mid-Atlantic region from Cape Cod, Massachusetts to Cape Fear, North Carolina. Summer flounder usually begin to spawn at age two or three, at lengths of about 10 inches. Spawning occurs in the fall while the fish are moving offshore. Spawning migration is linked to sexual maturity, with the oldest and largest fish migrating first. As in their seasonal migrations, spawning summer flounder in the northern portion of the geographic range spawn and move offshore (depths of 120 to 600 feet) earlier than those in the southern part of the range. Larvae migrate to inshore coastal and estuarine areas from October to May. The larvae, or fry, move to bottom waters upon reaching the coast and spend their first year in bays and other inshore areas. At the end of their first year, some juveniles join the adult offshore migration. Adults spend most of their life on or near the sea bottom burrowing in the sandy substrate. Flounder lie in ambush and wait for their prey. They are quick and efficient predators with well-developed teeth allowing them to capture small fish, squid, sea worms, shrimp, and other crustaceans (ASMFC, 2016).

South Atlantic Shrimp

EFH for Penaeid Shrimp (Brown, Pink, Rock, and White shrimp) exists in the St. Augustine Inlet system and includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic

vegetation (e.g., seagrass); and subtidal and intertidal non-vegetated flats. This applies from North Carolina through the Florida Keys.

South Atlantic Wahoo

The wahoo (*Acanthocybium solandri*) is an oceanic pelagic fish found worldwide in tropical and subtropical waters. In the western Atlantic wahoo are found from New York through Columbia including Bermuda, the Bahamas, the Gulf of Mexico, and the Caribbean. Wahoo are present throughout the Caribbean area, especially along the north coast of western Cuba where it is abundant during the winter (from FAO species guide; FAO, 1978). There is pronounced seasonal variation in abundance of wahoo. They are caught off North and South Carolina primarily during the spring and summer (April-June and July-September), off Florida's east coast year-round, off Puerto Rico and the U.S. Virgin Islands year-round with peak catches between September and March, in the Gulf of Mexico year-round, in the eastern Caribbean between December and June, and in Bermuda between April and September (SAFMC, 1998a). The wahoo spawning season extends from June through August, with peak spawning in June and July.

2.3.4.3 HARDGROUNDS

Hardgrounds provide substrate for benthic organisms, crevices where organisms can seek protection, and foraging habitat for a number of aquatic species. Hardgrounds can be of various types, artificial or natural, such as reefs, with high and/or low relief, and can be of any shape. Foster, Spurgeon, and Cheng (2000) note that "a long and relatively significant headland feature" extends from about R15 to R75. This feature is associated with submerged coquina and/or beachrock outcrops in the nearshore zone, which may contribute to the shell hash observed in the beach sediments in the South Ponte Vedra reach. Shell components in the sediments may possibly derive from active shellfish populations associated with the outcrop habitat.

The study area (R84 to R209) is located south of the headland feature that may have associated hardground features. While the shoreline adjacent to the headland feature has been relatively stable, the zone between the headland feature and St. Augustine Inlet has been progressively erosive from south to north. In 1994, a side-scan sonar survey was conducted over 2.7 square miles of nearshore substrate, to determine the presence and extent of hard bottom areas in the vicinity of the project. There were no distinguishable bottom features that could be classified as exposed hard bottom or outcrops. Based on core borings, it was determined that rock formations did not exist within the placement area. The existing geologic formation was covered with approximately 10-20 feet of sand (USFWS, 1994). No features such as hardbottoms or rock outcrops are located in the project's impact area (USACE, 1996).

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The presence of EFH in the study area is not likely to be altered from the existing conditions if the project were not constructed.

2.3.5 COASTAL BARRIER RESOURCES

In the 1970s and 1980s, Congress recognized that certain Federal actions and programs historically subsidized and encouraged development in coastal areas. To remove any Federal incentives to develop in these areas, Congress passed the Coastal Barrier Resources Act of 1982 (Public Law 97-348; CBRA). CBRA designated relatively undeveloped coastal areas along the Atlantic and Gulf of Mexico coasts of the United States as part of the John H. Chafee Coastal Barrier Resources System (CBRS), and made these areas ineligible for most new Federal expenditures and financial assistance. CBRA encourages the conservation of hurricane prone, biologically-rich coastal resources by restricting Federal expenditures that encourage development, such as Federal flood insurance. The CBRA includes both CBRS units and "Otherwise Protected Areas," which include lands already protected by a conservation easement or that are in public ownership. CBRS units can be developed, provided that private developers or other non-federal parties bear the full cost. The USFWS administers the CBRS program, and makes the final determination of a project's consistency with the CBRA.

EXISTING CONDITIONS

The project area includes two CBRS units and two Otherwise Protected Areas (OPAs) (Figure 2-20):

- Guana River Unit, FL-03P (Otherwise Protected Area)
- Usinas Beach Unit, P04A (CBRS unit)
- Conch Island Unit, P05 (CBRS unit)
- Conch Island Unit, P05P (Otherwise Protected Area)

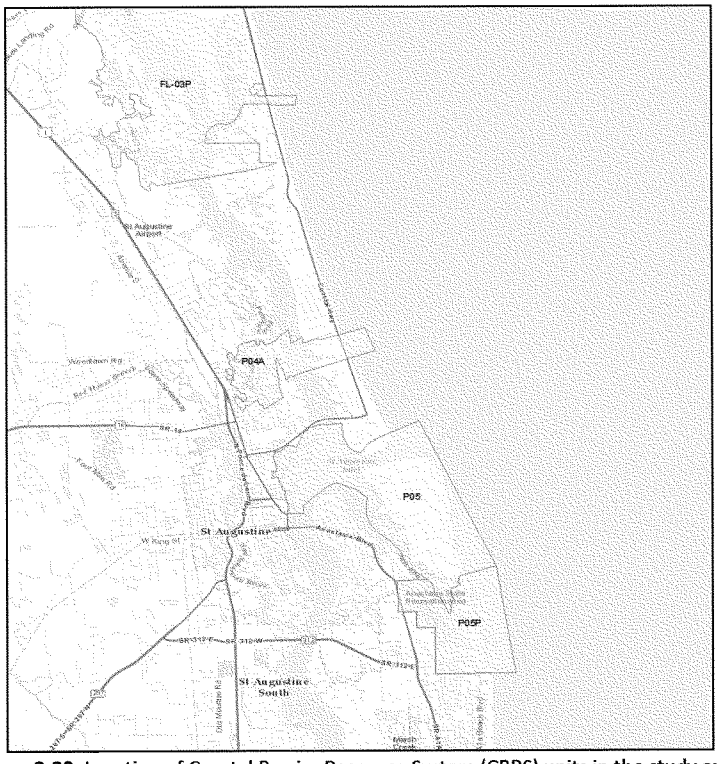


Figure 2-20. Location of Coastal Barrier Resource System (CBRS) units in the study area.

Portions of the Vilano Beach reach of the study area are within CBRS Unit P04A, Usinas Beach, while the southern portion of the Summer Haven reach lies within CBRS Unit P05A, Matanzas River (see Figure 2-20). The presence of CBRS units may limit federally-implementable alternatives, but not alternatives which could be carried out by the state or local sponsor. The effects of CBRA on plan formulation are discussed later in this report.

Portions of the South Ponte Vedra Beach reach lie within OPA FL-03P. The only Federal funding prohibition within OPAs is related to Federal flood insurance. The presence of this OPA will not constrain plan formulation.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Increased erosion in the future without-project condition could decrease the habitat available to nesting sea turtles and to wintering piping plover and red knot. In less developed areas, a potential overwash could increase habitat for piping plover.

2.3.6 WATER QUALITY

EXISTING CONDITIONS

The project area is a sandy, high energy coastline. The beach is predominantly fine sand-size quartz with little shell fragments. Due to the high energy conditions found along the St. Johns County coastline, sand is continuously re-suspended in the water column with each breaking wave. This re-suspension of sediment results in generally highly turbid conditions in the nearshore region of the project area. The coastal waters in the area of the authorized work are designated by the State of Florida as Class III, which are classified as being suitable for recreation and for the propagation of fish and wildlife. Immediately adjacent to the South Ponte Vedra reach is the GTMNERR.

FDEP regulates water quality in Florida and requires stringent water quality monitoring during dredging and beach-fill operations. FDEP designates certain waters as Outstanding Florida Waters (OFW), which are waters designated worthy of special protection because of their natural attributes. The designation is intended to protect existing good water quality (see the FDEP website at http://www.dep.state.fl.us/WATER/wqssp/ofw.htm). The nearshore waters adjacent to the South Ponte Vedra Beach reach, the IWW, and the Guana River are classified as OFWs. In addition, the area south of the St. Augustine Inlet, the Anastasia State Recreation Area, is also classified as an OFW (see Figure 2-21).

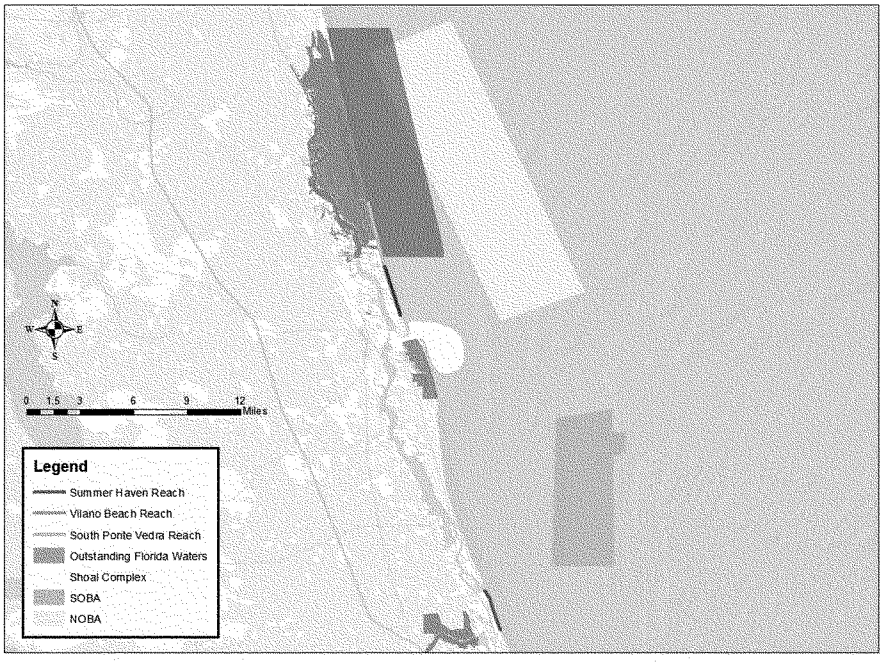


Figure 2-21. Location of OFWs in the Study Area.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The water quality in the study area is not likely to change from the existing conditions in the future without-project conditions.

2.3.7 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

EXISTING CONDITIONS

The coastline in the project area is located adjacent to predominantly residential and recreational areas. There are no known industrial activities in the immediate area. There are no known sources of hazardous or toxic wastes in the project area, and USACE is not aware of any records indicating these activities occurred in the project area in the past.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The presence/absence of hazardous or toxic wastes in the study area is not likely to change from the existing conditions in the future without-project conditions.

2.3.8 AIR QUALITY

EXISTING CONDITIONS

The urbanization of the City of St. Augustine and the popularity of the beaches contribute to a large number of motorized vehicles in the vicinity of the project area. However, air quality is generally good in the project area with respect to ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter (HomeFacts, 2016). Because of the sea breezes that are usually present along the St. Johns County shore, airborne pollutants are readily dispersed by the ocean-generated winds.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The air quality in the study area is not likely to change from the existing conditions in the future without-project conditions.

2.3.9 NOISE

EXISTING CONDITIONS

The project area is a favorite recreational spot for local residents of, as well as for the numerous tourists who visit the region. Additionally, St. Johns County beaches are a favorite spot for many residents of northeastern Florida. Because of the urbanization in the vicinity of the beaches and the popularity of the beaches, noise levels are usually slightly elevated during the tourist season and on most weekends.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

While the area may experience a decrease in tourist activity, noise levels in the study area are not likely to change significantly from the existing conditions in the future without-project conditions.

2.3.10 AESTHETIC RESOURCES

EXISTING CONDITIONS

Aesthetics found along most of the project area are typical of low-density, residential beach communities. The beach ecosystem includes a narrow beach berm and minimal intertidal area due to the extreme erosion experienced there since the early 1970s. Small portions of aesthetically valuable natural conditions remain, but even these areas experience overwash and erosion that has eliminated dune and saltmarsh vegetation. Most of the project area also includes some backdune naturalized areas with dune grasses, morning glory, and other native flowering groundcovers. There are a few commercial areas, but these generally lack dune features and native vegetation is absent. Previous efforts to restore dune habitats along St. Johns County beaches have been somewhat successful, and past maintenance efforts have greatly improved the aesthetics of the St. Johns County beaches.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The aesthetics of the study area is anticipated to decline in the future without-project condition due to increased erosion and the continued narrowing of the beach.

2.3.11 RECREATION RESOURCES

EXISTING CONDITIONS

The project area is a local favorite for county residents to spend much of their leisure time sunbathing, surfing, sailing, walking, and riding bicycles, in addition to a variety of other active and passive activities. The spring, summer, and fall months of the year are the most active times for recreational activities, with the summer months comprising the peak use period. During the winter months, the St. Johns County beaches have low recreational usage due to relatively low air and water temperatures (45-65°F and 56-61°F, respectively; NOAA 2015) and the frequency of northeast winds that produce strong waves and high tides.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The recreational usage of the study area are anticipated to decline in the future without-project condition due to increased erosion and the continued narrowing of the beach, which will make it less suitable for recreating.

2.3.12 NAVIGATION

EXISTING CONDITIONS

The St. Augustine Inlet is an improved tidal inlet connecting the San Sebastian River and the IWW Federal navigation channel to the Atlantic Ocean. Originally a natural inlet located south of its current location, the inlet was relocated in 1940 as part of the St. Augustine Harbor Navigation Project in response to public interests. Efforts to stabilize the inlet and improve navigation between 1941 and 1957 resulted in the construction of a north sand trap groin approximately 1,880 feet in length and a 3,695 foot south jetty. The authorized 16-foot inlet entrance channel is maintained at the best natural alignment, while the geographically fixed IWW channel is maintained at 12 feet deep.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

The St. Augustine Inlet is currently maintained with the IWW Federal navigation channels, and will be maintained regardless of whether this project moves forward. Navigation conditions should not change for the St. Augustine Inlet from the existing conditions in the future without-project conditions.

In the Summer Haven reach, continued erosion in the future without-project condition could result in overwash or a possible breach of the island. Increased sediment due to overwash in the IWW would need to be addressed during a maintenance dredging event of that channel.

2.3.13 CULTURAL RESOURCES AND HISTORIC PROPERTIES

EXISTING CONDITIONS

The coastal areas of St Johns County have been a focal point of European maritime activity for over 450 years, and a source of prehistoric populations' lifeways for over 3,000 years. Subsequently, archaeological sites including shipwrecks, coastal infrastructure, prehistoric middens, and others types of sites constitute the cultural landscape of the coastal area.

The earliest recorded maritime activity in the vicinity dates to 1513 when Juan Ponce de León documented landfall at a latitude that coincides with modern day South Ponte Vedra Beach, where he named the landmass La Florida, claiming it as Spanish Territory. Following intensive Spanish explorations of the southeast, Spain initiated a formal settlement attempt here in 1565 under the leadership of Pedro Menéndez de Avilés. Menéndez' orders were to establish a garrison/colony with soldiers and colonists in La Florida preventing any further French advancement into Spanish lands. Colonizing efforts by Jean Ribault in Port Royal and the creation of Fort Caroline on the St. Johns River in 1564 by René de Laudonnière had forced King Philip II to initiate protective measures. Menendez, having failed to reach Fort Caroline before French reinforcements arrived, passed through the St. Augustine Inlet in September 1565, establishing a defensive position from which he successfully drove the French out. Located on a harbor with a sand bar across the entrance, the St Augustine settlement became the location of the longest, continuous European presence in the continental United States. The port town was almost entirely dependent upon maritime transportation until the railroad reached St Augustine after 1880.

Key in the development and defense of the city and garrison was its limited access at the St. Augustine Inlet. The inlet historically consisted of a series of shifting sand bars that permitted only shallower draft vessels to cross. Documented ship losses around the inlet are testament to the treacherous nature of these shoals; however, the sandbars also provided defense for the town by preventing large, foreign ships-of-war from entering the harbor. Today, the historic inlet channel has closed in due to the southward migration of the northern peninsula and only portions of it remain in the form of the Salt Run lagoon adjacent to Anastasia Island. The current inlet was created by USACE in 1940, when a land cut was made across the southern tip of Vilano Point. Historic maps suggest, however, that the current inlet location is in close proximity to the location of the inlet during the time Menendez first colonized Florida.

Considering the extensive, maritime-related history of the St Augustine region, much attention has been given to the archaeological and historical resources of the coastal areas. Archival research and cultural resource surveys have been conducted along the St. Johns County shoreline, portions of the IWW and along almost the entire shoal complex of the St. Augustine inlet. The majority of the surveys were conducted for USACE-related projects, while several were conducted by the St Augustine Lighthouse Archaeological Maritime Program (LAMP) for shipwreck research.

USACE surveyed all three reaches (South Ponte Vedra, Vilano, and Summer Haven) for the presence of cultural resources in 2010. Two archaeological sites (8SJ5442 and 8SJ7988) have been previously documented within the South Ponte Vedra and Vilano Beach reaches; however, both of these sites were assessed as isolated finds that were washed onto the beach after storm events. The Chainplate site (8SJ5442) was documented in 2007 and was composed of isolated shipwreck components originating from a wooden sailing ship. LAMP archaeologists documented and removed the items for conservation at that time. The Vilano Beach Rudder site (8SJ4988) was a 12-foot long, wooden rudder recovered in 2005 by the St. Johns County archaeologist and documented as probably belonging to a late nineteenth-century, wooden sailing vessel. The rudder was the only component identified on the beach at this location. Considering the high energy environment, materials buried within the beach are often exposed by storms only to be reburied, or are washed up onto the beach from further offshore. Further monitoring after storm events was recommended for both site locations. However, no materials were identified in either area during the USACE 2010 shoreline survey and none have been reported to LAMP or to the St. Johns County Archaeologist since the artifacts were recovered in 2005 and 2007 suggesting that the sources of these isolated artifacts lie submerged offshore. The only known offshore wreck north of the inlet is Compton's Wreck (8SJ3525), which is documented as a more modern wooden sailing vessel. Currently, there is insufficient information on the significance of this site, but the resource is located sufficiently offshore to be exempt from impacts during nearshore or beach placement.

In addition to the 2010 USACE survey, several archaeological assessments have been conducted along the Summer Haven reach, between range monuments R197 – R209. Several archaeological surveys have been conducted along this stretch of SR A1A as a result of bridge replacement and highway construction activities by the Florida Department of Transportation (FDOT). Three archaeological sites (8JS0046, 8SJ2527, and 8SJ4887) have been identified west of the proposed beach renourishment area and west of State Road A1A. All three sites were recorded as thick, multi-component shell middens with dominant Orange Period (4,000 – 2,500 BP) components. The Summer Haven site (8SJ0046), located at the northern end of the peninsula, was first recorded in the 1950s and contained human burials within the site, although no additional burials have been identified at the site since this time. Unfortunately, the majority of all three sites has been destroyed from canal excavations, residential development, and road construction and no portion of these sites were documented as being within the proposed renourishment area. The 2010 USACE survey did not identify any archaeological resources within the project area; however, monitoring of any staging and access routes closer to SR A1A for beach renourishment activities will be required by USACE in consultation with the Florida State Historic Preservation Officer (SHPO) and appropriate federally-recognized tribes in the event such activities are planned.

Just west of the project reaches is the SR A1A National Scenic and Historic Coastal Byway. Along the road on both the east and west sides spanning the entire project area are numerous historic structures, none of which are currently listed on the National Register of Historic Places (NRHP). While outside the project area, their presence should be noted as continued erosional forces may have long-term effects on such

resources; therefore, they are considered as part of the existing conditions. Of particular note is the group of historic residential structures comprising the community of Summer Haven. Dating from the 1890s through the 1930s, these structures may be potentially eligible for listing in the NRHP as a historic district, although such designation does not currently exist. Any proposed beach nourishment activities would serve to protect all historic resources near the project area along SR A1A from erosion.

The proposed sand sources for potential nourishment activities involve the use of the ebb, flood, and Vilano Point shoals around the St. Augustine Inlet. These areas have been surveyed intensively for cultural resources by USACE (DHR survey numbers: 1805, 5214, 5210, 6565, 17239, 17883, and 17947) for prior St Augustine Beach renourishment and maintenance dredging projects. Two shipwreck sites have been documented and several, potentially significant remote sensing targets have been identified within these areas. USACE, during consultation with the Florida SHPO, has agreed to maintain all buffers established for these resources (DHR file numbers 2009-06256, 2010-0839, and 2015-1661). Site 8SJ4889, the *Dixie Crystal*, is a historic shipwreck identified within the flood shoal and may be potentially eligible for inclusion in the NRHP. USACE has agreed with the Florida SHPO to maintain a150-foot buffer during dredging projects working near it to protect the resource. In addition, four targets were identified within the St. Augustine Inlet (targets SA-T-5, SA-OS-2, SA-OS-3, and SA-OS-4) that have a high potential for being significant resources, and each has a requirement for a 200-foot buffer around them for all dredging and maintenance activities (DHR File No 2010- 04838-A and 04838-B). Within the northern ebb shoal area lies site 8SJ4784 the North Shoals Vessel, a historic shrimp boat which sank trying to navigate the St. Augustine entrance channel. There is currently insufficient information to determine its eligibility for inclusion in the NRHP; however, USACE will protect the site through the use of buffers that will be determined through consultation with the SHPO. Currently, USACE is completing a cultural resource survey of previously un-surveyed portions of the shoal complex. Consultation for this survey is ongoing with the Florida SHPO and appropriate federally-recognized tribes. The consultation will be updated prior to project implementation. When finalized, 100% of the shoal complex will have been subject to cultural resource surveys.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Continued erosion will eventually threaten cultural resources. As the shoreline recedes, resources will either be destroyed or hard structures will need to be constructed for their protection. As noted above, increased hardening is detrimental to the environment as a whole. Thus, continued shoreline erosion will create a cumulative negative effect on the environment.

2.3.14 NATIVE AMERICANS

EXISTING CONDITIONS

There is no known tribal or reservation land within the project area. However, Native American groups lived throughout this region in the past, and their decedents continue to live within the State of Florida

and throughout the United States. Prior consultation under Section 106 of the National Historic Preservation Act on various aspects of the project has not indicated any historic use, although it certainly remains possible. Consultation will be updated with both tribes in regards to project impacts.

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

Selection of the No Action Alternative would have no adverse effect on Native American groups. As discussed above, portions of the project have been consulted upon with both federally-recognized tribes living in the region.

2.4 ECONOMIC ENVIRONMENT

EXISTING CONDITIONS

Information on the existing economic conditions along the St. Johns County study area coastline was collected for economic modeling purposes using Beach-fx. The information on the coastal assets detailed in this section was collected from mapping resources, site visits, and contractors.

2.4.1 DAMAGE ELEMENTS - STRUCTURE & CONTENTS VALUE

The following discussion includes structure and contents value for the South Ponte Vedra Beach and Vilano Beach reaches. As will be discussed later in this report, the Summer Haven reach was screened out of formulation due to a variety of reasons. As a result, only the two northern reaches were included in intermediate and final alternative analysis employing Beach-fx, and only those structure and content variables relevant to Beach-fx analysis are included here. Beach-fx is an event-driven life-cycle model that estimates damages and associated costs over a period of analysis based on storm probabilities, tidal cycle, tidal phase, beach morphology, and many other factors (Rogers et al., 2009). Damages to developed shorelines include damages to buildings, pools, patios, parking lots, roads, utilities, seawalls, revetments, bulkheads, etc., all classified as "damage elements." Erosion of land resulting in the need to place backfill is also considered a damage. Economists, real estate specialists, and engineers have collected and compiled detailed information on damage elements within the study area including:

- 397 single-family residences
- 37 multi-family residences
- Commercial structures
- 251 dune walks
- SR A1A
- Several parking lots, gazebos, garages, pools, tennis courts, and bath houses

In total, attribute information for 817 separate damage elements was populated for economic modeling using Beach-fx. The proximity of these damage elements to the beach makes them potentially vulnerable to erosion, wave attack, and inundation.

Beach-fx handles economic considerations at the damage element level. These considerations include extent of damage, cost to rebuild, and time to rebuild. The construction and foundation type of each damage element was gathered from the St. Johns County property appraiser information and visual observations by USACE, Jacksonville District staff. First floor elevations of all the damage elements in the study area were surveyed. Real Estate professionals from Jacksonville District provided updated depreciated replacement costs for all of the damage elements in March 2015. An uncertainty of +/- 15% was assigned to these costs. The value of contents was assumed to be 50% of the structure value for all habitable structures per ER 1105-2-100. Non-habitable structures (dune walks, bathhouses, pools, etc.) had zero contents value.

2.4.2 STRUCTURE INVENTORY

The economic value of the existing structure inventory represents the depreciated replacement costs of damageable structures, and their associated contents, within the study area along the coastline. The damage element inventory includes 817 damageable structures with an overall estimated value of $268,000,000, with structure and content valuations of $188,000,000 and $80,000,000 respectively. Table 2-11 provides the distribution of structure and content values broken down by Beach-fx reach. Beach-fx reaches are 1,000-foot increment model reaches useful for developing study reaches into more manageable segments for analysis in Beach-fx. Their numbers approximate R-monument numbers. For instance, Beach-fx reach 100 spans the shoreline for 1,000 feet between R monuments 95.5 and 100.5. Beach-fx reaches are described with additional detail in the Economics Appendix.

Table 2-11. Distribution of Structures and Structure Value by Reach.

Distribution of Structures & Structure Value by Reach					
Beach-Fx Reach	**DE Count**	**Structure Value**	**Content Value**	**Total Value**	**% of Total Value**
84	8	$ 1,108,437	$ 376,268	$ 1,484,705	**1%**
85	20	$ 3,175,145	$ 1,275,190	$ 4,450,335	**2%**
86	20	$ 3,627,217	$ 1,469,831	$ 5,097,048	**2%**
90	27	$ 3,928,659	$ 1,603,997	$ 5,532,656	**2%**
91	22	$ 3,149,707	$ 1,233,206	$ 4,382,913	**2%**
92	15	$ 2,085,649	$ 816,325	$ 2,901,974	**1%**
93	28	$ 4,067,044	$ 1,681,022	$ 5,748,066	**2%**
87	32	$ 6,612,213	$ 2,861,777	$ 9,473,990	**4%**
88	22	$ 3,851,535	$ 1,641,533	$ 5,493,068	**2%**
89	28	$ 6,237,679	$ 2,715,902	$ 8,953,581	**3%**
94	8	$ 844,758	$ 140,214	$ 984,972	**0%**
95	19	$ 2,015,648	$ 584,794	$ 2,600,442	**1%**
96	26	$ 4,281,210	$ 1,761,098	$ 6,042,308	**2%**
97	20	$ 3,430,500	$ 1,383,555	$ 4,814,055	**2%**
98	61	$ 16,869,267	$ 7,846,416	$ 24,715,683	**9%**
100	46	$ 11,714,035	$ 5,313,803	$ 17,027,838	**6%**
101	25	$ 4,181,708	$ 1,711,544	$ 5,893,252	**2%**
102	8	$ 10,049,865	$ 4,680,000	$ 14,729,865	**5%**
103	12	$ 13,796,355	$ 6,419,700	$ 20,216,055	**8%**
104	22	$ 5,035,899	$ 2,181,137	$ 7,217,036	**3%**
105	15	$ 3,488,390	$ 1,350,185	$ 4,838,575	**2%**
106	20	$ 3,880,670	$ 1,665,604	$ 5,546,274	**2%**
107	30	$ 4,970,238	$ 2,068,742	$ 7,038,980	**3%**
108	11	$ 2,723,804	$ 1,074,022	$ 3,797,826	**1%**
109	15	$ 3,003,386	$ 862,898	$ 3,866,284	**1%**
110	18	$ 2,510,368	$ 888,944	$ 3,399,312	**1%**
111	31	$ 5,272,445	$ 2,241,253	$ 7,513,698	**3%**
112	22	$ 5,522,167	$ 2,198,746	$ 7,720,913	**3%**
114	16	$ 5,263,067	$ 2,141,249	$ 7,404,316	**3%**
115	11	$ 3,216,410	$ 1,287,180	$ 4,503,590	**2%**
116	12	$ 2,077,290	$ 655,080	$ 2,732,370	**1%**
117	10	$ 1,285,292	$ 360,946	$ 1,646,238	**1%**
118	36	$ 5,326,818	$ 2,186,154	$ 7,512,972	**3%**
119	33	$ 4,767,243	$ 2,059,374	$ 6,826,617	**3%**
120	36	$ 16,351,882	$ 7,684,346	$ 24,036,228	**9%**
121	19	$ 5,315,967	$ 2,575,266	$ 7,891,233	**3%**
122	13	$ 2,588,949	$ 1,279,362	$ 3,868,311	**1%**
Total	**817**	**$ 187,626,916**	**$ 80,276,658**	**$ 267,903,574**	**100%**

FUTURE WITHOUT-PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

2.4.3 BEACH-FX MODEL SET-UP

The Economic Appendix provides a complete description of the Beach-fx model set-up and use. Data on historic storms, beach survey profiles, and private, commercial, and public structures within the project area are used as input to the Beach-fx model. The model is then used to estimate future damages resulting from hurricanes and coastal storms.

The future without-project damages are used as the base condition against which potential alternatives will be compared. The difference between with and without-project damages are used to determine project benefits.

2.4.4 BEACH-FX MODEL ASSUMPTIONS

- **Start Year:** The year in which the simulation begins is 2015
- **Base Year:** The year in which a Federal project would be constructed, and benefits would begin accruing, is 2020
- **Period of Analysis:** 50 years (2020 to 2070)
- **Discount Rate:** 3.125% FY2016 Federal Water Resources Discount Rate (though plan screening was completed at 3.125%, the annual costs and benefits of the Recommended Plan were recomputed at the FY17 discount rate of 2.875% in accordance with the expected Chief's Report signing date; refer to the Executive Summary).
- **Damage Functions:** Damage functions developed by the Institute for Water Resources (IWR), Coastal Storm Damage Workshop (CSDW), and Coastal Storm Damage Relationships Based on Expert Opinion Elicitation in 2002, were used.
- **Coastal Armor:**
    - Existing armor set at the lot level will protect the damage elements in that lot until failure is triggered. If the armor fails, structures will be subject to damages until the armor is rebuilt.
    - For lots without armor, state permit requirements for armor construction determine if a lot is able to be protected by armor, or not, once erosion reaches the seaward edge of the lot.
- **Number of Times Rebuilding Allowed:** The maximum number of structure rebuilds can be specified for damage elements. Based on the assumed likeliness that certain types of damage elements will eventually stop being rebuilt by property owners, the following are number of times that rebuilding is allowed for certain types of damage elements:
    - Dune Walks: 10x
    - All Other Damage Elements: 99x
- **Future value of structures:** The future structure inventory and values are the same as the existing condition. This conservative approach neglects any increase in value due to future development. Due to the uncertainty involved in projections of future development, using the existing inventory

is considered conservative for Florida where coastal development has historically increased in density and value.

2.4.5 BEACH-FX FUTURE WITHOUT-PROJECT DAMAGE RESULTS

Future without-project (FWOP) damages across the study area range between $46.8 and $149.8 M present value dollars.

- Structure Damage: Economic losses resulting from the structures situated along the coastline being exposed to wave attack, inundation, and erosion damages. Structure damages account for approximately 53.7% of the total FWOP damages.
- Contents Damage: The material items housed within the aforementioned structures (usually air conditioned and enclosed) that are potentially subject to damage. Content damages make up approximately 21.5% of the total FWOP damages.
- Coastal Armor Cost: Beach-fx provides the capability to estimate the costs incurred from measures likely to be taken to protect coastal assets and/or prevent erosion in the study area. Based on the existence of coastal armor units throughout the study area, Beach-fx was used to estimate the costs of erecting such measures throughout the period of analysis. Armor costs account for approximately 24.8% of the total FWOP damages.

Table 2-13 provides greater detail on the composition of the average FWOP damages by category and damage element type based on the *Iteration.csv* and *ReachYearlyDamagesByType.csv* model output files.

Table 2-12. Distribution of FWOP Damages by Category and Type.

DE Type	Average PV Structure Damage	Average PV Content Damage	Average PV Armor Costs	Total Average PV Damages & Costs	% of Total
COMM	$ 1,861,712	$ 930,865	$ -	**$ 2,792,576**	3%
GAZEBO	$ 608,711	$ -	$ -	**$ 608,711**	1%
MFR1	$ 2,250	$ 1,125	$ -	**$ 3,375**	0%
MFR2	$ 808,674	$ 404,337	$ -	**$ 1,213,010**	1%
MFR3	$ 135,699	$ 68,225	$ -	**$ 203,924**	0%
PARKINGLOT	$ 442,541	$ -	$ -	**$ 442,541**	0%
POOL	$ 88,565	$ -	$ -	**$ 88,565**	0%
ROAD2	$ 4,835,406	$ -	$ -	**$ 4,835,406**	5%
ROAD3	$ 1,687,213	$ -	$ -	**$ 1,687,213**	2%
SFR1	$ 13,295,051	$ 6,623,894	$ -	**$ 19,918,946**	21%
SFR2	$ 20,055,501	$ 10,009,045	$ -	**$ 30,064,546**	31%
SFR3	$ 5,793,992	$ 2,892,867	$ -	**$ 8,686,859**	9%
TENNIS	$ 734	$ -	$ -	**$ 734**	0%
WALK	$ 2,522,672	$ -	$ -	**$ 2,522,672**	3%
ARMOR COST	$ -	$ -	$ 24,063,881	**$ 24,063,881**	25%
Total	**$ 52,138,722**	**$ 20,930,358**	**$ 24,063,881**	**$ 97,132,960**	100%
% of Total	53.7%	21.5%	24.8%	100%	

2.4.5.1 SPATIAL DISTRIBUTION OF WITHOUT-PROJECT DAMAGES

There are several reaches, within the area modeled, where FWOP damages and armor costs are the greatest. The segment that includes model reaches 96 – 100 accounts for about 22% of the overall FWOP damages, and the segment that includes model reaches 111 – 116 accounts for about 30% of the overall FWOP damages. **Figure 2-22** illustrates the spatial distribution of erosion rate, existing structure value, and FWOP damages and costs by reach.

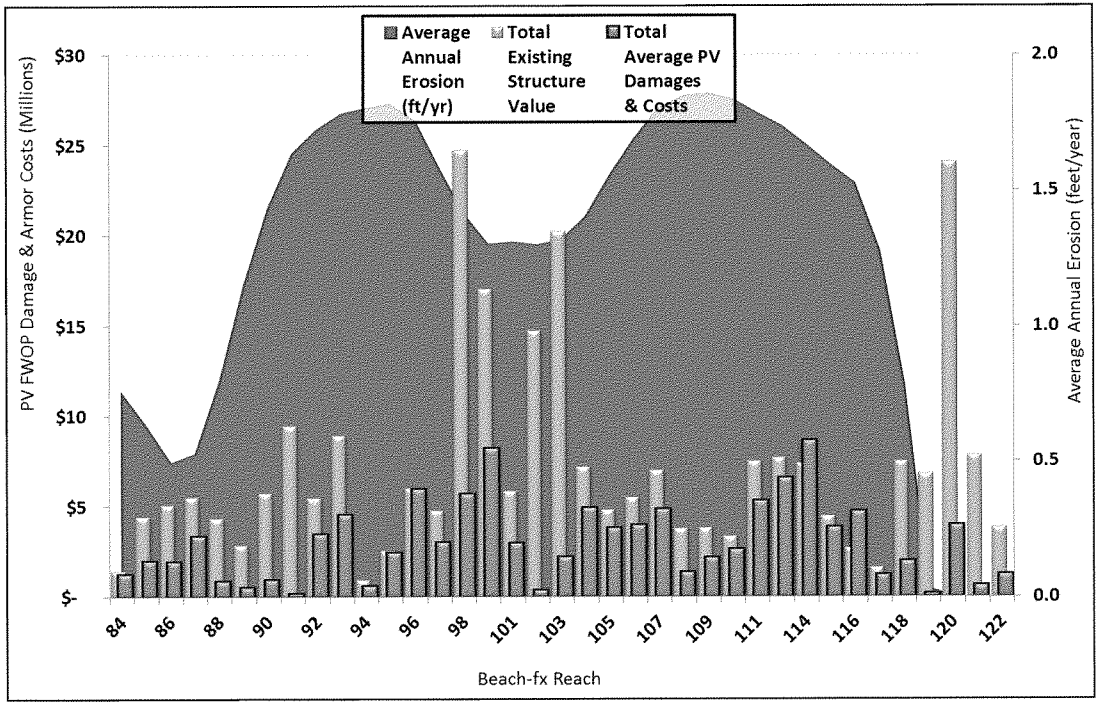


Figure 2-22. Spatial Distribution of Damages and Erosion Rates by Reach.

2.4.5.2 DAMAGE DISTRIBUTION BY DAMAGE DRIVING PARAMETER

Most of the FWOP damages and costs are attributable to erosion. The distribution of damages by driving parameter is as follows:

- Erosion: 99.56%
- Inundation: 0.13%
- Wave Attack: 0.32%

2.4.5.3 TEMPORAL DISTRIBUTION OF DAMAGES

Figure 2-23 illustrates the non-present value damages over time by Beach-fx reach. The timing of FWOP damages and armor costs varies across the model reaches. There is a great deal of variability in the amount of damages among the Beach-fx reaches. This is explained by the large number of variables, all of which the Beach-fx model takes into account. Variation between the reaches may result from the following:

- Density and amount of development
- Typical size and value of structures
- Typical distance between structures and mean-high water
- Size, shape, and location of the dunes, and coastal morphology
- Rate of erosion for each reach
- Amount and type of coastal armoring present
- Timing that property owners construct coastal armoring in the future

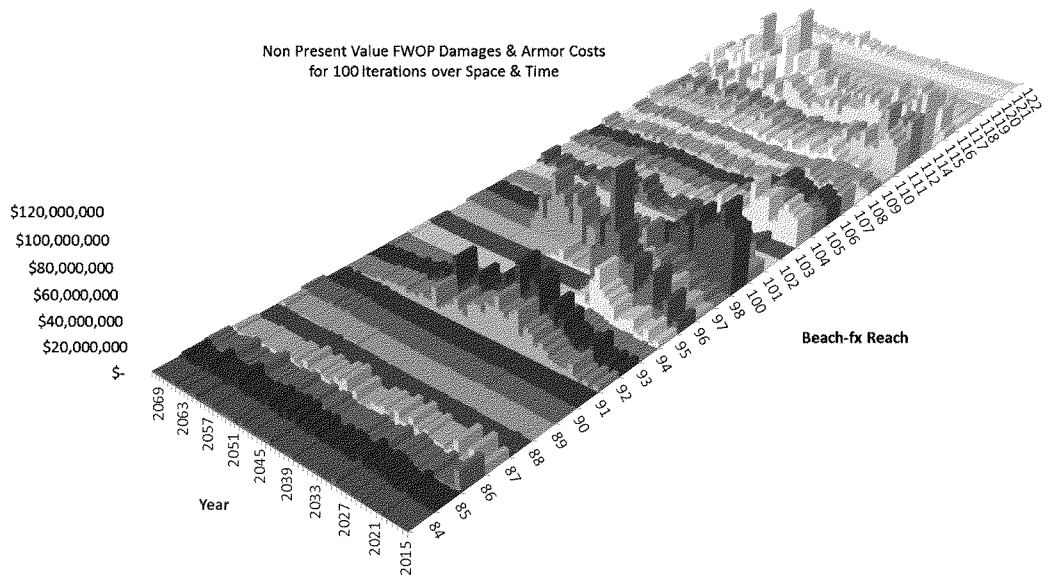


Figure 2-23. Non-Present Value FWOP Damages and Armor Costs over Space and Time.

2.4.5.4 FWOP DAMAGES IN ALTERNATIVE SEA LEVEL RISE (SLR) SCENARIOS

The FWOP condition was modeled for three Sea Level Rise (SLR) scenarios. ER 1110-2-8162 provides both a methodology, and a procedure, for determining a range of SLR estimates based on the local historic SLR rate, the construction (base) year of the project, and the design life of the project. The Beach-fx results presented above refer to the baseline scenario, which is based on the historic erosion rate. The results associated with the other two SLR scenarios are presented here.

Figure 2-24 provides an overall summary of FWOP average annual damage and armor costs in each SLR scenario. Combined structure and content damages increase by 22% from the base to intermediate scenarios, and 51% from the base to high scenarios. Armor costs increase by 57% from the base to intermediate scenarios, and 149% from the base to high scenarios. The total damage and armor costs increase by 31% from the base to intermediate scenarios, and 76% from the base to high scenarios. Erosion is the primary damage driver, accounting for about 99% of the FWOP damage and armor costs in the intermediate and high SLR scenarios. Additional detail on results from the SLR analysis is provided in the Economics Appendix.

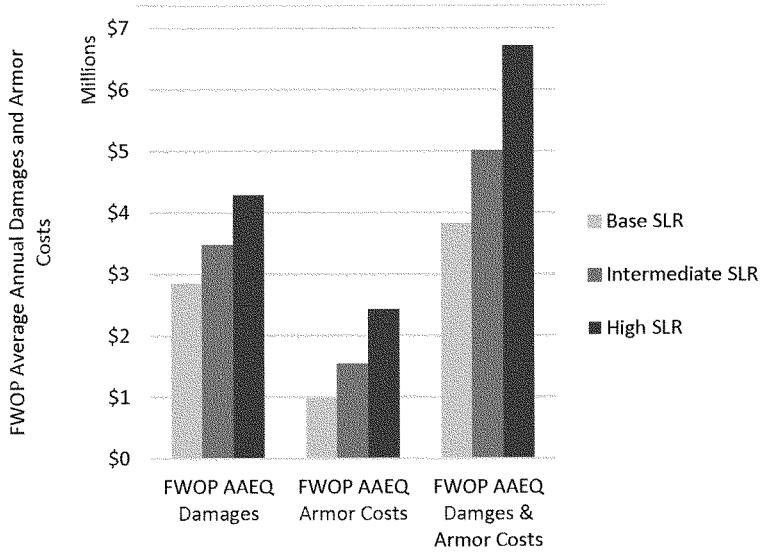


Figure 2-24. FWOP Average Annual Damage and Armor Costs for SLR.

2.4.5.5 FUTURE WITHOUT PROJECT CONDITION CONCLUSION

The following points summarize the FWOP conditions:

- Most of the FWOP damages are associated with single-family residences located along the shoreline.
- The majority of the damage and armoring is caused by erosion.
- **Damages in the FWOP condition increase in the accelerated SLR scenarios.**

CHAPTER 3

PLAN FORMULATION

3 PLAN FORMULATION

3.1 PLAN FORMULATION RATIONALE

Plan formulation is the process of developing alternative plans which meet the project-specific objectives while avoiding constraints.

The first step of plan formulation involves identifying all potential management measures for the given problems. A management measure is a structural or non-structural action that can be implemented at a specific geographic site to address one or more planning objectives.

An alternative plan is a set of one or more management measures functioning to address one or more objectives. Sometimes a plan consists of only one measure, but more often it's a combination of measures. Different alternative plans consist of different measures, or they combine the same measures in different ways, such as different dimensions, quantities, materials, locations, or implementation time frames. As the study evolves, favorable plans are reformulated to devise the most efficient, effective, complete, and acceptable plan.

Four accounts are established in the *Principles and Guidelines* (P&G 1983) to facilitate the evaluation of management measures and display the effects of alternative plans. The National Economic Development (NED) account displays the plan with the greatest net economic benefit consistent with protecting the nation's environment; the Environmental Quality (EQ) account displays non-monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of alternative plans; the Regional Economic Development (RED) account displays changes in the distribution of regional economic activity (e.g., income and employment); and the Other Social Effects (OSE) account displays plan effects on social aspects such as community impacts, health and safety, displacement, energy conservation, and others. The Federal *Principles and Guidelines* require that for Coastal Storm Risk Management (CSRM) projects, the NED plan is to be the selected plan unless an exception is granted. The NED plan must also be evaluated in consideration of the Principles and Guidelines criteria of completeness, effectiveness, efficiency, and acceptability. Each alternative plan is formulated in consideration of these four criteria.

3.2 SCOPING*

An initial scoping period for the project was conducted from August 17, 2005 through September 17, 2005. As the study progressed, USACE anticipated that an Environmental Impact Statement (EIS) might be required. A second scoping period was held from September 16, 2008 to October 16, 2008. A notice of intent to draft an EIS was published in the Federal Register on April 5, 2010. Subsequently, it became evident that no significant impacts to the human or natural environments were anticipated. USACE decided to initially prepare an Environmental Assessment (EA), rather than continue with the previous plans to draft an EIS. The draft EA and draft Finding of No Significant Impact (FONSI) were made available to the public for a 45-day public comment period from February 17, 2016 to April 4, 2016.

3.2.1 FEDERAL

3.2.2 AGENCY AND PUBLIC FEEDBACK

The most common concerns voiced in response to the scoping letters and comment periods included:

- Loss of land and property due to erosion
- Lack of protection from hurricanes
- Loss of recreational beach
- Concern over impacts to sea turtles and shore birds from renourishment
- Concern over impacts to benthic organisms from mining and fill
- Concern over protecting surfing spots and the revenue they generate
- Concern over wasting Federal tax dollars
- Too much time since the first studies without positive results
- Concern that revetments and seawalls harm sea turtle nesting

3.3 PROBLEMS AND OPPORTUNITIES*

A problem is an existing undesirable condition to be changed. An opportunity is a chance to create a future condition that is desirable. The difference between problems and opportunities is often indistinct, but in both cases a changed future condition is preferred. The purpose of this feasibility study is to develop an implementable and acceptable plan to improve the future condition and address specific problems and opportunities in the study area. Problems and opportunities to be addressed were identified in several ways. The study team reviewed previous studies by USACE

and other agencies and groups, as well as scoping letter comments received from local residents and stakeholders to identify current coastal risk related problems affecting the study area.

3.3.1 PROBLEMS

Problems within the study area include:

- Storm damages due to erosion, inundation, and waves threatening infrastructure
- Loss of natural habitat
- Shoreline erosion threatening recreational opportunities
- Shoreline erosion threatening hurricane evacuation route SR A1A
- Beach/dune interaction limited or eliminated

Erosion, both long term and storm induced, is the greatest problem in the study area. Loss of protective beach and dunes due to shoreline erosion threatens infrastructure, including SR A1A which is a major hurricane evacuation route for most of the study area and a National Scenic and Historic Coastal Byway. Erosion also threatens natural habitat and recreational opportunities. The study area has experienced long-term erosion. Some natural recovery occurs in the short-term, but the long-term trend is erosional.

Homeowners seeking to protect their property have constructed some erosion control measures, such as seawalls. These structures limit, or eliminate, the natural interaction where dunes feed sand to the eroded beach during storm events. Limiting this natural protective function makes infrastructure, and the environment adjacent to protected properties, more susceptible to storm damages. Multiple homes in the South Ponte Vedra Beach and Vilano Beach reaches received permits from the Florida Department of Environmental Protection (FDEP) to construct temporary seawalls. Sea level rise and coastal storms will continue to exacerbate the erosion pressures in the study area. Additional problems associated with the eroding shoreline include impacts to tourism and loss of recreational resources and habitat.

3.3.2 OPPORTUNITIES

Opportunities exist to:

- Protect/enhance habitat/environmental resources
- Maintain recreation
- Protect hurricane evacuation route (SR A1A)
- Protect/enhance beach/dune interaction
- Implement recommendations in the State of Florida's St. Augustine Inlet Management Plan to use the inlet as a sand source for beaches to the north of the inlet

There is an opportunity to reduce storm damage to infrastructure by implementing measures which control development in the project area and/or by engineering features which protect infrastructure. These are "management measures" and will be discussed in detail later in this chapter.

There is also the opportunity to preserve recreational opportunities that the current beach and dune systems provide in all reaches such as beach access, surfing, fishing, and wildlife viewing.

Coincident with some management measures like beach nourishment and dune creation are opportunities to protect and enhance natural habitat for sea turtles, etc., as well as protecting or enhancing the natural beach and dune interaction. The dunes act as a reservoir of sand. As they are eroded during storm events they feed sand to the beach and reduce potential erosion impacts to infrastructure. Measures that maintain this beach/dune interaction are preferable to those that would inhibit it, such as seawalls. While some natural functions, such as sea turtle nesting, may be disrupted around the time of construction activities, there is an opportunity for long-term benefit in preserving the beach habitat. Management measures requiring a source of sand for construction also provide an opportunity to implement part of the FDEP St. Augustine Inlet Management Plan which states that a portion of beach-compatible sand dredged from the inlet should be placed on beaches to the north of the inlet. This also represents the opportunity to implement a Regional Sediment Management (RSM) strategy where maintenance of the Federal inlet can be combined with a CSRM project, realizing significant cost savings to the Federal government and to the non-federal project sponsors.

3.4 CONSTRAINTS

3.4.1 PLANNING CONSTRAINTS

A constraint is a restriction that limits the extent of the planning process; it is a statement of effects that alternative plans should avoid. Constraints are designed to avoid undesirable changes between without and with project future conditions. The planning constraint for this study area is to avoid conflict with Federal regulations, as stated in Federal law, USACE regulations, and executive orders.

3.4.2 LOCAL CONSTRAINTS

Local and state laws, such as Florida State statutes, are not a constraint to NED formulation. However, they may be considered in the selection of a Locally Preferred Plan (LPP).

3.5 OBJECTIVES

3.5.1 FEDERAL OBJECTIVES

The Federal objective, as stated in The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, established by the U.S. Water Resources Council on March 10, 1983 (P&G), is to contribute to national economic development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net economic benefits that accrue in the study area and the rest of the nation.

The Federal objective does not seek to identify specific targets within objectives. For example, targeting a pre-defined storm frequency (100 year storm) relative to the storm damage reduction objective would be inappropriate. Rather, the planning process includes formulation of alternative plans to maximize benefits relative to costs.

3.5.1.1 PLANNING OBJECTIVES

The planning objectives are statements of the study purpose. Planning objectives are more specific than the Federal and non-federal objectives and reflect the problems and opportunities in the study area. Federal and non-federal objectives are discussed later in this chapter. An objective is developed to address each of the identified problems and opportunities while being consistent with the study authority and the USACE mission of coastal storm risk management. Planning objectives represent desired positive changes. The planning objectives for the study area would be attained within the 50-year period of analysis for the study, from 2020 through 2070. All of the objectives focus on activity within the three reaches of the study. The planning objectives are:

- Reduce storm damage to infrastructure, including SR A1A, a major hurricane evacuation route
- Maintain existing recreation (beach and nearshore)
- Maintain environmental quality for human and natural use, including natural protection provided by beach/dune interaction, air and water quality, habitat, and aesthetics

The goal of the feasibility study is to develop a range of alternative plans that balance the objectives and avoid conflicts or, where necessary, demonstrate the trade-offs between conflicting objectives; and enabling decisions to be made.

3.5.1.2 FEDERAL ENVIRONMENTAL OBJECTIVES

USACE strives to balance the environmental and developmental needs of the nation in full compliance with the National Environmental Policy Act (NEPA), and other authorities provided by Congress and the Executive Branch. Public participation is encouraged early in the planning process to define environmental problems and elicit public expression of needs and expectations. Significant environmental resources and values that would likely be impacted, favorably as well as adversely, by an alternative under consideration are identified early in the planning process. All plans are formulated to avoid, to the fullest extent practicable, any adverse impact on significant resources. Significant adverse impacts that cannot be avoided are mitigated as required by Section 906(d) of WRDA 1986. This feasibility study is an integrated document. Rather than having a separate NEPA document, it includes the Environmental Assessment (EA), which describes the environmental impacts of the recommended plan and summarizes compliance with Federal statutes and regulations.

3.5.1.3 ENVIRONMENTAL OPERATING PRINCIPLES

Consistent with NEPA, USACE has reaffirmed its commitment to the environment by formalizing a set of "Environmental Operating Principles" applicable to all its decision making and programs. These principles foster unity of purpose regarding environmental issues and ensure that conservation, environmental preservation, and restoration are considered in all USACE activities. Section 6.26 includes a discussion of the USACE Environmental Operating Principles and how the study addresses them.

3.5.1.4 CAMPAIGN PLAN OF THE U.S. ARMY CORPS OF ENGINEERS (USACE)

USACE Campaign Plan goals and objectives are derived, in part, from the Commander's intent, the Army Campaign Plan, and the Office of Management and Budget. The four goals, and their associated objectives, also build on prior strategic planning efforts. Each goal and objective is led by a USACE senior leader who manages and oversees actions to reach the goal and objective.

The successful achievement of the goals and objectives contained in the Campaign Plan are dependent on actions implemented by the entire USACE team. The implementing actions supporting each goal and objective are contained in the headquarters staff and Major Subordinate Command (MSC) implementation guidance for the Campaign Plan. The four goals of the Campaign Plan are:

Goal 1: Deliver innovative, resilient, and sustainable solutions to the Department of Defense (DoD) and the nation.

Goal 2: Deliver enduring and essential water resource solutions, utilizing effective transformation strategies.

Goal 3: Deliver support that responds to, recovers from, and mitigates disaster impacts to the nation.

Goal 4: Build resilient people, teams, systems, and processes to sustain a diverse culture of collaboration, innovation, and participation to shape and deliver strategic solutions.

These Campaign Plan goals, and associated objectives, will be addressed through the course of this feasibility study.

3.5.2 STATE AND LOCAL OBJECTIVES

The State of Florida is empowered by the Federal Coastal Zone Management Act (CZMA), and its implementing regulations at 15 CFR Part 930, to review Federal activities within or adjacent to its coastal zone, to comment on and concur with or object to a Federal agency's determination that the activity is consistent with the enforceable policies of the state's approved coastal management program. The Federal CZMA requires Federal activities to be consistent with a state's coastal zone program to the maximum extent practicable; it does not require compliance with a state's program. Florida's Coastal Zone Management Program was established under the Coastal Management Act of 1978 (Chapter 380.20, Florida Statutes) and approved by the Federal Coastal Zone Management office in 1981. Florida does not regulate its coastal zone through one comprehensive law, but rather through state statutes and administrative codes. Through Florida's comprehensive planning act, local governments are also given the opportunity to determine whether these activities are consistent with their goals and policies. FDEP is the lead state agency for the implementation of the CZMA.

The Beach and Shore Preservation Act (Chapter 161, Florida Statutes) is Florida's primary statute for developing and implementing the state's strategic beach management plan, regulating coastal construction seaward of the Mean High Water line, and regulating activities seaward of the coastal construction control lines. The act, administered by FDEP, was first passed in 1965 and has since been significantly amended. The objective of the Beach and Shore Preservation Act is to preserve and protect Florida's sandy beaches and adjacent beach and dune systems. FDEP strives to accomplish this objective with the following programs: Coastal Construction Control Lines, Joint Coastal Permit Program, Erosion Setbacks, Coastal Building Zone, Erosion Control Program, Erosion Control Line, and Inlet Management.

3.5.2.1 LOCAL COMPREHENSIVE PLANNING

The state's Local Government Comprehensive Planning Act of 1985 (Chapter 163) requires that all local governments prepare, adopt, and implement comprehensive plans that address community growth and development needs. It requires that local, regional, and state comprehensive plans be consistent with each other and requires coastal counties and cities to

include a "coastal management element" in their local plans. This section of the plan must be based on an inventory of the beach and dune system, existing coastal land uses, and an analysis of the effects of future land uses on coastal resources. Local governments must also address disaster mitigation and redevelopment, designation of coastal high-hazard areas, beach protection, and shoreline use.

The St. Johns County Beach Management Plan states that the county's central vision for its beaches provides for an equitable balance between dune and wildlife protection and amenities development for beach use and enjoyment, similar to those developed in Federal and state parks.

3.6 SUMMARY OF MANAGEMENT MEASURES

Management measures are specific structural or non-structural actions that would take place at geographical locations within the project areas. For this first iteration of evaluating measures, the entire project area was split into two geographical locations:

1) The South Ponte Vedra Beach and Vilano Beach reaches were grouped together due to their proximity and physical similarity.

2) The Summer Haven reach was evaluated separately due to its remote location relative to the rest of the study area and unique physical characteristics (e.g., limited number of houses).

3.6.1 IDENTIFICATION OF MANAGEMENT MEASURES

Management measures were selected to accomplish at least one planning objective. Both non-structural (NS) and structural (S) measures are included. All possible measures are considered, including those beyond the authority of USACE to implement.

NS-1: No Action. The no action plan is the continuation of existing conditions. Although this measure does not address any specific problems, it will provide a comparison to other measures. Information to describe this measure was collected during the inventory of existing conditions. The rate of shoreline change and current adjacent beach-fill and sand bypassing operations will be assumed to continue over the 50-year period of analysis. Present structures and replacement costs will be used into the future.

NS-2: Coastal Construction Control Line. A coastal construction control line (CCCL) that does not prohibit construction, but does provide stringent structural restrictions, has already been established by the State of Florida for all of the St. Johns County study area. This management measure provides for potential changes to the CCCL or building regulations that could be implemented by the State of Florida. Such changes could include moving the CCCL landward,

increasing the setback for construction, or increasing the standards for construction to reduce storm damages. The erosion of the shoreline would continue at the present rate, unabated by this measure.

NS-3: Moratorium on Construction. This management measure would not permit new construction in the area vulnerable to storm damages within the study area. As properties are damaged, reconstruction would not be permitted. The erosion of the shoreline would continue at the present rate, unabated by this measure. Although not a congressionally authorized activity, this measure could be implemented by state or local governments.

NS-4: Establish a No-Growth Program. This management measure would allow for existing structures and limited reconstruction following storm damage, but would not allow for an increased number of structures within the area vulnerable to storm damages adjacent to the study area. The erosion of the shoreline would continue at the present rate, unabated by this measure. Although not a congressionally authorized activity, this measure could be implemented by state or local governments.

NS-5: Relocation of Structures. This measure would allow the area to continue to erode and the land in this area would be lost. Structures vulnerable to storm damage in the study area would be identified, and where feasible, such structures would be moved further landward on their parcels to escape the vulnerable area.

NS-6: Flood Proofing of Structures. Flood proofing of existing structures, and regulation of flood plain and shorefront development, are management measures that state and local governments could implement. This measure would require changes to the building codes to further minimize flood damages associated with coastal storms. New construction, and substantial reconstruction, would be improved by new building code regulations. Existing structures could be improved through incentives and aid programs.

NS-7: Acquisition of Land and Structures. This measure would allow the shoreline to erode in the study area with a loss of land. Structures within the study area vulnerable to storm damage would be identified for acquisition. These structures would be demolished and natural areas would be restored. Such parcels would become public property, reducing the number of structures vulnerable to storm damages.

S-1: Seawalls. The construction of additional concrete seawalls, or improvements to and maintenance of, the existing bulkheads/seawalls would provide a significant degree of protection. The seawalls would be constructed at the seaward edge of the existing dune line. Existing seawalls may be demolished in favor of a new seawall to provide a seamless wall over the entire study area or select areas. This measure would stabilize the shoreline at the location of the bluff, allowing erosion to continue until the seawall becomes the water line. A concrete sheet pile wall

is proposed due to its stability in the salt environment and its ability to withstand wave action. Construction would entail excavation into the bluff to install tie-back features. The seawall must be of sufficient depth underground to withstand projected scour by wave action and will require rock protection at the bottom (toe) of the structure.

S-2: Revetments. Revetments have been placed on similar beaches to protect critically damaged or eroding areas. This measure would involve placement of large rock, designed to withstand the wave environment, along the existing dune line. The engineered structure would start at the elevation of the bluff to tie into existing elevations, and have a sloped profile. The structure would be imbedded under the beach elevation to a depth below expected scour and future erosion. In-place materials from the excavation would be used for backfill behind the structure. Along the shoreline, the revetment should be continuous to avoid erosional features at gaps and should include tie back features at the ends. Existing armor can either be incorporated into the structure, or demolished to provide a seamless structure.

S-3: Sand Covered Soft Structure. This management measure includes construction of a dune composed of geotextile sand-filled forms (typically tubes or bags) and covered with sand. This forms a sand dune with a structured core. Sand depth over the geotextile core would be maintained to an adequate depth to allow the dune to function as habitat and to not inhibit sea turtle nesting.

S-4: Beach Nourishment. This management measure includes initial construction of a beach-fill and future renourishments at regular intervals. Renourishment of the beach would be undertaken periodically to maintain the recreational and erosion control features within design dimensions. Dimensions of the beach-fill would be based on economic optimization of benefits provided, with consideration to cost, as well as the potential environmental impacts. Beach nourishment material is anticipated to be available in adequate quantities from offshore and/or from combinations of other sources such as navigation dredging, upland disposal areas, etc.

S-5: Groins. A series of groins in the problem area would help hold a beach in front of existing development and prevent further losses of land. The construction of groins would have to be supplemented with nourishment so that adjacent beaches would not be starved of sand. For this reason, groins are considered a method to help hold the fill in place and to reduce periodic nourishment requirements. The groins would be constructed of large size rock, designed to interlock together, and with a foundation that would avoid subsidence. The groins would be placed perpendicular to the shoreline and would extend from above the Mean High Water line out into shallow water. The length, orientation, and head of the structure (T-head or not) would be designed based on wave conditions, storms, and sediment transport. The beach-fill material would come from offshore and/or from in combinations of other sources such as navigation dredging, upland disposal areas, etc.

S-6: Submerged Artificial Reefs. This management measure would use the "perched beach concept" to limit the amount of underwater beach-fill and retain the dry beach for a longer period. Such construction would limit cross-shore losses of fill material. This would be accomplished by placement of a submerged artificial reef in shallow water with beach-fill material placed "perched" behind the reef structure. This measure may reduce initial nourishment (fill) quantities, reduce renourishment requirements, and offer mitigation for potential nearshore environmental impacts. The submerged artificial reef would be constructed out of large size rock with a foundation material to avoid subsidence. Typically, a structure perpendicular to the shore is constructed down-drift of the reef to stabilize fill. The beach-fill material would come from offshore and/or in combinations of other sources such as navigation dredging, upland disposal areas, etc.

S-7: Submerged Artificial Multi-purpose Reefs. This measure was chosen to fully account for the "maintain existing recreation (beach and nearshore)" objective. Multi-purpose reefs are intended to reduce wave energy by causing waves to break offshore over an artificial reef. The reef is designed to cause wave breaking in a form favorable for surfing and is constructed of material suitable for nearshore habitat. It is advisable to construct the reefs in combination with beach nourishment. A point of sand (or salient) typically forms in the wave shadow of the reef extending that portion of beach seaward. Sand that forms the salient would come from adjacent beaches. Pre-filling the project area with sand prior to, or with reef construction, would reduce adverse impacts to adjacent shorelines. Typically, these reefs are constructed of large, sand filled geotextile bags (or geotubes). Sand would come from offshore and/or in combinations of other sources such as navigation dredging, upland disposal areas, etc.

S-8: Nearshore Placement. Dredged material would be placed in the nearshore to dissipate wave energy, nourish the active profile, or placed as a combination of both. This method allows placement in water depths 15 feet and deeper. This management measure assumes that a portion of the sand placed in shallow water will move towards the beach under normal wave conditions. Over time, following construction, the sand bar will migrate towards the beach, attach to the beach, and shape into the normal equilibrium profile of the beach (thus adding material and enlarging the beach). The dredged material would come from offshore.

S-9: Breakwaters. The construction of breakwaters offshore along the St. Johns County study area is considered as a management measure to stabilize the existing beach. Such structures reduce the amount of wave energy reaching the shoreline behind them. As a result, the rate of annual erosion could decrease. The breakwaters would be constructed of large size rock with foundation materials to prevent subsidence. The breakwaters would be trapezoidal in profile and would be placed parallel to the shoreline in shallow water. The breakwaters would be constructed in segments separated from each other to prevent infilling between the existing beach and the

breakwaters. The elevation and length of each breakwater segment, and the distance between segments, would be designed using the wave and sediment transport characteristics of the reach.

S-10: Dunes and Vegetation. The presence of dunes is essential if a beach is to remain stable and able to accommodate the stress from unpredictable storms and extreme conditions of wind, wave, and elevated sea surfaces. Dunes maintain a sand repository that, during storms, provides sacrificial sand before structures would be damaged. The dune system provides a measure of public safety and property protection. Proper vegetation on dunes increases sand erosion resistance by binding the sand together via extensive root masses penetrating deep into the sand. Further, such vegetation promotes dune growth through its sand trapping action when significant wind action transports substantial quantities of sand. This measure would include placement of beach compatible material from upland, offshore, or other sources, in a dune feature adjacent to any existing dune. The top elevation of the constructed dune would tie into the existing dune. The front slope of the dune would be a function of the material grain size and construction equipment. Vegetation would be planted after placement of the dune material, as needed.

3.7 SCREENING OF MANAGEMENT MEASURES

3.7.1 PRELIMINARY SCREENING

In Table 3-1 management measures are evaluated by how they will individually meet planning objectives given planning constraints during a 50-year planning horizon within each geographic location, not necessarily across entire reaches. Seawalls, for example, would not necessarily be constructed down the entire length of the South Ponte Vedra Beach and Vilano Beach reaches. Rather the measure is evaluated to identify how constructing seawalls singularly, in select portions of the reaches, would meet planning objectives and constraints. Also, the overall effects of implementation are evaluated, not the shorter-term effects during construction of structural measures. This is especially relevant for beach nourishment, which typically includes periodic renourishment (reconstruction) of the beach over 50 years.

In addition to planning objectives and constraints, measures were also rated on their potential to meet the Four Accounts: National Economic Development (NED) includes damages prevented, emergency costs avoided, and other project costs; Environmental Quality (EQ) includes ecosystem value, water circulation, noise level changes, public facilities and services, aesthetic values, natural resources, air and water quality, cultural and historical preservation, and other factors covered by the National Environmental Policy Act (NEPA); Other Social Effects (OSE) includes security and preservation of life, health, and safety, community cohesion and growth, tax and property values, displacement of businesses, and public facilities; and Regional Economic Development (RED) includes the impact on local economy including local employment, income, and sales volume.

For the NED account, costs and benefits were not yet developed at this stage of plan formulation. The implementation of some measures, such as "Moratorium on Construction," would impact damage to future construction, but not damage to the existing inventory, which the NED calculation is based on for this study. These statements were entered in the matrix under the NED account and all measures given a "1" rating, which effectively negates the weight of this account. This ensures that no measures, which could potentially be part of a NED plan were screened out at this time as a result of the NED account. Rough costs versus Beach-fx damages were later used to screen measures carried forward from this stage.

The OSE account considers how measures impact life safety risk, especially as related to hurricanes and other significant storm events. The sponsor and state have an effective hurricane education, preparedness, and evacuation program. This results in most measures not having a significant difference between the with-project and future without-project condition (FWOP) as it is assumed most residents are prepared and would evacuate when necessary. As reflected in Table 3-1, structural measures could minimally improve life safety risk as a result of protecting hurricane evacuation route SR A1A. However, this analysis assumes that the majority of the population evacuates damage prone areas in adequate time to effectively reduce life safety risk.

It is important to note, that no alternatives were screened out due to their inability to meet the planning objective to "Maintain existing recreation (beach and nearshore)." USACE participates in single purpose projects formulated exclusively for coastal storm risk management, with economic benefits equal to or exceeding the costs, based solely on damage reduction benefits, or a combination of damage reduction benefits and recreation benefits. Under current policy, recreation must be incidental in the formulation process and may not be more than 50% of the total benefits required for justification (ER 1105-2-100, 3-4.b.(4)(a)).

The management measures were evaluated and rated in Table 3-1 for their potential to accomplish planning objectives given project constraints: 0 = does not meet criteria, 1 = partially meets criteria, and 2 = fully meets criteria. If the total rating equals a number greater than 8, the measure partially meets, at least, over half of the objectives and constraints, and is carried forward for further analysis. If the total rating is equal to or less than 8, the measure is not considered further. The final total rating should not be inferred to be a ranking of measures against one another. A measure's rating is only an indication of how likely it is to meet objectives given constraints, and therefore whether it is carried forward or not.

Management measures for the South Ponte Vedra Beach and Vilano Beach reaches were jointly screened due to their similarities and proximity to one another. The only significant difference between the reaches is the presence of the Coastal Barrier Resources System (CBRS) unit in the Vilano Beach reach. Federal law constrains Federal participation in a CBRS unit. Total ratings in Table 3-1 were significantly high or low enough that separate evaluation of the reaches was not

required. The only exception was evaluation of S-8 (Nearshore Placement). Presence of the CBRS unit caused this measure to not be carried forward for the Vilano Beach reach. However, the measure was carried forward for the South Ponte Vedra reach where no CBRS unit exists.

Table 3-1. Preliminary screening matrix.

South Ponte Vedra Beach and Vilano Beach Non-Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	SOUTH PONTE VEDRA AND VILANO	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Nonstructural Measures (NS)										
NS-1	No-Action	No improvement	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures.	Consistent with Federal law.	No project cost. No damages prevented.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Moderate risk to loss of public facilities (parking, beach access, bathrooms). Negative effect on community cohesion due to perceived inequality.	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues.		
		0	1	0	2	1	1	0	0	5	Yes
NS-2	Coastal Construction Control Line	Increasing construction standards could decrease damage to future construction	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures.	Implemented by state/local government and is consistent with Federal law.	Would impact future construction but not impact damages to existing inventory which NED calculation is based on for this study.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Increased requirements/restrictions on future construction are typically unfavorable.	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues.		
		1	1	0	2	1	1	0	0	6	No
NS-3	Moratorium on Construction	No improvement to damage of current construction but elimination of damage to future construction	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures.	Implemented by state/local government and is consistent with Federal law.	Would impact future construction but not impact damages to existing inventory which NED calculation is based on for this study.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Moderate risk to loss of public facilities (parking, beach access, bathrooms). Negative effect on community cohesion due to perceived inequality.	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues.		
		1	1	0	2	1	1	0	0	6	No

[ ] Carried Forward [ ] Eliminated [2] Fully Meets Obj/Constraint [1] Partially Meets Obj/Constraint [0] Does Not Meet Obj/Constraint

South Ponte Vedra Beach and Vilano Beach Non-Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	SOUTH PONTE VEDRA AND VILANO	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Nonstructural Measures (NS)										
NS-4	Establish a No-Growth Program	No improvement to damage of current construction but elimination of damage to future construction.	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures.	Implemented by state/local government and is consistent with Federal law.	Would impact future construction but not impact damages to existing inventory which NED calculation is based on for this study.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Loss of property value and tax value. Moderate risk to loss of public facilities (parking, beach access, bathrooms). Negative effect on community cohesion due to perceived inequality.	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues.	6	No
		1	1	0	2	1	1	0	0		
NS-5	Relocation of Structures	Relocating damageable elements would reduce damages.	No impact to nearshore recreation. Eventual narrowing of beach could cause loss of beach recreation.	Relocation could reduce private shore protection measures and maintain beach/dune interaction. Eventual narrowing of beach/dune system between ocean and A1A would limit or eliminate interaction	Consistent with Federal law.	Costs undetermined at this stage.	Eventual narrowing of beach/dune system between ocean and A1A would limit or eliminate habitat. No impact to nearshore habitat. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Moderate risk to loss of public facilities (parking, beach access, bathrooms). Negative effect on community cohesion due to perceived inequality.	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues.	7	No
		1	1	1	2	1	1	0	0		
NS-6	Flood Proofing of Structures	Increasing construction standards could decrease damage to future construction	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures.	Implemented by state/local government and is consistent with Federal law.	Costs undetermined at this stage.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Increased requirements/ restrictions on future construction are typically unfavorable.	Loss of property value and tax value. Loss of other revenue related to existing beach as long -term erosion continues.	6	No
		1	1	0	2	1	1	0	0		
NS-7	Acquisition of Land and Structures	Removing damageable elements and conversion of property to natural area would maximize storm damage reduction.	No impact to nearshore recreation. Loss of beach recreation as beach/dune system narrows between A1A and ocean.	Eventual narrowing of beach/dune system between ocean and A1A would limit or eliminate interaction	Consistent with Federal law.	Costs undetermined at this stage.	Creation of natural area/habitat would improve environment. Loss of habitat as beach/dune system narrows between ocean and A1A.	Small life safety risk due to hurricane evacuation route damage. Moderate risk to loss of public facilities if parkland were created. Negative effect on community cohesion due to perceived inequality.	Minimal increase with creation of parkland and eco-tourism benefits.	9	Yes
		2	1	1	2	1	1	0	1		

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

South Ponte Vedra Beach and Vilano Beach Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS						
	SOUTH PONTE VEDRA AND VILANO	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-1	Seawalls	Would maximize storm damage reduction where constructed. However, adjacent properties could be made more vulnerable due to erosive effects of structures.	Potential loss of beach recreation fronting structures. Steepening of profile and/or wave reflection may effect nearshore recreation such as surfing.	Construction would eliminate beach/dune interaction. Interaction on properties adjacent to construction could be negatively affected.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Negative effects to sea turtle nesting habitat and wildlife habitat.	Likely supported by homeowners but little support from others.	No change.			
		1	1	0	1	1	0	1	0	5	No
S-2	Revetments	Would maximize storm damage reduction where constructed. However, adjacent properties could be made more vulnerable due to erosive effects of structures.	Sloped construction causes revetments to take up more beach width than seawalls. Potential loss of beach recreation fronting structures. Steepening of profile and/or wave reflection may effect nearshore recreation such as surfing.	Construction would eliminate beach/dune interaction. Interaction on properties adjacent to construction could be negatively affected.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Negative effects to sea turtle nesting habitat and wildlife habitat.	Likely supported by homeowners but little support from others.	No change.			
		1	1	0	1	1	0	1	0	5	No
S-3	Sand Covered Soft Structure	Would improve storm damage reduction.	Existing narrow beach may be maintained.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Environmental quality is highly dependent on maintaining sand coverage of structure. Without adequate coverage dune habitat and sea turtle nesting could be negatively impacted. No impact to nearshore habitat.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms).	Minimal increase to RED through improvement of tourism/beach economy. Protection of property value and tax value.			
		1	1	2	1	1	1	2	1	10	Yes

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

South Ponte Vedra Beach and Vilano Beach Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS						
	SOUTH PONTE VEDRA AND VILANO	Reduce Storm Damage to Infrastructure, including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-4	Beach Nourishment	Continuous nourishment along constructible lengths of shoreline would maximize storm damage reduction.	Beach recreation would be maintained or improved. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Empirical evidence indicates potential negative effects to benthic invertebrates and nearshore habitat are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms). Supported by majority of community.	Moderate increase to RED through improvement of tourism/ beach economy. Protection of property value and tax value.		
		2	1	2	1	1	1	2	2	12	Yes
S-5	Groins	In combination with beach nourishment, groins could be used at hotspots to stabilize fill and maximize storm damage reduction.	In combination with beach nourishment, beach recreation would be maintained. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments. Periodic renourishments should be reduced due to stabilization effects of groins.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Periodic renourishments could be reduced due to stabilizing effect of groins. Empirical evidence indicates potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat. Possible entrapment hazard for hatchling sea turtles.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms). Supported by majority of community.	Moderate increase to RED through improvement of tourism/ beach economy. Protection of and tax value.		
		2	1	2	1	1	1	1	2	11	Yes
S-6	Submerged Artificial Reefs	Constructed in select locations, in combination with beach nourishment and a shore perpendicular structure, could maximize storm damage reduction.	In combination with beach nourishment and a shore perpendicular structure, beach recreation would be maintained. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Reef has potential as nearshore habitat. Empirical evidence indicates potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms).	Moderate increase to RED through improvement of tourism/ beach economy. Protection of property value and tax value.		
		2	1	2	1	1	2	1	2	12	Yes

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

South Ponte Vedra Beach and Vilano Beach Structural Measures

	MEASURES	PROJECT OBJECTIVES			CONSTRAINTS	FOUR ACCOUNTS						
	SOUTH PONTE VEDRA AND VILANO	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-7	Submerged Artificial Multi-Purpose Reefs	Constructed in select locations in combination with beach nourishment, could maximize storm damage reduction. 2	In combination with beach nourishment, beach recreation would be maintained. Reef construction could maintain or improve nearshore recreation such as surfing, fishing, and diving. Reef could serve as mitigation for periodic beach nourishment impacts to nearshore recreation in other portions of the study area. 2	Beach/dune interaction would be maintained. 2	Supported by Federal law except in CBRA zone. 1	Costs undetermined at this stage. 1	Reef has potential as nearshore habitat. Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat. 2	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms). May receive more support from environmental agencies. 1	Moderate increase to RED through improvement of tourism/beach economy. Protection of property value and tax value. 2	13	Yes
S-8 South Ponte Vedra	Nearshore Placement	Could provide moderate storm damage reduction dependent on migration of fill. 1	Beach recreation could be maintained or improved dependent on fill migration. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial placement and future periodic placements. 1	Beach/dune interaction would be maintained. 2	Consistent with Federal law. 2	Costs undetermined at this stage. 1	Empirical evidence indicates potential negative effects to benthic invertebrates and nearshore habitat are for short periods of time, with habitat recovering within one year. Source of sand needed to provide significant benefits could have negative impact to sea turtle nesting habitat dependent on migration of fill. 0	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms). 1	Minimal protection of property value and tax value. 1	9	Yes
S-8 Vilano	Nearshore Placement	Could provide moderate storm damage reduction dependent on migration of fill. 1	Beach recreation could be maintained or improved dependent on fill migration. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial placement and future periodic placements. 1	Beach/dune interaction would be maintained 2	Supported by federal law except in CBRA zone. 1	Costs undetermined at this stage. 1	Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat are for short periods of time, with habitat recovering within one year. Source of sand needed to provide significant benefits could have negative impact to sea turtle nesting habitat dependent on migration of fill. 0	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms). 1	Minimal protection of property value and tax value. 1	8	No
S-9	Emergent Breakwaters	As a stand-alone measure, emergent breakwaters could improve storm damage reduction. 1	Beach recreation could be maintained. Nearshore recreation such as surfing could be negatively impacted. 1	Beach/dune interaction would be maintained. 2	Supported by Federal law except in CBRA zone. 1	Costs undetermined at this stage. 1	Potential negative impacts to sea turtle nesting activities and hatchling entrapment. 1	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms). 1	Minimal protection of property value and tax value. 1	9	Yes
S-10	Dunes and Vegetation	Could improve storm damage reduction as a stand-alone measure. 1	Beach recreation could be maintained. No impact to nearshore recreation. 1	Beach/dune interaction would be maintained or improved. 2	Supported by Federal law except in CBRA zone. 1	Costs undetermined at this stage. 1	Dune creation improves dune habitat and potentially beach habitat for sea turtle nesting. No impact to nearshore habitat. 2	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms). 1	Moderate increase to RED through improvement of tourism/beach economy. Moderate protection of property value and tax value. 2	11	Yes

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

Summer Haven Non-Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Nonstructural Measures (NS)										
NS-1	No Action	No improvement 0	No impact to nearshore recreation. Loss of beach recreation. 1	No dune exists in northern, reverted portion. Minimal impact to beachy dunes system in southern portion 0	Consistent with Federal law. 2	No project cost. No damages prevented. 1	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors. 1	Negative effect on community cohesion due to perceived inequality 0	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues. 0	5	Yes
NS-2	Coastal Construction Control Line	Increasing construction standards could decrease damage to future construction 1	No impact to nearshore recreation. Loss of beach recreation. 1	Natural and artificial loss due to private shore protection measures 0	Implemented by state/local government and is consistent with Federal law. 2	Would impact future construction but not impact damages to existing inventory which NED calculation is based on for this study. 1	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors. 1	Increased requirements/restrictions on future construction are typically unfavorable. 0	Loss of property value tax value. Loss of other revenue related to existing beach as long-term erosion continues. 0	6	No
NS-3	Moratorium on Construction	No improvement to damage of current construction but elimination of damage to future construction 1	No impact to nearshore recreation. Loss of beach recreation. 1	Some natural loss likely due to erosion. No artificial loss due to no anticipated shore protection measures in southern reach.. 1	Implemented by state/local government and is consistent with Federal law. 2	Would impact future construction but not impact damages to existing inventory which NED calculation is based on for this study. 1	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width. Minimal change to other factors. 1	Loss of property value and tax value. Negative effect on community cohesion due to perceived inequality 0	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues. 0	7	No
NS-4	Establish a No-Growth Program	No improvement to damage of current construction but elimination of damage to future construction 1	No impact to nearshore recreation. Loss of beach recreation. 1	Some natural loss likely due to erosion. No artificial loss due to no anticipated shore protection measures in southern reach. 1	Implemented by state/local government and is consistent with Federal law. 2	Would impact future construction but not damage to existing inventory which NED calculation is based on for this study. 1	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width. Minimal change to other factors. 1	Loss of property value and tax value. Negative effect on community cohesion due to perceived inequality. 0	Loss of property value and tax value. Loss of other revenue related to existing beach as long-term erosion continues. 0	7	No

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

Summer Haven Non-Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Nonstructural Measures (NS)										
NS-5	Relocation of Structures	Relocating damageable elements would reduce damages.	No impact to nearshore recreation. Eventual narrowing of beach could cause loss of beach recreation.	Relocation could reduce private shore protection measures in the southern reach and maintain beach/dune interaction. Eventual narrowing of beach/dune system between ocean and Old A1A would limit or eliminate interaction	Consistent with Federal law.	Costs undetermined at this stage.	Eventual narrowing of beach/dune system between ocean and Old A1A would limit or eliminate habitat. No impact to nearshore habitat. Minimal change to other factors.	Small life safety risk due to hurricane evacuation route damage. Moderate risk to loss of public facilities (parking, beach access, bathrooms). Negative effect on community cohesion due to perceived inequality.	Loss of property value and tax value. Loss of other revenue related to existing beach as long- term erosion continues.		
		1	1	1	2	1	1	0	0	7	No
NS-6	Flood Proofing of Structures	Increasing construction standards could decrease damage to future construction	No impact to nearshore recreation. Loss of beach recreation.	Natural and artificial loss due to private shore protection measures	Implemented by state/local government and is consistent with Federal law.	Costs undetermined at this stage.	Possible loss of dune habitat. Loss of turtle nesting habitat due to decreased beach/dune width and private shore protection measures. Minimal change to other factors.	Increased requirements/restrictions on future construction are typically unfavorable.	Loss of property value and tax value. Loss of other revenue related to existing beach as long- term erosion continues.		
		1	1	0	2	1	1	0	0	6	No
NS-7	Acquisition of Land and Structures	Removing damageable elements and conversion of property to natural area would maximize storm damage reduction.	Creation of natural area/park would not impact beach or nearshore recreation. This assumes removal of Old A1A in southern reach.	Creation of natural area and removal of Old A1A would maintain beach/dune interaction.	Consistent with Federal law.	Costs undetermined at this stage.	Creation of natural area/habitat would improve environment.	Overall, public may view measure as beneficial to local interests.	Minimal increase with creation of parkland and eco-tourism benefits.		
		2	2	2	2	1	2	1	1	13	Yes

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

Summer Haven Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-1	Seawalls	Would maximize storm damage reduction where constructed. Structures exist to the north and south, therefore minimal effects to adjacent properties.	Potential loss of beach recreation fronting structures. Steepening of profile and/or wave reflection may effect nearshore recreation such as surfing.	Construction would eliminate beach/dune interaction. Beach/dune interaction on properties adjacent to construction could be negatively affected.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Negative effects to sea turtle nesting habitat in southern reach.	Likely supported by homeowners but little support from others.	No change.		
		2	1	0	1	1	0	1	0	6	No
S-2	Revetments	Would maximize storm damage reduction where constructed. Structures exist to the north and south, therefore minimal effects to adjacent properties.	Sloped construction causes revetments to take up more beach width than seawalls. Potential loss of beach recreation fronting structures. Steepening of profile and/or wave reflection may effect nearshore recreation such as surfing.	Construction would eliminate beach/dune interaction. Beach/dune interaction on properties adjacent to construction could be negatively affected.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Negative effects to sea turtle nesting habitat in southern reach.	Likely supported by homeowners but little support from others.	No change.		
		2	1	0	1	1	0	1	0	6	No
S-3	Sand Covered Soft Structure	Would improve storm damage reduction.	Existing narrow beach may be maintained.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Environmental quality is highly dependent on maintaining sand coverage of structure. Without adequate coverage dune habitat and sea turtle nesting could be negatively impacted. No impact to nearshore habitat.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms).	Minimal increase to RED through improvement of tourism/beach economy. Protection of property value and tax value.		
		1	1	2	1	1	1	2	1	10	Yes

Carried Forward Eliminated 2 Fully Meets Obj/Constraint 1 Partially Meets Obj/Constraint 0 Does Not Meet Obj/Constraint

Summer Haven Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-4	Beach Nourishment	Continuous nourishment along constructible lengths of shoreline would maximize storm damage reduction.	Beach recreation would be maintained or improved. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments.	Beach/dune interaction would be maintained in southern reach.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Supported by homeowners.	Moderate increase to RED through improvement of tourism/beach economy. Minimal protection of property value and tax value in northern reach due to existing protection provided by revetment. Increased protection likely in southern reach.	11	Yes
		2	1	2	1	1	1	1	2		
S-5	Groins	In combination with beach nourishment, groins could be used at hotspots to stabilize fill and maximize storm damage reduction.	In combination with beach nourishment, beach recreation would be maintained. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments. Periodic renourishments should be reduced due to stabilization effects of groins.	Beach/dune interaction would be maintained in southern reach.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Periodic renourishments could be reduced due to stabilizing effect of groins. Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Supported by homeowners.	Moderate increase to RED through improvement of tourism/beach economy. Minimal protection of property value and tax value in northern reach due to existing protection provided by revetment. Increased protection likely in southern reach.	11	Yes
		2	1	2	1	1	1	1	2		

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

Summer Haven Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS						
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-6	Submerged Artificial Reefs	Constructed in select locations in combination with beach nourishment, could maximize storm damage reduction.	In combination with beach nourishment, beach recreation would be maintained. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial nourishment and periodic renourishments.	Beach/dune interaction would be maintained in southern reach.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Reef has potential as nearshore habitat. Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Supported by homeowners.	Moderate increase to RED through improvement of tourism/beach economy. Minimal protection of property value and tax value in northern reach due to existing protection provided by revetment. Increased protection likely in southern reach.	12	Yes
		2	1	2	1	1	2	1	2		
S-7	Submerged Artificial Multi-Purpose Reefs	Constructed in select locations in combination with beach nourishment, could maximize storm damage reduction.	In combination with beach nourishment, beach recreation would be maintained. Reef construction could maintain or improve nearshore recreation such as surfing, fishing, and diving. Reef could serve as mitigation for periodic beach nourishment impacts to nearshore recreation in other portions of the study area.	Beach/dune interaction would be maintained in southern reach.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Reef has potential as nearshore habitat. Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat from beach nourishment are periodic, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Supported by homeowners.	Moderate increase to RED through improvement of tourism/beach economy.	13	Yes
		2	2	2	1	1	2	1	2		
S-8	Nearshore Placement	Could provide moderate storm damage reduction dependent on migration of fill.	Beach recreation could be maintained or improved dependent on fill migration. Nearshore recreation such as surfing and fishing could be impacted (negatively or positively) for a period of time after initial placement and future periodic placements.	Beach/dune interaction would be maintained in the southern reach.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Empirical evidence indicate potential negative effects to benthic invertebrates and nearshore habitat are for short periods of time, with habitat recovering within one year. Volume of sand needed to provide significant benefits could have negative impact to sea turtle nesting habitat dependent on migration of fill.	Supported by homeowners.	Dependent on fill migration to the dry beach, there could be a moderate increase to RED through improvement of tourism/beach economy. Minimal protection of property value and tax value in northern reach due to existing protection provided by revetment. Increased protection likely in southern reach.	8	No
		1	1	2	1	1	0	1	1		

C Carried Forward E Eliminated 2 Fully Meets Obj/Constraint 1 Partially Meets Obj/Constraint 0 Does Not Meet Obj/Constraint

Summer Haven Structural Measures

	MEASURES	PROJECT OBJECTIVES			PROJECT CONSTRAINTS	FOUR ACCOUNTS					
	Summer Haven	Reduce Storm Damage to Infrastructure, Including SR A1A	Maintain Existing Recreation (Beach and Nearshore)	Maintain Environmental Quality Including Beach/Dune Interaction	Consistent with Federal Laws	National Economic Development (NED)	Environmental Quality	Other Social Effects	Regional Economic Development (RED)	Total	Measure Carried Forward (Yes/No)
	Structural Measures (S)										
S-9	Emergent Breakwaters	As a stand-alone measure, emergent breakwaters could improve storm damage reduction.	Beach recreation could be maintained. Nearshore recreation such as surfing could be negatively impacted.	Beach/dune interaction would be maintained.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Potential negative impacts to sea turtle nesting activities and hatchling entrapment.	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of property value and tax value. Minimal protection of public facilities (parking, beach access, bathrooms).	No change	8	No
		1	1	2	1	1	1	1	0		
S-10	Dunes and Vegetation	Could improve storm damage reduction as a stand-alone measure.	Beach recreation could be maintained. No impact to nearshore recreation.	Beach/dune interaction would be maintained or improved.	Supported by Federal law except in CBRA zone.	Costs undetermined at this stage.	Dune creation improves dune habitat and potentially beach habitat for sea turtle nesting. No impact to nearshore habitat.	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of property value and tax value. Minimal protection of public facilities (parking, beach access, bathrooms).	Moderate increase to RED through improvement of tourism/beach economy.		
		1	1	2	1	1	2	1	2	11	Yes

Carried Forward | Eliminated | 2 Fully Meets Obj/Constraint | 1 Partially Meets Obj/Constraint | 0 Does Not Meet Obj/Constraint

Management measures that were carried forward from this screening include:

Measures carried forward for South Ponte Vedra Beach and Vilano Beach reaches
NS-1: No Action
NS-7: Acquisition of Land and Structures
S-3: Sand Covered Soft Structure
S-4: Beach Nourishment
S-5: Groins
S-6: Submerged Artificial Reef
S-7: Submerged Artificial Multi-Purpose Reef
S-8: Nearshore Placement (for South Ponte Vedra Beach reach only)
S-9: Emergent Breakwaters
S-10: Dunes and Vegetation

Measures carried forward for Summer Haven reach
NS-1: No Action
NS-7: Acquisition of Land and Structures
S-3: Sand Covered Soft Structure
S-4: Beach Nourishment
S-5: Groins
S-6: Submerged Artificial Reef
S-7: Submerged Artificial Multi-Purpose Reef
S-10: Dunes and Vegetation

The measures carried forward were further discussed with the Project Development Team, the non-federal sponsor, and other stakeholders. In some cases, further analysis of a measure was not recommended, and the measure was eliminated. The following paragraphs discuss measures carried forward and their potential for development into alternatives. Rough Order Magnitude (ROM) costs for measures carried forward were developed and compared to FWOP damages from Beach-fx, as described later in this chapter. This comparison provides insight into where specific measures may be justified and which ones merit more in-depth analysis.

NS-7: Acquisition of Land and Structures. In the South Ponte Vedra Beach and Vilano Beach reaches, this measure will include buyout and demolition of the existing structures most susceptible to damage. For the Summer Haven reach, this measure would include buyout and demolition of existing structures in the southern portion of the reach south of the existing revetment.

S-3: Sand Covered Soft Structure. Such structures could be constructed in select areas of all three reaches, especially where infrastructure is particularly vulnerable during periods of beach narrowing. The vicinity of R114 in Vilano Beach is an area where the beach and dune have eroded close to homes and SR A1A during storm events. In their review of the screening matrix, FDEP stated that five similar structures

constructed in Brevard County, Florida, have been problematic, mainly due to the difficulty in maintaining appropriate sand cover over the structure. Sand-covered soft structures are likely to operate best in combination with beach nourishment.

S-4: Beach Nourishment. This is the most common type of structural measure constructed for large storm damage reduction projects in Florida. The Florida coastline is typically composed of straight sand beaches periodically interrupted by inlets and other man-made structures, but with few natural obstructions. This creates an environment where sediment transport patterns span large areas which the construction structures can easily interrupt. Because of this, constructing a beach system with natural storm damage reduction and habitat functions typically serves as the most effective and environmentally sound solution.

S-5: Groins: Groins are typically constructed to stabilize a sandy beach in isolated sections of shoreline with high erosion rates (hot spots). Constructing groins on long straight sections of sandy beach, such as South Ponte Vedra and Vilano beaches, can cause erosion to adjacent beaches downdrift of the sand transport flow. Although the R114 vicinity in Vilano Beach is considered a hotspot, other measures, such as beach nourishment, would be more likely to meet project objectives without causing downdrift impacts. Groins will not be evaluated in the South Ponte Vedra Beach or Vilano Beach reaches. However the Summer Haven reach could benefit from groins, especially if constructed near the southern end of the existing revetment where breaches have occurred. Previous beneficial use placements of sand dredged from navigation projects have eroded at very high rates from this area and could be stabilized with groins.

S-6: Submerged Artificial Reefs. Such a structure is typically constructed to protect isolated areas experiencing erosion and to prevent sand from eroding in the cross shore direction. Construction on a long straight beach such as South Ponte Vedra or Vilano beaches may cause negative impacts on adjacent beaches. The cost to construct structures the length of the study area would likely be excessive. There would also be significant difficulties with construction and maintenance since the structure would be located in the surf zone. Construction of these structures in Summer Haven could be evaluated further, however, material costs for construction would likely exceed those for other structures (such as groins) that could provide similar benefits. Due to these points, submerged artificial reefs are eliminated from further analysis.

S-7: Submerged Artificial Multi-Purpose Reefs. These structures are typically constructed along isolated areas of high erosion and particularly in order to mitigate for impacts to recreation (such as surfing) and/or habitat. Negative impacts, as described for S-6, may not be such a factor with these reefs since they are constructed in deeper water. The technology is relatively new compared to other structural measures. However, construction techniques are improving, which could lower costs and improve performance. Construction of such a measure would be best offshore of an erosional hotspot, such as in the R114 vicinity of Vilano Beach or offshore of the Summer Haven breach, just south of the constructed revetment.

S-8: Nearshore Placement (South Ponte Vedra Beach reach only). Typically, nearshore placement is conducted when a sand source's characteristics do not match the native beach and direct placement on

the beach (beach nourishment) is not possible for permitting reasons. For nearshore placement, material is placed in the nearshore where processes such as waves and currents can naturally sort finer material out and transport material suitable for the beach toward the shore. Preliminary investigations indicate that beach quality material is available for any potential project. Material of this quality would likely be more effective for storm damage reduction if placed as typical beach nourishment and not in the nearshore. Due to these considerations, nearshore placement is eliminated from further analysis.

S-9: Emergent Breakwaters. Emergent breakwaters would be constructed to minimize erosive forces, particularly waves, on the shoreline behind them. As a stand-alone measure, they can be effective at slowing erosion in isolated sections of shoreline with high erosion rates (hotspots). However, they may cause impacts to adjacent shorelines if constructed without beach nourishment, especially if constructed on long straight sections of sandy beach such as the South Ponte Vedra Beach and Vilano Beach reaches. In combination with beach nourishment, this measure could be effective in select areas such as the hotspot around R114 in Vilano Beach.

S-10: Dunes and Vegetation. Dunes are an integral component of the existing beach/dune system throughout the majority of the study area. Dunes protect against elevated water levels resulting from storm surge and are also a "reservoir" of sand, feeding the beach during erosive events. This measure would include nourishing the existing dune or creating a dune where one does not currently exist. The nourished dune would be vegetated, as needed, in order to stabilize the sand.

3.7.2 FORMULATION STRATEGY

Measures used singularly or in combination with others create alternatives, and varying scales of each create additional alternatives. For example, an alternative may be implementable for a portion of a reach, but not for an entire reach. Several alternatives of merit have resulted from combinations of management measures. These alternatives will undergo further analysis.

The purposes of the Coastal Barrier Resources Act (CBRA) include minimizing the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife, and other natural resources associated with CBRS units. There are limits to Federal expenditures related to actions that could affect a unit. Due to the presence of a CBRS unit in the southern portion of the Summer Haven reach, and the revetment providing significant storm damage reduction to infrastructure in the northern portion, USACE will be limited in which alternatives it can implement. Due to the fact that a significant amount of shoreline within the CBRS unit is composed of undeveloped privately owned parcels, Federal expenditures for any alternative implementation would be prohibited by the CBRA due to the fact that such action could encourage development.

USACE will analyze structural alternatives only for the northern half of the Summer Haven reach, north of the CBRS unit. The only alternative analyzed in the southern half will be NS-7: Acquisition of Land and

Structures. The non-federal sponsor or state would not be as limited and may choose to implement other alternatives without Federal assistance.

There is also a CBRS unit located in the Vilano Beach reach that extends from just south of R114 to just south of R116, a distance of approximately 2,000 feet. Although no Federal expenditures are permitted in the unit that would be inconsistent with the purposes of the act, some alternatives may be implementable for the remainder of the reach. The location of the unit would allow for certain alternatives, such as beach nourishment, to be continuously implemented for justifiable lengths of the South Ponte Vedra Beach and Vilano Beach reaches, ending at the northern border of the CBRS unit. USFWS is amenable to beach nourishment next to a CBRS unit as long as natural sediment transport through the CBRS unit is not impeded. Further, placement can occur in a CBRS unit if the cost is incurred entirely by the non-federal sponsor.

Finally, the St. Augustine Inlet system is almost entirely located within a CBRS unit. The existing St. Augustine project currently obtains sand from this system, and the project has used this sand source for approximately 15 years. USACE initially coordinated with USFWS on the CBRS units in the project area on May 20, 2016, and provided additional information on the sand source location in a letter dated October 12, 2016. USFWS provided their determination that the use of the St. Augustine Inlet system as a sand source for this project was consistent with the purposes of the CBRA in a letter dated October 25, 2016.

Beach-fx modeling of the FWOP condition indicates very limited damages in the Vilano Beach reach from R117 through R122 at the St. Augustine Inlet. This indicates that it is highly unlikely any alternatives would provide a benefit justifying their cost to implement. Due to this, R117 – R122 of the Vilano Beach reach is eliminated from further analysis. Only the portion from R104 – R117 will be considered further.

<u>Alternatives for South Ponte Vedra Beach and Vilano Beach reaches</u>

- Acquisition of Land and Structures (NS-7)
- Beach nourishment (S-4)
- Dunes and vegetation (S-10)
- Beach nourishment (S-4) and sand covered soft structure (S-3)
- Beach nourishment (S-4) with emergent breakwaters (S-8)
- Beach nourishment (S-4) and multi-purpose artificial reef (S-7)

<u>Alternatives for Summer Haven reach</u>

In northern reach only, north of CBRS unit

- Beach nourishment (S-4)
- Beach nourishment (S-4) with multi-purpose artificial reef (S-7)
- Beach nourishment (S-4) with groin construction (S-5)

In southern reach only, within CBRS unit

- Acquisition of Land and Structures (NS-7)

As alternatives are developed, the alternative evaluation criteria of completeness, effectiveness, efficiency, and acceptability are considered. Completeness is satisfied by ensuring that the alternatives

include all activities to implement the plan. Effectiveness is determined by how the alternatives address the project problems. Efficiency is indicated by the cost effectiveness of a plan, which will be determined through the cost and benefit analysis. Acceptability is determined by evaluating the plan against local, state, and Federal law and policy, environmental constraints, and public willingness to support the plan.

Alternatives not meeting the criteria will be eliminated. Alternatives which meet the criteria will be carried forward as alternative plans.

3.8 ALTERNATIVES MILESTONE

The preliminary plan formulation and initial screening discussed in the sections above was undertaken prior to 2011, when study progress was put on hold due to funding constraints. With the advent of SMART Planning (Water Resources Reform and Development Act (WRRDA) 2014), the study received funding and was realigned in 2014 to meet the SMART Planning milestones, the first of which is the Alternatives Milestone, which was held in March 2015. As stated at the milestone meeting, the alternatives outlined above continued to be feasible for the South Ponte Vedra Beach and Vilano Beach reaches. Between 2011 and 2014, the non-federal sponsor continued efforts in the Summer Haven reach to buy out threatened properties within the CBRS unit and to not allow future development, thus furthering the NS-7 alternative discussed above without Federal assistance. Implementation of one of the structural measures discussed above is highly likely to have significant cost without providing much additional benefit. **With non-federal sponsor concurrence, the decision was made at the Alternatives Milestone to drop the Summer Haven Reach from further analysis based on the following:**

- Summer Haven is a geographically separate reach from the other two reaches and has extremely limited public access/parking.
- Major infrastructure such as SR A1A has already been relocated landward.
- There are a minimal number of structures in the southern portion of the reach.
- Structures in the northern portion of the reach are fronted by a revetment, reducing damage risk.
- Rebuilding of damaged structures is questionable given limited road access and damage susceptibility.
- The sponsor is purchasing properties when able and not allowing future development of the acquired properties.
- With the existing structural inventory growing smaller, it is highly likely that damages would not justify a 50-year CSRM project anywhere in the reach.
- Alternatives are also limited by the presence of a CBRS unit in three-quarters of the reach.

Although the Summer Haven Reach was screened out of further analysis in this Feasibility Study and Environmental Assessment (EA), additional coordination efforts were made to determine if other Federal agencies, such as the Federal Emergency Management Agency (FEMA), could provide assistance to the local sponsor in their ongoing efforts to acquire vulnerable structures and property and limit future construction within the reach. FEMA has provided past assistance by funding small berm construction (beach nourishment) following severe storms warranting Federal assistance. In addition, dredging of the

Intracoastal Waterway (IWW) in the vicinity of Matanzas Inlet typically results in the beneficial placement of dredged sand within the Summer Haven Reach.

3.9 SECONDARY SCREENING: SCREENING WITH ROUGH ORDER OF MAGNITUDE COSTS

Elimination of the Summer Haven Reach resulted in further development of the following alternatives for the South Ponte Vedra Beach and Vilano Beach reaches:

A. Buyout of Structures and Land Acquisition (NS-7)
B. Beach nourishment (S-4)
C. Dunes and vegetation (S-10)
D. Beach nourishment (S-4) with sand covered soft structure (S-3)
E. Beach nourishment (S-4) with emergent breakwaters (S-8)
F. Beach nourishment (S-4) with submerged multi-purpose artificial reef (S-7)

In order to screen these alternatives prior to modeling alternatives in Beach-fx, rough order of magnitude (ROM) cost estimates were developed for each of the alternatives. The ROM cost estimates were developed using information from similar historical projects. The estimates were based on implementing a measure along one mile of shoreline. It was assumed that it would not be feasible, or practical, to implement any alternatives along a stretch of shoreline less than one mile. These ROM costs were brought to present value (PV) based on maintenance assumptions over 50 years, and broken down to a cost per linear foot (LF) of shoreline, shown in Table 3-2.

The four accounts, National Economic Development (NED), Environmental Quality (EQ), Other Social Effects (OSE), and Regional Economic Development (RED) are also shown in Table 3-2 for comparison.

Table 3-2. Alternative Descriptions and Rough Order of Magnitude (ROM) Costs.

St John's County; Preliminary Alternative Cost Screening

Alternative	Description	Assumptions		Present Value (PV) of accumulated total cost	(PV) of accumulated cost per linear foot (LF)	Four Accounts			
						National Economic Development (NED)	Environmental Quality (EQ)	Other Social Effects (OSE)	Regional Economic Development (RED)
A	Acquisition of land and structures	Estimates were made for reaches that had the greatest Future Without Project damages. Buying out structures and parcels in these reaches would equate to "managed retreat" of the most vulnerable reaches.	In addition to buy-out of structures, a $50,000 relocation allowance and $15,000 demolition cost per structure was assumed. Vacant parcels would also be bought out to prevent future development. Cost of vacant land is estimated at $3,600/linear foot of oceanfront footage plus $12,000 legal fees per vacant parcel.	This cost differs per reach due to differing estimated structure value, number of structures and number of vacant parcels per reach.	This cost differs per reach due to differing estimated structure value, number of structures and number of vacant parcels per reach.	Depending on the amount of damages reduces, net benefits will likely be lower than other alternatives due to high costs.	Conversion of developed land to undeveloped park, natural area, and habitat would improve environment. Loss of habitat would occur as beach/dune system narrows between ocean and SR A1A.	Small life safety risk improvement due to hurricane evacuation route damage. Increased requirements/restrictions on future construction are typically unfavorable.	Minimal increase with creation of parkland and potential eco-tourism benefits.
B	Beach nourishment	Includes the cost of nourishment with 120 cubic yards of sand per linear foot using an offshore sand source, approximately ten miles offshore.	The renourishment interval is seven years.	$34,945,011	$6,818	Net benefits are likely to be high compared to other alternatives depending on amount of damages reduced. Beach nourishment is an effective alternative for damage reduction on similar Florida shorelines.	Empirical evidence indicates potential negative effects to benthic invertebrates and nearshore habitat for short periods of time, with habitat recovering within one year. Positive impact to sea turtle nesting habitat.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms). Supported by majority of community.	Moderate increase through improvement of tourism/beach economy. Protection of property value and tax value.
C	Dunes and vegetation	15 cubic yards of sand per linear foot using an offshore sand source, approximately ten miles offshore.	Renourishment would be required every seven years.	$13,969,117	$2,646	Net benefits are likely to be high compared to other alternatives depending on amount of damages reduced. If dunes can prevent approximately the same amount of damages as beach nourishment, this alternative could provide the greatest net benefits given its lower cost.	Would push the entire beach profile seaward, only temporarily increasing berm width but maintaining dune width. Hence, there could be impacts from construction similar to beach nourishment. Positive impacts would include improvement of dune habitat and limited additional beach habitat for sea turtle nesting.	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms).	Moderate increase through improvement of tourism/beach economy. Moderate protection of property value and tax value.
D	Beach nourishment with sand covered soft structure (Geotube)	Includes the cost of geotube core filled with sand plus an additional 9 cubic yards of sand per linear foot covering the filled geotube.	Also includes the cost of a full beach nourishment to keep geotube covered with sand. This is necessary to prevent exposure of the tube, which threatens turtle nesting and exposes the core to degradation from sunlight and vandalism. Renourishment interval is assumed to be seven years.	$39,933,581	$7,563	Net benefits are likely to be lower than other alternatives. Addition of a sand covered soft structure to beach nourishment may add additional cost without the addition of significant damage reduction.	Highly dependent on maintaining sand coverage of structure. Without adequate coverage, dune habitat and sea turtle nesting could be negatively impacted. Other benefits/impacts similar to Alternative 2, Beach Nourishment.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms).	Minimal increase through improvement of tourism/beach economy. Protection of property value and tax value.
E	Beach nourishment with emergent breakwater	Assumes that eight breakwaters would be required, per mile.	Assumes that periodic renourishment would be necessary every seven years. Renourishment costs are estimated at 75% cost of full beach nourishment alternative.	$75,419,880	$14,284	Net benefits will likely be lower than other alternatives, if not the lowest. The addition of breakwaters to beach nourishment may not add significant damage reduction while adding significant cost.	Potential negative impacts to sea turtle nesting and sea turtle hatchling entrapment. Other benefits/impacts similar to Alternative 2, Beach Nourishment.	Minimal improvement to life safety risk due to hurricane evacuation route protection. Minimal protection of public facilities (parking, beach access, bathrooms).	Minimal protection of property value and tax value.
F	Beach nourishment with submerged artificial multi-purpose reef	Assumes that two reefs per mile would be required.	Periodic renourishment would be necessary along with reef construction. Renourishment interval is seven years. Renourishment costs are estimated at 75% cost of full beach nourishment alternative. Also, it is assumed that the artificial reef would need to be rebuilt at year 15 and again in year 30.	$38,849,987	$7,359	Net benefits are likely to be lower than other alternatives. Addition of a multi-purpose reef to beach nourishment may add additional cost without the addition of significant damage reduction.	Potential to provide nearshore habitat. Other benefits/impacts similar to Alternative 2, Beach Nourishment.	Improved life safety risk due to hurricane evacuation route protection. Protection of public facilities (parking, beach access, bathrooms). May receive more support from environmental agencies and local special interest groups (surfers, fishermen, etc.)	Moderate increase through improvement of tourism/beach economy. Protection of property value and tax value.

FY2015 interest rate is 3.375%
Basic cost assumption information data based on Level 3 ROM Cost Report provided to the PDT on 9/1/15
The "per linear foot" estimate includes all associated costs (mobilization, demobilization, inspections, monitoring during construction, etc.)

A project's benefit-to-cost ratio (BCR) must be greater than 1.0 in order for an alternative to be justified and implementable (i.e., the benefits must be greater than the costs). Benefits equal damages prevented, or the difference between the FWOP damages and damages resulting after implementation of an alternative (with-project damages). At this point in the study, damages are used as a proxy for benefits. Using the value of FWOP damages as a substitute for the benefits will overestimate the benefit provided by any alternative since this assumes that 100% of damages have been averted. Therefore if the ROM cost of an alternative is equal to, or less than, the FWOP damages, the Benefit-to-Cost Ratio (BCR) can be assumed to approximate 1, and the measure may be justified. Figure 3-1 displays the ROM costs per linear foot of alternatives, in addition to the FWOP Beach-fx damages along the shoreline for each of the three SLR scenarios. Wherever damages were far below an alternative's ROM cost, it was assumed that the measure would not be justified along that shoreline length and the alternative was screened out. Where damages are near or above ROM costs along a stretch of shoreline of sufficient length for an alternative to be realistically implemented, it was assumed that the alternative could be justified and was carried forward. This comparison not only helps in screening, but it also serves to scale alternatives that are carried forward, illustrating the shoreline lengths that may have enough FWOP damages to justify implementation of a project.

The cost of an alternative's implementation may vary depending on the SLR scenario used for design. Because of this, it is important to note that there is uncertainty around future costs, and alternatives with costs just above projected damages should not be screened out prematurely. Beach nourishment, for example, will have a higher cost for higher SLR scenarios because more sand or shorter renourishment intervals would be required. Other alternatives may have the same implementation cost for any scenario.

In Figure 3-1, FWOP damages are shown for each Beach-fx reach throughout the South Ponte Vedra Beach and Vilano Beach reaches. On the horizontal axis, R84 is the northernmost reach and R122 is the furthest southern reach, adjacent to St. Augustine Inlet. The damages include both damages to infrastructure (roads and houses), as well as costs for replacing and constructing armor as it is damaged or triggered in the Beach-fx model. Straight horizontal lines are the ROM costs for alternatives listed in Table 3-2.

Figure 3-1 also shows where Federal cost sharing in an alternative would be limited due to the presence of a CBRA zone and, in the case of an alternative requiring placement of sand on the dune or beach, limited public access and parking.

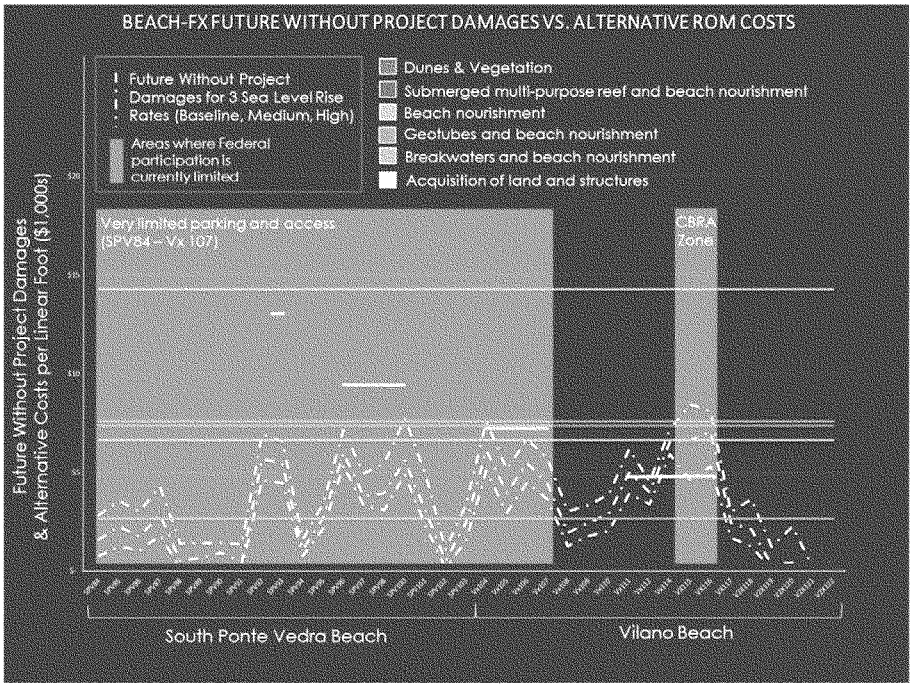


Figure 3-1. Beach-fx Future Without-Project Damages vs. Alternative ROM Costs.

This step resulted in the following alternatives being carried forward for modeling in Beach-fx:

- Acquisition of land and structures in Beach-fx reaches 111 to 116 (Vilano Beach)
- Dunes and vegetation in Beach-fx reaches 92-101 (South Ponte Vedra) and 104-116 (Vilano Beach)
- Beach nourishment in Beach-fx reaches 92-101 (South Ponte Vedra) and 104-116 (Vilano Beach)

For Beach-fx modeling and evaluation of alternatives, the acquisition of land and structures alternative already had an adequate cost estimate. The two other alternatives were developed further for specific application in the designated reaches and more detailed cost estimates were prepared. Descriptions of the alternatives are as follows:

Acquisition of Land and Structures: This alternative would allow the shoreline to erode in the study area with a loss of land. Parcels, both developed and undeveloped, vulnerable to storm damage would be bought, and structures would be demolished. Parcels would be managed by the non-federal sponsor, remaining undeveloped into the future and reducing future storm damages.

Dunes and Vegetation: This alternative would include placement of beach compatible material in a dune feature adjacent to the existing bluff. The top elevation of the dune would tie into the bluff. Initial engineering modeling indicated that the existing dune elevations, when combined with berm and/or dune extension, provide sufficient protection. Therefore, no additional elevation is included in further alternative analysis. The front slope of the dune would be a function of the material grain size and construction equipment. Vegetation would be planted, after placement of the dune material, where needed. Preliminary engineering design work concluded that the most feasible plan for dunes and vegetation would have the following characteristics:

- Extension from the existing seaward face of the dune or existing armor (revetment/seawall).
- Construction such that the dune, and beach profile out to the depth of closure, will extend approximately 10 to 20 feet seaward from its existing location and the dune elevation will as closely as possible match the elevation of the existing dune elevation.
- Construction such that a berm feature will extend seaward from its existing location above the water line to account for the volume of material needed to fill the submerged portion of the beach profile extension.
- Periodic reconstruction of the dune and beach profile extension.
- Construction using a dredge to transport material from a sand source.

Beach Nourishment: This measure includes initial construction of beach-fill and future renourishments at regular intervals. The design berm elevation for the project area is +8.0 ft-NAVD88, which is approximately at the natural berm elevation. Restricting the design berm elevation to the natural berm elevation minimizes scarping of the beach, which hinders beach access by nesting sea turtles and can pose safety problems for recreational beach use. Other reasons for following the natural berm elevation are related to storm damage reduction. A berm constructed at a lower elevation would increase the probability of overtopping by storm surge, thereby offering less protection to upland development and/or existing dunes. A higher berm elevation could result in backshore flooding due to excessive rainfall or wave/surge overtopping. A higher berm may also be more susceptible to wind-induced erosion.

Preliminary engineering design work, and economic analysis, suggested that the plan for beach nourishment would have the following characteristics:

- Maintaining the existing dune feature and extension of the berm feature from the existing seaward toe of the dune or existing armor (revetment/seawall)
- Construction such that the berm will extend approximately 20 to 100 feet seaward from its existing location and the berm elevation will as closely as possible match the elevation of the existing berm elevation
- Periodic reconstruction of the berm extension and occasional reconstruction of the dune feature

Figure 3-2 shows profile views of the beach nourishment, dunes and vegetation, and a combination of both alternatives.

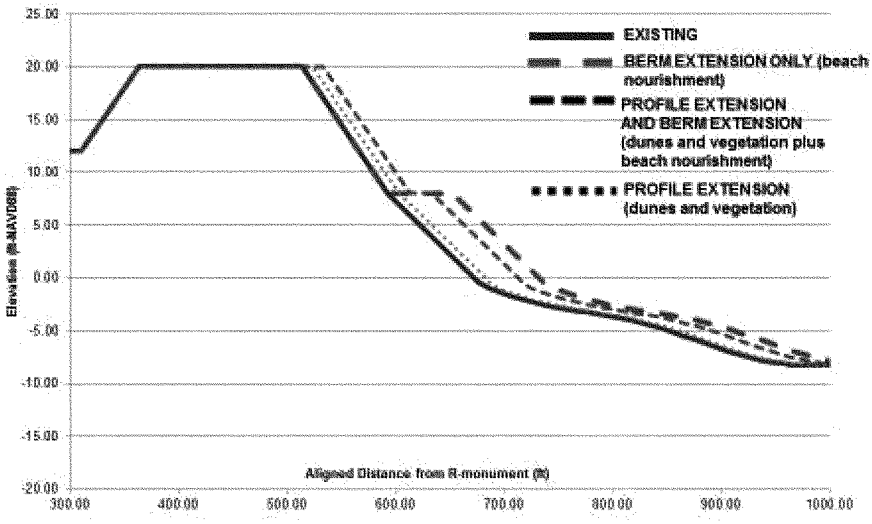


Figure 3-2. Profile view of dunes and vegetation and beach nourishment combinations.

3.9.1 FINAL SCREENING: FUTURE WITH PROJECT MODELING IN BEACH-FX

The non-structural alternative of Acquisition of Land and Structures in Beach-fx reaches 111 to 116 was modeled in Beach-fx by starting with a copy of the FWOP model setup, then deactivating all of the damage elements that were to be bought out and setting all of the lots to be bought out as unable to be armored. The Future With-Project (FWP) damages were compared to the FWOP damages to determine the benefits of this alternative over 50 years. This alternative only prevents 28% of the FWOP damages in reaches 111 to 116. Most of the FWOP damages in this area are associated with SR A1A and future armoring costs to protect the road. The alternative does nothing to prevent these damages. USACE, Jacksonville District Real Estate estimated the cost of this alternative to be $30,226,584. The results showed that this alternative would not be economically justified, with a BCR of 0.45.

Additionally, the alternative did not meet the efficiency criterion and only partially meets the effectiveness criterion of the Principles and Guidelines (P&G) screening criteria:

- Effectiveness: The alternative partially meets this criteria. Buyout does not alleviate damages to SR A1A, only to structures being bought out.

- Efficiency: The alternative is not efficient, as reflected in the BCR being less than one.

The dune and beach nourishment alternatives were set up to be modeled in Beach-fx for any combination of 0, 10, or 20 foot dune and profile extensions (dunes and vegetation) along with 0, 20, 40, 60, 80, or 100- foot berm extensions (beach nourishment). Initial results indicated that no alternative with only a dune and profile extension resulted in a BCR greater than one. Furthermore, the original plan was to use an offshore sand source located within the Northern Offshore Borrow Area (NOBA). This source is located approximately 10 miles from the study area; using this distant source resulted in low BCRs. The FDEP's Inlet Management Plan for St. Augustine Inlet directs that a portion of sand dredged from the inlet should be placed on beaches north of the inlet. Formulation of further alternatives then focused on use of the inlet system as a sand source. Since the inlet is approximately four miles from the study area, nourishment costs are less and the BCR improved. Table 3-3 shows all alternative combinations resulting in a BCR of one or greater using the inlet system as the sand source. More information on Beach-fx inputs and results for alternative formulation is provided in the Economic Appendix.

Table 3-3. Results Summary for Beach-fx Future With-Project Modeling (discount rate of 3.125%).

Alternative Number	Dune and Profile Extension* (ft)	Berm Extension** (ft)	Shoreline Extent (Beach-fx Reaches)	Project Length (miles)	Average Nourishment Interval (years)	Average Annual Project Cost	Average Annual Project Benefits	Benefit to Cost Ratio	Average Annual Project Net Benefits
1	0	100	104 to 116	2.6	16	$ 1,650,000	$ 1,823,000	1.10	$ 173,000
2	10	80	104 to 116	2.6	16	$ 1,584,000	$ 1,759,000	1.11	$ 175,000
3	0	80	104 to 116	2.6	15	$ 1,512,000	$ 1,777,000	1.18	$ 265,000
4	10	60	104 to 116	2.6	13	$ 1,508,000	$ 1,850,000	1.23	$ 342,000
5	0	60	92 to 116	4.8	16	$ 2,435,000	$ 2,797,000	1.15	$ 362,000
6	**0**	**60**	**104 to 116**	**2.6**	**12**	$ 1,435,000	$ 1,845,000	**1.29**	**$ 410,000**
7	10	40	104 to 116	2.6	12	$ 1,408,000	$ 1,689,000	1.20	$ 281,000
8	0	40	92 to 116	4.8	11	$ 2,276,000	$ 2,679,000	1.18	$ 403,000
9	0	40	104 to 116	2.6	10	$ 1,380,000	$ 1,647,000	1.19	$ 267,000
10	20	20	92 to 116	4.8	12	$ 2,376,000	$ 2,526,000	1.06	$ 150,000
11	20	20	104 to 116	2.6	10	$ 1,405,000	$ 1,514,000	1.08	$ 109,000
12	10	20	92 to 116	4.8	9	$ 2,323,000	$ 2,329,000	1.00	$ 6,000
13	10	20	104 to 116	2.6	9	$ 1,380,000	$ 1,417,000	1.03	$ 37,000

Notes:
Values based on 30 iteration runs, preliminary cost estimates, and only include structure, content, & armor damage.
Table is sorted by length of horizantal seaward dune and berm extension from greatest to least.
*Value indicates the horizantal seaward extension of the dune and entire profile (feet). At a minimum, the 2015 dune profile is maintained.
**Value indicates the horizantal seaward extension of the berm (feet) in addition to the dune and profile extension.

Alternative 6 results in the greatest net benefits. This alternative includes a 60-foot berm extension and maintenance of the 2015 dune position, but no extension of the dune and profile.

Table 3-3 includes alternatives that cover portions of both the South Ponte Vedra Beach and Vilano Beach reaches. As noted elsewhere in this report, the South Ponte Vedra Beach reach contains very limited public access and parking. Continued coordination with the sponsor on this issue resulted in the determination that no additional public access would be added to the reach prior to initial construction of any potential project. Additionally, the reach is separable from the Vilano Beach reach, meaning that no construction of a project in the South Ponte Vedra Beach reach has no impact on project performance in the Vilano Beach reach. **These factors resulted in screening out of the South Ponte Vedra Beach reach from further formulation.**

Screening out of the South Ponte Vedra Beach reach resulted in consideration of alternatives from Beach-fx reaches 104 through 116 in the final array. The top two alternatives covering these reaches were run in Beach-fx using 100 iteration simulations. The results of these simulations were used to determine the NED Plan. The results of the alternative comparison are presented in Table 3-4. The NED Plan is the plan with a BCR greater than one which maximizes net benefits. The NED Plan is Alternative 6 from Beach-fx reaches 104 - 116. As shown in Table 3-3, Alternative 6 is bracketed by a larger alternative, #3, and a smaller alternative, #9, demonstrating that a larger or smaller project would not result in greater net

benefits and that the NED Plan is the optimal size alternative. Additional detail on NED selection is provided in the Economics Appendix.

Table 3-4. Average Annual Benefits and Costs for Final Array of Alternatives (discount rate of 3.125%)

Alternative Number	Dune and Profile Extension* (ft)	Berm Extension** (ft)	Shoreline Extent (Beach-fx Reaches)	Average Annual Benefits ($)	Average Annual Costs ($)	BCR	Average Annual Net Benefits ($)
6	0	60	104 to 116	$ 1,733,000	$ 1,392,000	1.25	$ 341,000
4	10	60	104 to 116	$ 1,763,000	$ 1,466,000	1.20	$ 297,000
Values based on 100 iteration runs, preliminary cost estimates, and only include structure, content, & armor damage							
*Value indicates the norizontal seaward extension of the dune and entire profile (feet). At a minimum, the 2015 dune profile is maintained.							
**Value indicates the horizontal seaward extension of the berm (feet) in addition to the dune and profile extension.							

3.10 THE RECOMMENDED PLAN

Typically, the NED plan becomes the Recommended Plan unless the non-federal sponsor opts to pursue a Locally Preferred Plan (LPP) which differs from the NED plan. An LPP is subject to the requirements described in ER 1105-2-100. The option of selecting an LPP was coordinated with the local sponsor, who opted not to pursue an LPP. The NED plan therefore is the Recommended Plan.

Alternative 6 is the Recommended Plan. The economic results presented in this section reflect the costs in the Total Project Cost Summary (TPCS) found in Appendix B – Cost Engineering and Risk Analysis. Therefore the results presented here will differ slightly from the values presented in previous sections.

The Beach-fx model results describing the physical performance of the Recommended Plan will not change from the simulation run for the final array of alternatives. These results are independent of the project costs. The physical performance results most relevant to the economic analysis are the nourishment volumes and the timing of nourishment events.

The average initial construction volume over 100 Beach-fx iterations is 1,310,000 cubic yards. The average volume of individual future periodic nourishments over 100 iterations is 866,000 cubic yards.

Beach-fx reaches correspond, approximately, with FDEP R monuments. The shoreline extent of the Recommended Plan (Alternative 6), from Beach-fx reaches 104 to 116, corresponds to a shoreline length spanning from R monuments R103.5 to R116.5. A detailed description of the Recommended Plan is included in the next chapter.

3.10.1 INCREMENTAL JUSTIFICATION OF THE RECOMMENDED PLAN

ER 1105-2-100 Appendix E, E-3 c (2) defines a "separable element" as, "...any part of a project which has separately assigned benefits and costs, and which can be implemented as a separate action (at a later date or as a separate project). Separable elements so considered are similar to the planning concept of

last added increments, with the added idea of separation or detachment of the increment from the whole." "Separable elements usually must be incrementally justified."

Incremental analysis has been incorporated throughout plan formulation. The original study reaches, South Ponte Vedra Beach, Vilano Beach (R104 – R117), Vilano Beach (R117 – R122), and Summer Haven were designated based on geography, erosion rates, and the ability to be constructed as separable elements. As described earlier in this report R117 – R122 of the Vilano Beach reach was screened out due to the limited potential for justification. The Summer Haven reach was screened out for similar reasons. Figure 3-1 then screened and scaled potential alternatives, further refining the incremental analysis within the separable reaches. Finally, the South Ponte Vedra Beach reach was screened out, supported in part by the fact that it was separable from the Vilano Beach reach. Further formulation of the Recommended Plan then proceeded for the justifiable shoreline length.

On a long straight sandy coast like the Recommended Plan area, it is assumed that a project of less than approximately one mile of shoreline length would not be implemented as a separate action or project. Therefore the Recommended Plan area was divided into three separable elements of roughly one mile, as shown in Table 3-5.

Table 3-5. Incremental Analysis of the Recommended Plan (discount rate of 3.125%).

JUSTIFICATION OF SEPARABLE ELEMENTS (AVERAGE ANNUAL TERMS)				
Model Reaches	Capped Benefits Per Separable Element	Certified Placement Cost Per Separable Element	Capped Net Benefits Per Separable Element	Approx Length of Separable Elements (miles)
104-107	$ 737,000	$ 317,000	$ 420,000	0.8
108-111	$ 527,000	$ 344,000	$ 183,000	0.8
112-116	$ 1,053,000	$ 449,000	$ 604,000	1

As shown in Table 3-5, each separable element has positive net benefits, demonstrating that each is incrementally justified. Figure 3-3 presents the same data with the blue line indicating that net benefits remain positive across all three elements.

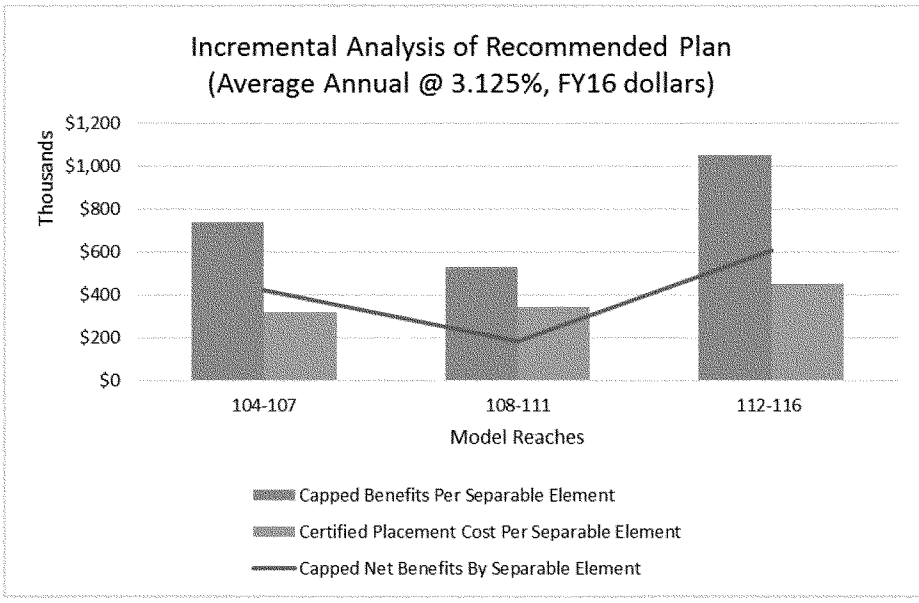


Figure 3-3. Incremental analysis of the Recommended Plan. Calculation includes primary storm damage reduction benefits and incidental recreation benefits capped at 50% of total benefits needed for justification.

CHAPTER 4
RECOMMENDED PLAN

4 RECOMMENDED PLAN

The Recommended Plan will provide Coastal Storm Risk Management (CSRM) to a number of residences and commercial structures, including 105 single-family residences, 9 multi-family residences, and 5 commercial structures.

The Recommended Plan will also reduce damages to a key piece of critical infrastructure, SR A1A, increasing the accessibility of the Recommended Plan area and uninterrupted ingress/egress of emergency vehicles and affected population during storm events, as well as the daily traffic count of up to 14,000 vehicles per day (http://www2.dot.state.fl.us/floridatrafficonline/viewer.html).

According to the 2010 census, there are approximately 2,500 residents within the Recommended Plan area, and this population increases periodically throughout the year due to tourism. Notably, tourism can increase the population during summer months when the Recommended Plan area is most susceptible to hurricanes.

- **Description:** The Recommended Plan is Alternative 6, which includes construction of a 60- foot equilibrated berm extension from R103.5 to R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 dune position. Maximum length tapers of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline. A dredge will be used to fill the template with sand from the St. Augustine Inlet system, including the ebb, flood, Vilano Point shoals, and the Federal navigation channel and any associated shoals.
- **Average # Nourishment Events:** 1 initial construction event, 3 periodic nourishment events
- **Average Volume of Initial Construction**: 1,310,000 cubic yards
- **Average Volume of Each Periodic Nourishment**: 866,000 cubic yards
- **Average Periodic Nourishment Interval**: 12 years
- **Initial Construction Duration**: approximately 3.3 months

4.1 PROJECT DESIGN

The project design can be described by three factors; the dimensions of the dune, dimensions of the berm, and shoreline slopes.

4.1.1 PROJECT DUNE

Existing dune elevations in the Recommended Plan area are between +14 and 20 feet NAVD88, generally increasing moving from south to north. Evaluation of the design alternatives has shown that the existing elevations, when combined with berm and/or dune extension, provide sufficient protection. Therefore, no additional elevation is included in the selected design plan.

Table 4-1. Generalized Dune Characteristics of the Recommended Plan Area.

R monuments	Dune Height (ft-NAVD88)	Dune Width (ft)
R100 to R111	20	150
R112 to R114	20	30
R115 to R117	14	110

Within the area encompassed by the Recommended Plan, the average dune width ranges between 110 feet and 150 feet, with the exception of the R112 to R114 area, which is only 30 feet wide (Table 4-1). Although the Recommended Plan does not include widening the existing dune, any erosion of material from the existing idealized dune template (i.e., the 2015 generalized profile) will be replaced during nourishment events. Therefore, the existing 2015 idealized dune template will be restored accordingly during initial construction and periodic nourishment of the project and is noted as an important feature of the project.

4.1.2 PROJECT BERM

The design berm elevation for the project area is +8.0 feet NAVD88, which is approximately at the natural berm elevation. Restricting the design berm elevation to the natural berm elevation minimizes scarping of the beach, which hinders beach access by nesting sea turtles and can pose safety problems for recreational beach use. Other reasons for following the natural berm elevation are related to storm damage reduction. A berm constructed at a lower elevation would increase the probability of overtopping by storm surge, thereby offering less protection to upland development and/or existing dunes. A higher berm elevation could result in backshore flooding due to excessive rainfall or wave/surge overtopping. A higher berm may also be more susceptible to wind-induced erosion.

The Recommended Plan includes a 60-foot extension of the +8 foot NAVD88 contour, sloping 1V:10H to the 0.0 foot NAVD88 contour, and a 60-foot extension of the existing subaqueous (below water) profile. Figure 4-1 shows a typical existing idealized profile and nourishment template. Following construction and equilibration of the profile, the beach dimensions are expected to approximate the idealized profile. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline.

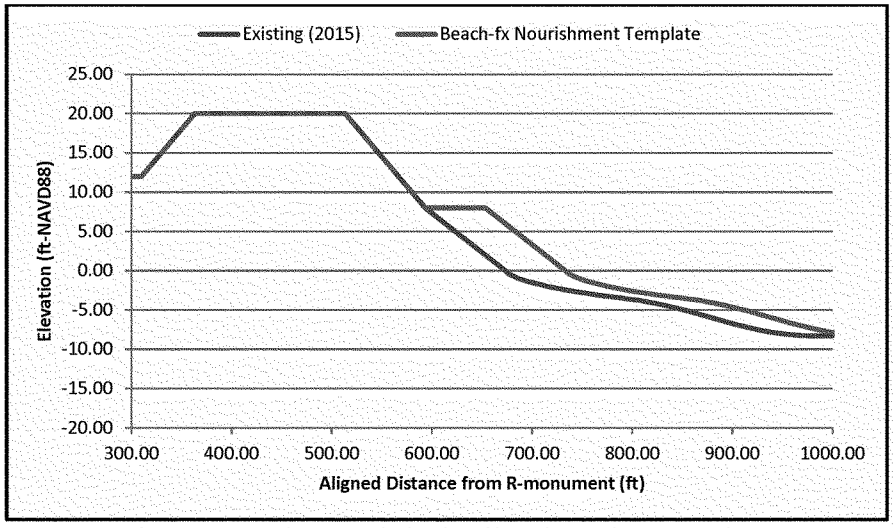


Figure 4-1. Typical Existing Idealized Profile and Nourishment Template.

4.1.3 PROJECT BEACH SLOPES

After waves adjust and sort the placed sand, the sand is expected to settle into an equilibrium beach slope, similar to the native beach. The native beach slopes in the area of the Recommended Plan vary between 1V:5H (1 vertical foot for every 5 horizontal feet) to 1V:10H at the dune, between 1V:9.09H and 1V:10H along the berm to the water's edge, and are round 1V:50H from the water's edge to -12 foot NAVD88. The estimate of the slope of the material after adjustment is based on averaging the beach profile slopes of the native beach from the mean low water datum to the approximate location of the 12-foot depth contour. Since sand from the sand source was determined to be a near match to the gradation of the existing beach, it is expected that the placed sand will equilibrate to a shape similar to the existing profile.

It is unnecessary and impractical to artificially grade beach slopes below the low water elevation since they will be shaped by wave action. For this reason, the front slope of the sand placed at the time of construction may differ from that of the natural profile. The final slope of the placed sand depends on the characteristics of the sand and the wave climate in the project area. With steep initial slopes, the sand will quickly adjust to the natural slopes.

4.1.4 PROJECT VOLUMES

The average initial construction volume over 100 Beach-fx iterations is 1,310,000 cubic yards. The average volume of individual future periodic nourishments over 100 iterations is 866,000 cubic yards. These are average volumes based on Beach-fx modeling. The Engineering Appendix includes detailed description on how these averages are reached and the variability that can be expected.

4.1.5 PROJECT CONSTRUCTION

The Recommended Plan includes a 60-foot berm extension from the +8.0 foot NAVD88 2015 contour out to the depth of closure between R monuments 103.5 and 116.5. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline, resulting in a maximum length of placement between R monuments R102.5 and R117.5. The +8.0 foot NAVD88 2015 contour includes perturbations due to the natural undulations of the shoreline, as well as shoreline armoring (revetments) in select locations, but overall is rather smooth and straight. It will be necessary during the project engineering and design (PED) phase to establish a smooth, relatively straight, base construction line that will allow the project to perform as predicted during the Beach-*fx* shoreline analysis. The location of the +8.0 foot NAVD88 2015 contour serves as the basis for creating the baseline which will be tailored to provide the approximate amount of material predicted for initial construction by Beach-*fx*.

As previously discussed, the front slope of the beach-fill placed at the time of construction, or future renourishment, may differ from that of the natural profile. This reflects the capabilities of the construction equipment that will be used to build the shore protection project. Within the first year or two after placement of the beach-fill, the construction profile will be reshaped by waves into an equilibrium profile, causing the berm to retreat to a position more characteristic of the project design template.

4.1.6 RENOURISHMENT EVENTS

As stated, the Recommended Plan includes a 60-foot berm extension and maintenance of the existing (2015) idealized dune. The existing beach is therefore the minimum acceptable profile.

Traditionally, in CSRM studies, a fixed renourishment interval is defined and optimized for the 50-year period of Federal participation. In Beach-fx, rather than having a fixed renourishment interval, renourishment events are triggered when specific criteria are met. The triggers were set up to simulate a point at which the berm extension erodes to at least half its equilibrated width in at least one reach, and a minimum volume of 750,000 cubic yards has eroded from the entire project template. Based on these parameters, the average time interval between nourishment events over all 100 iterations is 12 years. In reality, this interval could vary significantly depending on erosion and storm events. More information about the renourishment triggers is provided in the Engineering Appendix.

Planning of renourishment events will be based on performance of the project. A survey of the project area (such as a monitoring or post-storm survey) will be analyzed to determine if berm erosion is progressing as expected. Volume changes between the latest survey, the design template, and the construction template will be calculated. If the project has lost sufficient volume due to storms, a renourishment may be necessary. Beach-fx has been used to determine the average renourishment interval of 12 years. It should be emphasized that this is an average and the need to renourish the project could occur before, or after, this period depending on storm events. The Engineering Appendix provides additional detail on renourishment triggers.

The average volume of individual future periodic nourishments over 100 iterations is 866,000 cubic yards. With an average time interval of 12 years, the nourishment years would be 2020 for initial construction, followed by the following years for periodic nourishment: 2032, 2044, and 2056. An additional volume of sand will be placed in 2056 to carry the project throughout its period of Federal participation. It would be uneconomical to plan for a periodic nourishment in 2068 with only two years left in the period of Federal participation.

4.1.7 PROJECT MONITORING

Physical monitoring of the recommended project is necessary to assess project performance and to ensure that project functionality is maintained throughout the 50-year period of Federal participation in the project. The monitoring plan will be directed primarily toward accomplishing systematic measurements of the beach profile shape. Profile surveys should provide accurate assessments of dune and beach-fill volumes and a basis for assessing post-construction dune and beach-fill adjustments, as well as variation in the profile shape due to seasonal changes and storms. Monitoring will play a vital role in determining if project renourishment is necessary. Post-construction monitoring activities include topographic and bathymetric surveys of the placement area and adjacent areas on an annual basis for 3 years following construction and then biannually until the next construction event. Other monitoring efforts include bathymetric surveying of the sand source, which will be done as part of the pre-construction engineering and design (PED) phase prior to each nourishment. Measured wind, wave, and water level information will be obtained from the best available existing data sources. This data will be applied in support of previously discussed monitoring efforts. It will also be used to periodically assess the state of sea level rise and to determine if reassessment of the project volumes and/or renourishment intervals is required.

4.1.8 OPERATIONS AND MAINTENANCE CONSIDERATIONS

33 U.S. Code § 426e (Federal aid in protection of shores) states, "When in the opinion of the Chief of Engineers the most suitable and economical remedial measures would be provided by periodic beach nourishment, the term "construction" may be construed for the purposes of sections 426e to 426h–1 of

this title to include the deposit of sand fill at suitable intervals of time to furnish sand supply to project shores for a length of time specified by the Chief of Engineers." By this provision, periodic nourishment is considered construction and not maintenance, and therefore is cost shared. The Recommended Plan involves initial construction and periodic nourishment, and is technically "beach nourishment." Physical (topographic and bathymetric) and environmental surveys supporting beach nourishment are cost-shared activities included in the total project cost. The operations, maintenance, repair, rehabilitation, and replacement (OMRR&R) anticipated for this project includes any necessary long-term topographic and bathymetric surveys (different from those supporting beach nourishment activities) of the placement area and adjacent areas, and a monitoring report on an annual basis for 3 years following construction and then biannually until the next construction event. Other OMRR&R items may include revegetating the dune as needed between nourishment activities (per Policy Guidance Letter No. 27 (11/17/92)), scarp repair, and beach tilling. The operations and maintenance will also include the items of local cooperation. These items entail publicizing floodplain information, ensuring continued conditions of public ownership and use of the shore, performing surveillance of the beach, and any specific directions prescribed by the government. Based on the size and scope of the Recommended Plan and the cost of similar activities for similar projects, the annual costs for OMRR&R are estimated to be $35,000 per year.

Operations and maintenance is borne 100% by the non-federal sponsor and is detailed in the Project Partnership Agreement (PPA). An Operations and Maintenance Manual will be completed by USACE and provided to the sponsor following completion of initial construction.

4.2 RECOMMENDED PLAN SAND SOURCE

As plan formulation proceeded, it was determined that the available offshore sand sources were too far from the Recommended Plan project area to be cost effective. Use of navigation channels and inlet material had been discussed, and these sources are closer to the project area than offshore sand sources and therefore more cost effective. During a Value Engineering (VE) analysis, discussion of sand sources focused on the St. Augustine Inlet system, including the ebb, flood, and Vilano Point shoals, as well as the Federal navigation channel. These sources are projected to be cost effective and able to provide the needed volume of sediment to both the Recommended Plan and the ongoing Federal coastal storm risk management project at St. Augustine Beach without negatively impacting the inlet system.

The Recommended Plan will require approximately 5,640,000 cubic yards of sand over a 50-year period. The FDEP "Final Order Adopting St. Augustine Inlet Management Implementation Plan," directs that strategies should be implemented to:

1. Continue to transfer sediment from the inlet system to the adjacent beaches, meeting a bypassing objective of 278,000 cubic yards per year, as determined by the Inlet Sink Analysis, provided in the document, *Regional Sediment Budget for St. Augustine Inlet and St. Johns County, FL, 1998/1999-2010* (USACE, 2012). The material obtained from the inlet system shall be distributed to the adjacent Atlantic Ocean-fronting beaches, with a placement ratio of approximately one third of material placement to the north and two thirds of material placement to the south.

2. Inlet sand transfer material shall be placed in designated critically eroded areas to the north or south of the inlet between R84 and R152, St. Johns County, in accordance with Implementation Strategy #1.
3. Inlet dredge material may be obtained from the Federal navigation channel, the intracoastal waterway channel, and encroaching flood shoals adjacent to the Federal channel, including the Porpoise [Vilano] Point borrow area, for placement in accordance with Implementation Strategies #1 and #2.

The Recommended Plan area is to the north of St. Augustine Inlet, between R102.5 and R117.5. As detailed in the Geotechnical Appendix, there is adequate beach quality sand (meeting FDEP permitting requirements for beach placement) to meet the estimated sand needs of the Recommended Plan. Currently, there is approximately 6.5 million cubic yards of compatible sand available within the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is 866,000 cubic yards every 12 years. The inlet management plan states that the bypassing objective is 278,000 cubic yards per year, of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 million cubic yards would be available to meet the 866,000 cubic yard need for a periodic nourishment event.

Use of the inlet system would implement a Regional Sediment Management (RSM) strategy where maintenance of Federal navigation features can be combined with a Federal CSRM project, realizing significant cost savings. It would be ideal if construction of the Recommended Plan could be coordinated with future construction of the already authorized and constructed Federal Shore Protection Project at St. Augustine Beach, south of the inlet. Such a strategy would realize significant cost savings and minimize potential environmental impacts from multiple dredge mobilizations, as outlined in the Engineer Research and Development Center (ERDC) 2016 technical report, *Regional Sediment Management Strategies for the Vicinity of St. Augustine Inlet, St. Johns County, Florida,* ERDC/CHL TR-16-12.

The existing Federal Shore Protection Project at St. Augustine Beach uses a hydraulic dredge to acquire sand from the St. Augustine Inlet system, and the Recommended Plan could potentially use the same dredge. Dredging of the Federal navigation channel through St. Augustine inlet also typically uses a hydraulic dredge. Therefore three Federal projects in the same vicinity could potentially use the same plant for construction or maintenance. Each time construction or maintenance of the projects could be combined would result in minimization of environmental impacts and a cost savings of at least $4,000,000 by combining three separate dredge mobilization into one.

The existing St. Augustine Project has an average periodic nourishment interval of every five years. The Recommended Plan has an average periodic nourishment interval of twelve years. Since the given intervals are average it is likely that the periodic renourishments, or initial construction of the Recommended Plan, could coincide.

Use of the inlet system as the Recommended Plan's sand source is similar to any project's dependency on a sand source within state waters and subject to applicable regulation. The inlet system lies within CBRS Unit P05, and its use as a sand source for the Recommended Plan has been coordinated with the U.S. Fish

and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the state, as documented elsewhere in this report. Given this coordination and the agencies' concurrence that the intended use is acceptable and beneficial to the coastal system, there is low risk that the source will become unusable in the future and another sand source will be required.

4.3 SEA LEVEL RISE CONSIDERATIONS

An important question about the Recommended Plan is its performance under different Sea Level Change scenarios. As discussed earlier in this report, the study area is experiencing Sea Level Rise (SLR). Each of the SLR scenarios described earlier are considered equally likely to occur. Therefore, if the project does not perform, then it cannot be considered a completely effective plan. Table 4-2 shows the average BCRs and net benefits of the Recommended Plan under the three SLR scenarios.

Table 4-2. Recommended Plan Benefits and Costs (AAEQ@2.875%) for different SLR scenarios.

SLR Scenario	AAEQ Benefits	AAEQ Costs	BCR	Net AAEQ Benefits
Base SLR	$ 1,683,000	$ 1,719,000	0.98	$ (37,000)
Intermediate SLR	$ 2,221,000	$ 1,996,000	1.11	$ 225,000
High SLR	$ 2,694,000	$ 2,593,000	1.04	$ 100,000

*Based on 100 iteration runs and only include structure, content, and armor damage.

As shown in Table 4-2, though the average benefits of the project increase in the SLR scenarios, the average costs also increase. The costs increase because renourishment is triggered more frequently. Thus, the project performance (in terms of the benefit-cost ratio) is relatively constant throughout the SLR scenarios. Overall, these results suggest that the Recommended Plan is effective in all three simulated SLR scenarios.

4.4 LAND LOSS AND RECREATION BENEFITS

In outlining the process and procedures to be used in the evaluation of CSRM projects, ER-1105-2-100 mentions the inclusion of land loss due to erosion, stating that such damages should be computed as the market value of the average annual area expected to be lost. Prevention of land loss is a component of primary storm damage reduction benefits but is not computed within the Beach-fx model. Thus, calculation of land loss benefits must be completed outside of the model and added to the structure and contents damage and armor costs benefits to obtain the total storm damage reduction benefits of the project.

Following the guidance provided, two key pieces of information are needed to calculate the land loss benefits of a CSRM project: (1) the square footage of land lost each year, and (2) the market value of land in the project footprint. The Economics Appendix provides detail on how the square footage of land loss each year was calculated. As the second component of the land loss benefits calculation, ER 1105-2-100

instructs that nearshore land values be used to estimate the value of land lost. The USACE, Jacksonville District Real Estate Department estimated a nearshore land value of $14.00 per square foot for the St Johns Study Area.

Using the analysis technique described, the total present value of land loss benefits over the 50-year period of Federal participation is estimated at $7,314,000, or $278,000 in average annual terms (2.875% discount rate).

According to ER-1105-2-100, incidental recreation benefits can be calculated for CSRM projects. While recreation benefits cannot make up more than 50% of the total benefits needed for project justification, the guidance states, "if the criterion for participation is met, then all recreation benefits are included in the benefit to cost analysis."

Additionally, ER-1105-2-100 specifies that benefits arising from recreation opportunities created by a project be measured in terms of willingness to pay. As described in the Economics Appendix, the unit day value (UDV) method was used to calculate the incidental recreation benefit provided by the Recommended Plan, resulting in an estimated total present value of recreation benefits of $18,224,000 or $692,000 average annual terms (2.875% discount rate). Table 4-3 provides a summary of the NED Plan with land loss and recreation benefits added, expressed in average annual equivalent terms.

Table 4-3. Economic Summary.

Economic Summary	**Primary Storm Damage Reduction Benefits**	**Primary Storm Damage Reduction + Incidental Recreation Benefits**
Price Level	FY17	FY17
FY17 Water Resources Discount Rate	2.875%	2.875%
Average Annual Structure & Contents Damage & Armor Costs Benefits	$1,683,000	$1,683,000
Average Annual Land Loss Benefits	$278,000	$ 278,000
Average Annual Incidental Recreation Benefits	$ -	$ 692,000
Average Annual Total Benefits	$1,961,000	$ 2,653,000
Average Annual Costs	$2,031,000	$2,031,000
Average Annual Net Benefits	**($70,000)**	**$622,000**
Benefit Cost Ratio	**0.97**	**1.3**

The total BCR, including CSRM, land loss, and incidental recreation benefits for the Recommended Plan, is equal to 1.3.

4.5 RECOMMENDED PLAN BENEFITS TO HURRICANE EVACUATION ROUTE SR A1A

As described elsewhere in this report, SR A1A is designated as a National Scenic and Historic Coastal Byway, is the only evacuation route for the region, and is a major north-south thoroughfare for the area. After the 2008 hurricane season, areas of the dune were eroded to within five feet of SR A1A in portions of the Vilano Beach reach around R115, within the southern-half of the Recommended Plan area. If SR A1A were to be breached in this location, any north/south access of emergency vehicles to affected areas, as well as any evacuating population, would be cut off. SR A1A is the evacuation route for approximately 6,000 residents on the barrier island. As shown in Figure 4-2, there are no other north/south roads in this vicinity. The Recommended Plan reduces the risk of damage to SR A1A and maintains its use as the only evacuation route, ingress/egress for emergency vehicles, as well as maintaining a corridor for the resident population to return once conditions are safe.



Figure 4-2: R115 vicinity, where past storms have eroded beach and dunes to within five feet of SR A1A. Damage to SR A1A in this area would significantly slow north/south ingress/egress for evacuating populations and emergency response vehicles. Breaching of SR A1A in this vicinity would completely cut off north/south transport as there is no other north/south route.

4.6 COMPLIANCE WITH EXECUTIVE ORDER (EO) 11988

EO 11988 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988, as referenced in USACE ER 1165-2-26, require an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to, or within, the floodplain. The eight steps reflect the decision-making process required in Section 2(a) of the EO. The eight steps and responses to them are summarized below.

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

Yes, the Recommended Plan footprint is within the base floodplain. However, this project reduces damages caused by erosion, and flooding (or inundation) does not cause significant future without-project damages.

2. If the action is in the base floodplain, identify and evaluate practicable alternatives to the action, or to location of the action, in the base floodplain.

This document has evaluated alternatives in earlier sections. Practicable measures and alternatives were formulated and evaluated, including non-structural measures such as acquisition of land and structures.

3. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments.

Scoping letters were sent to all abutting property owners, and Federal and state agencies on August 17th, 2005, and on September 16, 2008, in fulfillment of NEPA requirements. Views and comments were received from residents, the FDEP, the Florida Fish & Wildlife Conservation Commission (FWC), the State Historic Preservation Office (SHPO), and NMFS.

4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base floodplain will affect the base floodplain, impacts resulting from these actions should also be identified.

Potential impacts associated with the Recommended Plan are summarized in Chapters 3, 4, and 7 of this report. The project will not alter or impact natural or beneficial floodplain values.

5. If the action is likely to induce development in the base floodplain, determine if a practicable non-floodplain alternative for the development exists.

The project will not encourage development in the floodplain. Development is expected to continue whether or not the action is taken, as demonstrated by coastal development around the State of Florida in areas both with, and without, constructed Federal CSRM projects. The project provides benefits for existing development. The project will not change the base floodplain. Practicable measures and alternatives were formulated and evaluated earlier in this report, including non-structural measures such as acquisition of land and structures.

6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action, including any likely induced development for which there is no practicable alternative, and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative.

The project will not induce development in the floodplain, and the project will not impact the natural or beneficial floodplain values. Management measures and alternatives, including the No Action alternative, were evaluated and discussed earlier in this report.

7. If the final determination is made that no practicable alternative exists to locating the action in the floodplain, advise the general public in the affected area of the findings.

The Draft Feasibility Study and Environmental Assessment (EA) was released for public review on February 5, 2016. Comments received, and responses to the comments, have been incorporated into the report.

8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order.

The Recommended Plan is the most responsive to all of the study objectives and is consistent with the requirements of EO 11988. This project reduces damages caused by erosion, and flooding (or inundation) does not cause significant future without-project damages.

4.7 FEDERAL IMPLEMENTATION RESPONSIBILITIES

USACE is responsible for budgeting for the Federal share of future Federal construction projects. Federal funding is subject to budgetary constraints inherent in the formation of the national civil works budget in a given fiscal year. USACE would perform the necessary preconstruction engineering and design (PED) needed prior to construction. USACE would meet requirements for the use of Federal lands at the borrow area, obtain water quality certification, coordinate with the state as required by the CZMA, and construct the project. Cost sharing of PED, initial construction, and periodic nourishment will be in accordance with WRDA 1986, as amended, subject to the availability of appropriations.

4.8 NON-FEDERAL IMPLEMENTATION RESPONSIBILITIES

The non-federal sponsor for the CSRM project will be St. Johns County. The non-federal project sponsor would provide an up-front cash contribution for initial construction costs of the proposed project. The amount of the non-federal up-front cash contribution would be based on cost-sharing principles reflecting shoreline use, ownership, and public access in existence at the time of construction. The non-federal sponsor shall provide the entire cost of all material placed on or seaward of private undeveloped lands and developed private lands (which are inaccessible to the public). The non-federal sponsor shall provide lands, easements, and rights-of-way and bear a portion of the administrative costs associated with land requirements. The non-federal project sponsor will be responsible for all costs of operation, maintenance, repair, rehabilitation, and replacement of project features. Section 402 of the 1986 Water Resources Development Act (33 USC 701b-12) as amended by Section 14 of the 1988 Water Resources Development Act, states that "Before construction of any project for local flood protection or any project for hurricane or storm damage reduction, that involves Federal assistance from the Secretary, the non-federal interests shall agree to participate in and comply with applicable Federal floodplain management and flood insurance programs." The non-federal sponsor and communities must be enrolled in, and in compliance with, the National Flood Insurance Program (NFIP) to receive Federal funding for a recommended storm damage reduction project. St. Johns County is enrolled in, and in compliance with, the NFIP.

4.9 RECOMMENDED PLAN COST SHARING

Cost-sharing percentages are based on ownership and use of parcels landward of where the full 60-foot equilibrated berm extension and 2015 dune feature will be placed. Parcels landward of the 1,000 foot tapers are not used to calculate cost sharing, but construction of the tapers will be cost shared in the calculated amount. For full Federal cost sharing, public access with adequate parking (or another way for the public to reach access, such as a public bus or beach shuttle) must be provided every ½ mile. Figure 4-3 includes public access and parking locations for the Recommended Plan area and depicts the shoreline lengths that are covered by adequate public access and parking.

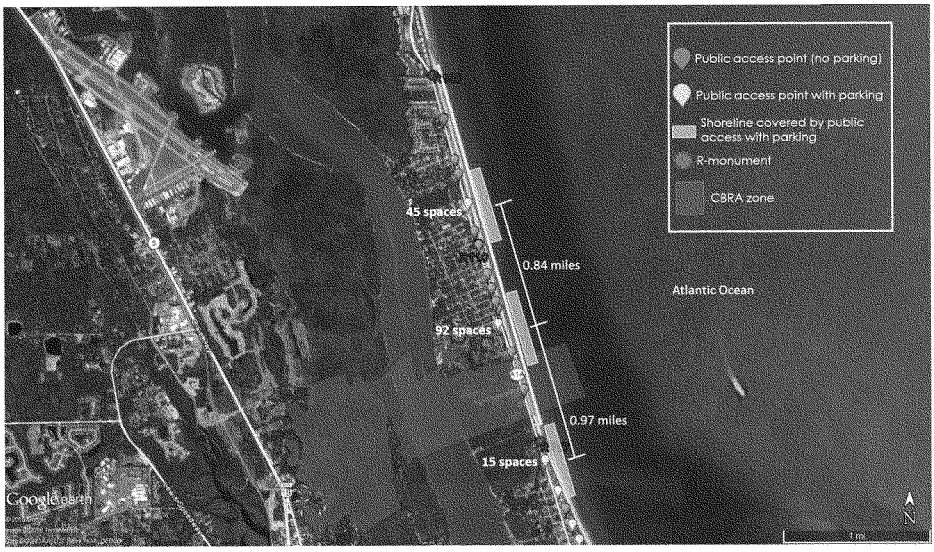


Figure 4-3. Public Access and Parking within the Recommended Plan Area.

The current cost share estimates are based on policy guidance provided by ER 1105-2-100, Appendix E and ER 1165-2-130. Cost sharing for this project is determined by section 103(c)(5)of WRDA 1986, which establishes a 65/35 cost share for CSRM. To provide for other than the cost sharing established in section 103, statutory language directing a different cost sharing percentage would have been required. The WRDA of 1999 changed the cost sharing policy previously provided by WRDA 1986 by setting the non-federal share of periodic nourishment carried out after January 1, 2003 to 50% for projects authorized for construction after December 31st, 1999. Table 4-4 shows the Federal and non-federal cost sharing for the Recommended Plan. Additional detail on how percentages were calculated is given in Appendix F. Changes to shoreline ownership and use prior to construction could change the stated cost sharing percentages. Cost sharing for initial construction is 23.0% Federal / 77.0% non-federal. Cost sharing for periodic nourishments is 17.7% Federal / 82.3% non-federal.

Table 4-4. Recommended Plan Cost Sharing.

Shore Ownership and Project Purpose (as defined in ER 1105-2-100)	INITIAL CONSTRUCTION				PERIODIC NOURISHMENT*		
	Maximum Level of Federal Participation in Construction Costs	Shoreline Length (feet)	Shoreline Length x Federal Participation %	Shoreline Length x non-Federal Participation %	% of Federal Participation for Periodic Nourishment	Shoreline Length x Federal Participation %	Shoreline Length x non-Federal Participation %
I. Federally Owned	100%	0	0	0	100%	0	0
II. Publicly and Privately Owned, Protection Results in Public Benefits							
A. Coastal Storm Risk Management (CSRM) on Developed Lands (Public/Private)	65%	3,835	2,493	1,342	50%	1,918	1,918
B. CSRM on Undeveloped Public Lands **	65%	948	616	332	50%	474	474
C. CSRM on Undeveloped Private Lands	0%	603	0	603	0%	0	603
III. Privately Owned, Use Limited to Private Interests (No public access within 1/4 mile)	0%	5,922	0	5,922	0%	0	5,922
IV. CBRA Zone	0%	2,190	0	2,190	0%	0	2,190
	Total Distance:	13,498	3,109	10,389	Total Distance:	2,392	11,107
		Cost Shares:	23.0%	77.0%	Cost Shares:	17.7%	82.3%

4.10 RECOMMENDED PLAN COSTS

The Recommended Plan total project cost, including contingency, is $78,417,000, as shown in Table 4-5 (FY17 price levels). The Cost Appendix provides additional detail.

Table 4-5. Recommended Plan Cost Summary (Project First Cost) (FY17 Price Levels).

	Cost Summary (Project First Costs) (FY17 Price Levels)			
	St. Johns County, FL CSRM Project			
	R102.5 - R117.5 (total placement area, including tapers)			
		INITIAL CONSTRUCTION		PERIODIC NOURISHMENT
WBS	**Item**	**Total Item Cost**		**Total Item Cost**
017	Mob/Demob	$3,052,000		$9,147,000
017	Beach Fill	$10,110,000		$21,138,000
017	Associated General Items	$254,000		$597,000
	Subtotal	$13,416,000		$30,882,000
01	Real Estate			
01	- lands and damages	$0		$0
01	- administrative	$2,514,000		$0
	- Federal admin.	$1,571,000		$0
	- non-federal admin.	$943,000		$0
30	PED	$1,203,000		$4,884,000
31	Construction Management	$1,096,000		$2,574,000
017	Dune vegetation	$1,009,000		$3,027,000
30	Post-Project Monitoring	$164,000		$493,000
	Subtotal	$5,986,000		$10,978,000
	Contingency (28%)	$5,432,000		$11,721,000
	Total	**$24,834,000**		**$53,583,000**
	Total Project Cost for 50 year period of Federal participation = $78,417,000			

Table 4-6 displays cost sharing for the Recommended Plan.

Table 4-6. Recommended Plan Cost Sharing (Project First Cost) (FY17 Price Levels).

St. Johns County, FL CSRM Project					
Summary of Project Cost Sharing (Project First Costs) (FY17 Price Levels)					
R102.5 - R117.5 (total placement area, including tapers)					
Initial Construction					
Item	Federal Cost Share	Federal Cost	Non-federal Cost Share	Non-federal Cost	Project First Cost
Coastal Storm Risk Management Costs	23.0%	$5,712,000	77.0%	$19,122,000	$24,834,000
Non-federal LERRD Contribution*	0.0%	$0	100.0%	$943,000	
Non-federal Cash Contribution				$18,179,000	
Periodic Nourishment					
Periodic Nourishment	17.7%	$9,484,000	82.3%	$44,099,000	$53,583,000
Initial Construction + Periodic Nourishment					
Final Project Cost Share and Cost (50 years)	-	$15,196,000	-	$63,221,000	$78,417,000
* Includes non-federal admin costs only					
NOTE: Dollar values are rounded					

4.11 HURRICANE MATTHEW (2016) EROSION IMPACT ANALYSIS

Hurricane Matthew, a strong category 3 hurricane, impacted northeast Florida from October 6th through 8th, 2016. The storm caused structural damage and dune erosion throughout the Recommended Plan area as shown in Figure 4-4, Figure 4-5, and Figure 4-6. An evaluation was completed to determine if the volume of sand eroded by Hurricane Matthew was significant enough to warrant reanalysis of the Recommended Plan.



Figure 4-4. Hurricane Matthew damage in the vicinity of R114 on Oct. 8, 2016. Note erosion of sand below house. Image courtesy of Florida Department of Environmental Protection.



Figure 4-5. Hurricane Matthew damage in the vicinity of R116 on Oct. 8, 2016. Note top of vinyl sheet pile seawall emerging from sand in foreground and dune scarping and erosion below pile-supported homes. Image courtesy of Florida Department of Environmental Protection.

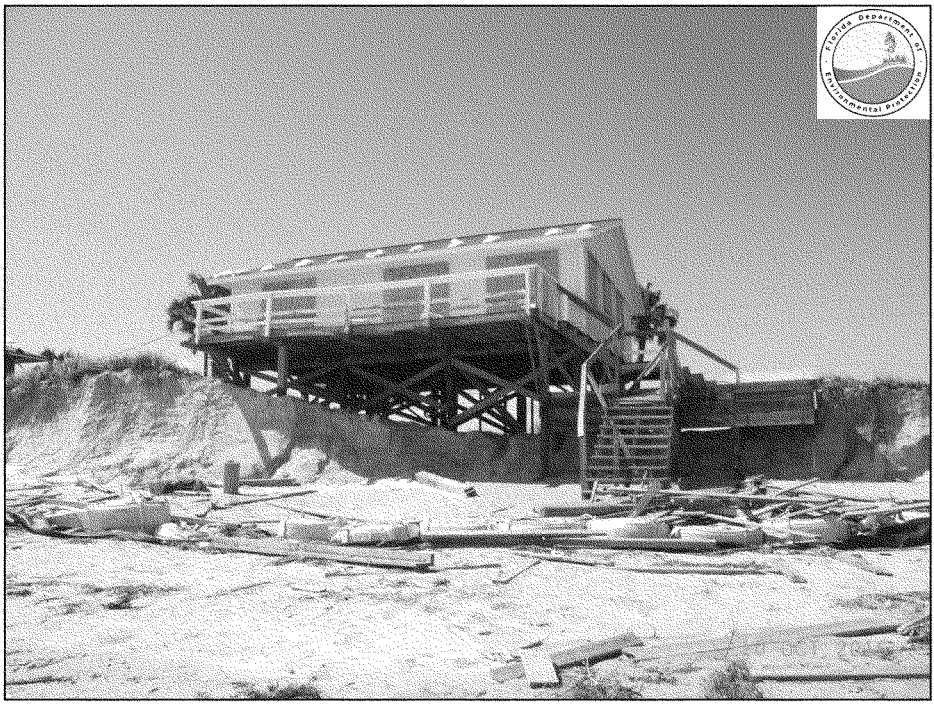


Figure 4-6. Hurricane Matthew damage in the vicinity of R116 on Oct. 10, 2016. Note debris from destroyed dune walkovers and other structures. Note dune scarping and erosion below house. Image courtesy of Florida Department of Environmental Protection.

For the evaluation, pre and post-storm LIDAR data collected by USACE was compared. Figure 4-7 includes pre and post-storm profiles showing the dune erosion experienced at R111, near the middle of the recommended plan area. Along the recommended plan shoreline approximately 165,000 cubic yards was eroded from the dune as a result of Hurricane Matthew. Erosional losses to the berm were minimal, as the sand eroded from the dune was spread out over the berm and nearshore area. The portions of the berm that did erode are expected to experience natural recovery in the months following the storm. However, natural recovery of dunes can take a very long time.

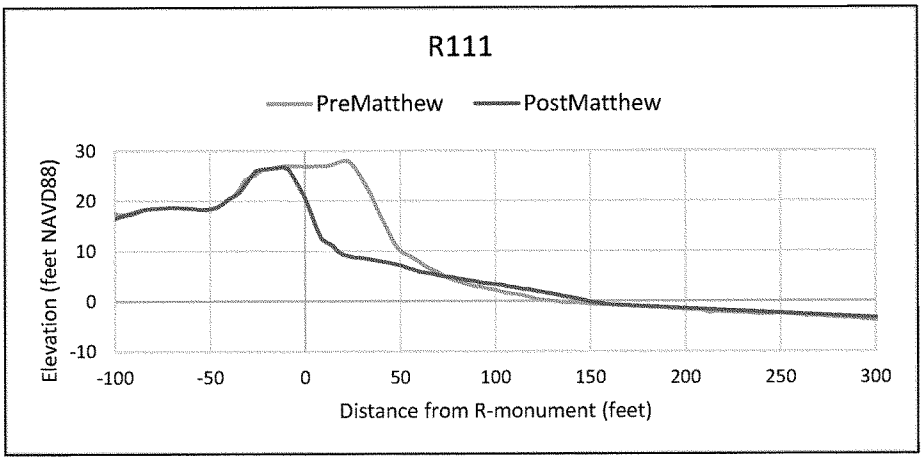


Figure 4-7. Pre and Post-Storm LIDAR Profiles at R111.

This result indicates that approximately 165,000 cubic yards of additional sand could be needed for initial construction in 2020. This volume is a relatively small amount and does not take into account any natural recovery of the dune that could occur prior to 2020. Furthermore, to understand how this volume compares to the Recommended Plan's initial construction volume of 1,310,000 cubic yards, it is important to consider the probabilistic nature of Beach-*fx*.

Each complete Beach-*fx* model run consists of 100 iterations, with each iteration representing the 50-year planning horizon for the project. Each iteration, therefore, has a unique volume requirement for initial construction. Based on the Recommended Plan modeling, a range of volumes was determined for each initial construction event. The average initial construction volume modeled in Beach-*fx* is 1,310,000 cubic yards with a standard deviation of 189,000 cubic yards. The estimated 165,000 cubic yards of additional volume needed for initial construction as a result of Hurricane Matthew's impact is within the standard deviation for the initial construction volume. The range of volumes for initial construction are shown in Table A-21 of the Engineering Appendix.

Regarding potential cost impacts, quantity estimates are the primary cost risk driver identified in the cost schedule risk analysis, and the potential 13% increase in initial construction volume caused by Hurricane Matthew is covered by the 28% cost contingency for the Recommended Plan. In conclusion, the erosion impacts of Hurricane Matthew are included in the risk and uncertainty used to develop the Recommended Plan and re-analysis is not recommended.

4.12 FINANCIAL ANALYSIS OF NON-FEDERAL SPONSOR'S CAPABILITIES

A financial analysis is required for any plan being considered for USACE implementation that involves non-federal cost sharing. The ultimate purpose of the financial analysis is to ensure that the non-federal sponsor understands the financial commitment involved and has reasonable plans for meeting that commitment. By memorandum dated April 24, 2007, the Assistant Secretary of the Army (Civil Works), granted approval of the self-certification of the non-federal sponsors for their ability to pay the non-federal share of projects. The self-certification is required prior to submission of the Project Partnership Agreement, typically during the PED phase of the project. Included with the self-certification, the financial analysis shall include the non-federal sponsor's statement of financial capability, the non-federal sponsor's financing plan, and an assessment of the sponsor's financial capability.

4.13 VIEWS OF NON-FEDERAL SPONSOR

St. Johns County is the non-federal sponsor for the Recommended Plan. They have been an integral part of the Project Delivery Team (PDT) from the conception of the project. At each step of the process, St. Johns County has contributed to the available information, participated in the formulation, and reviewed the products. St. Johns County supports the Recommended Plan.

CHAPTER 5
EFFECTS OF THE RECOMMENDED PLAN

5 EFFECTS OF THE RECOMMENDED PLAN*

The effects of the Recommended Plan will include effects resulting from the use of the offshore sand sources identified in Section 2.2.5. The sand source is not included in the Recommended Plan; however, effects of the sand mining are discussed in the event that offshore sand may be sought as a borrow source in the future if economically justified.

5.1 GENERAL ENVIRONMENTAL EFFECTS*

The environmental effects associated with the Recommended Plan are primarily temporary in nature, and most affected resources would return to pre-construction conditions either immediately after dredging (with respect to resources such as aesthetics and noise) or within one or two years (with respect to sea turtle nesting and benthic resources). However, dredging inlets and altering the shoreline has the potential to change how sediment transport occurs regionally. The use of the St. Augustine Inlet was extensively studied, and the FDEP Inlet Management Plan supports the usage of the inlet system as identified in the Recommended Plan.

5.2 NATURAL (GENERAL) ENVIRONMENT*

This section is the scientific and analytic basis for the comparisons of the alternatives. Section 2 includes the effects resulting from the "no action alternative," or the "future without-project conditions (FWOP)." The following section includes anticipated changes to the existing environment including direct, indirect, and cumulative effects as a result of the Recommended Plan, or the "future with-project conditions."

5.2.1 GENERAL CONDITIONS

5.2.1.1 ST. AUGUSTINE INLET

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Since the St. Augustine Inlet is currently maintained at a depth of 16 feet, the future with-project condition will not change the inlet. USACE modeled the sediment transport patterns in the ebb shoal of the inlet, and dredging the ebb shoal in the quantities proposed in the Recommended Plan will not increase shoaling rates associated with the inlet. The material from the inlet system will be distributed to the beaches north and south of the inlet in accordance with the FDEP Inlet Management Plan, which corresponds to the volumes outlined in the Recommended Plan.

If the offshore sand sources are used, there may be increased shoaling in the St. Augustine Inlet due to the increased volume of material in the sediment budget. However, the inlet will continue to be maintained as part of the Federal inlet and Intracoastal Waterway (IWW) projects. Therefore, no significant changes to the inlet are expected to occur.

5.2.1.2 SOUTH PONTE VEDRA AND VILANO BEACH

The Recommended Plan includes beach placement at the full template width from R103.5 to R116.5. There are 1,000 foot tapers at each end, extending the area of beach placement to approximately R102.5 to R117.5. This placement area extends slightly into the South Ponte Vedra study reach; however, the majority of the South Ponte Vedra reach will not be affected by the Recommended Plan. Vilano Beach will be entirely affected by the Recommended Plan.

5.2.1.3 SUMMER HAVEN BEACH

The Recommended Plan does not affect Summer Haven Beach. Without beach placement, the beach and dune systems in the Summer Haven Beach study reach will continue to erode.

5.2.2 VEGETATION

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The project will plant dune vegetation on the reconstructed frontal dune to stabilize the dune slopes as part of the initial construction. Sea oats will be the primary species planted, and the costs were based on sea oats planted on nine-inch centers along 30 feet of dune slope for the length of the project. Although the costs were based on planting sea oats, the project will attempt to incorporate other native coastal species in the project planting plan to create a diverse habitat based on their commercial availability. Other potential species to be included in the planting plan include gulfhairawn muhly (*Muhlenbergia filipes*), bluestem (*Schizachyrium scoparium, S. maritimum*, or *S. littorale*), seashore dropseed (*Sporobolus virginicus*), beach sunflower (*Helianthus debilis*), beach morningglory (*Ipomoea imperati*), and bayhops (*Ipomoea pes-caprae*).

After dune vegetation is established, additional vegetation will naturally recruit following future periodic nourishments and will be planted as needed. This increase would be seen regardless of the sand source; inlet system or offshore sand source.

5.2.3 FISH AND WILDLIFE RESOURCES (OTHER THAN THREATENED AND ENDANGERED SPECIES)

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The dredging activity may attract some seabirds to the dredge area. Activities, such as oil exploration, have been shown to attract large numbers of seabirds, possibly because of an increase in food availability as bottom sediments are stirred up by drilling, potentially resulting in an algal bloom, and attracting species preyed on by seabirds (Tasker et al. 1986; Herron Baird 1990). Similar processes may occur during the initial stages of sand dredging. In addition, some species groups, notably gulls, are attracted by increases in shipping activity, especially at the low speeds associated with dredging (Garthe and Hüppop 1999; Skov and Durinck 2001; Christensen et al. 2003). Vision has been shown to be an important component in the foraging activity of a number of seabird species (Essink 1999; Garthe et al. 2000; Gaston

2004; Thaxter et al. 2010). As a result, water clarity may play an important role in the foraging success of these, and other, species. Changes to water clarity resulting from the re-suspension of sediments during dredging operations would negatively affect the foraging capabilities of some species. However, turbidity would only be increased in the vicinity of the dredging and placement operations. In addition, the impact of increases in turbidity is likely to be dependent, both in scale and spatial extent, on initial background levels (Cook 2010). Water quality would quickly return to pre-dredging conditions upon completion of construction. Other than these effects, migratory birds would be minimally affected by dredging activities.

Although benthic organisms would be temporarily impacted at the beach placement site and at the sand source locations (including both the inlet system and the offshore sand source locations), recovery of the benthic community is expected to occur with normal seasonal recruitment patterns. Suitable foraging areas exist outside of the project area to prevent significant impacts to both shorebirds and fish species foraging on the benthic species impacted in the nearshore environment and at the ebb shoal. If construction occurs during the summer months, USACE would implement its migratory bird protection measures that include daily surveys for shorebird nesting activities. If nests were found, a buffer zone of at least 300 feet would be established around each nest. No significant adverse impacts to migratory birds are anticipated with the migratory bird protection measures in effect. Some opportunistic foraging during placement is expected by both fish and bird species. Other wildlife utilizing the dredging and placement sites would be temporarily displaced during construction.

If the offshore sand source were used, the impacts to fish and wildlife species other than those protected under the Endangered Species Act will be similar to those effects identified for the use of the inlet system.

5.2.4 THREATENED AND ENDANGERED SPECIES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

With the implementation of the protective measures listed in this section, USACE has determined that the Recommended Plan may affect, but is not likely to adversely affect, sea turtles in the water (may affect if a hopper dredge is used), manatees, piping plover, red knot, or whales. The Conservation Measures outlined in the 1991 National Marine Fisheries Service (NMFS) South Atlantic Division Regional Biological Opinion (SARBO; revised 1995 and 1997), the 2013 U.S. Fish and Wildlife Service (USFWS) Piping Plover Programmatic Biological Opinion (P3BO), and the 2015 USFWS Statewide Programmatic Biological Opinion (SPBO) will be adhered to for these species as appropriate. In addition, USACE has determined that the presence of a dredge in the nearshore waters and pipeline on the beach could temporarily impact the physical or biological features (PBF) and primary constituent elements (PCE) of loggerhead critical habitat unit LOGG-N-14 during construction. Hatchling egress from the water's edge to open water, and nesting female transit back and forth between the open water and the nesting beach during nesting season, could be hindered by the presence of the dredge and pipeline. However, the construction phase would typically last three to four months, approximately every 10-12 years (erosion due to storms could require more frequent events), and the daily construction activity would occur within only a small area at

a time (approximately 500 linear feet per day). In addition, the SARBO includes conditions that minimize incidental take of turtles. Finally, the placement of sand may increase sea turtle nesting habitat if the placed sand is highly compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project (i.e., the project complies with the terms and conditions of the SPBO). Therefore, USACE has determined that the project will not destroy or adversely modify loggerhead critical habitat.

5.2.4.1 SEA TURTLE NESTING HABITAT

Beach placement may occur year-round; however, construction during the winter months would lessen the impact on nesting and hatchling turtles. The Florida Fish and Wildlife Conservation Commission (FWC) noted in their comments on the draft EA that sand placement between May 1 and October 31 could interfere with nesting or hatchling turtles. As the construction is anticipated to take three to four months, restricting sand placement to November through April could substantially increase construction costs, as competition would be limited by the dredge companies available to perform the work. However, USACE will take the recommendations to conduct the work outside of nesting season into consideration. If construction occurs during nesting season, sea turtle nests will be relocated by trained monitors to an appropriate location outside of the construction area. Additional measures to protect sea turtles and their nesting habitat can be found in the USFWS Statewide Programmatic Biological Opinion (2011; revised in 2015); however, a summary of these is found below:

- Only beach compatible material containing no more than 5% fine material passing a #230 sieve would be placed on the beach.
- Daily sea turtle nest monitoring and relocation would be required. Only nests that would be affected by construction activities would be relocated to a nearby self-release beach site in a secure setting where artificial lighting would not interfere with hatchling orientation.
- Sand compaction and escarpment monitoring would occur post placement.
- Staging areas for construction equipment would be located off the beach to the maximum extent practicable.
- Direct lighting of the beach and nearshore waters would be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all U.S. Coast Guard, EM 385-1-1, and Occupational Safety and Health Administration (OSHA) requirements.

The Recommended Plan will help to maintain the dune feature that may be important as a cue for nesting green turtles. In addition, it will ensure that approximately 3.15 acres of nesting habitat are maintained that might otherwise be lost due to coastal armoring and erosion.

5.2.4.2 LOGGERHEAD CRITICAL NEARSHORE REPRODUCTIVE HABITAT

The proposed placement area is located in designated loggerhead Nearshore Reproductive Critical Habitat Unit LOGG-N-14. The Primary Constituent Elements (PCEs) for Nearshore Reproductive Habitat include waters off the highest density nesting beaches, waters free from obstructions or artificial lighting to allow

ingress/egress of turtles, and waters with minimal manmade structures to promote predators and to disrupt wave patterns.

In the designation of Critical Nearshore Reproductive Habitat, NMFS indicates that dredging and disposal activities may "affect habitat conditions for efficient passage of hatchlings or females by creating barriers or dramatically altering the slope of the beach approach." Dredging of the inlet system sand source will be located far enough away from nesting beaches to avoid impacting nesting and hatchling turtles, and will be at dredging depths shallow enough to avoid modifying wave energy reaching the shoreline. Dredging of the inlet system sand sources, or of the proposed offshore sand sources, would not "dramatically" alter the slope of the "beach approach" or disrupt wave patterns that would impact nesting female or hatchling ingress or egress to/from the beach. Additionally, in the final ruling for critical habitat, NMFS responded to a commenter that, "neither beach nourishment nor the dredging of sand from offshore borrow sites are expected to be significantly impacted by the critical habitat designation as proposed."

Placement of sediment on the beach requires the use of a pipeline to convey the material from the dredge to the placement site. The pipeline typically includes floating and submerged components and approaches perpendicular to the beach. Though the pipeline will be located within the nearshore reproductive habitat, a pipeline located along the sea floor would not be an obstruction to ingressing/egressing sea turtles and would not affect the PCE's that support nearshore reproductive habitat. Dredging and placement of beach-compatible sediment will not result in barriers or dramatic altering of the slope of the beach approach for nesting females because of the relatively fast equilibration of the constructed profile. The constructed profile immediately begins to equilibrate to the more natural equilibrium profile as the waves redistribute sediment along and cross-shore to the equilibration toe of fill. The beach profile will extend into the Nearshore Reproductive Habitat; however, the slope will quickly adjust and would not block or otherwise impede passage of hatchlings or females. Additionally, in the Final Rule for Nesting Beaches Critical Habitat, USFWS states that processes that "mimic these natural processes" (e.g., beach nourishment) are an important component of the physical and biological features of these high density nesting beaches. Since Critical Nearshore Reproductive Habitat is tied to the locations of these high nesting density beaches and beach nourishment projects can be essential to maintaining the long term nesting densities on highly erosive beaches, beach nourishment is not likely to adversely modify Critical Nearshore Reproductive Habitat.

Lighting on-board dredges and associated ancillary equipment/vessels is required for safe and efficient operations at night. Lighting associated with beach nourishment dredging is a temporary occurrence. However, while dredging sand sources, all lighting aboard dredges, support vessels, etc. operating within three nautical miles of sea turtle nesting beaches are limited to the minimal lighting necessary to comply with U.S. Coast Guard and/or OSHA requirements. All nonessential lighting on the dredge and supporting equipment/vessels shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to minimize illumination of the water to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches. Through the implementation of minimum lighting requirements on board dredges and

associated ancillary equipment, the PCEs that support Nearshore Reproductive Habitat will not be affected.

5.2.4.2.1 Sea Turtle Protective Measures

To minimize potential adverse impacts to sea turtles, the following measures would be implemented:

- The contractor would instruct all personnel associated with the project of the potential presence of these species and of the need to avoid collisions with sea turtles. All construction personnel would be responsible for observing water-related activities for their presence.
- The contractor would advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles, which are protected under the Endangered Species Act of 1973.
- Siltation barriers would be made of material in which a sea turtle cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment.
- All vessels associated with the construction project would operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels would preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- If a sea turtle is seen within 100 yards of the active daily construction/disposal operation or vessel movement, all appropriate precautions would be implemented to ensure its protection. These precautions would include cessation of operation of any moving equipment closer than 50 feet of a sea turtle. Operation of any mechanical construction equipment would cease immediately if a sea turtle is seen within a 50-foot radius of the equipment. Activities would not resume until the protected species has departed the project area of its own volition.
- Any collision with and/or injury to a sea turtle would be reported immediately to the NMFS Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

5.2.4.3 WEST INDIAN MANATEE AND WHALES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Standard protective measures would be taken during placement activities to ensure the safety of manatees and whales. These measures are recommended by both the USFWS and NMFS as part of the 2015 USFWS SPBO (for manatees) and the 1991 NMFS SARBO (revised in 1995 and 1997; for whales). To make the contractor and his personnel aware of the potential presence of these species in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the following standard manatee and whale protection clauses:

- The contractor would instruct all personnel associated with construction activities about the potential presence of manatees and whales in the area and the need to avoid collisions with them.

- If siltation barriers are used, they shall be made of material in which manatees and whales cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block entry to or exit from essential habitat.
- If a manatee were sighted within 100 yards of the project area, all appropriate precautions would be implemented by the contractor to ensure protection of the manatee. These precautions would include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee were closer than 50 feet to moving equipment or the project area, the equipment would be shut down and all placement activities would cease to ensure protection of the manatee. Placement activities would not resume until the manatee has departed the project area.
- The vessel operators shall maintain a 500-yard buffer between the vessel and any whale.
- All vessels associated with the project would operate at 'no wake' speeds at all times while in shallow waters or channels where the draft of the boat provides less than three feet clearance from the bottom. Boats used to transport personnel would be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat would follow routes of deep water to the greatest possible extent. Shore crews would use upland road access if available.
- Mooring bumpers would be placed on all large vessels wherever and whenever there is a potential for manatees to be crushed between two moored vessels. The bumpers would provide a minimum stand-off distance of four feet.
- All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees and whales, which are protected under the Endangered Species Act and the Marine Mammal Protection Act (discussed further in Section 6).

5.2.4.4 PIPING PLOVER AND RED KNOT

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

As the placement area associated with the Recommended Plan is not optimal habitat for piping plover or red knot, effects (both adverse and beneficial) are minimal. Beach placement of material would temporarily impact wintering piping plover and red knot due to displacement from their foraging and roosting habitat. In addition, the benthic invertebrates on which these species feed will be affected by the placement of sand. Recovery of the benthic infauna should occur with normal seasonal recruitment patterns. During pump-out of the dredged material, there may be some opportunistic feeding at the placement area by shorebirds, including piping plover and red knot.

5.2.4.5 ANASTASIA ISLAND BEACH MOUSE (AIBM)

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Although AIBM have not been trapped within the GTMNERR since 2006 and are not likely to be affected by the beach placement activities, the following conditions for the AIBM from the SPBO would be followed.

- Beach mouse habitat would be avoided when selecting sites for equipment, pipes, vehicle storage and staging to the maximum extent practicable.
- All construction activity would remain at least 5 to 10 feet seaward of the toe of the dune or 10% of the beach width seaward of the dune toe in areas of occupied beach mouse habitat.
- Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The topography at the access points shall be fully restored to preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts to existing habitat and transporting workers along the beachfront.
- If needed, personnel would trap any pipeline access corridor through beach mouse habitat for five days prior to pipeline placement and removal.

5.2.5 ESSENTIAL FISH HABITAT (EFH)

Pursuant to the 1999 Finding between USACE and NMFS, USACE's Notice of Availability of the draft EA initiated USACE's consultation under the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA). Section 2.3.4 describes the Existing Conditions of the EFH in the project area, as well as the individual and cumulative impacts of the No Action Alternative. This Section describes the individual and cumulative impacts of the Recommended Plan and other reasonable alternatives. This NEPA document satisfies the coordination requirement for EFH under the MSFCMA (also see Section 6.13).

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Placement of dredged material on the beach could directly and indirectly impact approximately 15,500 feet of ocean high salinity surf zone. Long-term adverse impacts (i.e. suppression of re-colonization of the infaunal community) are not anticipated if nourishment events are spaced more than five years apart. In addition, material placed will be beach-quality sediment similar in composition to the existing beach sediments. Beach placement is anticipated to take three to four months, and migrating larvae and/or juvenile fish could be subject to project-related elevated turbidity and suspended sediment levels during that time period. In their comments dated April 4, 2016, NMFS provided the following conservation recommendations: 1) best management practices restricting the time of year for dredging to reduce impacts to EFH and vulnerable life stages of federally managed fishery species, and (2) development of a scientifically supported rationale and monitoring program to assess impacts of beach disposal (nourishment) to benthic shoreline communities. USACE responded to NMFS' comments on December 28, 2016 (see Appendix G-3). The first recommendation to time dredging for the fall and winter months, when taken in combination with recommendations to avoid impacts to sea turtle nesting, limits construction to only a few months during the spring. USACE will consider this window and the development of a monitoring program as funding and scheduling allow. The headland feature discussed in Section 2.3.4 is located over five miles north of the proposed location of sand placement in the

Recommended Plan (R102.5 to R117.5). Since the direction of longshore sediment transport in this region is north to south, any potential rock outcrops located north of sand placement are unlikely to experience coverage by placed sand as it equilibrates.

5.2.6 COASTAL BARRIER RESOURCES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The Federal government will not cost-share in the sand placement within Unit P04A (Usinas Beach). The proposed project does not include the construction of structures that would require Federal Flood Insurance. Although sand will be removed from Unit P05, the project will not result in effects that are contrary to the purposes of CBRA. Therefore, the Recommended Plan will not affect the Units P04A or P05 (Conch Island) with respect to the goals of CBRA. The USFWS found the project to be consistent with the purposes of CBRA in a letter dated October 25, 2016. Please see also Section 2.3.5 and Section 6.15.

5.2.7 WATER QUALITY

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The primary anticipated change in water quality at the beach placement site would be a temporary increase in turbidity. According to the State of Florida's Class III water quality standards, turbidity levels during placement of dredged material are not to exceed 29 nephelometric turbidity units (NTUs) above background levels at the edge of normally a 150-meter mixing zone, which would be the standard for the dredge and beach placement areas. Portions of the placement area are in close proximity to the Guana River Marsh Aquatic Preserve (approximately 0.5 miles), and the St. Augustine Inlet system adjacent to the Anastasia State Recreation Area. As both of these areas are classified as Outstanding Florida Waters (OFWs), increased turbidity levels at the OFWs that are a result of the dredging and placement activities at the project site cannot exceed 0 NTUs above background levels unless a variance is obtained from FDEP. In order to comply with these standards, turbidity will be monitored according to state protocols during the proposed beach placement work. If at any time the turbidity standards are exceeded, the activities causing the violation would temporarily cease.

5.2.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

As mentioned in Section 2.3.7, there are no known sources of hazardous or toxic wastes in the project area, and USACE is not aware of any records indicating these activities occurred in the project area in the past. Therefore, USACE does not anticipate that dredging in any of the proposed sand source locations would encounter hazardous, toxic, or radioactive wastes. USACE includes in all project specifications the procedures and protective measures to be taken should munitions be encountered during dredging operations.

5.2.9 AIR QUALITY

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The proposed action may result in small, localized, temporary increases in concentrations of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM). Emissions associated with the dredge plant would be the largest contribution to the inventory. Projected emissions from the dredge plant and other associated construction activities would not adversely impact air quality given the anticipated relatively low level of emissions and the likelihood for prevailing offshore winds. With the proposed action, the criteria pollutant levels should be well within the national ambient air quality standards. Short term impacts from dredge emissions and other construction equipment associated with the Recommended Plan would not significantly impact air quality. No air quality permits would be required.

Since the placement area and the preferred sand source (the inlet system sand sources) are located in an attainment area, there is no requirement to prepare a conformity determination pursuant to the General Conformity Regulations (58 FR 63214). The criteria pollutants, including ozone, are estimated herein for planning purposes only. The offshore sand sources are located in Federal Outer Continental Shelf waters where the attainment status is unclassified. There is no provision for any classification in the Clean Air Act for waters outside of the boundaries of state waters.

The Council on Environmental Quality (CEQ) issued final guidance in August 2016 on Greenhouse Gases and Climate Change, specifically related to their impacts in reviews conducted under the National Environmental Policy Act (available online athttps://ceq.doe.gov/guidance/ceq_guidance_nepa-ghg-climate_final_guidance.html). The analysis in this section is provided pursuant to this guidance. To ensure that the analysis conducted in this section is as conservative as possible, the emissions from the project are compared to the *de minimus* standard set by U.S. Environmental Protection Agency (EPA) for air quality in St. Johns County. Comparing the project emissions to the *de minimus* is the simplest method and is the best first look at effects of emissions. The *de minimis* standards are located at http://epa.gov/airquality/genconform/deminimis.html.

Direct emissions from the Recommended Plan involving dredging of the inlet system sand sources and placement of sand for the period of Federal participation would be confined to exhaust emissions of dredging, transport, and construction equipment. Criteria air pollutant emissions were estimated for the Recommended Plan using estimates of power requirements, duration of operations, and emission factors for the various equipment types. Multiplying horsepower rating, activity rating factor (percent of total power), and operating time yields the energy used. The energy used multiplied by an engine-specific emission factor yields the emission estimate. Operational data from the 2005 Duval County nourishment cycle and the Wilmington District's Brunswick County shore protection project were used to estimate power requirements and duration of the proposed hopper dredging activity. Additionally, the Lake Worth Inlet Feasibility Study air quality analysis was used to prepare the estimate of using a cutterhead dredge.

The following types of equipment were included in the analysis:

- Hopper Dredge
- Cutterhead Dredge
- Tow Vessel
- Spreader/ Grater (Bulldozer)
- Spreader/ Grater (Front-end loader)
- Booster Pump
- Crew/ Survey Vessel
- Crane Barge/Hauler
- Tug Boats (2)

The horsepower of each piece of equipment, the hours each piece of equipment would be used each day, and the fuel consumed by that piece of equipment over a 24-hour period were determined. Additional information such as the anticipated contract duration and actual working days of each component was also determined.

Certain assumptions were made for each piece of dredging, construction, and support equipment regarding the number of hours a day that equipment would be used. These factors were utilized in the overall emissions calculations.

- Dredging vessels were assumed to be operating 24-hours a day, which does not account for downtime due to maintenance, refueling and repositioning.
- For sand placement operations using a hopper dredge, the beach-based equipment used to spread the sand and arrange the pipeline, and the booster itself were assumed to be operating approximately 5 hours a day.
- The crew boat/survey vessel was assumed to operate up to 5 hours a day.
- The two tug boats and crane barge would be used to mobilize and de-mobilize the pipeline into the selected corridor, and it is expected that the work will occur for 12 hours a day for up to 14 days.
- As actual contractor equipment is unavailable (a contract has not been awarded and USACE generally does not dictate the type of equipment a contractor may use), where a range of input values into the assessment was available, the value which would result in a "worst-case" analysis was chosen.

The daily values for each equipment type were then applied to each component of the Recommended Plan. The emissions values for the components were summed to compare against the EPA National Emissions Inventory for St. Johns County to determine the impact to air quality.

Table 5-1. Equipment Horsepower, Estimated Daily Working Hours and Resultant Fuel Consumption.

Equipment Type	Horse Power	Hours worked per day	Fuel Consumption/day (gals)
Hopper Dredge (1)	6,500	24	7,030
Cutterhead Dredge (1)	1,256	24	1,546^
Tow Vessel (1)	400^	24	321.6^
Spreader/ Grater (Bulldozer) (2)	250	5	46.8^
Spreader/ Grater (Front-end loader) (1)	250	5	23.4^
Booster Pump (1)	13,000	5	144^
Crew/ Survey Vessel (1)	100	5	200
Crane Barge/hauler (1)	175	12	31^
Tug Boats (2)	400^	12	321.6^
Equipment Type	**Horse Power**	**Hours worked per day**	**Fuel Consumption/day (gals)**
Hopper Dredge	6,500	24	7,030
Cutterhead Dredge	1,256	24	1,546^
Tow Vessel	400^	24	321.6^
Spreader/ Grater (Bulldozer) (2)	250	5	46.8^
Spreader/ Grater (Front-end loader)	250	5	23.4^
Booster Pump	13,000	5	144^
Crew/ Survey Vessel	100	5	200
Crane Barge/hauler	175	12	31^
Tug Boats (2)	400^	12	321.6^

^ Anderson, 2008

Table 5-2. Duration of Each Event.

Year	Event	Construction Duration (Days)
2020	Initial Construction	98
2032	Beach Renourishment (1)	77
2044	Beach Renourishment (2)	77
2056	Beach Renourishment (3)	77
2068	Beach Renourishment (4)	77

All dredging, turning, steaming, and pumpout were assumed to occur in state waters. Emission factors for the diesel engines on the dredges, barge, tugboats were obtained from EPA's *Compilation of Air Pollutant Emissions Factors, AP-42, Volume 1* (2002). Emission factors for tiered equipment used in beach construction were derived from NONROAD Model (5a) estimates. Total component emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and

particulate matter (PM) are presented broken out on a per year basis for comparison with the per year *de minimus* standards.

Table 5-3. National De Minimus Annual Tons for an Area in Attainment Maintenance.

	CO	NOx	$PM_{2.5}$	PM_{10}	SOx	VOC
de minimus Annual Tons	100	100	100	100	100	100

Table 5-4. Emissions Totals (Tons/Year).

Construction Year	Duration (Months)	CO	NOx	$PM_{2.5}$	PM_{10}	SOx	VOC
2020	3.21	22.50	145.83	3.33	3.33	25.00	2.50
2032	2.52	17.66	114.48	2.61	2.61	19.63	1.96
2044	2.52	17.66	114.48	2.61	2.61	19.63	1.96
2056	2.52	17.66	114.48	2.61	2.61	19.63	1.96
2068	2.52	17.66	114.48	2.61	2.61	19.63	1.96

To date, EPA has not established CO^2 emission standards for temporary mobile emission sources, nor for equipment used in construction projects (e.g., dump trucks, cranes, and front end loaders). However, USACE calculated CO^2 emissions for each year of the project, which are reported below.

Table 5-5. CO2 Emissions (Lbs/Year).

Construction Year	Emissions of Carbon Dioxide using a Hopper Dredge (Lbs/Year)	Emissions of Carbon Dioxide using a Cutterhead (Lbs/Year)
2020	15,587,880	5,058,214
2032	12,247,620	3,974,311
2044	12,247,620	3,974,311
2056	12,247,620	3,974,311
2068	12,247,620	3,974,311

One opportunity to decrease emissions would be to construct this project at the same time as other projects in this region, including maintenance of the IWW, maintenance of the St. Augustine Inlet, and renourishment of St. Augustine Beach. Not only would combining these projects result in cost savings, but it would reduce greenhouse gas emissions by requiring the dredge and associated equipment to mobilize only once to the project site.

5.2.10 NOISE

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Dredging noise can affect marine mammals, sea turtles, and fishes. Possible effects of dredging noise can vary depending on a variety of internal and external factors, and can be divided into masking (obscuring sounds of interest by the production of interfering sounds, generally at similar frequencies), response, discomfort, hearing loss, and injury (MALSF, 2009). Deeper water operations may propagate sound over greater distances than those in confined nearshore areas (Hildebrandt, 2004).

Dredging to extract sand produces broadband and continuous sound, mainly at lower frequencies. The little available data indicates that dredging is not as noisy as seismic surveys, pile driving, and sonar; however, it is louder than most shipping, operating, offshore wind turbines, and drilling (MALSF, 2009). Noise associated with dredging activities can be placed into five categories:

1. **Collection noise** – The noise generated from the collection of material from the sea-floor; for example, the scraping of the buckets on a bucket ladder dredge or the operation of the drag head. This noise is dependent on the structure of the sea floor and the type of dredge used.
2. **Pump noise** – The noise from the pump driving the suction through the pipe.
3. **Transport noise** – The noise of the material being lifted from the sea floor to the dredge and pumped through a pipeline to the beach. For trailing suction hopper and cutter suction dredges, this would be the noise of the material as it passes up the suction pipe. For clamshell dredges, it would be the sound of the crane dropping/lifting the bucket.
4. **Deposition noise** – This noise is associated with the placement of the material within the barge or hopper.
5. **Ship/machinery noise** – The noise associated with the dredging ship itself. For stationary dredges, the primary source will be the onboard machinery. Mobile dredges will also have propeller and thruster noise (MALSF, 2009).

Field investigations have been undertaken to characterize underwater sounds typical of bucket, hydraulic cutterhead, and hopper dredging operations (Dickerson et al., 2001). Preliminary findings indicate that cutterhead dredging operations are relatively quiet as compared to other dredging operations in aquatic environments. Bucket dredges create a more complex spectrum of sounds, very different than either cutterhead or hopper dredges. Hopper dredges produce somewhat more intense sounds similar to those generated by vessels of comparable size. Hopper dredge noises consist of a combination of sounds emitted from two relatively continuous sources: engine and propeller noise similar to that of large commercial vessels, and sounds of dragheads moving in contact with the substrate.

Reported source levels for dredging operations range from 160 to 180 dB re 1 uPa @ 1 m for 1/3 octave bands with peak intensity between 50 and 500 Hz (Greene and Moore, 1995). The intensity, periodicity, and spectra of emitted sounds differ greatly among dredge types. Components of underwater sounds produced by each type are influenced by a host of factors including substrate type, geomorphology of the

waterway, site-specific hydrodynamic conditions, equipment maintenance status, and skill of the dredge plant operator (Dickerson et al., 2001).

Noise generated by the dredge may minimally impact those living on the beaches during project construction, but will likely not be too noticeable over ambient noise of wind and waves. Noise generated on the beaches by equipment placing the dredged material will be relatively low level, and will be of a short duration (construction period of approximately three to four months). Construction equipment such as booster pumps will be properly maintained to minimize effects of noise. Once dredging and beach placement have concluded, noise levels will drop back to background levels for the beach area. Since the increases to the current level of noise as a result of this project will be localized and minor, there will only be a temporary reduction in aesthetics and no expectation of adverse effects to the environment as a result of construction-related noise.

5.2.11 AESTHETIC RESOURCES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The aesthetics of the beach placement area would be temporarily adversely impacted during construction due to the presence of construction equipment on the beach. In the longer term, the beach aesthetics will be improved over the previously eroded shoreline with the construction of a more natural beach. Aesthetics of the sand source locations would also experience temporary adverse impacts due to the presence of dredge equipment during construction.

5.2.12 RECREATION RESOURCES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Recreational use of the beach, including sunbathing and surfing, would be temporarily disrupted for up to several months during construction due to the presence of construction equipment on the beach. In addition, recreational use of the inlet system and the offshore sand sources (e.g., boating, kayaking, and windsurfing) would be temporarily adversely affected by the dredging operations.

Recreational usage in the future with-project condition would be improved over the long-term due to the availability of a wider beach face.

5.2.13 NAVIGATION

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Temporary impacts to vessel traffic could occur due to the presence of dredge equipment in St. Augustine Inlet during construction. If the inlet system is used as a sand source, the shoaling rate is not anticipated to increase in the inlet. However, an offshore sand source may cause additional shoaling in the inlet system due to the material added to the sediment budget in the region.

5.2.14 CULTURAL RESOURCES AND HISTORIC PROPERTIES

As discussed in the Section 2: Existing Conditions and Future Without-Project Conditions portion of this document, substantial cultural resources work and investigations have been conducted throughout various portions of the project area. Consultation is ongoing with the Florida State Historic Preservation Officer (SHPO) and appropriate federally-recognized tribes. Prior to project implementation, consultation and any required resources surveys will be finalized in accordance with Section 106 of the National Historic Preservation Act for all proposed alternatives.

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

The Recommended Plan would see shoreline impacts occurring between FDEP R Monuments R102.5 and R117.5. USACE surveyed this shoreline area for cultural resources in 2010 and did not identify any archaeological sites. As discussed in Section 2, this area includes the Chainplate Site (SJ5442) documented in 2007 which was composed of isolated shipwreck components washed onto the shoreline from a storm event. Identified materials were removed for conservation by St. Augustine Lighthouse Archaeological Maritime Program (LAMP) archaeologists at that time. Another site documented in the project area that was an isolated find recovered from the beach after a storm event is site 8SJ4988 the Vilano Beach Rudder Site. The 12-foot long, wooden rudder was recovered in 2005 by the St. Johns County archaeologist and was recorded as probably belonging to a late nineteenth-century, wooden sailing vessel. The rudder was the only component identified on the beach in this location. Further monitoring after storm events was recommended for both site locations. However, no materials were identified in either area during the USACE 2010 shoreline survey and none have been reported to LAMP or to the St. Johns County Archaeologist since the artifacts were recovered in 2005 and 2007 suggesting that the sources of these isolated artifacts lie submerged offshore. No further resources were identified in the renourishment area that would be affected by this recommended plan.

The proposed sand source for the selected plan would involve the use of the ebb, flood, and Vilano Point shoals around the St. Augustine Inlet. These areas have been surveyed intensively for cultural resources by USACE and known resources have been identified within these areas. During consultation with the Florida SHPO, USACE agreed to maintain all buffers established for these resources. Site 8SJ4889, the *Dixie Crystal*, is a historic shipwreck identified within the flood shoal and may be potentially eligible for inclusion in the National Register of Historic Places. A 150-foot buffer was agreed upon during consultation with the Florida SHPO for dredging projects working near it to protect the resource. In addition, four targets were identified within the St. Augustine Inlet (targets SA-T-5, SA-OS-2, SA-OS-3, and SA-OS-4) that have a high potential for being significant resources, and each has a requirement for a 200-foot buffer around them for all dredging and maintenance activities. Within the northern ebb shoal area lies site 8SJ4784 the North Shoals Vessel, a historic shrimp boat which sank trying to navigate the St. Augustine entrance channel. There is currently insufficient information to determine its eligibility for inclusion in the NRHP; however USACE will protect the site through the use of buffers that will be determined through consultation. Currently, USACE is completing a cultural resource survey of previously un-surveyed portions of the shoal complex. Consultation for this survey is ongoing with the Florida SHPO and

appropriate federally-recognized tribes. The consultation will be updated prior to project implementation. When finalized, 100% of the shoal complex will have been subject to cultural resource surveys. USACE does not expect any effects to historic properties contingent on use of buffers within the sand source areas for identified resources and targets. Consultation under Section 106 of the National Historic Preservation Act is ongoing and will be completed prior to project implementation. The project will maintain a fortuitous find policy that will halt use of an area should any resources be identified during maintenance dredging.

5.2.15 NATIVE AMERICANS

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

As part of the development of this project, consultation is ongoing between USACE and the two federally-recognized tribes within the immediate area of potential effect. As discussed in Chapter 3, there are no known Native American properties within the project area and the project should not have any effects to Native Americans. However, consultation with both federally-recognized tribes within the region is ongoing and will be updated upon further consultation on this project. Archaeological sites near the project area are discussed in the Cultural Resources section of this report. Once consultation is complete, additional updates may be needed.

5.2.16 NATURAL OR DEPLETABLE RESOURCES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Sand is a natural and depletable resource. However, the use of the material from the navigation channel serves two purposes: shoreline protection and enhanced navigation. As discussed in Section 4.1, the use of the inlet system would implement a Regional Sediment Management strategy where the material from the navigation project is beneficially used to nourish the adjacent beaches.

5.2.17 CUMULATIVE IMPACTS

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Cumulative impacts are defined in 40 CFR 1508.7 as those effects that result 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Material from the inlet system is currently used for the St. Augustine Beach CSRM project, which is expected to continue into the future. No other future beach nourishment, either public or private, are anticipated to occur in this region. Without a Federal beach nourishment project, it is expected that private property owners would begin armoring their properties individually with hard structures such as seawalls and revetments.

Table 5-6 summarizes the impact of cumulative impacts resulting from actions identified to occur in the past, present, and reasonably foreseeable future. Summaries of the impacts to sand resources, protected species, and water quality, are provided to discuss how they would be directly or indirectly impacted by the proposed action and its alternatives. The table also illustrates the with-project and the FWOP condition (the difference being the incremental impact of the project). Please also see Section 2.2.14 for additional information about the effects of other Federal projects in the project area.

Table 5-6. Cumulative Impacts.

	Past (cumulative impacts due to Past Actions)	Present (cumulative impacts due to Present Actions)	Future without-project (cumulative impacts anticipated)	Future with Proposed Action (cumulative impacts anticipated)
Sand Resources	St. Augustine Inlet was created in the mid-1900s, and maintenance dredging of the Inlet and the IWW has occurred since that time. Material has been removed from the St. Augustine Inlet system has been used for the Federal shore protection project at St. Augustine Beach since the 1990s	offshore sand resources are not within an economic distance of the study site for use; shoal sediments at St. Augustine Inlet are abundant as sediment accumulates from alongshore transport	Material from navigational channels will continue to be periodically dredged, and the material will be placed on downdrift beaches; seawalls may be required to protect upland structures in the project area; future beach placement constructed by local entities would likely also use the shoal system, as offshore resources are not economically feasible	Sediments eroding from north of St. Augustine Inlet will be deposited into the inlet system; approximately 1/3 of the sediment in the system will be dredged and placed north of the Inlet
Protected Species	more abundant and widespread prior to development	erosion causing continued decline in habitat	Increased erosion in the future without-project condition will cause beach habitat to continue to shrink	individuals may be affected by dredging and placement activities; coastal habitat is sustained for life of project
Water Quality	Pristine prior to development; increasing recreational usage, and the development of the City of St. Augustine may have caused some decline in water quality	some degradation due to anthropogenic actions such as navigation through the inlet	no change to present condition; no known projects in the vicinity that may occur in the future and cause a decline in water quality	temporary increases in local turbidity due to construction; no long-term change

5.2.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

5.2.18.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. The use of sand from the proposed sand sources would temporarily deplete the suitable sand reserves in the short term, but they are expected to reestablish following dredging as outlined in the FDEP "Final Order Adopting St. Augustine Inlet Management Implementation Plan."

5.2.18.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to mandate the resource for another purpose, opportunities to use or enjoy the resources as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. As littoral drift restores the sand volumes in the inlet system over time, the dredging alternatives would not result in an irretrievable commitment of resources.

5.2.19 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

FUTURE WITH-PROJECT (RECOMMENDED PLAN)

Species of relatively non-motile infaunal invertebrates that inhabit the dredge areas will unavoidably be lost during dredging. Species of motile epifaunal invertebrates inhabit the inlet system. Motile organisms such as fish and crabs should be able to escape the area during construction. Many of those species that are not able to escape the construction area are expected to recolonize after project completion from adjacent similar habitat.

CHAPTER 6

ENVIRONMENTAL COMPLIANCE

6 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS*

This chapter discusses the status of coordination and compliance of the Recommended Plan with environmental requirements. Additionally, the Recommended Plan's applicability to the USACE environmental operating principles is addressed.

6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA)

This report documents the effects of this project and serves as the Environmental Assessment (EA). It was made available for public review and comment for a 45-day period from February 17 through April 4, 2016. The public coordination and environmental assessment complies with the intent of the National Environmental Policy Act (NEPA). The project is in compliance with the National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, *et seq*. P.L. 91-190.

6.1.1 SCOPING AND ISSUES

An initial scoping period for the project was conducted from August 17, 2005 through September 17, 2005. The National Oceanic and Atmospheric Administration (NOAA) responded to the scoping letter with concerns about the essential fish habitat (EFH) in the nearshore waters of the study area and requested that an EFH assessment be prepared as part of the study. This assessment is included in Sections 2.3.4 and 5.2.5 of this report. The Florida Department of Environmental Protection (FDEP) coordinated a review of the scoping letter and proposed project with the appropriate state agencies. Their comments were incorporated into the drafting of this report. The scoping letter also drew a response from one concerned citizen who owned property in the area.

As the study progressed, USACE anticipated that an Environmental Impact Statement (EIS) would be required. A second scoping period was held from September 16, 2008 to October 16, 2008. Responses were received from the Environmental Protection Agency (EPA), the Florida Department of State's Division of Historical Resources, the Seminole Nation of Oklahoma, and several landowners in the study area. A notice of intent to draft an EIS was published in the Federal Register on April 5, 2010.

Subsequently, it became evident that no significant impacts to the human or natural environments were anticipated. USACE decided to initially prepare an EA, rather than continue with the previous plans to draft an EIS. The draft EA and draft Finding of No Significant Impact (FONSI) was made available to the public for a 45-day public comment period from February 17, 2016 to April 4, 2016.

All correspondence associated with the NEPA scoping process is included in Appendix G-3, NEPA Correspondence.

6.1.2 AGENCY COORDINATION AND COOPERATING AGENCIES

This proposed project has been coordinated with the following agencies: U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (EPA), Florida State Clearinghouse, Florida State Historic Preservation Officer (SHPO), and the Florida Department of Environmental Protection (FDEP). The FDEP, Bureau of Beaches and Coastal Systems, NMFS Habitat Conservation Division, and the Bureau of Ocean and Energy Management (BOEM) have all accepted USACE's invitations to participate as cooperating agencies in this study. These agencies were involved in the study during the plan formulation process to ensure that the Recommended Plan was consistent with their policies. BOEM's role in the study was limited following the selection of the Recommended Plan, which did not involve Outer Continental Shelf (OCS) resources. Correspondence with all Federal and state agencies is included in Appendix G-3.

6.1.3 LIST OF RECIPIENTS

A Notice of the Availability of the Draft EA and Draft FONSI was mailed to those listed in Appendix G-4, NEPA Mailing List on February 17, 2016. The document was also made available on USACE's website at http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#St_Johns.

6.1.4 COMMENTS RECEIVED AND RESPONSE

Comments received as a result of the public review of the draft EA are included in Appendix G, and are addressed in this document as appropriate.

6.2 ENDANGERED SPECIES ACT OF 1973

This project falls under the scope of the November 25, 1991 South Atlantic Regional Biological Opinion (SARBO; as amended in 1995 and 1997) for federally-listed marine species. USACE reinitiated consultation with NOAA Fisheries under the SARBO, which is ongoing. NOAA Fisheries provided guidance that projects found to be consistent with the SARBO as reinitiated for loggerhead critical habitat should not consult separately while consultation is ongoing for the programmatic opinion (R. Sweeney, email correspondence dated November 18, 2015). Therefore, no additional coordination is required with NOAA Fisheries for these species.

USACE has determined that the sand placement activities associated with this project fall within the scope of the USFWS SPBO (2011), as amended in 2015, and the P^3BO (2013). The USFWS provided their comments on the project and their concurrence that the SPBO was appropriate to apply to the project in a letter dated December 22, 2016. The project is in compliance with the Endangered Species Act.

This project is in compliance with the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, *et seq.* P.L. 93-205.

6.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

Coordination with USFWS under the Fish & Wildlife Coordination Act of 1958 was conducted concurrently with the USFWS review of the project under the Endangered Species Act, and was initiated in a letter dated May 20, 2016. USFWS provided their comments and determination in a letter dated December 22, 2016. This project is in full compliance with the act.

6.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (*INTER ALIA*)

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR Part 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL93-29), Archeological Resources Protection Act (Public Law 96-95), American Indian Religious Freedom Act (Public Law 95-341), Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Consultation with the Florida SHPO, appropriate federally-recognized tribes, and other interested parties has been initiated and is ongoing. No construction work will begin prior to completion of consultation. The Proposed Action will be in compliance with the goals of this act upon completion of coordination as stated above.

6.5 CLEAN WATER ACT OF 1972

A Section 401 water quality certification application will be submitted to FDEP, and USACE will obtain this certification prior to construction. All state water quality requirements would be met, and the USACE will ensure that turbidity standards in OFWs adjacent to the project area are met. A Section 404(b) evaluation is included in this report as Appendix G-1. The project is in compliance with this act.

6.6 CLEAN AIR ACT OF 1972

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

6.7 COASTAL ZONE MANAGEMENT ACT OF 1972

The Florida State Clearinghouse coordinated a review of the project in response to USACE's scoping letter dated August 17, 2005. Based on the information contained in the scoping notice and comments provided by their reviewing agencies, the state had no objections to the proposed activities. However, the state provided several comments in their letter dated October 14, 2005. FDEP staff noted that the project would require state water quality certification in the form of a Joint Coastal Permit. They did not object to investigating the offshore borrow areas, but expressed concern about the use of the ebb shoal. They suggested that further investigation of the nearshore area adjacent to Vilano Beach be conducted for the presence of hardbottom communities. Finally, they discouraged the use of structural alternatives. Please see Appendix G-3 for the FDEP comments, which will be addressed primarily during the FDEP permit process.

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix G-2. USACE has determined that the project is consistent with the Florida Coastal Management Plan (FCMP) concerning acquisition of Water Quality Certifications and other state authorizations. The Draft EA and Section 404 (b)(1) Evaluation have been submitted to the state in lieu of a summary of environmental impacts to show consistency with the FCMP.

The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process, in accordance with the 2006 Interagency Coordination Agreement. USACE has no indication that FDEP will not concur with our determination. At this time, this project is in compliance with this act.

6.8 FARMLAND PROTECTION POLICY ACT OF 1981

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

6.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This project is in compliance with this act.

6.10 MARINE MAMMAL PROTECTION ACT OF 1972

USACE does not anticipate the take of any marine mammal during any activities associated with the project. Should a hopper dredge be utilized, a trained, government-certified sea turtle and marine mammal observer will be stationed on the dredge during all water-related construction activities. Appropriate actions will be taken to avoid adverse effects to listed and protected marine mammal species during project construction. Therefore, this project is in compliance with this act.

6.11 ESTUARY PROTECTION ACT OF 1968

In the Estuary Protection Act of 1968, Congress declared that "many estuaries in the United States are rich in a variety of natural, commercial, and other resources, including environmental natural beauty, and are of immediate and potential value to the present and future generations of Americans." This act is intended to protect, conserve, and restore estuaries in balance with developing them to further the growth and development of the Nation. There are no estuaries of national significance located in the study area; therefore, this project is consistent with the purposes of this act.

6.12 FEDERAL WATER PROJECT RECREATION ACT

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

6.13 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

Pursuant to the 1999 Finding between USACE and NMFS, USACE's Notice of Availability of the draft EA initiated USACE's consultation under the MSFCMA. NMFS provided initial comments on September 13, 2005, in response to USACE's request for scoping comments (August 17, 2005). NMFS requested that any NEPA document associated with the project include an EFH assessment, and noted the importance of the nearshore waters in the study area as foraging habitat for federally managed fishery resources. NMFS provided comments on the draft EA on April 4, 2016, and USACE responded to their recommendations on December 28, 2016 (see Appendix G-3). The project is in compliance with the act.

6.14 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The project is being coordinated with the state, and is in compliance with the act.

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

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

Federal monies can be spent within the CBRS units for certain activities, including, but not limited to, (1) projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats; (2) establishment and operation and maintenance of navigation aids; (3) projects funded under the Land and Water Conservation Fund Act of 1965; (4) scientific research; (5) assistance for emergency actions essential to saving lives and the protection of property and the public health and safety, if preferred pursuant to the Disaster Relief Emergency Assistance Act and the National Flood Insurance Act and are necessary to alleviate the emergency; (6) maintenance, repair, or reconstruction, but not expansion, of publically owned or publically operated roads, structures, or facilities; (7) non-structural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system; (8) any use or facility necessary for the exploration, extraction, or transportation of energy resources; (9) maintenance or construction of improvements of existing Federal navigation channels, including the disposal of dredge materials related to such projects; and (10) military activities essential to national security.

USACE coordinated with USFWS concerning the CBRS units in the project area to confirm that the project is in compliance with the act on May 20, 2016. This consultation focused on the beach placement area, and the USFWS provided confirmation that beach placement pursuant to the Recommended Plan was consistent with the purposes of the CBRA. The USACE consulted further with the USFWS on October 12, 2016, specifically to address the use of the St. Augustine Inlet system as a sand source for the project. The USFWS provided confirmation in a letter dated October 25, 2016, that the removal of sediment from CBRS Unit P05 (Conch Island Unit) for placement pursuant to the Recommended Plan was consistent with the purposes of CBRA. This project is in compliance with this act.

6.16 RIVERS AND HARBORS ACT OF 1899

The proposed work would temporarily obstruct navigable waters of the United States. The proposed action will be subject to the public notice, public hearing, and other evaluations normally conducted for activities subject to the act. The project is in compliance with this act.

6.17 ANADROMOUS FISH CONSERVATION ACT

This act authorizes the Secretaries of the Interior and Commerce to enter into cooperative agreements with the States and other non-federal interests for conservation, development, and enhancement of anadromous fish and to contribute up to 50% as the Federal share of the cost of carrying out such agreements. As this project is not receiving funding for these purposes, this act does not apply.

6.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

Migratory birds would be minimally affected by dredging at the proposed sand source locations. The USACE will include our standard migratory bird protection requirements in the project plans and

specifications and will require the contractor to abide by those requirements. Renourishment activities at the beach placement site will be monitored at dawn or dusk daily during the nesting season to protect nesting migratory birds. If nesting activities occur within the construction area, appropriate buffers will be placed around nests to ensure their protection. The project is in compliance with these acts.

6.19 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT (OCEAN DUMPING ACT)

The term "dumping" as defined in the act (33 U.S.C. 1402) does not apply to the disposal of material for beach nourishment or to the placement of material for a purpose other than 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 (see Appendix A).

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

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

While one of the alternatives considered during plan formulation included the acquisition of real property, this is not part of the Recommended Plan. Therefore, this project does not involve any real property acquisition or displacement of property owners or tenants. Therefore, this act is not relevant to this project.

6.21 EXECUTIVE ORDER (EO) 11990, PROTECTION OF WETLANDS

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

6.22 E.O 11988, FLOOD PLAIN MANAGEMENT

To comply with EO 11988, the policy of USACE is to formulate projects that, to the extent possible, avoid or minimize adverse effects associated with the use of the floodplain and avoid inducing development in the floodplain unless there is no practicable alternative. No activities associated with this project are located within a floodplain, which is defined by EO 11988 as an "area which has a one percent or greater chance of flooding in any given year." The project is located within the Coastal High Hazard Area (CHHA), as defined by EO 11988 as an "area subject to inundation by one-percent-annual chance of flood, extending from offshore to the inland limit of a primary frontal dune along an open coast and any other

area subject to high velocity wave action from storms." The project shoreline is significantly developed, and further development is anticipated to be minimal.

CSRM projects are inherently located in coastal areas, and are often located in CHHAs based on the problems the project is seeking to alleviate. The primary objective of the St. Johns County CSRM Project is to reduce infrastructure damage. There is no practicable alternative that could be located outside of the CHHA that would achieve this objective.

For the reasons stated above, the project is in compliance with EO 11988, Floodplain Management.

6.23 E.O. 12898, ENVIRONMENTAL JUSTICE

On February 11, 1994, the President of the United States issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* The Executive Order mandates that each federal agency make environmental justice part of the agency mission and to address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs and policies on minority and low-income populations.

Any potential adverse effects of the proposed action would be more likely to affect those of higher socioeconomic status, such as large watercraft owners or those living in the coastal area surrounding the project. The beneficial effect of a wider, more sustainable beach at South Ponte Vedra Beach and Vilano Beach would benefit all members of the public who are able to obtain transportation to access the beach. The storm damage reduction benefits are primarily benefitting the landowners in this area. There are no disproportionate adverse impacts to minority or low income populations resulting from the implementation of the project.

6.24 E.O. 13045, DISPARATE RISKS INVOLVING CHILDREN

On April 21, 1997, the President of the United States issued Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks.* The Executive Order mandates that each Federal agency make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

As the proposed action does not affect children disproportionately from other members of the population, the proposed action would not increase any environmental health or safety risks to children.

6.25 E.O. 13112, INVASIVE SPECIES

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

outweigh the risks associated with the very slight potential for introducing non-native species to this region. The action takes place primarily in Atlantic Ocean waters, minimizing risk to more sheltered coastal habitats.

6.26 ENVIRONMENTAL OPERATING PRINCIPLES

1. Foster sustainability as a way of life throughout the organization.

The Recommended Plan prioritizes the use of material from the inlet system that is already in the sediment system. This prevents the need from dredging offshore, previously undisturbed sediments.

2. Proactively consider environmental consequences of all USACE activities and act accordingly.

The integration of the EA into the feasibility study requires all members of the Project Delivery Team to acknowledge the impact that the proposed project will have on the environment. This helps to ensure the project is designed with the environment in mind.

3. Create mutually supporting economic and environmentally sustainable solutions.

The use of the inlet system in the Recommended Plan incorporates RSM strategies, which inherently incorporate outcomes that are economically and environmentally preferable.

4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.

This document includes all information necessary to document how the project meets USACE's corporate responsibility and accountability requirements for actions that may impact human and natural environments.

5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.

The project biologist is involved throughout the study process to ensure that environmental considerations are taken into account for the life of the project.

6. Leverage scientific, economic and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.

The entire Project Delivery Team understands the need to consider the environment during its decision-making process.

7. Employ an open, transparent process that respects views of individuals and groups interested in USACE activites.

The actions taken to involve the public, resource agencies, and NGOs who may be interested in the project are outlined in Section 6.1.

CHAPTER 7
Recommendation

7 RECOMMENDATION

I have given consideration to all significant aspects in the overall public interest including engineering feasibility, economic, social, cost and risk analysis, and environmental effects. The Recommended Plan described in this final report provides the optimum solution for coastal storm risk management benefits within the study area that can be developed with the framework of the formulation concepts. Implementation of the St. Johns County, Florida Coastal Storm Risk Management (CSRM) Project is recommended at this time, with such modification as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers (HQUSACE), may be advisable.

The Recommended Plan, shown in Figure 7-1, is the National Economic Development (NED) Plan including beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60-foot equilibrated berm extension from the +8.0 foot 1988 North Atlantic Vertical Datum (NAVD88) contour between the R monuments R103.5 and R116.5 along 2.6 miles of shoreline. The project template will include a dune feature varying in height between +14.0 to +20.0 feet NAVD88, reflecting the average 2015 dune position. Tapers of a maximum length of one thousand feet will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline.

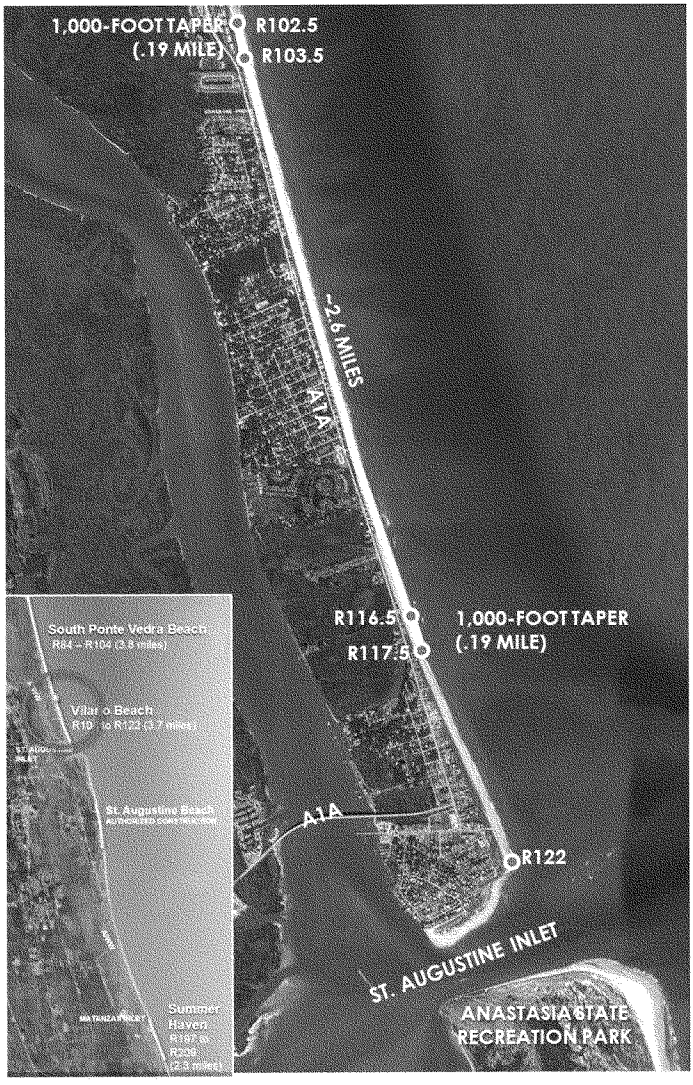


Figure 7-1. Recommended Plan.

The Recommended Plan will reduce coastal risk and damage to infrastructure as well as a critical hurricane evacuation route for the area, SR A1A. The Project First Costs are $78,417,000 (FY17 price levels) over 50 years. Initial construction will be cost shared at 23% Federal and 77% non-federal. Periodic nourishments will be cost shared at 17.7% Federal and 82.3% non-federal. The average annual net benefits for the Recommended Plan are $622,000 and benefit cost ratio (BCR) is 1.3 to 1.

In addition to the NED benefits associated with reducing damages to infrastructure, the Recommended Plan will also have non-monetary benefits for environmental quality and other social effects. Construction of the identified Recommended Plan will use the St. Augustine Inlet system as a sand source. Use of this source will provide considerable value to the nation since a Federal navigation channel is within the system and an ongoing Federal CSRM project is located south of the inlet. One construction event could effectively accomplish all three Federal projects with one dredge mobilization, saving considerable funds over the 50-year period of Federal participation in the Recommended Plan, as well as avoid environmental impact risks related to multiple dredging events.

Initial construction will require approximately 1,310,000 cubic yards of sand, and each periodic nourishment event will require approximately 866,000 cubic yards from the inlet system. The renourishment interval is expected to be approximately 12 years, equaling three renourishment events in addition to initial construction over the 50-year period of Federal participation.

7.1 ITEMS OF LOCAL COOPERATION

Recommendations for provision of Federal participation in the Recommended Plan described in this report would require the project sponsor to enter into a written Project Partnership Agreement (PPA), as required by Section 221 of Public Law 91-611, as amended, to provide local cooperation satisfactory to the Secretary of the Army. Such local cooperation shall include:

a. Per WRDA 1986, as amended, provide 35% of initial project costs assigned to hurricane and storm damage reduction, plus 100% of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and as further specified below:

   1) Enter into an agreement that provides, prior to construction, 35% of design costs;
   2) Provide all lands, easements, and rights-of-way, and perform or ensure the performance of any relocations determined by the Federal Government to be necessary for the initial construction, periodic nourishment, and operation and maintenance of the project;
   3) Provide, during construction, any additional amounts as are necessary to make their total contribution equal to 35% of initial project costs assigned to hurricane and storm damage reduction, plus 100% of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50% of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100% of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. For so long as the project remains authorized, operate, maintain, and repair the completed project, or functional portion of the project, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations, and any specific directions prescribed by the Federal Government;

c. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspecting, operating, maintaining, repairing, replacing, rehabilitating, or completing the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall relieve the non-federal sponsor of responsibility to meet the non-federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;

d. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, mitigation, operation, maintenance, repair, replacement, and rehabilitation of the project and any project related betterments, except for damages due to the fault or negligence of the United States or its contractors;

e. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

f. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

g. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

h. Agree that the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

i. If applicable, comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100 17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the initial construction, periodic nourishment, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

j. Comply with all applicable Federal and state laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600 7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c *et seq.*);

k. Provide the non-federal share of that portion of the costs of data recovery activities associated with historic preservation that are in excess of 1% of the total amount authorized to be appropriated for the project in accordance with the cost sharing provisions of the agreement;

l. Participate in and comply with applicable Federal floodplain management and flood insurance programs;

m. Do not use Federal funds to meet the non-federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized;

n. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder future periodic nourishment and/or the operation and maintenance of the project;

o. Not less than once each year inform affected interests of the extent of protection afforded by the project;

p. Publicize floodplain information in the area concerned, provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain, and adopt such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

q. For so long as the project remains authorized, the non-federal sponsor shall ensure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based;

r. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms;

s. Recognize and support the requirements of Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof, until the non-federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

t. At least twice annually, and after storm events, perform surveillance of the beach to determine losses of nourishment material from the project design section and provide the results of such surveillance to the Federal government; and

u. Comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires the non-federal sponsor to participate in and comply with applicable Federal floodplain management and flood insurance programs, prepare a floodplain management plan within one year after the date of signing the project partnership agreement (PPA), and implement the plan no later than one year after project construction is complete.

7.2 DISCLAIMER

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to higher authority as proposals for project modification and/or implementation funding. The recommendations herein for provision of a coastal storm risk management project for St. Johns County, Florida do not include any provisions for work which would result in any new Federal expenditures or financial assistance prohibited by the Coastal Barrier Resources Act (Public Law 97-348); nor were funds obligated in past years for this project for purposes prohibited by this act.

7.3 CERTIFICATION OF PUBLIC ACCESSIBILITY

As part of the obligations established in the project partnership agreement (PPA) for the St. Johns County, Florida, Coastal Storm Risk Management (CSRM) Project, the non-federal sponsor shall assure continued conditions of public ownership and public use of the shore upon which Federal participation is based during the economic life of the project. The non-federal sponsor shall also provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms. In the

determination of the Federal interest in cost sharing, Federal participation was limited to areas where public beach access and adequate parking are available. For shoreline reaches farther than ¼ mile from public access with adequate parking, Federal participation was not provided. The maximum Federal participation allowable for each land use category is applied for cost sharing. I therefore conclude that there is reasonable public availability of the project beaches in all areas where Federal participation is provided.

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

CHAPTER 8
List of Preparers

8 LIST OF PREPARERS*

8.1 PREPARERS

This Feasibility Study with integrated Draft Environmental Assessment was prepared by the following U.S. Army Corps of Engineers personnel:

Matt Schrader, P.E.	Coastal Engineer
Aubree G. Hershorin, Ph.D.	Ecologist
Dan Hughes, Ph.D.	Archeologist

8.2 REVIEWERS

This report was reviewed by the following personnel:

Paul DeMarco	Biologist
Brandon Burch	Project Manager

CHAPTER 9
References and Index

9 REFERENCES AND INDEX*

9.1 REFERENCES

Atlantic States Marine Fisheries Commission. 2016. Summer Flounder: Life History. Available online at http://www.asmfc.org/species/summer-flounder.

Carrier, J.C. and Luer, C.A., 1990. Growth rates in the nurse shark, *Ginglymostoma cirratum*. *Copeia*, pp.686-692.

Castro, J.I. 1983. The sharks of North American waters. Texas A&M University Press, College Station: 180pp.

Christensen, T.K., Clausager, I. & Petersen, I.K. 2003. Base-line investigations of birds in relation to an offshore wind farm at Horns Rev, and results from the year of construction. NERI Report.

Compagno, L.J.V. 1984. FAO Species Catalog Vol.4, Part 1 and 2: Sharks of the world: An annotated and illustrated catalogue of shark species known to date. FAO Fish. Synop. 125. FAO, Rome, Italy

Cook, A.S.C.P. and N.H.K. Burton. 2010. A review of the potential impacts of marine aggregate extraction on seabirds. Marine Environment Protection Fund Project 09/P130. Marine Aggregate Levy Sustainability Fund. Available online at http://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2010/rr563.pdf.

Dickerson, C., Reine, K.J., and Clarke, D.G. 2001. Characterization of underwater sounds produced by bucket dredging operations, DOER Technical Notes Collection (ERDC TNDOER-E14), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/dots/doer.

Driggers III, W.B., Ingram Jr, G.W., Grace, M.A., Gledhill, C.T., Henwood, T.A., Horton, C.N. and Jones, C.M., 2008. Pupping areas and mortality rates of young tiger sharks Galeocerdo cuvier in the western North Atlantic Ocean. *Aquatic Biology*, *2*(2), pp.161-170.

Duncan, K.M., A.P. Martin, B.W. Bowen, and H.G. De Couet. 2006. Global phylogeography of the scalloped hammerhead shark (*Sphyrna lewini*). Molecular Ecology 15(8):2239-2251.

Essink, Karel. 1999. Ecological effects of dumping of dredged sediments; options for management. Journal of Coastal Conservation 5: 69-80.

Foster, Emmett R., Darren L. Spurgeon, and Jenny Cheng. 2000. Shoreline Change Rate Estimates: St. Johns County, June 2000. Florida Department of Environmental Protection, Office of Beaches and Coastal Systems. Report No. BCS-00-03. Available online at ftp://ftp.dep.state.fl.us/pub/water/beaches/HSSD/reports/stjsre.pdf.

Garthe, S. and O. Hüppop. 1999. Effect of ship speed on seabird counts in areas supporting commercial fisheries. Journal of Field Ornithology, 70: 28-32.

Garthe, S., Benvenuti, S. and Montevecchi, W. A. 2000. Pursuit diving in northern gannets feeding on capelin. Proceedings of the Royal Society of London: Series B, 267, 1717-1722.

Gaston, A. J. 2004. Seabirds a natural history. Helm, London.

Greene, C.R.J. and S.E. Moore. 1995. Man-made noise. Pp 101-158 in Marine Mammals and Noise. W.J. Richardson, C.R.J. Greene, C.I. Malme and D.H. Thomson (ed.), Academic Press, San Diego.

Hall, Wes. 2000. Archaeological Diver Identification and Evaluation of Twelve Potentially Significant Submerged Targets in St. Augustine Inlet, St. Johns County, Florida. Contract No. DACW17-98-M-0200. Submitted to U.S. Army Corps of Engineers, Jacksonville District by Mid-Atlantic Technology and Environmental Research, Inc. May 27, 2000.

Heithaus, M.R. and Dill, L.M., 2002. Food availability and tiger shark predation risk influence bottlenose dolphin habitat use. *Ecology*, *83*(2), pp.480-491.

Herron Baird, P. 1990. Concentrations of seabirds at oil-drilling rigs. Condor, 92: 768-771.

Heupel, M.R. and Simpfendorfer, C.A., 2005. Quantitative analysis of aggregation behavior in juvenile blacktip sharks. *Marine Biology*, *147*(5), pp.1239-1249.

Hildebrand, J. 2004. Sources of anthropogenic sound in the marine environment. In E. Vos and R.R. Reeves (eds.) Report of an International Workshop: Policy on Sound and Marine Mammals, 28–30 September 2004, London, England 23 December 2005. U.S. Marine Mammal Commission, London, England.

HomeFacts. 2016. St. Augustine, FL Air Quality Information. Accessed online at http://www.homefacts.com/airquality/Florida/St.-Johns-County/St.-Augustine.html.

Lombardi-Carlson, L.A., 2007. Life history traits of bonnethead sharks, Sphyrna tiburo, from the eastern Gulf of Mexico. *SEDAR13*, pp.1-7.

Marine Aggregate Levy Sustainability Fund (MALSF). 2009. A generic investigation into noise profiles of marine dredging in relation to the acoustic sensitivity of the marine fauna in UK waters with particular emphasis on aggregate dredging: PHASE I Scoping and review of key issues. MEPF Ref No: MEPF 08/P21. Cefas contract report C3312. Accessed online at http://www.cefas.co.uk/media/462318/mepf-08p21%20final%20report%20published .pdf.

Morgan, Alexia. 2008. Lemon shark biological profile. Florida Museum of Natural History. Available at http://www.flmnh.ufl.edu/fish/discover/species-profiles/negaprion-brevirostris.

NMFS. 2006. Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. pp. 1600.

NOAA, 1991. Regional biological opinion for Southeastern hopper dredging. November 15, 1991 (revised August 25, 1995, and September 5, 1997). Available online at http://sero.nmfs.noaa.gov/protected_resources/section_7/freq_biop/index.html.

NOAA, 2015. Water Temperature Table of the Southern Atlantic Coast. Accessed online on November 13, 2015 at https://www.nodc.noaa.gov/dsdt/cwtg/all_meanT.html.

Pratt, H.L., Jr., and J.C. Carrier. 2001. A review of elasmobranch reproductive behavior with a case study on the nurse shark, *Ginglymostoma cirratum.* Environmental Biology of Fishes 60:157-188.

Rogers, Cory M., Kristine A. Jacobson, and Mark Gravens. 2009. Beach-fx User's Manual: Version 1.0 Report No. ERDC/CHL SR-09-6. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory 3909 Halls Ferry Road, Vicksburg, MS 39180-6199. 262 pages. Available online at http://acwc.sdp.sirsi.net/client/search/asset/1000110.

Skomal, G.B., 2007. Shark nursery areas in the coastal waters of Massachusetts. In *American Fisheries Society Symposium* (Vol. 50, p. 17). American Fisheries Society.

Skov, H. and J. Durinck. 2001. Seabird attraction to fishing vessels is a local process. Marine Ecology Progress Series, 214: 289-298.

SAFMC (South Atlantic Fishery Management Council). 1998. Final Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region. Including a Final Environmental Impact Statement/Supplemental Environmental Impact Statement, Initial Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, Charleston, S.C. 136 pages.

Tasker, M. L., P. Hope-Jones, T. Dixon, and A. Wallis. 1986. Seabirds associated with oil production platforms in the North Sea. Ringing and Migration, 7: 7-14.

Thaxter, C.B., Wanless, S., Daunt, F., Harris, M.P., Benvenuti, S., Watanuki, Y., Gremillet, D. & Hamer, K. C. 2010. Influence of wing loading on the trade-off between pursuit-diving and flight in Common Guillemots and Razorbills. Journal of Experimental Biology, 213, 1018-1025.

U.S. Climate Data. 2015. Average Monthly Climate, Jacksonville Beach – Florida. Accessed online on November 13, 2015 at http://www.usclimatedata.com/climate/florida/united-states/3179.

U.S. Fish and Wildlife Service. 2011. Statewide programmatic biological opinion. Revised March 13, 2015. Available online at http://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/.

U.S. Fish and Wildlife Service. 2013. Piping plover programmatic biological opinion. Available online at http://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/.

U.S. Fish and Wildlife Service. 2015. Species Account/Biologue: Anastasia Island Beach Mouse. Information available online at http://www.fws.gov/northflorida/species-accounts/beach-mice-2005.htm.

9.2 INDEX

—A—

Air Quality, 2-51, 5-10
Alternatives, 3-6, 3-29
Artificial Reef, 3-11

—B—

Backfill, 3-10
Benefit, 3-4, 3-30
Borrow Area, 5-20
Breakwaters, 3-11

—C—

County, 3-8, 3-11, 5-10

—D—

dredge, 5-10
dredging, 5-10
Dunes, 3-12

—E—

Economics, 4, 6-9
Emissions, 5-10
Environmental Justice, 6-8
environmental operating principles, 6-1
Erosion, 2, 2-1, 2-37, 3-2, 3-9, 3-10, 3-11, 3-12
Executive Orders
E.O. 12898, Environmental Justice, 6-8

—F—

Federal, 1-8, 1-11, 2-1, 3-2, 3-4, 3-5, 3-6, 3-7, 3-9, 3-30
Federal Water Project Recreation Act, 6-5
Flood Plain, 3-9

—G—

Groins, 3-10

—H—

Habitat, 3-3
Hardbottom, 3-2, 3-10, 3-11

—I—

Impact, 3-6, 3-10
Irretrievable, 5-20
Irreversible, 5-20

—L—

Land Use, 3-8
Location, 3-9

—M—

Migratory Bird Treaty Act and Migratory Bird Conservation Act, 6-6
Mitigate, 3-6

—N—

National Environmental Policy Act, 4, 3-6
Nesting, 2-37, 3-4
No Action Alternative, 2-9, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16, 2-17, 2-19, 2-29, 2-31, 2-32, 2-37, 2-38, 2-39, 2-40, 2-46, 2-49, 2-50, 2-51, 2-52, 2-55, 2-56, 2-59
Nourishment, 3-10, 3-11

—O—

Offshore, 3-11, 3-12

—P—

Plan Formulation, 4
Preservation, 3-7

—R—

Recommended Plan, 6-1
Recreation, 3-3
Reef, 3-11
Relocation, 3-9
Renourishment, 3-11
resources, 5-20
Resources, 3-6, 3-8
Revetments, 3-2
risk, 6-9

—S—

Safety, 3-12
Sediment, 3-10, 3-12
State, 3-4, 3-7, 3-8, 3-9

—T—

Turtle, 3-4

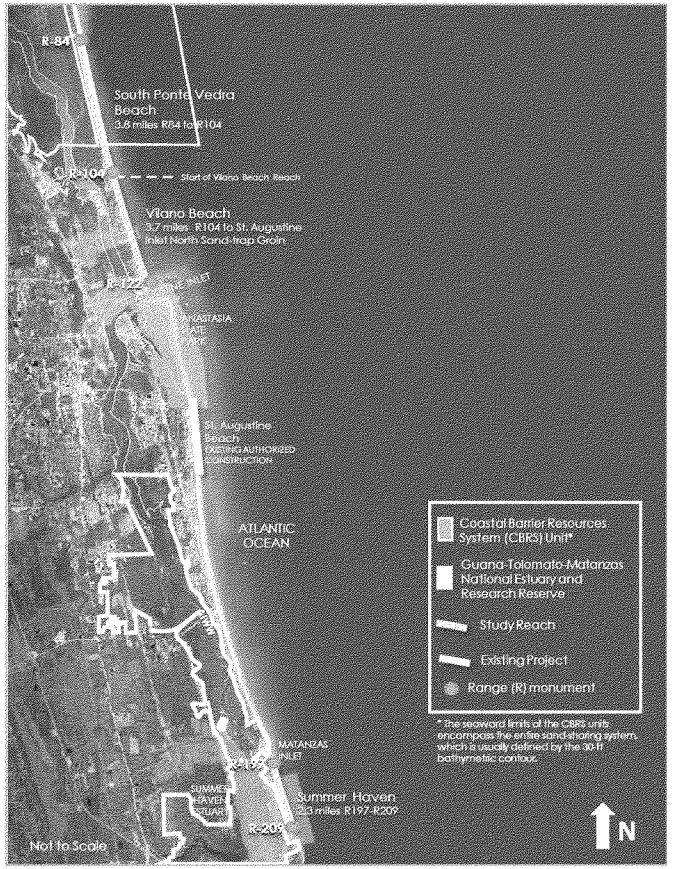
—U—

U.S. Army Corps of Engineers, 3-4
Upland, 3-12

—V—

Vegetation, 2-31, 3-9, 3-12, 5-1, 5-2, 5-20

Back cover
fold-out



ST. JOHNS COUNTY, FLORIDA
South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches

COASTAL STORM RISK MANAGEMENT PROJECT
INTEGRATED FEASIBILITY STUDY AND
ENVIRONMENTAL ASSESSMENT

APPENDIX A
Engineering

March 2017

US Army Corps
of Engineers
Jacksonville District

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

Table of Contents

Background 1
Problem Identification 1
Natural Forces 1
  Winds 1
  Waves 6
  Tides and Currents 8
  Storm Effects 9
  Storm Surge 11
  Sea Level Change 12
    Relative Sea Level Rise 12
    Beach Responses to Sea Level Change 14
Historical Shoreline Change 16
Historical Volume Change 22
Effects of Adjacent Features 24
  St. Augustine Inlet 24
Beach-*fx* Life-Cycle Shore Protection Project Evolution Model 26
  Background & Theory 26
  Meteorologic Driving Forces 28
  Coastal Morphology 29
    Shoreline Storm Response 29
    Applied Erosion Rate 38
    Project Induced Shoreline Change (GenCade) 39
    Post Storm Berm Recovery 41
  Economic Evaluation 41
  Management Measures 41
    Nourishment Design Templates 42
    Nourishment Triggers and Mobilization Threshold 43
  Beach-*fx* Project Design Alternatives 43
Protective Beach Design 44
  Project Length 44
  Project Design 44
    Project Dune 44
    Project Berm 45
    Project Beach Slopes 46
  Project Volumes 47
Project Construction 48
Renourishment Events 50
Project Monitoring 50
Summary 51
References 52

Table of Figures

Figure A - 1. Project area and details. 2
Figure A - 2. Wind percent occurrence by magnitude and direction 3
Figure A - 3. Location of WIS Station 63416 relative to study area. 4
Figure A - 4. Wind rose for WIS Station 63416 5
Figure A - 5. Wave rose for WIS Station 63416. 7
Figure A - 6. Typical coastal processes (from Shore Protection Assessment primer published by USACE-Engineer Research Development Center). 10
Figure A - 7. Historic tropical storm tracks passing within a 50-mile radius 11
Figure A - 8. Relative sea level change, St. Johns County. 13
Figure A - 9. Estimated shoreline recession rate due to sea level rise 15
Figure A - 10. Estimated volume loss due to sea level rise. 16
Figure A - 11. Reference monument locations around study area. 17
Figure A - 12. Study area shoreline change rates. 20
Figure A - 13. Unit volume change rates for the study area 23
Figure A - 14. Beach-*fx* model setup representation. 27
Figure A - 15. Averaged and idealized profiles: P1 grouping. 30
Figure A - 16. Averaged and idealized profiles: P2 grouping. 31
Figure A - 17. Averaged and idealized profiles: P3 grouping. 31
Figure A - 18. Averaged and idealized profiles: P4 grouping. 32
Figure A - 19. Averaged and idealized profiles: P5 grouping. 32
Figure A - 20. Averaged and idealized profiles: P6 grouping. 33
Figure A - 21. Averaged and idealized profiles: P7 grouping. 33
Figure A - 22. Averaged and idealized profiles: P8 grouping. 34
Figure A - 23. Hurricane Diana and 1984 subtropical storm wave and water level data for SBEACH calibration. 36
Figure A - 24. Measured and modeled profile change during SBEACH calibration. 37
Figure A - 25. Measured and modeled profile change during SBEACH verification. 37
Figure A - 26. Target MHW shoreline change rate. 39
Figure A - 27. Shoreline change rates for with- and without-project simulations. 40
Figure A - 28. Existing profile and Beach-*fx* nourishment template for idealized Profile 3. 46

Table of Tables

Table A - 1. Seasonal wind conditions. 5
Table A - 2. Average wave heights (1980 to 2012) 6
Table A - 3. Seasonal wave conditions. 8
Table A - 4. Tidal datums for St. Augustine Beach, FL. 8
Table A - 5. Tidal datums for Vilano Beach, FL 9
Table A - 6. Peak storm tide elevations 12
Table A - 7. Relative sea level rise for St. Johns County. 13
Table A - 8. Study area distances between R monuments and MHW 18
Table A - 9. Shoreline change rates (ft/yr) for selected periods. 21
Table A - 10. Study segment shoreline change summary. 22
Table A - 11. Unit volume change rates for the study area. 22
Table A - 12. Model reaches, reference monuments, and Beach-*fx* representative profiles 27
Table A - 13. St. Johns County Beach-*fx* storm seasons. 28
Table A - 14. Dimensions of idealized pre-storm representative profiles (existing) 34
Table A - 15. Range of dune and berm width values for representative profiles. 35
Table A - 16. SBEACH calibrated beach characteristic and sediment transport parameters. 37
Table A - 17. Dune and berm features for initial array of nourishment alternatives. 43
Table A - 18. Array of alternatives with BCR and net benefits from 100-iteration model runs. 44
Table A - 19. Generalized dune characteristics of the study area. 44
Table A - 20. Project dune and foreshore slopes. 46
Table A - 21. Beach-*fx* volume statistics for 100 iterations of recommended plan with SLR scenarios. 48
Table A - 22. Reference monument control and location of the 2015 +8 ft-NAVD88 contour 49
Table A - 23. Mean high water range and coordinates from 2015 survey. 49

Background

St. Johns County is located on the northeast coast of Florida approximately midway between the Florida-Georgia state line and Cape Canaveral. The County is bounded to the north by Duval County and to the south by Flagler County. St. Johns County has approximately 42 miles of coastal shoreline, with about 24 miles extending from the Duval County line to St. Augustine Inlet, about 14 miles from St. Augustine Inlet to Matanzas Inlet, and about 3 miles from Matanzas Inlet to the Flagler County line. South Ponte Vedra Beach and Vilano Beach (denoted SPV and Vilano throughout this appendix) are located on the north side of St. Augustine Inlet and are the focus of the present study (Figure A - 1). Anastasia State Park and St. Augustine Beach are located south of the St. Augustine Inlet. Summer Haven, initially part of the study but screened out due to reasons described in the main report, is located south of Matanzas Inlet. A Federal Shore Protection Project is authorized for a contiguous portion of St. Augustine Beach and currently uses St. Augustine Inlet as a borrow source. The purpose of this study is to assess the feasibility of providing Federal Coastal Storm Risk Management (CSRM) measures to additional portions of the St. Johns County shoreline.

Problem Identification

Historically, beaches of St. Johns County have generally experienced substantial erosion due to the combined effects of winds, waves, and tides. The severity of erosion in some areas is indicated by the presence of protective structures such as seawalls and revetments, and the absence of any beach seaward of those protective structures. The objectives of the engineering analysis include the quantification of existing beach erosion and the design of corrective measures. Quantification efforts involve analysis of historical shoreline positions, estimation of alongshore sediment transport rates, and prediction of cross-shore losses of beach material due to storms. The results of those efforts serve as the basis for the design and analysis of beach nourishment measures, which could be employed to reduce storm damage in the project area.

Natural Forces

Winds

Local winds are the primary means of generating the small-amplitude, short period waves that are an important mechanism of sand transport along the Florida shoreline. Winds that drive sediment transport from the east-southeast quadrant are generally mild in nature and occur in the spring and summer months. Elevated wind speeds from the north-northeast quadrant in fall and winter months occur during passage of northeasters which can cause extensive beach erosion and shorefront damage. Occasionally the area is impacted by the passage of tropical storms that can generate devastating winds, waves, and storm surge, which can cause direct damage to coastal structures and infrastructure or heavy erosion that can result in the undermining of coastal structures.

Wind data offshore of the project area is available from the U.S. Army Corps of Engineers (USACE) Wave Information Study (WIS) Program. WIS hindcast data are generated using the numerical hindcast model WISWAVE (Hubertz, 1992). The WIS hindcast database includes significant wave height, peak and mean wave period, peak and mean wave direction, wind

speed, and wind direction. WISWAVE inputs include time varying wind fields overlaying a bathymetric grid.

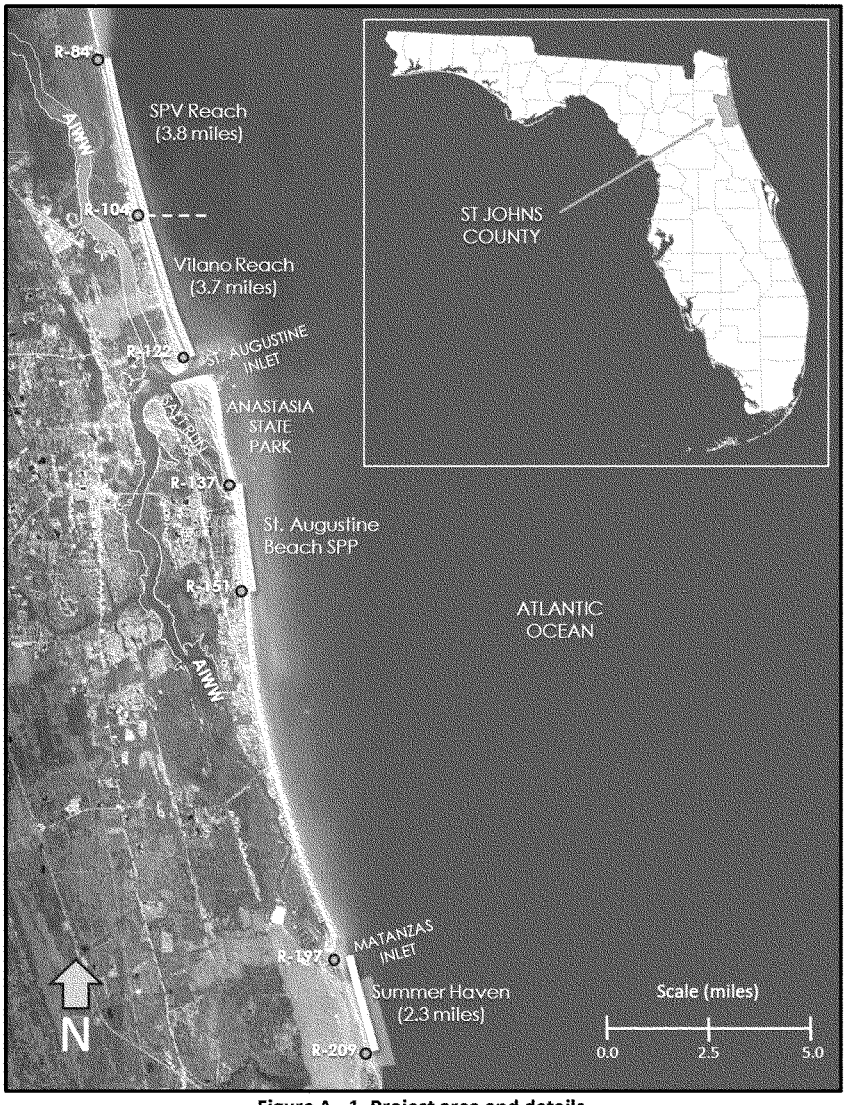


Figure A - 1. Project area and details.

There are 523 WIS stations along the Atlantic Coast. WIS Station 63416 is representative of offshore deep water wind and wave conditions for the project area since it is the closest station to the study area. As such, data presented in this section and the Waves section to follow use data output from Station 63416. Figure A - 2 provides a summary of wind data from WIS Station 63416, located at latitude 30.0° and longitude -81.08° (about 13.5 miles east of the project area; Figure A - 3), and shows the frequency of occurrence of wind speeds broken down into sixteen 22.5 degree angle-bands. The distribution of winds are consistent for all degree bands with percent occurrence varying from 4.5% to 8.3%. However, there is a slight increase of occurrence in wind from the east-northeast and south-southwest directions as seen in the wind rose in Figure A - 4. Note that generalizations of the wind fields in this section pertain to those directions that are important with respect to sediment transport. Therefore, offshore-directed winds may show greater frequency at the offshore WIS Station 63416 but are ignored when generalizing conditions.

Wind conditions in Coastal Florida are seasonal. A further breakdown of the wind data provides a summary of the seasonal conditions (Table A - 1). Note that predominant wind directions in Table A-1 are occurrence based and therefore don't necessarily reflect the winds that influence sediment transport. Between December and March, frontal weather patterns driven by cold Arctic air masses can extend as far as South Florida. These fronts typically generate northeast winds before the frontal passage and northwest winds behind the front. The northeaster behavior is responsible for the increased intensity of wind speed seen in the northeast sector winds during the winter months. Northeasters may result in wave conditions that can cause extensive beach erosion and shorefront damage.

ATLANTIC HINDCAST WAM4.5.1C : ST63416_v03
ALL MONTHS FOR YEARS PROCESSED : 1980 - 2012
STATION LOCATION : (-81.08 W / 30.00 N)
DEPTH : 22.0 m

PERCENT OCCURRENCE (X1000) OF WIND SPEED AND DIRECTION
CENTRAL LOCAL ANGLE BANDS OF (+/- 11.25 DEG)

NO. CASES : 289294

WND DIR	WIND SPEED (M/S)										
DEG	<2.5	2.5-4.9	5.0-7.4	7.5-9.9	10.0-12.4	12.5-14.9	15.0-17.4	17.5-19.9	20.0-24.9	25.0-GREATER	TOTAL
0.0	242	1423	1864	1389	592	179	30	8	1	0	5728
22.5	254	1674	1960	1358	656	139	29	9	0	0	6079
45.0	293	2034	2449	1529	529	109	8	1	0	0	6952
67.5	328	2341	2760	1410	347	79	15	3	2	0	7285
90.0	406	2868	2543	871	163	48	8	2	2	0	6911
112.5	457	2934	2043	518	106	30	2	1	2	0	6093
135.0	518	3055	1900	430	98	29	3	2	1	0	6036
157.5	529	3273	1995	542	151	26	4	2	0	0	6522
180.0	587	3678	2821	926	253	54	8	0	0	0	8327
202.5	477	3404	2757	908	234	48	5	0	1	0	7834
225.0	396	3169	2683	795	218	41	4	0	2	0	7308
247.5	331	2330	1910	695	265	73	6	0	1	0	5611
270.0	276	1570	1313	776	426	121	17	2	2	0	4503
292.5	235	1160	1202	1022	711	274	57	2	0	0	4663
315.0	212	1138	1444	1276	781	259	37	3	1	0	5151
337.5	234	1181	1456	1248	648	133	23	1	3	0	4927
TOTAL	5775	37232	33100	15693	6178	1642	256	36	18	0	

MEAN WS(M/S) = 5.8 MAX WS(M/S) = 24.6 MEAN WIND DIR(DEG) = 351.0 FINITE

Figure A - 2. Wind percent occurrence by magnitude and direction.

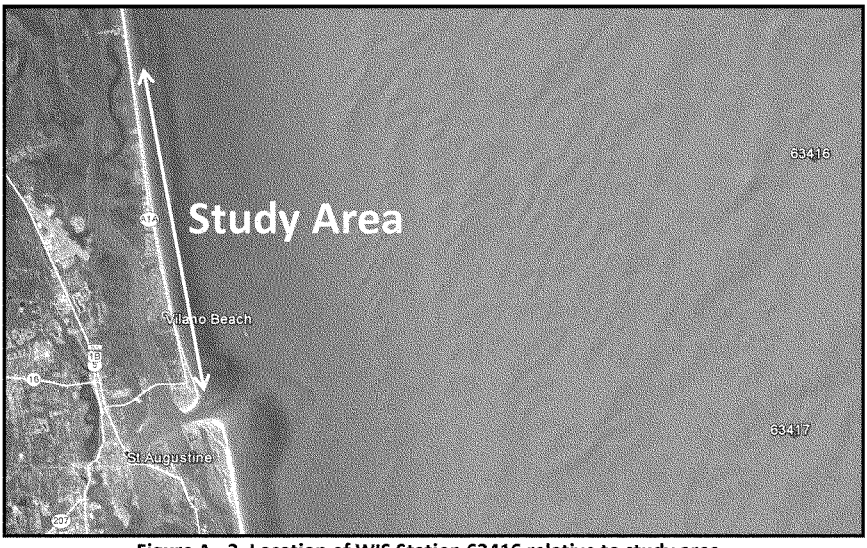


Figure A - 3. Location of WIS Station 63416 relative to study area.

The summer months (June through September) are characterized by southeast trade winds and tropical weather systems traveling toward the west and toward the northwest in the lower latitudes. Additionally, daily breezes onshore and offshore result from differential heating of land and water masses. These diurnal winds typically blow perpendicular to the shoreline and have less magnitude than Trade winds and northeasters. Daily breezes account for the general shift to east/southeast winds during the summer months when northeasters no longer dominate.

During the summer and fall months, tropical waves may develop into tropical storms and hurricanes, which can generate devastating winds, waves, and storm surge when they impact the project area. These storms contribute greatly to the overall alongshore and cross-shore sediment transport at the site. These intense seasonal events will be discussed in greater detail under the Storm Effects section.

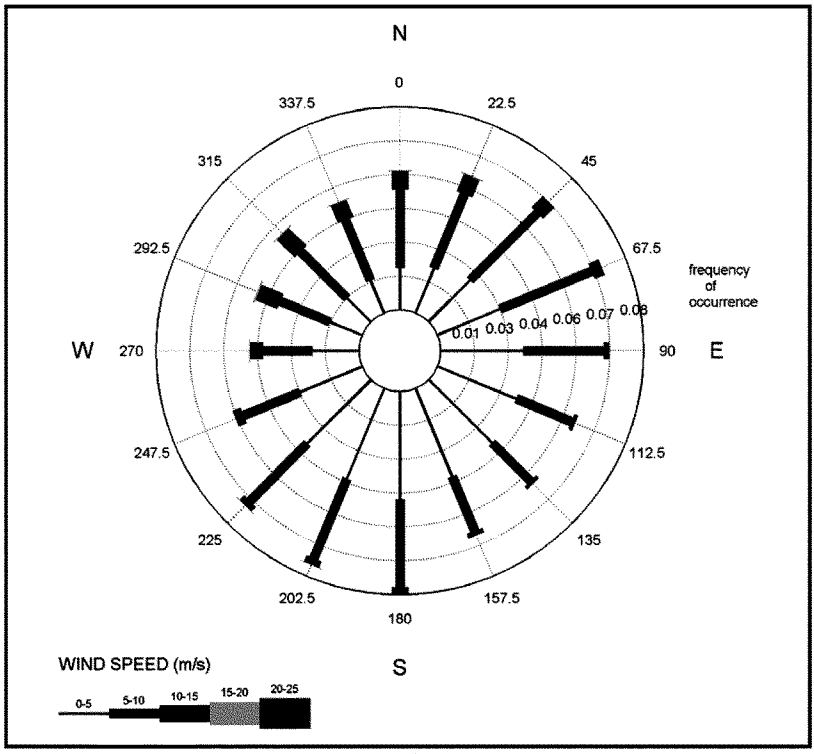


Figure A - 4. Wind rose for WIS Station 63416.

Table A - 1. Seasonal wind conditions.

Month	WIS Station 63416 (1980 – 2012)	
	Average Wind Speed (mph)	Predominant Direction (from)
January	15.4	W
February	15.0	N
March	14.3	NE
April	13.0	WNW
May	11.4	N
June	10.7	NNE
July	10.5	NNE
August	10.3	W
September	12.1	NNW
October	14.1	ENE
November	14.8	WSW
December	15.0	N

Waves

The wave energy dissipation that occurs as waves enter the nearshore zone and break is the principal driver for sediment transport. Wave height, period, and direction, in combination with tides and storm surge, are the most important factors influencing the behavior of the beach and dune system. The SPV-Vilano study area is exposed to both short period wind-waves and longer period open-ocean swells originating predominantly from the northeast during spring, fall and winter months and from northeast to southeast during summer months.

Periodic erosion of the SPV-Vilano beach system and associated damage to upland development is attributable to large storm waves produced primarily by northeasters during the late fall and winter months and by tropical disturbances, including hurricanes, during the summer months. Because the study area is fully exposed to the open ocean in all seaward directions, the coastline is vulnerable to wave attack from distant storms (causing long period swells) as well as local storms (causing short period steep waves). Tropical storm passage is relatively frequent for the study area and even without landfall of a tropical storm, a system passing within several hundred miles may cause extensive erosion damage to the area.

Wave data for this report were obtained from the long-term USACE WIS hindcast database for the Atlantic coast of the U.S. This 33-year record extends from 1980 through 2012, and consists of a time-series of wave events at 3-hour intervals for stations located along the east and west coasts of the US, as well as the Gulf of Mexico and Great Lakes. The WIS station closest to the project area is 63416, located 13.5 miles offshore. The location of WIS station 63416 relative to the study area is shown previously in Figure A - 3.

Table A - 2 summarizes the percentage of occurrence and average wave height of the WIS waves by direction. It can be seen that the dominant wave direction is from the east with contributions from the east-northeast and east-southeast. This can be seen clearly in the wave rose presented in Figure A - 5. The total wave climate reflects both the open-ocean swell and more locally generated wind-waves.

Similar to wind conditions, wave conditions in Coastal Florida experience seasonal variability. The seasonal breakdown of wave heights is provided in Table A - 3 and shows that fall and winter months have an increase in wave height due to northeaster activity. The intensity and direction of these fall/winter wave conditions are reflected in the dominant southward transport of sediment and seasonal erosional patterns in the project area. In contrast, summer months experience milder conditions, with smaller wave heights with exception to the infrequent passage of a tropical cyclone. Overall, waves originating from the east to northeast quadrant dominate.

Table A - 2. Average wave heights (1980 to 2012).

Wave Direction (° True North)	Number of Occurrences	Percent Occurrence	Average Wave Height (ft)
0.0	4,884	1.7%	4.3
22.5	7,705	2.7%	4.3
45.0	20,266	7.0%	4.9
67.5	63,098	21.8%	4.9

Wave Direction (° True North)	Number of Occurrences	Percent Occurrence	Average Wave Height (ft)
90.0	110,585	38.2%	3.9
112.5	65,239	22.6%	3.3
135.0	8,359	2.9%	3.6
157.5	1,941	0.7%	3.6
180.0	849	0.3%	3.3
202.5	433	0.1%	3.3
225.0	348	0.1%	3.3
247.5	342	0.1%	3.3
270.0	471	0.2%	3.3
292.5	637	0.2%	3.6
315.0	1,451	0.5%	3.9
337.5	2,686	0.9%	4.3
Totals	**289,294**	**100.0%**	**3.9**

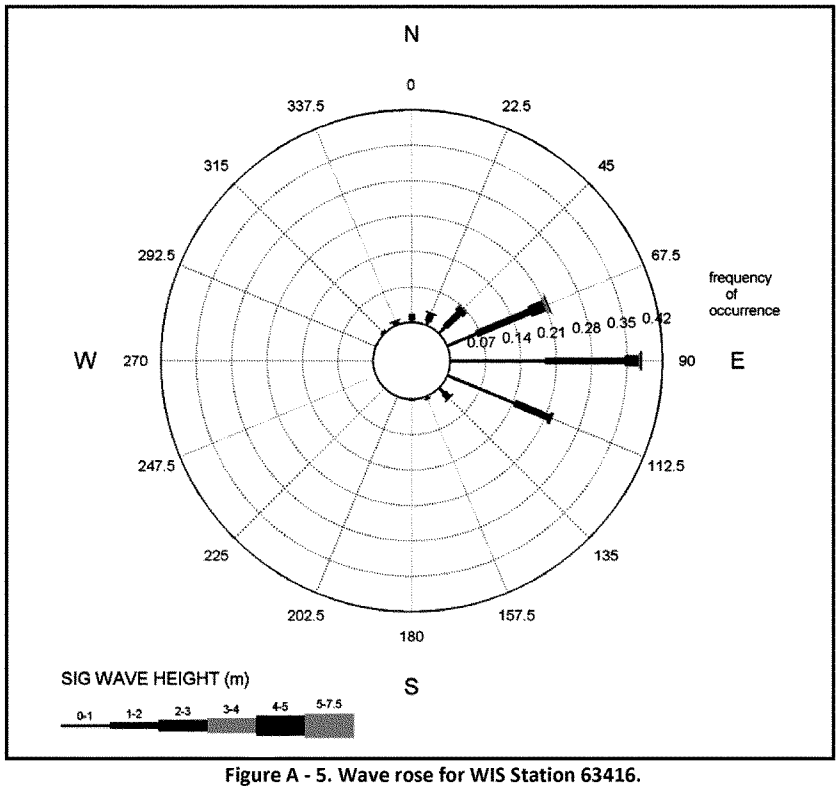


Figure A - 5. Wave rose for WIS Station 63416.

Table A - 3. Seasonal wave conditions.

Month	WIS Station 63416 (1980 – 2012)	
	Average Wave Height (ft)	Predominant Direction (from)
January	4.3	E
February	4.3	E
March	4.3	E
April	3.6	E
May	3.6	E
June	3.0	ESE
July	2.6	ESE
August	3.0	E
September	4.3	E
October	4.6	E
November	4.9	E
December	4.6	E

Tides and Currents

Astronomical tides are created by the gravitational effects of the moon and sun on the ocean and are well understood and predictable in magnitude and timing. The National Oceanic and Atmospheric Administration (NOAA) regularly publishes tide tables for selected locations along the coastlines of the United States and selected locations around the world. These tables provide times of high and low tides, as well as predicted tidal amplitudes.

Tides in St. Johns County area are semidiurnal, meaning two high tides and two low tides occur per tidal day. Tidal datums for St. Augustine Beach (NOAA station 8720587) and Vilano Beach ICWW (NOAA station 8720554) are summarized in Table A - 4 and Table A - 5, respectively. The St. Augustine Beach water level station was located on the St. Augustine Beach pier and represents open ocean water levels while the Vilano Beach water level station was located in the Intercoastal Waterway on the SR A1A bridge. The datums presented in Table A - 4 and Table A - 5 are based on tidal analysis periods of 6/1/1992 to 5/31/2000 and 10/1/2003 to 7/31/2004, respectively. The difference between Mean High Water (MHW) and Mean Low Water (MLW), known as the mean tide range, equals 4.61 ft at St. Augustine Beach and 4.24 feet at Vilano Beach.

Table A - 4. Tidal datums for St. Augustine Beach, FL.

Tidal Datum	Elevation Relative to NAVD88 (feet)
Mean Higher High Water (MHHW)	2.01
Mean High Water (MHW)	1.64
North American Vertical Datum (NAVD88)	0.00
Mean Tide Level (MSL)	-0.70
Mean Low Water (MLW)	-2.97
Mean Lower Low Water (MLLW)	-3.13

Table A - 5. Tidal datums for Vilano Beach, FL.

Tidal Datum	Elevation Relative to NAVD88 (feet)
Mean Higher High Water (MHHW)	1.86
Mean High Water (MHW)	1.53
North American Vertical Datum (NAVD88)	0.00
Mean Tide Level (MSL)	-0.56
Mean Low Water (MLW)	-2.71
Mean Lower Low Water (MLLW)	-2.89

Near-shore currents affect the supply and distribution of sediment on the sandy beaches of St. Johns County and are composed of alongshore and cross-shore components. Alongshore currents, induced by oblique wave energy, generally determine the long-term direction and magnitude of littoral transport. Cross-shore currents may have a more short term impact, but can result in both temporary and permanent erosion. The magnitude of these currents is determined by the wave characteristics, angle of waves from offshore, configuration of the beach, and the nearshore profile. For St. Johns County beaches, the net sediment transport is from north to south. This is due to the dominant wave activity from the northeast during the fall and winter months, particularly northeaster storms.

Since the southern portion of the study area is directly adjacent to the St. Augustine Inlet, currents are affected by the ebb and flood tidal flow through the inlet. The terminal groin structure on the north side of St. Augustine Inlet also provides varying degree of influence on nearshore currents depending on its exposure level. During the flood tide, currents along the beach within the inlet's area of influence will set with a larger inlet directed component (southerly in the study area) than areas outside the influence of the inlet. During the ebb tide, inlet-directed currents may still be present due to wave refraction around the ebb shoal as well as return flow eddies that develop from the ebb jet.

Storm Effects

The beaches of St. Johns County are influenced by tropical systems during the summer and fall and by northeasters during the late fall, winter, and spring. Although hurricanes typically generate larger waves and storm surge, northeasters typically have a greater cumulative impact on the shoreline due to longer storm duration and greater frequency of event occurrence.

Periodic and unpredictable hurricanes and coastal storms, with their energetic breaking waves and elevated water levels, can change the width and elevation of beaches and accelerate erosion (Figure A - 6). Storms erode and transport sediment from the subaerial beach into the active zone of storm waves. Once caught in the waves, this sediment is carried along the shore and re-deposited farther down the beach, or is carried offshore and stored temporarily in submerged sand bars. After storms pass, long period residual swell usually returns sediment from the sand bars to the beach, which is restored gradually to its natural equilibrium profile. While the beach profile typically recovers from storm energy as described, extreme storm events may cause sediment to leave the beach system entirely, sweeping it into inlets, into the back bay (over wash), or moving it far offshore into deep water where waves cannot return it to the beach. This causes the shoreline to recede, or move farther landward.

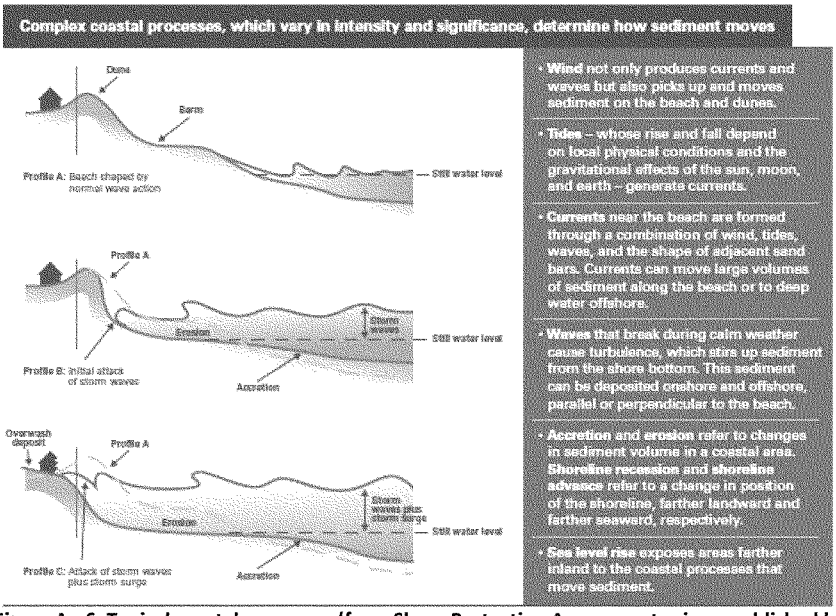


Figure A - 6. Typical coastal processes (from Shore Protection Assessment primer published by USACE-Engineer Research Development Center).

St. Johns County is located in an area of moderate hurricane activity. Figure A - 7 shows historic tracks of hurricanes and tropical storms from 1842 to 2014, as presented by the National Ocean Service (NOS) and available from the National Oceanic and Atmospheric Administration (NOAA, 2015). The shaded circle in the center of this figure indicates a 50-nautical mile radius (encompassing the entire St. Johns County shoreline) from St. Augustine Inlet. Based on National Hurricane Center (NHC) records, 18 hurricanes and 39 tropical storms have passed within this 50-mile radius over the 172-year period of record; or, one event of tropical storm force or greater passes within 50 miles of the study area every 3.0 years (NOAA, 2015). The 50-mile radius was chosen for display purposes in Figure A - 7 because any tropical disturbance passing within this distance, even a weak tropical storm, would likely cause erosive damage to the shoreline. Stronger storms are capable of producing significant damage to the coastline from far greater distances. Northern Florida has been affected by many hurricanes, but Hurricane Dora in 1964 may have had the greatest impact on St. Johns County. The storm surge in St. Augustine reached 12.0 feet (MSL-1929) during Dora (FDNR, 1987). The NHC data show that hurricanes and tropical storms pass within 50 nautical miles of the study area approximately every 3.0 years (NOAA, 2015). Shoreline erosion occurred during the series of hurricanes in 1999 that included Dennis, Floyd, and Irene. The northeasters of the 1960's and of November 1984 are notable storms that caused intense erosion (Foster et al., 2000). Historic records indicate that an extra-tropical storm will impact the shoreline approximately 1.75 times per year (USACE, 1998).

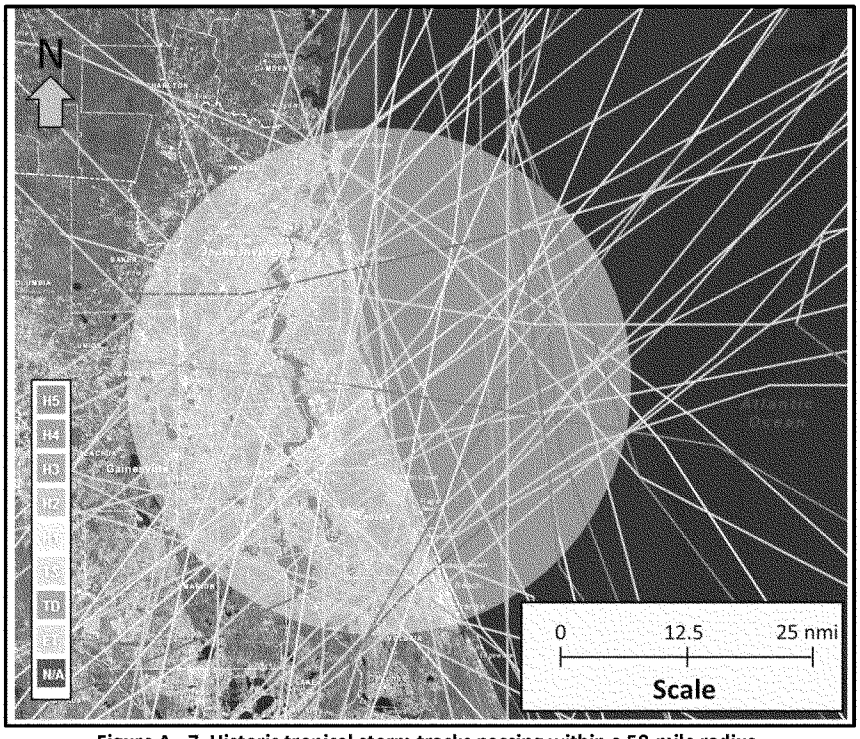


Figure A - 7. Historic tropical storm tracks passing within a 50-mile radius.

Storm Surge

Storm surge is defined as the rise of the ocean surface above its astronomical tide level due to physical forces. Surges occur primarily as a result of atmospheric pressure gradients and surface stresses created by wind blowing over a water surface. Strong onshore winds pile up water near the shoreline, resulting in elevated water levels along the coastal region and inland waterways. In addition, the lower atmospheric pressure which accompanies storms also contributes to a rise in water surface elevation. Extremely high wind velocities coupled with low barometric pressures (such as those experienced in tropical storms, hurricanes, and very strong northeasters) can produce very high, damaging water levels. In addition to wind speed, direction and duration, storm surge is also influenced by water depth, length of fetch (distance over water), and frictional characteristics of the nearshore sea bottom. Water level (with storm surge) time series are critical for input into shoreline response and coastal storm risk modeling applications.

The return period storm surge events can provide insight into the vulnerabilities of a given location through comparison with the existing topography. Table A - 6 provides peak storm surge heights by return period for St. Augustine Inlet, Florida. Storm surge levels versus

frequency of occurrence presented in Table A - 6 were obtained from data compiled by the University of Florida for the Florida Department of Transportation (Sheppard and Miller, 2003).

Table A - 6. Peak storm tide elevations.

Storm Return Period	Peak Storm Surge Height		
(years)	ft-NGVD29	ft-NAVD88	ft-MSL
10	3.6	2.5	1.8
20	5.4	4.3	3.6
50	9.6	8.5	7.8
100	12.3	11.2	10.5
200	14.5	13.4	12.7
500	16.9	15.8	15.1

Sea Level Change

Relative Sea Level Rise

Relative sea level (RSL) refers to local elevation of the sea with respect to land, including the effects of lowering or rising land through geologic processes such as subsidence and glacial rebound. It is anticipated that the global mean sea level will rise within the next 100 years. To incorporate the direct and indirect physical effects of projected future sea level change on design, construction, operation, and maintenance of coastal projects, the USACE has provided guidance in the form of Engineering Regulation, ER 1100-2-8162 (USACE, 2013) and Engineering Technical Letter 1100-2-1 (USACE, 2014).

ER 1100-2-8162 provides both a methodology and a procedure for determining a range of sea level change estimates based on global sea level change rates, the local historic sea level change rate, the construction (base) year of the project, and the period of Federal participation for the project. Three estimates are required by the guidance, a Baseline (or "Low") estimate, which is based on historic sea level rise and represents the minimum expected sea level change, an Intermediate estimate, and a High estimate representing the maximum expected sea level change. More details are provided in the referenced ER and ETL.

The SPV-Vilano project area is located approximately 31 miles from NOS gage #8720218 at Mayport, Florida. The historical local sea level rise rate taken from this gage was determined to be 2.40 mm/year (0.0079 ft/year; USACE, 2015). Given a project base year of 2020 a table of sea level change rates was produced for each of the three required scenarios through the end of Federal participation (Table A - 7). Figure A - 8 provides a graphic representation of the three levels of projected future sea level change for the 50-year planning horizon of the project (2020 to 2070) as well as an additional 50 years (to 2120).

The local rate of vertical land movement is found by subtracting regional MSL trend from local MSL trend. The regional mean sea level trend is assumed equal to the eustatic mean sea level trend of 1.7 mm/year (USACE, 2015). Therefore at SPV-Vilano, there is 0.70 mm/year of local vertical land movement.

Table A - 7. Relative sea level rise for St. Johns County.

Year		Baseline (Historic)			Intermediate (NRC Curve I)			High (NRC Curve III)		
		mm	m	ft	mm	m	ft	mm	m	ft
Base Year	2020	0.0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
	2025	12.0	0.01	0.04	20.3	0.02	0.07	46.5	0.05	0.15
	2030	24.0	0.02	0.08	41.9	0.04	0.14	98.6	0.10	0.32
	2035	36.0	0.04	0.12	64.9	0.06	0.21	156.3	0.16	0.51
	2040	48.0	0.05	0.16	89.2	0.09	0.29	219.8	0.22	0.72
25 Year	2045	60.0	0.06	0.20	114.9	0.11	0.38	288.8	0.29	0.95
	2050	72.0	0.07	0.24	141.9	0.14	0.47	363.5	0.36	1.19
	2055	84.0	0.08	0.28	170.3	0.17	0.56	443.9	0.44	1.46
	2060	96.0	0.10	0.31	200.1	0.20	0.66	529.9	0.53	1.74
	2065	108.0	0.11	0.35	231.2	0.23	0.76	621.6	0.62	2.04
50 Year	2070	120.0	0.12	0.39	263.6	0.26	0.86	718.9	0.72	2.36
	2075	132.0	0.13	0.43	297.4	0.30	0.98	821.9	0.82	2.70
	2080	144.0	0.14	0.47	332.6	0.33	1.09	930.5	0.93	3.05
	2085	156.0	0.16	0.51	369.1	0.37	1.21	1044.7	1.04	3.43
	2090	168.0	0.17	0.55	407.0	0.41	1.34	1164.7	1.16	3.82
75 Year	2095	180.0	0.18	0.59	446.3	0.45	1.46	1290.2	1.29	4.23
	2100	192.0	0.19	0.63	486.8	0.49	1.60	1421.4	1.42	4.66
	2105	204.0	0.20	0.67	528.8	0.53	1.73	1558.3	1.56	5.11
	2110	216.0	0.22	0.71	572.1	0.57	1.88	1700.8	1.70	5.58
	2115	228.0	0.23	0.75	616.7	0.62	2.02	1849.0	1.85	6.07
100 Year	2120	240.0	0.24	0.79	662.8	0.66	2.17	2002.8	2.00	6.57

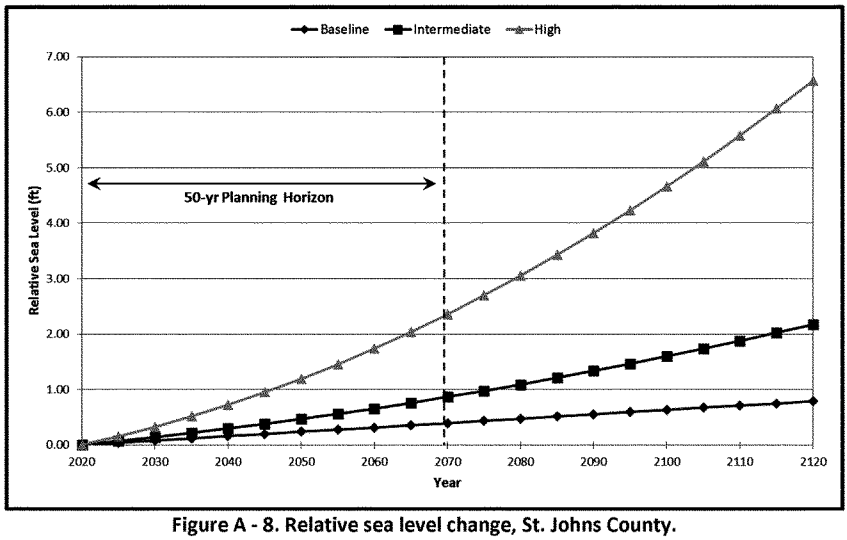


Figure A - 8. Relative sea level change, St. Johns County.

Beach Responses to Sea Level Change

ETL 1100-2-1 outlines methods and procedures to incorporate sea level change into the analysis, design and maintenance of projects. Per this guidance, this section evaluates how the sea level change scenarios outlined in the preceding section could affect future beach and shoreline behavior in the project area. The principal means by which sea level change would manifest itself on an open coast, sandy beach would be through changes to shoreline position and to beach volume. The below analyses are based on the assumption that sea level change would cause a change in the horizontal and vertical position of the beach profile. This phenomenon was first outlined by Bruun (1962). The theory states that an increase in water level causes the beach profile to shift upward and landward in response, in order to maintain an equilibrium shape. This shift causes both a shoreline change and a volumetric change as described herein.

Shoreline Change

Bruun (1962) proposed a formula for estimating the rate of shoreline recession based on the local rate of sea level change. This methodology also includes consideration of the local topography and bathymetry. Bruun's approach assumes that with a change in sea level, the beach profile will attempt to reestablish the same bottom depths relative to the surface of the sea that existed prior to sea level change. That is, the natural profile will be translated upward and shoreward to maintain equilibrium. If the alongshore littoral transport in and out of a given shoreline is equal, then the quantity of material required to reestablish the nearshore slope must be derived from erosion of the shore. The shoreline recession rate, *X*, resulting from sea level change can be estimated using Bruun's Rule, defined as:

$$X = \frac{-SW_*}{(h_*+B)} \qquad (1)$$

Where *S* is the rate of sea level change; *B* is the berm height (+8 ft NAVD88); h_* is the depth of closure (the depth beyond which there is no significant change over time in the shoreline profile; estimated to be approximately -20 ft NAVD88), and W_* is the width of the active profile (approximately 1400 ft). Figure A - 9 provides the resulting shoreline recession rate versus year for each of the three sea level rise scenarios.

The Bruun procedure is applicable to long straight sandy beaches with an uninterrupted supply of sand (which is applicable to the subject study area). Little is known about the rate at which profiles respond to changes in water level; therefore, this procedure should only be used for estimating long-term changes. The procedure is not a substitute for the analysis for historical shoreline and profile changes when determining historic (baseline) conditions. However, if little or no historical data is available, then historical analysis may be supplemented by this method to provide an estimate of the long-term erosion rates attributable to sea level rise. The offshore contours in the project area are not entirely straight and parallel; however, Bruun's Rule does provide an estimate of the potential shoreline changes within the project area attributable to a projected change in sea level.

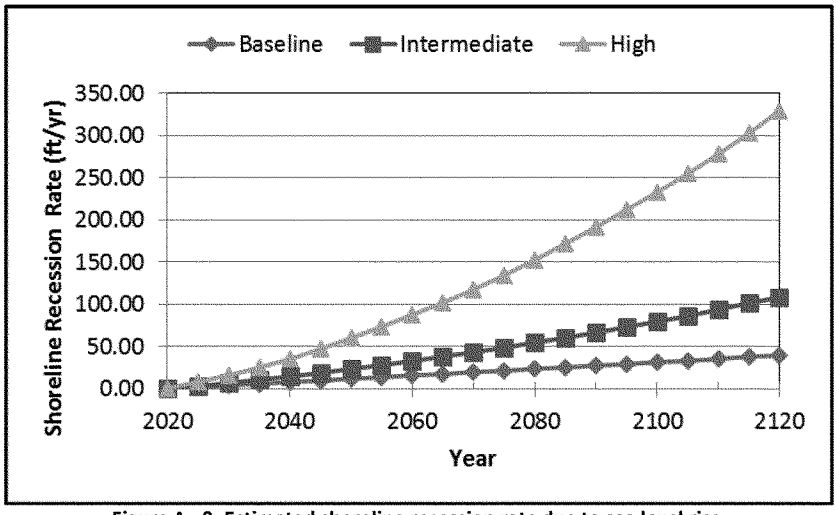


Figure A - 9. Estimated shoreline recession rate due to sea level rise.

Volumetric Change

Engineering Manual (EM) 1110-2-3301 (USACE, 1995) provides guidance on how to calculate beach volume based on berm height, depth of closure, and translation of the shoreline (in this case, shoreline recession). Assuming that as an unarmored beach erodes, it maintains approximately the same profile above the seaward limit of significant transport, the volume can be determined as:

$$V = (B + h_*)X \qquad (2)$$

Where variables are consistent with Equation 1. Figure A - 10 provides the resulting volume lost versus year for each of the three sea level rise scenarios.

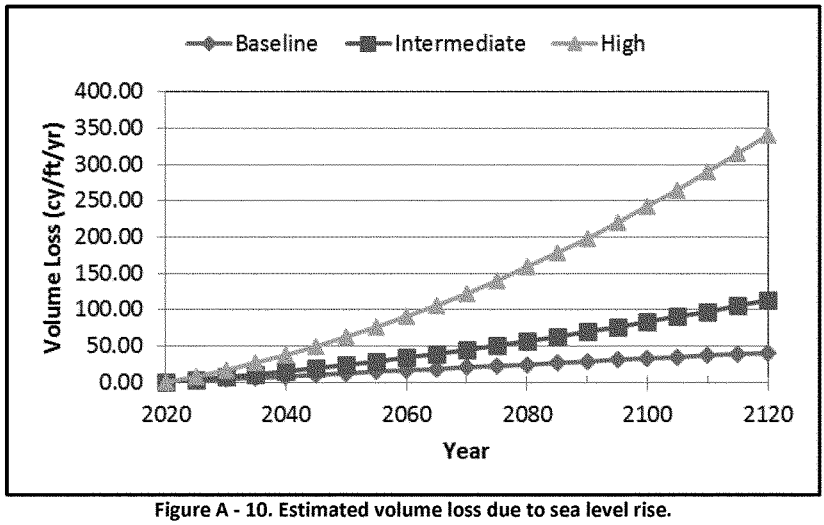


Figure A - 10. Estimated volume loss due to sea level rise.

Historical Shoreline Change

Changes in MHW position provide a historical view of the behavior of the shoreline. Beach profiles are traditionally gathered by the FDEP, local sponsors, and USACE. Available beach surveys for St. Johns County go back as far as 1883. However, the reliability of such historical profiles may be questionable. Additionally, some surveys were conducted over a span of years (i.e. 1970 to 1973) without any indication of which portion of the shoreline was surveyed during which year. Knowing the year of the survey data is vital to the accuracy of the annual recession rate. Therefore, based on a review of all available surveys, it was determined that profiles surveyed prior to 1972 would be excluded from the MHW analysis. All of the survey data along with the associated survey metadata used for this analysis is available online at http://www.dep.state.fl.us/beaches/data/his-shore.htm.

MHW shoreline positions were measured at each DNR survey monument location, for each survey, along the proper azimuth (75° for the study area; Figure A - 11). The distance given from each DEP monument to the MHW elevation for each year surveyed can be seen in Table A - 8. At each DEP R-monument in the study area the change in the MHW position and the rate of change was determined for the time period between each of the surveys as well as the overall change from 1972 to 2015. The rate of MHW position change for each monument for selected periods are displayed in Figure A - 12 and Table A - 9. The average MHW position change and change rate for each of the three study segments are presented in Table A - 10.

Shoreline changes fluctuate over time along the study area. The shoreline of St. Johns County has fluctuated throughout history seeing areas undergo both advancement and recession of the MHW position. This analysis showed that over the long term from 1972 to 2015 the study area, on average, has been receding. In the time between 1972 and 2015, the MHW in South Ponte Vedra receded an average of 1.3 ft/yr. In the Vilano Beach 1 segment the MHW receded 1.7

ft/yr on average while the Vilano Beach 2 segment directly north of the St. Augustine Inlet the MHW advanced seaward an average of 0.3 ft/yr.

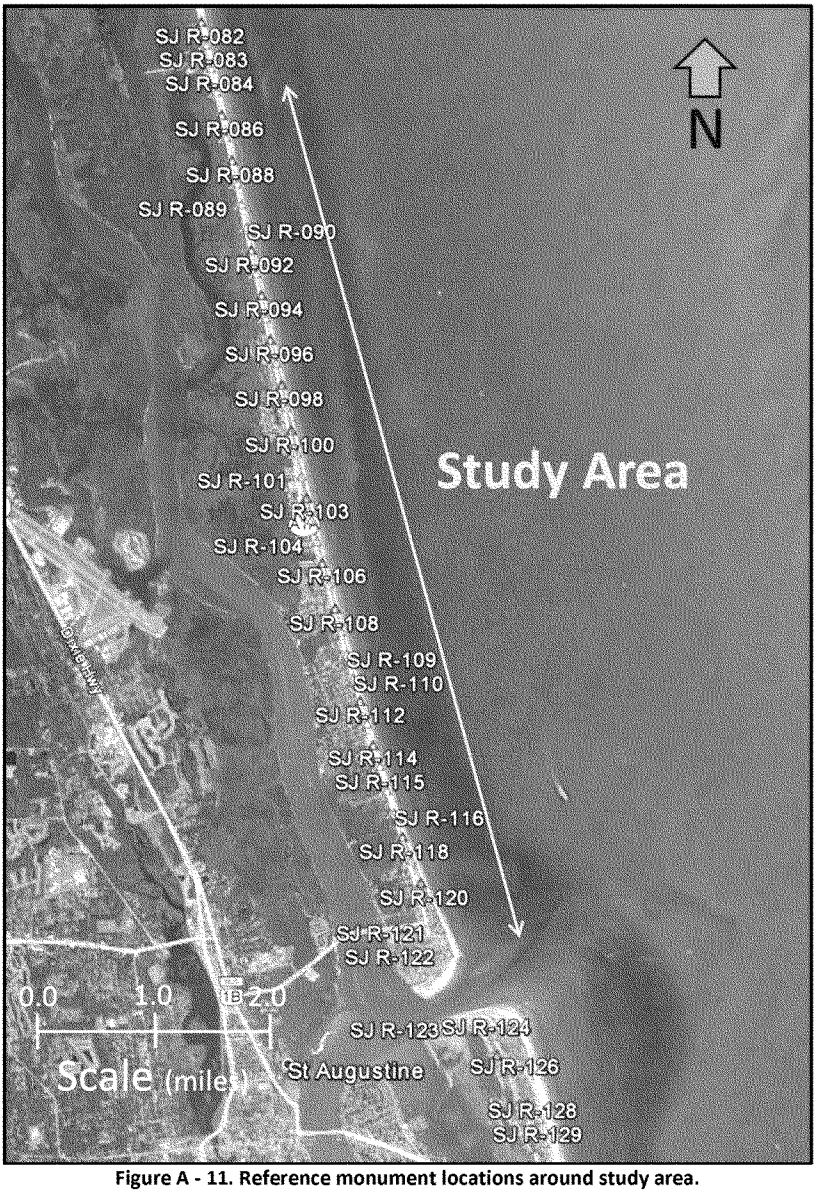


Figure A - 11. Reference monument locations around study area.

Table A - 8. Study area distances between R monuments and MHW.

Mon. ID	Sep 1972	Jun 1984	Sep 1986	Apr 1999	Aug 2003	Oct 2007	Dec 2009	Dec 2010	Feb 2012	Dec 2012	Jun 2013	July 2014	Aug 2015
84	214	164	198	163	168	140			156	159	145	156	150
85	186	176	212	167	158	139			151	132	169	132	121
86	162	150	159	157	152	120			171	153	179	163	225
87	177	127	150	146	140	103			111	127	97	130	153
88	143	178	179	140	143	89			109	104	120	101	100
89	187	156	182	159	147	103			117	117	104	133	140
90	178	171	158	142	134	95			102	102	104	100	99
91	205	193	190	181	153	130			133	142	133	119	125
92	199	224	228	184	170	145			164	145	141	138	127
93	160	164	143	145	139	114			125	118	108	100	93
94	199	226	223	161	166	133			147	139	143	143	126
95	221	192	175	176	173	150			160	165	161	158	130
96	182	148	200	138	139	115			127	128	125	112	92
97	179	140	142	125	132	99			108	96	100	81	93
98	203	162	169	159	161	121			136	148	132	115	171
99	192	196	217	162	158	136			151	139	142	142	150
100	190	179	188	156	151	131			147	142	139	138	130
101	232	194	195	190	186	144			155	136	140	150	151
102	197	205	196	167	162	147			152	135	131	144	157
103	209	223	198	190	181	160			158	166	141	151	162
104	207	213	198	192	176	158			162	147	154	144	158
105	225	207	199	206	188	160			176	177	179	169	151
106	194	171	181	169	154	130			152	139	135	129	120
107	199	170	161	151	146	128			153	139	134	139	117
108	205	175	174	167	141	134			151	127	137	134	132
109	237	184	187	188	170	154	164	160	173	163	162	172	150
110	242	208	219	199	179	150	160	161	172	165	151	167	166
111	215	175	183	178	160	133	165	147	146	127	128	131	132
112	211	171	173	157	152	135	129	132	126	122	139	128	148
113	208	170	183	178	152	136	134	126	124	118	92	123	136
114	191	158	147	160	128	134	114	121	120	119	119	109	121
115	191	175	171	160	126	134	107	127	131	135	132	145	142
116	228	191	181	164	127	141	105	133	145	148	137	140	138
117	224	207	201	174	135	159	106	155	162	168	164	143	155

Mon. ID	Sep 1972	Jun 1984	Sep 1986	Apr 1999	Aug 2003	Oct 2007	Dec 2009	Dec 2010	Feb 2012	Dec 2012	Jun 2013	July 2014	Aug 2015
118	243	240	213	191	157	192	172	194	184	193	184	181	182
119	213	255	241	188	179	211	188	189	173	186	159	208	203
120	183	287	300	204	211	229	184	169	177	190	163	244	246
121	229	247	235	225	274	271	220	214	274	266	302	319	311
122	262	279	243	403	380	341	449	453	455	312	379	372	342

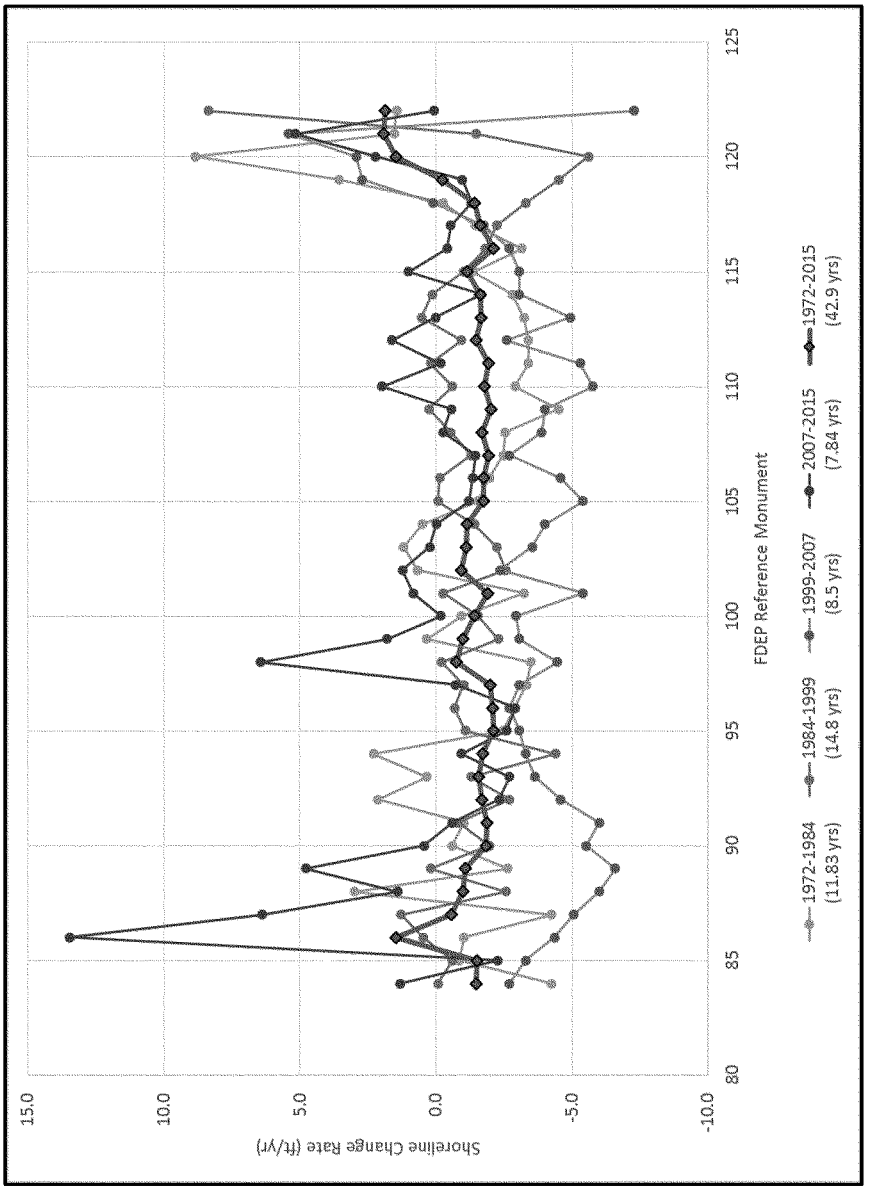


Figure A - 12. Study area shoreline change rates.

Table A - 9. Shoreline change rates (ft/yr) for selected periods.

Mon. ID	1972-1984 (11.83 yrs)	1984-1999 (14.8 yrs)	1999-2007 (8.5 yrs)	2007-2015 (7.84 yrs)	1972-2015 (42.9 yrs)
84	-4.3	-0.1	-2.7	1.3	-1.5
85	-0.9	-0.6	-3.3	-2.3	-1.5
86	-1.0	0.5	-4.3	13.5	1.5
87	-4.3	1.3	-5.1	6.4	-0.6
88	3.0	-2.6	-6.0	1.4	-1.0
89	-2.6	0.2	-6.6	4.8	-1.1
90	-0.6	-2.0	-5.5	0.5	-1.9
91	-1.0	-0.8	-6.0	-0.6	-1.9
92	2.1	-2.7	-4.6	-2.3	-1.7
93	0.3	-1.3	-3.6	-2.7	-1.6
94	2.3	-4.4	-3.3	-0.9	-1.7
95	-2.5	-1.1	-3.1	-2.6	-2.1
96	-2.9	-0.7	-2.7	-2.9	-2.1
97	-3.3	-1.0	-3.1	-0.7	-2.0
98	-3.5	-0.2	-4.5	6.4	-0.7
99	0.3	-2.3	-3.1	1.8	-1.0
100	-0.9	-1.5	-2.9	-0.2	-1.4
101	-3.2	-0.3	-5.4	0.8	-1.9
102	0.7	-2.6	-2.4	1.2	-0.9
103	1.2	-2.2	-3.5	0.2	-1.1
104	0.5	-1.4	-4.0	0.0	-1.1
105	-1.5	-0.1	-5.4	-1.2	-1.7
106	-2.0	-0.1	-4.6	-1.3	-1.7
107	-2.5	-1.3	-2.7	-1.5	-1.9
108	-2.6	-0.5	-3.9	-0.3	-1.7
109	-4.5	0.3	-4.0	-0.6	-2.0
110	-2.9	-0.6	-5.8	2.0	-1.8
111	-3.4	0.2	-5.3	-0.2	-1.9
112	-3.4	-0.9	-2.6	1.6	-1.5
113	-3.2	0.5	-4.9	0.0	-1.7
114	-2.8	0.1	-3.1	-1.7	-1.6
115	-1.4	-1.0	-3.1	1.0	-1.1
116	-3.1	-1.8	-2.7	-0.4	-2.1
117	-1.4	-2.2	-1.8	-0.5	-1.6
118	-0.3	-3.3	0.1	-1.3	-1.4
119	3.6	-4.5	2.7	-1.0	-0.2
120	8.8	-5.6	2.9	2.2	1.5
121	1.5	-1.5	5.4	5.2	1.9
122	1.4	8.4	-7.3	0.1	1.9

Table A - 10. Study segment shoreline change summary.

Project Segments		1972-1984 (11.83 yrs)	1984-1999 (14.8 yrs)	1999-2007 (8.5 yrs)	2007-2015 (7.84 yrs)	1972-2015 (42.9 yrs)
SPV (R-84 to R-104)	Avg Change (ft)	-11.5	-18.1	-34.7	8.6	-55.7
	Avg Change Rate (ft/yr)	-1.0	-1.2	-4.1	1.1	-1.3
VB (R-104 to R-117)	Avg Change (ft)	-29	-9	-33	-2	-72
	Avg Change Rate (ft/yr)	-2.4	-0.6	-3.8	-0.2	-1.7
VB (R-117 to R-122)	Avg Change (ft)	27	-22	3	6	14
	Avg Change Rate (ft/yr)	2.3	-1.5	0.4	0.8	0.3

Historical Volume Change

Volume change analysis can provide additional insight into beach changes beyond the shoreline change analysis. The variability of volume change rates is visible in the values presented in Table A - 11 and Figure A - 13. On average, volume change varied between 0.95 cy/ft/yr (1972 to 1986) and -6.18 cy/ft/yr (1999 to 2003) for an overall average change of -3.62 cy/ft/yr. Although the shoreline change suggests erosion of the profile during the 1972 to 1984 period, the volume change over a similar period (1972 to 1986) indicates that the shoreline recession is actually a redistribution of material along the profile since volume changes were actually positive. The final two periods analyzed in Table A - 11 (2003 to 2007 and 2011 to 2015) show the volume change rate along the study area to be consistent with the average of all the periods.

Table A - 11. Unit volume change rates for the study area.

	Volume Change (cy/ft/yr)					
Monument	1972 to 1986	1986 to 1999	1999 to 2003	2003 to 2007	2011 to 2015	Average
84	0.65	-8.56	4.42	-14.36		-4.46
85	2.28	-8.77	0.19	-8.81	-1.20	-3.26
86	1.77	-2.18	2.77	-11.71	-0.67	-2.00
87	1.26	-7.15	-4.00	-6.56	-6.69	-4.63
88	2.99	-10.19	3.76	-17.37	-0.96	-4.35
89	2.09	-9.47	0.34	-21.25	-6.32	-6.92
90	1.52	-6.87	-1.94	-12.67	4.25	-3.14
91	1.95	-4.32	-7.48	-6.04	-4.59	-4.10
92	2.54	-5.04	0.89	-9.86	-2.81	-2.86
93	1.68	-5.54	-9.17	1.24	-0.81	-2.52
94	1.22	-8.27	5.55	-6.83	-11.01	-3.87
95	-0.39	-2.43	-16.92	0.04	-15.50	-7.04
96	-0.07	-5.18	1.50	-7.77	-18.38	-5.98
97	-0.24	-10.22	-2.49	-3.20	-8.97	-5.02
98	-0.74	-4.61	-11.99	-2.31	-3.38	-4.61
99	1.39	-8.44	-17.55	5.00	1.95	-3.53
100	1.29	-5.41	-10.41	-4.04	-1.96	-4.11
101	1.68	-7.84	-7.43	-0.58	0.48	-2.74
102	2.00	-5.58	-2.06	-10.22	0.23	-3.13
103	3.94	-7.04	-14.85	4.56	-5.45	-3.77
104	4.14	-7.32	-18.01	-0.40	-12.54	-6.83
105	4.03	-7.19	-19.09	-0.64	0.37	-4.50

Monument	Volume Change (cy/ft/yr)					
	1972 to 1986	1986 to 1999	1999 to 2003	2003 to 2007	2011 to 2015	Average
106	2.45	-5.29	-15.54	-0.70	-3.07	-4.43
107	-0.56	-4.58	-12.73	2.15	-3.57	-3.86
108	0.14	-5.79	0.65	-11.69	-2.27	-3.79
109	-1.06	-4.20	-18.63	13.17	-1.68	-2.48
110	2.29	-4.21	-11.53	-6.67	-14.83	-6.99
111	-1.29	-8.33	-15.93	14.86	-1.50	-2.44
112	-3.07	-7.78	-8.31	-2.08	2.57	-3.73
113	-1.00	-7.02	-16.35	3.36	-1.57	-4.52
114	-0.91	-4.36	-6.11	-8.19	-0.30	-3.97
115	-0.57	-5.89	-0.56	-15.14	-2.96	-5.03
116	-1.08	-8.90	-11.09	1.90	-3.07	-4.45
117	-0.30	-9.12	-11.05	5.05	-4.50	-3.98
118	-0.88	-7.17	-6.58	8.54	-4.44	-2.11
119	1.13	-5.60	-3.07	11.02	-3.13	0.07
120	3.91	-7.88	1.99	0.12		-0.46
121	0.89	2.73	-9.47	5.58		-0.07
122	0.06	7.54	27.17	-16.92		4.46
Average	**0.95**	**-5.99**	**-6.18**	**-3.32**	**-3.95**	**-3.62**

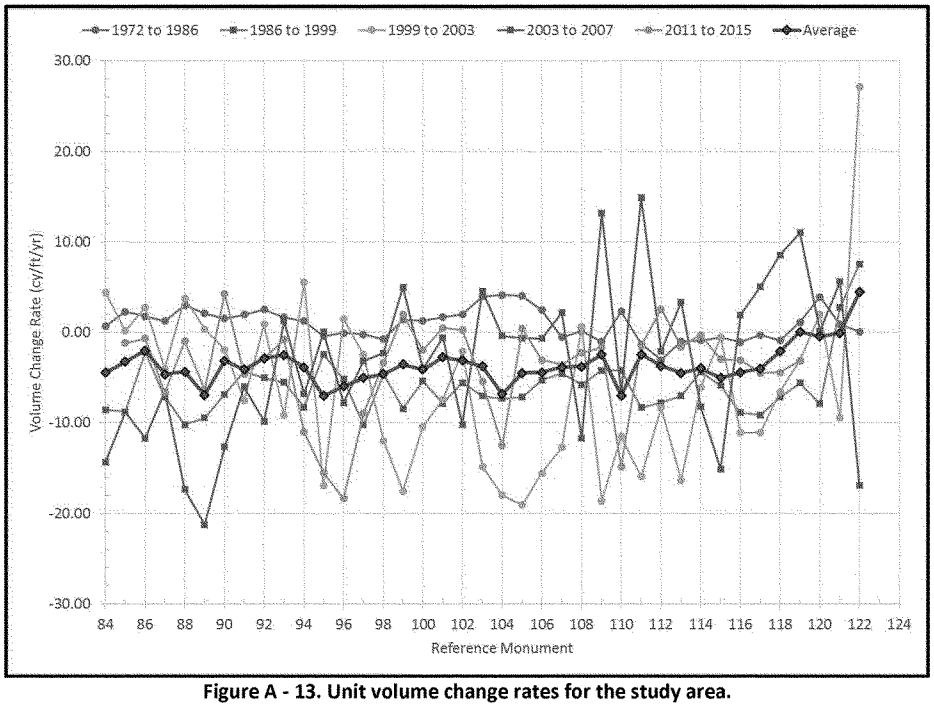


Figure A - 13. Unit volume change rates for the study area.

Effects of Adjacent Features

St. Augustine Inlet

St. Augustine Inlet features a Federal navigation channel and lies in central St. Johns County, approximately 34 mi south of the St. Johns River Inlet and 15 mi north of the Matanzas Inlet (Figure A - 1). The inlet supports navigation and provides access to the Atlantic Ocean from the St. Augustine Harbor and the Intracoastal Waterway (ICWW). The extent of impacts to adjacent shorelines attributable to the Federal navigation channel was investigated using historical shoreline information dating as far back as 1859, prior to construction of Federal improvements in 1940. It was determined that prior to 1940, the shorelines adjacent to the existing inlet were characterized by cyclic periods of instability. Rates of shoreline change varied from as much as +250 feet/year to -250 feet/year. Much of this can be attributed to the unstable and migratory nature of the inlet prior to stabilization. Despite the mobility of the inlet at the time, available survey information suggests that the overall, average shoreline change rate prior to inlet stabilization was -4 feet/year.

Rates of erosion and accretion after inlet stabilization were estimated based on shoreline information obtained since construction in 1940. Inlet improvement involved cutting a new channel north of the natural inlet and constructing north and south structures at the inlet entrance: a sand-trap groin on the north side and a jetty on the south side. Immediately after construction shorelines adjacent to the inlet experienced fluctuating patterns of erosion and accretion as the old inlet migrated and filled, existing shoals dispersed and reformed, and the entire inlet/shoreline system sought equilibrium. Accounting for the years immediately after construction, as well as the addition of armor in various locations along the shoreline, and the addition of beach material obtained through maintenance dredging events, the average shoreline rate of change south of the inlet was determined to be -8 feet/year. With the exception of the post-construction stabilization period, shoreline erosion/accretion rates to the north of the inlet appear to have remained comparable to those of the pre-construction shoreline.

Assuming that any differences in shoreline change rates before and after inlet stabilization are indicative of the inlet's impacts on sediment transport processes, then approximately 50% of post-construction beach erosion south of the inlet has occurred due to impacts of the Federal navigation project. A previous inlet impact analysis, performed during preparation of the 1979 feasibility study (USACE, 1979) estimated that the inlet-induced component of total erosion occurring over approximately 5 miles of the project shoreline (south of the inlet) was about 50%. Therefore the analyses are comparable.

The St. Augustine Inlet contributes to beach erosion for areas north and south of the inlet by acting as a sediment sink (USACE, 2012). The sand trap groin structure on the north side of the inlet acts to stabilize southern portions of the study area by trapping sediment following the net southerly sediment transport direction. However, as designed, transport around the tip of the north sand-trap groin is prevalent and visible in the development of "Porpoise Point", the sand spit at the southern end of Vilano Beach adjacent to the navigation channel on the north side of the inlet. Flood tidal currents are responsible for diverting sediment from the north and south shorelines into the inlet. Once inside the inlet, sediments tend to settle out into flood shoals. Tidal ebb currents also divert sediments from the littoral system in the offshore direction where some of the sediment is deposited on the ebb shoal. Sediments not trapped in the ebb shoal complex are bypassed to the adjacent shorelines.

Based on USACE (2012), the inlet impounds 278,000 cy/yr of sediment originating from the adjacent north and south beaches. The sediment budget presented in USACE (2012) suggests that 248,800 cy/yr

enters the inlet complex from the north beaches and 29,300 cy/yr originates from beaches to the south. Coupled with the net southerly transport of 150,000 cy/yr, the net deficit for the north and south beaches are 248,800 cy/yr and 179,300 cy/yr, respectively.

The Federally constructed coastal storm risk management project on St. Augustine Beach (construction initiated in 2001) addresses the down drift impacts of the inlet by facilitating inlet bypassing through dredging of the ebb shoal and nourishing down drift (south of the inlet) beaches. Since it was determined that 50% of the erosion south of the inlet was attributable to the Federal navigation project, the cost apportionment that would otherwise be paid by the local sponsor is further reduced and paid by the Federal government. For further details see USACE (1998).

Two governmental entities routinely dredge in the vicinity of St. Augustine Inlet. The Florida Inland Navigation District (FIND) acts as the local sponsor for ICWW maintenance, which places beach quality material along Anastasia Island State Park north of the existing St. Johns County SPP. USACE maintains the Federal navigation channel that traverses St. Augustine Inlet and often dredges the channel concurrently with renourishment of the existing St. Johns County Federal SPP since the inlet ebb shoal is the authorized borrow area. In 1996, 324,000 cubic yards (cy) of maintenance material from the navigation project was placed on St. Augustine beach between R-138 and R-148. Initial construction of the St. Johns County Federal Shore Protection Project in 2003 removed 4,500,000 cy from the ebb shoal with a portion of this volume placed in Anastasia State Park. This dredging event was followed by removal of 2,800,000 cy as part of the Federal emergency renourishment in 2005 as a result of the 2004 hurricane season. The latest renourishment of the St. Johns County SPP occurred in 2012 and placed 2,100,000 cy between R-139 and R-147.

Beach-*fx* Life-Cycle Shore Protection Project Evolution Model

Federal participation in Coastal Storm Risk Management (CSRM) projects is based on a favorable economic justification in which the benefits of the project outweigh the costs. Determining the Benefit to Cost Ratio (BCR) requires both engineering analysis (project performance and evolution) and planning (alternative analysis and economic justification). The interdependence of these functions has led to the development of the life-cycle simulation model Beach-*fx*. Beach-*fx* combines the evaluation of physical performance and economic benefits and costs of shore protection projects (Gravens et. al., 2007), particularly beach nourishment, to form the basis for determining the justification for Federal participation. This section describes the engineering aspects of the Beach-*fx* model.

Background & Theory

USACE guidance requires that flood damage reduction studies include risk and uncertainty (USACE, 2006). Beach-*fx* is an event-driven life-cycle model that satisfies this requirement by fully incorporating risk and uncertainty throughout the modeling process (input, methodologies, and output). Over the project planning horizon, typically 50 years, the model estimates shoreline response to a series of historically-based storm events. These plausible storms are randomly generated using a Monte Carlo simulation. The corresponding shoreline evolution includes not only erosion due to the storms, but also allows for storm recovery, post-storm emergency dune and/or shore construction, and planned nourishment events throughout the period of Federal participation for the project. Risk based damages to structures are estimated based on the shoreline response in combination with pre-determined Damage Functions for all structure types within the project area. Uncertainty is incorporated not only within the input data (storm occurrence and intensity, structural parameters, structure and contents valuations, and Damage Functions), but also in the applied methodologies (probabilistic seasonal storm generation and multiple iteration, life-cycle analysis). Results from the multiple iterations of the life-cycle are averaged and the economics of the project are determined.

The project site itself is represented by divisions of the shoreline referred to as "Reaches". Because this term may also be used to describe segments of the shoreline to which project alternatives are applied, Beach-*fx* reaches will be referred to in this appendix as "Model reaches". Model reaches are contiguous, morphologically homogenous areas that contain groupings of structures (residences, businesses, walkovers, roads, etc.), all of which are represented by Damage Elements (DEs). DEs are grouped within divisions referred to as Lots. Figure A - 14 shows a graphic depiction of the model setup. For further details about the specifics of Lot extents and DE grouping see the Economics Appendix.

Each model reach is associated with a representative beach profile that approximates the cross-shore profile and beach composition of the reach. Multiple model reaches may share the same representative beach profile while groupings of model reaches may represent a single design reach. For SPV/Vilano, the project area consists of a single design reach, originally divided into 37 model reaches. Table A - 12 provides model reach identifiers as well as corresponding FDEP R monuments and Beach-*fx* representative profiles for each model reach. Model reaches are grouped assigned to representative profiles based on the similarity of profile characteristics (detailed in Pre-Storm Representative Profile Section).

Implementation of the Beach-*fx* model relies on a combination of meteorology, coastal engineering, and economic analyses and is comprised of four basic elements:

- Meteorological driving forces

- Coastal morphology
- Economic evaluation
- Management measures

The subsequent discussion in this section addresses the basic aspects of implementing the Beach-*fx* model. For a more detailed description of theory, assumptions, data input/output, and model implementation, refer to Gravens et al. (2007), Males et al. (2007), and USACE (2009).

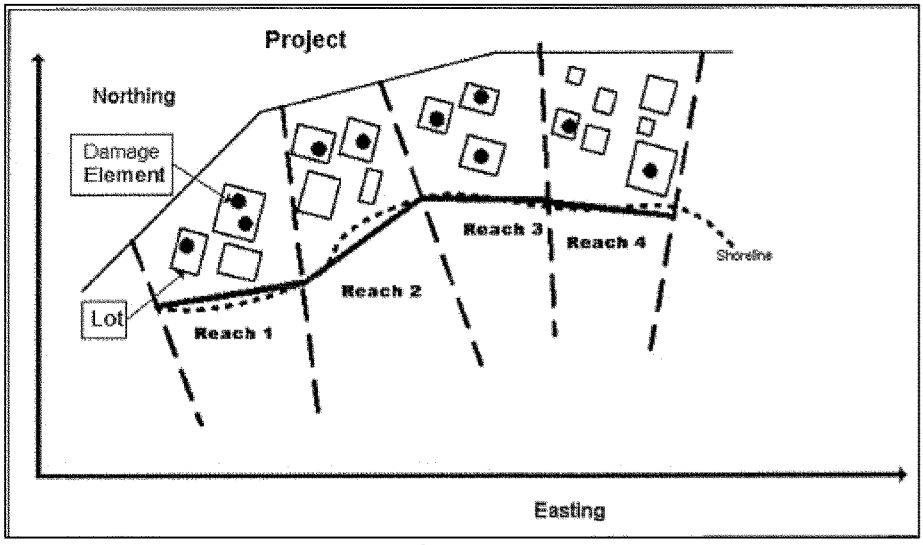


Figure A - 14. Beach-*fx* model setup representation.

Table A - 12. Model reaches, reference monuments, and Beach-*fx* representative profiles.

Model Reach	R-monument(s)	Beach-*fx* Profile #	Model Reach	R-monument(s)	Beach-*fx* Profile #
SPV84	84	1	SPV104	104	3
SPV85	85	1	SPV105	105	3
SPV86	86, 87	1	SPV106	106	3
SPV87	87	2	SPV107	107	3
SPV88	88	2	SPV108	108	3
SPV89	89	2	SPV109	109	3
SPV90	90	1	Vx110	110	3
SPV91	91	1	Vx111	111	3
SPV92	92	1	Vx112	112, 113	4
SPV93	93	1	Vx114	114	4
SPV94	94	2	Vx115	115	5
SPV95	95	2	Vx116	116	5
SPV96	96	2	Vx117	117	5
SPV97	97, 98	2	V2x118	118	6
SPV98	none	2	V2x119	119	6
SPV100	99, 100	3	V2x120	120	7

Model Reach	R-monument(s)	Beach-*fx* Profile #
SPV101	none	3
SPV102	101, 102	4
SPV103	103	4

Model Reach	R-monument(s)	Beach-*fx* Profile #
V2x121	121	7
V2x122	122	8

Meteorologic Driving Forces

The predominant driving force for coastal morphology and associated damages within the Beach-*fx* model is the historically based set of storms that is applied to the life-cycle simulation. Because the eastern coast of Florida is subject to seasonal storms- tropical storms (hurricanes) in the summer months and extra-tropical storms (northeasters) in the winter and fall months- the "plausible storms" dataset for St. Johns County is made up of both types. Derived from the historical record of the region, the plausible storm set is based on 46 tropical storms, occurring between 1887 and 1999 and 48 extra-tropical storms, occurring between 1980 and 1999.

Because tropical storm events tend to be of limited duration, passing over a given site within a single portion of the tide cycle, it is assumed that any of the historical storms could have occurred during any combination of tidal phase and tidal range. Therefore, each of the 46 tropical storms surge hydrographs was combined with possible variations in the astronomical tide. This was achieved by combining the peak of each storm surge hydrograph with the astronomical tide at high tide, mean tide falling, low tide, and mean tide rising for each of three tidal ranges corresponding to the lower quartile, mean, and upper quartile tidal ranges. This resulted in 12 distinct combinations for each historically based tropical storm and a total of 552 tropical storm conditions in the plausible storm dataset.

Due to their generally extended durations, extra-tropical storms in the historical record tend to occur over complete tide cycles. Therefore, it can be assumed that the storm hydrograph of each of the 48 historical extra-tropical storms is sufficient without combining with possible variations of the astronomical tide. The entire plausible storm suite therefore consists of a total of 600 tropical and extra-tropical storms.

In addition to the plausible storm dataset, the seasonality of the storms must also be specified. The desired storm seasons are based on the assumption that each plausible storm takes place within the season in which the original historical storm occurred. The probability of both tropical and extra-tropical storms is defined for each season through the Probability Parameter. The Probability Parameter is determined for each season and storm type by dividing the number of storms by the total number of years in the storm record (extra-tropical or tropical). Four storm seasons were specified for St. Johns County (Table A - 13).

Table A - 13. St. Johns County Beach-*fx* storm seasons.

Storm Season	Start Date	End Date	Probability Parameter Extra-Tropical Storm	Probability Parameter Tropical Storm
Extratrop. Winter/Spring	Dec 1	Apr 31	1.45	0.00
Tropical Early Summer	May 1	Jul 31	0.15	0.04
Tropical Peak	Aug 1	Sep 30	0.10	0.29
Extratrop./Tropical	Oct 1	Nov 30	0.70	0.07

The combination of the plausible storm dataset and the specified storm season allows the Beach-*fx* model to randomly select from storms of the type that fall within the season currently being processed. For each storm selected, a random time within the season is chosen and assigned as the storm date. The timing of the entire sequence of storms is governed by a pre-specified minimum storm arrival time. A minimum arrival time of 7 days was specified for St. Johns County. Based on this interval the model attempts to place subsequent storm events outside of a 14 day window surrounding the date of the previous storm (i.e. a minimum of 7 days prior to the storm event and a minimum of 7 days following the storm event). The model does allow the user to set different minimum arrival times for extra-tropical and tropical storms; however, the 7 day interval was considered suitable for both storm types. Also, due to the probabilistic nature of the model the minimum arrival time may be overridden as warranted during the course of the life-cycle analysis.

Coastal Morphology

The Beach-*fx* model estimates changes in coastal morphology through four primary mechanisms:

- Shoreline storm response
- Applied shoreline change
- Project-induced shoreline change
- Post-storm berm recovery

Combined, these mechanisms allow for the prediction of shoreline morphology for both with and without project conditions.

Shoreline Storm Response

Shoreline storm response is determined by applying the plausible storm suite that drives the Beach-*fx* model to simplified beach profiles that represent the shoreline features of the project site. As standard practice for obtaining storm response inputs for Beach-*fx*, application of the storm suite to the idealized profiles was accomplished employing the SBEACH coastal processes response model (Larson and Kraus, 1989). SBEACH is a numerical model which simulates storm-induced beach change based on storm conditions, initial profiles, and shoreline characteristics such as beach slope and grain size. Output consists of post-storm beach profiles, maximum wave height and wave period information, and total water elevation including wave setup. Pre- and post-storm profiles, wave data, and water levels can be extracted from SBEACH and imported into the Beach-*fx* Shore Response Database (SRD). The SRD is a relational database used by the Beach-*fx* model to pre-store results of SBEACH simulations of all plausible storms impacting a pre-defined range of anticipated beach profile configurations.

Pre-Storm Representative Profiles

In order to develop the idealized SBEACH profiles from which the SRD was derived, it was necessary to first develop representative profiles for the project shoreline. The number of representative profiles developed for any given project depends on the natural variability of shoreline itself. Historical profiles at each FDEP R-monument were compared over time, aligned, and then averaged into a composite profile representative of the shoreline shape at that given R-monument location. Composite profiles were then compared and separated into groupings according to the similarity between the following seven dimensions:

- Upland elevation

- Dune slope
- Dune height
- Dune width
- Berm height
- Berm width
- Foreshore slope

For St. Johns County, eight groupings of similarly dimensioned beach profiles were identified. Within each grouping, the composite profiles were then averaged into a single profile representative of a portion of the project shoreline. Using these representative profiles, idealized profiles describing the major dimensions of the profile were defined (Figure A - 15 through Figure A - 22). Below the zero foot-NAVD88 contour the idealized profile is the same shape as the average profile as it is assumed the average profile represents the equilibrium profile. Thus, the entire profile is not shown in Figure A - 15 through Figure A - 22. Table A - 12 provides dimensions for each of the idealized pre-storm Beach-*fx* profiles.

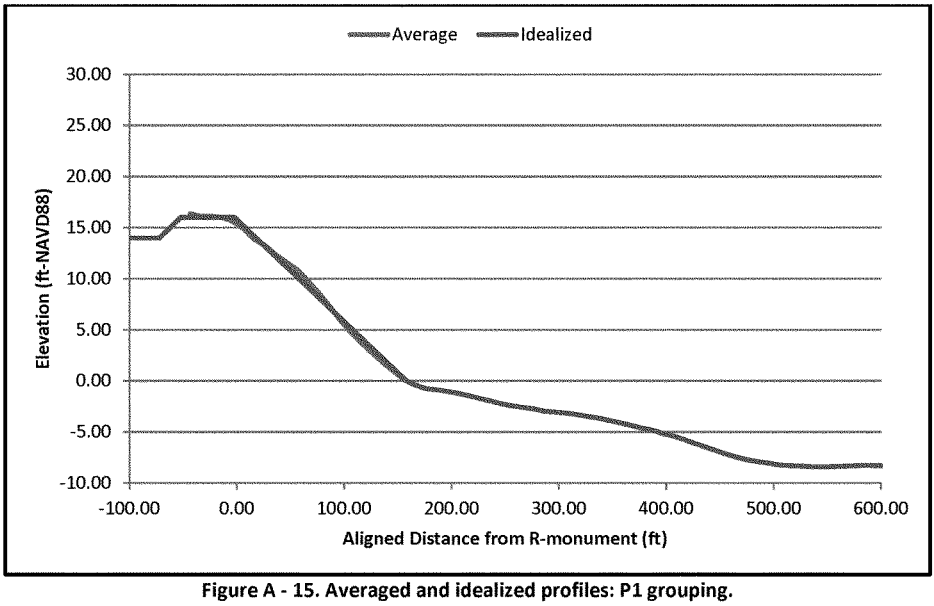


Figure A - 15. Averaged and idealized profiles: P1 grouping.

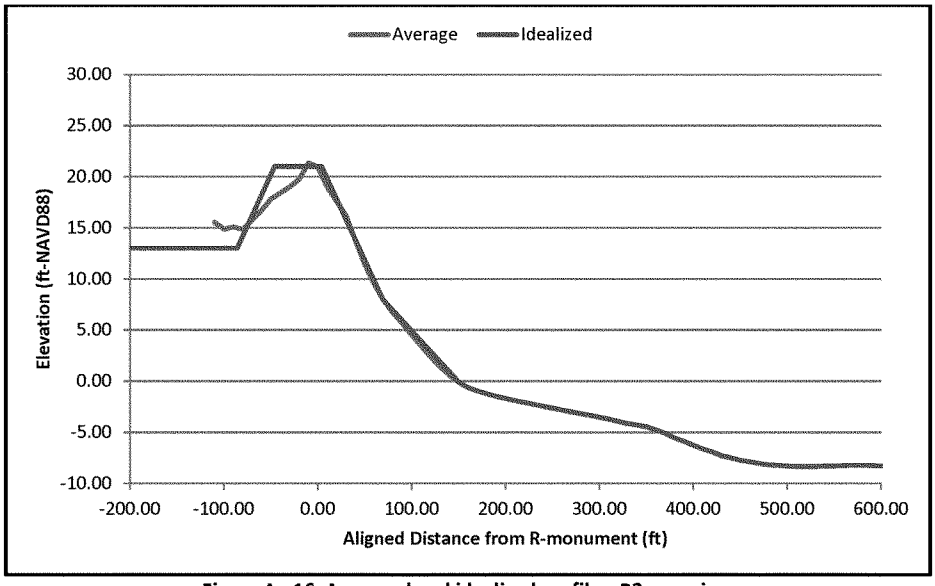


Figure A - 16. Averaged and idealized profiles: P2 grouping.

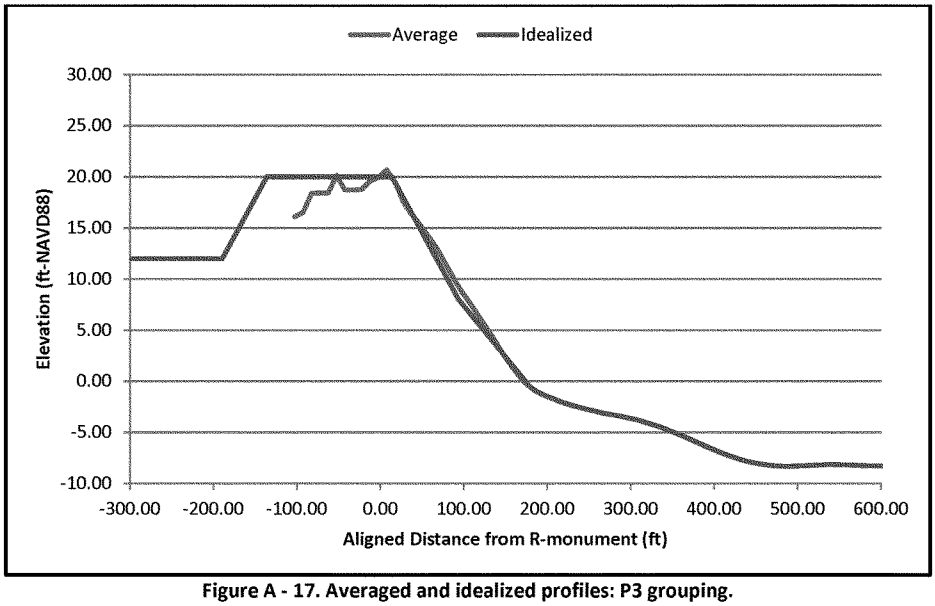


Figure A - 17. Averaged and idealized profiles: P3 grouping.

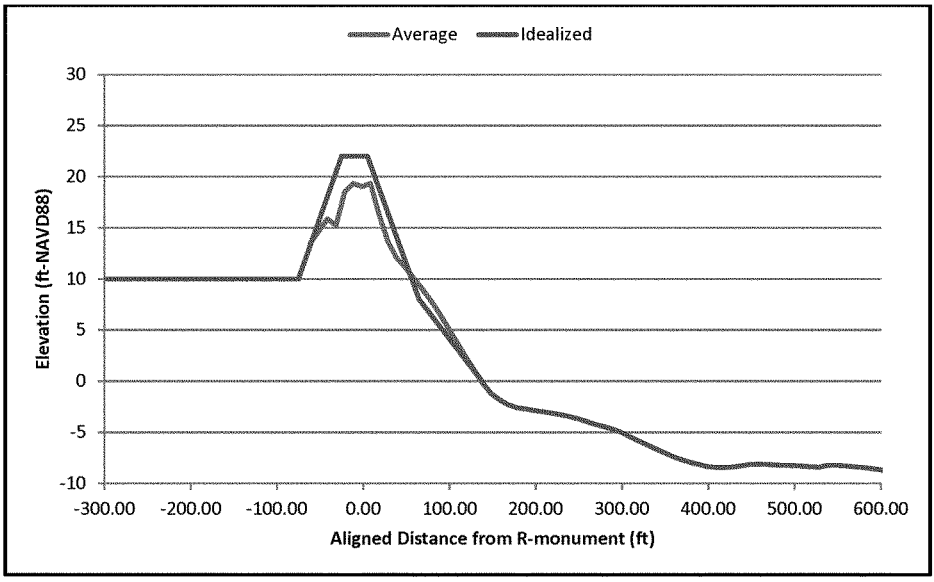


Figure A - 18. Averaged and idealized profiles: P4 grouping.

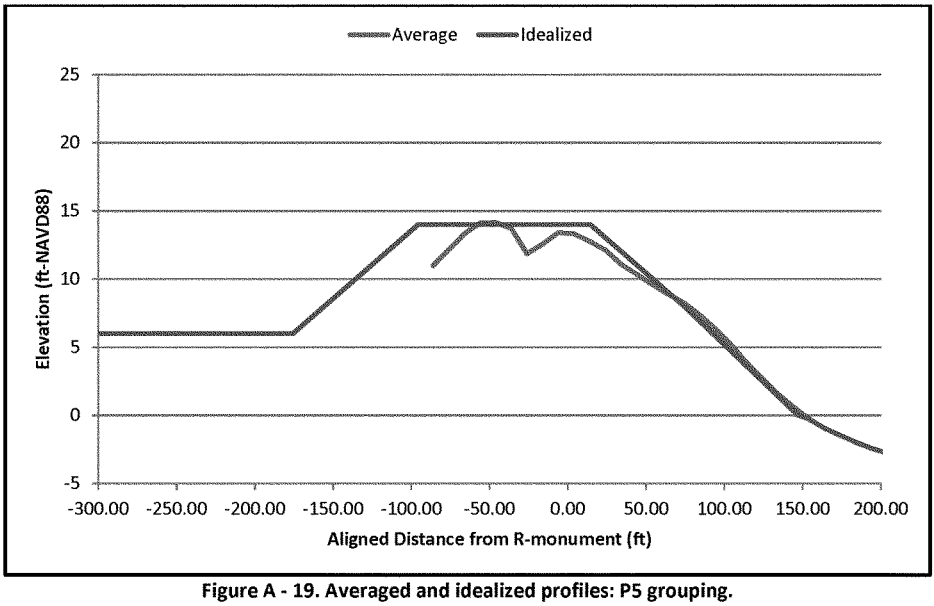


Figure A - 19. Averaged and idealized profiles: P5 grouping.

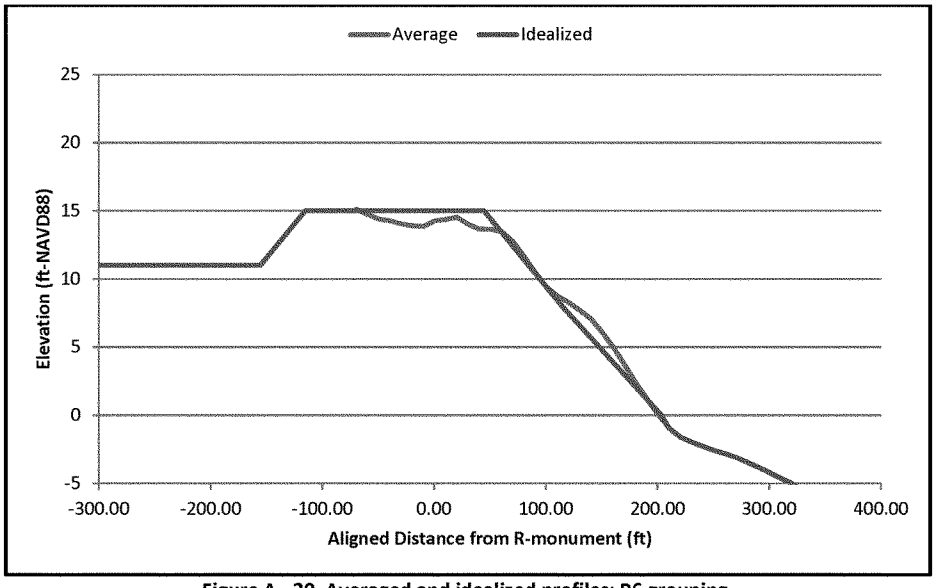


Figure A - 20. Averaged and idealized profiles: P6 grouping.

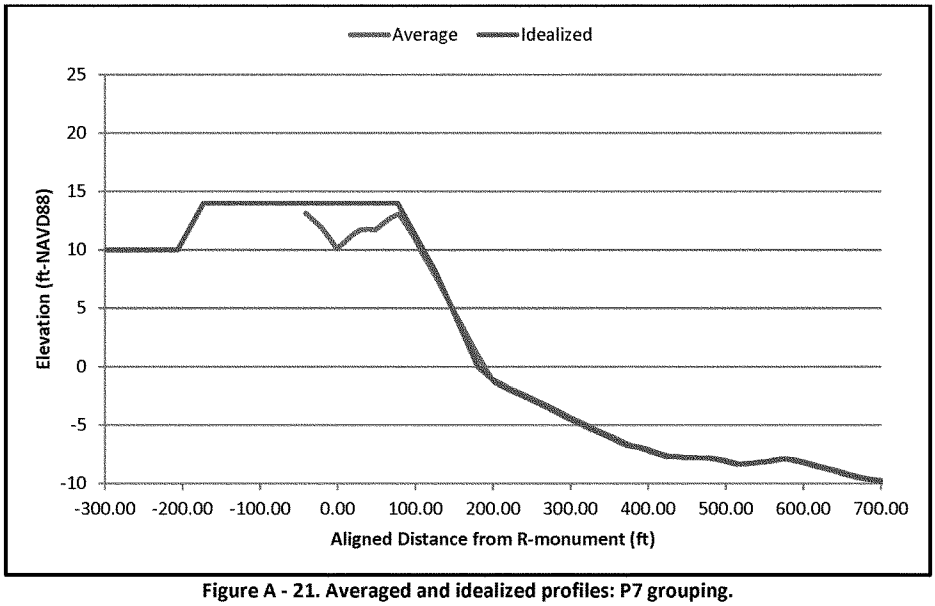


Figure A - 21. Averaged and idealized profiles: P7 grouping.

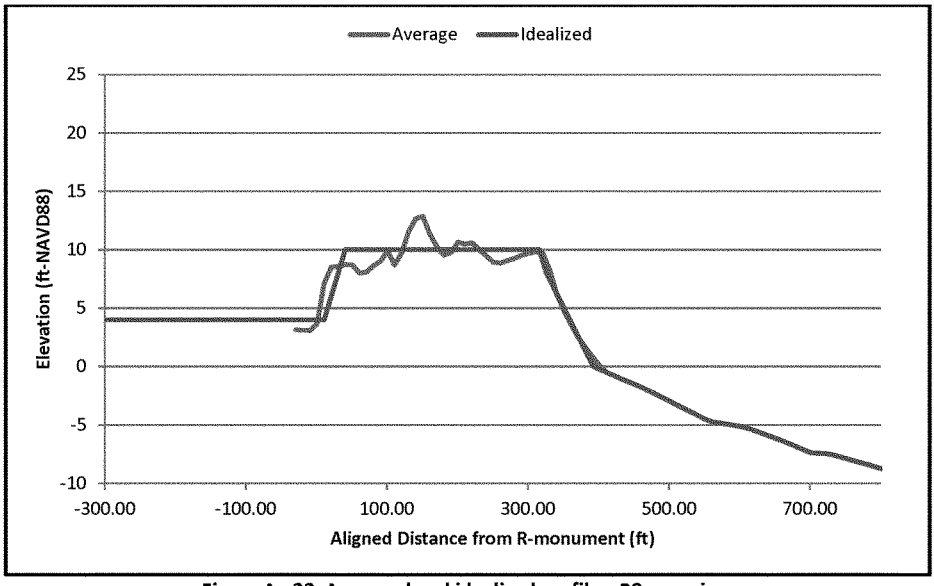


Figure A - 22. Averaged and idealized profiles: P8 grouping.

Table A - 14. Dimensions of idealized pre-storm representative profiles (existing).

Profile	R monuments Represented	Upland Elevation (ft-NAVD88)	Dune Height (ft-NAVD88)	Dune Width (ft)	Dune Slope (V:H)	Berm Elevation (ft-NAVD88)	Berm Width (ft)	Foreshore Slope (V:H)
P1	R-84 to R-86; R-90 to R-93	14	16	50	1:10	8	0	1:10
P2	R-87 to R-89; R-94 to R-98	13	21	50	1:5	8	0	1:10
P3	R-100 to R-111	12	20	150	1:6.67	8	0	1:10
P4	R-112, R-114	10	20	30	1:5	8	0	1:9.09
P5	R-115 to R-117	6	14	110	1:10	8	0	1:9.09
P6	R-118 to R-119	11	15	160	1:10	8	0	1:11.11
P7	R-120 to R-121	10	14	250	1:8.33	8	0	1:6.67
P8	R-122	4	10	275	1:5	8	0	1:8.33

The idealized profiles described in Table A - 14 represent the existing shoreline condition. In order to provide Beach-*fx* SRD database entries representative of future shoreline conditions, with- and with-out the presence of a shore protection project, it was necessary to develop idealized profiles for a series of possible future conditions. Table A - 15 provides the array of future profile dimensions modeled for the study area. Note that elevations and slopes do not change between existing and future conditions.

Table A - 15. Range of dune and berm width values for representative profiles.

	Dune Width				Berm Width			
Profile	Minimum	Maximum	Increment	Added Dune Width	Minimum	Maximum	Increment	Added Berm Width
P1	10	70	10	20	0	100	20	100
P2	10	70	10	20	0	100	20	100
P3	15	180	15	30	0	100	20	100
P4	10	50	10	20	0	100	20	100
P5	10	130	20	20	0	100	20	100
P6	20	180	20	20	0	100	20	100
P7	25	275	25	25	0	100	20	100
P8	25	300	25	25	0	100	20	100

SBEACH Methodology

SBEACH simulates beach profile changes that result from varying storm waves and water levels. These beach profile changes include the formation and movement of major morphological features such as alongshore bars, troughs, and berms. SBEACH is a two-dimensional model that considers only cross-shore sediment transport; that is, the model assumes that simulated profile changes are produced only by cross-shore processes. Alongshore wave, current, and sediment transport processes are not included.

SBEACH is an empirically based numerical model, which was formulated using both field data and the results of large-scale physical model tests. Input data required by SBEACH describes the storm being simulated and the beach of interest. Basic requirements include time histories of wave height, wave period, water elevation, beach profile surveys, and median sediment grain size.

SBEACH simulations are based on six basic assumptions:

- Waves and water levels are the major causes of sand transport and profile change
- Cross-shore sand transport takes place primarily in the surf zone
- The amount of material eroded must equal the amount deposited (conservation of mass)
- A relatively uniform sediment grain size is distributed throughout the profile
- The shoreline is straight and alongshore effects are negligible
- Linear wave theory is applicable everywhere along the profile without shallow-water wave approximations

Once applied, SBEACH allows for variable cross shore grid spacing, wave transformation, randomization of input wave conditions, and water level setup due to wind. Output data consists of a final calculated profile at the end of the simulation, maximum wave heights, maximum total water elevations plus setup, maximum water depth, volume change, and a record of various coastal processes that may occur at any time-step during the simulation (accretion, erosion, over-wash, boundary-limited run-up, and/or inundation).

SBEACH Calibration

Calibration of the SBEACH model was performed during the 1984 period using wave height, wave period, and water level information from Hurricane Diana and a subtropical storm as inputs (Figure A - 23). Calibration of the model is required to ensure that the SBEACH model is tuned to provide realistic shore responses that are representative of the specific project location.

Pre- and post-storm shoreline profiles were obtained from FDEP from May 1984 and December 1984 surveys, respectively. Using the pre-storm profiles, SBEACH was then run with a range of values for an array of calibration parameters. Table A - 16 provides the relevant beach characteristic and sediment transport calibration parameters as well as their final calibrated values. Figure A - 24 provides a comparison of the measured data versus the calibrated model output. Calibration parameters were verified using wave height, wave period, and water level information from Hurricanes Floyd and Irene in 1999 and pre-and post-storm shoreline profiles from the March 1999 and October/November 1999 surveys which provided a better prediction of the post-storm survey than the calibration period (Figure A - 25).

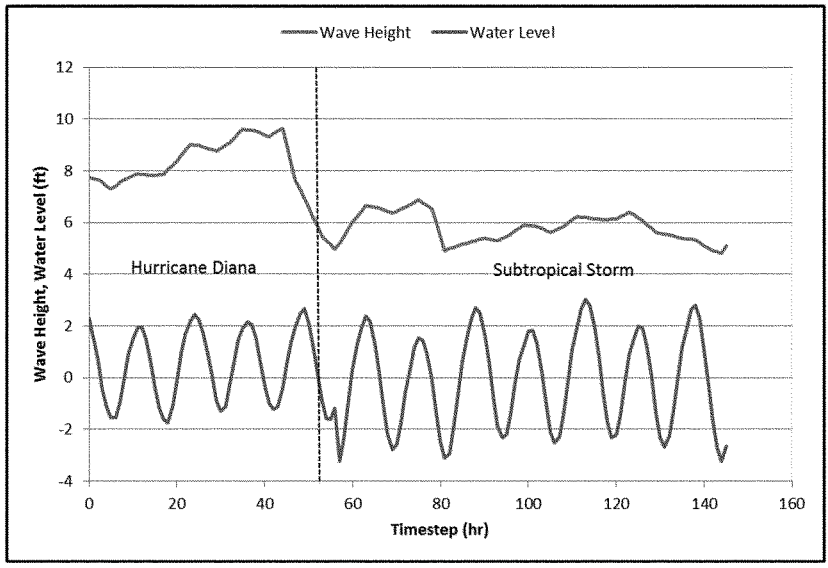


Figure A - 23. Hurricane Diana and 1984 subtropical storm wave and water level data for SBEACH calibration.

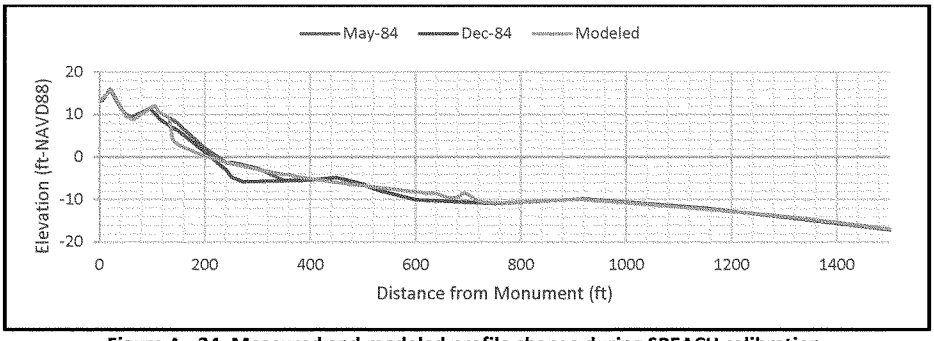


Figure A - 24. Measured and modeled profile change during SBEACH calibration.

Table A - 16. SBEACH calibrated beach characteristic and sediment transport parameters.

Beach Characteristic		Sediment Transport	
Parameter	**Calibrated Value**	**Parameter**	**Calibrated Value**
Landward Surf Zone Depth	1.0 ft	Transport Rate Coefficient	2.5e-06 (m^4/N)
Effective Grain Size	0.25 mm	Overwash Transport Parameter	0.005
		Coefficient for Slope-Dependent Term	0.005
Maximum Slope Prior to Avalanching	25	Transport Rate Decay Coefficient Multiplier	0.1
		Water Temperature	20°C

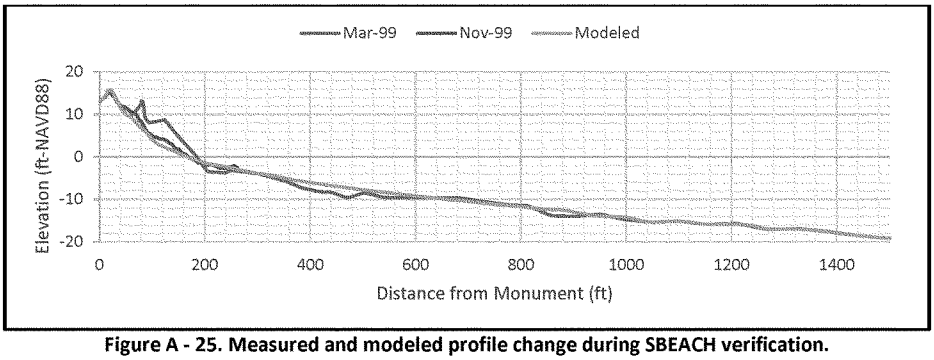


Figure A - 25. Measured and modeled profile change during SBEACH verification.

SBEACH Simulations

Calibrated SBEACH simulations were run for the idealized profiles, plus the range of widths provided in Table A - 15, in combination with each of the tropical and extra-tropical storms in the plausible storm database. From these profiles, changes in the key profile dimensions were extracted and stored in the SPV-Vilano Beach-*fx* SRD. The Beach-*fx* model extracts the profile responses stored in the SRD as storms

impact the project area during the project simulation period which extends from present day through the anticipated initial construction date (2020) and ends with the 50-year planning horizon (2070).

Applied Erosion Rate

The Applied Erosion Rate (shoreline change rate in feet per year) is a Beach-*fx* morphology parameter specified at each of the model reaches. It is a calibrated parameter that, combined with the storm-induced change generated internally by the Beach-*fx* model, returns the historical shoreline change rate for that location.

The target shoreline change rate during Beach-*fx* calibration is an erosion or accretion rate derived from the MHW rate of change determined at each R-monument location (see **Historical Shoreline Change**). Although the MHW rate of change represents the historical behavior of the project shoreline, when it is calculated at single point locations, such as R monuments, there is a high degree of variability between consecutive locations. This variability results in a similar variability in the Beach-*fx* results, specifically in project costs and predicted damages. Because this does not reflect actual shoreline behavior and leads to inconsistencies between adjacent economic reaches, the target shoreline change rate is determined by averaging adjacent MHW change rates to allow for smoother transitions along the length of the project shoreline. A three-monument smoothing window (approximately 3,000 ft) was applied four times to adequately reduce the noise in the MHW change rate signal. Figure A - 26 shows the smoothed target shoreline change rates along with the original MHW shoreline change rates (between 1972 and 2015) from which they were derived.

During Beach-*fx* calibration, Applied Erosion Rates were adjusted for each model reach and the Beach-*fx* model was run for 300 iterations of the 50-year project planning horizon. Calibration of the Beach-*fx* model is achieved when the rate of shoreline change, averaged over hundreds of life-cycle simulations, is equal to the target shoreline change rate.

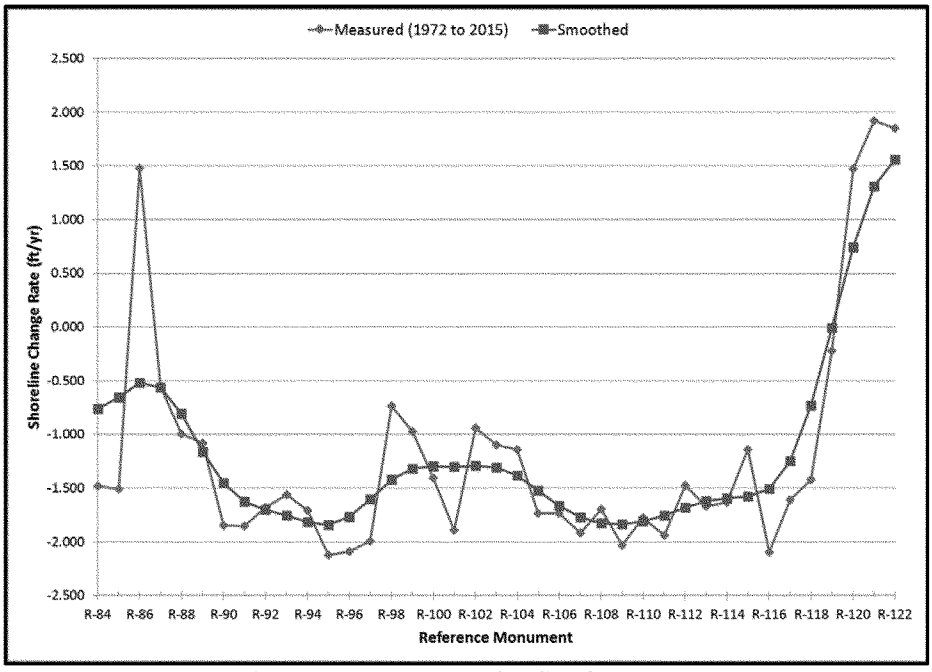


Figure A - 26. Target MHW shoreline change rate.

Project Induced Shoreline Change (GenCade)

The project induced shoreline change rate, also in feet per year, accounts for the alongshore dispersion of proposed beach nourishment alternatives. Beach-*fx* requires the use of shoreline change rates (beyond the Applied Erosion Rate) in order to represent the plan form diffusion of the beach fill alternatives after placement. The USACE one-dimensional shoreline change model GenCade was used to determine how the beaches of SPV and Vilano would respond to beach nourishment shore protection alternatives. The results from each beach fill alternative model run, including the no-fill without project condition, provided the plan form rate of change for each alternative. The difference in the rate of change for each alternative versus the without project condition was then used as input to the Beach-*fx* economic model to determine project benefits.

The GenCade model was developed by combining the USACE project-scale, engineering design-level shoreline change model GENESIS and the regional-scale, planning level model Cascade. The model can be set up and executed within the Surface-Water Modeling System (SMS) or executed as a stand-alone model through the MS-DOS interface and calculates the shoreline change and alongshore sediment transport due to waves. The original shoreline change model GENESIS was limited in its application to areas of sufficient distance from tidal inlets and to single littoral cells. By coupling the GENESIS and Cascade models, project areas represented in GenCade can span multiple littoral cells and include the features that separate the littoral cells such as inlets and structures (Frey et al., 2012).

Taylor Engineering, Inc. (2010) describes the development, calibration, and verification of the GenCade model in support of this study. The measured volume change over the 1986 to 1999 period was used to calibrate the model and verification of model parameters was determined using the volume changes measured over the period of 1999 to 2007. The Florida Coastal Forcing Project provided the wave data input for the GenCade model over the selected calibration and verification periods at the 10 m (33 ft) depth contour with dense alongshore spacing to account for any spatial differences in the wave field.

The unmodified shoreline used as input during model calibration served as the basis for determining the expected deviations in historic shoreline change rates that an advancement of the shoreline (i.e. beach nourishment) could cause. Beach nourishment alternatives explored in the present study were added in the GenCade model and simulated over the same period of time as the unmodified shoreline. The resulting shoreline changes were compared and the difference between the with-nourishment and without-nourishment model simulations represent the expected diffusion rate of a given beach nourishment alternative. Figure A - 27 shows the smoothed historic shoreline change rate (as presented in Figure A - 26), the diffusion rate predicted by GenCade (for a scenario of extending the shoreline 60 ft between reference monuments 103.5 and 116.5), and the superposition of the two. The result is an increase in shoreline recession rates within the simulated fill area (due to the project-induced perturbation of the shoreline) and a decrease in recession rates outside the fill area (as the fill material diffuses laterally outside the project limits). Figure A - 27 shows that immediately outside the project area the shoreline change rates become positive due to the influence of the simulated beach nourishment project.

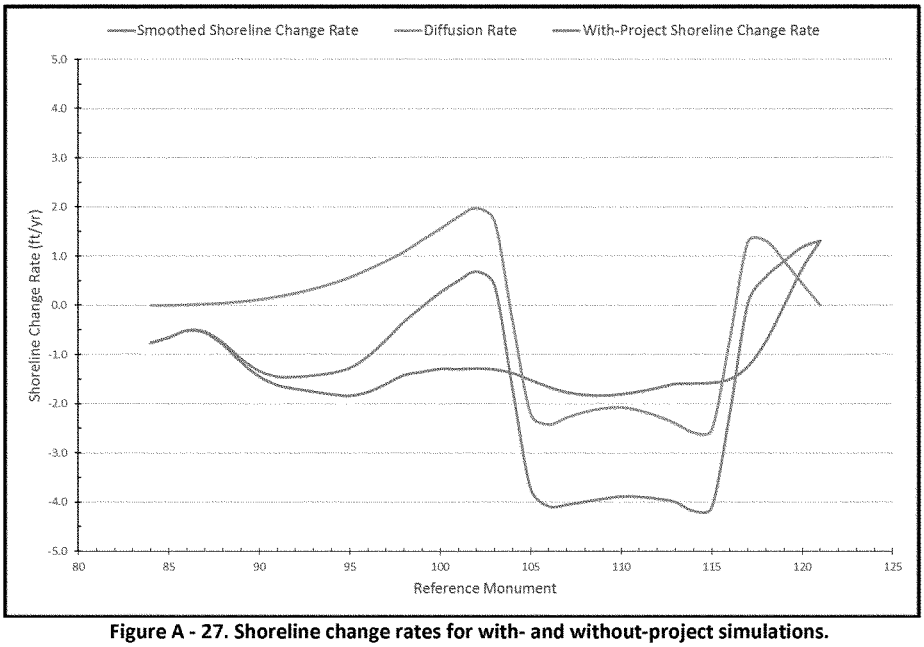


Figure A - 27. Shoreline change rates for with- and without-project simulations.

Post Storm Berm Recovery

Post storm recovery of eroded berm width after passage of a major storm is a recognized process. Although present coastal engineering practice has not yet developed a predictive method for estimating this process, it is an important element of post-storm beach morphology. Within Beach-*fx*, post-storm recovery of the berm is represented in an ad hoc procedure in which the user specifies the percentage of the estimated berm width loss during the storm that will recover over a given recovery interval. Based on review of available historical FDEP profiles that would qualify as pre- and post- storm, a recovery percentage of 90% over a recovery interval of 21 days was determined for the SPV-Vilano study area.

Economic Evaluation

The Beach-*fx* model analyzes the economics of shore protection projects based on the probabilistic nature of storm associated damages to structures in the project area. Damages are treated as a function of structure location and construction, the intensity and timing of the storms, and the degree of protection that is provided by the natural or constructed beach. Within the model, damages are attributed to three mechanisms:

- Erosion (through structural failure or undermining of the foundation)
- Flooding (through structure inundation levels)
- Waves (through the force of impact)

Although wind may also cause shoreline damage, shore protection projects are not designed to mitigate for impacts due to wind. Therefore, the Beach-*fx* model does not include this mechanism.

Damages are calculated for each model reach, lot, and damage element following each storm that occurs during the model run. Erosion, water level, and maximum wave height profiles are determined for each individual storm from the lookup values in the previously stored SRD. These values are then used to calculate the damage driving parameters (erosion depth, inundation level, and wave height) for each damage element.

The relationship between the value of the damage driving parameter and the percent damage incurred from it is defined in a user-specified "damage function". Two Damage Functions are specified for each damage element, one to address the structure and the other to address its contents. Damages due to erosion, inundation, and wave attack are determined from the Damage Functions and then used to calculate a combined damage impact that reduces the value of the damage element. The total of all damages is the economic loss that can be mitigated by the shore protection project. A thorough discussion of the economic methodology and processes of Beach-*fx* can be found in the **Economics Appendix.**

Management Measures

Shoreline management measures that are provided in the Beach-*fx* model are emergency nourishment, planned nourishment, and structure armoring. Emergency nourishments are generally limited beach fill projects conducted by local governments in response to storm damage. St. Johns County does not have a history of emergency nourishment. The absence of past emergency nourishment events prevents the assumption that future emergency nourishment events will occur, either with or without an authorized

shore protection project in place. Therefore, this management measure was not included in the SPV-Vilano Beach-*fx* analysis.

Planned nourishments are handled by the Beach-*fx* model as periodic events based on design templates, triggers, and nourishment cycles. Nourishment templates are specified at the model reach level and include all relevant information such as order of fill, dimensions, placement rates, unit costs, and borrow-to-placement ratios. Planned nourishments occur when user defined nourishment triggers are exceeded and a mobilization threshold volume is met. At a pre-set interval (equal to one year in the present study), all model reaches which have been identified for planned nourishment are examined. In reaches where one of the nourishment threshold triggers is exceeded, the required volume to restore the design template is computed. If the summation of individual model reach level volumes exceeds the mobilization threshold volume established by the user, then nourishment is triggered and all model reaches identified for planned nourishment are restored to the design template.

Beach-*fx* allows for future armoring of structures if shoreline recession crosses an established threshold over the course of the life-cycle simulation. The threshold used for the SPV-Vilano study area is consistent with recent efforts to protect threatened structures within the study area and was set to approximately 30 ft from the seaward face of the structure for those properties deemed armorable. In locations where adjacent properties were already armored, the threshold trigger was set in line with the existing armor so a contiguous seawall was represented. A structure was determined to be armorable by following the regulations set forth by the State of Florida. If a structure was built prior to 1988 or the adjacent properties on either side are armored and the gap between them is less than 250 ft the structure is armorable.

Nourishment Design Templates

Beach-*fx* planned nourishment design templates are defined by three dimensions, the template dune height, template dune width, and template berm width. Berm elevations and dune and foreshore slopes remain constant based on the existing profiles. For the SPV and Vilano study area, each reach level nourishment template was developed based on a 0-, 10-, or 20-ft extension of the beach profile (from the dune to depth of closure) and five berm width extensions: 20-ft, 40-ft, 60-ft, 80-ft, and 100-ft. Template dune heights and widths in each case were set to the elevation and width of the existing idealized Beach-*fx* profile. Therefore, the existing 2015 dune and profile was rebuilt during model simulations if any portion of the dune template was damaged at the time a nourishment event was triggered.

Results from the future without-project (FWOP) model simulations provided the anticipated damages that occur over the 50-year life-cycle- which is the established time horizon for this study. The amount of damages varied throughout the study area due to differences in the existing profile conditions, historic erosion rates, and profile responses to storm events. Beach nourishment was not included for locations where FWOP damages were lower than the estimated cost of shore protection alternatives (see Economics Appendix Section 3.4.2). From the FWOP analysis, the area between R-92 and R-116 appeared most promising for testing future with project (FWP) beach nourishment alternatives. Given the lack of availability of public access in the SPV portion of the study area, and, therefore, the lack of Federal cost sharing for the area, an additional FWP area was identified and limited to only include R-103.5 to R-116.5 where adequate public access exists. Table A - 17 lists the initial FWP alternatives modeled in Beach-*fx* and the template dimensions of each alternative.

Table A - 17. Dune and berm features for initial array of nourishment alternatives.

Alternative Number	Project Length (mi)	Model Reaches	Dune Width Extension (ft)	Berm Width Extension (ft)
1	2.6	104 to 116	0	100
2	2.6	104 to 116	10	80
3	2.6	104 to 116	0	80
4	2.6	104 to 116	10	60
5	4.8	92 to 116	0	60
6	2.6	104 to 116	0	60
7	2.6	104 to 116	10	40
8	4.8	92 to 116	0	40
9	2.6	104 to 116	0	40
10	4.8	92 to 116	20	20
11	2.6	104 to 116	20	20
12	4.8	92 to 116	10	20
13	2.6	104 to 116	10	20

Nourishment Triggers and Mobilization Threshold

Beach-*fx* planned nourishment design templates have three nourishment triggers: berm width, dune width, and dune height. Each trigger is a fractional amount of the corresponding template dimension that denotes the requirement for renourishment. During initial screening of project alternatives, the berm width, dune width, and dune height triggers were set at 0.5, 0.95, and 0.9, respectively, for alternatives which included a profile extension and a berm extension. Triggers were set at 0.0, 0.91, and 0.9, respectively, for alternatives which included only a profile extension. The mobilization threshold for all planned nourishment alternatives was varied depending on the projected volume requirement of each alternative. However, in order to maintain consistency among alternatives for comparison purposes, nourishment trigger volumes were set to approximately equal 80% of the calculated volume need of the alternative. Nourishment triggers and mobilization threshold are subjective parameters, based on local infrastructure and engineering judgment of when renourishment will become essential to the continued performance of the project. Application of these parameters for SPV and Vilano is discussed in greater detail in Project Volumes.

Beach-*fx* Project Design Alternatives

In order to determine the most effective and cost efficient protective beach design for the SPV and Vilano study area, alternatives were developed by combining the design reaches and nourishment templates discussed previously. Preliminary Beach-*fx* runs, limited to 30 iterations (as discussed in the Economics Appendix), allowed the initial array of alternatives to be screened down to those most likely to provide an effective and justified Federal project (see the **Main Text** for screening details). The remaining array of alternatives run with Beach-*fx* for 100 iterations of the 50-year period of Federal participation is presented in Table A - 18. These consist of two basic designs, a 60-ft extension of the berm and a 10-ft extension of the existing (2015) beach profile (from dune to depth of closure) with a 60-ft extension of the berm. No changes to the existing dune height were included. Typically the alternative with the greatest net benefits is selected as the recommended plan, however, due to the lack of public access in South Ponte Vedra, the recommended plan consists of a 60-ft berm between reference monuments 104 and 116 (Alternative 6).

Table A - 18. Array of alternatives with BCR and net benefits from 100-iteration model runs.

Alternative Number	Project Length (mi)	Model Reaches	Dune Width Extension (ft)	Berm Width Extension (ft)	BCR	Net Benefits ($)
6	2.6	104 to 116	0.00	60.00	1.25	$ 8,573,000
4	2.6	104 to 116	10.00	60.00	1.20	$ 7,473,000

Protective Beach Design

Based on Beach-*fx* model results and economic evaluation, 'Alternative 6', a 60 ft extension of the berm and subaqueous beach profile, was identified as the recommended plan for nourishment of the beach between reference monument R-103.5 and R-116.5. A description of this shore protection plan is provided in the following sections.

Project Length

Project evaluation using Beach-*fx* started with the SPV and Vilano study area along 7.5 miles of shoreline, extending from FDEP monument R-84 to R-122 within St. Johns County. Note that this does not include the Summerhaven segment of the original study (R-197 to R-209), which was removed early in the study. The selected design provides a 60-ft wide berm extension for approximately 2.6 miles of the study area. The beach fill will be placed from R-103.5 to R-116.5 with tapers extending approximately 1,000 ft to the north of R-103.5 and approximately 1,000 ft to the south of R-116.5.

Project Design

The project design can be described by three factors, the dimensions of the dune, dimensions of the berm, and shoreline slopes.

Project Dune

Existing dune elevations in the project area are between 10 and 21 ft-NAVD88, generally increasing moving from south to north (Table A - 19). Evaluation of the design alternatives has shown that the existing elevations, when combined with berm and/or dune extension, provide sufficient protection. Therefore, no additional elevation is included in the selected design plan.

Table A - 19. Generalized dune characteristics of the study area.

Profile*	R monuments	Dune Height (ft-NAVD88)	Dune Width (ft)
P1	R-84 to R-86; R-90 to R-93	16	50
P2	R-87 to R-89; R-94 to R-98	21	50
P3	R-100 to R-111	20	150
P4	R-112, R-114	20	30
P5	R-115 to R-117	14	110
P6	R-118 to R-119	15	160
P7	R-120 to R-121	14	250
P8	R-122	10	275

*Shaded portions indicate areas that are not part of the recommended plan.

Within the alongshore limits of a given alternative the values in Table A - 19 provide the minimum dune dimensions required during a nourishment in the Beach-*fx* model. Within the area encompassed by the recommended plan (portions of Table A - 19 not shaded) the average dune width ranges between 110 ft and 150 ft with the exception of the R-112 to R-114 area which is only 30 ft wide. Alternatives that feature a profile extension include an additional 10-ft or 20-ft dune width beyond the minimum dune dimensions in Table A - 14, as discussed in the Nourishment Design Template section. Although the recommended plan alternative does not include an *extension* of the existing dune, any erosion of material from the existing idealized dune template (i.e. the 2015 generalized profile) is replaced during nourishment events in model simulations. Therefore, the existing 2015 idealized dune template will be restored accordingly during initial construction and renourishment of the project and is noted as an important feature of the CSRM project.

Project Berm

The design berm elevation for the project area is 8.0 ft-NAVD88, which is approximately at the natural berm elevation. Restricting the design berm elevation to the natural berm elevation minimizes scarping of the beach fill as it undergoes profile equilibration. Vertical scarps can hinder beach access by nesting sea turtles, and may also pose safety problems for recreational beach use. Other reasons for following the natural berm elevation are related to storm damage protection. A berm constructed at a lower elevation would increase the probability of overtopping by relatively frequent storms, thereby offering less protection to upland development and/or existing dunes. A higher berm elevation could result in problems related to backshore flooding due to excessive rainfall or wave overtopping. A higher berm may also be more susceptible to wind-induced erosion.

The recommended plan includes a design berm for the refined project area (R-103.5 to R-116.5) modeled in Beach-*fx* as a 60-ft extension of the +8 ft-NAVD88 contour sloping 1V:10H to the 0.0 ft-NAVD88 contour and a 60-ft extension of the existing subaqueous profile. Figure A - 28 shows the existing idealized profile and modeled nourishment template for Profile 3 (which represents R-100 to R-111). Construction of the recommended plan alternative will likely include a berm that is wider than what was modeled in order to account for the additional material below the 0.0 ft-NAVD88 contour and the difference in idealized/modeled slope versus practical construction slopes. Following construction and equilibration of the profile, the beach dimensions are expected to approximate the idealized profile.

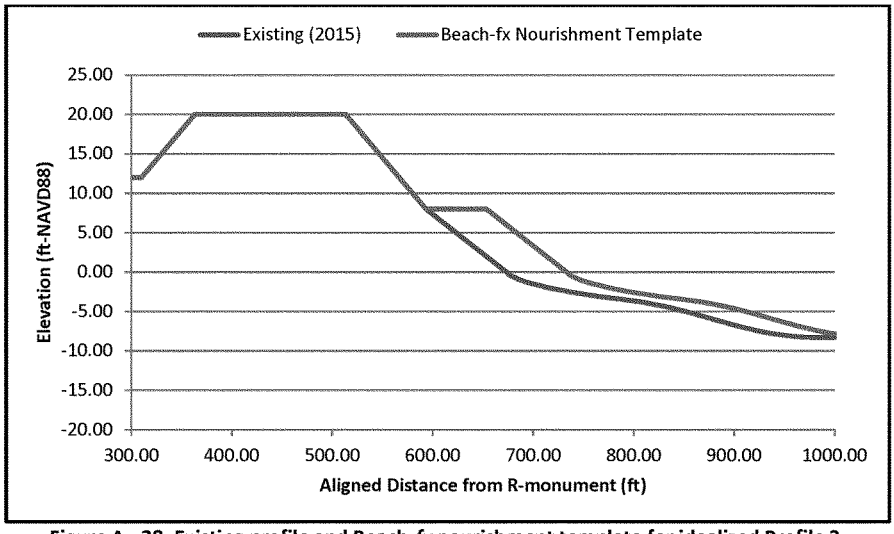


Figure A - 28. Existing profile and Beach-*fx* nourishment template for idealized Profile 3.

Project Beach Slopes

After adjustment and sorting of the placed material by wave action, the material is expected to adjust to an equilibrium beach slope, similar to the native beach. In SPV and Vilano, the native beach slopes in the area of the recommended plan vary between 1V (vertical) on 5H (horizontal) to 1V:10H at the dune, between 1V:9.09H and 1V:10H from the berm to 0.0 ft-NAVD88, and around 1V:50H from 0.0 to -12 ft-NAVD88. The estimate of the slope of the material after adjustment is based on averaging the beach profile slopes of the native beach from the mean low water datum to the approximate location of the 12 foot depth contour. Offshore slopes between the 0.0 ft and -30 ft-NAVD88 contour vary between 1V:75H and 1V:110H within the area of the recommended plan. Since, sand from the project borrow site was determined to be a near match to the gradation of the existing beach it is expected that the beach fill will equilibrate to a shape similar to the existing profile.

Table A - 20. Project dune and foreshore slopes.

Profile	R monuments	Dune Slope	Foreshore Slope	Offshore Slope	
				0 to -12 ft-NAVD88	0 to -30 ft-NAVD88
P3	R-100 to R-111	1V:6.67H	1V:10.0H	1V:53H	1V:71H
P4	R-112, R-114	1V:5.00H	1V:9.09H	1V:50H	1V:93H
P5	R-115 to R-117	1V:10.0H	1V:9.09H	1V:48H	1V:110H

It is unnecessary and impractical to artificially grade beach slopes below the low water elevation since they will be shaped by wave action. For this reason, the front slope of the beach fill placed at the time of construction or future renourishment may differ from that of the natural profile. The angle of repose of the hydraulically placed material depends on the characteristics of the fill material and the wave climate in the project area. With steep initial slopes, the material will quickly adjust to the natural slopes.

Project Volumes

Traditionally, beach fill designs are presented as a set of three cross-sectional templates: the design template, which is based on an equilibrium profile translated seaward by the desired width of the berm or MHW extension; the advanced nourishment template, which represents the volume of material that is expected to erode between successive renourishment intervals; and, the construction template, which includes both the design and advanced fill quantities, but incorporates the wider berm and steeper slope that reflects the capabilities of the construction equipment. The design template is the minimum beach profile to be maintained, while the advance nourishment template contains the volume of material that anticipated to erode over the economically optimized renourishment interval while protecting the design template. This traditional approach, however, does not conform well to the probabilistic nature of the Beach-*fx* model or the methodology used for determining renourishment requirements.

Beach-*fx* begins with the desired design template (i.e. the 60 ft berm extension, Figure A - 28). Each life-cycle simulation then applies randomly generated storms, storm erosion, and natural background plus project-induced shoreline change rates. At one year intervals the model evaluates the resulting shoreline against two criteria (1) whether shoreline position at one or more reaches has exceeded one or more planned nourishment triggers and (2) whether the total volume presently required to fill the original design template exceeds the mobilization threshold. If both criteria are met then a nourishment event is initiated as long as the current simulation year is within the planned nourishment period (2020 to 2070 for this study). There are three planned nourishment triggers in Beach-*fx*: berm width, dune width, and dune height. Each trigger indicates what percentage of the design template berm width, dune width, or dune height must be present to prevent a renourishment (For example, a 90% (0.90) dune width trigger means that 90% of the total design template dune width must remain intact. If 10% or more of the template dune width is eroded, the first criteria for initiating a planned renourishment event has been met). Should any planned nourishment trigger be exceeded in one or more reaches, then Beach-*fx* computes the volume required to fill the original design template over all of the planned nourishment reaches and compares that volume to the mobilization volume threshold. If the mobilization volume threshold is exceeded a nourishment event over all planned nourishment reaches occurs and the model continues through the remainder of the life-cycle.

For the recommended plan ('Alternative 6'), the berm width, dune width, and dune height planned nourishment triggers were set at 0.5, 0.95, and 0.9, respectively. The mobilization threshold was initially set to 650,000 cy. Together, the triggers and the mobilization threshold allow for the optimization of the beach fill based on the physical dimensions of the project as well as assumptions regarding tolerable erosion limits and reasonable fill volumes. Sensitivity analysis of the nourishment triggers and mobilization threshold indicated that the mobilization threshold volume was the dominant parameter for optimizing project net benefits. Employing 100,000 cubic yard increments between 550,000 and 1,150,000 cy, a mobilization threshold of 750,000 was found to be (when combined with the above nourishment triggers) the most optimal threshold value for the recommended plan ('Alternative 6'). Below the 750,000 cy threshold benefits were increased for an incrementally greater cost and above the optimized threshold costs were decreased for incrementally less benefits. For more details on mobilization threshold optimization see Economic Appendix Section 3.4.4.

Each complete Beach-*fx* model run consists of 100 iterations, each iteration representing the 50-year period of Federal participation for the project. Each iteration, therefore, has a unique volume requirement for initial construction and each renourishment. Based on 'Alternative 6' (100 iteration

runs), a range of volumes was determined for each initial fill event and each subsequent renourishment event. Model runs were made for each of the three sea level rise cases: Base, Intermediate, and High. Table A - 21 provides volume statistics based on the 100 iterations of Beach-*fx* runs for the Base, Intermediate, and High sea level rise (SLR) scenarios. This table also provides the number of expected renourishment events.

Table A - 21. Beach-*fx* volume statistics for 100 iterations of recommended plan with SLR scenarios.

	Base SLR Scenario		
Volume Statistic	**Initial**	**Renourishment***	**Total**
Average (cy)	**1,310,000**	**866,000**	**4,267,000**
Max (cy)	1,844,000	993,000	5,790,000
Min (cy)	998,000	803,000	2,698,000
Std. Dev. (cy)	189,000	64,000	540,000

*Average interval 12 years

	Intermediate SLR Scenario		
Volume Statistic	**Initial**	**Renourishment***	**Total**
Average (cy)	**1,424,000**	**851,000**	**5,205,000**
Max (cy)	1,950,000	978,000	6,438,000
Min (cy)	1,087,000	780,000	3,899,000
Std. Dev. (cy)	191,000	73,000	517,000

*Average interval 10 years

	High SLR Scenario		
Volume Statistic	**Initial**	**Renourishment***	**Total**
Average (cy)	**1,614,000**	**788,000**	**6,829,000**
Max (cy)	2,114,000	867,000	8,160,000
Min (cy)	1,262,000	738,000	5,557,000
Std. Dev. (cy)	186,000	92,000	523,000

*Average interval 7 years

Project Construction

The recommended plan for the study area results in a 60 foot berm extension from the +8.0 ft-NAVD88 2015 contour out to the depth of closure between reference monuments 103.5 and 116.5. Table A - 22 lists the Northing and Easting coordinates of the +8.0 ft-NAVD88 2015 contour along the recommended plan project area. This contour includes perturbations due to the natural undulations of the shoreline as well as shoreline armoring (revetments) in select locations, but overall is rather smooth and straight. In order to ensure that the nourishment project provides the maximum benefit, it will be necessary during the project engineering and design (PED) phase to establish a smooth, relatively straight base construction line that will allow the project to perform as predicted during the Beach-*fx* shoreline analysis. The location of the +8.0 ft-NAVD88 2015 contour serves as the basis for creating the baseline which will be tailored to provide the approximate amount of material predicted for initial construction by Beach-*fx*.

As previously discussed, the front slope of the beach fill placed at the time of construction or future renourishment may differ from that of the natural profile. This reflects the capabilities of the construction equipment that will be used to build the shore protection project. Within the first year or two after placement of the beach fill, the construction profile will be reshaped by waves into an

equilibrium profile, causing the berm to retreat to a position more characteristic of the project design template. Analysis of monitoring surveys collected during initial equilibration should anticipate higher erosion/recession rates than observed historically. However, the shoreline change rates over longer periods of time should reflect the pre-project erosion/recession rate plus the additional diffusion losses resulting from the beach fill.

Table A - 22. Reference monument control and location of the 2015 +8 ft-NAVD88 contour.

	Control		+8 ft NAVD88 Contour		
Monument	Easting*	Northing*	Range from Mon. (ft)	Easting*	Northing*
R-103	558,321.91	2,048,381.47	79.86	558,399.04	2,048,402.14
R-104	558,557.68	2,047,420.02	55.90	558,611.67	2,047,434.49
R-105	558,792.65	2,046,454.35	79.32	558,869.27	2,046,474.88
R-106	559,073.67	2,045,513.26	63.23	559,134.74	2,045,529.62
R-107	559,357.88	2,044,435.73	69.50	559,425.01	2,044,453.72
R-108	559,630.27	2,043,408.20	71.63	559,699.46	2,043,426.74
R-109	559,870.56	2,042,423.61	97.99	559,965.22	2,042,448.97
R-110	560,153.48	2,041,337.66	101.71	560,251.72	2,041,363.98
R-111	560,466.29	2,040,320.32	64.78	560,528.86	2,040,337.09
R-112	560,768.11	2,039,325.32	55.98	560,822.19	2,039,339.81
R-113	561,043.54	2,038,355.17	61.36	561,102.81	2,038,371.05
R-114	561,335.16	2,037,423.69	36.13	561,370.06	2,037,433.04
R-115	561,648.28	2,036,348.78	84.67	561,730.06	2,036,370.69
R-116	561,962.61	2,035,333.23	102.47	562,061.59	2,035,359.75
R-117	562,336.86	2,034,275.87	72.67	562,407.05	2,034,294.68

*Points reported in feet, NAD83/90.

Table A - 23. Mean high water range and coordinates from 2015 survey.

	Mean High Water Contour		
Monument	Range from Mon. (ft)	Easting*	Northing*
R-103	161.8	558,478.20	2,048,423.35
R-104	158.0	558,710.30	2,047,460.91
R-105	150.6	558,938.12	2,046,493.33
R-106	119.6	559,189.19	2,045,544.21
R-107	116.7	559,470.60	2,044,465.93
R-108	132.1	559,757.87	2,043,442.39
R-109	149.7	560,015.16	2,042,462.36
R-110	165.6	560,313.44	2,041,380.52
R-111	131.9	560,593.70	2,040,354.46
R-112	147.8	560,910.87	2,039,363.57
R-113	136.3	561,175.20	2,038,390.45
R-114	121.0	561,452.04	2,037,455.01
R-115	142.0	561,785.44	2,036,385.53
R-116	137.8	562,095.71	2,035,368.90
R-117	154.8	562,486.39	2,034,315.94

*Points reported in feet, NAD83/90.

Renourishment Events

Traditionally, renourishment events take place based on both an economically optimized renourishment interval and the physical performance of the project. Project performance, in the past, has been determined by assessing the condition of the design template. Should the design template be breached, the project is no longer providing the required level of protection and is considered for renourishment. Part of this consideration is how close in time the project may be to the designated renourishment interval.

While the basic principles of renourishment still apply, due to the probabilistic nature of Beach-*fx* and the way in which the model assesses renourishment requirements, a new means of assessing project performance must be employed. The former concepts of "design template" and "advance fill" are no longer applicable in the traditional sense. As shown in Figure A - 28 the existing dune and 60-ft berm extension template acts as the "advance fill", while the existing beach profile is the minimum acceptable profile (making it akin to what was formerly the "design template").

Planning of renourishment events will be based on performance of the project fill. A survey of the project area (such as a monitoring or post-storm survey) will be analyzed to determine if berm erosion is progressing as expected. Volume changes between the latest survey, the design template, and the construction template will be calculated. If the total volume required to restore the receded profiles exceeds the optimized mobilization threshold volume (750,000 cy), then a renourishment event is recommended. The decision to renourish may then be made based on traditional concerns, such as budget cycle and available funding. If projections of berm widths and volume changes suggest that a renourishment event is needed before the average interval found using Beach-*fx* (12 years) then the schedule should be adjusted accordingly.

Project Monitoring

Physical monitoring of the recommended project is necessary to assess project performance and to ensure that project functionality is maintained throughout the 50-year period of Federal participation in the project. The monitoring plan will be directed primarily toward accomplishing systematic measurements of the beach profile shape. Profile surveys should provide accurate assessments of dune and beach fill volumes and a basis for assessing post-construction dune and beach fill adjustments, as well as variation in the profile shape due to seasonal changes and storms. Monitoring will play a vital role in determining if project renourishment is necessary. Post construction monitoring activities include topographic and bathymetric surveys of the placement area (from the stable upland areas out to the depth of closure) and adjacent areas on an annual basis for 3 years following construction and then biannually until the next construction event. The cost for this post construction monitoring is included in the shared total project cost.

Other monitoring efforts include bathymetric surveying of the borrow site, which will be done as part of the pre-construction engineering and design (PED) phase prior to each nourishment. Since the existing St. Johns County SPP is required by permit to conduct surveys of the entire ebb shoal and inlet channel area, and the likelihood of such a permit requirement for construction of the present project, costs will likely be shared between the two projects.

Measured wind, wave, and water level information will be obtained from the best available existing data sources. This data will be applied in support of previously discussed monitoring efforts. It will also be

used to periodically assess the state of sea level rise and to determine if reassessment of the project volumes and/or renourishment intervals based on an intermediate or high SLR case is required.

Summary

This appendix summarizes the engineering investigation and design of a shore protection project proposed for the SPV and Vilano portions of St. Johns County, Florida. The result of the study shows that shore protection measures are feasible for a portion of the study shoreline. Through optimization of developed alternatives, the selected alternative consists of beach nourishment/renourishment along approximately 2.6 miles of shoreline between FDEP monuments R-103.5 to R-116.5 at approximately 12-year intervals using material obtained from the St. Augustine Inlet complex. Information on the geology of the study area and borrow area details are in the Geotechnical Appendix.

The design beach fill template is characterized by a 60-ft extension of the 2015 beach profile between the berm (at +8 ft-NAVD88) and depth of closure (about -20 ft-NAVD88). Note that any erosion to the dry beach portion of the generalized 2015 profile (including the dune) will be restored during initial construction. The expected volume of nourishment material required for initial construction and renourishment events under the Base SLR case equal 1,310,000 cy and 866,000 cy, respectively. These values represent the average volumes from 100 unique Beach-*fx* model simulations that each spanned the 50 year planning horizon. No impacts to facilities or utilities are anticipated as a result of the project. Real estate interests necessary for the project construction and maintenance are described in the Real Estate Appendix. Benefits and cost information for the selected alternative can be found in the Economics Appendix.

References

Bruun, P., 1962. "Sea-level Rise as a Cause of Shore Erosion", American Society of Civil Proceedings, Vol. 88, Paper 3065, Journal of Waterways and Harbors Division, No. WW1, pp117-130.

ERDC, 2012. http://wis.usace.army.mil/wis.shtml. Wave Information Studies website. U.S. Army Corps of Engineers, Engineer Research and Development Center, Vicksburg, MS. October, 2012.

Frey, et al., 2012. "GenCade Version 1 Model Theory and User's Guide, Technical Report, ERDC-CHL TR-12-25, Coastal Inlets Research Program, U.S. Army Engineer Research and Development Center, Vicksburg, MS. December, 2012.

Foster, E.R., Spurgeon, D.L., and Cheng, J., 2000. "Shoreline Change Rate Estimates St. Johns County." Florida Department of Environmental Protection. Office of Beaches and Coastal Systems. Report No. BCS-00-03. June 2000.

FDNR, 1987. "St. Johns County Coastal Construction Control Line Study." Florida Department of Natural Resources. Division of Beaches and Shores. May 1987.

Gravens, M.B., Males, R.M, and Moser, D.A, 2007. "Beach-*fx*: Monte Carlo Life-Cycle Simulation Model for Estimating Shore Protection Project Evolution and Cost Benefit Analyses", Shore and Beach, Vol. 75(1): 12-19.

Hubertz, J. A., 1992. "User's Guide to the Wave Information Studies (WIS) Wave Model, version 2.0," WIS Report 27, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Larson, M., and Kraus, N.C., 1989. "SBEACH: Numerical Model for Simulating Storm-Induced Beach Change, Report 1. Empirical Foundation and Model Development." Technical Report CERC-89-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Males, R.M., Gravens, M.B, Moser, D.A., and Rogers, C.M., 2007. "Beach-*fx*: Life-Cycle Risk Analysis of Shore Protection Projects", Proceedings 30th International Conference on Coastal Engineering, J.M. Smith (ed.). Singapore, Japan: World Scientific Publishing Company, Inc.

NOAA, 2015. "Historic Hurricane Tracks." National Ocean Service. National Oceanic and Atmospheric Administration. http://csc.noaa.gov/hurricanes/#. Date Accessed: 6 November 2015.

Sheppard, M.D., and Miller Jr., W., 2003. "Design Storm Surge Hydrographs for the Florida Coast." Department of Civil and Coastal Engineering. University of Florida. Gainesville, Florida. Submitted to: Florida Department of Transportation. Tallahassee, Florida. September 2003.
U.S. Army Corps of Engineers (USACE), May 1995.

Taylor Engineering, Inc., 2010. "Shoreline Change Modeling for the St. Johns County, Florida Hurricane and Storm Damage Reduction Feasibility Study." Prepared for U.S. Army Corps of Engineers, Jacksonville District. Taylor Engineering, Inc., Jacksonville, FL. December, 2010.

USACE, 1979. "Feasibility Report for Beach Erosion Control St. Johns County Florida." U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, FL. December 1977, rev. January 1979.

USACE, 1995. "Design of Beach Fills." U.S. Army Corps of Engineers. EM 1110-2-3301. Washington, DC. May 1995.

USACE, 1998. "St. Johns County, Florida Shore Protection Project General Reevaluation Report with Final Environmental Assessment." U.S. Army Corps of Engineers. Jacksonville District. Jacksonville, FL. March 1998.

USACE, 2006. "Risk Analysis for Flood Damage Reduction Studies." U.S. Army Corps of Engineers. ER 1105-2-101. Washington DC. January, 2006.

USACE, 2007. "Northeast Florida Atlantic Coast Regional Sediment Budget Nassau through Volusia Counties." U.S. Army Corps of Engineers, Jacksonville District. March, 2007.

USACE, 2009. "Beach-*fx* User's Manual: Version 1.0." U.S. Army Corps of Engineers. ERDC/CHL SR-0906. Washington, DC. August 2009.

USACE, 2011. "Sea-level Change Considerations in Civil Works Programs." U.S. Army Corps of Engineers. EC 1165-2-212. Washington, DC.

USACE, 2012. "St. Johns County, St Augustine Inlet, FL, Report 1: Historical Analysis and Sediment Budget." U.S. Army Corps of Engineers, Engineer Research and Development Center. Technical Report-12-14. Washington, DC. August, 2012.

USACE, 2013. "Sea-level Change Considerations in Civil Works Programs." U.S. Army Corps of Engineers. ER 1110-2-8162. Washington, DC. December 2013.

USACE, 2014. "Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation." U. S. Army Corps of Engineers. Engineering Technical Letter 1100-2-1. Washington, DC. June 2014.

USACE, 2015. "Climate Change Adaptation Comprehensive Evaluation of Projects with Respect to Sea-Level Change." U. S. Army Corps of Engineers. Accessed 22 Dec 2015. Revised 19 Nov 2014. http://corpsclimate.us/ccaceslcurves.cfm.

ST. JOHNS COUNTY, FLORIDA

South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches

COASTAL STORM RISK MANAGEMENT PROJECT

FINAL INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT

APPENDIX B
Cost Engineering and Risk Analysis

March 2017



US Army Corps of Engineers
Jacksonville District

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

TABLE OF CONTENTS

B. COST ESTIMATES 1
B1. GENERAL INFORMATION 1
B.1.1 Plan Formulation Cost Estimates 1
B.1.2 Recommended Plan(s) 2
B.1.3 Construction Cost 2
B.1.4 Non-construction Cost 2
B.1.5 Construction Schedule 3
B.1.6 Total Project Cost Summary 3
B2. PLAN FORMULATION COST ESTIMATES 3
B3. RECOMMENDED PLAN (NED) COST ESTIMATE 4
B4. SCHEDULE 5
B5. RISK AND UNCERTAINTY ANALYSIS 6
B.5.1 Risk Analysis Methods 6
B.5.2 Risk Analysis Results 6
B6. TOTAL PROJECT COST SUMMARY 7
B.6.1 Total Project Cost Summary Spreadsheet 7
B7. COST MCX TPCS CERTIFICATION 8

ATTACHMENT TO APPENDIX B
ATTACHMENT A: CSRA EXECUTIVE SUMMARY

B. COST ESTIMATES

B1. GENERAL INFORMATION

Corps of Engineers cost estimates for planning purposes are prepared in accordance with the following guidance:

- Engineer Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 September 2008
- Engineer Regulation (ER) 1110-1-1300, Cost Engineering Policy and General Requirements, 26 March 1993
- ER 1110-2-1302, Civil Works Cost Engineering, 15 September 2008
- ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999
- ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, as amended
- Engineer Manual (EM) 1110-2-1304 (Tables Revised 31 March 2009), Civil Works Construction Cost Index System, 31 March 2000
- CECW-CP Memorandum for Distribution, Subject: Initiatives to Improve the Accuracy of Total Project Costs in Civil Works Feasibility Studies Requiring Congressional Authorization, 19 September 2007
- CECW-CE Memorandum for Distribution, Subject: Application of Cost Risk Analysis Methods to Develop Contingencies for Civil Works Total Project Costs, 3 July 2007
- Cost and Schedule Risk Analysis Process, March 2008

The goal of the cost estimates for the St. Johns County Coastal Storm Risk Management Project Feasibility Study is to present a Total Project Cost (construction and non-construction costs) for the Recommended Plan(s) at the current price level to be used for project justification/authorization and to escalate costs for budgeting purposes. In addition, the costing efforts are intended to produce a final product (cost estimate) that is reliable and accurate, and that supports the definition of the Government's and the non-Federal sponsor's obligations.

The cost estimating effort for the study also yielded a series of alternative plan formulation cost estimates for decision making. The final set of plan formulation cost estimates used for plan selection rely on construction feature unit pricing and are prepared in Civil Works Work Breakdown Structure (CWWBS) format to the sub-feature level. The cost estimate supporting the National Economic Development (NED) plan (Recommended Plan/Locally Preferred Plan) is prepared in MCACES/MII format to the CWWBS sub-feature level. This estimate is supported by the preferred labor, equipment, materials and crew/production breakdown. A fully funded (escalated for inflation through project completion) cost estimate, the Baseline Cost Estimate or Total Project Cost Summary, has also been developed.

An abbreviated risk analysis was prepared that addresses project uncertainties and sets contingencies for the plan formulation cost estimates. A full cost and schedule risk analysis was performed to establish the project contingency for the Recommended Plan's cost items.

B.1.1 Plan Formulation Cost Estimates

For the plan formulation cost estimates, unit prices for dredging related work were developed in CEDEP and then entered into MCACES/MII. Unit prices for the remaining major

or variable construction elements were developed in MCACES/MII based on input from the PDT. Design details, information and assumptions were provided in the Engineering Appendix. Plan formulation alternatives were run through Beach-Fx for calculation of the Benefit-to-Cost Ratio (BCR). Cost Engineering provided estimates for the initial construction on all alternatives that were input into Beach-Fx. An abbreviated risk analysis was completed in order to establish the contingency for each of the alternatives. Non-construction costs were included as percentages of the total construction contract cost for this level of comparison and screening.

Refer to Economics Section in the main report for final plan formulation cost tables.

B.1.2 Recommended Plan

The Recommended Plan or NED plan was chosen by the Project Delivery Team (PDT) according to the plan formulation described above. The Economics Appendix fully describes the plan selection. The scope of work for the Recommended Plan is found in Appendix A, Engineering. The MCACES/MII cost estimate for the Recommended Plan (Section A3, below) is based on that scope and is formatted in the CWWBS. The notes provided in the body of the estimate detail the estimate parameters and assumptions. These include pricing at the Fiscal Year 2017 price level (1 October 2016-30 September 2017). For project justification purposes, the estimate costs are categorized under the appropriate CWWBS code and include both construction and non-construction costs.

The construction costs fall under the following feature codes:

- 17 Beach Replenishment

The non-construction costs fall under the following feature codes:

- 01 Lands and Damages
- 30 Planning, Engineering and Design
- 31 Construction Management

B.1.3 Construction Cost

For the construction costs, unit prices for dredging related work were developed in the Cost Engineeing Dredge Estimating Program (CEDEP) and then entered into MCACES/MII. These costs include all major project components categorized under the appropriate CWWBS to the sub-feature level. The Total Project Cost Summary (TPCS) on the Recommended Plan contains contingencies as noted in the estimate (below) and were determined as a result of the risk analysis which is covered under another paragraph.

B.1.4 Non-construction Cost

Non-construction costs typically include Lands and Damages (Real Estate), Planning Engineering & Design (PED) and Construction Management Costs (Supervision & Administration, S&A). These costs were provided by the PDT either as a lump sum cost or as a percentage of the total Construction Contract Cost. Lands and Damages are provided by Real Estate and are best described in the Real Estate Appendix, Appendix D. PED costs are for the preparation of contract plans and specifications (P&S) and include itemized costs that were provided by the PDT, as well as costs for Post-Construction Monitoring costs and

percentages for Engineering During Construction (EDC) that were provided by the project manager. Construction Management costs are for the supervision and administration of a contract and include Project Management and Contract Admin costs. These costs were provided by the project manager and are included as a percentage of the total construction contract cost.

The main report details both cost allocation and cost apportionment for the Federal Government and the non-Federal Sponsor. Also included in the main report are the non-Federal Sponsor's obligations (items of local cooperation).

B.1.5 Construction Schedule

A construction schedule was prepared utilizing input from the PDT and reflects all project construction components. The schedule considers not only durations of individual components of construction, but also the timing of construction contracts based on funding and construction windows. The construction schedule was combined with the project schedule to create an overall schedule that was used for the generation of the TPCS. The construction schedule will change as the project moves through the various project lifecycle phases. The overall project schedule is provided below.

B.1.6 Total Project Cost Summary

The cost estimate for the Recommended Plan is prepared with an identified price level date and inflation factors are used to adjust the pricing to the project schedule. This estimate is known as the Fully Funded Cost Estimate or Total Project Cost Summary. It includes all Federal and non-Federal costs: Lands, Easements, Rights of Way and Relocations; construction features; Planning Engineering and Design; Construction Management; Contingency; and Inflation.

B2. PLAN FORMULATION COST ESTIMATES

There were several alternatives the PDT evaluated during plan formulation in order to identify the Recommended Plan. All alternatives that were evaluated at various stages in the study can be found in the Economics Appendix and are also outlined in the Main Report.

All dredging unit costs were calculated in CEDEP and transferred to MII to determine the total initial construction costs for each alternative. Real estate provided costs for the Lands and Damages by reach. The Planning, Engineering and Design (PED) costs, Engineering During Construction (EDC) costs and Supervision & Administration (S&A) costs were provided as a percentage of the total construction contract cost per the Project Manager.

A contingency was applied to each alternative. The contingencies for the construction and non-construction costs were developed using an Abbreviated Risk Analysis. All major risk components were the same for each reach and alternative. Fluctuations in contingencies were mostly as a result of varying total initial construction costs. Site access, staging areas and dune crossovers were all identified as risk items that would require further consideration and refinement in the cost estimate.

Once the total initial construction costs for each alternative were developed in MII, the costs were broken down into a spreadsheet so that the PDT could input the cost information into BeachFx. The table listed the Mobilization & Demobilization costs separately and a Total Cost/Cubic Yard that consisted of the Dredging Cost, plus the non-Construction Costs (minus the Real Estate) since these were the two main cost inputs for BeachFx. The cost of the dune plantings and the Real Estate costs were listed separately and were added to the total project cost outside of BeachFx.

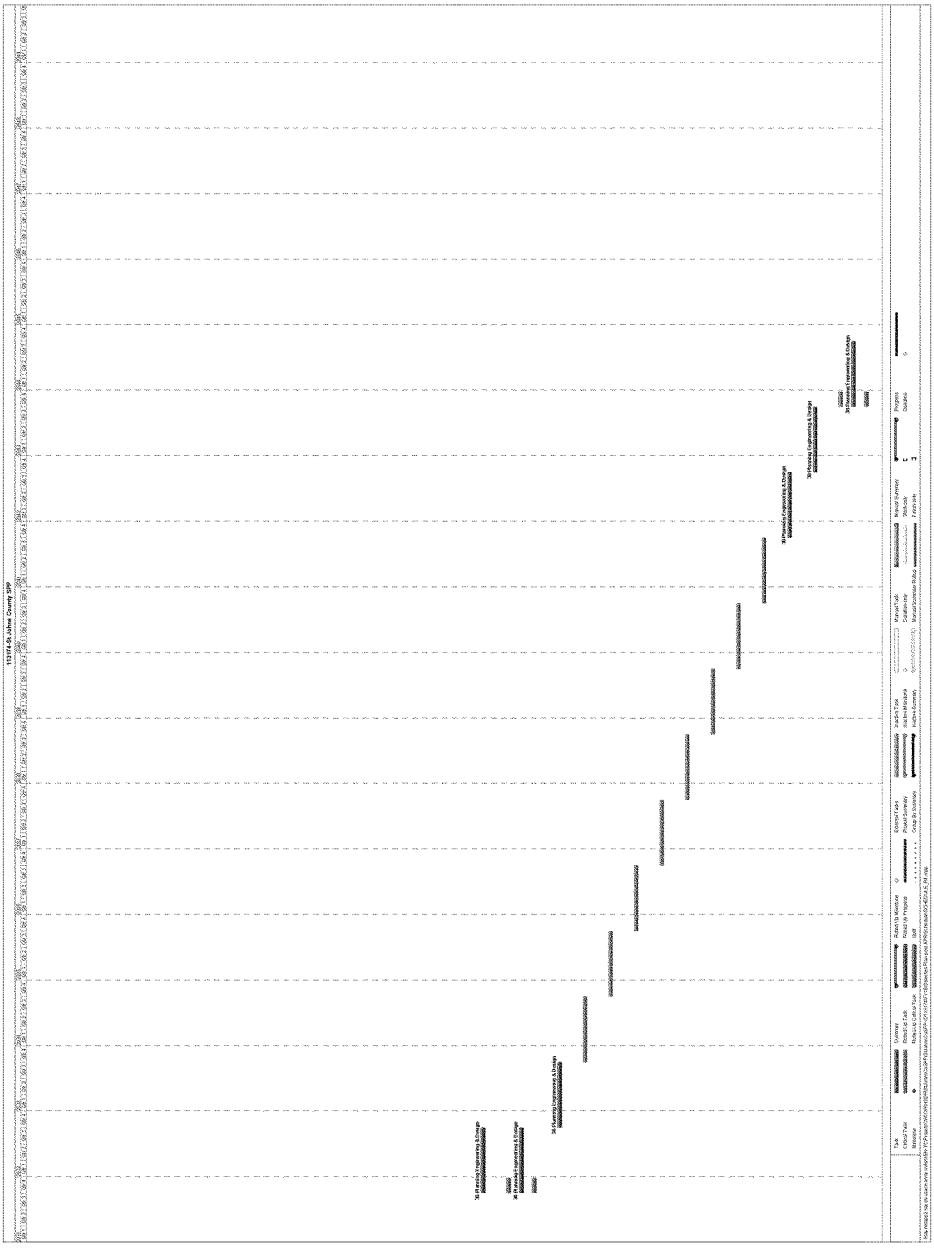
B3. RECOMMENDED PLAN (NED) COST ESTIMATE

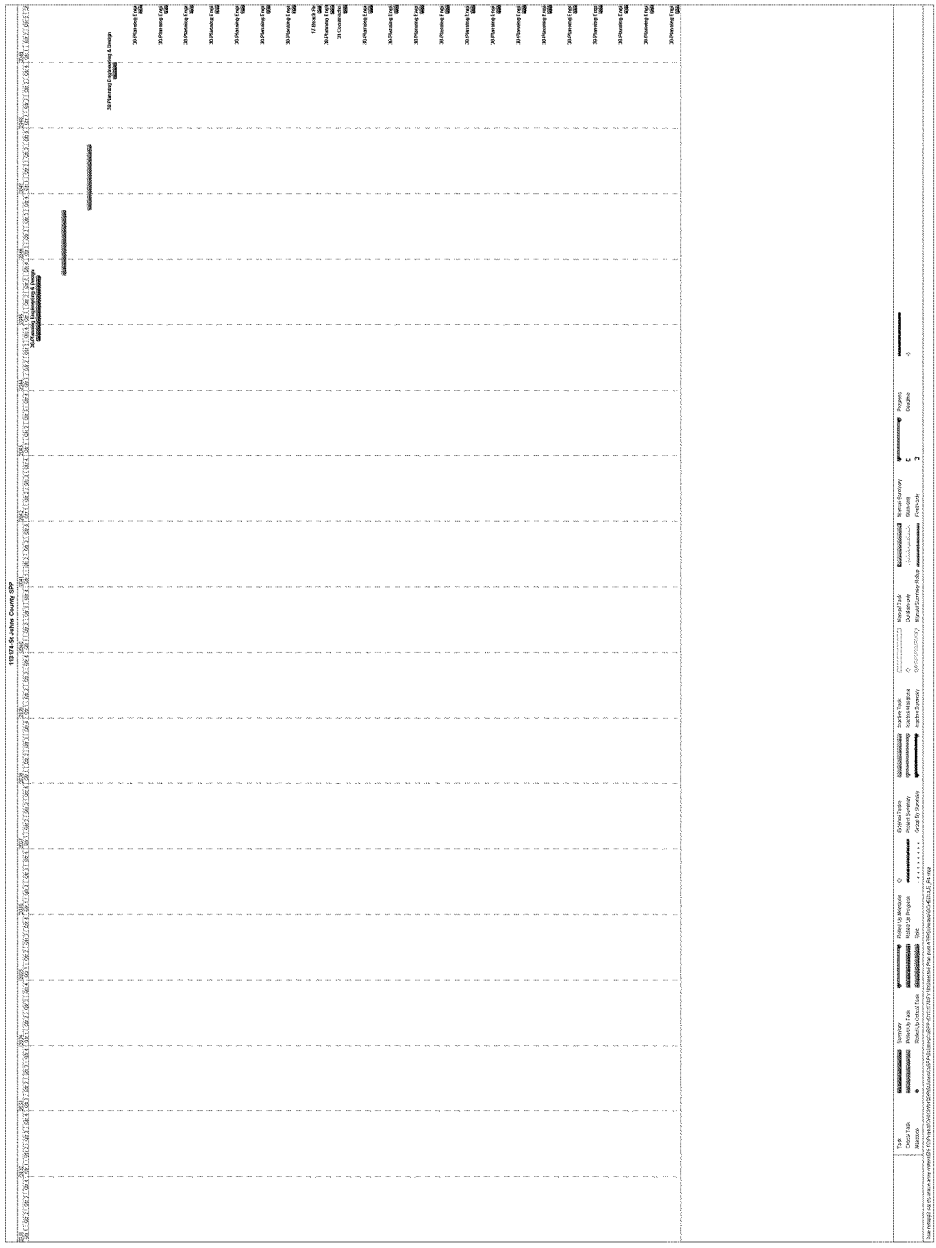
The recommended design covers approximately 2.6 miles of the study area extending from R-103.5 to R-116.5 with tapers extending approximately 1000 ft north of R-103.5 and approximately 1000ft south of R-116.5. The construction template consists of a 60 foot wide berm extension plus nourishment of the dune where necessary to maintain the existing (2015) dune profile.

The Recommended Plan estimate was prepared for the Total Project Cost, not just the initial construction costs.

B4. SCHEDULE

The project schedule covers the lifecycle phases of the Recommended Plan (Planning Phase, Preconstruction, Engineering and Design (PED) Phase and the Construction Phase). Refer to the Schedule on the next page.


11/1/14-St. Johns County SPP
Task
Critical Task
Milestone
Summary
Rolled-Up Critical Task
Rolled-Up Milestone
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Progress
Deadline
30 Planning Implementing & Design
30 Planning Implementing & Design
30 Planning Implementing & Design



B5. RISK AND UNCERTAINTY ANALYSIS

A Cost and Schedule Risk Analysis was conducted according to the procedures outlined in the following documents and sources:

- Cost and Schedule Risk Analysis Process guidance prepared by the USACE Cost Engineering MCX.
- Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008.
- Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

B.5.1 Risk Analysis Methods

The risk analysis process for this study is intended to determine the probability of various cost outcomes and quantify the required contingency needed in the cost estimate to achieve the desired level of cost confidence.

The entire PDT participated in a risk analysis brainstorming session to identify risks associated with the Recommended Plan. The risks were listed in the risk register, which is a tool commonly used in project planning and risk analysis, and evaluated by the PDT. The actual Risk Register is provided in Attachment A. Assumptions were made as to the likelihood and impact of each risk item, as well as the probability of occurrence and magnitude of the impact if it were to occur. A risk model was then developed by Walla Walla in order to establish contingencies to apply to the project cost. Risks were evaluated for the following features of work:

- 01 Lands and Damages
- 17 Beach Replenishment
  - Mob, Demob & Preparatory Work
  - Hopper Dredging
  - Dune Planting
- 30 Planning, Engineering and Design
- 31 Construction Management

After the model was run, the results were reviewed and all parameters were re-evaluated by the PDT as a sanity check of assumptions and inputs. Adjustments were made to the analysis accordingly and the final contingency was established. The contingency was applied to the Recommended Plan estimate in the Total Project Cost Summary in order to obtain the Fully Funded Cost.

B.5.2 Risk Analysis Results

Risk analysis results are intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as projects progress through planning and implementation.

Based on the risks that were assessed for the project, the resultant contingency was 28%. The complete breakdown of results can be viewed in the Cost and Schedule Risk Analysis report provided in Attachment A.

B6. TOTAL PROJECT COST SUMMARY

The Total Project Cost Summary (TPCS) addresses inflation through project completion (accomplished by escalation to mid-point of construction per ER 1110-2-1302, Appendix C, Page C-2). It is based on the scope of the Recommended Plan and the official project schedule. The TPCS includes Federal and non-Federal costs for Lands and Damages, all construction features, PED, S&A, along with the appropriate contingencies and escalation associated with each of these activities. The TPCS is formatted according to the CWWBS and uses Civil Works Construction Cost Indexing System (CWCCIS) factors for escalation (EM 1110-2-1304) of construction costs and Office of Management and Budget (EC 11-2-18X, 20 Feb 2008) factors for escalation of PED and S&A costs.

The Total Project Cost Summary was prepared using the MCACES/MII cost estimate on the Recommended Plan, as well as the contingencies set by the risk analysis and the official project schedule.

B.6.1 Total Project Cost Summary Spreadsheet

Refer to the Total Project Cost Summary Spreadsheet on the next page.

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: St Johns County Coastal Storm Risk Management Project
PROJECT NO P2 113174
LOCATION: St Johns County, FL

DISTRICT: Jacksonville District **PREPARED:** **2/14/2017**
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

This Estimate reflects the scope and schedule in report; St Johns County CSRMP Feasibility Report December 2015

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2017 Effective Price Level Date: 1 OCT 16									
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST ($K) C	CNTG ($K) D	CNTG (%) E	TOTAL ($K) F	ESC (%) G	COST ($K) H	CNTG ($K) I	TOTAL ($K) J	Spent Thru: 10/1/2016 ($K)	TOTAL FIRST COST ($K) K	INFLATED (%) L	COST ($K) M	CNTG ($K) N	FULL ($K) O
	Initial														
17	BEACH REPLENISHMENT 2020	$14,233	$3,985	28.0%	$18,218	1.4%	$14,425	$4,039	$18,464	$0	$18,464	3.3%	$14,908	$4,174	$19,082
	Renourishments														
17	BEACH REPLENISHMENT	$33,457	$9,368	28.0%	$42,825	1.4%	$33,910	$9,495	$43,405	$0	$43,405	61.8%	$54,866	$15,362	$70,229
	CONSTRUCTION ESTIMATE TOTALS:	$47,689	$13,353		$61,042	1.4%	$48,335	$13,534	$61,869	$0	$61,869	44.4%	$69,774	$19,537	$89,311
	Initial														
01	LANDS AND DAMAGES	$2,480	$694	28.0%	$3,174	1.4%	$2,514	$704	$3,217	$0	$3,217	3.3%	$2,598	$727	$3,325
	Renourishments														
01	LANDS AND DAMAGES	$0	$0 -		$0	-	$0	$0	$0	$0	$0	-	$0	$0	$0
	Initial														
30	PLANNING, ENGINEERING & DESIGN	$1,331	$373	28.0%	$1,703	2.7%	$1,367	$383	$1,749	$0	$1,749	6.6%	$1,457	$408	$1,866
	Renourishments														
30	PLANNING, ENGINEERING & DESIGN	$5,236	$1,466	28.0%	$6,702	2.7%	$5,377	$1,506	$6,883	$0	$6,883	322.4%	$22,715	$6,360	$29,075
	Initial														
31	CONSTRUCTION MANAGEMENT	$1,087	$299	28.0%	$1,386	2.7%	$1,096	$307	$1,403	$0	$1,403	6.6%	$1,169	$327	$1,496
	Renourishments														
31	CONSTRUCTION MANAGEMENT	$2,507	$702	28.0%	$3,209	2.7%	$2,575	$721	$3,296	$0	$3,296	217.6%	$8,178	$2,290	$10,467
	PROJECT COST TOTALS:	$60,310	$16,887	28.0%	$77,197		$61,263	$17,154	**$78,417**	$0	**$78,417**	72.8%	$105,890	$29,649	$135,540

CHIEF, COST ENGINEERING, Matthew Cunningham

PROJECT MANAGER, Jason Harrah

CHIEF, REAL ESTATE, Audrey Omerod

CHIEF, PLANNING, Eric Summa

CHIEF, ENGINEERING, Laurenn Borochaner

CHIEF, OPERATIONS, Carol Bernstein

CHIEF, CONSTRUCTION, Steve Duba

CHIEF, CONTRACTING, Tim Black

CHIEF, PM-PB, Karen Smith

CHIEF, DPM, Tim Murphy

TOTAL PROJECT COST INITIAL:	**$25,769**
TOTAL PROJECT COST RENOURISHMENTS:	**$109,771**
ESTIMATED TOTAL PROJECT COST:	**$135,540**

Filename: Non-CAP_113174_TPCS Mar 2016 r0 - 14FEB2017.xlsx
TPCS

**** CONTRACT COST SUMMARY ****

PROJECT: St Johns County Coastal Storm Risk Management Project
LOCATION: St Johns County, FL
This Estimate reflects the scope and schedule in report; St Johns County CSRMP Feasibility Report December 2015

DISTRICT: Jacksonville District
POC: CHIEF, COST ENGINEERING, Matthew Cunningham
PREPARED: 2/14/2017

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			20-Jun-16 / 1-Oct-15	Program Year (Budget EC): / Effective Price Level Date:			2017 / 1 OCT 16					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	INITITAL CONSTRUCTION-2020													
17	BEACH REPLENISHMENT	$14,233	$3,985	28.0%	$18,218	1.4%	$14,425	$4,039	$18,464	2018Q4	3.3%	$14,908	$4,174	$19,082
	CONSTRUCTION ESTIMATE TOTALS:	$14,233	$3,985	28.0%	**$18,218**		$14,425	$4,039	$18,464			$14,908	$4,174	$19,082
01	LANDS AND DAMAGES	$2,480	$694	28.0%	$3,174	1.4%	$2,514	$704	$3,217	2018Q4	3.3%	$2,598	$727	$3,325
30	PLANNING, ENGINEERING & DESIGN													
1.4%	Project Management	$205	$57	28.0%	$262	2.7%	$211	$59	$269	2018Q4	6.6%	$224	$63	$287
0.6%	Planning & Environmental Compliance	$80	$22	28.0%	$102	2.7%	$82	$23	$105	2018Q4	6.6%	$88	$25	$112
2.8%	Engineering & Design	$400	$112	28.0%	$512	2.7%	$411	$115	$526	2018Q4	6.6%	$438	$123	$561
0.3%	Contracting & Reprographics	$40	$11	28.0%	$51	2.7%	$41	$12	$53	2018Q4	6.6%	$44	$12	$56
0.6%	Life Cycle Updates	$90	$25	28.0%	$115	2.7%	$92	$26	$118	2018Q4	6.6%	$99	$28	$126
2.5%	Engineering During Construction	$356	$100	28.0%	$455	2.7%	$365	$102	$468	2018Q4	6.6%	$390	$109	$499
1.1%	Physical Monitoring	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2018Q4	6.6%	$164	$46	$210
0.1%	Environmental Monitoring	$10	$3	28.0%	$13	2.7%	$10	$3	$13	2018Q4	6.6%	$11	$3	$14
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	$1,067	$299	28.0%	$1,366	2.7%	$1,096	$307	$1,403	2018Q4	6.6%	$1,169	$327	$1,496
	CONTRACT COST TOTALS:	$19,111	$5,351		$24,462		$19,402	$5,432	$24,834			$20,132	$5,637	$25,769

Filename: Non-CAP_113174_TPCS Mar 2016 r0 - 14FEB2017.xlsx
TPCS

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: St Johns County Coastal Storm Risk Management Project
LOCATION: St Johns County, FL
This Estimate reflects the scope and schedule in report; St Johns County CSRMP Feasibility Report December 2015

DISTRICT: Jacksonville District
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

PREPARED: 2/14/2017

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			20-Jun-16 / 1-Oct-15	Program Year (Budget EC): / Effective Price Level Date:			2017 / 1 OCT 16					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	RENOURISHMENT 1-2032													
17	BEACH REPLENISHMENT	$10,780	$3,018	28.0%	$13,799	1.4%	$10,926	$3,059	$13,985	2028Q1	24.2%	$13,570	$3,800	$17,369
							$0							
	CONSTRUCTION ESTIMATE TOTALS:	$10,780	$3,018	28.0%	**$13,799**		$10,926	$3,059	$13,985			$13,570	$3,800	$17,369
01	LANDS AND DAMAGES	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
3.1%	Project Management	$330	$92	28.0%	$422	2.7%	$339	$95	$434	2028Q1	54.4%	$523	$146	$670
0.7%	Planning & Environmental Compliance	$80	$22	28.0%	$102	2.7%	$82	$23	$105	2028Q1	54.4%	$127	$36	$162
3.7%	Engineering & Design	$400	$112	28.0%	$512	2.7%	$411	$115	$526	2028Q1	54.4%	$634	$178	$812
0.4%	Contracting & Reprographics	$40	$11	28.0%	$51	2.7%	$41	$12	$53	2028Q1	54.4%	$63	$18	$81
1.4%	Life Cycle Updates	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2028Q1	54.4%	$238	$67	$304
2.5%	Engineering During Construction	$269	$75	28.0%	$345	2.7%	$277	$77	$354	2028Q1	54.4%	$427	$120	$546
1.4%	Physical Monitoring	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2028Q1	54.4%	$238	$67	$304
0.1%	Environmental Monitoring	$10	$3	28.0%	$13	2.7%	$10	$3	$13	2028Q1	54.4%	$16	$4	$20
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	$808	$226	28.0%	$1,034	2.7%	$830	$232	$1,062	2028Q1	54.4%	$1,281	$359	$1,639
	CONTRACT COST TOTALS:	$13,017	$3,645		$16,662		$13,224	$3,703	$16,926			$17,116	$4,793	$21,909

Filename: Non-CAP_113174_TPCS Mar 2016 r0 - 14FEB2017.xlsx
TPCS

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: St Johns County Coastal Storm Risk Management Project
LOCATION: St Johns County, FL
This Estimate reflects the scope and schedule in report; St Johns County CSRMP Feasibility Report December 2015

DISTRICT: Jacksonville District
POC: CHIEF, COST ENGINEERING, Matthew Cunningham
PREPARED: 2/14/2017

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			20-Jun-16 / 1-Oct-15	Program Year (Budget EC): / Effective Price Level Date:			2017 / 1 OCT 16					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	RENOURISHMENT 2-2044													
17	BEACH REPLENISHMENT	$10,780	$3,018	28.0%	$13,799	1.4%	$10,926	$3,059	$13,985	2040Q1	57.5%	$17,210	$4,819	$22,029
							$0							
	CONSTRUCTION ESTIMATE TOTALS:	$10,780	$3,018	28.0%	**$13,799**		$10,926	$3,059	$13,985			$17,210	$4,819	$22,029
01	LANDS AND DAMAGES	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
3.1%	Project Management	$330	$92	28.0%	$422	2.7%	$339	$95	$434	2040Q1	174.6%	$931	$261	$1,191
0.7%	Planning & Environmental Compliance	$80	$22	28.0%	$102	2.7%	$82	$23	$105	2040Q1	174.6%	$226	$63	$289
3.7%	Engineering & Design	$400	$112	28.0%	$512	2.7%	$411	$115	$526	2040Q1	174.6%	$1,128	$316	$1,444
0.4%	Contracting & Reprographics	$40	$11	28.0%	$51	2.7%	$41	$12	$53	2040Q1	174.6%	$113	$32	$144
1.4%	Life Cycle Updates	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2040Q1	174.6%	$423	$118	$541
2.5%	Engineering During Construction	$269	$75	28.0%	$345	2.7%	$277	$77	$354	2040Q1	174.6%	$759	$213	$972
1.4%	Physical Monitoring	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2040Q1	174.6%	$423	$118	$541
0.1%	Environmental Monitoring	$10	$3	28.0%	$13	2.7%	$10	$3	$13	2040Q1	174.6%	$28	$8	$36
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	$808	$226	28.0%	$1,034	2.7%	$830	$232	$1,062	2040Q1	174.6%	$2,278	$638	$2,916
	CONTRACT COST TOTALS:	$13,017	$3,645		**$16,662**		$13,224	$3,703	$16,926			$23,518	$6,585	**$30,103**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: St Johns County Coastal Storm Risk Management Project
LOCATION: St Johns County, FL
This Estimate reflects the scope and schedule in report; St Johns County CSRMP Feasibility Report December 2015

DISTRICT: Jacksonville District
POC: CHIEF, COST ENGINEERING, Matthew Cunningham
PREPARED: 2/14/2017

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared:			20-Jun-16	Program Year (Budget EC):			2017					
		Effective Price Level:			1-Oct-15	Effective Price Level Date:			1 OCT 16	FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	RENOURISHMENT 3-2056													
17	BEACH REPLENISHMENT	$11,896	$3,331	28.0%	$15,227	1.4%	$12,058	$3,376	$15,434	2052Q1	99.8%	$24,086	$6,744	$30,831
							$0							
	CONSTRUCTION ESTIMATE TOTALS:	$11,896	$3,331	28.0%	**$15,227**		$12,058	$3,376	$15,434			$24,086	$6,744	$30,831
01	LANDS AND DAMAGES	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
2.8%	Project Management	$330	$92	28.0%	$422	2.7%	$339	$95	$434	2052Q1	404.5%	$1,710	$479	$2,189
0.7%	Planning & Environmental Compliance	$80	$22	28.0%	$102	2.7%	$82	$23	$105	2052Q1	404.5%	$415	$116	$531
3.4%	Engineering & Design	$400	$112	28.0%	$512	2.7%	$411	$115	$526	2052Q1	404.5%	$2,073	$580	$2,653
0.3%	Contracting & Reprographics	$40	$11	28.0%	$51	2.7%	$41	$12	$53	2052Q1	404.5%	$207	$58	$265
1.3%	Life Cycle Updates	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2052Q1	404.5%	$777	$218	$995
2.5%	Engineering During Construction	$297	$83	28.0%	$380	2.7%	$305	$85	$391	2052Q1	404.5%	$1,540	$431	$1,971
1.3%	Physical Monitoring	$150	$42	28.0%	$192	2.7%	$154	$43	$197	2052Q1	404.5%	$777	$218	$995
0.1%	Environmental Monitoring	$10	$3	28.0%	$13	2.7%	$10	$3	$13	2052Q1	404.5%	$52	$15	$66
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	$891	$250	28.0%	$1,141	2.7%	$916	$256	$1,172	2052Q1	404.5%	$4,619	$1,293	$5,912
	CONTRACT COST TOTALS:	$14,245	$3,989		**$18,234**		$14,470	$4,051	$18,521			$36,256	$10,152	**$46,407**

Filename: Non-CAP_113174_TPCS Mar 2016 r0 - 14FEB2017.xlsx
TPCS

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: St Johns County Coastal Storm Risk Management Project
LOCATION: St Johns County, FL
This Estimate reflects the scope and schedule in report: St Johns County CSRMP Feasibility Report December 2015

DISTRICT: Jacksonville District PREPARED: 2/14/2017
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared:			20-Jun-16	Program Year (Budget EC):			2017					
		Effective Price Level:			1-Oct-15	Effective Price Level Date:			1 OCT 16	FULLY FUNDED PROJECT ESTIMATE				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	RENOURISHMENT 3-Project End													
17	BEACH REPLENISHMENT	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	CONSTRUCTION ESTIMATE TOTALS:	$0	$0	0.0%	**$0**		$0	$0	$0			$0	$0	$0
01	LANDS AND DAMAGES	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
	Project Management	$340	$95	28.0%	$435	2.7%	$349	$98	$447	2064Q2	838.6%	$3,277	$918	$4,195
	Planning & Environmental Compliance	$50	$14	28.0%	$64	2.7%	$51	$14	$66	2064Q2	838.6%	$482	$135	$617
	Engineering & Design	$400	$112	28.0%	$512	2.7%	$411	$115	$526	2064Q2	838.6%	$3,858	$1,080	$4,935
	Contracting & Reprographics	$40	$11	28.0%	$51	2.7%	$41	$12	$53	2064Q2	838.6%	$386	$108	$494
	Life Cycle Updates	$30	$8	28.0%	$38	2.7%	$31	$9	$39	2064Q2	838.6%	$289	$81	$370
	Engineering During Construction	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	Physical Monitoring	$50	$14	28.0%	$64	2.7%	$51	$14	$66	2064Q2	838.6%	$482	$135	$617
	Environmental Monitoring	$10	$3	28.0%	$13	2.7%	$10	$3	$13	2064Q2	838.6%	$96	$27	$123
31	CONSTRUCTION MANAGEMENT													
	Construction Management	$0	$0	28.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	CONTRACT COST TOTALS:	$920	$258		**$1,178**		$945	$265	$1,209			$8,868	$2,483	**$11,351**

Filename: Non-CAP_113174_TPCS Mar 2016 r0 - 14FEB2017.xlsx
TPCS

B7. COST MCX TPCS CERTIFICATION

The Recommended Plan estimate, formal cost and schedule risk analysis and total project cost summary spreadsheet underwent cost review and certification by the Walla Walla Mandatory Center of Expertise.

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

SAJ - PN 113174
St Johns County, FL
Coastal Storm Risk Management Project

The St John County, FL Coastal Storm Risk Management Project, as presented by the Jacksonville District, has undergone a successful update for the Cost Agency Technical Review (Cost ATR) of remaining costs, performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the cost products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of February 15, 2017, the Cost MCX certifies the estimated total project cost:

FY17 Project First Cost:	$ 78,417,000
Fully Funded Costs:	$135,540,000

Note: Cost ATR was devoted to remaining work. It did not review spent costs, which requires an audit process. It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through Federal interest of the project.

CALLAN.KIM.C.1231558221
Digitally signed by CALLAN.KIM.C.1231558221
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=CALLAN.KIM.C.1231558221
Date: 2017.02.15 12:46:58 -08'00'

Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District

ATTACHMENT A
CSRA REPORT EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The CSRA was developed by CESAJ-ENTC with support by the Cost Engineering Mandatory Center of Expertise (MCX) for Civil Works. The CSRA was reviewed by the MCX during Agency Technical Review (ATR) and during subsequent coordination between the MCX and Jacksonville District Cost Engineering. This report presents a recommendation for the total project cost and schedule contingencies for the St. Johns County Coastal Storm Risk Management (CSRM) Project Feasibility Report. In compliance with Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated September 15, 2008, a formal risk analysis study was conducted for the development of contingency on the total project cost. The purpose of this risk analysis study was to establish project contingencies by identifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

Specific to the St. Johns County CSRM project, the most likely total project cost (at current price level) is approximately $78.4 Million. Based on the results of the analysis, the Jacksonville District recommends a contingency value of $16.9 Million, or 28%. This contingency includes $16.3 Million (27%) for risks related to cost and $0.7 Million (1%) for the effect of schedule delay on overall project costs.

The Jacksonville District performed the risk analysis using the *Monte Carlo* technique, producing the aforementioned contingencies and identifying key risk drivers. This has been reviewed, as required, by the MCX, Walla Walla District.

The following table portrays the development of contingencies (28% overall). The contingency is based on an 80% confidence level, as per USACE Civil Works guidance.

Table ES-1. Contingency Analysis Table

Base Cost Estimate	**$60,310,000**	
Confidence Level	**Value ($$)**	**Contingency (%)**
5%	$68,600,300	14%
50%	$73,605,100	23%
80%	**$77,313,700**	**28%**
95%	$79,906,100	32%

KEY FINDINGS/OBSERVATIONS RECOMMENDATIONS

The key cost risk drivers identified through sensitivity analysis are PR5 (Fuel Prices), PR1 (Bidding Climate), PR9 (Sea Level Rise), CA1 (Acquisition Strategy), and which together contribute over 90% of the statistical cost variance.

- Fuel Prices captures the risk that fluctuation in fuel costs could impact the contract cost.
- Bidding Climate captures the risk that severe economic swings could increase / decrease the number of potential bidders and affect cost and schedule.
- Sea Level Rise captures the risk that sea level rise could impact the scope and schedule.
- Acquisition Strategy captures the risk possibility that multiple contracts could increase the cost.

Additional moderate cost risks that should be closely monitored are PM1 (Scope Definition), TL3 (Availability of Sand), TL4 (Character of Materials), REG1 (Environmental Impacts), ET4 (Subcontracting Plan), ET5 (Dredge Size/Type), and PR2 (Bid Protests).

- Scope Definition captures the risk that poorly defined scope could lead to higher costs and impacts to the schedule.
- Availability of Sand captures the risk that there could be a shortage in the amount of borrow material available for the life of the project.
- Character of Materials captures the risk that a lack of geotech investigations or the presence of rock leads to uncertainty regarding the yield of suitable material from the borrow site.
- Environmental Impacts captures the risk to cost caused by impacts to cultural resources at the project site or borrow area which would require additional investigation, coordination and permitting.

- Subcontracting Plan captures the risk that a subcontracting plan different than the assumed could affect cost and schedule.
- Dredge Size/Type captures the risk that the equipment used in the estimate, including the dredge type, might not be similar to what contractors offer.
- Bid Protests captures the risk that there is the inherent risk of protests from the industry.

The key schedule risk drivers identified through sensitivity analysis are PM2 (Funding Stream), REG1 (Environmental Impacts), REG3 (Environmental Restrictions), and PR1 (Bidding Climate) which together contribute over 70% of the statistical schedule variance.

- Funding Stream captures the impacts to the schedule of not receiving funding in a timely manner.
- Environmental Impacts captures the impacts to the schedule associated with the possibility of cultural resources at the project site or borrow area which would require additional investigation, coordination and permitting.
- Environmental Restrictions captures the impacts to the schedule associated with required dredging windows and environmental restrictions.
- Bidding Climate captures the impacts that severe economic swings could increase / decrease number of potential bidders and affect cost and schedule.

Additional moderate schedule risks that should be closely monitored are PM1 (Scope Definition), ET2 (Quantity Estimates), and PR2 (Bid Protests).

- Bid Protests captures the risk to the schedule due to the risk of protests from the industry.
- Quantity Estimates captures the risk to the schedule of quantity changes due to severe weather, sea level rise, changes in erosion rates, etc. The greater quantity variance risks would likely be in the out years.
- Scope Definition captures the risk to the schedule of a poorly defined scope.

Recommendations, as detailed within the main report, include the implementation of cost and schedule contingencies, further iterative study of risks throughout the project lifecycle, potential mitigation throughout the PED phase, and proactive monitoring and control of risk identified in this study.

ST. JOHNS COUNTY, FLORIDA
FEASIBILITY STUDY

APPENDIX C – ECONOMICS

US Army Corps of Engineers, Jacksonville District

3/8/2017

0. EXECUTIVE SUMMARY

The St. Johns County, Florida Coastal Storm Risk Management Feasibility Study was authorized by House Resolution 2646, adopted June 21, 2000. Based on a reconnaissance study, completed in 2004, the feasibility study was initiated in 2005 to investigate alternatives for coastal storm risk management along the St. Johns County shoreline.

✖ Alternative Evaluation

Upon conduct of a preliminary screening, followed by a detailed evaluation of a final array of alternatives, the project delivery team has determined a Recommended Plan for reducing coastal storm and erosion damage to infrastructure. Alternatives were evaluated using FY 2016 price levels, the FY2016 federal water resources discount rate of 3.125%, and a 50 year period of analysis with a base year of 2020. Structure and contents damage and armor costs benefits are included. Incidental recreation benefits and land loss benefits are not included. See **Table 0-1** for more detail on the evaluation of the final array of alternatives.

Table 0-1: Final Alternative BCRs & Average Annual Net Benefits

Alternative Name	Brief Description	BCR	Average Annual Net Benefits
Alternative 6	Initial and periodic nourishments of the existing dune profile and additional 60' extension of the berm along 2.6 miles from R-103.5 to R-116.5.	1.25	$341,126
Alternative 4	Initial and periodic nourishments of a 10' dune profile extension and additional 60' extension of the berm along 2.6 miles from R-103.5 to R-116.5.	1.20	$297,385

✖ The Recommended Plan

The plan with the highest net benefits is "Alternative 6". Therefore, it is the Recommended Plan. This is also the plan with the highest Benefit-Cost-ratio (BCR).

The Recommended Plan will include initial construction and periodic nourishment of a 60 foot equilibrated berm (beach) extension. Additionally, for initial and periodic nourishment, the dune will be nourished where needed to maintain the average existing (2015) dune profile. The dune will be vegetated (where constructed) at initial construction only. These features will extend from R103.5 to R116.5 along 2.6 miles of shoreline. Tapers will extend 1,000 feet from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. With the inclusion of tapers, sand placement extends from R102.5 to R117.5 along 3 miles of shoreline. A hydraulic dredge will be used to fill the template with sand from the St. Augustine Inlet shoal complex.

Though the alternative comparison and evaluation was conducted using the FY16 discount rate, the net benefits and BCR of the Recommended Plan have been updated to FY17 price levels and with the FY17 discount rate (2.875%). This is to ensure that the Chief's Report is based on the best available cost and benefit information. The following table provides a summary of the Recommended Plan with and without incidental recreation benefits added at FY17 price levels discounted with the FY17 Water Resources Discount Rate (2.875%). See **Table 0-2** for more detail on the NED Plan. Other than the final

Recommended Plan summary provided here and at the conclusion of the Appendix, damages and benefits are reported as they were originally computed at the FY16 discount rate.

Table 0-2: Economic Summary of the NED Plan

Economic Summary	Primary Storm Damage Reduction Benefits	Primary Storm Damage Reduction + Incidental Recreation Benefits
Price Level	FY17	FY17
FY17 Water Resources Discount Rate	2.875%	2.875%
Average Annual Structure & Contents Damage & Armor Costs Benefits	$ 1,683,000	$ 1,683,000
Average Annual Land Loss Benefits	$ 278,000	$ 278,000
Average Annual Incidental Recreation Benefits	$ -	$ 692,000
Average Annual Total Benefits	$ 1,961,000	$ 2,653,000
Average Annual Costs	$ 2,031,000	$ 2,031,000
Average Annual Net Benefits	($ 70,000)	$ 622,000
Benefit Cost Ratio	**0.97**	**1.3**

TABLE OF CONTENTS

0. Executive Summary ii
1. Introduction 1
2. Existing Conditions 2
2.1 Overview of Existing Structures and Data Organization 2
2.2 Data Collection for Structure Inventory 4
2.2.1 Lots - Coastal Armor 4
2.2.2 Damage Elements - Structure & Contents Value 6
2.3 Structure Inventory Overview 6
3. Coastal Storm Risk Management Benefits 8
3.1 Benefit Estimation Approach using Beach-fx 8
3.2 Model Assumptions 8
3.3 Future Without-Project Condition (FWOP) 9
3.3.1 Damage Distribution by Structure Category and Type 9
3.3.2 Spatial Distribution of Without-Project Damages 11
3.3.3 Damage Distribution by Damage Driving Parameter 14
3.3.4 Temporal Distribution of Damages 14
3.3.5 FWOP Damages in alternative Sea Level Rise (SLR) scenarios 16
3.3.6 FWOP Condition Conclusion 20
3.4 Future with Project Condition 20
3.4.1 Management Measures 20
3.4.2 Alternative Development 21
3.4.3 Alternative Comparison 23
3.4.4 Nourishment Volume Sensitivity and Recommended Plan Optimization 24
4. The Tentatively Selected Plan 26
4.1 Beach-fx Modeling and Project Costs 26
4.2 Benefits of the NED Plan 30
4.3 Sea Level Rise Considerations 34
4.4 Uncertainty and Reliability of the Recommended Plan 34
4.5 Land Loss Benefits 37

4.6 Incidental Recreation Benefits 39
5. Conclusion 45

THE TABLES.....

Table 0-1: Final Alternative Net Benefits & BCRs ii
Table 0-2: Economic Summary of the NED Plan iii
Table 2-1: Armor Costs 5
Table 2-2: Distribution of Structures & Structure Value by Reach 7
Table 3-1: Distribution of FWOP Damages by Category and Type 10
Table 3-2: FWOP present value damages by Category and Beach-fx Reach 12
Table 3-3: FWOP Average PV Damage and Armor Costs by SLR Scenario 16
Table 3-4: Results Summary for Initial Beach-fx FWP Modeling 23
Table 3-5: Damages for Final Array of Alternatives 23
Table 3-6: Benefits and Costs for Final Array of Alternatives 24
Table 3-7: Range of Potential Net Benefit for Final Alternatives over 100 Iterations 24
Table 3-8: Range of Potential Benefit-Cost Ratios for Final Alternatives over 100 Iterations 24
Table 4-1: Beach-fx Volume per Construction Event 26
Table 4-2: Recommended Plan Project Costs 28
Table 4-3: Representing the Project Costs in Beach-*fx* 29
Table 4-4: PV of Damages in the Study Area 31
Table 4-5: PV Damages by Type 32
Table 4-6: Average PV Benefits and Costs for NED Plan in different SLR scenarios 34
Table 4-7: Average Nourishment Intervals and Damages in the SLR scenarios 34
Table 4-8: Range of Recommended Plan Costs and Benefits in the Base SLR Scenario 35
Table 4-9: Recommended Plan Reliability in the Base SLR Scenario 36
Table 4-10: Recommended Plan Reliability for All SLR Scenarios 36
Table 4-11: Recommended Plan Performance in Life Cycles with Greatest FWOP Damages 37
Table 4-12: Current Unit Day Values for Recreation 39
Table 4-13: Total Unit Day Point Scores applied to St. Johns County 40
Table 5-1: Economic Summary 45

THE FIGURES.....

Figure 2-1: Typical Beach-fx Set Up (2014 Google Aerial) 3
Figure 2-2: Lot Armor Status 5
Figure 3-1: Probability Distribution of the Future Without-Project Condition Results 9
Figure 3-2: Spatial Distribution of Damages and Erosion Rates by Reach 13
Figure 3-3: Non Present Value FWOP Damages & Armor Costs over Space and Time 15
Figure 3-4: FWOP Average PV Damage and Armor Costs for SLR 17
Figure 3-5: Average Non PV FWOP Damage & Armor Costs by Model Reach for SLR 18
Figure 3-6: Average Non PV FWOP Damage & Armor Costs over Time for SLR 19
Figure 3-7: FWOP Damages per Linear Foot vs ROM Cost per Linear Foot of Alternatives Modeled in Beach-fx. ..... **Error! Bookmark not defined.**
Figure 3-8: Minimum Mobilization Volume Sensitivity 25
Figure 4-1: Frequency Distribution of Nourishments over Time 27
Figure 4-2: Non Present Value Benefits over Space & Time 33
Figure 4-3: Non Present Value Damages, Benefits, and Estimated Costs over Time ... **Error! Bookmark not defined.**
Figure 4-4: Non Present Value Damages, Benefits, and Modified Beach-fx Costs over Time ..... **Error! Bookmark not defined.**
Figure 4-5: Frequency Distribution of Recommended Plan Net Benefits in the Base SLR Scenario 35
Figure 4-6: Recommended Plan Life Cycle Costs and Benefits Sorted By FWOP Damages 37
Figure 4-7: 2015 Beach Conditions 42

1. INTRODUCTION

The purpose of this economics appendix is to tell the story of the economics investigation, and provide greater detail on the results of the analysis. The sections that follow will cover the following topics:

- **Existing Conditions:** Items discussed include an assessment of socio-economic conditions, spatial organization of the study area, and an inventory of the coastal infrastructure within the study area.

- **Coastal Storm Risk Management Benefits:** This section will cover the methods used to estimate the future without-project, and future with-project condition using Beach-fx, accounting for risk and uncertainty. The future without-project condition will cover the distribution of the damages in the following dimensions:
  - Spatial (Where)
  - Categorization of structures (What)
  - Damage driving parameter (How)
  - Temporal (When)

  The future with-project condition discussion will cover the CSRM alternatives analyzed, and the analysis results. In addition, an analysis of alternative performance under the intermediate and high sea level change scenarios is provided.

- **NED & Recommended Plan Selection and Performance:** This section addresses the rationale for NED and Recommended Plan selection. A detailed description of the performance of the NED Plan is provided with the same 4 dimensions given in the Coastal Storm Risk Management section. A discussion on the project's incidental recreation benefits is also provided.

- **Beach-fx Overview:** Beach-*fx* was developed by the USACE Engineering Research and Development Center (ERDC) in Vicksburg, Mississippi. On April 1, 2009 the Model Certification Headquarters Panel certified the Beach-*fx* hurricane and coastal storm risk management (CSRM) model based on recommendations from the CSRM - Planning Center of Expertise (PCX). The model was reviewed by the PCX for Coastal and Storm Damage and found to be appropriate for use in CSRM studies.

  Beach-*fx* fully incorporates risk and uncertainty, and is used to simulate lifecycle hurricane and storm damages and to compute accumulated present worth damages and costs. Storm damage is defined as the damage incurred by the temporary loss of a given amount of shoreline as a direct result of wave attack, erosion, and/or inundation caused by a storm of a given magnitude and probability. Beach-*fx* is an event-driven life-cycle model that estimates damages and associated costs over a period of analysis based on storm probabilities, tidal cycle, tidal phase, beach morphology and many other factors. Damages or losses to developed shorelines include buildings, pools, patios, parking lots, roads, utilities, seawalls, revetments, bulkheads, replacement of lost backfill, etc. Beach-*fx* also provides the capability to estimate the costs of certain future measures undertaken by state and local organizations to protect coastal assets, such as emergency beach/dune fill projects.

  Data on historic storms, beach survey profiles, and private, commercial & public structures within the project area is used as input to the USACE Beach-*fx* model. The model is then used to estimate future project hurricane and storm damages.

2. EXISTING CONDITIONS

2.1 Overview of Existing Structures and Data Organization

Economists, real estate specialists, and engineers have collected and compiled detailed structure information for the stretch of shoreline to be modeled in Beach-fx as part of the St. Johns County, Florida Coastal Storm Risk Management Feasibility Study covering 7.5 miles of shoreline (FDEP Monuments R-84 to R-122), which includes:

- 397 single family residences
- 37 multi-family residences
- 10 commercial structures
- 251 dune walks
- State Road A1A (SR A1A)
- Several parking lots, gazebos, garages, pools, tennis courts, and bath houses

In total, attribute information for 817 separate damage elements (DE) was populated for economic modeling using Beach-*fx*. The proximity of these buildings to the beach makes them potentially vulnerable to erosion, wave attack, and inundation.

The study area to be modeled in Beach-*fx* has been divided into two study reaches based on municipal boundaries. These two study reaches are South Ponte Vedra Beach and Vilano Beach. A "study reach" simply delineates sub-regions or municipal/political boundaries within an authorized study area. See Figure 1-1 in the Main Report for a map of the study area.

The study area was disaggregated into 8 representative beach profiles, 37 model (Beach-*fx*) reaches, and 445 lots, for economic modeling and reporting purposes. **Figure 2-1** shows an aerial view of the Beach-*fx* model features in the vicinity of R-106 and R-107 which represent a typical stretch of shoreline in the study area modeled. This hierarchical structure is depicted as follows:

- **Beach Profiles:** Coastal beach profile surveys were analyzed by USACE Jacksonville District (SAJ) Coastal Engineering personnel to develop representative beach profiles that include the dune, berm and submerged portions of the beach. The representative beach profiles are used for shore response modeling in the SBEACH engineering numerical model, and only referred to in this section for informational purposes.
- **Beach-*Fx* (Model) Reaches:** Quadrilaterals with a seaward boundary that is parallel with the shoreline that contain the Lots and Damage elements, and that are used to incorporate coastal morphology changes for transfer to the lot level. Model reaches are also useful because they allow modelers to divide study reaches into more manageable segments for analysis. After the FWOP conditions are modeled, the Beach-*fx* reaches will be grouped into "design reaches" to represent separable increments delineated based on shoreline condition and FWOP damages, where unique FWP alternatives could be implemented.
- **Lots:** Quadrilaterals encapsulated within model reaches used to transfer the effect of coastal morphology changes to the damage element. Lots are also repositories for coastal armor costs, specifications, and failure threshold information.
- **Damage Elements:** Represents the smallest unit of the existing condition coastal inventory and a store of economic value subject to losses from wave attack, inundation, and erosion damages. Damage elements are a primary model input and the topic of focus in this discussion. The primary structure categories are coastal armor and coastal structures.

More details on the establishment of the Profiles and Beach-*fx* Model Reaches, which is primarily based on physical shoreline characteristics, can be found in the Appendix A - Engineering.

Beach-*fx* handles economic considerations at the Lot and Damage Element levels. These considerations include armor construction costs at the Lot level and the extent of damage and rebuilding costs at the Damage Element level. When damages occur in Beach-*fx*, Damage Elements may be partially rebuilt depending on the extent of modeled damage. Beach-*fx* calculates rebuild costs as the difference in the structures depreciated replacement value before and after the damage occurs. **Section 2.2** will provide further detail on the Lot and Damage Element attribute data that makes up the structure inventory for this project area.

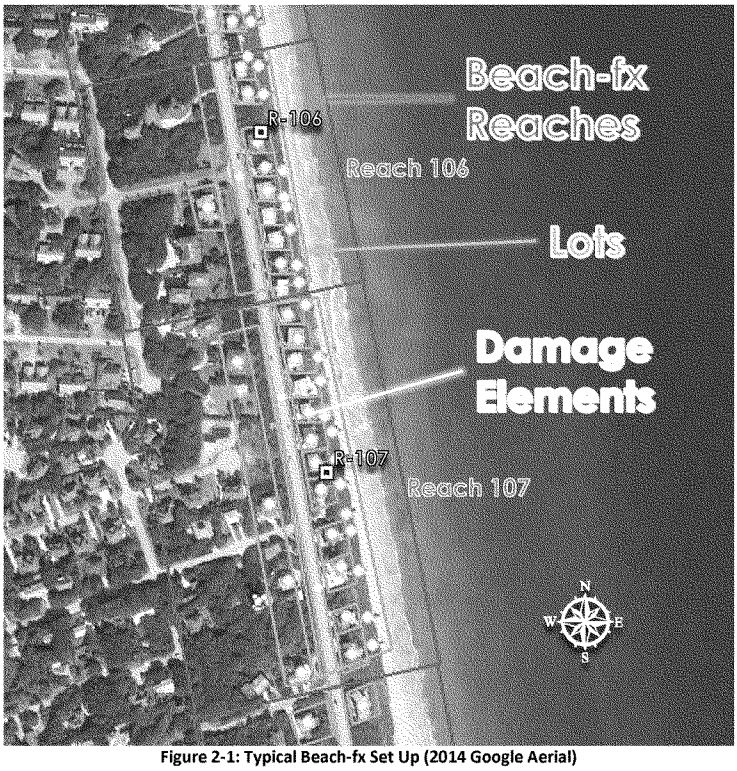


Figure 2-1: Typical Beach-fx Set Up (2014 Google Aerial)

2.2 Data Collection for Structure Inventory

Information on the existing economic conditions along the St. Johns County study area coastline was collected for economic modeling purposes using Beach-*fx*. The information on the coastal assets detailed in this section was collected from mapping resources, site visits, and contractors.

2.2.1 Lots - Coastal Armor

Beach-*fx* handles coastal armoring parameters and condemnation at the lot level. Lots are designated as being either armored, armorable in the future, or not armorable, based on coastal regulations that dictate armor construction and local history on armor permitting and construction. Since armoring forms one of the major roles of lots in Beach-*fx*, the location and length of potential future armoring dictates the seaward boundary of most lots.

Data on coastal armor within the project area was collected from a variety of sources including a site visit on March 15, 2015, aerial photography, and USACE SAJ Coastal Engineering personnel. Coastal armor value was determined by USACE SAJ Cost Engineering personnel.

The area modeled contains several types of existing coastal armor including seawalls and revetments constructed of various materials. Most of this existing armor has been constructed to protect single family residences from erosion damages. **Figure 2-2** shows the lots color coded by armor status for a typical stretch of shoreline in the vicinity of R-87 and R-88. Lots that are already armored are shown in red.

The project area shoreline that is not currently armored has been categorized as being either armorable in the future or not armorable. This categorization is based on the assumed likelihood that armor would or would not be constructed by local interests should property be threatened in the future by coastal processes.

Lots designated as armorable in the future are shown in yellow in **Figure 2-2**. It is assumed that certain structures along the shoreline would be armored by local interests in a similar manner to existing armor as erosion continues to threaten homes and property. In St. Johns County homes that were built before 1988, or that are located between armored properties less than 250 feet apart, are eligible for armor permits under Florida's Coastal Construction Control Line (CCCL) program. Seawalls to protect single family residences in the study area have been constructed as recently as 2015. It is also assumed that the Florida Department of Transportation (FDOT) would construct armor in order to protect State Road (SR) A1A if erosion threatened it. This road is the main north to south corridor in the study area and is an emergency evacuation route. FDOT already has plans and designs developed for armoring a section of SR A1A in the study area between R-115 and R-116.

SAJ Cost Engineering personnel developed cost estimates for 6 unique types of existing or potential future armor in the study area. **Table 2-1** shows the armor costs per linear foot used in the model.

Table 2-1: Armor Costs

Armor Type (Typical Length)	Cost/Linear Foot	Mob/Demob
Vinyl Sheetpile Seawall (75 LF)	$1,920	$20,000
Steel Sheetpile Seawall (75 LF)	$2,440	$20,000
Wood Bulkhead (75 LF)	$1,280	$20,000
FDOT Steel Sheetpile Seawall (1000 LF)	$5,726	$442,000
Wood Wall (68 LF)	$426	$6,000
Armor Stone Revetment (90 LF)	$2,178	$7,000

Not armorable lots are shown in green in **Figure 2-2**. It is assumed that these lots would not be armored in the future either because the property would not be eligible for armor construction under the CCCL criteria or the property owner would likely find that armor is more costly that the infrastructure being protected. In the area modeled, lots that are empty or contain only relatively low value structures such as dune walks or gazebos along the shoreline are assumed to be not armorable in the future.

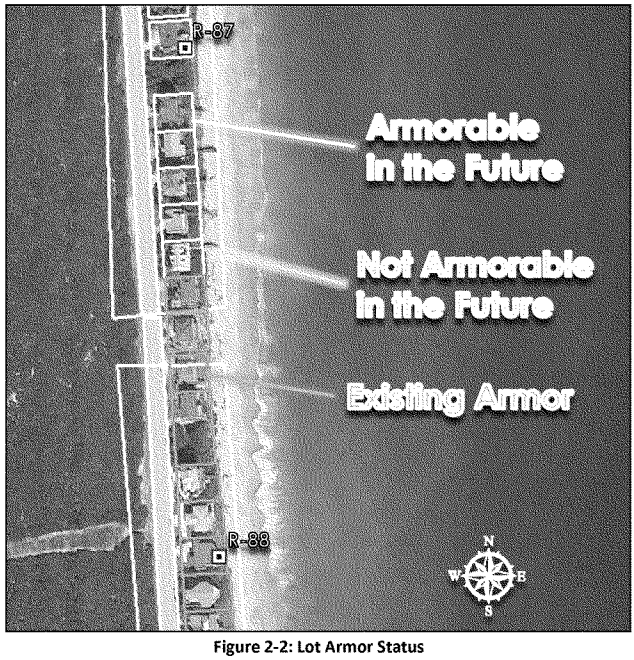


Figure 2-2: Lot Armor Status

2.2.2 Damage Elements - Structure & Contents Value

Beach-*fx* handles economic considerations at the damage element (DE) level. These considerations include extent of damage, cost to rebuild, and time to rebuild. Beach-*fx* uses pre-defined damage functions to calculate the extent of damage. For each damage element, the following information is input into Beach-*fx*:

- Geographical reference (northing and easting of center point)
- Alongshore length and cross-shore width
- Usage (e.g., single family, multi-family, commercial, walkover, pool, gazebo, tennis court, parking lot)
- Number of floors
- Construction type (e.g., wood frame, concrete, masonry)
- Foundation type (e.g., shallow piles, deep piles, slab)
- Armor type (e.g., seawall)
- Ground and/or first floor elevation
- Value of structure (replacement cost less depreciation)
- Value of contents

The geospatial location and footprint of the damage elements was verified using aerial photography in ArcMap. The construction and foundation type of each damage element was gathered from the St. Johns County property appraiser information and visual observations by Jacksonville district (SAJ) staff. First floor elevations of all the damage elements in the study area were surveyed. Real Estate professionals from SAJ provided updated depreciated replacement costs for all of the damage elements in March 2015. An uncertainty of +/- 15% was assigned to these costs. The value of contents was assumed to be 50% of the structure value for all habitable structures. Non-habitable structures (dune walks, bathhouses, pools, etc...) had zero contents value.

2.3 Structure Inventory Overview

The economic value of the existing structure inventory represents the depreciated replacement costs of damageable structures and their associated contents within the study area along the coastline. The damage element inventory includes 817 damageable structures with an overall estimated value of $268 M, with structure and content valuations of $188 M and $80 M respectively.

Values aggregated by Beach-*fx* Reach show only slight variation due to differentiation between the type, magnitude, and density of development. **Table 2-2** provides the distribution of structure and content values broken down by Beach-*fx* Reach.

Table 2-2: Distribution of Structures & Structure Value by Reach

Distribution of Structures & Structure Value by Reach					
Beach-Fx Reach	**DE Count**	**Structure Value**	**Content Value**	**Total Value**	**% of Total Value**
84	8	$ 1,108,437	$ 376,268	$ 1,484,705	**1%**
85	20	$ 3,175,145	$ 1,275,190	$ 4,450,335	**2%**
86	20	$ 3,627,217	$ 1,469,831	$ 5,097,048	**2%**
90	27	$ 3,928,659	$ 1,603,997	$ 5,532,656	**2%**
91	22	$ 3,149,707	$ 1,233,206	$ 4,382,913	**2%**
92	15	$ 2,085,649	$ 816,325	$ 2,901,974	**1%**
93	28	$ 4,067,044	$ 1,681,022	$ 5,748,066	**2%**
87	32	$ 6,612,213	$ 2,861,777	$ 9,473,990	**4%**
88	22	$ 3,851,535	$ 1,641,533	$ 5,493,068	**2%**
89	28	$ 6,237,679	$ 2,715,902	$ 8,953,581	**3%**
94	8	$ 844,758	$ 140,214	$ 984,972	**0%**
95	19	$ 2,015,648	$ 584,794	$ 2,600,442	**1%**
96	26	$ 4,281,210	$ 1,761,098	$ 6,042,308	**2%**
97	20	$ 3,430,500	$ 1,383,555	$ 4,814,055	**2%**
98	61	$ 16,869,267	$ 7,846,416	$ 24,715,683	**9%**
100	46	$ 11,714,035	$ 5,313,803	$ 17,027,838	**6%**
101	25	$ 4,181,708	$ 1,711,544	$ 5,893,252	**2%**
102	8	$ 10,049,865	$ 4,680,000	$ 14,729,865	**5%**
103	12	$ 13,796,355	$ 6,419,700	$ 20,216,055	**8%**
104	22	$ 5,035,899	$ 2,181,137	$ 7,217,036	**3%**
105	15	$ 3,488,390	$ 1,350,185	$ 4,838,575	**2%**
106	20	$ 3,880,670	$ 1,665,604	$ 5,546,274	**2%**
107	30	$ 4,970,238	$ 2,068,742	$ 7,038,980	**3%**
108	11	$ 2,723,804	$ 1,074,022	$ 3,797,826	**1%**
109	15	$ 3,003,386	$ 862,898	$ 3,866,284	**1%**
110	18	$ 2,510,368	$ 888,944	$ 3,399,312	**1%**
111	31	$ 5,272,445	$ 2,241,253	$ 7,513,698	**3%**
112	22	$ 5,522,167	$ 2,198,746	$ 7,720,913	**3%**
114	16	$ 5,263,067	$ 2,141,249	$ 7,404,316	**3%**
115	11	$ 3,216,410	$ 1,287,180	$ 4,503,590	**2%**
116	12	$ 2,077,290	$ 655,080	$ 2,732,370	**1%**
117	10	$ 1,285,292	$ 360,946	$ 1,646,238	**1%**
118	36	$ 5,326,818	$ 2,186,154	$ 7,512,972	**3%**
119	33	$ 4,767,243	$ 2,059,374	$ 6,826,617	**3%**
120	36	$ 16,351,882	$ 7,684,346	$ 24,036,228	**9%**
121	19	$ 5,315,967	$ 2,575,266	$ 7,891,233	**3%**
122	13	$ 2,588,949	$ 1,279,362	$ 3,868,311	**1%**
Total	**817**	**$ 187,626,916**	**$ 80,276,658**	**$ 267,903,574**	**100%**

3. COASTAL STORM RISK MANAGEMENT BENEFITS

This section of the appendix covers the approach used to estimate the economic benefits of reducing hurricane and storm related damages in St. Johns County using Beach-*fx*. The topics covered include:

- Benefit estimation approach using Beach-*fx*
- The future without-project condition
- The future with-project condition

3.1 Benefit Estimation Approach using Beach-fx

Beach-*fx* links the predictive capability of coastal evolution modeling with project area infrastructure information, structure and content damage functions, and economic valuations to estimate the costs and total damages under various CSRM alternatives. This output is then used to determine the benefits of each alternative.

The future structure inventory and values are the same as the existing condition. This conservative approach neglects any increase in value due to future development. Due to the uncertainty involved in projections of future development, using the existing inventory is preferable and considered conservative for Florida where coastal development has historically increased in density and value.

The future without-project damages will be used as the base condition. Potential alternatives are measured against this base condition. The difference between with and without-project damages will be used to determine project benefits.

Once benefits for each of the alternatives are calculated, they will be compared to the costs of implementing the alternative. Dividing the benefits of an alternative by the costs of the alternative yields a Benefit-to-Cost Ratio (B/C Ratio). The federally preferred plan (NED – National Economic Development Plan) is the plan that maximizes net benefits. Net benefits are determined by subtracting the cost of any given alternative from the benefits of that alternative (Benefits – Costs = Net Benefits).

3.2 Model Assumptions

- **Start Year:** The year in which the simulation begins is 2015
- **Base Year:** The year in which the benefits of a constructed federal project would be expected to begin accruing is 2020
- **Period of Analysis:** 50 years (2020 to 2070)
- **Discount Rate:** 3.125% FY2016 Federal Water Resources Discount Rate
- **Damage Functions:** Damage functions developed by the Institute for Water Resources (IWR), Coastal Storm Damage Workshop (CSDW), Coastal Storm Damage Relationships Based on Expert Opinion Elicitation in 2002, were used.
- **Coastal Armor:**
  - Existing armor set at the lot level will protect the damage elements in that lot until failure is triggered. If the armor fails structures will be subject to damages until the armor is rebuilt.
  - When erosion reaches the seaward edge of armorable in the future lots, armor will be constructed at this location. Before the armor is built the damage elements are subject to damages. Once construction of the armor is completed, armor will function normally.
  - Shorefront properties that are not armorable will not be armored in the future because of either permitting restrictions, or the cost of armor would not likely be warranted to protect the relatively low value structures on these properties.

- **Number of Times Rebuilding Allowed:** The maximum number of structure rebuilds can be specified for damage elements. Based on the assumed likeliness that certain types of damage elements will eventually stop being rebuilt by property owners, the following are the number of times that rebuilding is allowed for certain types of damage elements:
  - Dune Walks: 10X
  - Remaining: 99X
- **Future Development:** It should be noted that future development has not been assumed to occur on currently vacant lots. The damages and benefits are based only on existing infrastructure. Given uncertainty about what may happen in the future, this is a conservative, but defensible, assumption.
- **Content-to-Structure Value Ratios (CSVRs):** Because site specific surveys about content values are not available, content values were assumed to be 50% of the structure value for all structure types. This is consistent with other Beach-fx studies in Florida.

3.3 Future Without-Project Condition (FWOP)

Over 100 iterations the future without-project condition damages across the study area modeled range between $46.8 and $149.8 M present value dollars. 100 iterations was determined to be adequate for the analysis as the moving average of damages and armor costs normalize by 50 iterations. Descriptive statistics on the FWOP model damages are as follows:

- Mean: PV $97,132,960
- Standard deviation: $20,508,484
- Median: $95,674,130

Figure 3-1 provides an illustration of FWOP results as a probability distribution based on the *Iteration.csv* model output file. The distribution is characterized by a relatively low peak and fairly normal shape. This suggests a relatively stable model with only moderate variability between iterations.

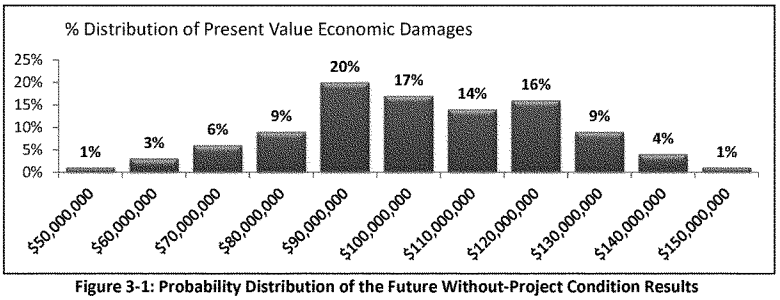


Figure 3-1: Probability Distribution of the Future Without-Project Condition Results

3.3.1 Damage Distribution by Structure Category and Type

Pursuant to estimating future without-project condition damages and associated costs for the St. Johns County study area, Beach-*fx* was used to estimate damages and costs in the following categories:

- Structure Damage: Economic losses resulting from the structures situated along the coastline being exposed to wave attack, inundation, and erosion damages. Structure damages account for approximately 53.7% of the total FWOP damages.

- Contents Damage: The material items housed within the aforementioned structures (usually air conditioned and enclosed) that are potentially subject to damage. Content damages make up approximately 21.5% of the total FWOP damages.
- Coastal Armor Cost: Beach-*fx* provides the capability to estimate the costs incurred from measures likely to be taken to protect coastal assets and or prevent erosion in the study area. Based on the existence of coastal armor units throughout the study area, Beach-*fx* was used to estimate the costs of erecting such measures throughout the period of analysis. Armor costs account for approximately 24.8% of the total FWOP damages.

Table 3-1 provides greater detail on the composition of the average FWOP damages by category and damage element type based on the *Iteration.csv* and *ReachYearlyDamagesByType.csv* model output files.

Table 3-1: Distribution of FWOP Damages by Category and Type

DE Type	Average PV Structure Damage	Average PV Content Damage	Average PV Armor Costs	Total Average PV Damages & Costs	% of Total
COMM	$ 1,861,712	$ 930,865	$ -	**$ 2,792,576**	3%
GAZEBO	$ 608,711	$ -	$ -	**$ 608,711**	1%
MFR1	$ 2,250	$ 1,125	$ -	**$ 3,375**	0%
MFR2	$ 808,674	$ 404,337	$ -	**$ 1,213,010**	1%
MFR3	$ 135,699	$ 68,225	$ -	**$ 203,924**	0%
PARKINGLOT	$ 442,541	$ -	$ -	**$ 442,541**	0%
POOL	$ 88,565	$ -	$ -	**$ 88,565**	0%
ROAD2	$ 4,835,406	$ -	$ -	**$ 4,835,406**	5%
ROAD3	$ 1,687,213	$ -	$ -	**$ 1,687,213**	2%
SFR1	$ 13,295,051	$ 6,623,894	$ -	**$ 19,918,946**	21%
SFR2	$ 20,055,501	$ 10,009,045	$ -	**$ 30,064,546**	31%
SFR3	$ 5,793,992	$ 2,892,867	$ -	**$ 8,686,859**	9%
TENNIS	$ 734	$ -	$ -	**$ 734**	0%
WALK	$ 2,522,672	$ -	$ -	**$ 2,522,672**	3%
ARMOR COST	$ -	$ -	$ 24,063,881	**$ 24,063,881**	25%
Total	**$ 52,138,722**	**$ 20,930,358**	**$ 24,063,881**	**$ 97,132,960**	100%
% of Total	53.7%	21.5%	24.8%	100%	

3.3.1.1 *Single Family Residences (SFR)*

Single family residences consist of 1-3 story structures of varying construction type and value. This category accounts for the majority of the damage elements in the study area. 61% of the total FWOP damages are associated with direct damages to these structures and their content.

3.3.1.2 *Armor Costs*

Armor costs are associated with the construction of new armor and rebuilding of damaged armor. The purpose of coastal armor is to protect coastal infrastructure from hurricane and storm damage. Armor costs account for 25% of the total FWOP damages.

3.3.1.3 *Roads*

Road damages make up about 7% of the overall FWOP damages. These damages are associated with damages to segments of SR A1A that are exposed to erosion.

3.3.1.4 *Public / Commercial*

Damage associated with public/commercial (COMM) structures and their contents make up about 3% of the overall FWOP damages. Structures within this category include 1-2 story buildings used for public or commercial purposes.

3.3.1.5 *Mulit-Family Residential*

Damage associated with multi-family residences (MFR) and their contents make up about 1% of the overall FWOP damages. Structures within this category tend to be more substantial in terms of construction, and contain the greatest amount of economic value per structure.

3.3.1.6 *Other Structures*

Other structures include the GARAGE, GAZEBO, PARKINGLOT, POOL, TENNIS, and WALK damage element types. These structures are rarely protected by coastal armor, are built for outdoor use, tend to be closer to the shoreline, and tend to be less costly to rebuild. As a result, these damage elements are hit by the damage driving parameters more often, and rebuilt with a greater frequency. With the exception of garages, these damage elements are not subject to contents damage. Other structures account for about 4% of the total FWOP damages.

3.3.2 Spatial Distribution of Without-Project Damages

There are several reaches within the area modeled where the FWOP damages and armor costs are the greatest. The segment that includes model reaches 96 – 100 accounts for about 22% of the overall FWOP damages, and the segment that includes model reaches 111 – 116 accounts for about 30% of the overall FWOP damages. These results are summarized in **Table 3-2**.

Figure 3-2 illustrates the spatial distribution of erosion rate, existing structure value, and FWOP damages and costs by reach. **Table 3-2** and **Figure 3-2** are based on the *ReachStatistics.csv* and *ArmorStatus.csv* model output files.

Table 3-2: FWOP present value damages by Category and Beach-fx Reach

Beach-fx Reach	Average Annual Erosion (-ft/yr)	Average PV Structure Damage	Average PV Content Damage	Average PV Armor Costs*	Total Average PV Damages & Costs	% of Total
84	-0.8	$ 375,421	$ 171,294	$ 29,434	**$ 576,149**	1%
85	-0.6	$ 387,424	$ 153,773	$ 582,413	**$ 1,123,610**	1%
86	-0.5	$ 194,176	$ 66,465	$ 840,648	**$ 1,101,289**	1%
87	-0.5	$ 924,351	$ 428,326	$ 579,429	**$ 1,932,106**	2%
88	-0.8	$ 132,154	$ 6,442	$ 14,947	**$ 153,542**	0%
89	-1.2	$ 91,835	$ 386	$ 13,649	**$ 105,870**	0%
90	-1.4	$ 195,611	$ 15,664	$ 108,687	**$ 319,962**	0%
91	-1.6	$ 144,462	$ -	$ -	**$ 144,462**	0%
92	-1.7	$ 2,243,397	$ 1,076,163	$ 516,555	**$ 3,836,116**	4%
93	-1.8	$ 2,920,996	$ 1,379,401	$ 960,862	**$ 5,261,258**	5%
94	-1.8	$ 230,338	$ 105,534	$ 344,429	**$ 680,301**	1%
95	-1.8	$ 1,595,891	$ 603,125	$ 4,227	**$ 2,203,243**	2%
96	-1.8	$ 3,910,423	$ 1,882,485	$ 4,507	**$ 5,797,415**	6%
97	-1.6	$ 2,028,330	$ 932,266	$ 1,933	**$ 2,962,528**	3%
98	-1.4	$ 3,588,286	$ 1,717,764	$ -	**$ 5,306,051**	5%
100	-1.3	$ 4,957,520	$ 2,333,828	$ 47,070	**$ 7,338,419**	8%
101	-1.3	$ 1,621,671	$ 682,001	$ -	**$ 2,303,672**	2%
102	-1.3	$ 36,615	$ 239	$ 81,856	**$ 118,710**	0%
103	-1.3	$ 1,157,672	$ 513,568	$ 114,792	**$ 1,786,033**	2%
104	-1.4	$ 3,167,351	$ 1,421,507	$ 14,676	**$ 4,603,534**	5%
105	-1.6	$ 2,410,012	$ 919,385	$ 56,334	**$ 3,385,731**	3%
106	-1.7	$ 2,500,772	$ 1,081,897	$ 21,065	**$ 3,603,734**	4%
107	-1.8	$ 2,792,717	$ 1,145,779	$ 567,255	**$ 4,505,751**	5%
108	-1.8	$ 531,719	$ 119,372	$ 469,274	**$ 1,120,366**	1%
109	-1.9	$ 1,140,633	$ 220,796	$ 450,694	**$ 1,812,123**	2%
110	-1.8	$ 811,124	$ 189,564	$ 1,348,534	**$ 2,349,222**	2%
111	-1.8	$ 2,522,822	$ 987,537	$ 1,131,931	**$ 4,642,290**	5%
112	-1.7	$ 2,698,139	$ 1,147,810	$ 1,164,313	**$ 5,010,261**	5%
114	-1.7	$ 2,558,600	$ 795,126	$ 5,362,279	**$ 8,716,006**	9%
115	-1.6	$ 1,485,160	$ 289,737	$ 2,742,730	**$ 4,517,628**	5%
116	-1.5	$ 1,297,118	$ 102,037	$ 5,058,869	**$ 6,458,024**	7%
117	-1.3	$ 237,272	$ 11,450	$ 1,221,097	**$ 1,469,820**	2%
118	-0.8	$ 817,198	$ 345,302	$ 582,751	**$ 1,745,251**	2%
119	0.0	$ 57,161	$ 12,228	$ 6,728	**$ 76,117**	0%
120	0.7	$ 106,945	$ 7,613	$ -	**$ 114,558**	0%
121	1.3	$ 131,791	$ -	$ -	**$ 131,791**	0%
122	1.5	$ 135,613	$ 64,495	$ -	**$ 200,108**	0%
	Total	**$ 52,138,722**	**$ 20,930,358**	**$ 24,443,970**	**$ 97,513,050**	100%

* The PV Armor Costs presented in this table were calculated for each reach based on the *ArmorStatus.csv* output file because Beach-fx does not output PV armor costs by reach. Therefore, they do not match exactly with the PV Armor costs presented in Table 3-1 and Table 3-3 which were direct model outputs from the *Iteration.csv* model output file which does not break out reach specific armor data.

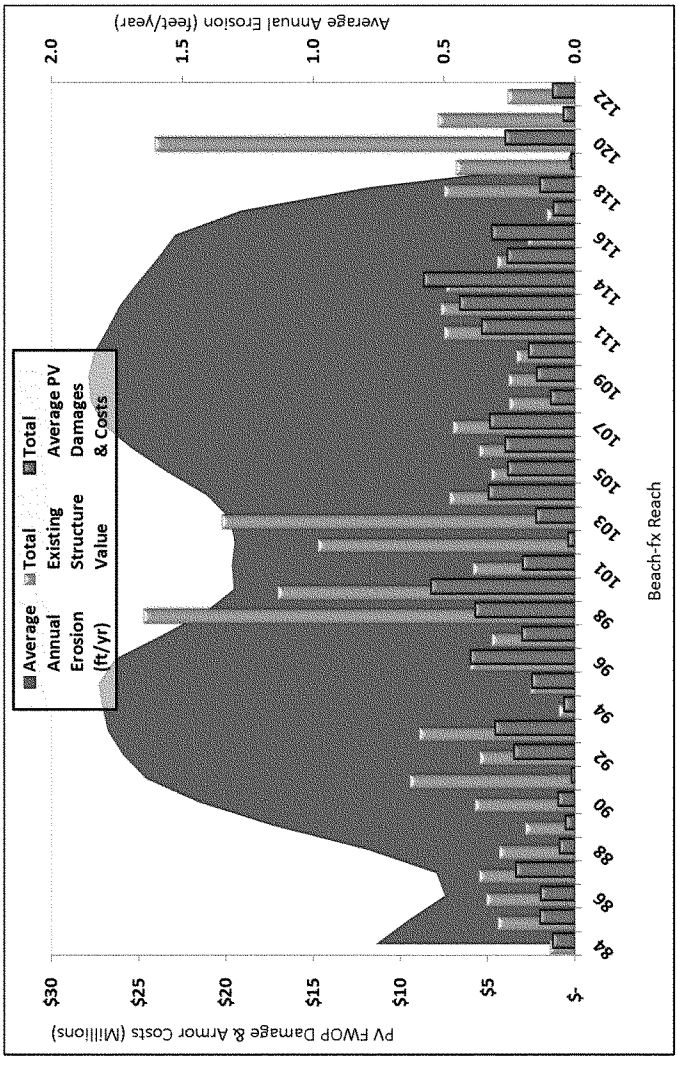


Figure 3-2: Spatial Distribution of Damages and Erosion Rates by Reach

3.3.3 Damage Distribution by Damage Driving Parameter

Just about all of the FWOP damages and costs are attributable to erosion. The distribution of damages by driving parameter based on the *ReachYearlyDamagesByType.csv* is as follows:

- Erosion: 99.56%
- Inundation: 0.13%
- Wave Attack: 0.32%

3.3.4 Temporal Distribution of Damages

Figure 3-3 illustrates the non-present value damages over time by study reach based on the *ReachYearlyDamages.csv* and *ArmorStatus.csv* model output files. The timing of FWOP damages and armor costs varies across the model reaches.

There is a great deal of variability in the amount of damages amongst the Beach-*fx* Reaches. This is explained by the large number of variables, all of which the Beach-*fx* model takes into account. Examples of variation between the reaches result from the following:

- Density and amount of development
- Typical size and value of structures
- Typical distance between structures and mean-high water
- Size, shape and location of the dunes and coastal morphology
- Rate of erosion for each reach
- Amount and type of coastal armoring present
- Timing that property owners construct coastal armoring in the future.

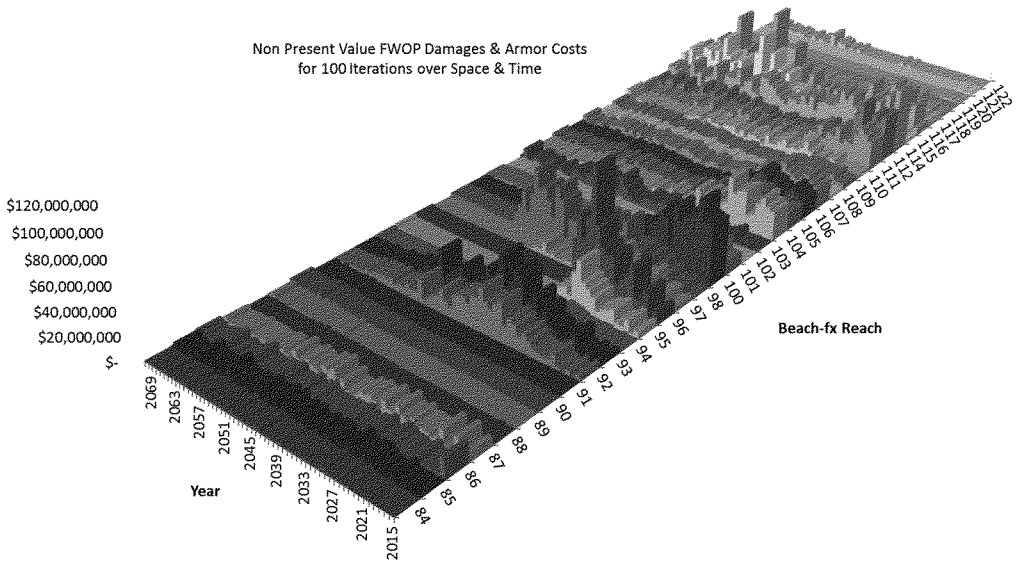


Figure 3-3: Non Present Value FWOP Damages & Armor Costs over Space and Time

3.3.5 FWOP Damages in alternative Sea Level Rise (SLR) scenarios

The FWOP condition was modeled for three sea level rise (SLR) scenarios. ER 1110-2-8162 provides both a methodology and a procedure for determining a range of sea level rise estimates based on the local historic sea level rise rate, the construction (base) year of the project, and the design life of the project. The Beach-*fx* results presented above refer to the baseline scenario, which is based on the historic erosion rate. The results associated with the other two SLR scenarios are presented here. The three level rise scenarios are graphically shown in Figure 2-9 of the Main Report.

Table 3-3 and **Figure 3-4** provide an overall summary of FWOP average present value damage and armor costs in each SLR scenario based on the *Iteration.csv* model output files. Combined structure and content damages increase by 22% from the base to intermediate scenarios, and 51% from the base to high scenarios. Armor costs increase by 57% from the base to intermediate scenarios, and 149% from the base to high scenarios. The total damage and armor costs increase by 31% from the base to intermediate scenarios, and 75% from the base to high scenarios. Erosion is the primary damage driver, accounting for about 99% of the FWOP damage and armor costs in the intermediate and high SLR scenarios. **Figure 3-5** shows the distribution of average present value FWOP damages and armor costs by model reach and **Figure 3-6** shows the distribution of average non present value FWOP damages and armor costs over time respectively for the three SLR scenarios based on the *ReachYearlyDamages.csv* and *ArmorStatus.csv* model output files.

The SLR results suggest that damages increase as the erosion rate increases. With greater erosion, more structures become subject to damaged more quickly.

Table 3-3: FWOP Average PV Damage and Armor Costs by SLR Scenario (at 3.125%)

	Base SLR	Intermediate SLR	High SLR
FWOP Average PV Damages	$ 73,069,080	$ 89,203,284	$ 110,450,927
FWOP Average PV Armor Costs	$ 24,063,881	$ 37,790,225	$ 59,955,346
Total FWOP Average PV Damages & Armor Costs	$ 97,132,960	$ 126,993,508	$ 170,406,273

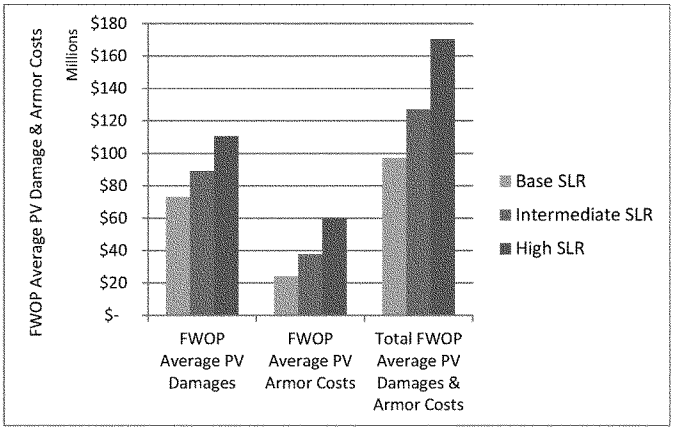


Figure 3-4: FWOP Average PV Damage and Armor Costs for SLR

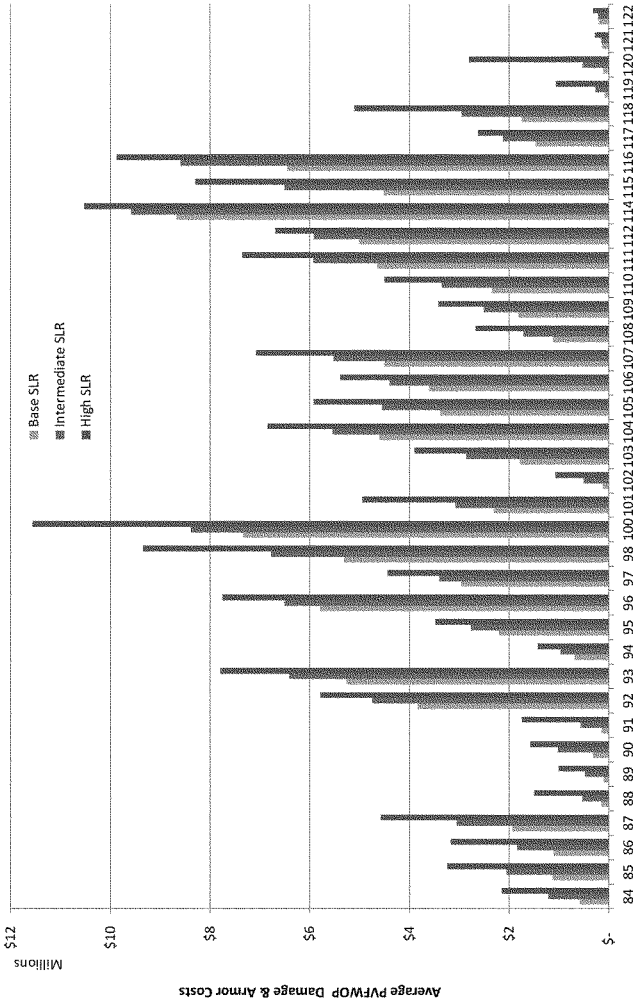


Figure 3-5: Average Non PV FWOP Damage & Armor Costs by Model Reach for SLR

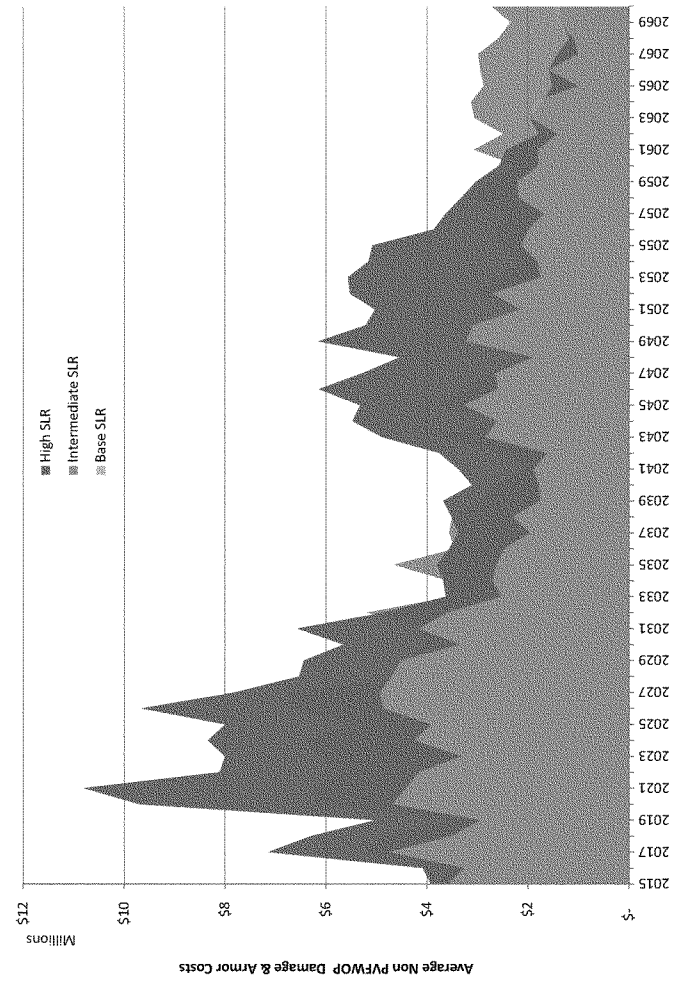


Figure 3-6: Average Non PV FWOP Damage & Armor Costs over Time for SLR

3.3.6 FWOP Condition Conclusion

- Most of the FWOP damages are associated with the single family residences located along the shoreline.
- The overwhelming majority of the damage and armoring is caused by erosion.
- Damages in the future without project condition increase in the accelerated sea level rise scenarios.

3.4 Future with Project Condition

This section of the appendix tells the story behind the evaluation and comparison of the St. Johns County CSRM study alternatives. A description of the alternatives and their performance in terms of benefits and costs are provided in the sub-sections that follow.

3.4.1 Management Measures

Management measures were selected to accomplish at least one of the planning objectives for the St. Johns County study. Both nonstructural (NS) measures and structural (S) measures were identified. All possible measures were considered, including those beyond the authority of USACE to implement. The following is a summary of the management measures considered for the study area.

- **Structural Measures:**
  - Seawalls
  - Revetments
  - Sand Covered Soft Structures
  - Beach Nourishment
  - Groins
  - Submerged Artificial Reef
  - Submerged Artificial Multi-Purpose Reef
  - Near shore sand placement
  - Emergent Breakwaters
  - Dunes and Vegetation
- **Non-structural Measures:**
  - No Action
  - Coastal Construction Control Line
  - Moratorium on Construction
  - No Growth Program
  - Relocation of Structures
  - Flood Proofing
  - Acquisition of Land and Structures

During the plan formulation process, management measures were screened against seven criteria. Benefits and costs were not calculated at this early stage of formulation, though a qualitative assessment of potential benefits was conducted. Ultimately, most of these measures were screened out. Acquisition of Land and Structures was the only non-structural measure carried forward to the modeling stage. Two structural measures were carried forward to the modeling stage: Dunes and Vegetation and Beach Nourishment. More information about each measure is provided below. More information about the management measure screening process is provided in the main report.

Acquisition of Land and Structures: This measure would allow the shoreline to erode in the study area with a loss of land. Structures within the study area vulnerable to storm damage would be identified for acquisition. These structures would be demolished and natural areas would be restored. Such parcels would become public property and would reduce the number of structures vulnerable to storm damages.

Dunes and Vegetation: This measure would include placement of beach compatible material, from either upland, inlet, or offshore sources, in a dune feature adjacent to the existing bluff. The top elevation of the dune would be such to tie into the bluff. The front slope of the dune would be a function of the material grain size and construction equipment. Vegetation would be planted after initial placement of the dune material where needed. Preliminary engineering design work concluded that the most feasible plan for dunes and vegetation would have the following characteristics:

- Extension from the existing seaward face of the dune or existing armor (revetment/seawall).
- Construction such that the dune and beach profile out to the depth of closure will extend approximately 10 to 20 feet seaward from its existing location and the dune elevation will as closely as possible match the elevation of the existing dune elevation.
- Construction such that a berm feature will extend seaward from its existing location above the water line to account for the volume of material needed to fill the submerged portion of the beach profile extension.
- Periodic re-construction of the dune and beach profile extension.
- Construction using a hydraulic dredge to transport material from a borrow area.

Beach Nourishment: This measure includes initial construction of a beach fill and future re-nourishments at regular intervals. Re-nourishment of the beach would be undertaken periodically to maintain the erosion control features within design dimensions. Preliminary engineering design work and economic analysis suggested that the plan for beach nourishment would have the following characteristics:

- Maintaining the existing dune feature and extension of the berm feature from the existing seaward toe of the dune or existing armor (revetment/seawall).
- Construction such that the berm will extend approximately 20 to 100 feet seaward from its existing location and the berm elevation will as closely as possible match the elevation of the existing berm elevation.
- Periodic re-construction of the berm extension and occasional re-construction of the dune feature.
- Construction using a hydraulic dredge to transport material from a borrow area.

3.4.2 Alternative Development

An alternative plan is a set of one or more management measures functioning to address one or more objectives. Each project alternative is a combination of a selected measure and the reaches where it would be applied. Fully developed alternatives consisting of acquisition of land and structures in Beach-*fx* Reaches 111 to 116 (Vilano Beach), and the dune and beach nourishment measures in Beach-*fx* Reaches 92-101 (South Ponte Vedra) and 104-116 (Vilano Beach) were carried forward to be modeled in Beach-*fx*.

Modeling alternatives in Beach-*fx* is a time consuming process; a single 100 iteration simulation takes approximately eight hours. Therefore, it was not practical to fully model a large number of alternatives for screening purposes. A sensitivity analysis was performed showing that the average damages varied

by less than 5% between 30 and 100 iteration runs. Therefore preliminary Beach-*fx* alternatives were run for 30 iterations rather than 100.

The non-structural alternative of Acquisition of Land and Structures in Beach-*fx* Reaches 111 to 116 was modeled in Beach-*fx* by starting with a copy of the FWOP model setup, then deactivating all of the damage elements that were to be bought out and setting all of the lots to be bought out as not armorable. The FWP damages were compared to the FWOP damages to determine the benefits of this alternative over 50 years. This alternative only prevents 28% of the FWOP damages in reaches 111 to 116. Most of the FWOP damages in this area are associated with A1A and future armoring costs to protect the road. The Acquisition of Land and Structures alternative does nothing to prevent these damages. SAJ Real Estate estimated the cost of this alternative to be $30,226,584. The results showed that this alternative would not be economically justified, with a BCR of 0.45.

The dune and beach nourishment alternatives were set up to be modeled in any of the Beach-*fx* Reaches for any combination of 0', 10', or 20' dune and profile extensions along with 0', 20', 40', 60', 80', or 100' berm extensions. More information on the development of the shoreline response database (SRD) and alternative templates can be found in the Appendix A - Engineering. The 'Planned Nourishment' inputs were entered into Beach-*fx* for the nourishment alternatives. The model was run for these FWP alternatives for the entire 7.6 mile length of the study area. The construction interval was set to 1 year so that every year the model checks if nourishment is needed, and constructs if the trigger and threshold requirements are met. In this way the project gets nourished when needed, and an average nourishment interval can be determined from the planned nourishment outputs. More information on the nourishment triggers and minimum volume thresholds used can be found in the Appendix A - Engineering. Plan formulation efforts determined that public access in South Ponte Vedra (Reaches 84 to 103) is negligible. Because this segment is a separable element that does not have public access, alternatives for reaches 92 to 101 were screened out. However nourishment alternatives were modeled for the continuous stretch of shoreline including reaches 92 to 116 to see if it would be justified, and could possibly be implemented as a locally preferred plan.

Initial Beach-*fx* modeling showed that none of the dune and beach nourishment alternatives were economically justified using the offshore borrow areas. Several alternatives were economically justified using shoals in the vicinity of St. Augustine Inlet which could provide adequate volume for the alternatives and could be used in accordance with the Inlet Management Plan recommendations. The results of these alternatives are summarized in **Table 3-4**.

Table 3-4: Results Summary for Initial Beach-fx FWP Modeling (at 3.125%)

Alternative Number	Dune and Profile Extension* (ft)	Berm Extension** (ft)	Shoreline Extent (Beach-fx Reaches)	Project Length (miles)	Average Nourishment Interval (years)	Average Annual Project Cost	Average Annual Project Benefits	Benefit to Cost Ratio	Average Annual Project Net Benefits
1	0	100	104 to 116	2.6	16	$ 1,649,679	$ 1,823,338	1.11	$ 173,659
2	10	80	104 to 116	2.6	16	$ 1,584,107	$ 1,758,757	1.11	$ 174,650
3	0	80	104 to 116	2.6	15	$ 1,511,843	$ 1,776,620	1.18	$ 264,776
4	10	60	104 to 116	2.6	13	$ 1,508,285	$ 1,849,848	1.23	$ 341,563
5	0	60	92 to 116	4.8	16	$ 2,434,999	$ 2,797,447	1.15	$ 362,448
6	**0**	**60**	**104 to 116**	**2.6**	**12**	$ 1,434,862	$ 1,844,860	**1.29**	**$ 409,997**
7	10	40	104 to 116	2.6	12	$ 1,407,552	$ 1,688,944	1.20	$ 281,393
8	0	40	92 to 116	4.8	11	$ 2,276,017	$ 2,678,738	1.18	$ 402,721
9	0	40	104 to 116	2.6	10	$ 1,379,513	$ 1,646,850	1.19	$ 267,336
10	20	20	92 to 116	4.8	12	$ 2,376,209	$ 2,525,738	1.06	$ 149,529
11	20	20	104 to 116	2.6	10	$ 1,404,820	$ 1,513,683	1.08	$ 108,864
12	10	20	92 to 116	4.8	9	$ 2,322,504	$ 2,329,432	1.00	$ 6,927
13	10	20	104 to 116	2.6	9	$ 1,379,570	$ 1,417,312	1.03	$ 37,741

Notes:
Values based on 30 iteration runs, preliminary cost estimates, and only include structure, content, & armor damage.
Table is sorted by length of horizantal seaward dune and berm extension from greatest to least.
*Value indicates the horizantal seaward extension of the dune and entire profile (feet). At a minimum, the 2015 dune profile is maintained.
**Value indicates the horizantal seaward extension of the berm (feet) in addition to the dune and profile extension.

3.4.3 Alternative Comparison

The top two alternatives, with public parking and access, from the preliminary Beach-*fx* modeling were run in Beach-*fx* using 100 iteration simulations. The results of these simulations were used to determine the National Economic Development (NED) Plan and the Recommended Plan. The results of the alternative comparison are presented in **Table 3-5** and Table 3-6. Typically, the plan with the highest net benefits is the NED plan. This plan is "Alternative 6".

The screening of alternatives was based on reduced structure, content, and armor damages. Land loss damages are primary benefits that could be included in the screening process. However, for this study land loss benefits were not used for screening because they would have approximately equal value for all alternatives of the same shoreline length, and make up a small portion of the overall primary benefits. Factoring in land loss benefits would not change the outcome of the screening or Recommended Plan selection.

Table 3-5: Average Annual Damages for Final Array of Alternatives (at 3.125%)

Alternative Number	Dune and Profile Extension (ft)	Berm Extension (ft)	Shoreline Extent (Beach-fx Reaches)	Project Length (miles)	FWOP Average Annual Damages ($)	FWP Average Annual Damages ($)	Average Annual Project Benefits ($)
6	0	60	104 to 116	2.6	$ 3,881,541	$ 2,148,637	$ 1,732,904
4	10	60	104 to 116	2.6	$ 3,881,541	$ 2,118,283	$ 1,763,258

Table 3-6: Average Annual Benefits and Costs for Final Array of Alternatives (at 3.125%)

Alternative Number	Dune and Profile Extension (ft)	Berm Extension (ft)	Shoreline Extent (Beach-fx Reaches)	Average Annual Benefits ($)	Average Annual Costs ($)	BCR	Average Annual Net Benefits ($)
6	0	60	104 to 116	$1,732,904	$1,391,778	1.25	$ 341,126
4	10	60	104 to 116	$1,763,258	$1,465,873	1.20	$ 297,385

Table 3-7 shows the minimum, maximum, and median values of the average annual net benefits for the final alternatives over all 100 iterations. **Table 3-8** shows the minimum, maximum, and median values of the benefit-cost ratios for the final alternatives over all 100 iterations. The Recommended Plan has the greatest median net benefits and BCR. The median (50th percentile) value separates the upper and lower half results of the 100 iterations simulated for each alternative.

Table 3-7: Range of Potential Average Annual Net Benefits for Final Alternatives over 100 Iterations (at 3.125%)

Alternative Number	Dune and Profile Extension (ft)	Berm Extension (ft)	Shoreline Extent (Beach-fx Reaches)	Minimum	Maximum	Median
6	0	60	104 to 116	$ (437,242)	$ 1,214,713	$ 351,507
4	10	60	104 to 116	$ (510,448)	$ 1,131,772	$ 296,104

Table 3-8: Range of Potential Benefit-Cost Ratios for Final Alternatives over 100 Iterations

Alternative Number	Dune and Profile Extension (ft)	Berm Extension (ft)	Shoreline Extent (Beach-fx Reaches)	Minimum	Maximum	Median
6	0	60	104 to 116	0.69	1.90	1.27
4	10	60	104 to 116	0.65	1.79	1.21

3.4.4 Nourishment Volume Sensitivity and Recommended Plan Optimization

For the Recommended Plan, the berm width, dune width, and dune height planned nourishment triggers were set at 0.5, 0.91, and 0.9, respectively. These trigger values represent the fractional amount of the berm width, dune width, or dune height that can eroded before a nourishment event is triggered. Only one of the triggers must be reached for a nourishment to be triggered. The mobilization threshold was originally set to 650,000 cubic yards. Together, the triggers and the mobilization threshold allow for the optimization of the beach fill based on the physical dimensions of the project. The project template will be nourished less often and erode further landward with a larger minimum volume threshold. The project template will be nourished more often with a smaller minimum volume threshold. Sensitivity analysis of the nourishment triggers and mobilization threshold indicated that threshold volume was the dominant parameter for optimizing project costs and benefits. A mobilization threshold of 750,000 cubic yards was found to be (when combined with the above nourishment triggers), the most optimal

threshold value to maximize net NED benefits. Decreasing the volume threshold results in increased benefits, but also results in a slightly greater increase to the costs. Increasing the volume threshold reduces costs, but results in a slightly greater reduction to the benefits. **Figure 3-7** provides added detail on model sensitivity to the mobilization volume threshold.

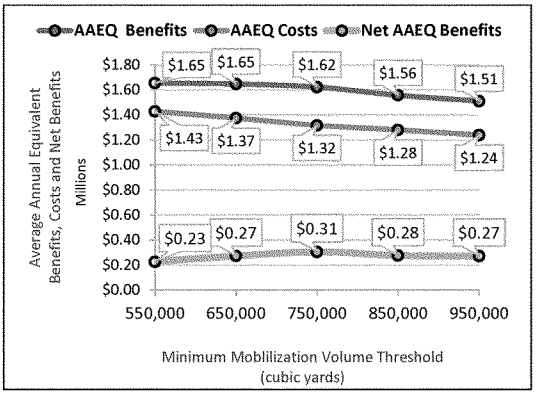


Figure 3-7: Minimum Mobilization Volume Sensitivity

4. THE RECOMMENDED PLAN

"Alternative 6" is the Recommended Plan. The economic results presented in this section reflect the costs in the Total Project Cost Summary (TPCS) found in Appendix B – Cost Engineering and Risk Analysis. Therefore the results presented here will differ slightly from the values presented in previous sections.

4.1 Beach-fx Modeling and Project Costs

The Beach-fx model results describing the physical performance of the Recommended Plan will not change from the simulation run for the final array of alternatives. These results are independent of the project costs. The physical performance results most relevant to the economic analysis are the nourishment volumes and the timing of nourishment events.

Beach-fx is a life cycle simulation model. One iteration represents one 50 year life-cycle. These results are based on 100 iterations generating 442 observations of individual nourishment events. All iterations within the model simulation are unique. The values presented in **Table 4-1** and **Figure 4-1** are essentially probabilistic nourishment events.

The average initial construction volume over 100 iterations is 1,310,000 cubic yards (cy). The average volume of all re-nourishments over 100 iterations is 866,000 cubic yards (cy). The average time interval between nourishment events over 100 iterations is 12 years. **Table 4-1** provides a summary on the volume of material per construction event over the 100 iterations modeled.

Table 4-1: Beach-fx Volume per Construction Event

Cycle	Event	Frequency	Average	Min	Max
1	Initial Construction	100	1,309,891	997,515	1,843,644
2	1st Re-Nourishment	100	863,393	750,392	1,298,719
3	2nd Re-Nourishment	100	865,239	762,712	1,305,486
4	3rd Re-Nourishment	96	864,010	751,512	1,183,744
5	4th Re-Nourishment	44	870,420	750,483	1,114,100
6	5th Renourishment	2	824,456	791,752	857,159

However, the distribution of each nourishment event is noticeably flatter and less peaked than the prior event. Initial construction spreads just over 1 year. The re-nourishments are distributed over variable time spans. This is because the conditional nature of beach nourishment coupled with the interplay of all the variable factors in the model cause the number of possible nourishment years to vary relative to the average time interval between nourishment events. **Figure 4-1** shows the frequency distribution of nourishments over time for the Recommended Plan as modeled with Beach-*fx*.

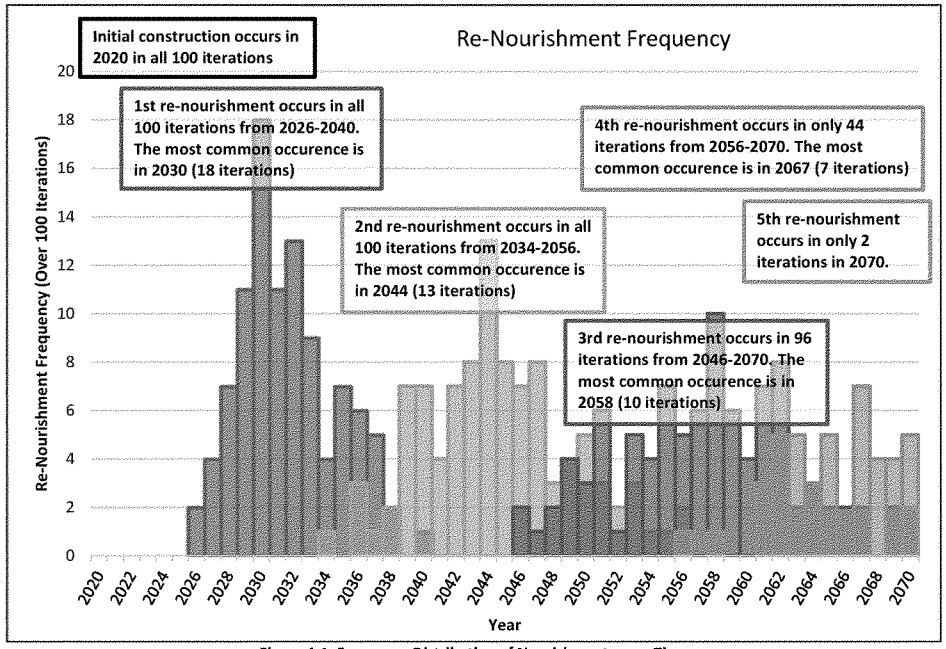


Figure 4-1: Frequency Distribution of Nourishments over Time

Traditionally, in CSRM studies, a fixed re-nourishment interval is defined and optimized for the life of the project. This interval is based in part on a clear distinction between a design berm and advance fill. With Beach-*fx*, no such distinction is defined. Rather, re-nourishment events are triggered within the model when specific criteria are met. The triggers were set up to simulate a point at which the berm extension had eroded to at least half its equilibrated width in at least one reach, and a minimum volume of 750,000 cubic yards had eroded from the entire project template. Based on these parameters, the average time interval between nourishment events over all 100 iterations is 12 years. In reality, this interval could vary significantly depending erosion and storm events. More information about the re-nourishment triggers is provided in the Appendix A - Engineering. Ultimately, planning based on life-cycle modeling results in plans that are more resilient and adaptable. Life-cycle modeling allows planners to design projects while recognizing the inherent uncertainty that exists when future events are simulated.

A description of the Recommended Plan is as follows:

- **Name (Description):** "Alternative 6" (Construction of 60 foot equilibrated berm extension. The project template will include a dune feature that reflects the average 2015 dune position. A hydraulic dredge will be used to fill the template with sand from the St. Augustine Inlet system)
- **Average # Nourishment Events:** 1 Initial Construction / 3 Re-nourishments
- **# Nourished Reaches:** 12
- **Range of Nourished Reaches:** Beach-fx Reach 104 – Beach-fx Reach 116
- **Average Volume of Initial Construction**: 1,310,000 yd^3
- **Average Volume of Each Periodic Nourishment**: 866,000 yd^3
- **Average Periodic Nourishment Interval**: 12 years
- **Initial Construction Duration** ~ 3.3 months
- **Interest During Initial Construction** ~ $47,177 (at 3.125% annual interest rate)

The cost estimate for the Recommended Plan was developed by SAJ Cost Engineering. **Table 4-2** provides details on the distribution of cost by nourishment event. This estimate assumed that initial construction would occur in 2020 and re-nourishment events would occur at the average 12 year interval. It is important to note that the actual re-nourishment interval timing and volumes will vary due to natural coastal processes. The cost estimate for the third periodic nourishment assumes an additional 144,000 cy to bring the project to the end of the 50 year period of Federal participation. These costs are in FY16 price levels and include a 20% contingency. Additional details on the project costs can be found in Appendix B - Cost Engineering and Risk Analysis.

Table 4-2: Recommended Plan Project Costs

Cost Description	Initial Construction (2020)	1st Re-Nourishment (2032)	2nd Re-Nourishment (2044)	3rd Re-Nourishment (2056)
Quantity (cy)	1,310,000	866,000	866,000	1,010,000
Mobilization	$ 3,614,000	$ 3,610,000	$ 3,610,000	$ 3,610,000
Dredging	$13,465,000	$ 9,326,000	$ 9,326,000	$10,666,000
Lands & Damages	$ 2,976,000	$ -	$ -	$ -
PED	$ 1,597,000	$ 1,715,000	$ 1,715,000	$ 1,749,000
Construction Management	$ 1,281,000	$ 969,000	$ 969,000	$ 1,070,000
Total Cost	$22,933,000	$15,621,000	$15,621,000	$17,094,000

These estimated project costs were modified further for entry into the Beach-*fx* user interface. The beach nourishment cost information that can be input to Beach-*fx* is limited to a single unit construction cost ($/cy) and a single mobilization cost. The Beach-*fx* model applies these two costs in the same way for each nourishment event regardless of if it is initial construction or a periodic re-nourishment. Non-dredging costs (Lands & Damages, PED, and Construction Management) need to be accounted for, so they are entered as part of the mobilizations cost. The unit cost and mobilization cost used for the Beach-*fx* input reflect the re-nourishment costs. The additional cost associated with the initial construction are added back into the life cycle cost outputs in the base year (2020) when initial construction occurs in all 100 iterations. There is a small difference between the final re-nourishment event because of additional construction management and reduced PED activities associated with the end of Federal participation. This difference is considered negligible for the cost modifications for Beach-*fx*. The methods for modifying the costs for use in Beach-fx is summarized in **Table 4-3**. Modeling the Recommended Plan with these modified cost inputs allows for the uncertainty of the projects performance to be quantified with respect to costs and net benefits.

Table 4-3: Representing the Project Costs in Beach-*fx*

Cost Description	Initial	Renourishment	Difference
Quantity (cy)	1,310,000	866,000	444,000
Mobilization	$ 3,614,000	$ 3,610,000	$ 4,000
Dredging	$ 13,465,000	$ 9,326,000	$ 4,139,000
Unit Cost ($/cy)	$ 10.28	$ 10.77	$ (0.49)
Lands & Damages	$ 2,976,000	$ -	$ 2,976,000
PED	$ 2,846,000	$ 1,715,000	$ 1,131,000
Construction Management	$ 1,281,000	$ 969,000	$ 312,000
Unit Cost Input to Beach-fx		**$ 10.77**	
Mob Cost Input to Beach-fx		**$ 6,294,000**	
Initial Dredging Cost Using Beach-fx Input (1,310,000cy*$10.76)			$ 14,107,460
Estimated Dredging Cost			$ 13,465,000
Beach-fx Initial Dredging Overestimate			$ 642,460
Beach-fx Initial Mob Underestimate			$ 4,423,000
Additional Initial Cost Added Back Into the Life Cycle Cost Outputs in the Base Year (2020)			**$ 3,780,540**

Even though Beach-*fx* models cost variability by tabulating costs when nourishment events occur for each unique iteration, the final net benefits and BCR presented in the conclusion of this appendix will reflect re-nourishment costs occurring at the average 12 year interval. In that way the costs used to calculate the project economics will match the costs presented in the TPCS found in Appendix B – Cost Engineering and Risk Analysis.

Interest during construction (IDC) for the initial nourishment was also calculated for the Recommended Plan. As stated in ER 1105-2-100 Para. D-3.e. (11), IDC "represents the opportunity cost of capital incurred during the construction period." Using the estimated initial construction period of approximately 3 months, the initial construction costs of $17,079,000, and the initial construction management costs of $1,281,000 from the TPCS, total IDC for initial construction of the Recommended Plan is $47,181 at an annual interest rate of 3.125%. Middle of the month uniform payments were assumed. This economic cost is factored into the final net benefits and BCR presented for the

Recommended Plan. Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) cost of $35,000 annually is also factored into the final net benefit and BCR calculations to account for future escarpment removal, vegetation maintenance, long term monitoring, and sand rebalancing.

4.2 Benefits of the NED Plan

The economic benefits of the plan are generated by reductions in coastal storm damages. The benefits described in this section do not include land loss and recreation benefits, which are discussed later in this appendix. As described in **Table 4-4**, the model results suggest that the alternative is effective at reducing coastal storm damages in the study area, caused primarily by erosion. In the with-project condition, 44% of damages are prevented within the entire study area. Within the 2.6 mile Recommended Plan fill area, spanning Beach-*fx* reaches 104 to 116, 71% of damages are prevented. This area contains a number of residences and commercial structures, including 105 single family residences, 9 multi-family residences, and 5 commercial structures.

Table 4-4: Recommended Plan Damages by Reach (AAEQ @3.125%)

Reach	AAEQ FWOP Damages	AAEQ FWP Damages	AAEQ Benefits	% Damage Prevented
84	$ 22,943	$ 23,018	$ (75)	0%
85	$ 45,040	$ 44,845	$ 195	0%
86	$ 44,298	$ 44,472	$ (175)	0%
87	$ 77,211	$ 76,048	$ 1,163	2%
88	$ 6,117	$ 5,895	$ 222	4%
89	$ 4,220	$ 3,926	$ 294	7%
90	$ 12,793	$ 12,576	$ 217	2%
91	$ 5,749	$ 5,482	$ 267	5%
92	$ 152,936	$ 142,414	$ 10,523	7%
93	$ 209,903	$ 193,426	$ 16,477	8%
94	$ 27,265	$ 26,111	$ 1,154	4%
95	$ 87,676	$ 84,701	$ 2,975	3%
96	$ 230,699	$ 220,207	$ 10,491	5%
97	$ 117,878	$ 108,614	$ 9,265	8%
98	$ 211,143	$ 143,118	$ 68,025	32%
100	$ 292,044	$ 260,156	$ 31,888	11%
101	$ 91,670	$ 70,398	$ 21,272	23%
102	$ 4,770	$ 924	$ 3,845	81%
103	$ 71,136	$ 27,255	$ 43,881	62%
104	$ 183,196	$ 58,421	$ 124,775	68%
105	$ 134,760	$ 39,397	$ 95,363	71%
106	$ 143,415	$ 52,951	$ 90,464	63%
107	$ 179,616	$ 60,189	$ 119,428	66%
108	$ 44,847	$ 8,020	$ 36,828	82%
109	$ 72,363	$ 21,846	$ 50,517	70%
110	$ 94,241	$ 12,398	$ 81,843	87%
111	$ 185,368	$ 73,590	$ 111,778	60%
112	$ 200,028	$ 86,201	$ 113,827	57%
114	$ 349,668	$ 106,084	$ 243,584	70%
115	$ 185,614	$ 24,407	$ 161,207	87%
116	$ 264,812	$ 51,756	$ 213,056	80%
117	$ 59,176	$ 37,092	$ 22,083	37%
118	$ 69,785	$ 48,515	$ 21,269	30%
119	$ 3,033	$ 2,238	$ 794	26%
120	$ 4,559	$ 4,559	$ -	0%
121	$ 5,244	$ 5,244	$ -	0%
122	$ 7,963	$ 7,963	$ -	0%

Most of the benefits are associated with reductions in damage to single family residences and reductions to future armor costs to protect ocean front residences and SR A1A. **Table 4-5** provides a

breakdown of the damages prevented for each damage element type across the entire study area and the Recommended Plan fill area.

Table 4-5: Damages and Benefits (AAEQ @ 3.125%) by Element Type

DE Type	7.5 Mile Study Area (entire study area)				2.6 Mile TSP Fill Area (recommended plan area)			
	FWOP AAEQ Damage	FWP AAEQ Damage	AAEQ Benefits	% Damage Prevented	FWOP AAEQ Damage	FWP AAEQ Damage	AAEQ Benefits	% Damage Prevented
COMM	$ 105,978	$ 23,590	$ 82,389	78%	$ 31,675	$ -	$ 31,675	100%
GAZEBO	$ 23,101	$ 18,934	$ 4,167	18%	$ 5,727	$ 4,437	$ 1,290	23%
MFR1	$ 128	$ 59	$ 69	54%	$ -	$ -	$ -	na
MFR2	$ 46,034	$ 22,311	$ 23,722	52%	$ 30,136	$ 14,575	$ 15,560	52%
MFR3	$ 7,739	$ 867	$ 6,872	89%	$ 4,595	$ -	$ 4,595	100%
PARKING LOT	$ 16,794	$ 7,180	$ 9,615	57%	$ 16,962	$ 7,252	$ 9,711	57%
POOL	$ 3,361	$ 515	$ 2,847	85%	$ 133	$ -	$ 133	100%
ROAD2	$ 183,504	$ 31,932	$ 151,571	83%	$ 154,340	$ 15,666	$ 138,674	90%
ROAD3	$ 64,030	$ 17,168	$ 46,861	73%	$ 63,487	$ 17,340	$ 46,147	73%
SFR1	$ 755,924	$ 600,002	$ 155,922	21%	$ 115,534	$ 47,966	$ 67,568	58%
SFR2	$ 1,140,950	$ 825,592	$ 315,358	28%	$ 309,367	$ 153,453	$ 155,914	50%
SFR3	$ 329,666	$ 169,579	$ 160,088	49%	$ 155,600	$ 53,994	$ 101,606	65%
TENNIS	$ 28	$ -	$ 28	100%	$ 28	$ -	$ 28	100%
WALK	$ 95,735	$ 89,161	$ 6,574	7%	$ 29,109	$ 24,226	$ 4,883	17%
ARMOR COST	$ 913,224	$ 275,840	$ 637,384	70%	$ 697,823	$ 96,062	$ 601,761	86%

Figure 4-2 graphically illustrates the accumulation of benefits over time and space within the Recommended Plan fill area spanning Beach-*fx* reaches 104 to 116.

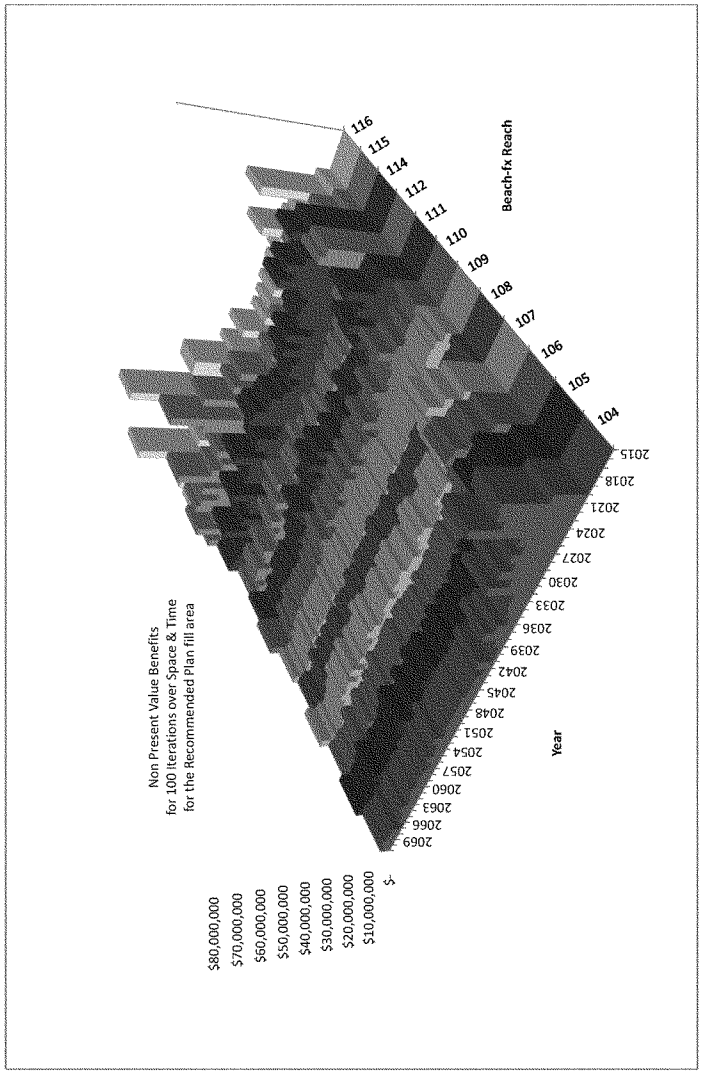


Figure 4-2: Non Present Value Benefits over Space & Time

4.3 Sea Level Rise Considerations

An important question about the Recommended Plan is its performance under different SLR scenarios. Each of the SLR scenarios described in the main report are considered equally likely to occur. Therefore, if the project does not perform, then it cannot be considered a completely effective plan. The SLR results presented in this section are based on the Beach-fx *iteration.csv* output files, and therefore will not exactly match the values presented in other sections of this appendix. The benefits presented in this section do not include land loss or recreation benefits. **Table 4-6** shows the average BCRs and net benefits of the plan in the different SLR scenarios.

Table 4-6: Recommended Plan Benefits and Costs (AAEQ@3.125%) for different SLR scenarios

SLR Scenario	AAEQ Benefits	AAEQ Costs	BCR	Net AAEQ Benefits
Baseline	$ 1,681,000	$ 1,478,900	1.14	$ 202,100
Intermediate	$ 2,150,000	$ 1,742,000	1.23	$ 408,000
High	$ 2,593,000	$ 2,225,000	1.17	$ 368,000

As shown in **Table 4-6**, though the average benefits of the project increase significantly in the SLR scenarios, the average costs also increase. The costs increase because re-nourishment is triggered more frequently. Thus, the project performance (in terms of the benefit-cost ratio) is relatively constant throughout the SLR scenarios. The average re-nourishment intervals and damages are summarized in **Table 4-7**.

Table 4-7: Average Nourishment Intervals and Damages (AAEQ @3.125%) in the SLR scenarios

SLR Scenario	Average Periodic Norishment Interval	AAEQ FWOP Damages	AAEQ FWP Damages
Baseline	12 years	$ 3,865,000	$ 2,184,000
Intermediate	10 years	$ 5,053,000	$ 2,902,000
High	7 years	$ 6,781,000	$ 4,188,000

Because both costs and benefits are increasing, the net benefits actually increase with increasing rates of sea level rise. Overall, these SLR results suggest that the NED Plan is effective in all three simulated SLR scenarios.

4.4 Uncertainty and Reliability of the Recommended Plan

Beach-*fx* is a life-cycle model that outputs a range of possible results from implementing the Recommended Plan. This range of outputs can be used to quantify the uncertainty associated with the performance of the Recommended Plan. Quantifying this uncertainty allows for a more complete understanding of how the Recommended Plan should be expected to perform, compared to only considering the average results. This section will present the uncertainty associated with the Recommended Plan and show how reliable the Recommended Plan is expected to be. The results presented in this section are based on the Beach-fx *iteration.csv* output files, and therefore will not

exactly match the values presented in other sections of this appendix. The benefits presented in this section do not include land loss or recreation benefits.

Table 4-8 shows the range of possible costs and benefits over the 100 life cycles (iterations) modeled in Beach-*fx*. **Figure 4-3** shows the frequency distribution of net benefits provided by the Recommended Plan over the 100 life cycles modeled.

Table 4-8: Range of Recommended Plan Costs and Benefits in the Base SLR Scenario

TSP Results (Base SLR)	AAEQ Costs	AAEQ Benefits	Net Benefits	BCR
Average	$ 1,478,943	$ 1,681,336	$ 202,392	1.13
Min	$ 1,081,298	$ 729,736	$ (584,793)	0.56
Max	$ 1,865,274	$ 2,628,907	$ 1,032,473	1.66
Std Dev	$ 137,908	$ 403,195	$ 358,630	0.24

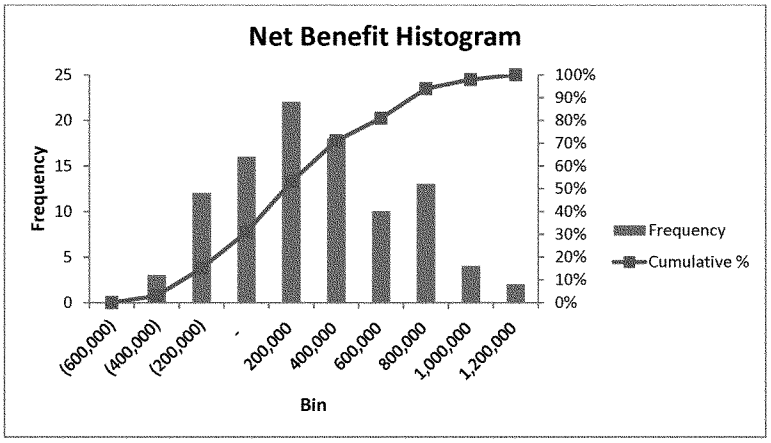


Figure 4-3: Frequency Distribution of Recommended Plan Net Benefits in the Base SLR Scenario

The results show that in 69 out of the 100 life cycles modeled for the base SLR scenario, the Recommended Plan will produce positive net benefits. Therefore the reliability of the Recommended Plan is 69%, with respect to producing positive net benefits. **Table 4-9** shows the reliability of the Recommended Plan for several benefit and cost considerations. **Table 4-10** shows how the reliability of the Recommended Plan varies for the three SLR scenarios.

Table 4-9: Recommended Plan Reliability in the Base SLR Scenario

With Respect to Having...	Recommended Plan Reliability
> Average Net Benefits	47%
> 0 Net Benefits	69%
> Average BCR	47%
> Average Cost	45%
> Average +20% Cost	3%

Table 4-10: Recommended Plan Reliability for All SLR Scenarios

With Respect to Having...	Base SLR Recommended Plan Reliability	Intermediate SLR Recommended Plan Reliability	High SLR Recommended Plan Reliability
> Average Net Benefits	47%	52%	48%
> 0 Net Benefits	69%	90%	84%
> Average BCR	47%	55%	48%
> Average Cost	45%	48%	49%
> Average +20% Cost	3%	34%	100%

Figure 4-4 shows the costs and net benefits for each iteration sorted in order of the model iteration having the greatest FWOP damages after 2020. The results show that the model iterations having the greatest FWOP damages generally have the greatest net benefits, while costs are relatively constant. This means that the Recommended Plan is resilient, because it performs above average with respect to net benefits in those iterations experiencing the greatest coastal storm damages. **Table 4-11** presents the results of the Recommended Plan in the 25 iterations having the greatest FWOP damages compared to the results for all 100 model iterations. The average net benefits for the top 25 FWOP damage iterations are more than double the average net benefits for all the iterations, while the average costs increased by only 6%.

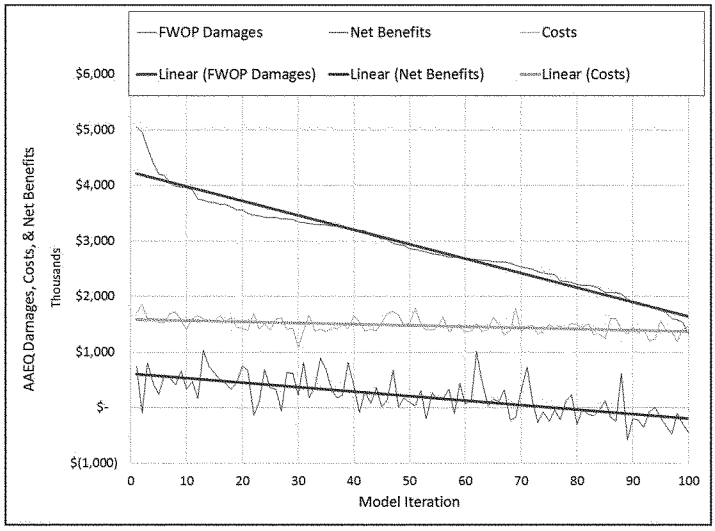


Figure 4-4: Recommended Plan Costs and Benefits (AAEQ @3.125%) Sorted By FWOP Damages for All Model Iterations

Table 4-11: Recommended Plan Performance in Iterations with Greatest FWOP Damages

Results	All 100 Life Cycles	Top 25 FWOP Damage Life Cycles
Net Benefits (AAEQ)	$202,392	$470,727
Cost (AAEQ)	$1,478,943	$1,569,478
BCR (AAEQ)	1.14	1.30
% Reliability wrt > Net Benefits	47%	84%
% Reliability wrt > Costs	45%	76%

4.5 Land Loss Benefits

In outlining the process and procedures to be used in the evaluation of coastal storm risk management projects, ER-1105-2-100 mentions the inclusion of land loss due to erosion, stating that such damages should be computed as the market value of the average annual area expected to be lost. Prevention of land loss is a component of primary benefits but is not computed within the Beach-*fx* model. Thus, calculation of land loss benefits must be completed outside of the model and added to the structure and contents damage and armor costs benefits as computed by Beach-*fx* to obtain the total benefits of the project.

Following the guidance provided, two key pieces of information are needed to calculate land loss benefits of a CSRM project: (1) the square footage of the land lost each year and (2) the market value of land in the project footprint.

The "economic upland", or the developed area landward of the berm, is considered to be eligible for land loss benefits. In the case of the St. Johns County, the "economic upland" is composed of the Beach-*fx* upland and of the developed or developable portion of the Beach-*fx* dune. The annual reduction in upland width plus the annual reduction in dune width across all Beach-*fx* study reaches was obtained from the Beach-*fx LandLoss.csv* FWOP and FWP output files based on modeled changes to the shoreline. ER 1165-2-130 does not allow land loss benefits be claimed for beach areas subject to temporary shoreline recessions. Thus, neither temporary erosion affecting the dune width nor any changes in berm width were included in the calculation of land loss benefits.

The basis of the annual change in upland width plus dune width calculation is the average of the minimum upland width plus the minimum dune width (or the minimum "economic upland" width) in each reach across all iterations. The difference between the minimum with project economic upland width and the without project economic upland width in a given year results in the cumulative loss of economic upland width given the profile of that specific reach. However, for the purpose of calculating land loss benefits, the annual loss of economic upland width is needed. This is obtained by taking the cumulative change in economic upland width in a given year and subtracting from it the cumulative change in economic upland width from the previous year. This calculation results in the yearly incremental change in economic upland width for a given reach.

Once annual change in economic upland is calculated, the length of the affected shoreline is needed to compute the square footage of the land lost. Because armor prevents the shoreline from eroding landward beyond the point where the armor is placed, land loss is not counted for any lots already armored or for any lots armorable in the future under current County permitting regulations. The Beach-*fx ArmorStatus.csv* output file was used to make this determination. After subtracting the already armored and armorable in the future shoreline lengths, the remaining shoreline length is eligible for land loss benefits. Note that the elimination of lots that may be armored in the future from receiving any land loss benefits between the project base year and the year the lot is armored in the model is a conservative assumption. While the land loss benefits here may be slightly understated, review of the data indicates very little loss in economic upland width between the start of the Beach-*fx* simulation and the triggering of armor construction for armorable lots. Thus, the effect of the exclusion of these lots from receiving land loss benefits is assumed to be minimal.

Using the annual decrease in economic upland width for a specific reach and the corresponding length of shoreline eligible for land loss benefits, the total annual square footage of land lost is obtained on a reach-by-reach basis and then summed across all study reaches for a given project year.

As the second component of the land loss benefits calculation, ER 1105-2-100 instructs that nearshore land values be used to estimate the value of land lost. In an FY16 update to information reported in St Johns County Beach Restoration Estimated Depreciated Replacement Costs of Damage Elements report, the SAJ Real Estate Department estimated a nearshore land value of $14.00 per square foot for the St. Johns study area.

Using the analysis technique described, the total present value of land loss benefits over the 50 years of Federal participation is estimated at $6,914,000, or $275,000 in average annual terms (at 3.125% discount rate).

4.6 Incidental Recreation Benefits

According to ER-1105-2-100, incidental recreation benefits can be calculated in CSRM studies. While recreation benefits cannot make up more than 50% of the total benefits needed for project justification, the guidance states that "if the criterion for participation is met, then all recreation benefits are included in the benefit to cost analysis."

Additionally, ER-1105-2-100 specifies that benefits arising from recreation opportunities created by a project be measured in terms of willingness to pay. Three acceptable calculation methods are outlined: (a) the travel cost method (TCM), (b) the contingent valuation method (CVM), and (c) the unit day value method (UVD).

The unit day value method estimates a user's willingness to pay for a given recreational opportunity by assigning ratings to five criteria designed to measure the quality of the overall recreation experience provided in the project area. According to ER-1105-2-100 Appendix E, UDV is appropriate in several scenarios, including cases where plan formulation or selection is not materially influenced by recreation benefits and where annual visitation to the project area does not exceed 750,000. In the case of St. Johns both of the aforementioned guidelines are met; the Recommended Plan was chosen prior to the calculation of recreation benefits and visitations used in the recreation benefits calculation cannot exceed 592,687 visits per year due to capacity limitations explained below. Also, the benefits to beach recreation provided by the St. Johns project are related to improvements in the *quality* rather than an increase in the *quantity* of recreation enjoyed in the project footprint, which also supports the selection of UDV as the method for the analysis.

As mentioned above, the UDV method uses five criteria to gauge the overall quality of the experience, availability, carrying capacity, accessibility, and environment in the project area. Each criterion can be assigned to one of five possible scoring ranges rated from low to high. Within each range a specific point value is also chosen. These point values are summed together and applied a dollar day value based on the current UDV guidance. The current unit day values, provided by USACE Economics Guidance Memorandum #16-03, *Unit Day Values for Recreation for Fiscal Year 2016*, are presented in **Table 4-12**. Linear interpolation was used to estimate the dollar value of point scores not published. For example, a point score of 2 corresponds with a dollar value of $4.05.

Table 4-12: Current Unit Day Values for Recreation

Point Values	General Recreation Values (FY16)
0	$ 3.90
10	$ 4.64
20	$ 5.12
30	$ 5.86
40	$ 7.32
50	$ 8.30
60	$ 9.03
70	$ 9.52
80	$ 10.49
90	$ 11.23
100	$ 11.71

The recreation point values assigned to the St. Johns County project area vary by year and between the with and without project scenarios. They are summarized in **Table 4-13.**

Table 4-13: Total Unit Day Point Scores applied to St. Johns County

Year	Without Project	With Project
2020	47	52
2030	43	52
2040	36	52
2050	34	52
2060	33	52
2070	33	52

*Base year is 2020.

The point assignments are based on qualitative criteria and depend on best professional judgment (also referred to as "judgment criteria") and knowledge of the project area. In order to learn more about recreation in St. Johns County (SJC), SAJ economists met with members of SJC Beach Services and Parks and Recreation in November of 2015. This collaboration helped in the assignment of the following judgment criteria applied to the project footprint.

- **Recreation Experience:** For both the with and without project conditions, the Recommended Plan area was assigned a score of 16 in the project base year (2020), which corresponds with "several general activities; one high quality value activity". General activities common to the area include swimming, surfing, and sunbathing, among others. On the coast of northeast Florida, horseback riding is unique to St. Johns County and is thus considered a "high quality value activity". Over the 50 years of Federal participation, the score of 16 is held constant in the with project condition because periodic nourishments guarantee sufficient berm width for on-beach recreation. However, in the without project condition, flat, traditional berm area is reduced leading to recreation on a more sloped profile less conducive to sunbathing, horseback riding, and other on-beach activities. Furthermore, the Beach-*fx* modeling shows that without a project armor is likely to be constructed on 42 Beach- *fx* lots that are currently unarmored as compared to only three lots with a project across Reaches 104 through 116. The increase in armored beachfront without a project has potential to make horseback riding in the area difficult and could perhaps even prevent on-beach horseback riding in the future.
- **Availability of Opportunity:** A score of 0, "several within 1 hr. travel time; a few within 30 minutes" was assigned to the project footprint in both the with and without the project conditions because several other beaches with public access are available within close proximity of the Vilano project area (Jacksonville Beach, St. Augustine Beach, etc.). Also, within Vilano Beach but outside of the reaches included in the recommended plan, there are several commonly used public access points with parking (e.g., Surfside Park, etc.) and on-beach parking at the Vilano Vehicle Access Ramp. Availability of opportunity does not change at any point during the 50 years.
- **Carrying Capacity:** In the project base year in both the with and without project conditions, the Recommended Plan area was assigned a point value of 11, "optimum facilities to conduct activity at site potential". The North Beach public parking area includes restrooms and a small pavilion (for picnics, shade, etc.). There are also several public access points within the project area that have boardwalks leading to the beach. Vilano Beach has a "roaming patrol" that takes care of safety in

the area and employees at fire stations throughout the study area are trained in rescue. In the without project condition, the score associated with carrying capacity, falls to a 9 (low end of "optimum facilities to conduct activity at site potential") over the 50 years due to deterioration of public boardwalks as beach erosion occurs and sand (and/or water) potentially covers/damages portions of the boardwalks. In the with project condition, no such decline is carrying capacity is expected.

- **Accessibility:** Currently, there is "good access, good roads to site; fair access, good roads within site", resulting in a unit day point value of 14 both with and without implementation of the project. A1A runs parallel to the study area. Boardwalks and footpaths provide beach access. Special Use permits also allow driving and horseback riding with entrance at R-119 (Surfside Park, outside Recommended Plan area) extending to R-104 (northern end of project footprint). If the project is implemented (FWP), there will be more beach to drive on and to ride horses on than if the project is not implemented and erosion continues. Thus, the without project accessibility score declines from 14 to 11 over the period of Federal participation.
- **Environmental Quality:** In the without project condition, a score of 6 ("average aesthetic quality; factors exist that lower the quality to minor degree") was assigned in the base year and is expected to decline to 4 by the end of the 50 years. The score was assigned based on the fact that there is little berm in R-104 to R-116 (Recommended Plan area) at high tide, which results in minimal area for recreation. From an environmental perspective, the small berm size could have adverse effects on the potential for sea turtles to nest in the area. There is also substantial debris on the beach in some areas. Sea grass and other native plants have suffered as the dune and beach areas have eroded. In the FWP, holding sand on the beach creates habitat for native species/helps upland habitat, which earns a score of 11 in the "high aesthetic quality; no factors exist that lower quality" category throughout the 50 years. **Figure 4-5** is a picture taken in November of 2015 during a site visit to the project area. Note the limited berm and the quantity of debris on the beach.

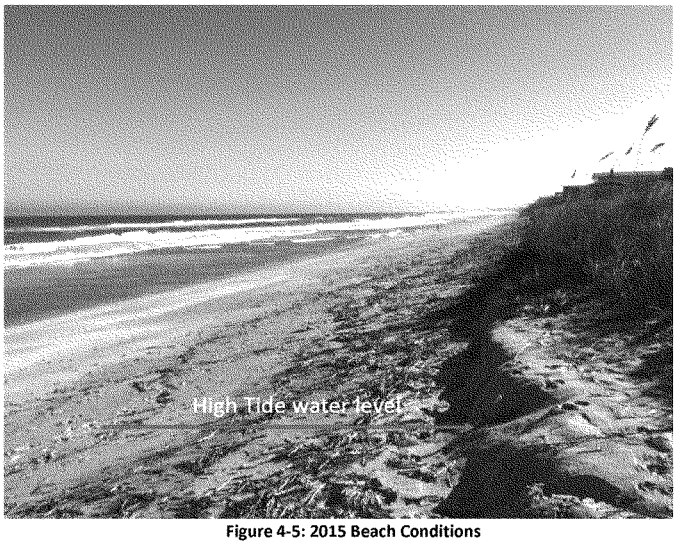


Figure 4-5: 2015 Beach Conditions

After assigning point scores and dollar values, these values must be applied to expected recreation visits over the life of the project. Because St. Johns County does not conduct beach counts in the project area, estimated beach visitation was calculated using data from the 2011 report entitled *Outdoor Recreation in Florida: Survey for the State Comprehensive Outdoor Recreation Plan*, which was conducted by Responsive Management for the Florida Department of Natural Resources and used as the basis for the 2013 Florida State Comprehensive Outdoor Recreation Plan (SCORP).

Several key pieces of information are taken from the 2011 Responsive Management and the 2013 SCORP reports. First, the reports provide the estimated number and percentage of both Florida residents and Florida tourists that participated in specific outdoor recreation activities in the state in the past 12 months (2011). One of the specified recreation categories is "saltwater beach activities", which is the activity most closely associated with beach visitation. The SCORP survey found that approximately 63% of Florida residents and 49% of Florida tourists had participated in saltwater beach activities within a year of being surveyed. Note that "saltwater beach activities" exclude fishing. Thus, saltwater fishing is not captured as a source of beach visitation here in the St. Johns County project area.

In addition to estimating saltwater beach participation statewide, the survey also asked Florida residents that reported participating in a saltwater beach activity in last 12 months in which counties they had participated. Approximately 4% of resident respondents reported taking part in a saltwater beach activity in St. Johns County at least once in the past year. Similarly, tourists were asked about where they had participated in saltwater beach activities in the state in the last year. However, instead of asking that tourists specify the counties in which they participated, the survey question grouped

counties/portions of counties into regions that would be more easily identifiable by tourists that may not be familiar with county names. St. John's County and the project area are included in the Jacksonville Area (south to St. Augustine and Fort Matanzas) where approximately 5% of tourists reported participating in one or more saltwater beach activities in the preceding 12 months.

In order to estimate annual visitation, the number of days each year that individuals spend taking part in saltwater activities is also needed. The SCORP survey results report the median days of participation in saltwater beach activities by Florida residents that participated at least once in the previous 12 months at 8.0 days, while the mean was 21.4 days. For tourists the median was 3.0 days and the mean was 4.9 days. For visitation estimates calculated in the present study, the median number of participation days for both residents and tourists was used to avoid placing extra weight on outliers.

The method applied thus far gives an estimated number of saltwater beach visitations for St. Johns County by Florida residents and for the Jacksonville Area (south to St. Augustine and Fort Matanzas) by Florida tourists. Now, the number of county and area visitations must be adjusted to include only the visits to the project footprint. Data from the Florida Department of Environmental Protection estimates 41.1 miles of sandy beaches in St. Johns County. Of that 41.1 miles, approximately 2.55 miles, or 6.2%, lie in the Recommended Plan footprint. Thus, 6.2% of all saltwater beach visits to St. Johns County by Florida residents are applied to the study area. Note that shoreline area was chosen as the proxy for visitations by Florida residents to account for pedestrian visitations that would not necessarily require public parking. However, this decision is not expected to have a significant impact on estimated visitations since the percentage of St. Johns County beach parking spaces in the Recommended Plan area is very similar at 6.05%. For Florida tourists, the number of Jacksonville Area saltwater beach visitations taking place in the Recommended Plan footprint is estimated as the approximate proportion of all public parking spaces with beach access from Nassau County to southern St. Johns County that are located in the Recommended Plan, or 1.86%.

Applying these factors to Florida residents and tourists, respectively, results in an estimated 353,462 visitors to the study area in 2011. In order to estimate beach visitation by Florida residents over the period of Federal participation, population projections for the state are used. The Bureau of Economic and Business Research at the University of Florida publishes historical U.S. Census data and provides population projections through 2040. Projections beyond 2040 were calculated by running a linear regression using time series data back to 2010. Similarly, Florida tourism estimates for 2020 through 2070 were calculated using linear regression on historical data (2009 through 2014) provided by VISIT FLORIDA. Using the combined techniques outlined here, the total number of beach visits within the Recommended Plan area is projected to increase to 427,588 by 2020 and to 832,648 by 2070.

In order to verify the reasonableness of the recreation benefits, total projected visitation must be compared to total recreation capacity. In the case of the St. Johns Recommended Plan, total recreation capacity has two key components, (1) parking capacity and (2) residential/hotel capacity within walking distance of the beach. Note that due to the residential nature of the study area and the limited availability of parking, pedestrian visitation is an important component of total visitation and pedestrian public access points are located throughout the Recommended Plan area.

Parking capacity was established using data provided by the County, which reports a total of 102 public parking spaces within the project footprint. In estimating beach visitations, the County assumes that on average each car that parks at the beach carries 2.4 people and that a parking space turns over 3 times per day. Here the County's assumptions are borrowed to establish an upper bound on the number of

visitors that could park in a public beach space in the Recommended Plan footprint in a year. If parking is full 365 days per year, the public spaces in the Recommended Plan can accommodate 268,056 visitors annually.

Maximum visitation by those within walking distance of the Recommended Plan beach takes into account residences, condos, and hotels that are located from the shoreline landward to one block west of A1A. This is a relatively conservative proxy since it is likely that people living greater than one to two blocks from the beach would also walk or ride a bike. Using 2014 Google Earth imagery, an estimated 228 single family residences and 88 condominium units are found within the specified boundaries. Data prepared by the U.S. Census Bureau from the American Community Survey estimates an average household size of owner-occupied and renter-occupied units in St. Johns County. Here, the owner-occupied average (2.670 occupants in 2014) is applied to residences and the renter-occupied average (2.530 occupants in 2013) is applied to condos. Assuming that each of these individuals goes to the beach one time each day of the year, a maximum possible number of 303,461 visitations from nearby home and condo occupants is established. Empty lots are not considered in establishing this cap.

There is also one hotel, the Ocean Sands Beach Inn, located directly across the street from the project footprint. The hotel has 29 rooms, each of which has either one king-sized or two queen-sized beds. To estimate the maximum number of annual beach visitations possible by hotel occupants, an average of 2 occupants per room, each of which visits the beach once per day all year long, is assumed. This yields an annual maximum hotel capacity of 21,170. It should be noted that there is also a large RV and camping area directly west of A1A (Beach-*fx* reach 109) called the North Beach Camp Resort that has 3 cabins and 159 RV spots for rental and covers 30 acres. Because no clear data was available regarding occupancy or the percentage of these accommodations within reasonable walking distance of the beach, this potential source of beach visitations is not factored into the maximum beach capacity.

The sum of estimated maximum possible visitations from public parking and from home, condo, and hotel occupants is 592,687. The projected Recommended Plan visitation of 832,648 by 2070 exceeds this number. Therefore, visitation was capped in year 2041 at 592,687 and left constant throughout the remainder of the 50 years.

Using these methods and applying the visitation cap results in an estimated total present value of recreation benefits of $16,839,000, or $670,000 in average annual terms (at a discount rate of 3.125%).

5. CONCLUSION

Table 5-1 provides a summary of the NED Plan with land loss and recreation benefits added expressed in average annual equivalent terms.

Table 5-1: Economic Summary

Economic Summary	Primary Storm Damage Reduction Benefits	Primary Storm Damage Reduction + Incidental Recreation Benefits
Price Level	FY17	FY17
FY17 Water Resources Discount Rate	2.875%	2.875%
Average Annual Structure & Contents Damage & Armor Costs Benefits	$ 1,683,000	$ 1,683,000
Average Annual Land Loss Benefits	$ 278,000	$ 278,000
Average Annual Incidental Recreation Benefits	$ -	$ 692,000
Average Annual Total Benefits	$ 1,961,000	$ 2,653,000
Average Annual Costs	$ 2,031,000	$ 2,031,000
Average Annual Net Benefits	($ 70,000)	$ 622,000
Benefit Cost Ratio	**0.97**	**1.3**

Portions of St. Johns County's shoreline are vulnerable to coastal erosion and storm damage. Beach-*fx* modeling has demonstrated that significant economic damage from coastal forces can be expected to occur over the next 50 years in the future without project condition. In the two alternative Sea Level Rise scenarios, damages increase substantially.

In order to reduce future damages, a large number of management measures were considered. After a detailed investigation and extensive modeling effort, a plan was selected that maximizes expected future net benefits. This plan, "Alternative 6", involves initial and periodic nourishment of 60 foot equilibrated berm extension. The project template will include a dune feature that reflects the average 2015 dune profile. A hydraulic dredge will be used to fill the template with sand from the St. Augustine Inlet and ebb shoal complex. The average annual net benefits of the Recommended Plan are $622,000.

USACE JACKSONVILLE DISTRICT

Appendix D
Geotechnical

ST. JOHNS COUNTY, FLORIDA

COASTAL STORM RISK MANAGEMENT PROJECT
DRAFT INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT

December 2015

TABLE OF CONTENTS

1 Background 1
1.1 Regional Geology 1
1.2 Local Geology 3
2 Native Beach 6
2.1 General 6
2.2 Native Beach Sampling and Analysis 6
3 Sand Sources 7
3.1 Sand Source Investigations 8
3.1.1 Historic Investigations 8
3.1.2 Recent Investigations 9
3.2 Proposed Offshore Sand Sources 11
3.2.1 North Offshore Borrow Area (NOBA) 11
3.2.2 South Offshore Borrow Area (SOBA) 19
3.3 Proposed St. Augustine Inlet Sand Sources 23
3.3.1 Ebb Shoal 23
3.3.2 Flood Shoal 27
3.3.3 Vilano Point 30
3.3.4 Navigation Channel 30
4 Compatibility of the Sand Sources with the Beaches 30
4.1 Grain size Distribution 30
4.2 Overfill and renourishment Factor 32
4.2.1 Overfill Factor 32
4.2.2 Renourishment Factor 33
4.3 Compatibility Summary 34
4.4 Adaptive Management of Sand Sources 34
5 References 36
Plates 37
Sub-Appendix 49
Grain Size Analysis Results for Vilano Beach 49
Grain Size Analysis Results for Proposed Sand Sources 51

INDEX OF TABLES

Table 1. Vilano Beach, Grain Size Statistics Summary 7
Table 2. Proposed Sand Source N-2 Sediment Analysis 13
Table 3. Proposed Sand Source N-3 Sediment Analysis. 16
Table 4. Proposed Sand Source S-1 Sediment Analysis. 20
Table 5. Proposed St. Augustine Inlet Ebb Shoal Sand Source Sediment Analysis. 24
Table 6. Proposed St. Augustine Inlet Flood Shoal Sand Source Sediment Analysis. 27
Table 7. Sediment Analysis Summary of Proposed Sand Sources. 31
Table 8. Summary of Overfill Factors for Vilano Beach. 33
Table 9. Summary of Renourishment Factors for Vilano Beach. 34

INDEX OF FIGURES

Figure 1. The Florida Peninsula, including the present coastline, previous sea level stands, and the extent of the carbonate platform. 2
Figure 2. Map of Florida, including points of interest on the Atlantic Coastal Plain. 3
Figure 3. Map of St. Johns County, Florida. 5
Figure 4. Beach Transect with Beach Sampling Locations 6
Figure 5. Pattern of survey lines used to collected acoustic sub-bottom profiles in each shoal area (USACE, 2009). 10
Figure 6. Geological cross section of the axis A-A' of proposed sand source N-2. 14
Figure 7. Geological cross section of the axis B-B' of proposed sand source N-2. 15
Figure 8. Geological cross section of the axis A-A' of proposed sand source N-3. 17
Figure 9. Geological cross section of the axis B-B' of proposed sand source N-3. 18
Figure 10. Geological cross section of the axis A-A' of proposed sand source S-1. 21
Figure 11. Geological cross section of the axis B-B' of proposed sand source S-1. 22
Figure 12. Geological cross section of the axis A-A' of proposed Ebb Shoal sand source. 25
Figure 13. Geological cross section of the axis B-B' of proposed Ebb Shoal sand source. 26
Figure 14. Geological cross section of the north lobe (A-A') of proposed Flood Shoal sand source. 28
Figure 15. Geological cross section of the south lobe (B-B') of proposed Flood Shoal sand source. 29

INDEX OF PLATES

Plate B - 1. Overview of Vilano Beach and Proposed Sand Source Locations. 37

Plate B - 2. Overview of Vilano Beach and Proposed Sand Source Locations with Vibracore Boring Locations..... 38

Plate B - 3. NOBA, Vibracore Boring Locations, and Proposed Sand Sources. 39

Plate B - 4. Proposed Sand Source N-1 and Vibracore Boring Locations..... 40

Plate B - 5. Proposed Sand Source N-2, Geological Cross Sections, and Vibracore Boring Locations. 41

Plate B - 6. Proposed Sand Source N-3, Geological Cross Sections, and Vibracores..... 42

Plate B - 7. SOBA, Vibracores, and Proposed Sand Source S-1..... 43

Plate B - 8. Proposed Sand Source S-1, Geological Cross Sections, and Vibracore Boring Locations. 44

Plate B - 9. St. Augustine Inlet Proposed Sand Sources and Vibracore Boring Locations. 45

Plate B - 10. St. Augustine Inlet Ebb Shoal Proposed Sand Source, Geological Cross Sections, and Vibracore Boring Locations. 46

Plate B - 11. St. Augustine Inlet Flood Shoal Proposed Sand Source, Geological Cross Sections, and Vibracore Boring Locations. 47

Plate B - 12. St. Augustine Inlet Vilano Point Proposed Sand Source and Vibracore Boring Locations. 48

1 BACKGROUND

This report includes a description of the regional and local geology of St. Johns County, a sediment characterization of the native beach, and a preliminary sand source design which includes an adaptive sediment management approach. Vibracore boring logs and laboratory results are attached in the **Sub-Appendix** of this document.

Sand source coordinates and quantities listed are based on a limited number of vibracores and on outdated bathymetric data. To develop sand source coordinates, dredge depths, and quantities for the Plans and Specifications, additional vibracores need to be taken and updated bathymetric surveys will be required.

1.1 REGIONAL GEOLOGY

The Florida Peninsula occupies a portion of a much larger geologic unit called the Florida Plateau. Deep water in the Gulf of Mexico is separated from deep water of the Atlantic Ocean by this partially submerged platform, nearly 500 miles long, that varies from 250 to 450 miles wide. In the last 200 million years, the plateau has been alternately dry land or covered by shallow seas. During that time up to 20,000 feet of carbonate and marine sediments were deposited. There has been a tilting of the Florida Plateau about its longitudinal axis. The west coast is partially submerged, as indicated by the wide estuaries and offshore channels, while the east coast is correspondingly elevated, showing the characteristics of an emergent coastline (Randazzo and Jones, 1997).

During the last million years, a series of four glacial periods, or ice ages, brought about significant changes in sea level, as shown in **Figure 1.** As a result of these sea level fluctuations, the Florida peninsula was again covered and uncovered by shallow seas. Following the first glacial period, sea level rose 270 feet above its present level. Dry land on the Florida peninsula was then restricted to a few small islands along the central Florida ridge and in northeast Florida.

About 100,000 years ago, the last glacial period began. Sea level fell to 300 feet below its present level and the Florida Plateau emerged as dry land. Approximately 15,000 years ago, sea level began its most recent rise towards present sea level (Shackleton, 1987). Sea level rose at an average rate of 30 feet per 1,000 years. About 7,000 years ago, the rate of sea level rise slowed when the sea level was about 30 feet below its present level (Smith et al., 2011). It was during this most recent slowing of sea level rise that the modern barrier islands of southeast peninsular Florida formed.

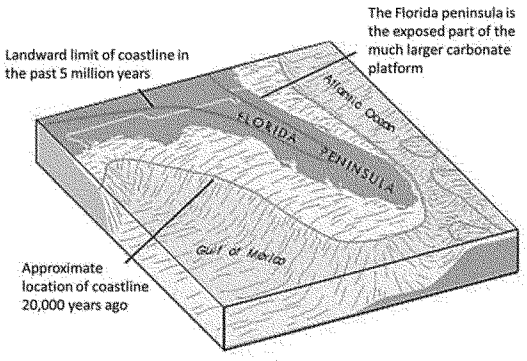


Figure 1. The Florida Peninsula, including the present coastline, previous sea level stands, and the extent of the carbonate platform.

Offshore of the beaches and modern barrier islands is the continental shelf. It is a broad, shallow, low relief shelf that extends from 80 miles offshore near Jacksonville, to only a few miles offshore near Miami. The shelf contains relic Pleistocene and Holocene terraces and submerged beach sand ridges. The wave climate and sediment transportation system creates a linear sandy coastline. The linear coastline is modified locally by inlets. An exception to the linear coastline is the cape structure located at Cape Canaveral which formed in response to a different wave and sand sediment transport system in the southern portion of the state.

The east coast of Florida, from the state line at the Georgia border to Miami Beach (350 miles), consists of a series of sandy barrier islands broken occasionally by inlets, as shown in **Figure 2**. The barrier islands are characterized by dunes and shore parallel beach ridges. Many of the islands display relic beach ridges formed during higher stands of sea level. The barrier islands often have a distinctive drumstick-shape with an accreting bulbous end and a slender eroding end. These barrier islands were formed from waves and longshore currents reworking marine and fluvial sediments. Lagoons and marshes are typically located between the barrier islands and the mainland.

The quartz component of the modern barrier island sand has deposited from sand migrating southward along the Atlantic coast, from the reworking of the Pamlico Sand that was previously deposited over the entire region. The remaining component of coastal sediments are typically carbonates, locally produced by calcite-producing plants and animals. Additional carbonate materials are from reworked materials from outcropping Pleistocene formations offshore (Duane and Meisburger, 1969).

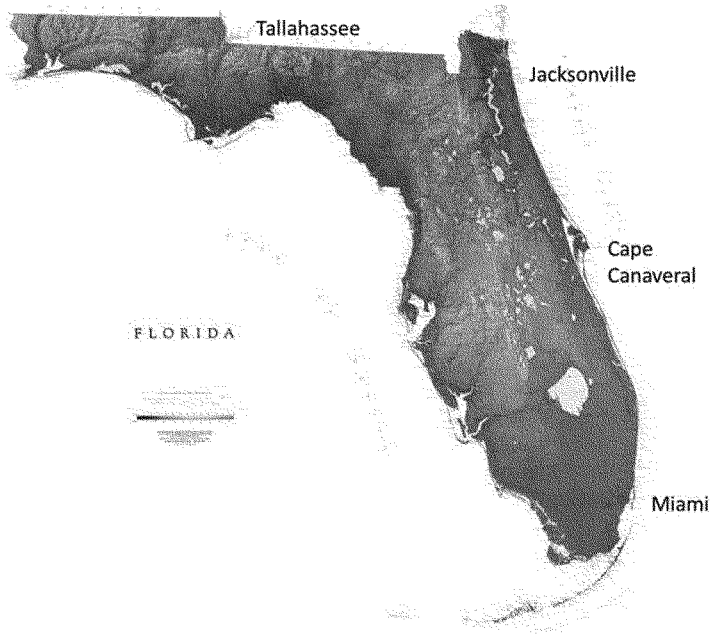


Figure 2. Map of Florida, including points of interest on the Atlantic Coastal Plain.

1.2 LOCAL GEOLOGY

The local geology of St. Johns County for the Quaternary and upper Tertiary Systems range in age from Recent to Pleistocene to Miocene age sediments. The formations exposed at the surface are undifferentiated sediments and the Anastasia Formation of Pleistocene and Recent age (Scott, et al., 2001). These deposits consist of fine to medium quartz sand and lenses of shell and clay of varying thickness. Thick shell beds and erosion of the outcropping Anastasia formation near the coast have been firmly cemented to form coquina. This formation is underlain by Upper Miocene or Pliocene deposits of interbedded lenses of marine, fine to medium sand, shell and green, calcareous, silty clay. This is underlain by the Hawthorne Formation of early and middle Miocene age, the surface of which is approximately 130 feet below sea level. The Hawthorne Formation consists of gray to green, plastic, phosphatic, sandy clay and marl, interbedded with lenses of phosphatic sand, pebbles and sandy limestone. The Hawthorne Formation is underlain by limestone formations of Eocene age.

The project is located on the barrier beach on the Atlantic Ocean, in central St. Johns County, in the Atlantic Coastal Plain physiographic unit. The St. Johns County shore is a barrier beach with

a low tidal marsh and lagoon behind it, as shown in **Figure 3**. For the northern 6 miles the beach ridge is about 3 miles wide, with dune elevations ranging from 15 to 25 feet, mean low water. For the next 12 miles the ocean is separated from the mainland by two ridges and two low marshes. The easterly ridge is about 500 to 1500 feet wide, with a nearly continuous dune line ranging in elevation from 15 to 44 feet. The eastern marsh, which contains the Guana River, is generally 2,000 feet wide. The land ridge west of the Guana River is generally 10 feet high and about 4,000 feet wide. The main marsh ranges in width from 3,000 feet to 9,000 feet wide and contains the Tolomato River at a point about 18 miles south of the Duval-St Johns County line.

The St. Johns County barrier islands have inlets at St. Augustine and at Fort Matanzas. There are low tidal marshes and lagoons between the barrier islands and the mainland. The barrier Islands are composed principally of sand and are underlain by silty, clayey marsh deposits that had formed at lower sea level stages. The sands are principally fine to medium-grained sand-sized quartz with variable amounts of shell and shell fragments.

Sediment transport in the area of St. Augustine Inlet has been altered in historic times by the construction of the navigation channel. Maintenance materials from the dredging of the entrance channel were disposed of offshore, but beach-quality materials have historically been placed on the beach.

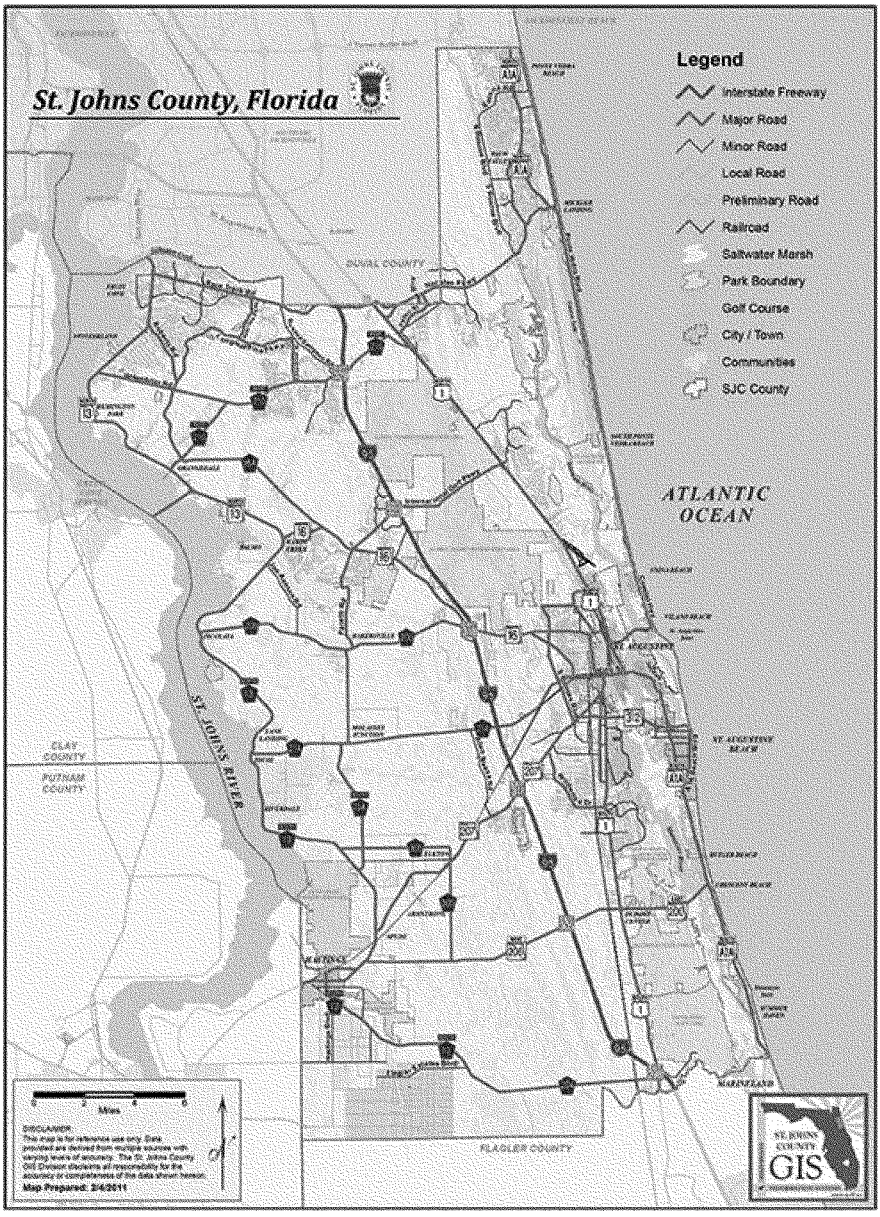


Figure 3. Map of St. Johns County, Florida.

2 NATIVE BEACH

2.1 GENERAL

The original study area included the St. Johns County shoreline from South Ponte Vedra to Vilano Beach, north of St. Augustine Inlet, and Summer Haven, south of St. Augustine Inlet. South Ponte Vedra Beach and Summer Haven were excluded in the course of the feasibility study due to limited public access and parking plus other factors described in the main report. Therefore the Tentatively Selected Plan for the project includes only Vilano Beach from R-102.5 to R-117.5, as depicted on **Plate B - 1** and **Plate B - 9**.

2.2 NATIVE BEACH SAMPLING AND ANALYSIS

The project beach area has not been nourished before. Sediment samples of the existing beach were collected by USACE in 2010 throughout the beach length of approximately 3 miles. Sediment samples were collected along five representative cross-shore transects that were located approximately at the DEP survey monuments with an interval of 3000 feet. Along each transect, five (5) sediment samples were collected between the berm and 15 feet below mean sea level at the following locations: mid-berm, mid-tide, -5 feet, -10 feet and -15 feet, as shown in **Figure 4**. Each sample was collected from 6 to 12 inches below the ground surface. Due to coastal armoring and/or lacking presence of a dune feature, some of the beaches in St. Johns County do not show this typical profile, and therefore dune samples were not collected at these locations.

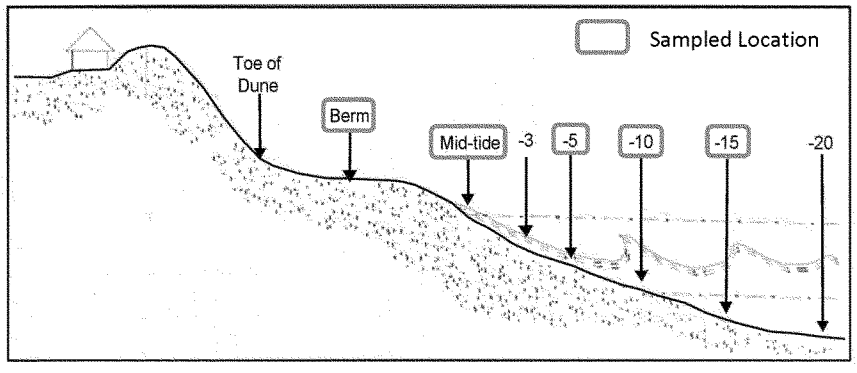


Figure 4. Beach Transect with Beach Sampling Locations

All of the beach samples and the composite samples of each cross-shore transect were analyzed in a laboratory with tests including sieve analysis, visual shell content, carbonate

content, and Munsell color to characterize the sediments of the existing beach. The grain size statistics for the individual samples and composites of cross-shore transects and along-shore profiles were developed by using the moment method provided by the US Army Corps of Engineers, Coastal Engineering Manual, 1110-2-1100, dated 2003, version 2.01 Professional Edition (CEM). The results are summarized in **Table 1**, and the Grain Size Analysis Results for Vilano Beach are in the **Sub-Appendix** attached at the end of the report. The laboratory gradation curves for Vilano Beach will be provided upon request.

Table 1. Vilano Beach, Grain Size Statistics Summary

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Percent Carbonate (%)	Visual Shell (%)	Munsell Color
St. Johns Beach Composite	0.42	1.26	2.04	1.35	1.20	27.10	25.94	10YR 6/2
St. Johns Beach Composite, Quartz Fraction	0.24	2.09	0.00	0.02	0.59	0	0	10YR 7/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

The laboratory analyses characterize the existing sediments at Vilano Beach as shelly, poorly sorted, fine to medium-grained sand-sized quartz and carbonate material. In general, the materials at Vilano Beach have a high shell content, and are coarser than the potential sand source materials. Samples collected at the mid-berm and at mid-tide locations have especially high shell contents caused by the deposits from the Anastasia formation, which also causes the typical brownish grey color of the St. Johns County beaches. Carbonate analysis was completed on all samples collected from the existing beach in order to obtain a grain size distribution of the quartz fraction of the existing beach sands. Both the post-carbonate grain size statistics and pre-carbonate grain size statistics will be utilized to examine the similarity between the existing beach and the potential sand sources selected for this project.

3 SAND SOURCES

This report is based on the data collected during geotechnical investigations in 1996, 2006, 2009, 2010, 2012, and 2015, plus additional available data, and are described in the following sub-sections. Sediment samples were collected from each vibracore collected for laboratory testing, including sieve analysis, visual shell content, silt percent (passing the #230 sieve), carbonate content, and Munsell color, in order to characterize the sand source materials. The grain size statistics for the individual samples and composites of each vibracore were developed by using the moment method provided by the CEM. Geologic cross-sections have been developed to delineate the proposed sand source boundaries and preliminary dredging limits. The lithology shown on the cross-sections is based on the vibracore logs; however, if a soil classification in a vibracore log is different with that from the lab data, the classification from the lab tests are used for the cross-sections. The statistical analysis of data from the vibracores

collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Several sand sources were identified during this Feasibility Study. The resulting potential sand sources for this project include the ebb and flood shoals of St. Augustine Inlet, the federal navigation channel, Porpoise/Vilano Point, off-shore sand sources, and upland sources. The upland sources were ruled out early in the process because of limited available volumes of beach quality material. The St. Augustine Inlet ebb and flood shoals, Porpoise/Vilano Point, and off-shore sand sources were investigated via vibracores. An overview of the study area and the recommended dredging boundaries of each proposed sand source are depicted on **Plate B - 1**. The proposed preliminary sand source locations and associated vibracores are depicted on **Plate B - 2**.

The proposed sand sources within the North Offshore Borrow Area (NOBA), South Offshore Borrow Area (SOBA), and the St. Augustine Inlet shoal complex (including the ebb and flood shoals, Porpoise/Vilano Point, and the federal navigation channel) have been divided into several sub-areas based on both the available volume and depth of beach quality sand at the location. A buffer zone of two (2) feet below the dredging limit has been allocated.

3.1 SAND SOURCE INVESTIGATIONS

Geotechnical investigations began offshore of St. Johns County in 1965, and have continued to present. Locations of all previous vibracores are depicted on **Plate B - 2**. Individual vibracore names and proposed sand sources are depicted on plates in subsequent sections.

3.1.1 Historic Investigations

In 1965, 10 vibracores (CB-1 through 10) were drilled adjacent to the Intracoastal Waterway (IWW) in St. Johns County. These vibracores are irregularly spaced over a distance of 27 miles. The vibracores show limited quantities of beach quality sand available along the IWW. In addition, the sand present was often interlayered with clayey or silty materials. This study was done in conjunction with the 1965 Beach Erosion Control Study, and the report was published March 15, 1965.

In July 1975, the Geomorphology, Shallow Structure, and Sediments of the Florida Inner Continental Shelf, Cape Canaveral to Georgia Study was published. The report is based on data collected in 1966 and 1967. The study covers the areas offshore from Cape Canaveral to Georgia, including St. Johns County. Over 1,000 miles of geophysical seismic lines were run and 197 3-inch diameter, 10 foot long vibracores were collected. The logs for these vibracores are no longer available. The report contains geologic sections based on the logged vibracores. A significant portion of this work was conducted offshore of St. Johns County, and the study identified potential sand sources offshore of St. Johns County.

In December 1977, the Feasibility Report for Beach Erosion Control was published, and later revised in January 1979. In 1976, 16 vibracores (CB-SJ-1 through CB-SJ-13) were collected to

locate potential sand sources at and south of St. Augustine Inlet. Three of the vibracores were collected in the ebb shoal of the inlet. The remaining 10 vibracores were collected just offshore in the vicinity of the city of St. Augustine Beach.

In December 1991, the St. Augustine Inlet Section 933 Study was published. Seven (7) vibracores (CB-SJ-1 to 7) were collected at the St. Augustine Inlet ebb tidal shoal. The composite gradation for the ebb shoal indicates a mean grain size of 0.33 mm (1.64 phi) with a sorting of 1.46 phi. The percent shell ranged from 1 % to 47 % with an average shell content of 17 %. The report concluded that the ebb shoal was a suitable sand source for nourishing the beaches south of St. Augustine Inlet.

3.1.2 Recent Investigations

In 1996, the St. Johns County Beach Nourishment Exploration Program was initiated. This effort consisted of both geophysical and drilling efforts. The geophysical work utilized a new analytical method called Acoustical Impedance, which was used to identify sand sources offshore of St. Johns County. This method was designed to characterize and quantify sand resources.

The drilling effort collected twenty (20) vibracores (CB-SJ96-1 through CB-SJ96-20) offshore of St. Johns County in areas where the Acoustical Impedance work indicated potential sand sources. Based on these vibracores, (4) potential sand sources were identified: the NOBA, SOBA, the South Nearshore Borrow Area, and Ebb Shoal Borrow Area. Three of these features were further developed in more recent studies, and have been proposed as sand sources for the St. Johns County Coastal Storm Risk Management Project (**Plate B - 1**).

In 2006, forty five (45) vibracores were collected at all of the proposed sand sources identified in 1996, except the Ebb Shoal Borrow Area, to a depth of 6 feet to 20 feet below the sea-floor, in order to collect more information on the potential sand reserves. These data provided additional background information which guided future investigations.

In 2009, eighty seven (87) vibracores were collected within the limits of the ebb shoal, NOBA, and SOBA to a maximum depth of 20 feet below the sea floor. The materials from the potential sand sources are intended for beach nourishment, and a higher level of data density was required to delineate the study area into a potential sand source, as well as complete a compatibility analysis in preparation for permitting. These data within ebb shoal developed the potential sand source within the ebb shoal.

Additionally, USACE completed a geophysical study offshore of St. Johns County. A sub-bottom seismic survey was conducted over several shoal features in shallow waters in order to determine the potential volume of beach quality sand that may be present. The shoals were selected using the existing data sets described in earlier U.S. Army Corps of Engineers, Florida Geological Survey, and Florida Department of Environmental Protection reconnaissance reports. On this basis, approximately 125 miles of high seismic profile data were collected at frequencies between 500 Hz and 5 kHz (**Figure 5**). Based on the final analysis, the beach quality

sand is likely to be contained within 5 to 10 feet below the topographic surface of the shoals. Consistent with the geologic model: the thickest deposits are below the crest and thin to near zero at the base of the shoals at depths of about 55 feet and greater. The total volume of sand present in five (5) shoals is calculated at approximately 157 million cubic yards. It is cautioned, however, that the actual volume of beach quality sand within the five (5) surveyed shoal features may be substantially lower pending further investigation based on additional geologic and acoustic data required to develop and permit offshore sand sources.

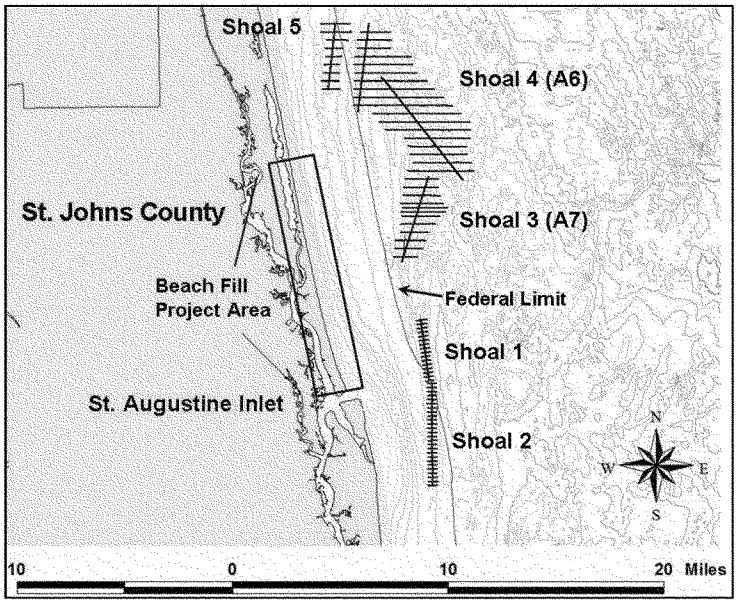


Figure 5. Pattern of survey lines used to collected acoustic sub-bottom profiles in each shoal area (USACE, 2009).

In 2010, three (3) vibracores were collected along Vilano Point (Porpoise Point). Accretion due to longshore transport had caused the spit to encroach on the navigation channel, causing a navigation hazard. The materials from the potential sand source are intended for beach nourishment, and data was required for compatibility analysis.

In 2012, one hundred twelve (112) vibracores were collected within the limits of SOBA and in the nearshore south of the ebb shoal to a maximum depth of 20 feet below the sea floor. The materials from these two potential sand sources are intended for beach nourishment. A higher level of data density was required to delineate the study area into a potential sand source, as well as complete a compatibility analysis in preparation for permitting. The data within SOBA developed the potential sand source S-1.

In 2015, one hundred one (101) vibracores were collected within the limits of the flood shoal, the nearshore south of the ebb shoal, and in N-2 and N-3, within NOBA, to a maximum depth of 20 feet below the sea floor. The materials from the potential sand sources are intended for beach nourishment. A higher level of data density was required to delineate the study area into a potential sand source, as well as complete a compatibility analysis in preparation for permitting. The data within NOBA developed the potential sand sources N-2 and N-3; the data within the flood shoal developed the potential sand sources within the flood shoal.

3.2 PROPOSED OFFSHORE SAND SOURCES

The proposed offshore sand sources N-1, N-2, N-3, and S-1 lay within the larger North Offshore Borrow Area (NOBA) and South Offshore Borrow Area (SOBA) study areas. The proposed preliminary sand source locations and associated vibracores are depicted on **Plate B - 2**.

Because the available vibracores are widely spaced offshore within NOBA and SOBA, geologic cross-sections were only developed for smaller sections of the study areas with higher levels of data density, which have been developed into a proposed sand source. The geologic cross sections presented within the subsequent sections of this Appendix are intended for a feasibility study, and are subject to change pending additional data.

In general, the material encountered within the proposed offshore sand sources consists of moderately well sorted quartz, fine to medium-grained sand with varying amounts of shell fragments, and grey or light grey in color.

3.2.1 North Offshore Borrow Area (NOBA)

The USACE began investigating the north borrow area (NOBA) in 2010. This area is a sand flat located approximately seven (7) miles northeast of the St. Augustine Inlet, extending approximately 17.5 miles to the north and nine (9) miles east in the Atlantic Ocean, and covers an area approximately of 79 square miles. NOBA has been subdivided into three (3) proposed sand sources: N-1, N-2, and N-3. Geologic cross-sections were previously developed for NOBA from the 2006 and 2009 data to guide future studies and delineate future sand source boundaries and dredging limits. The proposed sand source locations within NOBA, and associated vibracores, are depicted on **Plate B - 3**.

The materials in NOBA consist principally of quartz sand, having fine to medium-grained sand-sized particles, with varying amounts of shell fragments. The characteristics of the sand within this region were developed from laboratory gradations on samples of vibracores from 2006 located within the potential sand source boundary. The grain size statistics show the mean grain sizes of individual samples ranging from 0.19 to 0.71 mm with an overall average of 0.31 mm (1.72 phi). The silt content (passing #230 sieve) in individual samples is less than 10 percent, ranging from 0.4 % to 8.2 %, with an average of 2.6 %. The fine gravel content is also less than 5 %, varying from 0 % to 4 %, with an average of 1.1 %, and the amounts of visual shell range from 4 % to 63 %. The standard deviation values, which represent sorting values, range from 0.5 phi to 1.8 phi, representing moderately well sorted to poorly sorted sediments. The

moist Munsell color of the material is predominately a value of 5 or lighter, occasionally there are some samples at deeper locations that are darker than 5.

The beach quality materials within NOBA are bounded by layers of silt or clay that control the dredging limits. The thickness of the beach-quality sand ranges from 2 to 15 feet. NOBA is estimated to contain approximately 400 million cubic yards of beach quality sand, based on the existing vibracores and bathymetry that are widely spaced over the sand source search area. The water depths of NOBA range from -40.5 to -57.5 feet (NAVD 88) and can accommodate a large-capacity hopper. This sand flat containing three (3) proposed sand sources is an excellent source of sand. The sand sources within NOBA are not currently permitted.

North Offshore Borrow Area Coordinates (NAD83):

Corner	X	Y
NW	555,434	2,119,186
NE	579,180	2,128,369
SE	612,948	2,042,010
SW	589,429	2,032,692

3.2.1.1 N-1

The investigation of N-1 included sub bottom surveys and the collection of approximately nine (9) vibracores and grain size analysis on selected samples. Most vibracores show a 10 to 15 foot thick beach-compatible top sand layer. Therefore, an estimated volume of 40 million cubic yards of sand exists within N-1; however, only a preliminary level of data is available and additional data is necessary for formal delineation. The proposed sand source N-1 and associated vibracores are depicted on **Plate B - 4**.

3.2.1.2 N-2

The investigation of N-2 included sub bottom surveys and approximately thirty (30) vibracores and grain size analysis on selected samples. A summary of the composite sediment statistics of the proposed sand source N-2 is available in **Table 2**. Most of the vibracores show a 10 to 15 foot thick beach-compatible top sand layer. Geological cross sections were developed from the 2015 vibracores along the north/south axis (A-A') and the east/west axis (B-B') of the proposed borrow area. The geological cross section from north (A) to south (A') (**Figure 6**) is based on vibracores VB-SNJ15-65, VB-SNJ15-62, VB-SNJ15-60, VB-SNJ15-58, VB-SNJ15-54, VB-SNJ15-50, VB-SNJ15-46, VB-SNJ15-43, VB-SNJ15-40, and VB-SNJ15-37; the geological cross section from west (B) to east (B') (**Figure 7**) is based on vibracores VB-SNJ15-56, VB-SNJ15-55, VB-SNJ15-54, and VB-SNJ15-53. Therefore, an estimated volume of 15 million cubic yards of sand exists within N-2; however, only a small segment of the sand source containing approximately 8 million cubic yards has been fully developed. The proposed preliminary sand source N-2 and associated vibracores are depicted on **Plate B - 5**. The statistical analysis of data from the vibracores collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Table 2. Proposed Sand Source N-2 Sediment Analysis

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color
N2 Sand Source Composite	0.26	1.95	0.74	2.17	0.88	11.75	2.5Y 6/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

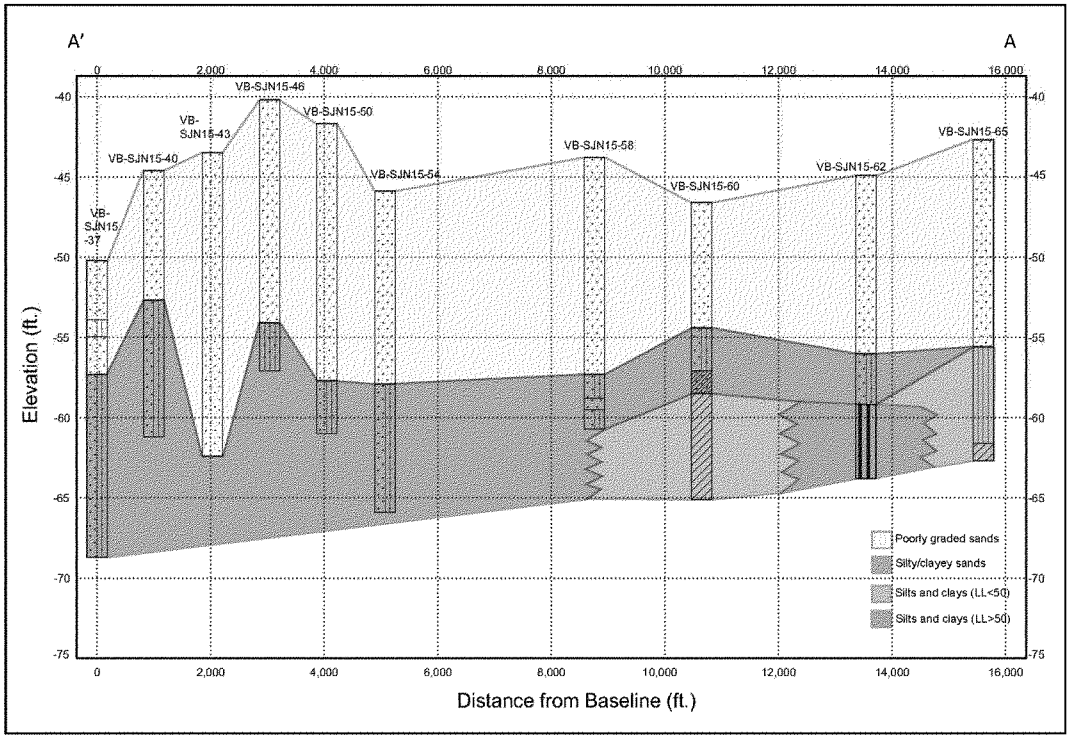


Figure 6. Geological cross section of the axis A-A' of proposed sand source N-2.

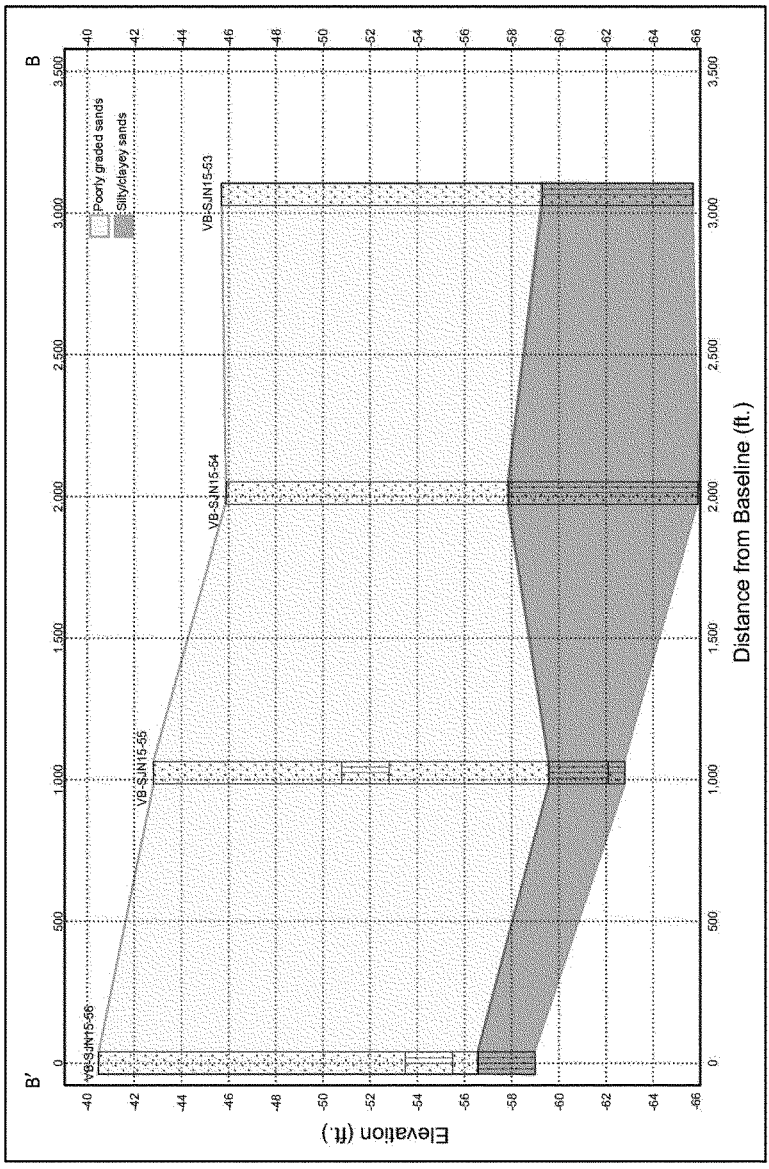


Figure 7. Geological cross section of the axis B-B' of proposed sand source N-2.

3.2.1.3 N-3

The investigation of N-3 included sub bottom surveys and approximately thirty five (35) vibracores and grain size analysis on selected samples. A summary of the composite sediment statistics of the proposed sand source N-3 is available in **Table 3**. Most of the vibracores show an 8 to 10 foot thick beach-compatible top sand layer. Geological cross sections were developed from the 2015 vibracores along the axis A-A' and the axis B-B' of the proposed borrow area. The geological cross section from north (A) to south (A') (**Figure 8**) is based on vibracores VB-SNJ15-32, VB-SNJ15-28, VB-SNJ15-25, VB-SNJ15-21, VB-SNJ15-17, VB-SNJ15-13, VB-SNJ15-10, VB-SNJ15-7, and VB-SNJ15-1; the geological cross section from west (B) to east (B') (**Figure 9**) is based on vibracores VB-SNJ15-23, VB-SNJ15-22, VB-SNJ15-21, and VB-SNJ15-20. Therefore, an estimated volume of 10 million cubic yards of sand exists within N-3; however, only a small segment of the sand source containing approximately 8 million cubic yards has been fully developed. The proposed preliminary sand source N-3 and associated vibracores are depicted on **Plate B - 6**. The statistical analysis of data from the vibracores collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Table 3. Proposed Sand Source N-3 Sediment Analysis.

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
N3 Sand Source Composite	0.26	1.95	2.33	2.33	0.92	2.33	2.5Y 6/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

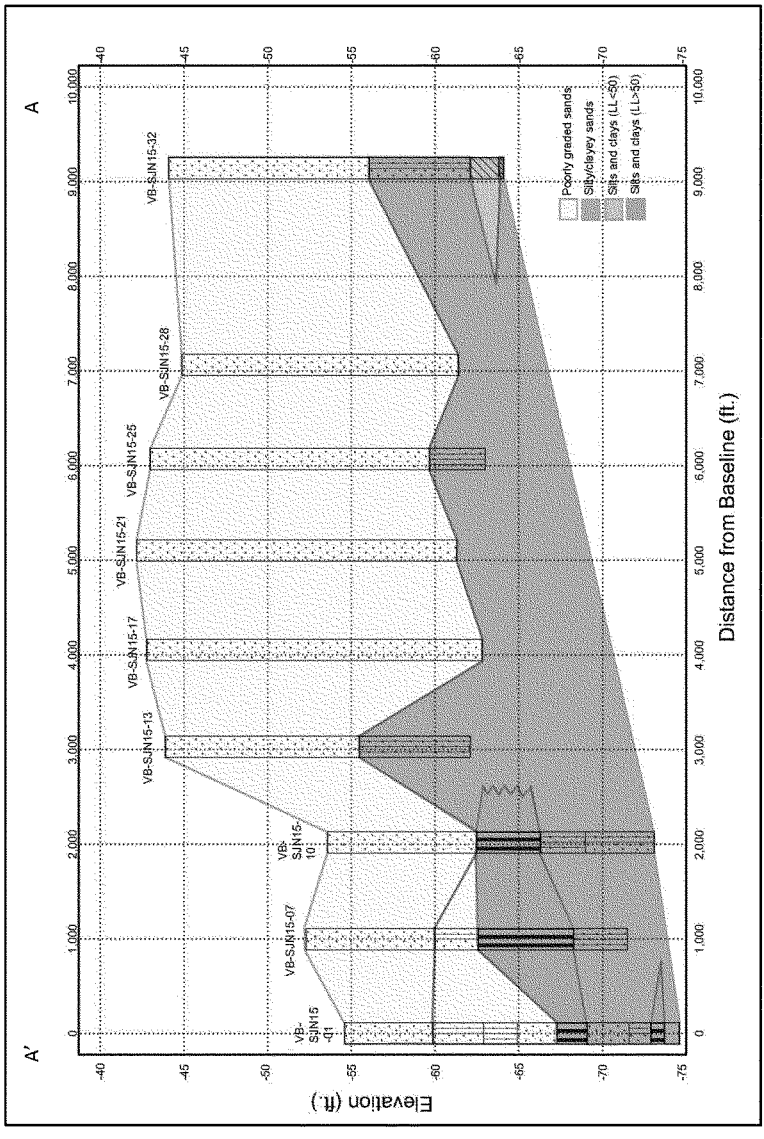


Figure 8. Geological cross section of the axis A-A' of proposed sand source N-3.

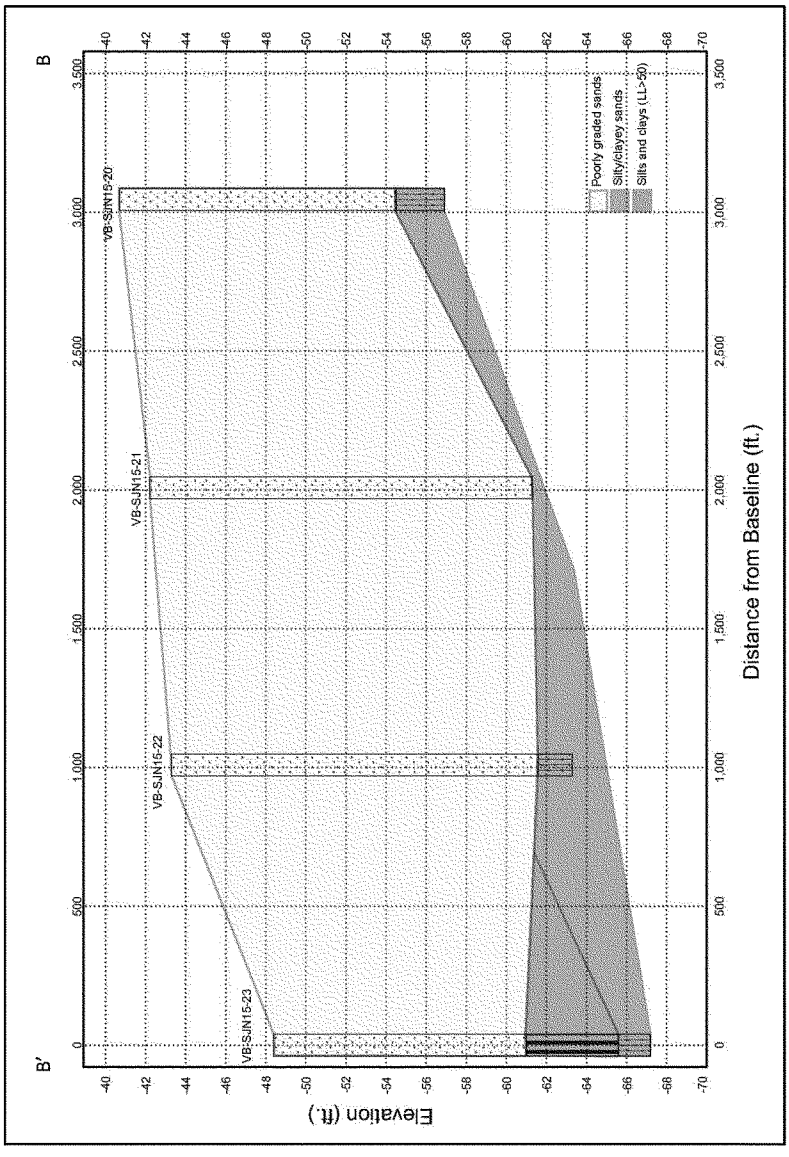


Figure 9. Geological cross section of the axis B-B' of proposed sand source N-3.

3.2.2 South Offshore Borrow Area (SOBA)

The South Offshore Borrow Area is located approximately eight (8) miles southeast of the city of St. Augustine Beach, and covers an area of approximately 30 square miles. SOBA has been subdivided into one (1) proposed sand source, S-1, and the remainder of SOBA will be investigated as additional sand sources are needed. Geologic cross-sections were previously developed for SOBA from the 2006 and 2009 data to guide future studies and delineate future sand source boundaries and dredging limits. The proposed sand source locations within SOBA, and associated vibracores, are depicted on **Plate B - 7**.

The materials in SOBA consist principally of quartz-rich, fine-grained sand with varying amounts of shell fragments. The characteristics of the sand for the sand source were developed from laboratory gradations on samples of vibracores from 2006 located within the potential borrow limits. The grain size statistics show the mean grain sizes of individual samples ranging from 0.18 mm to 0.40 mm with an overall average of 0.22 mm (2.30 phi). The silt content (passing #230 sieve) in individual samples ranges from 0.7 % to 10.2 %, having an average of 4.1%. The fine gravel content varies from 0 % to 7 %, having an average of 1.1 %, and the amount of visual shell ranges from 4 % to 28 %. The standard deviations range from 0.5 phi to 1.8 phi, representing moderately well sorted to poorly sorted sediments. The moist Munsell color of the materials is predominately a value of 5 or lighter; occasionally there are some samples at deeper locations appear darker than 5.

The beach quality materials within SOBA are bounded by layers of silt or clay that control the dredging limits. The thickness of the beach-quality sand ranges from 2 to 12 feet. SOBA contains approximately 130 million cubic yards of beach quality sand, based on the existing vibracores that are widely spaced over the sand source search area. The water depths of SOBA range from -52.5 to -60.5 feet (NAVD 88), which can accommodate a large-capacity hopper. This sand flat containing one (1) proposed sand source is an excellent source of sand. The sand sources within SOBA are not currently permitted.

South Offshore Borrow Area Coordinates (NAD83):

Corner	X	Y
NW	604,363	2,001,479
NE	620,513	2,003,143
SE	620,049	1,951,893
SW	602,832	1,952,913

3.2.2.1 S-1

The investigation of S-1 included sub bottom surveys and approximately one hundred sixteen (116) vibracores and grain size analysis on selected samples. A summary of the composite sediment statistics of the proposed sand source S-1 is available in **Table 4**. Most vibracores show a 5 to 10 foot thick beach-compatible top sand layer. Geological cross sections were developed from the 2012 vibracores along the axis A-A' and the axis B-B' of the proposed borrow area. The geological cross section from north (A) to south (A') (**Figure 10**) is based on vibracores VB-SJSP12-16, VB-SJSP12-15, VB-SJSP12-10, VB-SJSP09-14, VB-SJSP09-16, VB-SJSP12-72, and VB-SJSP12-73; the geological cross section from west (B) to east (B') (**Figure 11**) is based on vibracores VB-SJSP12-46, VB-SJSP12-29, VB-SJSP09-11, VB-SJSP09-14, VB-SJSP12-67, VB-SJSP12-93, and VB-SJSP12-109. Therefore, an estimated volume of 14 million cubic yards of sand exists within S-1; however, only a smaller segment of the sand source containing approximately 6.5 million cubic yards has been fully developed. The proposed preliminary sand source S-1 and associated vibracores are depicted on **Plate B - 8**. The statistical analysis of data from the vibracores collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Table 4. Proposed Sand Source S-1 Sediment Analysis.

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
S1 Sand Source Composite	0.25	2.01	0.75	2.03	0.85	12.79	5Y 7/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

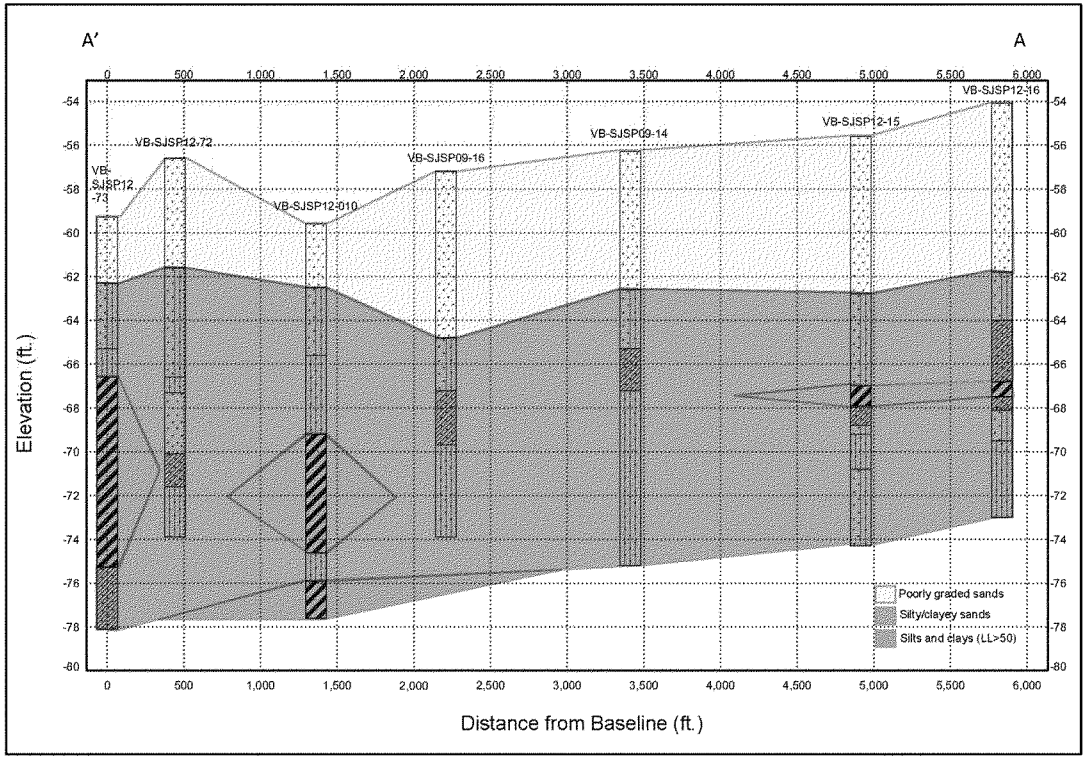


Figure 10. Geological cross section of the axis A-A' of proposed sand source S-1.

380

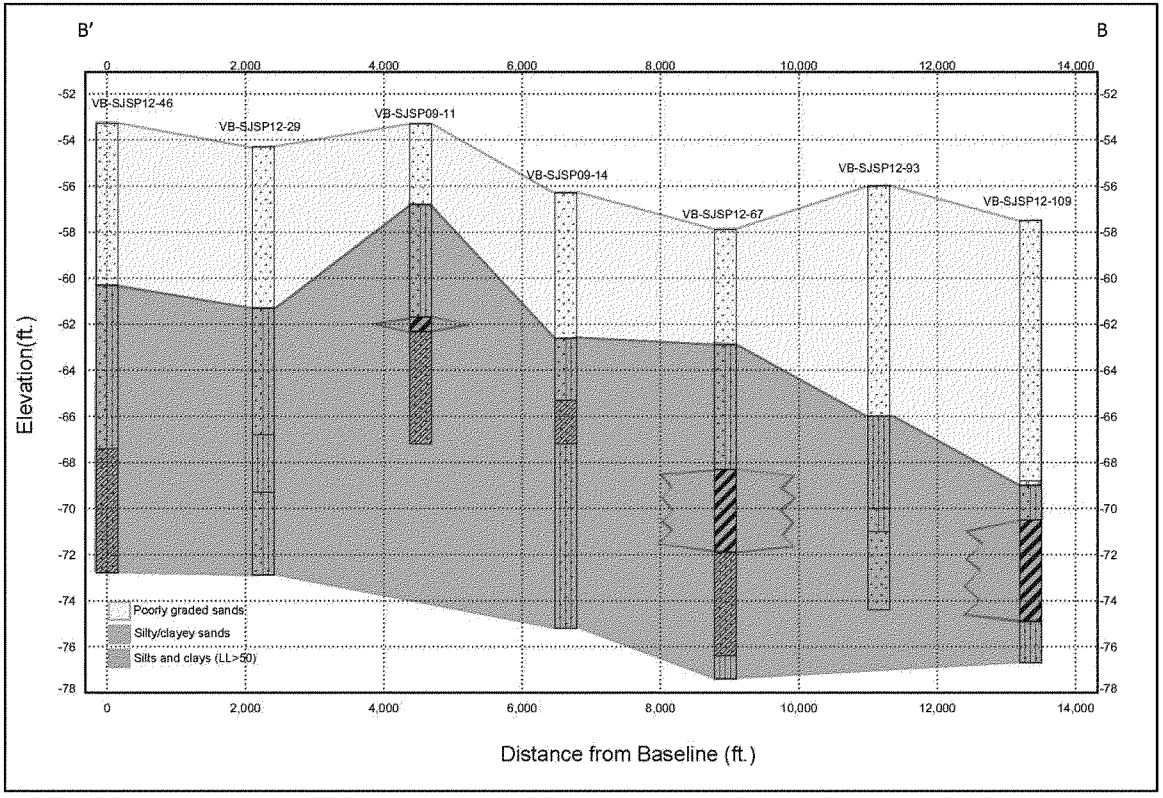


Figure 11. Geological cross section of the axis B-B' of proposed sand source S-1.

3.3 PROPOSED ST. AUGUSTINE INLET SAND SOURCES

The proposed sand sources within St. Augustine Inlet include the ebb and flood shoals, Vilano Point, and the federal navigation channel. The proposed St. Augustine Inlet sand source and associated vibracores are depicted on **Plate B - 9**.

The data used for developing the cross-sections for the sand sources within the St. Augustine Inlet sand source are limited to the ebb shoal, flood shoal, and Vilano Point. The geological cross sections presented within the subsequent sections of this Appendix are intended for a feasibility study, and are subject to change pending additional data. Additional vibracores may need to be collected as the ebb shoal was dredged in 2012, removing 2.1 million cubic yards, after the most recent vibracores were collected; the federal navigation channel is routinely dredged and maintained, most recently removing 150,000 cubic yards of material in 2015.

In general, the material encountered within the proposed St. Augustine Inlet sand sources consists of moderately well sorted quartz-rich, fine to medium-grained sand with varying amounts of shell fragments, and grey or light grey in color.

3.3.1 Ebb Shoal

The ebb shoal sand source is located just off St. Augustine Inlet. It covers an area of 1.2 square miles and contains approximately 30 million cubic yards of beach quality sand of which approximately 6 million cubic yards may be dredgeable. The ebb shoal feature can be divided into two lobes: a north lobe, and a south lobe. The investigation of the St. Augustine Inlet ebb shoal consisted of the collection of approximately thirty five (35) vibracores and grain size analysis on selected samples. A summary of the composite sediment statistics of the proposed ebb shoal sand source is available in **Table 5**.

The characteristics of the sand in the ebb shoal sand source were developed from laboratory analyses on samples from vibracores collected in 1996, 1998, and 2009. The sand deposit, as shown in the vibracores, is entirely beach quality sand. Geological cross sections were developed from the 2009 vibracores along the axis A-A' and the axis B-B' of the proposed borrow area. The geological cross section from north (A) to south (A') (**Figure 12**) is based on vibracores CB-SJEB09-P2A, CB-SJEB09-P7, CB-SJEB09-P6, CB-SJEB09-P11, CB-SJEB09-P15, CB-SJEB09-P19, CB-SJEB09-P23 and CB-SJEB09-P26; the geological cross section from west (B) to east (B') (**Figure 13**) is based on vibracores CB-SJEB09-P8, CB-SJEB09-P9, CB-SJEB09-P10, CB-SJEB09-P11, CB-SJEB09-P12, and CB-SJEB09-P13.

Therefore, an estimated volume of 4.5 million cubic yards of sand exists within the St. Augustine Inlet ebb shoal; however, only the southern portion of the sand source containing approximately 2 million cubic yards has been fully developed and permitted under FDEP JCP permit number 0295429-002-JC. This is an excellent source of sand; however, magnetic

anomalies, which will be further investigated, may restrict its use. The proposed preliminary ebb shoal sand source and associated vibracores are depicted on **Plate B - 10**. The statistical analysis of data from the vibracores collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Table 5. Proposed St. Augustine Inlet Ebb Shoal Sand Source Sediment Analysis.

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
Ebb Shoal Composite	0.23	2.38	0.00	1.43	0.64	21.48	2.5Y 6/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

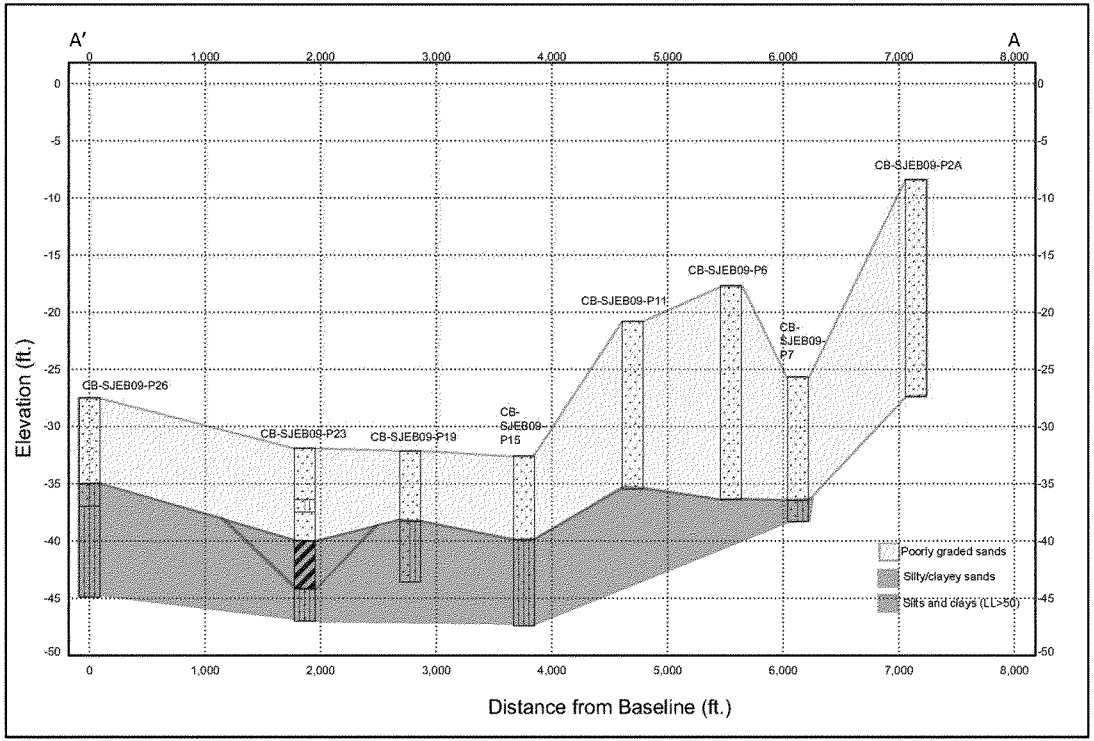


Figure 12. Geological cross section of the axis A-A' of proposed Ebb Shoal sand source.

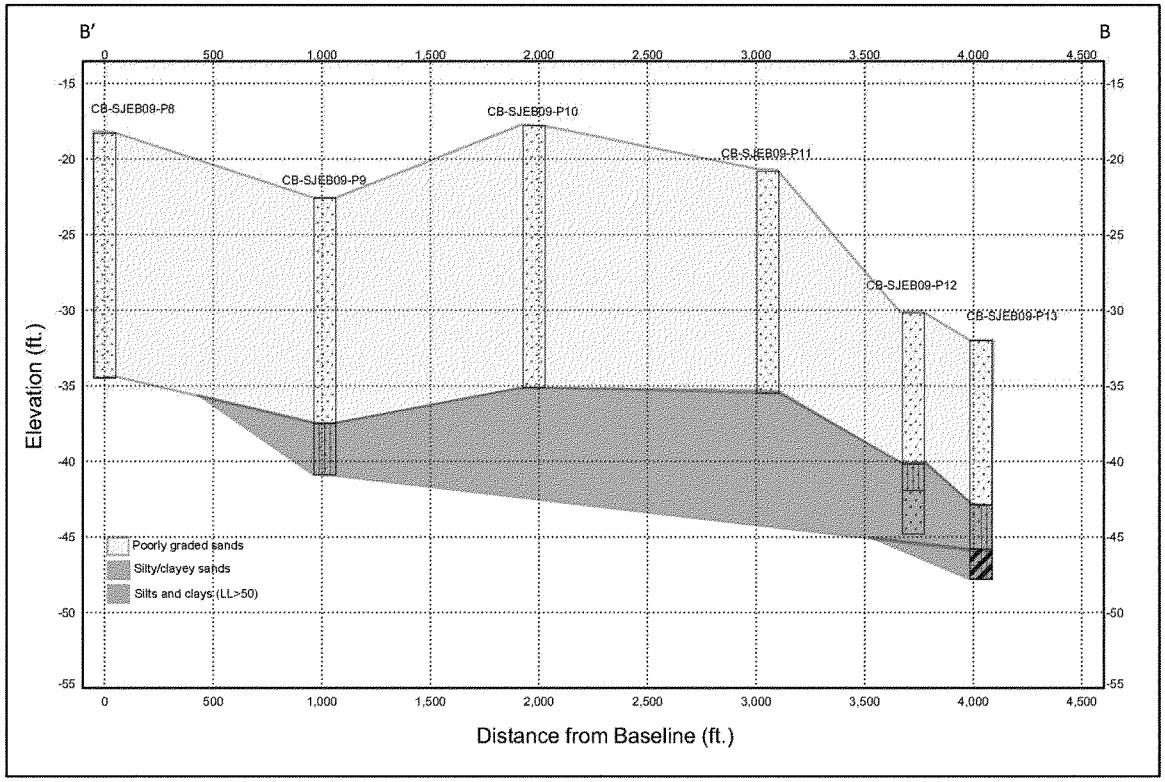


Figure 13. Geological cross section of the axis B-B' of proposed Ebb Shoal sand source.

3.3.2 Flood Shoal

The flood shoal sand source is located just inside St. Augustine Inlet. It covers an area of 1.2 square miles and contains approximately 2 million cubic yards of beach quality sand which may be dredgeable. The characteristics of the sand in the Flood Shoal Sand Source were developed from laboratory gradations on samples for vibracores collected in 2015; a bathymetric survey was not available at the time of this report and is scheduled to occur in early 2016. The flood shoal feature can be divided into two lobes: a north lobe, and a south lobe. The investigation of the St. Augustine Inlet flood shoal consisted of the collection of approximately thirty five (35) vibracores and grain size analysis on selected samples. A summary of the composite sediment statistics of the proposed flood shoal sand source is available in **Table 6**.

The characteristics of the sand in the flood shoal sand source were developed from laboratory analyses on samples from vibracores collected in 2015. The sand deposit, as shown in the vibracores, is entirely beach quality sand. Geological cross sections were developed from the 2015 vibracores along the axis A-A' and the axis B-B' of the proposed borrow area. The geological cross section of the north lobe of the flood shoal (**Figure 14**) is based on vibracores VB-SAFS15-1, VB-SAFS15-3, VB-SAFS15-2, VB-SAFS15-4, VB-SAFS15-5, and VB-SAFS15-6 from north (A) to south (A'); the geological cross section of the south lobe of the flood shoal (**Figure 15**) is based on vibracores VB-SAFS15-14, VB-SAFS15-13, VB-SAFS15-11, and VB-SAFS15-10 from west (B) to east (B').

Therefore, an estimated volume of 2 million cubic yards of sand exists within the St. Augustine Inlet flood shoal; this sand source has not yet been permitted. This is an excellent source of sand; however, magnetic anomalies, which will be further investigated, may restrict its use. The proposed preliminary flood shoal sand source and associated vibracores are depicted on **Plate B - 11**. The statistical analysis of data from the vibracores collected to date are provided in the **Sub-Appendix**; the vibracore logs and laboratory gradation curves will be provided upon request.

Table 6. Proposed St. Augustine Inlet Flood Shoal Sand Source Sediment Analysis.

	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
Flood Shoal Sand Source Composite	0.30	1.93	2.62	1.64	0.98	15.70	2.5Y 6/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

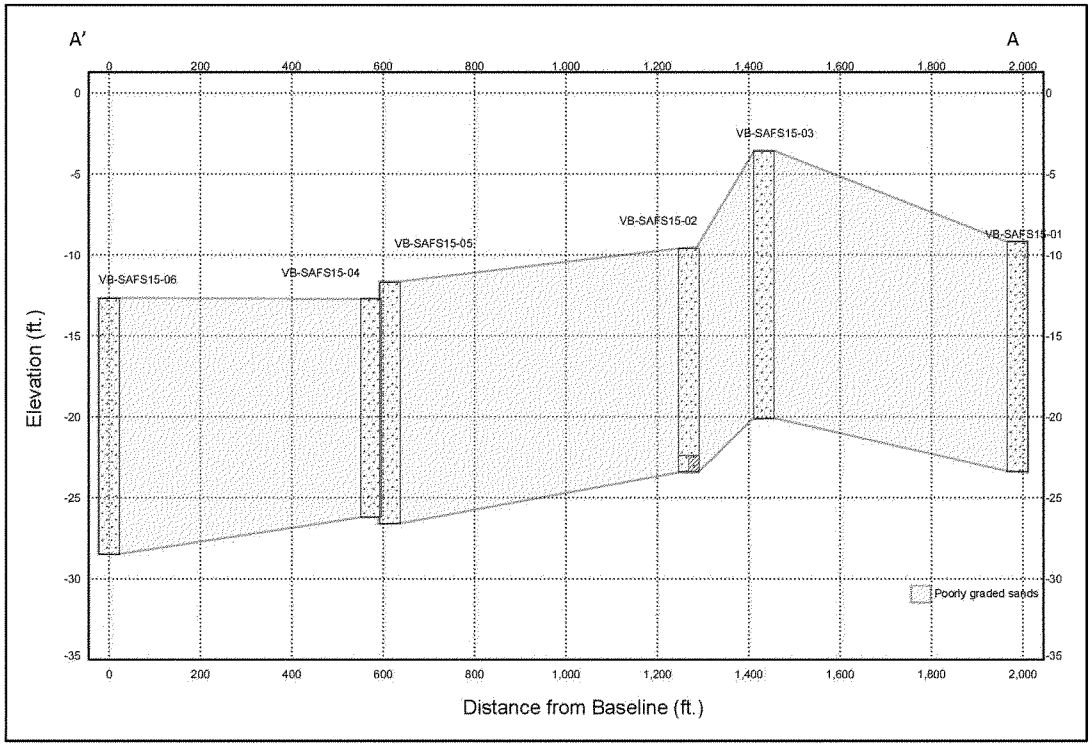


Figure 14. Geological cross section of the north lobe (A-A') of proposed Flood Shoal sand source.

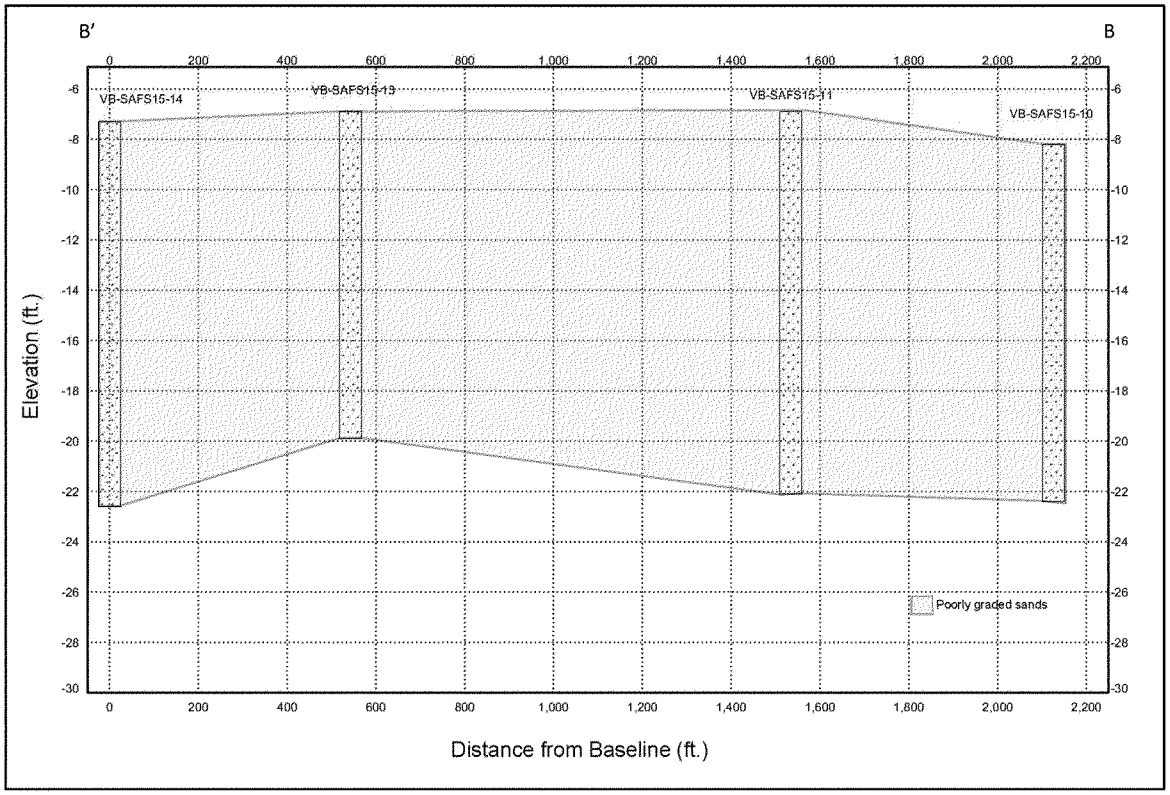


Figure 15. Geological cross section of the south lobe (B-B') of proposed Flood Shoal sand source.

3.3.3 Vilano Point

Four (4) vibracores were collected at Vilano Point in the St. Augustine Inlet channel. The material encountered consists of poorly-graded fine-grained sand-sized quartz and various shell layers. The shell layers consist of medium to coarse-grained sand-sized shell fragments with trace to some sand-sized quartz. Only in boring VB-SA08M-07, one 2-foot thick shell-layer exhibits approximately 20% fine-gravel-sized shell, retained in the #4 sieve. The proposed Vilano Point sand source and associated vibracores are depicted on **Plate B - 12**. This sand source is currently permitted under FDEP JCP permit number 0295429-002-JC, and has been utilized once.

3.3.4 Navigation Channel

Based on the earlier described 1991 933 study, maintenance dredging would be an excellent source of beach quality sand. The principal problem is that the quantity of sand available is limited to approximately 100,000 to 200,000 cubic yards at any given time. The proposed Navigation Channel sand source and associated vibracores are depicted on **Plate B - 9**. The federal navigation channel is permitted under FDEP JCP permit number 0294455-001-JC.

4 COMPATIBILITY OF THE SAND SOURCES WITH THE BEACHES

Florida Administrative Code (F.A.C.) 62B-41.007(2)(j) requires that beach fill meets the following requirements:

- Predominately carbonate or quartz with a particle size distribution ranging between 0.062 mm (4 phi) and 4.76mm (-2.25 phi);
- Contain less than 5% silt passing the #230 sieve;
- Contain less than 5% gravel sized shell retained on the #4 sieve;
- Not contain coarse gravel, cobbles, or material retained on the ¾" sieve in a percentage greater than the native beach
- Be free of construction debris, toxic material, or other foreign matter;
- Be similar in color and grain size distribution; and
- Not result in cementation of the beach.

All of the proposed sand sources meet the requirements of the sand rule criteria, as outline above, and in 62B-41/007(2)(j), F.A.C. Grain size distribution, Overfill Factor and Renourishment Factor are also used to determine compatibility between the proposed sand sources and the St. Johns County beaches, specifically Vilano Beach.

4.1 GRAIN SIZE DISTRIBUTION

Grain size analyses were performed on beach samples from St. Johns County's Beaches and on discrete samples of the proposed offshore and inlet sand sources. Samples were analyzed for

grain-size, visual shell and carbonate content. An arithmetic composite sample was calculated from the granularmetric results. The composite sample results for the beach, ebb shoal, flood shoal, and offshore sand sources are summarized in **Table 7** and discussed below.

The native beach sediments of Vilano Beach consist of a moderately to poorly sorted, fine- to medium-grained quartz sand, with a fine gravel (shell) content higher than some of the adjacent beaches due to erosion of the outcropping Anastasia Formation. The material from the proposed offshore sand sources consists of moderately well sorted quartz-rich, fine- to medium-grained sand with varying amounts of shell fragments, and grey or light grey in color. The material from the proposed St. Augustine Inlet sand source also consists of moderately well sorted quartz-rich, fine- to medium-grained sand with varying amounts of shell fragments, and grey or light grey in color.

The testing results show that the material from both offshore (N-2, N-3, and S-1) and inlet sand sources (ebb shoal and flood shoal) are very similar and compatible with the existing beach and also meet the requirements of Florida state regulation, 62B-41.007(2)(j), F.A.C. The material from existing beach has a higher shell content than the proposed sand sources, which are composed of primarily quartz sands.

Table 7. Sediment Analysis Summary of Proposed Sand Sources.

Sand Source Composite	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color
NOBA	0.31	1.72	1.1	2.6	0.5-1.8	4-63	5 or lighter
N2	0.26	1.95	0.74	2.17	0.88	2-59	2.5Y 6/1
N3	0.26	1.95	2.33	2.33	0.92	0-36	2.5Y 6/1
SOBA	0.22	2.3	1.1	4.1	0.5-1.8	na	5 or lighter
S1	0.25	2.01	0.75	2.03	0.85	2-60	5Y 7/1
Ebb Shoal	0.23	2.38	0	1.43	0.64	0-95	2.5Y 6/1
Flood Shoal	0.30	1.93	2.62	1.64	0.98	0-66	2.5Y 6/1
Beach	0.42	1.26	2.04	1.35	1.2	3-84	10YR 6/2
Beach, Quartz Fraction	0.24	2.09	0.00	0.02	0.59	0	10YR 7/1

*Retained in the #4 Sieve, **Passing the #230 Sieve

4.2 OVERFILL AND RENOURISHMENT FACTOR

The Overfill and Renourishment Factors were calculated to estimate the predicted performance of borrow materials with respect to the native beach materials, both during initial beach stabilization and over the long term. Thus, they help in choosing the best available borrow material. The factors also are used to calculate fill construction volume and renourishment volumes.

Overfill and Renourishment Factors are calculated using the sediment mean grain size and standard deviation of the native beach and the sand source in phi units.

4.2.1 Overfill Factor

The Overfill Factor (RA) is primarily a volume factor which may be used to calculate an intentional overfill to compensate for volume loss during the initial construction. The RA is used to determine which of the proposed sand sources will provide the lowest placement volume, and thus is most compatible with the existing beach.

The overfill factor for Vilano Beach was calculated using the USACE CEM software program for each of the sand sources, and the results are in **Table 8**. However, due to the high shell content of the existing beach caused by the eroding Anastasia formation, the existing beach has a highly variable shell content that cannot be matched to the offshore, nearshore, or upland quartz-rich sand deposits found within the vicinity of St. Johns County. As a result of these unusual natural conditions, the overfill factor for the proposed sand sources and the existing beach is higher than typical values for beach nourishment.

Therefore, the overfill factor was calculated again for only the quartz fraction of the existing beach in order to obtain a more accurate RA value for the proposed sand sources. The proposed sand sources within NOBA (N-2, N-3), SOBA (S-1), and St. Augustine Inlet are suitable for placement on St. Johns County's beaches. It should be noted that the overfill factor for the proposed ebb shoal sand source is moderately high, due to the very well sorted material which was identified by previous vibracoring efforts. However, the material within the ebb shoal was dredged and placed on St. Johns County beaches in 2012, and has performed well. Additional vibracores and overfill factor calculations will be necessary prior to design and construction since the ebb shoal has been accreting with new material since 2012.

Table 8. Summary of Overfill Factors for Vilano Beach.

	Offshore					Shoal		Native Beach	Native Beach (Quartz only)
	NOBA	N2	N3	SOBA	S1	Ebb	Flood		
Mean (mm)	0.31	0.26	0.26	0.22	0.25	0.23	0.30	0.42	0.24
Mean (phi)	1.72	1.95	1.95	2.3	2.01	2.38	1.93	1.26	2.09
Sorting / St. Dev (phi)	0.5-1.8	0.88	0.92	0.5-1.8	0.85	0.64	0.98	1.2	0.59
Visual Shell (%)	4-63	11.75	2.33	n/a	12.79	21.48	15.70	25.94	0
Overfill Factor, RA (Native)	2.19	6.82	5.12	13.67	15.40	33.6	3.63	n/a	n/a
Overfill Factor, RA (Quartz)	1.097	1.12	1.14	1.42	1.13	1.73	1.16	n/a	n/a

4.2.2 Renourishment Factor

The Renourishment Factor (RJ) estimates long term relative erosion rates of borrow materials with respect to native materials. This is done by assuming all grains have a finite residence time in the local littoral system before being transported offshore or alongshore. Larger grains remain longer. The RJ is primarily a measure of relative long-term stability. RJ values greater than one predict the borrow material will erode at a higher rate than the native beach. Conversely, values of less than one predict the borrow material is more stable.

The renourishment factor for Vilano Beach was calculated using the USACE CEM software program for each of the borrow areas, and the results are shown in **Table 9**. However, due to the high shell content of the existing beach caused by the eroding Anastasia formation, the existing beach has a highly variable shell content that cannot be matched to the offshore, nearshore, or upland quartz-rich sand deposits found within the vicinity of St. Johns County. As a result of these unusual natural conditions, the renourishment factor for the proposed sand sources and the existing beach is higher than typical values for beach nourishment.

Therefore, the renourishment factor was calculated again for only the quartz fraction of the existing beach in order to obtain a more accurate RJ value for the proposed sand sources. The proposed sand sources within NOBA (N-2, N-3), SOBA (S-1), and St. Augustine Inlet are suitable for placement on St. Johns County's beaches. It should be noted that the renourishment factor for the proposed ebb shoal sand source is high, due to the very well sorted material within the ebb shoal which was identified by previous vibracoring efforts. However, the material within the ebb shoal was dredged and placed on St. Johns County beaches in 2012, and has performed well. Additional vibracores and renourishment factor calculations will be necessary prior to design and construction since the ebb shoal has been accreting with new material since 2012.

Table 9. Summary of Renourishment Factors for Vilano Beach.

	Offshore					Shoal		Native Beach	Native Beach (Quartz only)
	NOBA	N2	N3	SOBA	S1	Ebb	Flood		
Mean (mm)	0.31	0.26	0.26	0.22	0.25	0.23	0.30	0.24	0.42
Mean (phi)	1.72	1.95	1.95	2.3	2.01	2.38	1.93	2.09	1.26
Sorting / St. Dev (phi)	0.5-1.8	0.88	0.92	0.5-1.8	0.85	0.64	0.98	0.59	1.2
Visual Shell (%)	4-63	11.75	2.33	n/a	12.79	21.48	15.70	0	25.94
Renourishment Factor, RJ (Native)	1.71	2.24	2.18	2.77	2.40	2.96	2.06	n/a	n/a
Renourishment Factor, RJ (Quartz)	0.209	0.42	0.385	0.559	0.509	1.496	0.316	n/a	n/a

4.3 COMPATIBILITY SUMMARY

The offshore borrow areas of NOBA, SOBA, and shoal complex contain significant volumes of beach quality sand that can be excellent sources for beach nourishment, although the materials in both sand sources are finer than that at the project beach. In general, the borrow materials at NOBA are coarser than that at SOBA; while the water is deeper at the SOBA than that at NOBA.

Grain size distribution, overfill factor and renourishment factor computations were used to determine if the proposed offshore and St. Augustine Inlet sand sources NOBA (N-2, N-3), SOBA (S-1), ebb shoal, and flood shoal are compatible with the native beach in St. Johns County. The compatibility analysis results for St. Johns County's Vilano beach are summarized in **Table 7**, **Table 8**, and **Table 9**. The grain size analysis revealed that the sediments of the borrow areas are composed of fine-grained quartz sand with visual shell values between 2 % and 27 %. The native beach is composed of fine- to medium-grained quartz and carbonate sand with a mean visual shell value of 26 %.

The overfill and renourishment factors for Vilano beach were calculated for each of the sand sources using the USACE CEM software program. The proposed sand sources within NOBA (N-2, N-3), SOBA (S-1), and St. Augustine Inlet showed acceptable overfill factors and renourishment factors and are therefore suitable for St. Johns County's beaches.

4.4 ADAPTIVE MANAGEMENT OF SAND SOURCES

This project anticipates to utilize an adaptive management of sand sources in order to maximize both the lifetime of the project, and the resources within the sand sources. At the time of this

study, the offshore sand sources, N-2 and N-3 (NOBA) and S-1 (SOBA), have not been permitted though the Florida Department of Environmental Protection (FDEP). Additionally, upland sand sources do not have the volume available to maintain the project. However, as a large portion of the St. Augustine Inlet sand source is already permitted through the FDEP (southern lobe of the ebb shoal, federal navigation channel, and Vilano Point) it is an efficient management of resources to first utilize the sand sources within St. Augustine Inlet before proceeding offshore. The St. Augustine Inlet sand source, consisting of the ebb shoal, flood shoal, Vilano Point, and federal navigation channel, currently contains approximately 6 million cubic yards of beach compatible sediment. However, due to cultural resources and dredging limitations, not all of this volume may be available for beach placement.

5 REFERENCES

Duane, D.B., Meisburger, E.P., 1969, Geomorphology and Sediments of the Nearshore Continental Shelf: Miami to Palm Beach, Florida. U.S. Army Corps of Engineers, 120 pp.

Randazzo, A. F., Jones, D.S., 1997. The Geology of Florida. University Press of Florida, Gainesville, FL, 400.

Scott, T.M., Campbell, K.M., Rupert, F.R., Arthur, J.D., Missimer, T.M., Lloyd, J.M., Yon, J.M., Duncan, J.G., 2001. Geologic Map of the State of Florida. Florida Geological Survey and Florida Department of Environmental Protection, Map Series 146.

Smith, D.E., Harrison, S., Firth, C.R., Jordan, J.T., 2011. The early Holocene sea level rise. Quaternary Science Reviews 30, 1846-1860.

Shackleton, N.J., 1987, Oxygen isotopes, ice volume and sea level. Quaternary Science Review, Vol. 6, p. 183-190.

US Army Corps of Engineers, Geotechnical Appendix of the General Reevaluation Report for St. Johns county Shore Protection Project, 1997.

US Corps of Engineer, 2003, Coastal Engineering Manual (EM 1110-2-1100).

US Army Corps of Engineers, Geotechnical Report for Investigation of Offshore Borrow Areas, St. Johns County, Florida, Shore Protection Project General Investigation, 2007(Draft).

US Army Corps of Engineers, 2009. Final Sub-Bottom Seismic Survey Report: Offshore Sand Borrow Site Assessment St. Johns County, FL, 49 pp.

PLATES

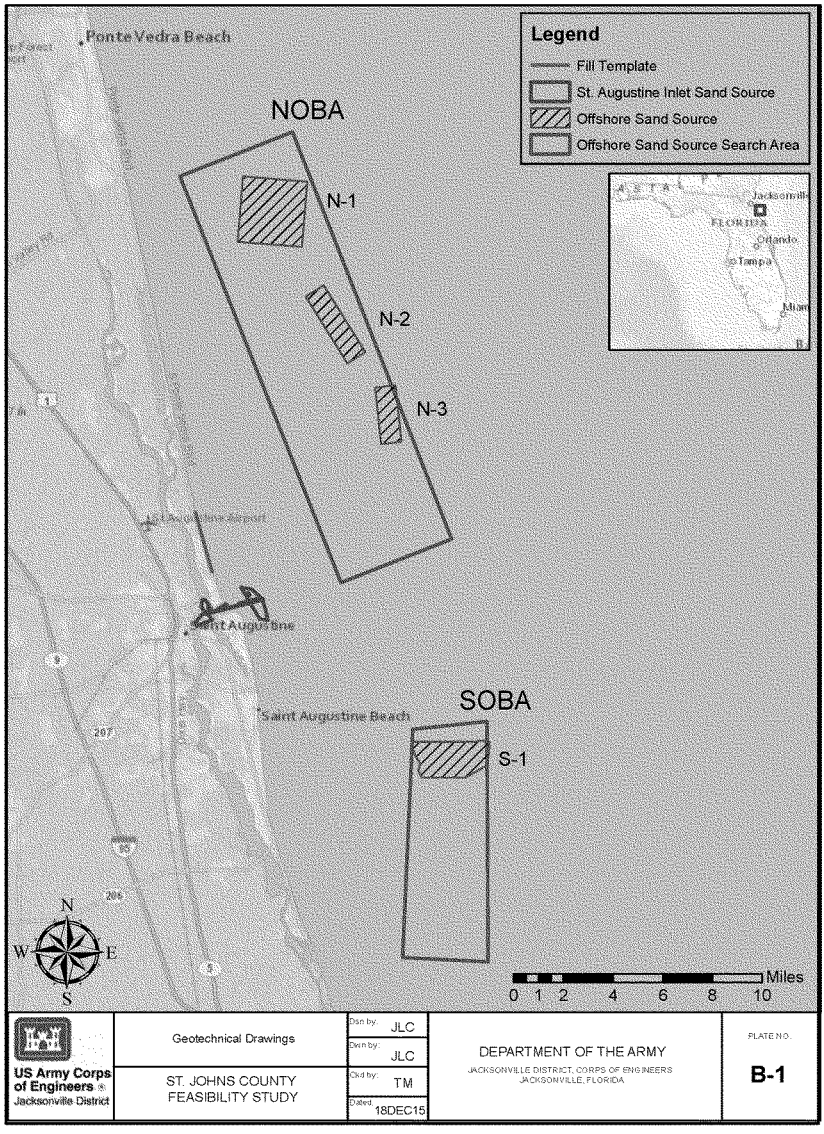


Plate B - 1. Overview of Vilano Beach and Proposed Sand Source Locations.

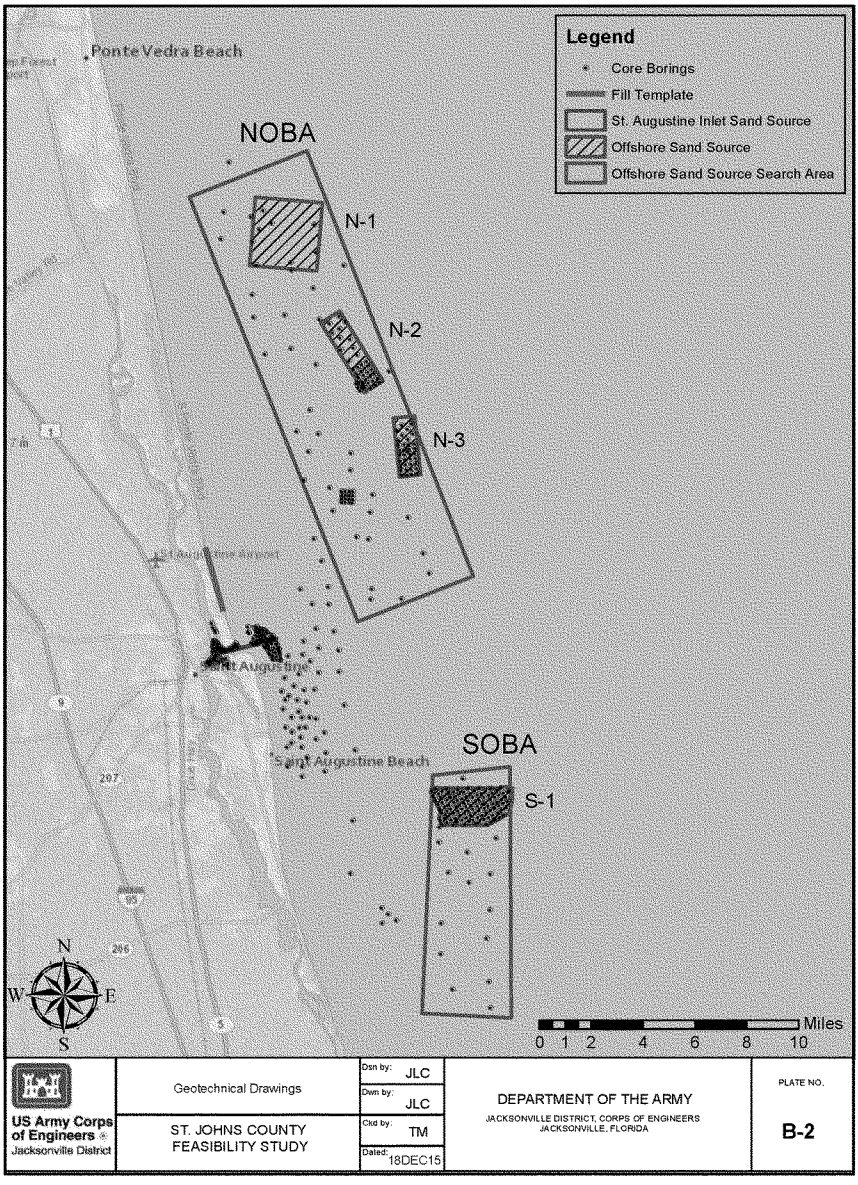


Plate B - 2. Overview of Vilano Beach and Proposed Sand Source Locations with Vibracore Boring Locations.

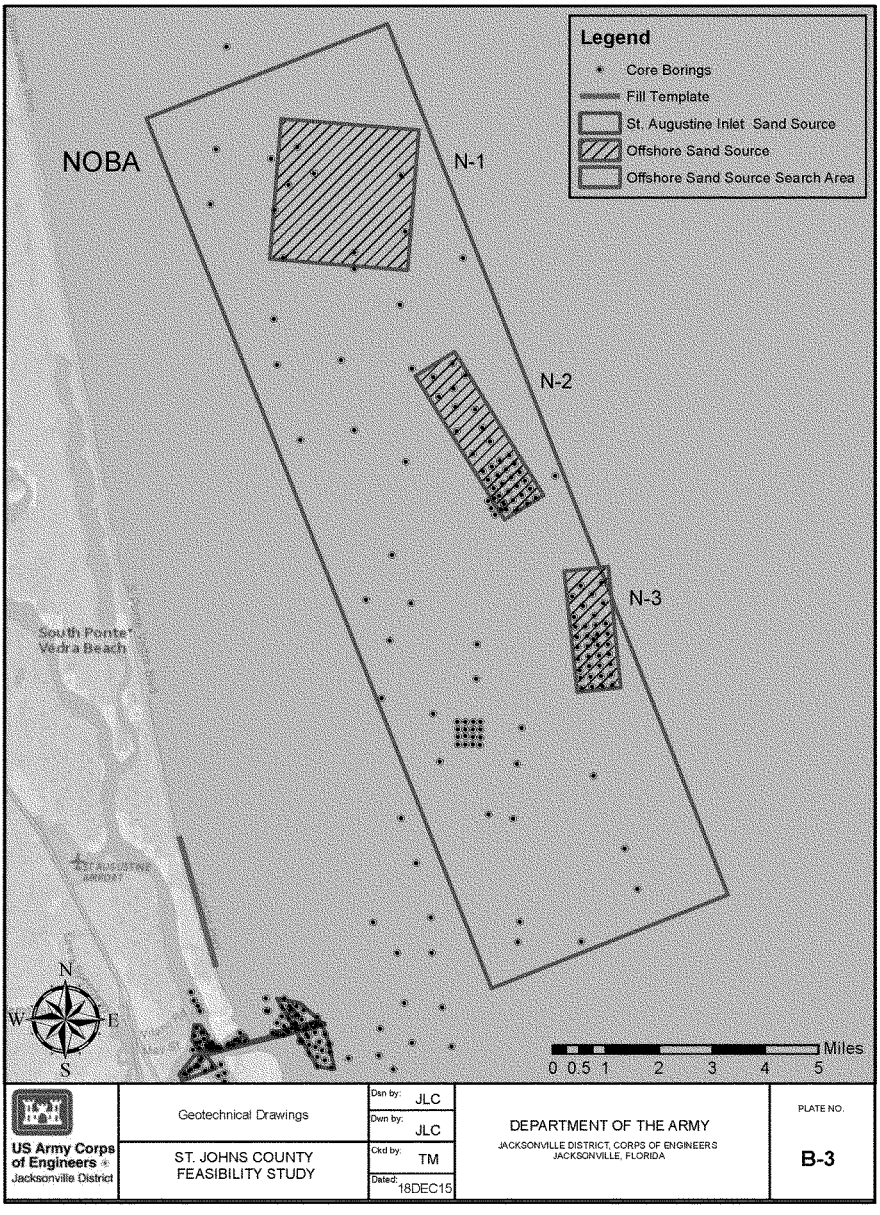


Plate B - 3. NOBA, Vibracore Boring Locations, and Proposed Sand Sources.

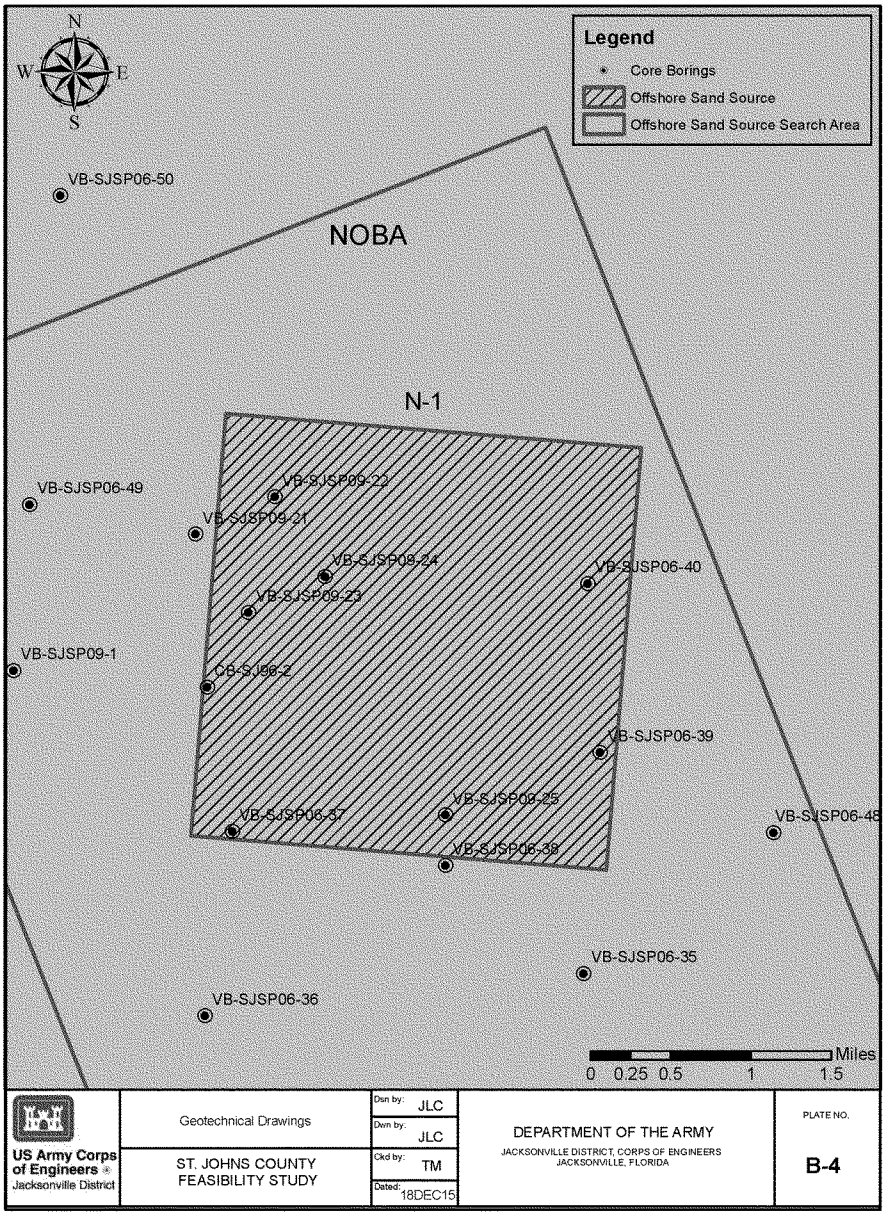


Plate B - 4. Proposed Sand Source N-1 and Vibracore Boring Locations.

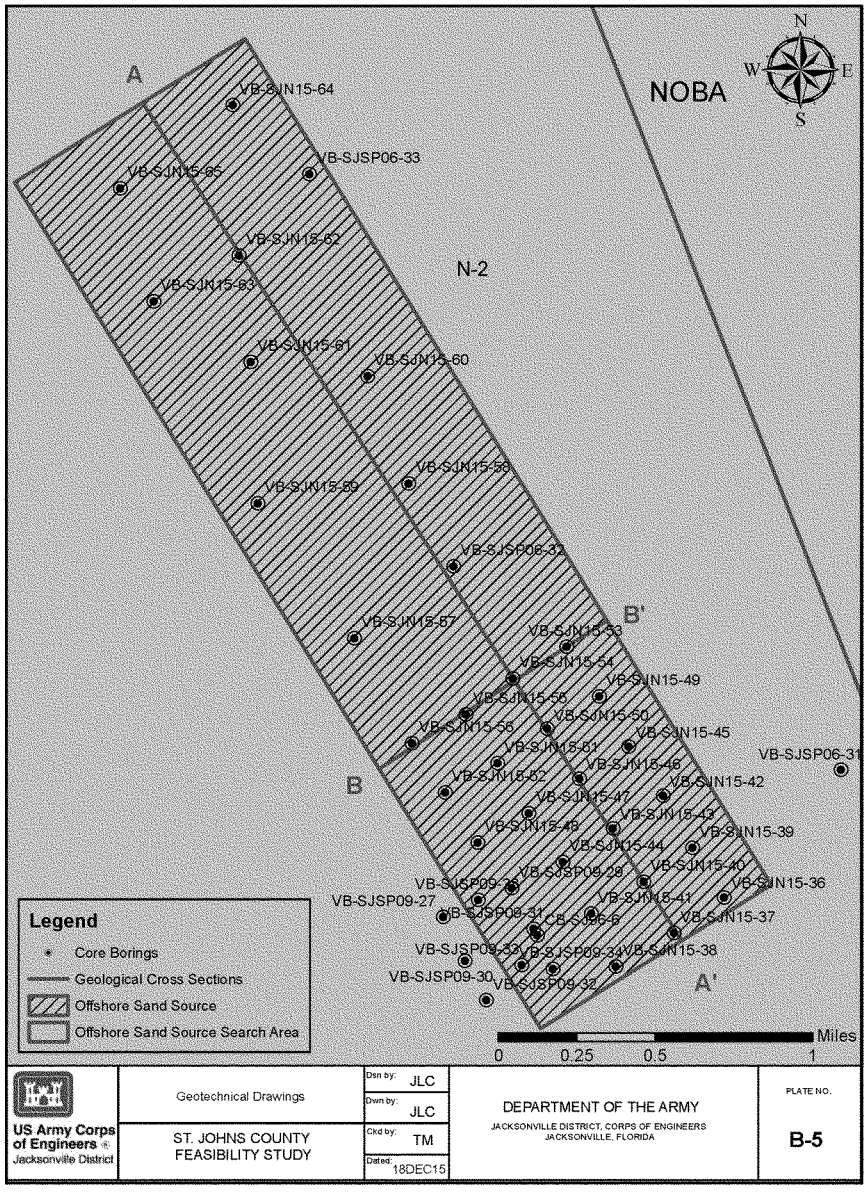


Plate B - 5. Proposed Sand Source N-2, Geological Cross Sections, and Vibracore Boring Locations.

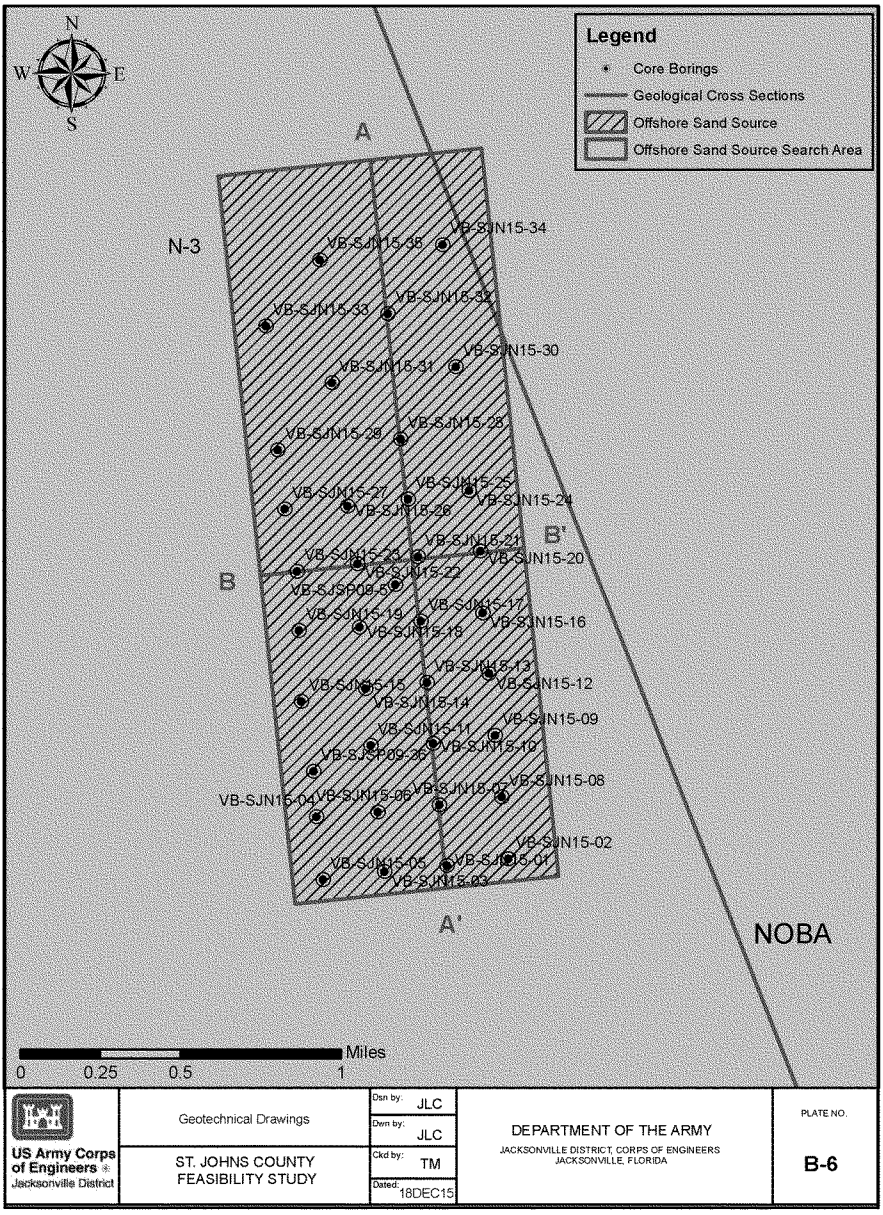


Plate B - 6. Proposed Sand Source N-3, Geological Cross Sections, and Vibracores.

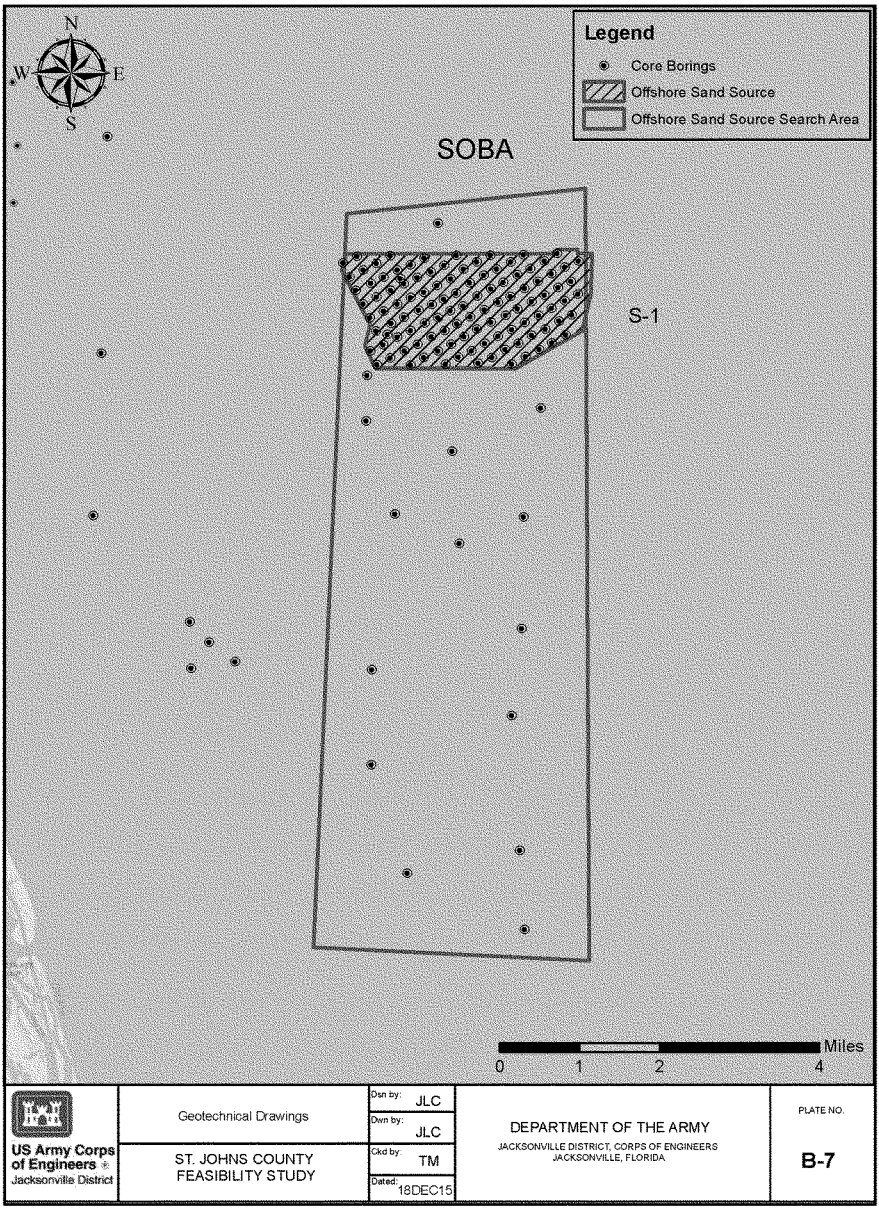


Plate B - 7. SOBA, Vibracores, and Proposed Sand Source S-1.

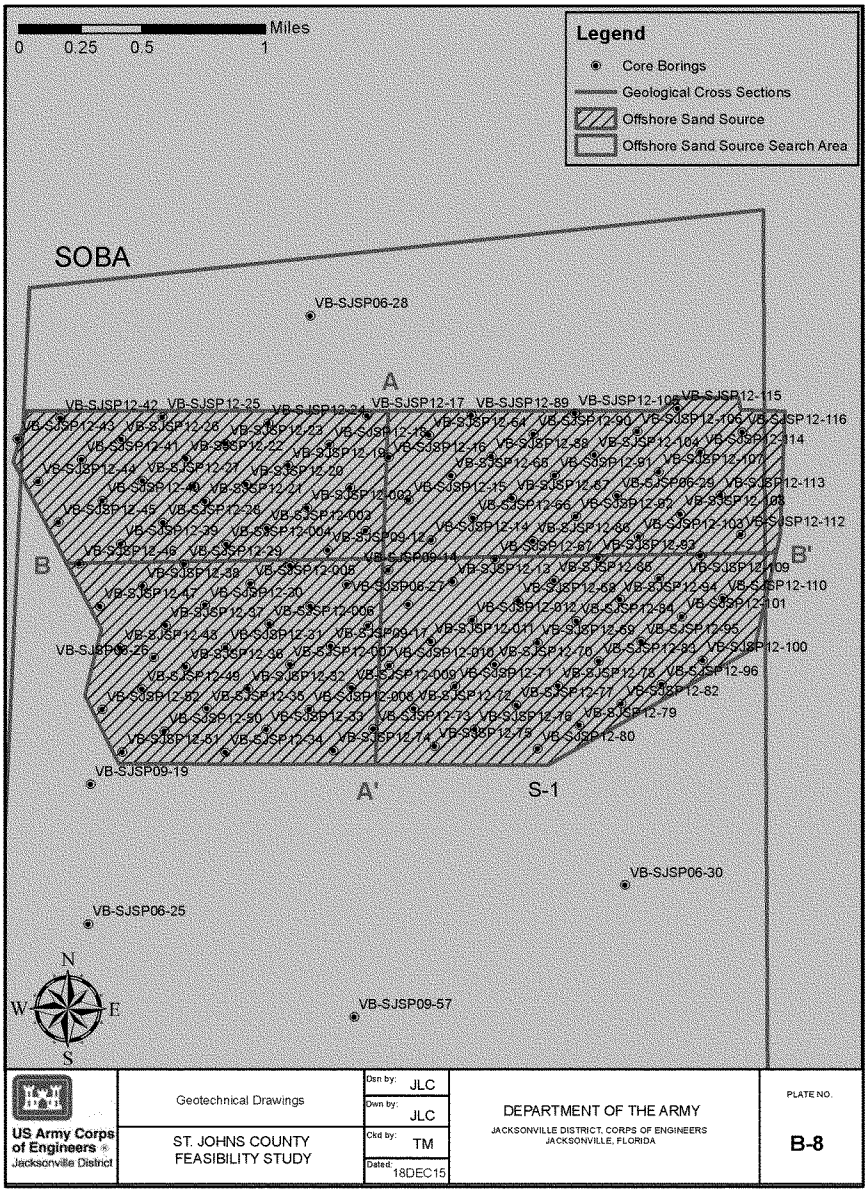


Plate B - 8. Proposed Sand Source S-1, Geological Cross Sections, and Vibracore Boring Locations.

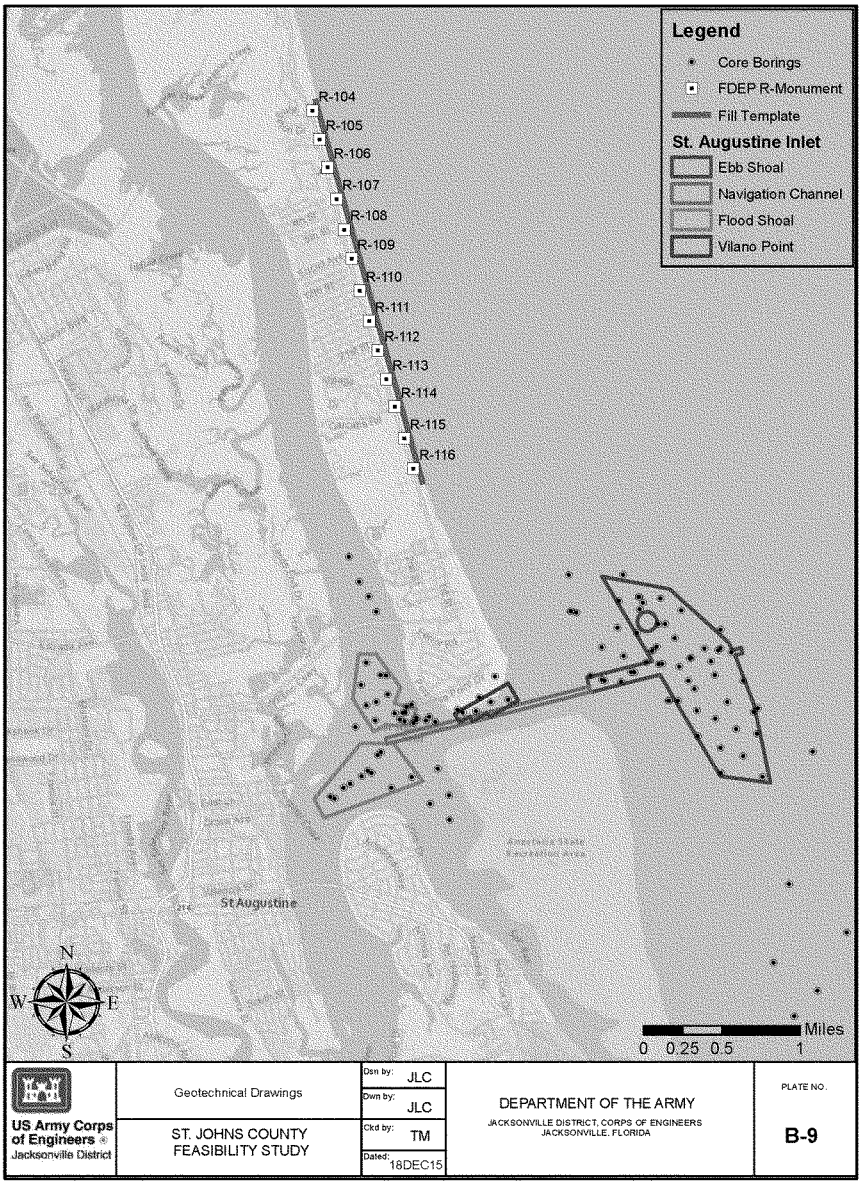


Plate B - 9. St. Augustine Inlet Proposed Sand Sources and Vibracore Boring Locations.

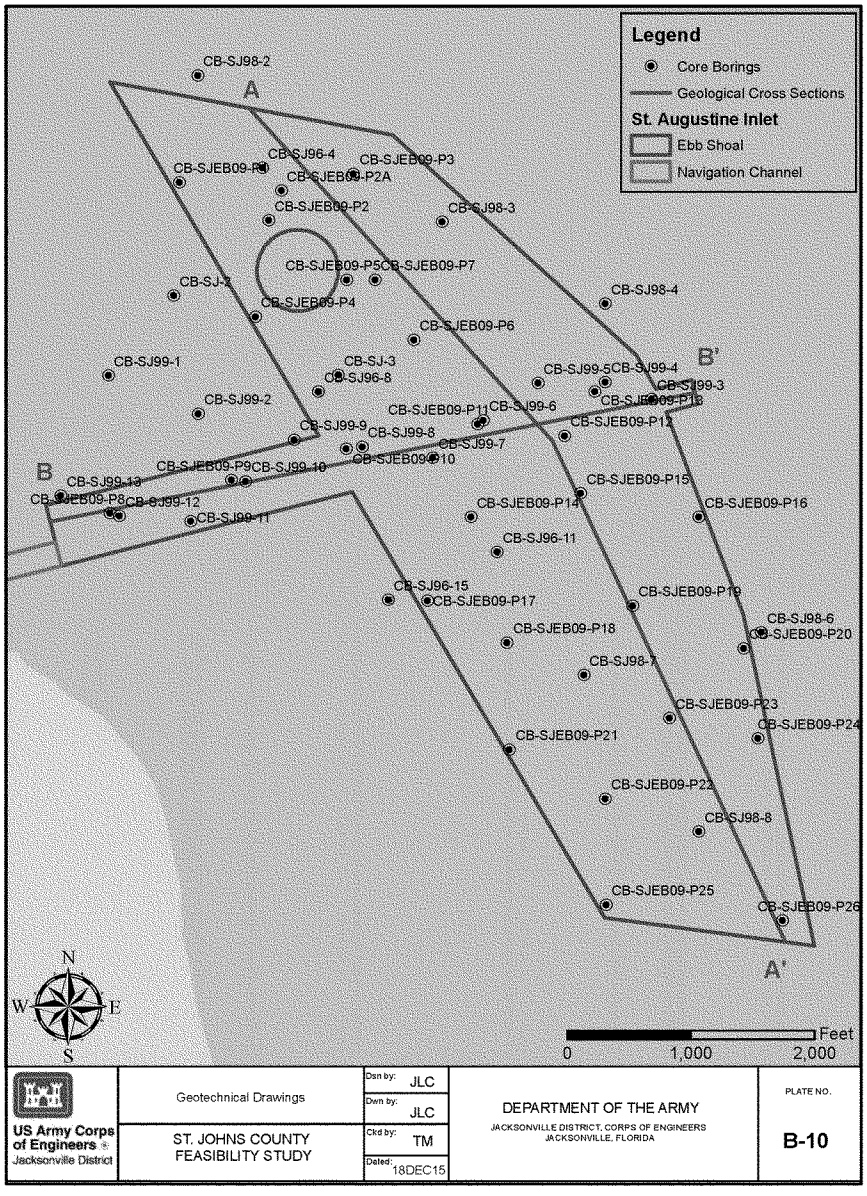


Plate B - 10. St. Augustine Inlet Ebb Shoal Proposed Sand Source, Geological Cross Sections, and Vibracore Boring Locations.

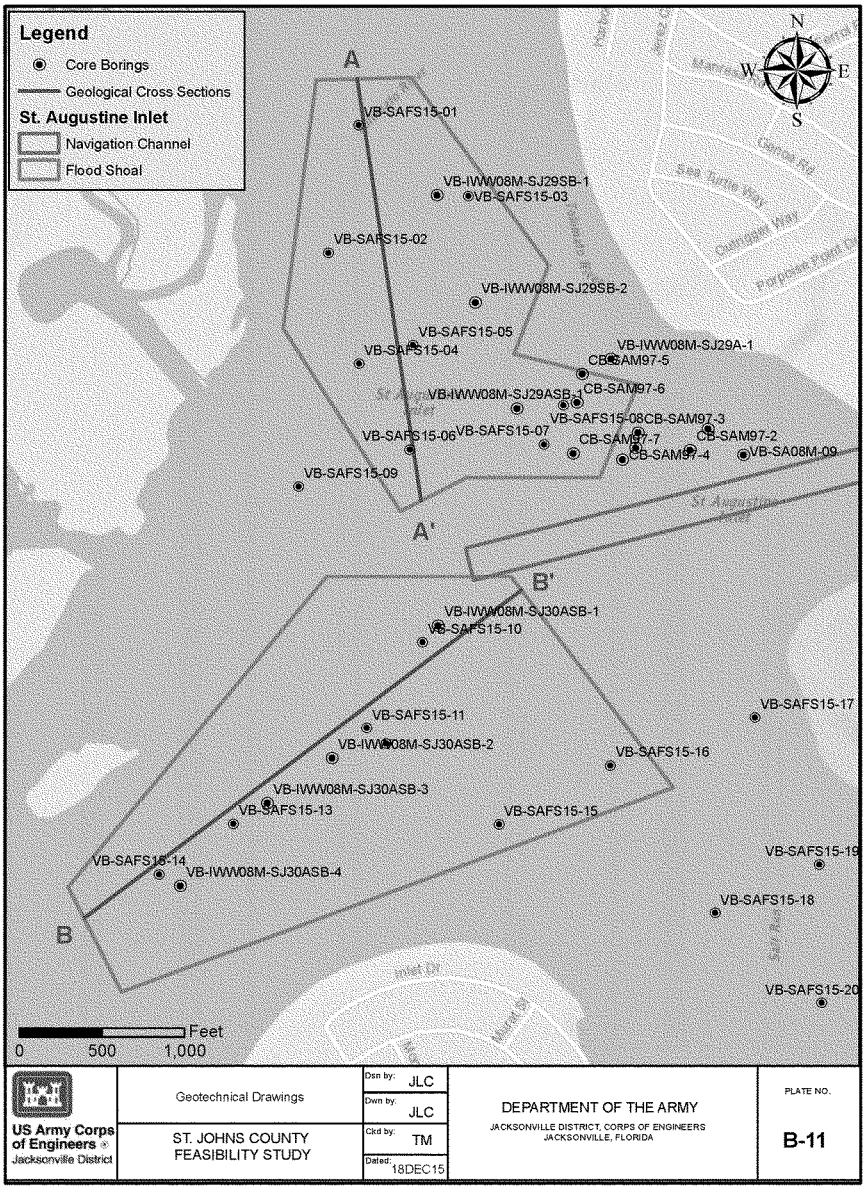


Plate B - 11. St. Augustine Inlet Flood Shoal Proposed Sand Source, Geological Cross Sections, and Vibracore Boring Locations.

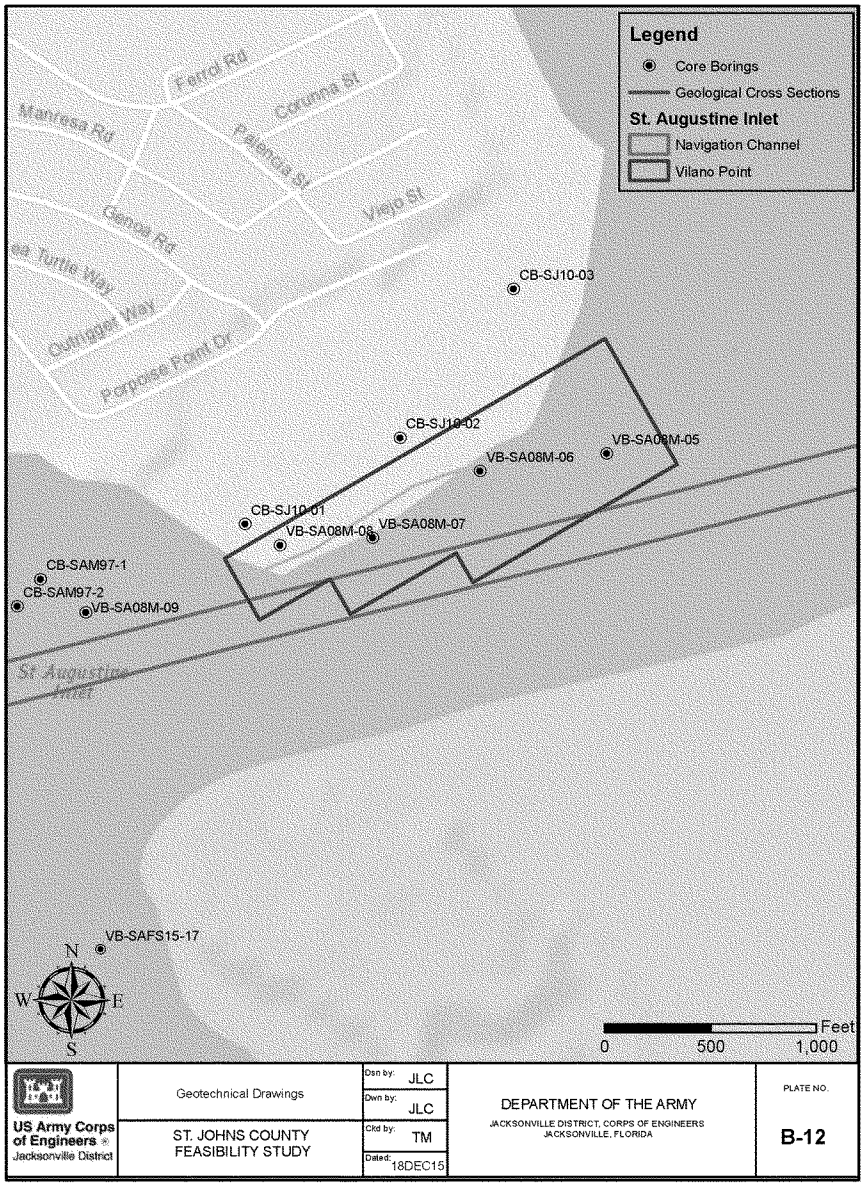


Plate B - 12. St. Augustine Inlet Vilano Point Proposed Sand Source and Vibracore Boring Locations.

SUB-APPENDIX

GRAIN SIZE ANALYSIS RESULTS FOR VILANO BEACH

Table D - 1. Vilano Beach, Grain Size Statistics

FDEP R-Monument	Sample Location	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Percent Carbonate (%)	Visual Shell (%)	Munsell Color
R-101	Mid-Berm	0.79	0.35	0	0.39	1.01	57.8	56	10YR 5/3
	Mid-Tide	0.67	0.58	0.9	0.41	1.04	47.1	45	10YR 5/3
	-3	0.57	0.82	4.12	0.71	1.84	51.8	43.2	10YR 5/3
	-5	0.18	2.44	0.12	1.32	0.92	10.4	8.7	10YR 6/1
	-10	0.20	2.34	1.78	1.82	0.92	5.3	5.3	10YR 6/1
	-15	0.17	2.58	0.97	2.32	1.18	10	8.6	10YR 6/1
R-105	Mid-Berm	0.69	0.53	2.07	0.04	1.21	43.8	50	10YR 5/3
	Mid-Tide	0.35	1.51	0	1.03	0.6	15.5	16.4	10YR 5/3
	-3	0.50	0.99	1.51	0.73	1.55	43.5	42.8	10YR 5/3
	-5	0.17	2.53	1.33	1.4	1.03	7.8	6.5	10YR 6/1
	-10	0.15	2.73	1.27	1.35	0.95	5.6	5	10YR 6/1
	-15	0.26	1.94	4.89	3.65	2.02	26.4	23.9	10YR 5/1
R-109	Mid-Berm	1.32	-0.40	3.08	0.21	1.04	78.5	83.7	10YR 6/4
	Mid-Tide	0.81	0.30	0.75	0.51	1.1	53.3	56.5	10YR 6/3
	-3	0.29	1.81	0.83	0.82	1.46	23	21.1	10YR 7/1
	-5	0.18	2.46	1.6	1.33	1.18	10.1	8.9	10YR 6/1
	-10	0.13	2.98	0.39	2.06	0.77	5.6	3.8	5Y 5/1
	-15	0.18	2.48	1.94	2.39	1.5	14.7	13	5Y 5/1
R-113	Mid-Berm	0.70	0.52	0.54	0.27	1.19	49.8	48.1	10YR 7/3
	Mid-Tide	1.42	-0.51	17.95	0.62	1.67	70.4	67	10YR 6/4
	-3	0.20	2.29	0.04	1.02	0.88	10.2	10.3	10YR 7/1
	-5	0.18	2.44	0.92	1.09	1.03	8.4	7.6	10YR 6/1
	-10	0.15	2.78	1.31	1.44	1.06	7.8	5.9	5Y 5/1
	-15	0.19	2.41	2	2.42	1.52	16.1	14.1	5Y 5/1
R-117	Mid-Berm	0.87	0.21	2.08	0.07	1.5	61.3	61.3	2.5Y 7/3
	Mid-Tide	0.55	0.87	3.01	0.44	1.47	43.3	38.3	2.5Y 7/4
	-3	0.16	2.63	0	1.53	0.57	4.2	2.9	2.5Y 7/1
	-5	0.16	2.67	2.58	1.48	1.17	7.2	6.1	2.5Y 6/1
	-10	0.15	2.74	1.49	3.2	1.25	10.1	7.9	2.5Y 5/1
	-15	0.16	2.64	1.61	4.38	1.43	14.1	10.4	2.5Y 5/1
St. Johns Beach Composite		**0.42**	**1.26**	**2.04**	**1.35**	**1.20**	**27.10**	**25.94**	**10YR 6/2**

*Retained in the #4 Sieve, **Passing the #230 Sieve

Table D - 2. Vilano Beach, Quartz Fraction, Grain Size Statistics

FDEP R-Monument	Sample Location	Quartz Mean (mm)	Quartz Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Quartz Munsell Color
R-101	Mid-Berm	0.44	1.17	0.00	0.03	0.81	10YR 7/1
	Mid-Tide	0.43	1.21	0.00	0.02	0.68	10YR 7/1
	-3	0.38	1.38	0.00	0.02	0.66	10YR 7/1
	-5	0.13	2.97	0.00	0.01	0.39	10YR 7/1
	-10	0.16	2.61	0.00	0.01	0.56	10YR 7/1
	-15	0.14	2.88	0.00	0.01	0.47	10YR 7/1
R-105	Mid-Berm	0.21	2.23	0.00	0.02	0.7	10YR 7/1
	Mid-Tide	0.33	1.59	0.00	0.01	0.53	10YR 7/1
	-3	0.23	2.10	0.00	0.02	0.74	10YR 7/1
	-5	0.13	2.90	0.00	0.01	0.41	10YR 7/1
	-10	0.15	2.74	0.00	0.01	0.41	10YR 7/1
	-15	0.13	3.00	0.00	0.02	0.5	10YR 7/1
R-109	Mid-Berm	0.60	0.74	0.00	0.03	0.9	10YR 7/1
	Mid-Tide	0.49	1.03	0.00	0.02	0.79	10YR 7/1
	-3	0.19	2.41	0.00	0.01	0.8	10YR 7/1
	-5	0.15	2.74	0.00	0.01	0.51	10YR 7/1
	-10	0.12	3.07	0.00	0.01	0.4	10YR 7/1
	-15	0.13	2.94	0.00	0.01	0.49	10YR 7/1
R-113	Mid-Berm	0.41	1.30	0.00	0.02	0.92	10YR 7/1
	Mid-Tide	0.39	1.36	0.00	0.03	0.98	10YR 7/1
	-3	0.18	2.47	0.00	0.01	0.57	10YR 7/1
	-5	0.16	2.67	0.00	0.01	0.4	10YR 7/1
	-10	0.13	2.99	0.00	0.01	0.41	10YR 7/1
	-15	0.13	2.96	0.00	0.01	0.46	10YR 7/1
R-117	Mid-Berm	0.31	1.69	0.00	0.02	0.69	10YR 7/1
	Mid-Tide	0.29	1.80	0.00	0.02	0.77	10YR 7/1
	-3	0.16	2.66	0.00	0.01	0.49	10YR 7/1
	-5	0.13	2.93	0.00	0.01	0.4	10YR 7/1
	-10	0.12	3.04	0.00	0.01	0.46	10YR 7/1
	-15	0.12	3.02	0.00	0.01	0.51	10YR 7/1
St. Johns Beach Composite		**0.24**	**2.09**	**0.00**	**0.02**	**0.59**	**10 YR 7/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

GRAIN SIZE ANALYSIS RESULTS FOR PROPOSED SAND SOURCES

Table D - 3. Sediment Analysis Results from Vibracores in Proposed Sand Source N-2.

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJN15-36	3	0.29	1.78	1.85	0.75	1.08	12.4	2.5Y 6/1
	6	0.28	1.85	0.12	0.82	0.8	13.2	2.5Y 6/1
	9.5	0.20	2.29	0.02	0.97	0.75	14.6	2.5Y 5/1
	11.5	0.15	2.75	0.10	4.75	0.78	6.4	2.5Y 5/1
VB-SJN15-37	2	0.29	1.81	0.00	0.3	0.95	21.1	2.5Y 7/1
	4	0.22	2.16	0.48	6.3	0.87	7.7	2.5Y 5/1
	6	0.25	2.03	0.03	0.83	0.7	7	2.5Y 7/1
	8	0.20	2.36	2.70	6.53	1.23	6.8	2.5Y 7/1
VB-SJN15-38	2.5	0.34	1.56	0.49	0.36	1.11	16.3	2.5Y 5/1
	5	0.26	1.92	0.13	0.34	0.84	10	2.5Y 6/1
	7.5	0.21	2.24	0.27	2.92	0.78	9.3	2.5Y 5/1
	9.5	0.23	2.12	0.62	2.58	0.89	8.4	2.5Y 5/1
	11	0.15	2.71	0.14	5.21	0.69	3.7	2.5Y 5/1
VB-SJN15-39	3	0.25	1.98	0.38	1.48	0.88	13.7	2.5Y 7/2
	6	0.23	2.11	0.20	2.52	0.82	7.6	2.5Y 5/1
	7	0.18	2.46	0.20	4.46	0.78	5.6	2.5Y 5/1
VB-SJN15-40	2	0.27	1.90	0.63	1.42	0.95	14.5	2.5Y 6/1
	4	0.22	2.19	0.28	2.04	0.72	7.5	2.5Y 6/1
	6.5	0.23	2.11	0.00	1.83	0.72	8.5	2.5Y 5/1
	9	0.17	2.56	0.73	4.38	0.82	3.4	2.5Y 5/1
VB-SJN15-41	2	0.33	1.60	0.26	1.02	1.03	23.9	2.5Y 6/1
	4	0.24	2.05	0.20	0.61	0.78	9.5	2.5Y 6/1
	6	0.25	2.02	0.09	1.35	0.75	10.8	2.5Y 6/1
	8	0.26	1.95	1.63	1.76	1.11	12.1	2.5Y 6/1
	10	0.26	1.95	1.63	1.76	1.11	10.7	2.5Y 5/1
	11	0.20	2.29	0.02	1.44	0.62	6.7	2.5Y 5/1
VB-SJN15-42	2.5	0.27	1.88	0.15	1.2	0.94	21	2.5Y 6/2
	5	0.27	1.89	0.03	2.28	0.87	15	2.5Y 6/2
	7	0.24	2.06	0.08	0.96	0.74	13.6	2.5Y 5/2
	9	0.25	2.01	0.15	2.66	0.78	14.4	2.5Y 5/2
	11.5	0.17	2.58	0.07	3.93	0.67	13.6	10Y 5/1
VB-SJN15-43	3	0.35	1.50	0.06	0.19	1.05	25.9	2.5Y 7/1
	5.5	0.38	1.38	0.56	0.63	1.15	38.4	2.5Y 7/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	8.5	0.43	1.23	3.52	1.67	1.36	27.4	2.5Y 6/1
	10	0.19	2.37	0.00	4.12	0.65	7.3	2.5Y 6/1
	12	0.16	2.61	0.30	3.49	0.7	5.3	2.5Y 5/1
VB-SJN15-44	3	0.33	1.59	0.10	0.99	0.98	25.8	2.5Y 6/2
	6	0.36	1.47	0.18	0.69	1.04	34.9	2.5Y 6/2
	9	0.25	2.01	0.03	1.2	0.82	12.3	2.5Y 6/1
	10	0.27	1.90	0.31	1.81	0.94	15.9	2.5Y 6/1
	12	0.28	1.86	2.46	1.01	1.17	10	2.5Y 6/1
	14	0.21	2.25	0.02	2.16	0.63	8.3	2.5Y 6/1
VB-SJN15-45	2	0.28	1.85	0.03	1.26	0.95	24.9	N 4/
	3.5	0.22	2.21	0.08	1.53	0.76	10.4	2.5Y 6/2
	6	0.38	1.41	1.24	1.5	1.22	23.3	2.5Y 6/2
	7.5	0.22	2.21	0.13	0.27	0.69	5.3	2.5Y 6/2
	9	0.19	2.39	0.00	2.44	0.7	11.4	10Y 5/1
VB-SJN15-46	3	0.39	1.35	0.10	0.75	1.03	29.1	2.5Y 6/1
	6	0.27	1.91	0.24	2	0.94	17.6	2.5Y 6/2
	8	0.24	2.08	0.07	1.65	0.75	6.5	2.5Y 6/2
	10	0.24	2.06	0.14	1.79	0.84	8.3	2.5Y 6/2
	12	0.20	2.31	0.02	2.46	0.57	2.1	2.5Y 6/1
	13.5	0.19	2.38	0.00	1.83	0.57	5.7	2.5Y 6/1
VB-SJN15-47	3.5	0.31	1.68	2.35	0.61	1.27	17.8	2.5Y 6/1
	7	0.24	2.08	0.42	1.85	0.85	7.4	2.5Y 6/1
	10.5	0.22	2.20	0.08	2.29	0.77	5.8	2.5Y 6/1
	13	0.24	2.09	2.61	3.94	1.39	14.4	2.5Y 5/1
	15	0.20	2.33	1.94	7.94	1.42	15.2	2.5Y 5/1
VB-SJN15-48	3.5	0.53	0.91	0.64	0.27	1.16	28.8	2.5Y 6/2
	7	0.28	1.83	0.01	0.78	0.88	13.6	2.5Y 6/2
	8.5	0.27	1.90	0.09	1.32	0.84	6.5	2.5Y 6/2
	11	0.22	2.20	0.01	0.49	0.6	3.3	2.5Y 7/1
	13.5	0.20	2.32	0.32	1.59	0.67	2.9	2.5Y 5/1
VB-SJN15-49	3	0.31	1.68	0.27	1.24	1.06	16.5	2.5Y 6/1
	6	0.29	1.80	0.43	1.51	1.01	16.7	2.5Y 6/1
	8	0.29	1.77	0.91	1.07	1.13	19.8	2.5Y 6/1
	10	0.42	1.26	5.52	1.83	1.56	24.7	2.5Y 6/1
	12	0.25	1.99	1.06	0.85	0.93	8.9	2.5Y 6/1
	14	0.21	2.24	0.17	1.96	0.85	3.7	2.5Y 6/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	16	0.16	2.65	0.14	4.35	0.72	3.7	2.5Y 6/1
VB-SJN15-50	3	0.33	1.60	0.17	1.03	1.1	24.2	2.5Y 5/1
	6	0.35	1.52	1.14	1.17	1.18	26	2.5Y 6/1
	9	0.25	2.03	1.22	1.44	0.93	7.7	2.5Y 7/1
	12.5	0.21	2.25	0.00	1.94	0.6	3.6	2.5Y 7/1
	14.5	0.22	2.21	0.15	1.87	0.71	6.8	2.5Y 7/1
	16.5	0.17	2.60	0.24	5.42	0.8	6	2.5Y 5/1
VB-SJN15-51	3	0.37	1.44	0.00	0.46	0.95	19.9	2.5Y 7/2
	6	0.45	1.15	0.46	1.51	1.23	23.2	2.5Y 7/2
	9	0.27	1.89	0.55	1.35	1	18	2.5Y 7/2
	12	0.25	1.98	1.90	1.05	1.11	6	2.5Y 7/2
	15	0.28	1.82	2.43	2.34	1.2	8.9	2.5Y 7/2
	17	0.21	2.28	0.36	3.37	0.85	5.5	N 7/
	19	0.29	1.77	2.23	3.01	1.41	22.4	2.5Y 5/1
VB-SJN15-52	2	0.25	2.01	0.10	0.77	0.72	10.5	2.5Y 6/2
	4	0.25	2.01	0.06	0.99	0.78	9.7	2.5Y 6/2
	6	0.27	1.87	0.18	0.87	0.91	7.7	2.5Y 6/2
	8	0.26	1.96	0.00	1.07	0.92	14.7	2.5Y 6/2
	10	0.22	2.22	0.18	2.57	0.73	5.8	2.5Y 6/2
	12	0.22	2.20	0.00	3.37	0.7	4.5	2.5Y 6/2
	14	0.20	2.31	0.09	3.63	0.65	3.5	2.5Y 5/1
VB-SJN15-53	3.5	0.29	1.77	0.42	0.56	1.06	20.9	2.5Y 6/1
	7	0.24	2.06	0.19	3.73	0.87	10.8	2.5Y 6/1
	10	0.22	2.22	0.00	1.43	0.68	3.9	2.5Y 6/1
	12	0.21	2.27	1.34	1.89	1	9.2	2.5Y 5/1
	14	0.17	2.52	0.92	4.93	1.01	6.6	2.5Y 5/1
VB-SJN15-54	2	0.35	1.53	0.97	2.51	1.18	26.6	2.5Y 6/2
	4	0.25	2.00	0.06	1.36	0.86	13	2.5Y 6/2
	6	0.20	2.31	0.00	1.59	0.61	5.4	2.5Y 6/1
	8	0.20	2.35	0.06	3.59	0.75	11.1	2.5Y 5/1
	10	0.26	1.95	2.83	2.13	1.21	10.7	2.5Y 6/1
	12	0.18	2.47	0.20	4.87	0.82	8.5	2.5Y 5/1
VB-SJN15-55	2	0.29	1.81	0.05	1.25	0.95	20.2	2.5Y 6/1
	4	0.30	1.73	0.15	0.97	0.98	20.3	2.5Y 6/1
	6	0.30	1.74	0.94	1.06	1	18.7	2.5Y 6/1
	8	0.21	2.23	0.92	9.77	0.98	12.9	2.5Y 5/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	10	0.22	2.21	0.39	2.94	0.66	4.2	2.5Y 5/1
	13	0.24	2.04	0.88	1.9	0.93	10.1	2.5Y 5/1
	16	0.23	2.10	1.15	3.07	0.96	6.3	2.5Y 5/1
VB-SJN15-56	3	0.25	1.98	0.07	1.03	0.72	6.7	2.5Y 7/2
	6	0.25	2.01	0.00	1.17	0.68	8.3	2.5Y 7/2
	9	0.21	2.28	0.01	2.34	0.57	6.9	2.5Y 7/2
	11	0.21	2.24	0.00	3.21	0.63	4.8	2.5Y 6/1
	13	0.25	2.03	0.67	7.98	0.94	5.7	2.5Y 6/1
	15	0.25	2.01	0.00	3.19	0.84	7.9	2.5Y 6/1
VB-SJN15-57	3	0.27	1.89	0.00	1.41	0.81	10.5	2.5Y 6/2
	6	0.27	1.88	0.07	2.15	0.78	6.9	2.5Y 6/2
	9	0.27	1.87	0.00	0.97	0.78	9.1	2.5Y 6/2
	12	0.32	1.66	1.66	1.1	1.12	13.8	2.5Y 6/2
	15	0.23	2.11	0.00	1.61	0.6	3.3	2.5Y 6/2
	17.5	0.21	2.24	0.14	3.12	0.77	8.1	2.5Y 5/1
VB-SJN15-58	3	0.27	1.91	0.42	1.39	0.94	15.9	2.5Y 7/1
	6	0.24	2.04	0.25	1.45	0.76	8.5	2.5Y 7/1
	9	0.22	2.21	0.00	2.61	0.66	6.4	2.5Y 6/1
	11	0.24	2.09	1.89	1.79	1.02	6.5	2.5Y 6/1
	13	0.20	2.35	0.23	4.64	0.7	5.3	2.5Y 6/1
	15	0.26	1.95	1.91	2.98	1.2	13	2.5Y 6/1
	16	1.37	-0.45	27.50	7.26	2.31	58.9	2.5Y 5/1
VB-SJN15-59	3	0.26	1.92	0.02	0.63	0.74	10.4	2.5Y 6/2
	6	0.28	1.84	0.74	0.59	0.91	8.1	2.5Y 6/2
	9	0.23	2.13	0.03	2.16	0.64	6.6	2.5Y 6/2
	10.5	0.25	2.03	0.20	1.39	0.75	8.9	2.5Y 6/2
	13.5	0.22	2.22	0.02	2.29	0.62	4.9	2.5Y 6/2
	15.5	0.19	2.38	0.00	3.16	0.64	3.4	5G 5/1
VB-SJN15-60	3	0.29	1.78	1.11	1.82	1.1	19.8	2.5Y 6/2
	6	0.32	1.63	3.80	1.81	1.3	21.9	2.5Y 6/2
	8.5	0.18	2.45	0.02	4.62	0.6	6.4	2.5Y 5/1
VB-SJN15-61	3	0.27	1.87	0.19	0.98	0.77	12.4	2.5Y 6/1
	6	0.32	1.63	0.49	0.96	0.96	18.2	2.5Y 6/1
	9	0.30	1.74	1.31	0.9	1.03	9.7	2.5Y 6/1
	11	0.23	2.12	0.29	1.54	0.72	6.4	2.5Y 5/1
	12	0.21	2.23	0.16	2.09	0.62	8.6	2.5Y 5/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	15	0.23	2.12	0.14	3.16	0.63	3.2	2.5Y 6/1
	16	0.22	2.19	0.06	2.35	0.63	7.6	2.5Y 6/1
VB-SJN15-62	3	0.23	2.14	0.09	2.38	0.66	7.2	2.5Y 6/1
	6	0.24	2.06	0.34	1.31	0.7	8.4	2.5Y 6/1
	9	0.32	1.65	1.00	3.43	1.11	13.9	2.5Y 6/1
	12	0.25	2.01	7.25	5.26	1.34	13.5	2.5Y 5/1
VB-SJN15-63	3	0.29	1.78	0.47	1.2	0.93	9.9	2.5Y 6/2
	6	0.22	2.17	0.05	2.18	0.68	3.9	2.5Y 6/2
	9	0.22	2.20	0.20	1.33	0.66	8.4	2.5Y 6/2
VB-SJN15-64	2	0.27	1.90	0.50	2.29	0.85	8.7	2.5Y 6/2
	4	0.26	1.93	0.48	1.63	0.84	8.5	2.5Y 6/2
	6	0.19	2.40	0.15	1.66	0.63	3.4	2.5Y 6/2
	7	0.19	2.39	0.13	3.07	0.8	6.9	2.5Y 5/1
VB-SJN15-65	2	0.23	2.15	0.13	1.81	0.67	7.9	2.5Y 6/1
	4	0.23	2.15	0.11	2.31	0.7	7.8	2.5Y 6/1
	6	0.22	2.19	0.02	1.21	0.7	7.4	2.5Y 6/1
	8	0.24	2.09	0.00	2.42	0.84	11.7	2.5Y 6/1
	10	0.22	2.17	0.35	2.48	0.75	8.2	2.5Y 6/1
N2 Sand Source Composite		**0.26**	**1.95**	**0.74**	**2.17**	**0.88**	**11.75**	**2.5Y 6/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

Table D - 4. Sediment Analysis Results from Vibracores in Proposed Sand Source N-3.

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJN15-01	2	0.25	1.99	2.36	2.16	1.14	7.9	2.5Y 8/1
	4	0.19	2.40	0.11	2.89	0.76	6.9	2.5Y 6/1
	6	0.17	2.59	0.39	8.44	0.82	3.6	10Y 5/1
VB-SJN15-02	1	0.21	2.25	0.00	1.51	0.6	8.3	2.5Y 6/1
	3	0.23	2.10	0.01	1.81	0.66	3.8	2.5Y 6/1
	5	0.18	2.49	0.03	2.92	0.62	4.5	2.5Y 5/1
	7	0.19	2.41	1.78	5.25	1.14	6.1	2.5Y 5/1
VB-SJN15-03	2	0.23	2.14	0.05	2.33	0.74	10.4	2.5Y 5/1
	4	0.20	2.31	0.00	8.44	0.69	6.9	2.5Y 5/1
	6	0.16	2.66	0.32	6.64	0.79	4	2.5Y 5/1
VB-SJN15-04	1.5	0.23	2.14	0.27	1.84	0.68	8.8	2.5Y 7/1
	3.5	0.22	2.20	0.08	5.11	0.69	11.4	2.5Y 6/1
	5	0.60	0.74	15.97	1.9	2.3	36	10Y 5/1
VB-SJN15-05	1	0.26	1.94	0.06	1.44	0.74	6.5	2.5Y 6/1
	2.5	0.20	2.35	0.04	2.07	0.72	7.5	2.5Y 5/1
VB-SJN15-06	2	0.24	2.04	0.44	3.62	0.88	10.2	2.5Y 6/2
	4.5	0.44	1.20	9.59	3.75	2.04	24.3	2.5Y 5/1
VB-SJN15-07	2	0.21	2.27	0.00	0.74	0.62	3.2	2.5Y 6/2
	4	0.26	1.92	2.48	1.83	1.19	9.3	2.5Y 6/2
	5.5	0.19	2.40	0.12	2.55	0.63	5.5	10Y 5/1
VB-SJN15-08	1	0.21	2.26	0.00	3.46	0.64	8	2.5Y 5/1
VB-SJN15-09	2	0.24	2.07	0.17	1.25	0.74	10.4	2.5Y 6/2
	4	0.24	2.08	0.49	1.25	0.79	11	2.5Y 6/1
	5	0.29	1.79	0.94	1.09	1.04	17.4	2.5Y 6/1
	6	0.36	1.46	8.07	1.19	1.54	21.3	2.5Y 7/1
	7.5	0.21	2.26	0.08	0.99	0.61	7	2.5Y 7/1
	8.5	0.19	2.43	0.10	2.38	0.71	2.83	2.5Y 5/1
VB-SJN15-10	1	0.27	1.91	0.47	0.45	0.89	15.3	2.5Y 7/1
	3	0.24	2.07	0.92	0.82	1.03	13.3	2.5Y 6/2
	4	0.20	2.34	0.00	2.33	0.66	6.4	2.5Y 6/2
VB-SJN15-11	2	0.27	1.91	0.11	0.56	0.72	11.5	2.5Y 7/1
	4	0.36	1.48	0.96	0.64	1.07	16.4	2.5Y 7/1
	6	0.29	1.78	0.60	0.93	1.01	16	2.5Y 6/2
	8	0.24	2.04	0.07	1.99	0.78	5.9	2.5Y 6/2
	10	0.24	2.06	0.11	1.77	0.78	5.7	2.5Y 6/2

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	12	0.25	1.99	0.41	0.84	0.88	7.1	2.5Y 6/2
	14	0.24	2.06	0.81	1.67	0.91	11.5	2.5Y 5/1
VB-SJN15-12	2	0.23	2.13	0.15	0.95	0.67	9.6	2.5Y 7/2
	4	0.33	1.62	0.67	1.23	1.13	23.1	2.5Y 7/2
	5	0.28	1.86	0.68	2.44	1	16.2	2.5Y 6/2
	7	0.24	2.06	0.62	1.69	0.86	10.7	2.5Y 6/2
	9	0.20	2.33	0.31	2.04	0.77	7.3	2.5Y 5/1
VB-SJN15-13	2	0.29	1.78	0.68	0.5	0.89	9.8	2.5Y 7/1
	4	0.25	1.98	0.27	1.19	0.71	5.7	2.5Y 7/1
	6	0.23	2.10	0.06	0.94	0.72	9	2.5Y 6/2
	8	0.31	1.67	2.22	0.81	1.18	17.5	2.5Y 6/2
	9	0.24	2.07	0.10	2.22	0.83	7.5	2.5Y 6/1
	10	0.18	2.44	0.00	64.88	0.68	0	2.5Y 6/1
VB-SJN15-14	2.5	0.27	1.89	0.15	0.46	0.78	9.1	2.5Y 7/1
	5	0.29	1.80	0.42	0.94	0.95	16.7	2.5Y 7/1
	7.5	0.25	2.00	0.08	1.53	0.8	8	2.5Y 7/1
	10	0.27	1.91	0.33	1.94	0.93	9.2	2.5Y 7/1
	12	0.25	1.98	0.81	0.89	0.91	6.9	2.5Y 7/1
	13	0.22	2.21	0.86	2.99	0.88	5.3	2.5Y 5/1
VB-SJN15-15	1	0.28	1.86	0.25	0.57	0.75	12	2.5Y 7/1
	3	0.22	2.21	0.10	1.08	0.65	6.9	2.5Y 7/1
	4.5	0.23	2.14	0.81	1.32	0.87	8.5	2.5Y 7/1
	6.5	0.24	2.08	0.03	2.15	0.8	9.8	2.5Y 7/1
	8	0.19	2.38	0.84	4.49	1.07	6.3	2.5Y 5/1
VB-SJN15-16	3	0.27	1.89	0.04	0.96	0.8	14.8	2.5Y 6/2
	6	0.26	1.92	0.11	2.46	0.88	8.9	2.5Y 6/2
	9	0.27	1.90	0.50	0.29	0.9	14.8	2.5Y 6/2
	12	0.20	2.29	0.35	1.79	0.69	1.9	2.5Y 5/2
	14	0.19	2.39	0.84	2.49	0.65	6	2.5Y 5/2
	16	0.17	2.54	0.61	9.19	0.9	4.3	10Y 5/1
VB-SJN15-17	3	0.28	1.82	0.91	0.29	0.89	14.3	2.5Y 7/1
	6	0.31	1.71	1.11	0.91	1.02	12.7	2.5Y 7/1
	9	0.31	1.70	0.60	1.13	0.98	18.4	2.5Y 7/2
	11	0.25	2.00	0.30	1.58	0.82	10.8	2.5Y 6/1
	13	0.25	2.01	0.90	1.31	0.92	12.4	2.5Y 6/1
	14	0.21	2.27	0.08	0.94	0.69	5.8	2.5Y 5/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJN15-18	2.5	0.32	1.63	0.14	0.55	0.88	16.6	2.5Y 7/1
	6	0.25	2.00	0.17	0.76	0.83	10.9	2.5Y 6/2
	8	0.22	2.16	0.41	1.22	0.8	8.6	2.5Y 6/2
	10	0.22	2.21	0.07	2.3	0.72	13.3	2.5Y 6/2
	12	0.30	1.73	2.46	4.06	1.41	17.3	2.5Y 6/2
VB-SJN15-19	3	0.32	1.66	1.40	0.76	1.02	6.7	2.5Y 7/1
	6	0.25	2.03	0.18	1.79	0.8	8.8	2.5Y 7/1
	9	0.26	1.92	0.41	0.65	0.93	10.5	2.5Y 7/1
	11	0.26	1.95	1.46	1.72	1.05	9.6	2.5Y 7/2
	13	0.21	2.24	0.05	1.43	0.66	4.9	2.5Y 7/1
	14.5	0.21	2.25	0.24	1.82	0.77	8.4	2.5Y 5/1
VB-SJN15-20	3	0.28	1.82	0.11	0.8	0.77	10.7	2.5Y 7/1
	6	0.32	1.63	0.49	0.95	0.94	16.7	2.5Y 7/1
	8.5	0.31	1.71	0.37	1.17	0.94	12.4	2.5Y 7/2
	11	0.24	2.04	0.02	1.69	0.82	8.1	2.5Y 7/2
	12.5	0.23	2.13	0.28	2.3	0.83	11	2.5Y 5/1
VB-SJN15-21	3.5	0.31	1.71	0.53	1.3	0.98	19.4	2.5Y 5/1
	7	0.27	1.87	0.29	1.07	0.86	12.2	2.5Y 5/1
	10.5	0.29	1.80	0.37	0.82	0.95	15.9	2.5Y 5/1
	14	0.22	2.16	0.00	4.47	0.87	12.5	2.5Y 5/1
	17	0.33	1.61	0.65	1.9	1.16	14.1	2.5Y 5/1
	18	0.27	1.91	2.97	3.6	1.43	16	2.5Y 5/1
VB-SJN15-22	3	0.32	1.64	0.99	0.99	1.1	20.8	2.5Y 6/1
	6.5	0.24	2.07	0.13	2.24	0.85	9.9	2.5Y 6/1
	9.5	0.22	2.18	0.45	1.72	0.88	12.6	2.5Y 5/1
	11	0.33	1.62	0.71	1.44	0.89	8.8	2.5Y 6/1
	14	0.21	2.25	0.13	2.11	0.79	6.8	2.5Y 5/2
	16	0.20	2.36	0.18	2.21	0.66	2.3	2.5Y 5/2
	18	0.20	2.29	0.90	2.89	0.94	5	2.5Y 5/2
VB-SJN15-23	1.5	0.31	1.70	0.78	1.41	0.94	12	2.5Y 5/1
	4	0.26	1.97	0.38	1.22	0.83	13	2.5Y 7/1
	6.5	0.26	1.97	0.25	0.81	0.9	10.3	2.5Y 6/1
	8	0.19	2.42	0.03	2.61	0.7	3.7	2.5Y 5/1
VB-SJN15-24	3	0.31	1.67	0.38	0.39	0.91	17.5	2.5Y 7/1
	6	0.32	1.64	0.25	1.19	0.98	16.9	2.5Y 7/1
	9.5	0.26	1.92	0.23	1.67	0.87	10.7	2.5Y 6/2

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	12.5	0.25	2.00	0.77	1.29	0.9	13	2.5Y 6/2
	14	0.20	2.35	0.07	1.95	0.72	8	2.5Y 5/1
VB-SJN15-25	3.5	0.32	1.63	2.59	0.95	1.25	17.3	2.5Y 7/1
	7	0.26	1.97	0.19	1.14	0.89	9.4	2.5Y 6/2
	10.5	0.24	2.08	0.29	1.49	0.8	9.2	2.5Y 6/2
	13.5	0.26	1.95	0.37	2.74	0.94	14.9	2.5Y 5/1
	15	0.22	2.16	0.21	2.66	0.75	6.9	2.5Y 5/1
VB-SJN15-26	3	0.29	1.78	0.24	0.66	0.94	17.1	2.5Y 7/2
	6	0.40	1.32	0.43	1.5	1	17	2.5Y 7/2
	9	0.24	2.07	0.12	1.57	0.82	17.1	2.5Y 6/2
	10.5	0.24	2.08	0.51	6.25	0.97	15.7	10Y 5/1
VB-SJN15-27	2.5	0.35	1.53	2.24	0.8	1.15	25.4	2.5Y 6/1
	5	0.31	1.68	0.00	0.41	0.95	17.9	2.5Y 6/1
	7	0.20	2.31	0.09	1.39	0.68	6.1	2.5Y 5/1
	9	0.20	2.35	0.20	1.43	0.7	4.2	2.5Y 5/1
	11	0.20	2.31	0.00	1.79	0.8	6.5	2.5Y 5/1
	13	0.24	2.09	0.94	5.98	0.98	12.3	2.5Y 5/1
VB-SJN15-28	2	0.32	1.64	0.54	1.08	1.01	18	2.5Y 7/2
	5	0.27	1.88	0.26	1.34	0.89	14.2	2.5Y 7/2
	8	0.28	1.85	0.68	1.45	0.97	14.1	2.5Y 7/2
	11	0.23	2.11	0.51	0.93	0.83	6.9	2.5Y 5/1
	12.5	0.27	1.90	1.96	0.94	1.18	16.3	2.5Y 5/1
	14	0.33	1.61	6.03	1.64	1.66	19.4	2.5Y 5/1
VB-SJN15-29	3	0.30	1.74	0.67	1.42	0.92	18.5	2.5Y 7/2
	6	0.27	1.91	0.12	0.99	0.86	13.1	2.5Y 7/2
	8	0.21	2.26	0.00	2.72	0.79	11.8	2.5Y 5/2
	10	0.20	2.35	0.41	3.15	0.77	7	2.5Y 5/2
	12	0.42	1.24	4.10	0.68	1.48	23.7	2.5Y 7/1
	14	0.17	2.54	0.00	2.57	0.61	8	2.5Y 5/1
VB-SJN15-30	3	0.32	1.66	0.51	0.67	0.96	17	2.5Y 7/1
	6	0.27	1.88	0.60	1	0.89	12.6	2.5Y 7/1
	9	0.27	1.91	0.15	1.25	0.89	20.8	2.5Y 7/1
	12	0.28	1.86	0.27	1.87	0.94	17.7	2.5Y 7/1
	13.5	0.21	2.24	0.00	2.14	0.74	8.5	2.5Y 6/1
	15	0.22	2.17	0.12	5.01	0.89	9.2	2.5Y 6/1
VB-SJN15-31	3	0.30	1.74	1.06	1.14	1.02	16	2.5Y 7/1

Sample Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	6	0.38	1.38	3.21	0.87	1.3	21.4	2.5Y 7/1
	9	0.30	1.76	0.32	1.16	1.08	16.8	2.5Y 6/1
	12	0.29	1.81	0.50	0.84	0.93	14	2.5Y 6/1
	13.5	0.25	2.00	0.47	1.72	0.94	12.3	2.5Y 6/1
VB-SJN15-32	3	0.31	1.67	1.20	0.71	1.13	23.2	2.5Y 6/2
	6	0.30	1.75	0.86	0.71	0.92	12.8	2.5Y 6/2
	9	0.24	2.05	0.15	1.36	0.82	10.7	2.5Y 6/2
	10	0.31	1.69	2.06	0.34	1.23	18	2.5Y 5/1
	12	0.19	2.41	0.00	2.22	0.7	5.7	2.5Y 5/1
	14	0.22	2.22	0.31	6.39	0.96	8.8	2.5Y 5/1
VB-SJN15-33	2	0.26	1.96	0.27	1.3	0.91	11.4	2.5Y 6/1
	5	0.22	2.19	0.03	2.5	0.75	9.6	2.5Y 5/1
	8	0.30	1.73	1.20	1.18	1.2	22.7	2.5Y 5/1
	9.5	0.21	2.25	2.82	8.15	1.44	11.5	2.5Y 5/1
VB-SJN15-34	3.5	0.26	1.93	0.00	0.53	0.72	11.4	2.5Y 7/1
	7	0.26	1.92	0.41	0.73	0.83	12.5	2.5Y 7/1
	10.5	0.25	1.98	0.28	1.22	0.81	15.5	2.5Y 7/1
	14	0.33	1.59	1.84	1.79	1.23	16.6	2.5Y 6/2
	16	0.54	0.89	10.58	1.09	1.87	26.7	2.5Y 6/2
VB-SJN15-35	3	0.26	1.94	0.57	0.51	0.81	8.2	2.5Y 6/1
	6	0.21	2.25	0.15	1.84	0.8	5.4	2.5Y 6/2
	8.5	0.25	2.01	2.41	5.5	1.43	15.4	10Y 5/1
	10	0.17	2.56	0.17	7.2	0.88	5.4	10Y 5/1
N3 Sand Source Composite		**0.26**	**1.95**	**2.33**	**2.33**	**0.92**	**2.33**	**2.5Y 6/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

Table D - 5. Sediment Analysis Results from Vibracores in Proposed Sand Source S-1.

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJSP12-001	1	0.31	1.71	0.78	1.06	1.01	15	2.5Y 6/1
	5	0.30	1.75	1.63	1.28	1.04	16	10Y 6/1
	9	0.21	2.27	0.15	1.69	0.63	8	2.5Y 6/1
	12	0.16	2.65	0.02	4.57	0.59	21	10Y 4/1
VB-SJSP12-002	1	0.39	1.37	1.48	0.4	1.02	20	5Y 6/1
	6	0.21	2.28	0.00	1.08	0.51	7	5Y 6/1
	9	0.18	2.48	0.64	4.33	0.85	14	5GY 5/1
VB-SJSP12-003	1	0.31	1.71	0.76	0.41	0.92	14	2.5Y 6/1
	3	0.27	1.87	0.11	1.03	0.76	9	2.5Y 6/1
	6	0.26	1.92	0.36	0.64	0.74	14	2.5Y 6/1
	8	0.17	2.52	0.13	4.7	0.71	12	10Y 4/1
VB-SJSP12-004	1	0.30	1.75	0.46	0.65	0.81	12	5Y 6/2
	4	0.29	1.81	0.97	1.36	1.01	20	5Y 6/2
	6	0.20	2.30	0.04	1.68	0.68	13	5Y 6/2
VB-SJSP12-005	0.5	0.23	2.14	0.15	2.7	0.89	14	2.5Y 6/2
	2	0.20	2.32	0.14	3.61	0.71	6	2.5Y 6/1
VB-SJSP12-006	1	0.30	1.74	0.92	0.73	0.96	17	10Y 7/1
	4	0.23	2.14	0.08	1.26	0.61	9	10Y 7/1
	6.5	0.22	2.19	0.30	1.49	0.7	12	5Y 6/1
VB-SJSP12-007	2	0.27	1.87	0.08	0.73	0.78	12	10Y 7/1
	4	0.23	2.13	0.00	1.59	0.6	7	10Y 7/1
	6	0.23	2.10	0.51	1.42	0.8	14	10Y 7/1
VB-SJSP12-008	2	0.21	2.27	0.18	0.77	0.63	7	5Y 7/1
	4	0.21	2.25	3.88	4.62	1.41	10	5Y 4/2
VB-SJSP12-009	1	0.20	2.32	0.00	1.45	0.53	6	2.5Y 6/1
VB-SJSP12-010	1	0.26	1.92	0.02	1.57	0.94	14.1	5Y 6/1
VB-SJSP12-011	1	0.39	1.37	1.46	0.72	1.16	25.5	5Y 5/1
	4	0.26	1.92	0.11	1.06	0.82	12.9	5Y 5/1
	6	0.22	2.17	0.00	0.87	0.64	8.4	5Y 5/1
VB-SJSP12-012	1	0.30	1.76	0.21	0.92	0.82	15.8	5Y 8/1
	4	0.25	2.02	0.18	1.43	0.75	11	5Y 8/1
	6	0.17	2.52	0.07	3.91	0.63	10.9	5Y 8/1
VB-SJSP12-013	2	0.28	1.83	0.16	1.02	0.93	15.7	5Y 8/1
	4	0.26	1.95	0.10	1.58	0.8	11.7	5Y 7/1
VB-SJSP12-014	1	0.29	1.81	1.57	0.98	1.02	14.3	5Y 8/1
	4	0.20	2.33	0.00	1.4	0.51	5.5	5Y 8/1
VB-SJSP12-015	2	0.28	1.84	0.33	1.32	0.95	12	5Y 8/1
	4	0.26	1.95	0.53	1.26	0.79	9	5Y 8/1
	6	0.23	2.13	0.11	1.41	0.71	10	5Y 8/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJSP12-016	1	0.30	1.76	0.92	0.74	1	14	5Y 8/1
	3	0.27	1.90	0.59	1.07	0.93	11	5Y 8/1
	7	0.31	1.71	3.05	1.01	1.29	15	5Y 8/1
	9	0.24	2.04	4.65	4.71	1.6	18	5Y 6/2
VB-SJSP12-017	2	0.30	1.75	0.94	0.87	0.97	8	5Y 8/1
	6	0.21	2.24	0.06	1.3	0.68	7	5Y 8/1
	9	0.18	2.50	0.46	4.49	0.81	6	5Y 8/1
VB-SJSP12-018	2	0.23	2.14	0.00	1.4	0.66	5	5Y 8/1
	6	0.24	2.07	0.20	1.06	0.73	7	5Y 8/1
	8	0.17	2.56	0.13	3.76	0.66	6	5Y 6/1
VB-SJSP12-019	2	0.28	1.84	0.12	1.13	0.83	10	5Y 8/1
	6	0.20	2.32	0.45	2.58	0.82	6	5Y 6/2
	9	0.17	2.55	0.24	4.07	0.71	5	5Y 6/2
	11	0.24	2.05	6.72	4.36	1.76	15	5Y 6/2
VB-SJSP12-020	2	0.31	1.67	0.56	0.92	0.92	15	5Y 8/1
	6	0.23	2.12	0.29	1.94	0.85	7	5Y 8/1
VB-SJSP12-021	2	0.32	1.63	0.04	1.04	0.8	12	5Y 8/1
	6	0.31	1.68	1.28	0.88	0.98	15	5Y 8/1
	9	0.21	2.27	0.03	1.43	0.5	4	5Y 8/1
VB-SJSP12-022	2	0.36	1.48	0.92	0.71	1.06	14	5Y 8/1
	6	0.31	1.70	0.68	2.92	1.07	20	5Y 8/1
	9	0.17	2.52	0.23	3.36	0.91	8	5Y 6/1
	11	0.33	1.59	7.34	2.55	1.88	25	5Y 6/1
VB-SJSP12-023	1	0.49	1.03	4.22	0.69	1.41	28	5Y 8/1
	4	0.27	1.87	0.65	2.01	0.92	9	5Y 8/1
	7	0.26	1.97	0.38	1.86	0.88	8	5Y 8/1
	9	0.17	2.59	0.00	3.33	0.74	4	5Y 6/2
VB-SJSP12-024	1	0.31	1.69	1.34	0.8	1.02	13	5Y 8/1
	4	0.25	1.98	0.30	1.62	0.77	8	5Y 8/1
	6	0.26	1.93	0.69	0.8	0.84	9	5Y 8/1
	8	0.17	2.55	0.47	3.49	0.8	5	5Y 6/2
VB-SJSP12-025	1	0.28	1.84	0.66	0.91	0.88	11	5Y 8/1
	4	0.22	2.16	0.02	1.16	0.52	4	5Y 8/1
	6	0.17	2.52	0.14	3.34	0.8	6	5Y 6/2
VB-SJSP12-026	1	0.30	1.75	0.60	1.32	0.83	8	5Y 8/1
	4	0.26	1.95	0.14	0.84	0.75	8	5Y 8/1
	6	0.18	2.48	0.10	3.51	0.74	8	5Y 6/2
VB-SJSP12-027	1	0.30	1.73	1.09	1.25	1	12	5Y 8/1
	4	0.25	2.03	0.32	1.93	0.91	9	5Y 8/1
	6	0.26	1.95	2.17	2.7	1.35	15	5Y 6/2

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJSP12-028	1	0.30	1.72	0.71	0.98	0.87	9	5Y 8/1
	5	0.24	2.04	0.16	1.7	0.59	4	5Y 8/1
	9	0.25	1.99	0.45	1.19	0.8	7	5Y 8/1
	12	0.19	2.37	0.62	4.86	1.03	8	5Y 6/2
VB-SJSP12-029	2	0.25	1.99	0.04	0.79	0.63	5	5Y 8/1
	4	0.25	2.00	0.06	0.75	0.63	5	5Y 8/1
	6	0.21	2.24	0.82	1.61	0.79	6	5Y 8/1
VB-SJSP12-030	2	0.26	1.95	0.94	0.94	0.83	7	5Y 8/1
	4	0.22	2.17	0.00	1.6	0.52	3	5Y 8/1
	6	0.29	1.79	0.37	1.13	0.87	13	5Y 8/1
VB-SJSP12-031	0	0.28	1.82	1.09	1.25	1.02	12	5Y 8/1
VB-SJSP12-032	1	0.26	1.94	0.30	0.8	0.77	8.5	5Y 8/1
	3	0.21	2.24	0.00	1.47	0.56	3	5Y 8/1
	5	0.23	2.14	0.55	1.23	0.76	10.4	5Y 8/1
VB-SJSP12-033	2	0.20	2.31	0.03	1.7	0.54	5.1	5Y 6/2
VB-SJSP12-034	1	0.19	2.41	0.05	1.57	0.63	6.8	5Y 7/1
VB-SJSP12-035	2	0.19	2.39	0.02	0.88	0.49	3.7	5Y 8/1
	5	0.25	1.99	0.59	0.83	0.92	11.5	5Y 8/1
	9	0.23	2.11	0.51	1.25	0.89	9.3	5Y 8/1
VB-SJSP12-036	1	0.20	2.36	0.00	2.18	0.56	6.9	5Y 8/1
VB-SJSP12-037	2	0.19	2.40	0.00	1.08	0.41	2.2	5Y 8/1
	4	0.20	2.32	0.00	1.12	0.43	2.2	5Y 8/1
	6	0.19	2.37	0.00	1.6	0.42	3.3	5Y 8/1
VB-SJSP12-038	2	0.23	2.13	0.14	0.74	0.67	10.3	5Y 8/1
	5	0.23	2.12	0.04	0.97	0.64	9	5Y 8/1
VB-SJSP12-039	0	0.26	1.94	0.27	0.84	0.75	8.6	5Y 8/1
	2	0.19	2.43	1.06	3.62	0.89	8.2	5Y 6/2
VB-SJSP12-040	1	0.25	2.01	0.10	1.65	0.68	7.2	5Y 8/1
	3	0.25	1.98	0.00	0.9	0.63	9.2	5Y 8/1
	5	0.21	2.27	0.51	3.66	0.96	10	5Y 6/1
VB-SJSP12-041	3	0.28	1.83	1.27	1.3	0.94	17.2	5Y 8/1
	7	0.24	2.05	0.08	1.73	0.79	13.6	5Y 8/1
VB-SJSP12-042	2	0.30	1.74	3.47	2.9	1.44	24	5Y 6/1
VB-SJSP12-044	2	0.24	2.09	1.27	2.84	1.15	14.5	5Y 8/1
	4	0.21	2.26	0.77	3.36	0.9	12.4	5Y 8/1
VB-SJSP12-045	2	0.20	2.34	0.02	1.41	0.58	7.2	5Y 7/1
	4	0.20	2.35	0.28	1.85	0.75	12.3	5Y 7/1
	6	0.20	2.31	0.07	2.58	0.78	8.9	5Y 7/1
VB-SJSP12-046	2	0.27	1.88	0.17	0.92	0.75	10	5Y 6/1
	4	0.22	2.20	0.34	1.24	0.76	7.4	5Y 6/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	6	0.20	2.33	0.48	1.32	0.67	6.9	5Y 6/1
	8	0.19	2.38	0.34	4.58	0.85	8.9	5GY 5/1
VB-SJSP12-047	3	0.24	2.09	0.00	1	0.71	10	5Y 6/1
	6	0.20	2.36	0.00	0.73	0.43	5	5Y 6/1
	8	0.17	2.59	0.04	4.2	0.57	8	5Y 4/1
	9	0.18	2.45	1.20	4.76	1	12	5Y 4/1
VB-SJSP12-048	3	0.19	2.37	0.00	0.98	0.4	3	5Y 8/1
	6	0.20	2.34	0.11	1.11	0.53	4	5Y 8/1
VB-SJSP12-049	2	0.19	2.42	0.00	1.7	0.54	7	5Y 8/1
	4	0.17	2.58	0.30	4.38	0.73	7	5Y 6/2
VB-SJSP12-050	2	0.20	2.34	0.27	4.26	0.92	12	5Y 6/2
VB-SJSP12-051	3	0.20	2.33	0.09	1.02	0.74	8	5Y 8/1
	5	0.18	2.45	0.00	1.86	0.41	3	5Y 8/1
	7	0.18	2.46	0.00	1.92	0.5	4	5Y 8/1
VB-SJSP12-052	3	0.21	2.23	0.33	1.02	0.66	8	5Y 8/1
	6	0.20	2.30	0.00	0.77	0.41	2	5Y 8/1
	9	0.31	1.68	3.13	2.06	1.43	22	5Y 8/1
	12	0.17	2.52	0.11	4.07	0.69	7	5Y 8/1
VB-SJSP12-064	2	0.29	1.79	1.55	1.24	1.13	16	5Y 8/1
VB-SJSP12-065	2	0.34	1.57	1.68	1.5	1.18	22	5Y 8/1
	4	0.20	2.36	0.01	1.84	0.55	6	5Y 8/1
VB-SJSP12-066	2	0.30	1.75	0.69	0.99	1	13.3	5Y 8/1
	5	0.25	2.02	0.34	1.41	0.77	7.9	5Y 8/1
	8	0.24	2.05	0.85	1.84	0.87	8.7	5Y 8/1
VB-SJSP12-067	2	0.28	1.84	1.53	1.59	1.08	9.8	5Y 8/1
	4	0.22	2.19	0.35	1.3	0.67	5.3	5Y 8/1
VB-SJSP12-068	2	0.31	1.67	1.02	0.9	1.03	12.3	5Y 8/1
	4	0.25	1.98	0.39	1.04	0.77	10.9	5Y 8/1
	6	0.22	2.20	0.68	1.4	0.79	9.6	5Y 5/1
	8	0.17	2.52	0.25	4.17	0.64	5.7	5Y 5/1
VB-SJSP12-069	1	0.19	2.38	0.00	1.09	0.49	4	5Y 8/1
	3	0.18	2.47	0.00	3.17	0.56	6	5Y 5/1
	5	0.17	2.57	0.68	4.54	0.88	10	5Y 5/1
VB-SJSP12-070	1	0.23	2.14	0.00	0.81	0.62	5.8	5Y 8/1
	3	0.19	2.37	0.10	3.92	0.66	5	5Y 5/1
VB-SJSP12-071	1	0.25	2.00	0.19	0.66	0.71	5.6	5Y 8/1
	3	0.19	2.41	0.03	2.89	0.57	4	5Y 5/1
	5	0.17	2.58	0.43	4.65	0.69	6.8	5Y 5/1
VB-SJSP12-072	2	0.22	2.20	0.10	0.82	0.55	3.6	5Y 8/1
	4	0.20	2.35	0.01	2.34	0.52	4.4	5Y 8/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SJSP12-073	1	0.19	2.41	0.16	1.37	0.57	6	5Y 8/1
	3	0.17	2.53	0.36	4.42	0.7	9	5Y 8/1
VB-SJSP12-074	2	0.18	2.45	0.00	2.48	0.56	7	5Y 8/1
	4	0.18	2.48	0.15	4.12	0.73	10	5Y 6/2
	8	0.22	2.17	1.27	4.64	1.27	16	5Y 6/2
VB-SJSP12-075	2	0.17	2.55	0.11	4.69	0.63	10	5Y 6/2
VB-SJSP12-076	1	0.23	2.15	0.39	2.54	0.68	10	5Y 7/1
	3	0.18	2.45	0.32	4.24	0.78	10	5Y 5/2
VB-SJSP12-077	2	0.26	1.93	0.35	0.8	0.83	9.1	5Y 8/1
	4.5	0.21	2.28	0.11	2.47	0.6	5	5Y 5/1
	6	0.17	2.53	0.18	3.95	0.66	7.6	5Y 5/1
VB-SJSP12-078	1	0.27	1.89	0.20	1.05	0.73	8	5Y 8/1
	3	0.25	2.03	0.35	1.55	0.72	6.8	5Y 5/1
	5	0.23	2.10	0.05	1.37	0.62	5.6	5Y 5/1
	7	0.18	2.46	0.10	4.14	0.58	6.9	5Y 5/1
VB-SJSP12-079	2	0.27	1.88	0.56	1.01	0.86	8.9	5Y 8/1
	4	0.23	2.11	0.02	1.26	0.59	5.1	5Y 8/1
	6	0.20	2.33	0.02	3.44	0.52	6.6	5Y 6/1
	8	0.20	2.29	0.79	3.91	0.97	13.7	5Y 6/1
VB-SJSP12-080	1	0.23	2.10	0.00	1.09	0.56	5.1	5Y 8/1
	3	0.21	2.24	0.11	2.36	0.59	8.2	5Y 5/1
	5	0.17	2.53	0.38	4.43	0.73	8	5Y 5/1
VB-SJSP12-082	2	0.25	2.00	0.14	1.72	0.75	8.4	5Y 8/1
	5	0.28	1.86	0.34	1.11	0.84	10.2	5Y 8/1
	7	0.25	2.03	0.15	1.57	0.71	7.6	5Y 8/1
	9	0.23	2.15	0.03	2.82	0.66	4.7	5Y 6/1
VB-SJSP12-083	2	0.25	2.01	0.00	2.28	0.73	8	5Y 8/1
	5	0.25	1.99	0.34	1.66	0.82	8.7	5Y 8/1
	8	0.25	2.02	1.57	1.61	0.95	9.1	5Y 8/1
	10	0.19	2.43	0.09	3.69	0.6	8.9	5Y 5/1
VB-SJSP12-084	2	0.25	2.02	0.06	1.08	0.68	8	5Y 8/1
	4	0.21	2.26	0.25	1.22	0.95	9	5Y 8/1
	6	0.13	2.92	0.00	3.07	0.54	10	5Y 5/1
	8	0.20	2.29	0.86	2.96	0.97	11	5Y 5/1
VB-SJSP12-085	2	0.25	1.99	1.21	0.9	0.91	7	5Y 8/1
	4	0.29	1.79	0.28	1.71	0.9	19	5Y 8/1
	6	0.23	2.11	0.58	1.78	0.9	18	5Y 8/1
	8	0.18	2.46	0.92	3.59	0.91	12	5Y 5/1
VB-SJSP12-086	1	0.23	2.14	0.46	1.32	0.95	13	5Y 8/1
	3	0.27	1.89	0.43	1.61	0.86	8	5Y 8/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	5	0.23	2.15	0.83	1.19	0.78	11	5Y 8/1
	7	0.20	2.32	1.43	4.71	1.11	15	5Y 6/1
VB-SJSP12-087	1	0.26	1.96	0.55	1.18	0.82	9	5Y 8/1
	3	0.22	2.18	0.38	2.05	0.76	9	5Y 8/1
	5	0.20	2.30	0.68	3.39	0.93	9	5Y 8/1
	7	0.19	2.42	0.34	4.47	0.83	8	5Y 5/1
VB-SJSP12-088	2	0.35	1.52	1.20	0.97	1.1	21	5Y 8/1
	4	0.24	2.07	0.22	3.53	0.77	11	5Y 8/1
	6	0.20	2.29	0.05	2.68	0.6	9	5Y 8/1
VB-SJSP12-089	2	0.26	1.92	0.49	1.81	0.9	18	5Y 8/1
	4	0.28	1.83	1.71	2.05	1.25	25	5Y 8/1
	6	0.17	2.54	0.25	2.83	0.83	8	5Y 5/1
VB-SJSP12-090	1	0.32	1.66	1.39	0.92	1.05	19	5Y 8/1
	3	0.26	1.95	0.22	1.71	0.78	15	5Y 8/1
	5	0.30	1.72	0.30	1.54	0.92	22	5Y 8/1
	7	0.17	2.57	0.03	4.18	0.61	8	5Y 5/1
VB-SJSP12-091	2	0.26	1.95	0.10	1.12	0.79	18	5Y 8/1
	4	0.26	1.96	2.01	1.65	1.18	16	5Y 8/1
	6	0.17	2.52	0.39	3.97	0.79	17	5Y 5/1
VB-SJSP12-092	2	0.26	1.93	0.05	0.97	0.74	14	5Y 8/1
	4	0.27	1.90	0.33	1.61	0.89	23	5Y 8/1
	6	0.26	1.97	0.52	0.96	0.93	18	5Y 8/1
	8	0.17	2.55	0.38	3.71	0.74	10	5Y 5/1
VB-SJSP12-093	2	0.24	2.05	0.12	1.02	0.66	15	5Y 8/1
	4	0.28	1.83	0.96	0.92	1.02	16	5Y 8/1
	6	0.21	2.24	0.25	1.19	0.64	10	5Y 8/1
	8	0.18	2.48	1.60	4.17	0.99	13	5Y 5/1
VB-SJSP12-094	3	0.29	1.78	0.63	1.17	1.03	16	5Y 8/1
	5	0.23	2.12	0.11	2.94	0.82	12	5Y 8/1
	7	0.21	2.27	0.04	1.7	0.64	6	5Y 8/1
	9	0.20	2.35	0.27	3.74	0.89	9	5Y 5/1
VB-SJSP12-095	3	0.43	1.21	0.36	1.23	1.11	23	5Y 8/1
	7	0.26	1.95	0.63	2.3	1.03	17	5Y 8/1
	11	0.18	2.45	0.04	2.03	0.55	6	5Y 8/1
VB-SJSP12-096	2	0.27	1.87	0.30	1.37	0.86	13	5Y 8/1
	5	0.26	1.92	0.36	1.96	0.89	15	5Y 8/1
	8	0.31	1.71	0.88	1.89	1.07	14	5Y 8/1
VB-SJSP12-100	3	0.27	1.88	0.56	1.11	0.89	13	5Y 8/1
	7	0.23	2.11	0.32	2.25	0.81	12	5Y 8/1
	11	0.18	2.46	0.26	2.83	0.75	9	5Y 5/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	13	0.17	2.59	0.22	3.87	0.78	11	5Y 5/1
VB-SJSP12-101	1	0.32	1.64	0.90	1.14	1.05	25	5Y 8/1
	4	0.34	1.57	1.26	0.72	1.09	22	5Y 8/1
	7	0.28	1.84	0.36	1.65	0.95	24	5Y 8/1
	9	0.20	2.32	0.22	3.13	0.79	10	5Y 5/1
VB-SJSP12-102	2	0.42	1.25	1.74	0.52	1.24	33	5Y 8/1
	5	0.28	1.85	0.38	1.43	0.84	18	5Y 8/1
	9	0.31	1.69	0.50	1.45	1.15	34	5Y 8/1
	12	0.18	2.51	0.00	4.63	0.63	9	5Y 5/1
VB-SJSP12-103	2	0.36	1.48	2.74	0.98	1.33	31	5Y 8/1
	4	0.42	1.25	2.05	1.33	1.22	36	5Y 8/1
	6	0.30	1.74	0.37	1.22	0.95	24	5Y 8/1
	8	0.20	2.34	0.04	2.63	0.67	10	5Y 5/1
VB-SJSP12-104	1	0.38	1.41	2.61	0.43	1.38	30	5Y 8/1
	3	0.21	2.27	1.55	2.75	1.07	13.2	5Y 5/1
	5	0.18	2.51	0.37	4.34	0.79	10.4	5Y 5/1
VB-SJSP12-105	1	0.69	0.54	11.79	1.15	1.88	52.4	5Y 8/1
	3	0.18	2.49	0.35	4.33	0.76	18.4	5Y 5/1
	5	0.18	2.44	0.20	3.34	0.87	23.5	5Y 5/1
VB-SJSP12-106	1	0.56	0.83	6.29	0.58	1.67	45.5	5Y 8/1
	3	0.21	2.27	2.14	2.85	1.14	18.3	5Y 5/1
	5	0.18	2.49	0.44	3.97	0.84	12.8	5Y 5/1
VB-SJSP12-107	0	0.90	0.15	10.69	0.46	1.69	60	5Y 8/1
	2	0.29	1.77	0.36	1.21	0.98	27	5Y 8/1
	4	0.27	1.89	0.36	2.8	1.11	27	5Y 5/1
	6	0.18	2.50	0.73	4.91	0.92	11	5Y 5/1
VB-SJSP12-108	1	0.77	0.37	6.30	1.03	1.56	56	5Y 6/1
	4	0.28	1.83	0.41	1.89	0.97	26	5Y 7/1
	6	0.25	1.98	0.77	3.57	1.03	26	5Y 7/1
	8	0.18	2.51	0.06	4.48	0.74	12	5Y 5/1
VB-SJSP12-109	1	0.64	0.65	5.79	0.45	1.55	55	5Y 6/2
	5	0.33	1.60	1.41	1.01	1.25	34	5Y 8/1
	9	0.20	2.30	0.20	2.04	0.78	16	5Y 8/1
VB-SJSP12-110	1	0.47	1.10	3.53	0.57	1.48	42	5Y 6/2
	3	0.21	2.24	0.06	1.46	0.73	17	5Y 8/1
	5	0.18	2.47	0.06	2.92	0.67	14	5Y 5/1
	8	0.17	2.53	0.86	4.29	0.89	11	5Y 5/1
VB-SJSP12-112	2	0.25	1.99	0.00	0.49	0.71	22	5Y 8/1
	6	0.24	2.04	0.58	0.79	0.79	11	5Y 8/1
	11	0.21	2.27	0.08	2.4	0.68	11	5Y 8/1

Boring Number	Sample Depth (feet)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	13	0.17	2.52	0.00	2.61	0.62	10	5Y 8/1
VB-SJSP12-113	1	0.35	1.53	3.25	1.21	1.33	25	5Y 8/1
	4	0.24	2.07	0.04	1.56	0.82	19	5Y 8/1
	7	0.19	2.43	0.04	2.85	0.59	9	5Y 8/1
	9	0.18	2.49	0.20	3.47	0.67	8	5Y 5/1
VB-SJSP12-114	2	0.35	1.50	1.06	1.83	1.19	28	5Y 8/1
	4	0.29	1.77	0.16	2.28	1.02	23	5Y 8/1
VB-SJSP12-115	2	0.53	0.91	6.17	0.91	1.71	43	5Y 8/1
	4	0.26	1.97	0.00	0	0.66	24	5Y 8/1
	6	0.20	2.31	2.38	3.74	0.87	13	5Y 5/1
	8	0.17	2.52	0.03	3.59	0.74	12	5Y 5/1
VB-SJSP12-116	2	0.27	1.87	1.68	0.99	1.07	17	5Y 8/1
	5	0.30	1.72	1.94	1.39	1.16	24	5Y 8/1
	8	0.28	1.82	1.81	1.85	1.28	25	5Y 8/1
	11	0.17	2.53	0.15	3.98	0.7	10	5Y 5/1
S1 Sand Source Composite		**0.25**	**2.01**	**0.75**	**2.03**	**0.85**	**12.79**	**5Y 7/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

Table D - 6. Sediment Analysis Results from Vibracores in the St. Augustine Inlet Ebb Shoal Proposed Sand Source.

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
SJEB09-1	2.0	0.18	2.49	0.00%	3.10	0.55	8	10YR 7/1
	7.0	0.16	2.67	0.00%	1.60	0.46	4	10YR 7/1
	12.0	0.16	2.67	0.00%	4.73	0.51	5	10YR 7/1
	17.0	0.15	2.74	0.00%	3.10	0.38	0	10YR 7/1
SJEB09-2A	2.0	0.17	2.57	0.00%	1.21	0.38	3	10YR 7/1
	7.0	0.17	2.52	0.00%	1.39	0.43	7	10YR 7/1
	12.0	0.17	2.58	0.00%	1.19	0.36	2	10YR 7/1
	17.0	0.16	2.64	0.00%	1.73	0.40	4	10YR 7/1
SJEB09-3	1.0	0.15	2.71	0.00%	1.32	0.43	25	5Y 6/1
	4.0	0.15	2.75	0.00%	2.06	0.36	22	5Y 6/1
	7.0	0.13	2.93	0.00%	3.14	0.36	17	5Y 5/1
SJEB09-4	1.0	0.22	2.16	0.00%	1.64	0.77	17	10YR 7/1
	2.5	0.30	1.72	1.30%	1.08	1.36	26	10YR 7/1
	6.0	0.25	2.00	0.70%	1.26	1.31	20	10YR 7/1
	11.0	0.16	2.61	0.00%	1.60	0.43	5	10YR 7/1
	16.0	0.14	2.87	0.00%	2.49	0.36	0	10YR 7/1
SJEB09-5	3.0	0.17	2.54	0.00%	1.40	0.46	3	10YR 7/1
	8.0	0.19	2.38	0.00%	0.82	0.52	4	10YR 7/1
	13.0	0.17	2.55	0.00%	1.29	0.44	3	10YR 7/1
SJEB09-6	4.0	0.16	2.67	0.00%	1.43	0.46	2	10YR 7/1
	9.0	0.17	2.55	0.00%	0.97	0.45	4	10YR 7/1
	14.0	0.16	2.62	0.00%	1.55	0.46	4	10YR 7/1
SJEB09-7	2.0	0.14	2.81	0.00%	3.99	0.42	19	2.5Y 6/1
	5.0	0.15	2.72	0.00%	1.62	0.37	21	2.5Y 6/1
	9.0	0.14	2.82	0.00%	2.70	0.43	19	2.5Y 6/1
SJEB09-8	3.0	0.66	0.60	3.98%	0.03	1.56	70	2.5Y 8/2
	7.0	0.27	1.88	0.62%	1.42	1.07	32	2.5Y 8/2
	10.0	1.44	-0.53	0.62%	0.49	1.42	92	2.5Y 6/3
	15.0	0.34	1.55	0.58%	0.28	0.92	34	2.5Y 8/1

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
SJEB09-9	3.0	1.60	-0.68	8.14%	0.25	1.16	95	2.5Y 6/3
	7.0	1.14	-0.19	4.45%	1.41	1.44	87	2.5Y 6/3
	12.0	0.31	1.70	2.55%	2.86	1.47	46	2.5Y 7/1
SJEB09-10	1.0	0.58	0.79	3.92%	0.40	1.36	71	2.5Y 6/3
	6.0	0.21	2.27	0.00%	0.83	0.57	33	2.5Y 7/1
	10.0	0.28	1.85	0.14%	1.35	0.78	39	2.5Y 7/1
	16.0	0.32	1.64	3.15%	3.10	1.61	42	2.5Y 6/3
SJEB09-11	2.0	0.17	2.52	0.00%	2.52	0.56	26	2.5Y 7/1
	7.0	0.17	2.57	0.00%	2.35	0.53	25	2.5Y 7/1
	10.5	0.16	2.64	0.00%	2.21	0.43	23	2.5Y 3/1
	13.0	0.24	2.04	0.31%	3.86	0.82	31	2.5Y 3/1
SJEB09-12	2.0	0.15	2.70	0.00%	1.56	0.38	21	2.5Y 5/1
	7.0	0.14	2.83	0.00%	2.48	0.37	19	2.5Y 5/1
SJEB09-13	1.0	0.14	2.78	0.00%	1.65	0.38	20	2.5Y 6/1
	6.0	0.14	2.83	0.00%	2.94	0.44	19	2.5Y 6/1
	8.0	0.14	2.83	0.00%	2.39	0.36	19	2.5Y 6/1
SJEB09-14	1.0	0.16	2.66	0.00%	1.94	0.49	25	2.5Y 6/1
	5.0	0.18	2.51	0.00%	1.35	0.65	27	2.5Y 6/1
	10.0	0.19	2.37	0.62%	1.67	0.99	30	2.5Y 6/1
SJEB09-15	2.0	0.16	2.68	0.00%	2.59	0.57	22	2.5Y 7/1
	6.0	0.17	2.59	0.00%	0.78	0.49	32	2.5Y 7/1
SJEB09-16	2.0	0.16	2.61	0.00%	1.22	0.46	23	5Y 6/1
SJEB09-17	2.0	0.17	2.54	0.00%	1.62	0.51	2	10YR 7/1
	7.0	0.24	2.08	0.00%	1.32	0.80	13	10YR 7/1
	12.5	0.17	2.54	0.00%	1.75	0.55	3	10YR 7/1
	14.0	0.16	2.60	0.00%	1.29	0.45	2	10YR 7/1
SJEB09-18	1.0	0.18	2.46	0.00%	1.49	0.65	27	10YR 7/2
	5.0	0.18	2.48	0.00%	2.91	0.70	26	2.5Y 6/1
	7.5	0.14	2.86	0.00%	3.78	0.46	18	2.5Y 6/1
SJEB09-19	1.0	0.14	2.81	0.00%	2.54	0.40	19	5Y 5/1
	4.0	0.14	2.82	0.00%	1.72	0.37	19	5Y 5/1

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
SJEB09-20	2	0.15	2.74	0.00%	2.71	0.40	20	2.5Y 7/1
	5	0.16	2.63	0.00%	1.03	0.44	23	2.5Y 7/1
SJEB09-21	2	0.22	2.17	0.19%	2.88	0.69	32	2.5Y 5/1
	3	0.14	2.82	0.12%	4.32	0.59	19	2.5Y 5/1
	4	0.18	2.46	0.00%	3.81	0.49	26	2.5Y 5/1
	8	0.14	2.82	0.00%	3.59	0.50	21	2.5Y 5/1
SJEB09-23	1	0.14	2.86	0.00%	2.49	0.42	19	2.5Y 7/1
	3.5	0.15	2.76	0.00%	4.30	0.43	20	2.5Y 3/1
SJEB09-24	1	0.17	2.60	0.00%	1.50	0.45	23	2.5Y 6/1
SJEB09-25	2	0.23	2.09	0.00%	2.48	0.63	39	2.5Y 6/1
	5	0.14	2.79	0.00%	2.71	0.43	19	2.5Y 6/1
SJEB09-26	0.5	0.15	2.77	0.00%	1.27	0.39	20	10YR 7/1
	4	0.13	2.92	0.00%	2.83	0.39	17	2.5Y 5/1
CB-SJ96-8	3.0	0.20	2.34	0.00%	0.80%	0.54	na	na
	6.0	0.52	0.94	1.70%	1.40%	1.35	na	na
	8.0	0.20	2.30	0.10%	3.40%	0.95	na	na
	12.5	0.17	2.52	0.50%	1.30%	0.77	na	na
	16.0	0.12	3.04	0.10%	4.70%	0.46	na	na
CB-SJ96-11	1.5	0.17	2.53	0.00%	1.10%	0.43	na	na
	6.5	0.15	2.77	0.00%	1.50%	0.48	na	na
	13.5	0.13	2.91	0.00%	1.20%	0.40	na	na
	19.0	0.11	3.21	0.00%	4.90%	0.45	na	na
CB-SJ98-2	3.5	0.13	2.95	0.00%	2.00%	0.43	na	na
	8.0	0.12	3.03	0.00%	3.00%	0.41	na	na
	9.5	0.16	2.67	0.00%	3.00%	1.17	na	na
	11.0	0.13	2.89	0.00%	3.00%	0.60	na	na
CB-SJ98-3	2.5	0.15	2.73	0.00%	1.00%	0.46	na	na
	4.5	0.14	2.81	0.00%	2.00%	0.43	na	na
	8.0	0.13	2.99	0.00%	2.00%	0.38	na	na
	14.0	0.12	3.05	0.00%	3.00%	0.43	na	na
CB-SJ98-7	1.0	0.15	2.70	0.00%	1.00%	0.41	na	na

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	9.0	0.14	2.89	0.00%	2.00%	0.49	na	na
	11.5	0.15	2.72	0.00%	2.00%	1.02	na	na
CB-SJ98-8	1.5	0.16	2.64	0.00%	1.00%	0.48	na	na
	9.0	0.16	2.65	0.00%	2.00%	0.41	na	na
	11.5	0.13	2.97	0.00%	3.00%	0.42	na	na
	14.5	0.13	2.97	0.00%	3.00%	0.59	na	na
	17.0	0.13	2.95	0.00%	2.00%	0.37	na	na
CB-SJ99-11	0.5	0.62	0.69	4.21%	0.94%	1.35	70%	na
	6.5	0.21	2.24	0.80%	2.02%	0.94	1%	na
	12.5	0.42	1.26	5.32%	2.18%	1.47	5%	na
CB-SJ99-13	0.6	0.59	0.76	3.15%	2.38%	1.26	45%	na
	6.6	0.78	0.36	2.12%	3.27%	1.14	30%	na
Ebb Shoal Composite		**0.23**	**2.38**	**0.00**	**1.43**	**0.64**	**21.48**	**2.5Y 6/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

Table D - 7. Sediment Analysis Results from Vibracores in the St. Augustine Inlet Flood Shoal Proposed Sand Source.

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
VB-SAFS15-01	1	0.221	2.18	0.67	0.89	0.71	7.7	2.5Y 7/2
	3	0.252	1.99	1.89	1.15	1.08	8.3	2.5Y 7/2
	6	0.179	2.48	0	2.77	0.34	3.1	2.5Y 7/2
	9	0.237	2.08	0.54	0.94	1	11.4	2.5Y 7/2
	11	0.215	2.22	0.54	1.04	0.8	8.6	2.5Y 7/2
	13	0.255	1.97	0.26	1.43	0.91	14.2	2.5Y 7/2
VB-SAFS15-02	1	0.213	2.23	0.38	0.9	0.72	7.6	2.5Y 7/2
	3	0.156	2.68	0	0.85	0.33	1.4	2.5Y 7/1
	6	0.176	2.51	0	0.93	0.32	0	2.5Y 7/1
	9	0.183	2.45	0	0.66	0.32	3.3	2.5Y 7/1
	12	0.248	2.01	0.66	3.47	1.04	9.2	2.5Y 7/1
	13	0.188	2.41	0	5.86	0.37	0.2	5GY 6/1
VB-SAFS15-03	1	0.192	2.38	0.09	0.44	0.55	5.5	2.5Y 7/2
	3.5	0.233	2.10	0.78	1.37	1.03	13.3	2.5Y 7/2
	7	0.219	2.19	0.35	1.28	0.68	8	2.5Y 7/2
	10.5	0.172	2.54	0	2.02	0.39	2.8	2.5Y 7/2
	14	0.189	2.40	0.17	0.56	0.63	5.4	2.5Y 7/2
	15.5	0.279	1.84	0.12	0.83	0.56	5.5	2.5Y 7/2
VB-SAFS15-04	1	0.314	1.67	2.77	2.74	1.48	23.1	2.5Y 7/2
	3	0.187	2.42	0	0.5	0.35	4	2.5Y 7/2
	6	0.289	1.79	1.1	0.23	1.22	20.8	2.5Y 7/2
	9	0.18	2.47	0	0.94	0.32	0.1	2.5Y 7/1
	12	0.193	2.37	0.3	0.59	0.59	2.2	2.5Y 7/1
	13.5	0.281	1.83	2.34	4.39	1.29	17.8	2.5Y 6/1
VB-SAFS15-05	3	0.266	1.91	2.82	0.89	1.38	16.5	2.5Y 7/1
	6	0.225	2.15	0.08	0.95	0.55	8.5	2.5Y 7/1
	9	0.215	2.22	0.47	1.54	0.79	6	2.5Y 7/1
	12	0.693	0.53	11.31	0.55	1.91	50.1	2.5Y 7/2
	14	0.186	2.43	0	1.28	0.52	2.5	2.5Y 6/1
VB-SAFS15-06	1	0.221	2.18	0.16	1.53	0.75	9.1	2.5Y 6/1
	3	0.382	1.39	4.75	1.79	1.72	26.6	2.5Y 6/1
	6	0.321	1.64	2.94	0.75	1.36	22	2.5Y 6/1
	8	0.59	0.76	8.13	0.94	1.83	41.6	2.5Y 6/1
	9	0.189	2.40	0	2.07	0.41	1.2	2.5Y 7/1
	11.5	0.24	2.06	0.43	0.52	0.88	11.9	2.5Y 7/1
	14	0.21	2.25	0.86	1.49	1.01	9.9	2.5Y 7/1
VB-SAFS15-07	1	0.264	1.92	0.83	1.35	1.07	16.5	2.5Y 7/2
	3	0.289	1.79	2.25	0.51	1.28	19.3	2.5Y 7/2
	6	0.154	2.70	0	2.69	0.42	1.9	2.5Y 6/1
	7.5	0.207	2.27	0.04	0.81	0.43	5.4	2.5Y 7/1
	10.5	0.193	2.37	0.14	1.21	0.56	5.1	2.5Y 7/1

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	14	0.354	1.50	4.56	1.53	1.78	27.9	2.5Y 7/1
VB-SAFS15-08	1	0.186	2.43	0	1.1	0.33	0.3	2.5Y 8/2
	3	0.184	2.44	0	0.54	0.33	3.6	2.5Y 8/2
	6	0.176	2.51	0	1.66	0.36	3	2.5Y 8/2
	9	0.209	2.26	0	0.77	0.49	11	2.5Y 7/2
	12	0.192	2.38	0	3.09	0.31	0.3	2.5Y 8/2
	15	0.5	1.00	9.2	0.75	1.94	37.5	2.5Y 8/2
VB-SAFS15-10	3	0.624	0.68	8.23	0.34	1.74	45.1	2.5Y 5/1
	6	0.18	2.47	0.27	1.56	0.59	4.4	2.5Y 7/1
	7.5	0.202	2.31	0.05	1.01	0.53	6	2.5Y 7/1
	9	0.747	0.42	13.98	0.88	1.59	45.9	2.5Y 7/1
	12	0.17	2.56	0	1.26	0.35	2.4	2.5Y 7/1
VB-SAFS15-11	1	0.252	1.99	5.34	2.66	1.64	15.4	2.5Y 6/2
	3	0.186	2.43	0.88	1.55	0.76	5.1	2.5Y 6/2
	6	0.529	0.92	9.53	0.95	1.9	39.9	2.5Y 7/1
	9	0.418	1.26	6.89	1.17	1.76	31.9	2.5Y 7/2
	12	0.559	0.84	2.59	1.24	1.46	48.8	2.5Y 7/2
	13.5	0.287	1.80	3.35	1.85	1.64	23.3	2.5Y 6/1
VB-SAFS15-12	1	0.551	0.86	8.05	1.23	1.79	43	2.5Y 6/2
	3	0.285	1.81	0.77	1.06	1.39	17.7	2.5Y 6/2
	6	1.37	-0.45	22.75	0.87	1.84	65.7	2.5Y 6/2
	9	0.993	0.01	11.75	1.08	1.72	66.3	2.5Y 6/2
	11	0.159	2.65	0.25	4.14	0.65	2.6	2.5Y 5/1
VB-SAFS15-13	1	0.369	1.44	4.71	2.86	1.81	30.7	2.5Y 6/1
	3	0.339	1.56	2.05	1.23	1.37	25.8	2.5Y 6/1
	5.5	0.865	0.21	18.69	1.26	2.09	48.1	2.5Y 7/2
	8.5	0.255	1.97	1.19	1.43	1.07	14.8	2.5Y 7/2
	10	0.218	2.20	0.23	2.34	0.79	9.2	2.5Y 6/1
	12	0.168	2.57	0.03	2.95	0.41	6.9	2.5Y 5/1
VB-SAFS15-14	1	0.54	0.89	9.47	1.66	1.97	40	2.5Y 6/2
	3	0.304	1.72	4.37	1.28	1.52	19.2	2.5Y 6/1
	6.5	0.646	0.63	12.49	1.01	1.98	44.5	2.5Y 7/2
	9	0.332	1.59	4.85	1.28	1.33	22	2.5Y 6/1
	10.5	0.171	2.55	0	2.3	0.44	2.9	2.5Y 6/1
	12	0.158	2.66	0	1.19	0.34	1.7	2.5Y 6/1
	14	0.243	2.04	2.54	1.68	1.32	14.3	2.5Y 6/1
VB-SAFS15-15	1	0.204	2.29	0.36	1.87	0.88	9.2	2.5Y 6/1
	3	0.159	2.65	0	2.15	0.52	2.37	2.5Y 6/1
	6	0.192	2.38	0.12	1.73	0.77	7	2.5Y 6/1
	9	0.255	1.97	0.89	1.7	0.89	12.4	2.5Y 7/2
	12	0.272	1.88	1.66	1.21	1.05	15.2	2.5Y 6/1
	15	0.203	2.30	0	2.32	0.45	6.2	2.5Y 7/2
VB-SAFS15-16	2	0.164	2.61	0	1.95	0.39	2.2	2.5Y 7/1

Boring Number	Sample Depth (ft)	Mean (mm)	Mean (phi)	Percent Fine Gravel* (%)	Percent Silt** (%)	Sorting / St. Dev (phi)	Visual Shell (%)	Munsell Color (moist)
	4	0.191	2.39	0.47	2.19	0.83	6.9	2.5Y 6/1
	7	0.646	0.63	9.96	1.22	1.93	46.8	2.5Y 6/2
	9.5	0.342	1.55	4.51	4.15	1.74	27.54	2.5Y 4/1
	12.5	0.463	1.11	5.97	1.05	1.69	37	2.5Y 7/1
VB-SAFS15-17	2	0.167	2.58	0	2.09	0.38	2.5	2.5Y 6/2
	4	0.207	2.27	0.09	6.07	0.42	1.1	2.5Y 5/1
	6	0.167	2.58	0	1.56	0.36	2.4	2.5Y 6/2
	8	0.147	2.77	0	6.78	0.5	0.9	2.5Y 6/2
Flood Shoal Sand Source Composite		**0.30**	**1.93**	**2.62**	**1.64**	**0.98**	**15.70**	**2.5Y 6/1**

*Retained in the #4 Sieve, **Passing the #230 Sieve

ST. JOHNS COUNTY
FLORIDA

ST. JOHNS COUNTY
COASTAL STORM RISK MANAGEMENT
FEASIBILITY STUDY

APPENDIX E

REAL ESTATE PLAN

Revised 2 March 2017

ST. JOHNS COUNTY, FLORIDA
ST. JOHNS COUNTY COASTAL STORM RISK MANAGEMENT
FEASIBILITY STUDY

REAL ESTATE PLAN

TABLE OF CONTENTS

SECTIONS	Page Nos.
1. STATEMENT OF PURPOSE	E-1
2. PROJECT AND STUDY AUTHORIZATION	E-1
3. PROJECT LOCATION	E-1
4. PROJECT DESCRIPTION	E-3
5. REAL ESTATE REQUIREMENTS	E-5
6. FEDERALLY GOVERNMENT OWNED LAND	E-7
7. NON-FEDERALLY OWNED LAND	E-7
8. NON FEDERAL OPERATION/MAINTENANCE RESPONSIBILITIES	E-7
9. NON FEDERAL AUTHORITY TO PARTICIPATE IN PROJECT	E-7
10. NAVIGATION SERVITUDE	E-7
11. ATTITUDE OF THE LANDOWNERS	E-8
12. MINERALS	E-8
13. HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)	E-8
14. INDUCED FLOODING	E-8
15. ZONING ORDINANCES	E-8

16. RELOCATIONS ASSISTANCE (Public Law 91-646) E-8

17. RELOCATIONS, ALTERATIONS, VACATIONS AND ABANDONMENTS E-8

18. STANDING TIMBER AND VEGETATIVE COVER E-9

19. RECREATION RESOURCES E-9

20. CULTURAL RESOURCES E-9

21. OUTSTANDING RIGHTS E-9

22. MITIGATION E-9

23. ACQUISITION SCHEDULE E-9

24. ACQUISITION/ADMINISTRATIVE COSTS E-9

25. REAL ESTATE CHART OF ACCOUNTS E-10

26. ESTATES TO BE ACQUIRED E-10

26.1 STANDARD ESTATES E-10
26.2 NON STANDARD ESTATES E-12

27. REAL ESTATE MAPS E-13

EXHIBIT 1: NON FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY ASSESSMENT E-20

EXHIBIT 2: RISK LETTER E-23

EXHIBIT 3: SAMPLE MEMORANDUM OF AGREEMENT E-26

EXHIBIT 4: SAMPLE SOVEREIGN SUBMERGED LANDS EASEMENT E-37

REAL ESTATE PLAN

1. STATEMENT OF PURPOSE

The purpose of this study is to determine whether there is economic justification for Federal participation in coastal storm risk management in additional reaches of St. Johns County. If it is found that there is a Federal interest, the further purpose of the study is to analyze alternatives and formulate a recommended plan for coastal storm risk management to include incidental opportunities for environmental restoration within the South Ponte Vedra Beach, Vilano Beach, and Summer Haven reaches of the St. Johns County coastline.

This report is preliminary and written to the level of detail of the main report, other details may be added and is intended for planning purposes only. Both the final real property lines and land values estimates are subject to change even after approval of this report. There may be modifications to the plans that occur during Pre-construction, Engineering and Design (PED) phase, thus changing the final acquisition area(s) and/or administrative and land costs.

2. STUDY AND PROJECT AUTHORIZATION

The authority for conducting this Feasibility Study is contained in House Resolution 2646 adopted 21 June 2000:

> *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that in accordance with Section 110 of the Rivers and Harbors Act of 1962, the Secretary of the Army, acting through the Chief of Engineers, is requested to survey the shores of St. Johns County, Florida, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of hurricane protection, storm damage reduction, beach erosion control, and other related purposes."*

The Reconnaissance Report (Section 905(b) Analysis) for St. Johns County, Florida, Shore Protection (USACE 2004) recommended evaluation of 3.8 miles of the counties 42 miles of shoreline in a feasibility study. The 3.8 miles were composed of 1.4 miles in Vilano Beach and 2.4 miles in Summer Haven. These areas were selected based on the following: the shoreline lengths were designated as critically eroded by the State of Florida, other portions of the St. Johns County shoreline had authorized Federal CSRM projects such as St. Augustine Beach, or other portions of shoreline did not include infrastructure susceptible to damage. Between 2004 and 2008, additional

areas were threatened by erosion causing the State of Florida to deem South Ponte Vedra as critically eroded. This reach was then added to the feasibility study. Additionally, the Vilano Beach reach in the feasibility study was expanded south to St. Augustine Inlet, beyond the bounds of the state's designated critical erosion area, at the sponsor's request, in order to fully evaluate this section of the county's shoreline as a contiguous system.

3. PROJECT LOCATION

St. Johns County is located on the northeast coast of Florida about midway between the Florida/Georgia state line and Cape Canaveral. The County is bounded to the north by Duval County and to the south by Flagler County. The County has approximately 42 miles of coastal shoreline, 24 miles of which are located from Ponte Vedra to St. Augustine Inlet, 14 miles from St. Augustine Inlet to Matanzas Inlet, and 4 miles from Matanzas Inlet to Marineland in Flagler County. Vilano Beach and Ponte Vedra Beach are located on the north side of St. Augustine Inlet and Anastasia State Park and St. Augustine Beach are located south of the inlet. The Guana-Tolomato-Matanzas National Estuarine Reserve is located south of Ponte Vedra. Crescent Beach is located north of Matanzas Inlet and Summer Haven is located south of Matanzas Inlet as below.

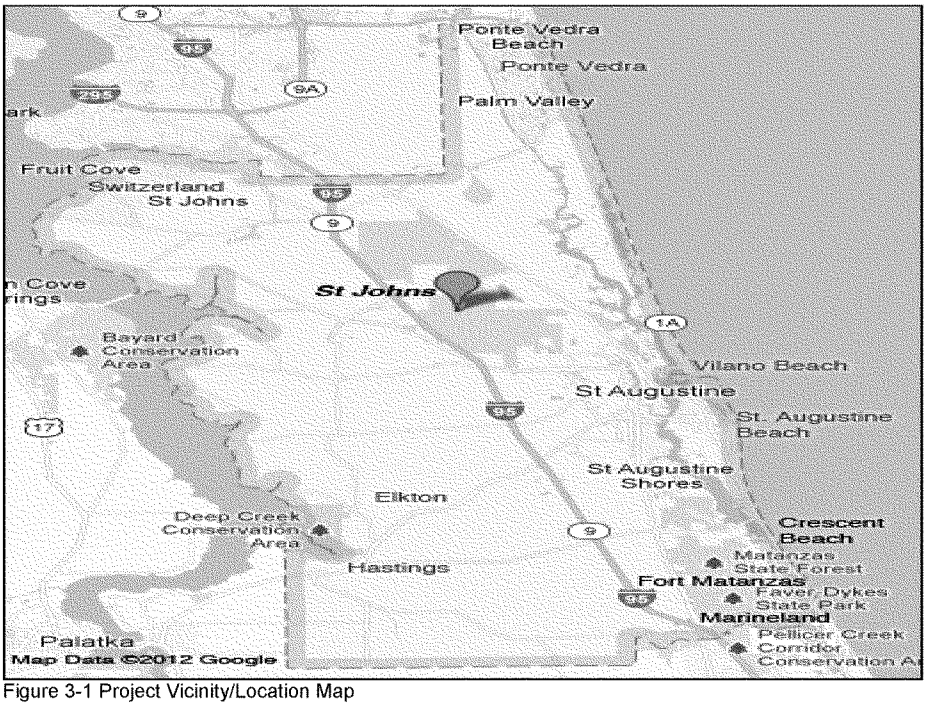


Figure 3-1 Project Vicinity/Location Map

4. PROJECT DESCRIPTION

The 9.8 mile length of the project area is separated into 3 reaches referenced to FDEP R monuments: South Ponte Vedra: R84 – R104 extending 3.8 miles, Vilano Beach: R104 to R117 extending 2.6 miles, R117 to St. Augustine Inlet north sand trap groin extending 1.1 miles, and Summer Haven: R197 – R209 extending 2.3 miles.

Florida State Road (SR) A1A a coastal highway that serves as the only north-south hurricane evacuation route for communities along the coastline, is an integral part of the county's infrastructure and is essential for public safety during evacuation events. The study also includes environmental protection opportunities.

The Recommended Plan Area (RPA) is the National Economic Development (NED) plan relative to cost and providing the maximum storm damage reduction benefits.

The RPA extends 2.6 miles and the full project boundary extends from R-103.5 to R-116.5 for the placement of the initial construction and beach renourishment. The taper areas consist of an additional 1000 feet each to the southern points from R-117.5 and the northern points from R-102.5 of the project boundary. The Recommended Plan will include construction of 60 foot equilibrated berm extension from R103.5 to R116.5 along 2.6 miles of shoreline. The project template will include a dune feature that reflects the average 2015 dune position.

The RPA is to the north of St. Augustine Inlet, between R102.5 and R117.5. As detailed in the Geotechnical Appendix, there is adequate beach quality sand (meeting FDEP permitting requirements for beach placement) to meet the estimated sand needs of the Recommended Plan. Currently, there is approximately 6.5 million cubic yards of compatible sand available within the inlet system. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is 866,000 cubic yards every 12 years. The inlet management plan states that the bypassing objective is 278,000 cubic yards per year, of which one third should go to beaches to the north. One third of the bypassing objective is 92,666 cubic yards per year. Over 12 years, 1.1 million cubic yards would be available to meet the 866,000 cubic yard need for a periodic nourishment event. Initial construction and periodic nourishment will require 1,310,000 cubic yards of sand and each renourishment will require approximately 866,000 cubic yards of sand. The average renourishment intervals are expected to be approximately 12 years, equaling three renourishment events plus the initial construction over the 50 years period of Federal participation. Shown below as Figure 4-2:

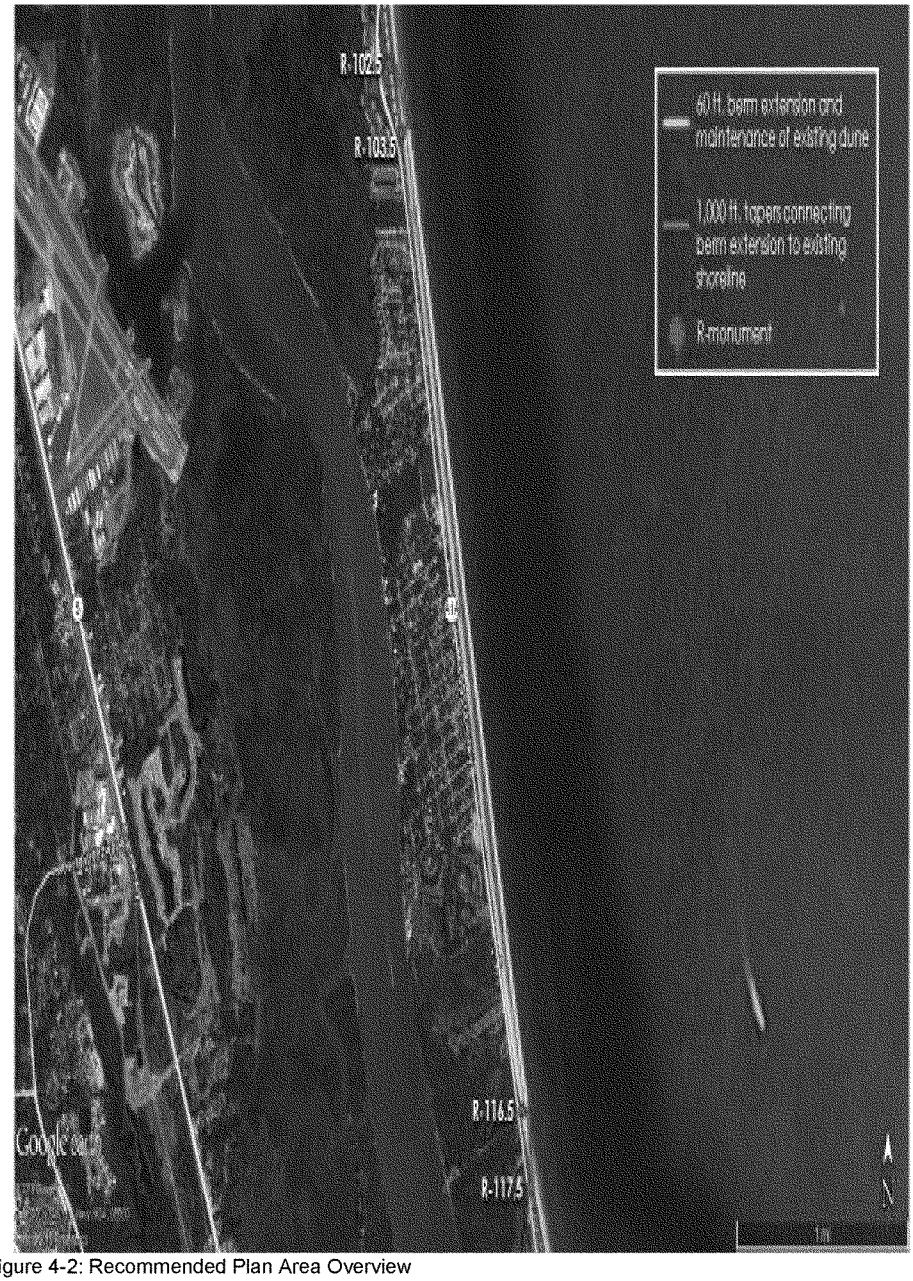


Figure 4-2: Recommended Plan Area Overview

5. REAL ESTATE REQUIREMENTS

In the State of Florida beach nourishment, beach restoration, and erosion control projects are established pursuant to Florida Statute, Section 161.141, Property Rights of State and Private Upland Owners in Beach Restoration Project Areas. Florida Statute, Section 161.191, Vesting of Title of Lands, states that title to all lands seaward of the Erosion Control Line (ECL) shall be vested to the state by right of its sovereignty. The lands landward of the ECL remain vested to the upland owner.

A Survey and Legal Descriptions will be completed to establish the Florida Statute ECL between the state sovereign lands and the adjacent upland property. Upon completion of the survey, the ECL will be established and the State of Florida will issue a Sovereign Submerged Lands Authorization, contained within the Consolidated Joint Coastal Permit, for placement areas located seaward of the ECL. A final initial fill volume will be determined prior to construction of the project. The Permit would be issued in ten year increments by the State of Florida.

In accordance to Engineering Circular (EC) 405-2-12, Real Estate Roles and Responsibilities for Civil Work Cost Shared, Section 12-8 states: "it is the policy of USACE to require the non-Federal Sponsor to provide the minimum interests in real property necessary to support a project." The following real estate interests are required to support the current project design.

Perpetual Beach Storm Damage Reduction Easements will be required over approximately 155 parcels located within the current project footprint. There are approximately 102 privately owned parcels and 53 public access/parking points owned by St. Johns County and the City of St. Johns. The public access/parking points contains 38 nature walking paths and 15 dune walkovers accessible from SR A1A.

The Offshore Borrow Area has changed, as the plan formulation proceeded **and** it was determined that the available offshore sand sources were too far from the Recommended Plan project area to be cost effective. Use of navigation channels and inlet material had been discussed, and these sources are closer to the project area than offshore sand sources and therefore more cost effective. During a Value Engineering (VE) analysis, discussion of sand sources focused on the St. Augustine Inlet system, including the ebb, flood, and Vilano Point shoals as well as the Federal navigation channel. These sources are projected to be cost effective and able to provide the needed volume of sediment to both the Recommended Plan and the ongoing Federal shore protection project at St. Augustine Beach without negatively impacting the inlet system.

The staging areas will require a Temporary Work Area Easement, if not located within the perpetual storm damage reduction easement areas. Staging areas have not yet been identified. Access to the project and the staging areas will be by public roads and NFS-owned lands situated within the project area.

Real Estate Division will coordinate with Florida Department of Transportation (FDOT) regarding the type of instrument required to meet the project requirements for placing fill material within the FDOT right-of-way. If the Real Estate Division determines the instrument is a non-standard estate, it will be submitted to HQ for approval.

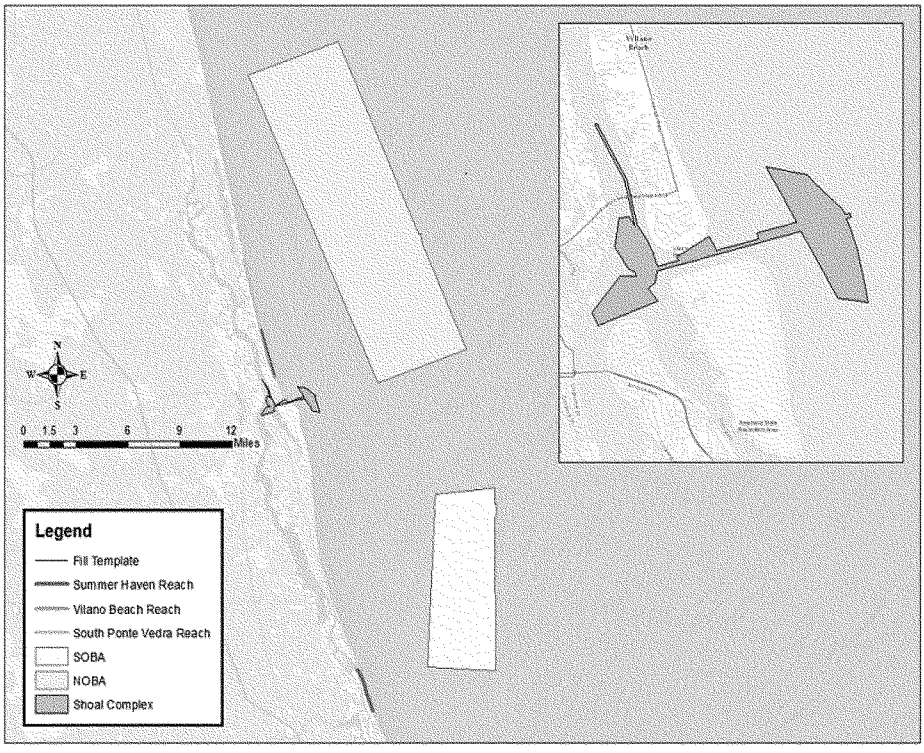


Figure 5-1

The amount of parking is consistent with the attendance used in benefit evaluation." The South Ponte Vedra reach (R84-R104) contains only two signed[1] public access points with parking which significantly limits Federal interest in a potential plan. At the time of this writing, the non-federal sponsor does not intend to add public access or parking in the near future. The Vilano Beach reach (R104-R122) has signed public access every ½ mile with a number of the accesses having adequate public parking. Should it be determined during PED that additional public access is required, acquisition of such public access is the responsibility of the NFS.

[1] "Signed" indicates that there are signs notifying the public of beach access entrances.

6. FEDERALLY GOVERNMENT-OWNED LAND

There is no known lands in the project area owned by the Federal Government.

7. NON FEDERALLY OWNED LAND

The non-Federal lands are owned by the non-Federal Sponsor, the City of St. Johns, Florida Department of Transportation, private landowners and commercial landowners.

8. NON-FEDERAL OPERATION AND MAINTAINANCE RESPONSIBILITIES

St. Johns County will be the NFS for the project. The NFS has the responsibility to acquire all real estate interests required for the Project. The NFS shall accomplish all alterations and relocations of facilities, structures and improvements determined by the government to be necessary for the construction of the Project. The sponsor will have operation and maintenance responsibility for the project once construction has been completed. Future periodic nourishments are considered construction and will be performed in accordance with the Project Partnership Agreement, when approved.

9. NON-FEDERAL SPONSOR'S AUTHORITY TO PARTICIPATE IN PROJECT

St. Johns County, Florida is a political subdivision of the State of Florida as provided by Florida Statute Title XI, Chapter 161, Section 141, Beach and Shore Preservation to, "establish and administer programs of housing, slum clearance, community redevelopment, conservation, flood and beach erosion control, air pollution control, and navigation and drainage and cooperate with governmental agencies and private enterprises in the development and operation of such programs."

St. Johns County has been an integral part of the Project Delivery Team (PDT) from the conception of the project. At each step of the process, the NFS has contributed to the available information and participated in the formulation of this study.

The Assessment of the NFS Real Estate Acquisition Capability is attached as Exhibit 1.

The Risk Letter is attached as Exhibit 2, and advises NFS that lands should not be acquired for the project prior to execution of the Project Partnership Agreement (PPA).

10. NAVIGATION SERVITUDE

In accordance with CECC-R Bulletin 14-05, Availability of the Navigation Servitude for Coastal Storm Damage Reduction Projects dated April 9, 2014, navigational servitude is not applicable to this project.

11. ATTITUDE OF THE LANDOWNERS

The St. Johns County, the City of St. Johns, Florida Department of Transportation, private landowners, commercial landowners, and local communities fully support the project.

12. MINERALS

Preliminary assessment indicates no known present or anticipated mineral or sub-surface mineral extraction activities within the vicinity of the proposed area which may affect construction, operation, or maintenance of the Project.

13. HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

There are no known cultural resources that have been identified as being affected by the project.

14. INDUCED FLOODING

There will be no flooding caused by the construction of the project.

15. ZONING ORDINANCES

Application or enactment of zoning ordinances will not be used in lieu of acquisition.

16. RELOCATIONS ASSISTANCE (PUBLIC LAW 91-646)

No persons, businesses or structures will be impacted by the project. There will be no relocations under PL 91-646 for this project.

17. RELOCATIONS, ALTERATIONS, VACATIONS, AND ABANDONMENTS (UTILITIES, STRUCTURES AND FACILITIES, CEMETERIES, AND TOWNS).

No relocation of the 15 public dune walkovers or the 85 private dune walkovers are planned.

18. STANDING TIMBER AND VEGETATIVE COVER

Existing dune vegetation will be impacted during construction. The Recommended Plan includes planting dune vegetation on newly constructed areas as well as re-vegetating areas disturbed during construction. It will be the responsibility of the non-Federal Sponsor for any necessary dune vegetation during future periodic nourishments

19. RECREATION RESOURCES

There are no separable recreational lands identified for this project.

20. CULTURAL RESOURCES

There are no known cultural resources identified as affected by the project.

21. OUTSTANDING RIGHTS

There are no known outstanding rights in the project area.

22. MITIGATION

There is no mitigation required.

23. ACQUISITION SCHEDULE

The NFS is responsible for acquiring real estate interests required for the project. The Perpetual Storm Damage Reduction Easements will take approximately 12-18 months to acquire once final plans and specifications have been completed and the Project Partnership Agreement has been executed. The Project Sponsor, Project Manager and Real Estate Technical Manager will formulate the milestone schedule upon project approval to meet dates for advertisement and award of the construction contract.

24. ACQUISITION/ADMINISTRATIVE COSTS

Revision to Policy Guidance Letter No. 11, Credit for Lands, Easements, Right-of-Way (LERR) at Shore Protection Projects, dated 21 April 1989, and ER 405-1-12, Real Estate Handbook, directs lands subject to shore erosion required for project purposes be appraised considering special benefits. The intent is to preclude credit for lands needed for shore protection projects, when the increase in value of the remaining lands would

offset compensation for the property as well as any severance damages. Erodible land protected by a Federal project is valued at zero as it will be enhanced post-project.

The estimate of the Federal real estate acquisition administrative cost including a contingency is $1,860,000. This cost includes project real estate planning, mapping, review, oversight, monitoring, crediting review costs of approximately 155 acquisitions, certification of lands required for project purposes, real estate analysis or other requirements that may be necessary during Planning, Engineering and Design (PED). The non-Federal sponsor will receive credit towards its share of real estate administrative project cost incurred for certification.

The estimate of the non-Federal Sponsor administrative costs including a contingency is $1,116,000. This cost includes project real estate planning, mapping, review, oversight, monitoring, and crediting review costs. The non-Federal Sponsor has been provided with requirements regarding acquisition policies and procedures, including compliance with Public Law 91-646, as amended, Land, Easement, Right-of-Way, relocation and Disposal (LERRD) crediting procedures, and milestones for the land acquisition.

25. REAL ESTATE CHART OF ACCOUNTS (FY 16 price levels)

		FEDERAL	NON-FEDERAL
01B	LANDS and DAMAGES	$0	$0
01B40	ADMINISTRATIVES	$1,550,000	$ 930,000
01M00	CONTINGENCIES 28%	$ 434,000	$ 260,400
	Sub-Totals	$1,984,000	$1,190,400
	Total Estimated Real Estate Cost:	**$3,174,400**	

26. ESTATES TO BE ACQUIRED

The standard and non-standard estates have been determined to represent the minimum real estate interest necessary from the non-Federal Sponsor to support the construction of this project.

26-1. STANDARD ESTATES

A perpetual beach storm damage reduction easement will be required over 155 parcels. Temporary Work Area Easements will be required for all staging, stockpiling, permits, fill material placement, temporary work areas for project construction and temporary.

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across the lands described as (Schedule A) (Tract No(s). ___ and ___), for public beginning with date possession of the land is granted to the Project Sponsor, for use by the United States, St. Johns County Coastal Storm Risk Management Feasibility Study Project, its representatives, agents, and contractors as a temporary work area easement for the staging areas, including the right to borrow and/or deposit fill, spoil and waste material thereon, move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the St. Johns Coastal Storm Risk Management Feasibility Study Project, together with the right to trim, cut, fell and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

PERPETUAL BEACH STORM DAMAGE REDUCTION EASEMENT

A perpetual and assignable easement and right-of-way, in, on, over and across the lands described as (Schedule A) (Tract No. _____) for use by the St. Johns County Coastal Storm Risk Management Feasibility Study Project, for use by the St. Johns County Board of Commissioner, it representatives, agents, contractors, and assigns, to construct; preserve; patrol; operate; maintain; repair; rehabilitate; and replace; a public beach [a dune system] and other erosion control and storm damage reduction measures together with appurtenances thereto, including the right to deposit sand; to accomplish any alterations of contours on said land; to construct berms [and dunes and walkovers); to nourish and re-nourish periodically; to move, store and remove equipment and supplies; to erect and remove temporary structures; and to perform any other work necessary and incident to the construction, periodic renourishment and maintenance of the (Project Name), together with the right of public use and access; to plant vegetation on sand dunes and berms; to erect, maintain and remove silt screens and sand fences; to facilitate preservation of dunes and vegetation through the limitation of access to dune areas; to trim, cut, fell, and remove from said land all trees, underbrush, debris, obstructions, and any other vegetation, structures and obstacles within the limits of the easement; reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns, the right to construct dune over walk structures in accordance with any applicable Federal, State or local laws or regulations, provided that such structures shall not violate the integrity of the dune in shape, dimension or function, and that prior approval of the plans and specifications for such structures is obtained from the (designated representative of the Project Sponsor) and provided further that such structures are subordinate to the construction, operation, maintenance, repair, rehabilitation and replacement of the project; and further

reserving to the grantor(s), (his) (her) (its) (their) (heirs), successors and assigns all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights and easements hereby acquired; subject however to existing easements for public roads and highways, public utilities, railroads and pipelines.

26-2. NON STANDARD ESTATES

As noted in Section 5, Real Estate Requirements; a Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization for use of lands seaward of the ECL is required from the State of Florida. The Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization is considered a non-standard estate. Approvals to use the non-standard estates is requested as part of the approval of this Real Estate Plan. A sample of the document is attached as Exhibit 4.

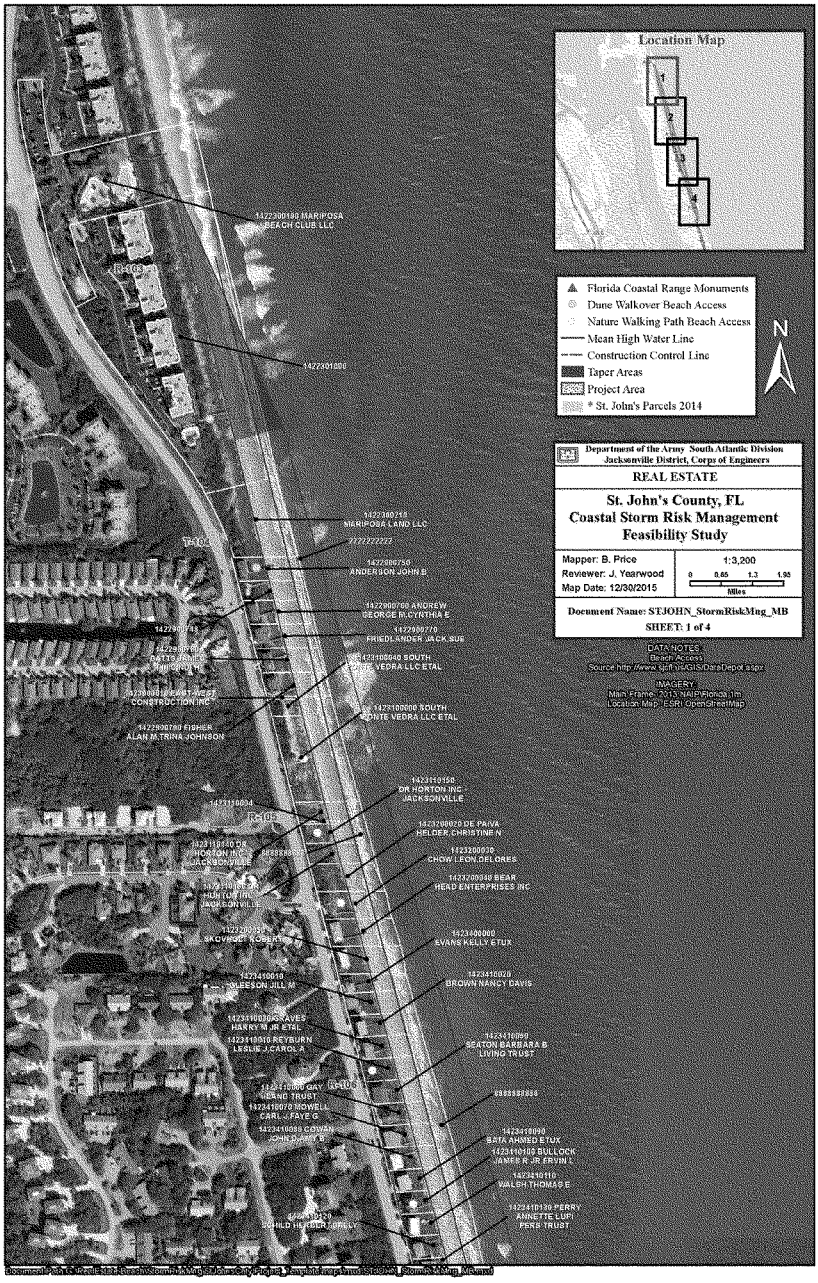
A Memorandum of Agreement between the Bureau of Ocean Energy Management, the U.S. Army Corps of Engineers, and the NFS will be executed pursuant to 43 United States Code, Section 1337(k) (2) Agreements for Use of Resources for Shore Protection, Beach or Coastal Wetlands Restoration, or other Projects, "the Secretary may negotiate with any person an agreement for the use of the Outer Continental Shelf sand, gravel and shell resources for (1) for use in a program of, or project for, shore protection, beach restoration, or local government agency, or (2) for use in a construction project, that is funded in whole or in part by or authorized by the Federal Government. A sample of the document is attached as Exhibit 3.

27. REAL ESTATE PROJECT MAPS



NOTE: Dune Walker Beach Access shown are not necessarily all public accesses with adequate parking.

Real Estate Project Map No. 1 of 6



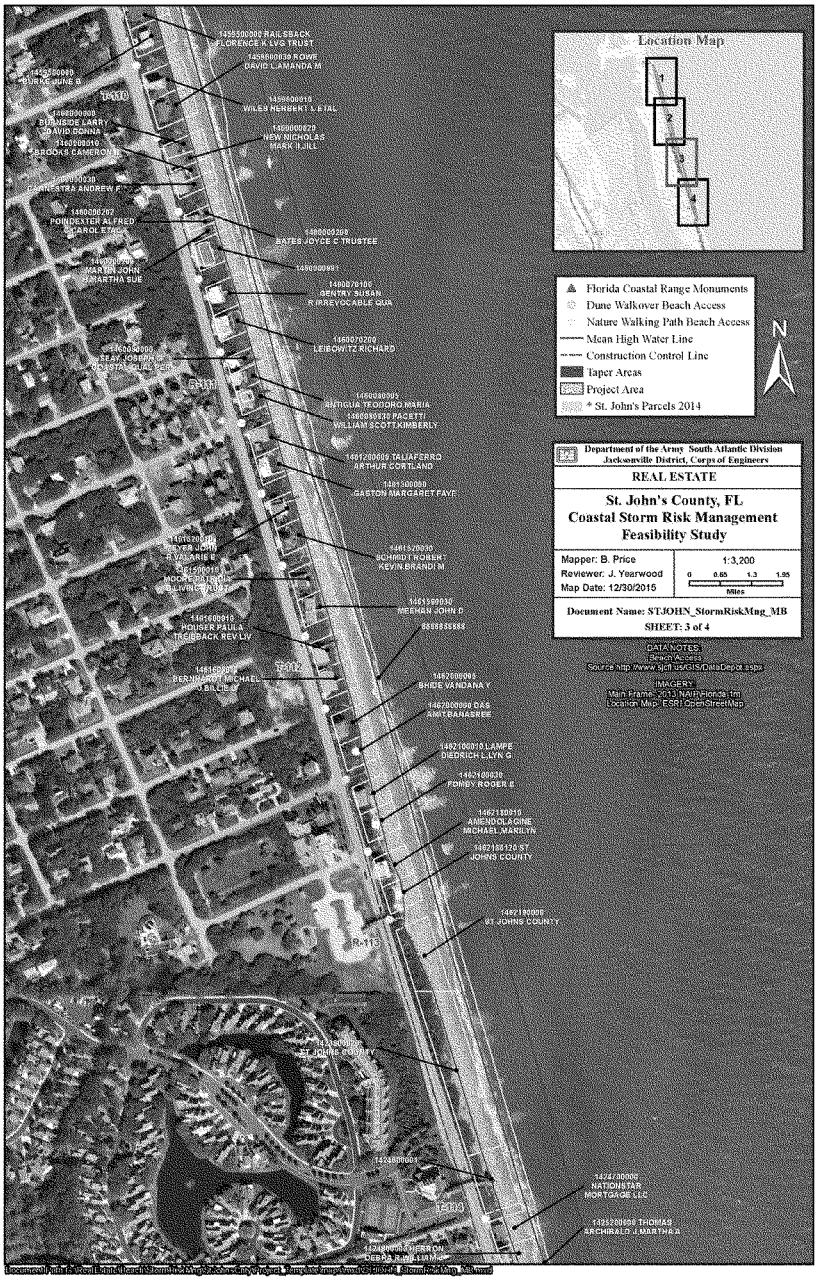
NOTE: Dune Walker Beach Access shown are not necessarily all public accesses with adequate parking.

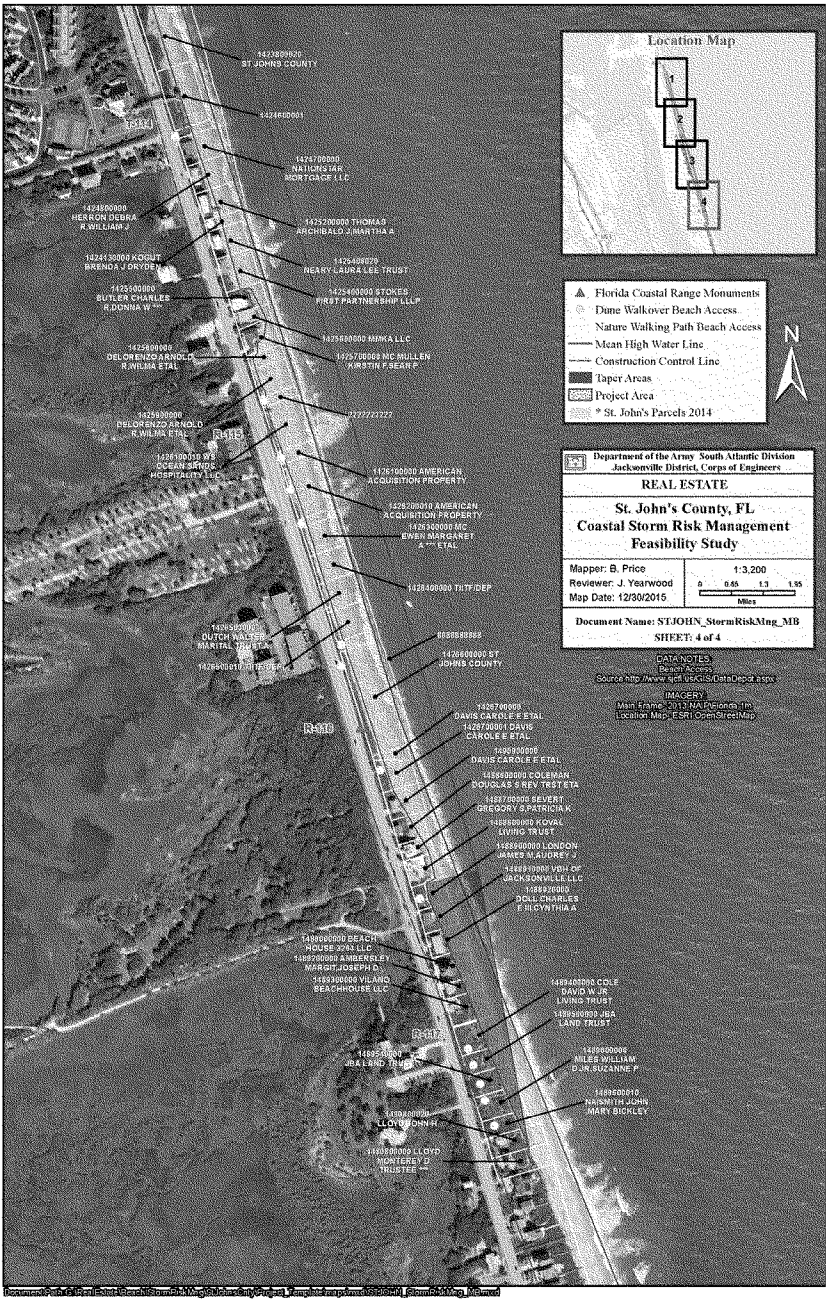
Real Estate Project Map No. 2 of 6



NOTE: Dune Walker Beach Access shown are not necessarily all public accesses with adequate parking.

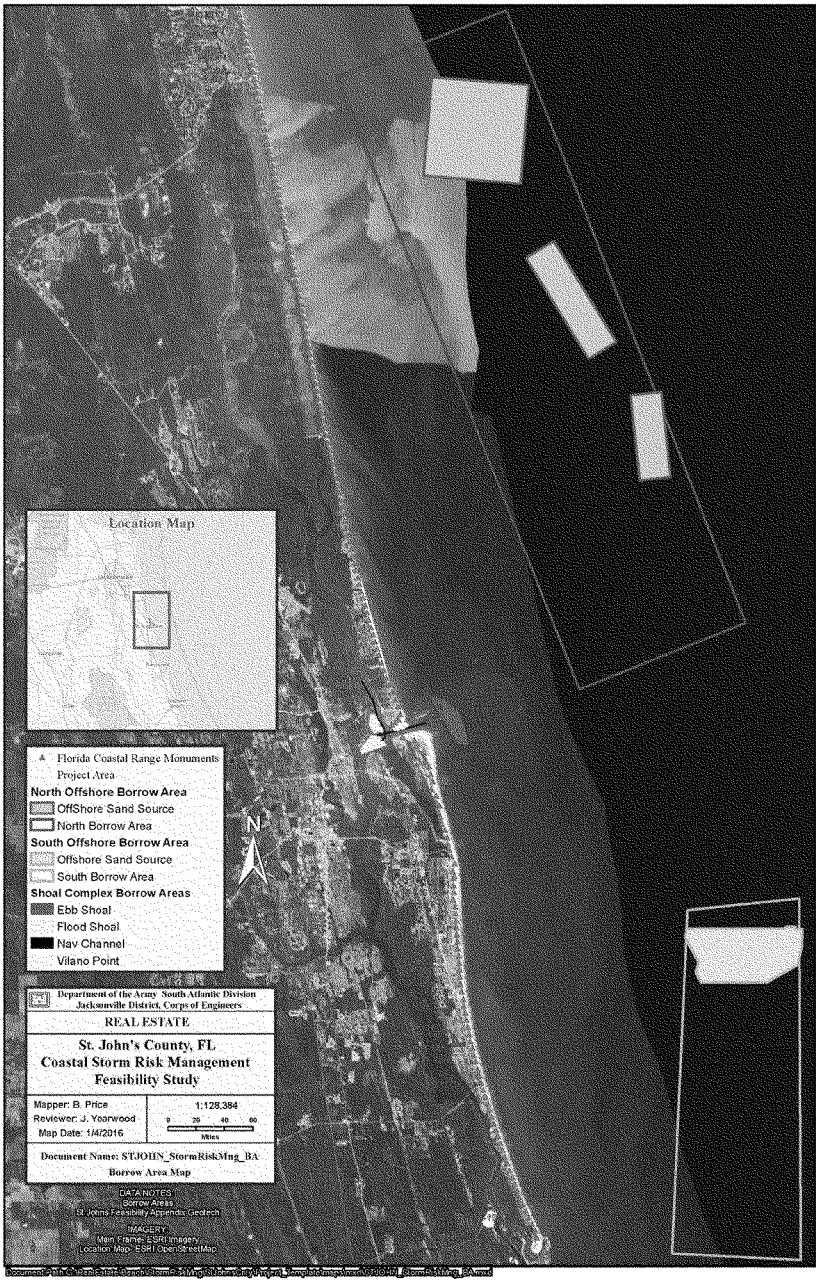
Real Estate Overview Project Map No. 3 of 6


Location Map
Florida Coastal Range Monuments
Dune Walkover Beach Access
Nature Walking Path Beach Access
Mean High Water Line
Construction Control Line
Taper Areas
Project Area
* St. John's Parcels 2014
N
Department of the Army South Atlantic Division
Jacksonville District, Corps of Engineers
REAL ESTATE
St. John's County, FL
Coastal Storm Risk Management
Feasibility Study
Mapper: B. Price
Reviewer: J. Yearwood
Map Date: 12/30/2015
1:3,200
0 0.65 1.3 1.95
Miles
Document Name: STJOHN_StormRiskMng_MB
SHEET: 3 of 4
DATA NOTES
Beach Access
Source:http://www.sjcfl.us/GIS/DataDepot.aspx
IMAGERY
Main Frame: 2013 NAIP Florida 1m
Locator Map: ESRI OpenStreetMap
1405500000 RAILSBACK FLORENCE K LVG TRUST
1405500030 ROWE DAVID LAMANDA M
1405500010 WILES HERBERT L ETAL
1405500020 NEW NICHOLAS MARK II JILL
1405500030 CONSTRA ANDREW F
1405500040 POINDEXTER ALFRED CAROL ETAL
1405500050 BATES JOYCE C TRUSTEE
1405500060
1405500070 SEAY JOSEPH M MARTHA SUE
1405500080 SEAY JOSEPH M MARTHA SUE
1405500090 ANTIGUA TEODORO MARIA
1405500100 PACETTI WILLIAM SCOTT KIMBERLY
1405500110 TALIAFERRO ARTHUR CORTLAND
1405500120 GASTON MARGARET FAYE
1405500130 TYER JOHN H VALARIE B
1405500140 BOOKE CAROL WILLIAM
1405500150 HOUSER PAULA TRSEBACK REV LIV
1405500160 BERNHARDT MICHAEL H BILCSEY
1405500170 SCHMIDT ROBERT KEVIN BRANDI M
1405500180 MEEHAN JOHN D
1405500190 BRIDE VANDANA Y
1405500200 DAS AMITABA&SREE
1405500210 LAMPE DIEDRICH LYN C
1405500220 POMPEY ROBERT E
1405500230 AMENDOLAGINE MICHAEL MARILYN
1405500240 ST JOHNS COUNTY
1405500250 ST JOHNS COUNTY
1405500260 ST JOHNS COUNTY
1405500270
1405500280 NATIONSTAR MORTGAGE LLC
1405500290 THOMAS ARCHIBALD J MARTHA R
1405500300 BROWN JEFFERSON DEBRA R WILLIAM
R-115
R-116
R-117
R-118
R-119
R-120
R-121
R-122
R-123
R-124
R-125
R-126
R-127
R-128
R-129
R-130
R-131
R-132
R-133
R-134
R-135
R-136
R-137
R-138
R-139
R-140
R-141
R-142
R-143
R-144
R-145
R-146
R-147
R-148
R-149
R-150
R-151
R-152
R-153
R-154



NOTE: Dune Walker Beach Access shown are not necessarily all public accesses with adequate parking.

Real Estate Project Map No. 5 of 6



Real Estate Project Map No. 6 of 6

EXHIBIT NO. 1

FINAL- ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION
CAPABILITY FOR
ST. JOHNS COUNTY COASTAL
STORM RISK MANAGEMENT FEASIBILITY STUDY

EXHIBIT NO. 1

FINAL – ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY FOR SAINT JOHN'S COUNTY COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? YES
b. Does the sponsor have the power of eminent domain for this project? YES
c. Does the sponsor have 'quick-take" authority for this project? YES
d. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? NO
e. Are any of the interests in land required for the project located outside the sponsor's political boundary? NO
f. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? NO

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require technical training to become familiar with the real estate requirements of Federal projects including Public Law 91-646, as amended? NO
b. If the answer to IIa. Is "yes" has a reasonable plan been developed to provide such training? NO
c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? YES
d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? YES
e. Can the sponsor obtain contractor support, if required in a timely fashion? YES
f. Will the sponsor likely request USACE assistance in acquiring real estate? Unknown at this time

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site? YES
b. Has the sponsor approved the project/real estate schedule/milestones? Project milestone will be developed during PED, will be joint effort between RE, PM and NFS

IV. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects? NO
b. With regard to this project, the sponsor is anticipated to be: Highly capable

V. Coordination:
a. Has this assessment been coordinated with the sponsor? YES
b. Does the sponsor concur with this assessment? YES

DATE: 6 January 2016

Prepared by

Katherine C. Rivers
Realty Specialist
Real Estate Division
Jacksonville District

Reviewed by:

for Hansler A. Bealyer
Chief, Acquisition Branch
Real Estate Division
Jacksonville District

Reviewed and Approved by:

Audrey C. Ormerod
Chief, Real Estate Division
Real Estate Division
Jacksonville District

EXHIBIT NO. 2

RISK LETTER

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Real Estate Division

1 January 2016

Ms. Mary A. Blount
Director of Land Management
Saint John's County, Board of County Commissioner
500 San Sebastian View
St. Augustine, FL 32084

Dear Ms. Blount;

The intent of this letter is to formally advise the Saint John's County as the non-Federal sponsor for the Saint John's County Coastal Storm Risk Management Feasibility Study, of the risks associated with land acquisitions prior to the execution of the Project Partnership Agreement (PPA) or prior to the Government's formal Notice to Proceed with the real estate acquisition. If a non-Federal sponsor deems it necessary to commence acquisition prior to an executed PPA for whatever reason, the non-Federal sponsor assumes full and sole responsibility for any and all costs, responsibility, or liability arising out of the acquisition effort.

Generally, these risks include, but may not be limited to the followings:

a. Congress may not appropriate funds to construct the proposed project;

b. The proposed project may otherwise not be funded or approved for construction;

c. A PPA mutually agreeable to the non-Federal sponsor and the Government may not be executed and implemented;

d. The non-Federal sponsor may incur liability and expense by virtue of its ownership of contaminated lands, or interests therein, whether such liability should arise out of local, state, or Federal laws, or regulations including liability arising out of Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended;

e. The non-Federal sponsor may acquire interests or estates that are later determined by the Government to be inappropriate, insufficient, or otherwise not required for the project;

Printed on Recycled Paper

f. The non-Federal sponsor may initially acquire insufficient or excessive real property acreage which may result in additional negotiations and/or benefit payments under Public Law 91-646, as well as, the payment of additional fair market value to affected landowners which could have been avoided by delaying acquisition until after the PPA execution and the Government's notice to commence acquisition; and performance of LERRD; and

g. The non-Federal sponsor may incur costs or expenses in connection with its decision to acquire real estate interest and/or perform LERRD in advance of the executed PPA and the Government's notice to proceed which may not be creditable under the provisions of Public Law 99-662 or the PPA.

We appreciate the County's participation in this project. Should you have questions or concerns pertaining to this letter please contact, Mrs. Katherine Rivers by phone: (904) 232-1656 or by email: Katherine.C.Rivers@usace.army.mil.

Sincerely,

Audrey C. Ormerod

Audrey C. Ormerod
Jacksonville District
Chief, Real Estate Division

CC:
Mr. Press Tompkins, P. E. County Engineer
Saint John's County, Board of County Commissioner
500 San Sebastian View
St. Augustine, FL 32084

EXHIBIT 3

SAMPLE Memorandum of Agreement (Federal Borrow Areas)

SAMPLE Memorandum of Agreement (Federal Borrow Areas)

MEMORANDUM OF AGREEMENT
AMONG
THE BUREAU OF OCEAN ENERGY MANAGEMENT
OF THE DEPARTMENT OF THE INTERIOR
AND THE
CORPS OF ENGINEERS
OF THE DEPARTMENT OF THE ARMY
AND
~~MIAMI-DADE COUNTY~~
BOARD OF COUNTY COMMISSIONERS, FLORIDA

REGARDING THE USE OF OUTER CONTINENTAL SHELF SAND RESOURCES FOR BEACH EROSION CONTROL AND HURRICANE PROTECTION IN ~~MIAMI-DADE~~ COUNTY, FLORIDA

BOEMRE Negotiated Agreement No. OCS - AXXXX

Title I. Explanatory Recitals

A. Pursuant to the authority and in accordance with the requirements of Flood Control Act of 1968 (H.D. No. 335/90/2), Water Resources Development Act (WRDA) of 1974 (Public Law 93-251, Section 69)and the WRDA of 1986 (Public Law 99-662), the Department of the Army, acting through the United States Army Corps of Engineers (USACE), with the cooperation of ~~Miami-Dade~~ County Board of County Commissioners (hereinafter referred as the County), are endeavoring to conduct a nourishment of beach along the Miami-Dade County, Florida shoreline.

B. USACE and the County have undertaken a project in furtherance of the abovementioned goals to renourish the shoreline along ~~Miami-Dade County~~, Florida, (herein referred to as the "Project").

C. In accordance with the requirements of the Flood Control Act of 1968 (H.D. No. 335/90/2), Water Resources Development Act of 1974 (PL 93-251, Section 69) and the WRDA of 1986 (PL 99-662), the County has procured lands, easements, and rights-of-way (collectively, "Land Rights") as necessary from upland landowners, other property right holders, public entities, and other persons and entities as appropriate scope and duration for facilitate the Project.

D. USACE, which is acting as the project manager for the Project, now seeks to obtain sand in a manner that minimizes costs and leverages Federal resources.

Title II. Purpose and Authority

A. The Department of the Interior (DOI), acting through the Bureau of Ocean Energy Management, Regulation and Enforcement (Bureau) or any iteration of its designation, enters into this Memorandum of Agreement (MOA) with the County and the USACE providing for the use of up to 500,000 cubic yards of Outer Continental Shelf sand resources ("OCS sand resources") for the Project under the authority of Section 8(k)(2)

of the Outer Continental Shelf Lands Act (OCSLA) (43 U.S.C. § 1337(k)(2)). The term "OCS sand resources" means the sediment deposits found on or below the surface of the seabed on the Outer Continental Shelf (OCS), as defined in Section 2(a) of the OSCLA (43 U.S.C. § 1331(a)). This MOA authorizes the County or the USACE, as appropriate, to use OCS sand from the _____, as designated and delineated in Table 1 and on the attached map (Attachment 1), in accordance with the terms of this MOA. After removal of the sand from the OCS and placement of those resources as specified in this MOA, the Bureau has no jurisdiction over those sand resources unless they return to the OCS.

Table 1: _____ Borrow Area Coordinates. Longitude and Latitude in Geographic Coordinate System NAD 1983. Easting and Northing in Florida State Plane Coordinate System (ft) NAD 1983.

	Lat.	Long.	X (NAD83 FLE)	Y (NAD83 FLE)
A				
B				
C				
D				
E				
F				
G				
H				
I				
J				
K				
L				
M				

B. The Bureau, under the authority delegated by the Secretary of the Interior, is authorized, pursuant to Section 8(k)(2) of the OCSLA (43 U.S.C. § 1337 (k)(2)) to enter into this MOA concerning the potential use of OCS sand resources.

The Bureau has determined that the Project meets the requirements of Section 8(k)(2)(A)(i) of the OCSLA. Therefore, in accordance with Section 8(k)(2), and subject to the terms and conditions as contained herein, the Bureau hereby authorizes the use of OCS sand resources from the _____ identified in Table 1 for the construction of the Project. The parties acknowledge that under the terms of Section 8(k)(2)(B), the Bureau will not assess any fee against the County or the USACE for the use of the OCS sand resources described herein.

Nothing in this MOA is intended to abrogate or diminish the Secretary of the Interior's authority under the OCSLA to oversee and regulate the removal of OCS sand.

C. USACE, which is undertaking this project pursuant to authority granted to it in accordance with Flood Control Act of 1968 (H.D. No. 335/90/2), Water Resources Development Act of 1974 (P.L. 93-251, Section 69)and the WRDA of 1986 (P.L. 99-662), enters into this MOA in compliance with requirements of section 8(k)(2)(D) of the OCSLA. The County, who has

procured and assigned Land Rights of appropriate scope and duration to facilitate the Project, enters into this MOA in compliance with requirements of section 8(k)(2)(A)(i) of the OCSLA.

Nothing in this MOA is intended to impede or hinder the County's or the USACE's ability to complete the Project or abrogate or diminish either's authority or responsibilities under applicable law, including but not limited to Section 101(b)(7) of the Water Resources Development Act of 1996, Public Law 104-303, National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Marine Mammal Protection Act (MMPA), National Historic Preservation Act (NHPA), or the Coastal Zone Management Act (CZMA).

Title III. Project Description

Designated, under Flood Control Act of 1968 (H.D. No. 335/90/2), Water Resources Development Act of 1974 (P.L. 93-251, Section 69)and the WRDA of 1986 (P.L. 99-662), as the Beach Erosion Control and Hurricane Protection Project, the Project is intended to restore the proper ecological function of a beach and facilitate beach stabilization. USACE anticipates extracting _____ cubic yards of sand resources to stabilize the shoreline and reconstruct the beach. The OCS sand resources will be extracted from the _____ Borrow Area, as designated and delineated on the attached map (Attachment 1).

Title IV. Provisions

A. The Bureau authorizes the use of OCS sand from the _____ Borrow Area. The USACE or its contractor(s) shall extract, transport, and place such OCS sand resources from the borrow area in accordance with the terms and conditions set forth below and in accordance with the Department of Environmental Protection - Consolidated Joint Coastal Permit and Sovereign Submerged Lands Authorization Permit No. _____. Except as provided above, the parties agree that all other aspects of the Project's execution and completion remain as described in the Local Cooperation Agreement between the Department of the Army and for Construction of the Beach Erosion Control and Hurricane Protection Project entered into agreement on _____.

B. This MOA applies only to the extraction, transportation, and placement described above. The MOA shall terminate or expire upon (1) the USACE sending written notice to Chief, Bureau of Ocean Energy Management, Regulation and Enforcement, Leasing Division, 381 Elden Street, MS 4010, Herndon, Virginia 20170, that USACE has received sufficient sand to complete the Project, two years from the date of execution of this MOA, whichever occurs first. Upon request by USACE, the parties may agree to extend the terms of the MOA as necessary to provide USACE and its contractor(s) with additional time to complete the Project. The parties acknowledge that there may be a potential need for future OCS sand resources for periodic maintenance, augmentation or construction purposes. The Bureau, the USACE, and the County may enter into subsequent agreements, as may be required in the future, consistent with each party's respective responsibilities under applicable law.

C. The Bureau, the USACE, and the County recognize that planning and coordination among the three parties will ensure that responsibilities under the OCSLA, other applicable Federal laws, and this Congressionally-authorized Project are carried out and accommodated in an efficient and timely manner so that the project schedule will not be unnecessarily delayed or

compromised. All parties recognize that the Bureau, as a bureau in the DOI, has certain responsibilities for the orderly, timely, and efficient recovery of OCS minerals using the best available technology while ensuring environmental stewardship and compliance. Moreover, the parties further recognize that USACE has certain stewardship and environmental compliance responsibilities that are separate and distinct from the responsibilities of the Bureau. To these ends, and with respect to the Project, the Bureau, USACE, and the County agree to the following terms:

1. Notification of Activity in or near the Borrow Areas

USACE will notify the Bureau at dredgeinfo@boemre.gov of the commencement and termination of the construction operations at _____ borrow area within 24 hours after USACE receives such notification from its contractor(s) for the Project. The Bureau will notify USACE in a timely manner of any OCS activity within the jurisdiction of the DOI that may adversely affect USACE's ability to use OCS sand for the Project.

2. Environmental Responsibilities and Environmental Compliance

USACE is the lead agency on behalf of the Federal government to ensure the Project complies with applicable environmental laws, including but not limited to the Endangered Species Act, Magnuson-Stevens Fishery Management and Conservation Act, Migratory Bird Treaty Act, National Historic Preservation Act, and Coastal Zone Management Act.

USACE will serve as the lead Federal agency for Endangered Species Act (ESA) Section 7 consultation concerning protected species under the purview of U.S. Fish and Wildlife Service (U.S. FWS) and National Marine Fisheries Service (NMFS). USACE will instruct its contractor(s) to implement the mitigation and monitoring terms, conditions, and measures required by the U.S. FWS, NMFS, Florida Department of Environmental Protection (FDEP), and the Bureau pursuant to applicable Federal and State laws and regulations. The required mitigation terms, conditions, and measures are reflected in the attached Biological Opinions, Conservation Recommendations (and related correspondence), and Joint Coastal Permit Final Order No._____.

USACE is responsible for compliance with the Specific Conditions of the Joint Coastal Permit, including implementation of turbidity monitoring and the Sediment Quality Control/Quality Assurance Plan. ~~Miami-Dade~~ Department of Environmental Resources Management (DERM) is responsible for compliance with certain monitoring and contingency mitigation requirements for the Project, including implementation of the requirements of the Final Physical and Biological Monitoring Plan and Contingency Mitigation Plan. Prior to the commencement of the Project, USACE and DERM will invite the Bureau to participate in any conference with FDEP to review specific conditions and monitoring requirements. Construction shall not commence until the pre-construction requirements of the Final Physical and Biological Monitoring Plan have been completed.

Copies of all relevant correspondence, monitoring reports, and other technical reports shall be provided to the Bureau at dredgeinfo@boemre.gov within 30 days of its completion. If physical and/or biological monitoring confirms that unexpected adverse

impacts are occurring in the vicinity of _____ borrow area, USACE and DERM will invite the Bureau to participate in any effort to further study the impacts and/or undertake corrective, remedial, and/or compensatory action.

3. Dredge Positioning

During all phases of the Project, USACE will ensure that the dredge and any bottom disturbing equipment is outfitted with an onboard global positioning system (GPS) capable of maintaining and recording location within an accuracy range of no more than plus or minus 3 meters. The GPS must be installed as close to the cutterhead or draghead as practicable. An exclusionary buffer of _____ ft has been established around documented hardbottom and reef features adjacent to the proposed borrow area. The borrow area design reflects the required buffer. During dredging operations, USACE will immediately notify the Bureau at dredgeinfo@boemre.gov if dredging occurs outside of the approved borrow area. Anchoring, spudding, or other bottom disturbing activity is to be avoided outside the authorized borrow area on the OCS.

USACE will provide the Bureau all Dredging Quality Management (DQM) data acquired during the project using procedures jointly developed by the USACE's National Dredging Quality Management Data Program Support Center and the Bureau. USACE will submit the DQM data, including draghead status and depth, to dredgeinfo@boemre.gov biweekly. A complete DQM dataset will be submitted within 45 days of completion of the Project.

4. Local Notice to Mariners

USACE shall require its contractor(s) for the Project to place a notice in the U.S. Coast Guard Local Notice to Mariners regarding the timeframe and location of dredging and construction operations in advance of commencement of dredging.

5. Marine Pollution Control and Contingency Plan

USACE will require its contractor(s) and subcontractor(s) to prepare for and take all necessary precautions to prevent discharges of oil and releases of waste and hazardous materials that may impair water quality. In the event of an occurrence, notification and response will be in accordance with applicable requirements of 40 C.F.R. 300. All dredging and support operations shall be compliant with U.S. Coast Guard regulations and the Environmental Protection Agency's Vessel General Permit, as applicable. USACE will notify the Bureau of any occurrences and remedial actions and provide copies of reports of the incident and resultant actions at dredgeinfo@boemre.gov.

6. Encounter of Ordinance

If any ordinance is encountered while conducting dredging activities at _____ borrow area, USACE will report the discovery within 24 hours to Chief, BOEMRE Leasing Division, at (703) 787-1215 and dredgeinfo@boemre.gov.

7. Archeological Resources

Onshore Prehistoric or Historic Resources
If USACE discovers any previously unknown historic or archeological remains while

accomplishing activity on ~~Miami-Dade~~ Beaches, USACE will notify the Bureau of any finding. USACE will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Offshore Prehistoric or Historic Resources
In the event that the dredge operators discover any archaeological resource while conducting dredging operations in _____ borrow area, USACE shall require that dredge and/or pump-out operations be halted immediately within _____ of the area of discovery. USACE shall then immediately report the discovery to Chief, BOEMRE Leasing Division, at (703) 787-1215. If investigations determine that the resource is significant, the parties shall together determine how best to protect it.

8. Bathymetric Surveys

USACE will provide the Bureau with pre- and post-dredging bathymetric surveys of _____ borrow area. The pre-dredging survey will be conducted within 30 days prior to dredging. The post-dredging survey will be conducted within 30 days after the completion of dredging. USACE will also provide the Bureau a bathymetric survey performed between 1 year and 3 years following the completion of dredging. Hydrographic surveys will be performed in accordance with the USACE Hydrographic Surveying Manual EM 1110-2-1003 unless specified otherwise. One hundred percent coverage using interferometric swath or multibeam bathymetry data is preferred over single-beam data. All bathymetric data shall be roll, pitch, heave, and tide corrected. Survey lines of the specific dredge area, within Unnamed Shoal A, will be established at no greater than 50 m intervals perpendicular to a baseline. Three equidistant cross-tie lines will be established parallel to the same baseline. Survey lines will extend at least 50 m beyond the edge of the dredge areas. All data shall be collected in such a manner that post-dredging bathymetry surveys are compatible with the pre-dredging bathymetric survey data to enable the latter to be subtracted from the former to calculate the volume of sand removed, the shape of the excavation, and nature of post-dredging bathymetric change.

Copies of pre-dredging and post-dredging hydrographic data will be submitted to the Bureau via dredgeinfo@boemre.gov within thirty (30) days after each survey is completed. The delivery format for data submission is an ASCII file containing x,y,z data. The horizontal data will be provided in the North American Datum of 1983 (NAD '83) Florida State Plane, U.S. survey feet. Vertical data will be provided in the North American Vertical Datum of 1988 (NAVD '88), U.S. survey feet. An 8.5x11" plan view plot of the pre- and post-construction data will be provided showing the individual survey points, as well as contour lines at appropriate elevation intervals. These plots will be provided in PDF format.

9. Submittal of Production and Volume Information

USACE, in cooperation with the dredge operator, shall submit to the Bureau on a biweekly basis a summary of the dredge track lines, outlining any deviations from the original Plan. A color-coded plot of the cutterhead or drag arms will be submitted, showing any horizontal or vertical dredge violations. The dredge track lines shall show dredge status: hotelling, dredging, transiting, or unloading. This map will be provided in PDF format.

USACE will provide at least a biweekly update of the construction progress including estimated

volumetric production rates to the Bureau. The biweekly deliverables will be provided electronically to dredgeinfo@boemre.gov. The project completion report, as described below, will also include production and volume information, including Daily Operational Reports.

10. Plans and Performance Requirements

USACE will provide the Bureau with a copy of the Project's "Construction Solicitation and Specifications Plan," including final project drawings, prior to construction (herein referred to as the "Plan"). No activity or operation authorized by the negotiated agreement (herein referred to as the Memorandum of Agreement or MOA) at _____ borrow area shall be carried out until the Bureau has had an opportunity to review the Plan, thus ensuring that each activity or operation is conducted in a manner that is in compliance with the provisions and requirements of the MOA. USACE will ensure that all operations at _____ borrow area are conducted in accordance with the final approved Plan and all terms and conditions in this MOA, as well as all applicable regulations, orders, guidelines, and directives specified or referenced herein.

The preferred method of obtaining and conveying sediment from _____ borrow area involves the use of a hopper dredge. The MOA does not implicitly authorize use of a cutterhead dredge. USACE will allow the Bureau to review and comment on modifications to the Plan, including the use of a cutterhead dredge and/or submerged or floated pipelines to convey sediment that may affect the project area. Said comments shall be delivered in a timely fashion in order to not delay the USACE's construction contract or schedule.

Prior to the commencement of construction, USCAE shall provide a summary of the construction schedule. USACE, at the reasonable request of the Bureau, shall allow access, at the site of any operation subject to safety regulations, to any authorized Federal inspector and shall provide the Bureau any documents and records that are pertinent to occupational or public health, safety, or environmental protection as may be requested.

11. Responsibility for Damages

The Bureau does not warrant that the OCS sand resources used in this project are suitable for the purpose for which they are intended.

12. Project Completion Report

A project completion report will be submitted by USACE to the Bureau within 120 days following completion of the activities authorized under this MOA. This report and supporting materials should be sent to Chief, BOEMRE Leasing Division, 381 Elden Street, MS 4010, Herndon, Virginia 20170 and dredgeinfo@boemre.gov. The report shall contain, at a minimum, the following information:

- the names and titles of the project managers overseeing the effort (for USACE, the engineering firm (if applicable), and the contractor), including contact information (phone numbers, mailing addresses, and email addresses);
- the location and description of the project, including the final total volume of material extracted from the borrow area and the volume of material actually placed on the beach or shoreline (including a description of the volume calculation method used to determine these volumes);
- ASCII files containing the x,y,z and time stamp of the cutterhead or drag arm locations;

- a narrative describing the final, as-built features, boundaries, and acreage, including the restored beach width and length;
- a table, an example of which is illustrated below, showing the various key project cost elements;

	Project Cost Estimate ($)	Cost Incurred as of Construction Completion ($)
Construction		
Engineering and Design		
Inspections/Contract Administration		
Total		

- a table, an example of which is illustrated below, showing the various items of work construction, final quantities, and monetary amounts;

Item No.	Item	Estimated Quantity	Unit	Unit Price	Estimated Amount	Final Quantity	Bid Unit Price	Final Amount	% Over/ Under
1	Mobilization and Demobilization								
2	Beach Fill								
3	Any beach or offshore hard structure placed or removed								

- a listing of construction and construction oversight information, including the prime and subcontractor(s), contract costs, etc.;
- a list of all major equipment used to construct the project;
- a narrative discussing the construction sequences and activities, and, if applicable, any problems encountered and solutions;
- a list and description of any construction change orders issued, if applicable;
- a list and description of any safety-related issues or accidents reported during the life of the project;
- a narrative and any appropriate tables describing any environmental surveys or efforts associated with the project and costs associated with these surveys or efforts;
- a table listing significant construction dates beginning with bid opening and ending with final acceptance of the project by USACE;
- digital appendices containing the as-built drawings, beach-fill cross-sections, and survey data; and any additional pertinent comments.

13. Sharing of Information

Consistent with the purpose stipulated by the parties in Title II, the USACE, the County, and Bureau agree to: (1) share all information needed for or generated from the Project, including

the sharing of implementation and other applicable schedules; (2) provide such information to the requesting agency as expeditiously as possible; and (3) work to ensure that all required completion report information is received.

14. Resolution of Disputes

The parties agree to make every attempt to settle any disputes regarding this MOA at the lowest operational level. In the case of a (1) substantial disagreement between Bureau and the USACE or between Bureau and the County with respect to any aspect of the Bureau's authorization of the use of OCS sand resources in accordance with the terms and conditions as specified or (2) any alleged breach by a party of the terms and conditions as specified herein, the undersigned will designate a senior management official in their respective agencies to state the area(s) of disagreement or alleged breach in writing and present such statement to the other party for consideration. If resolution is not reached within 60 days, the undersigned shall request the active participation of the District Commander, Jacksonville District of the U.S. Army Corps of Engineers, the Associate Director, Offshore Energy and Minerals Management, Bureau, and the County Mayor.

15. Miscellaneous

This MOA shall not affect any pre-existing or independent relationships or obligations among the Departments of Interior, the USACE, and the County, including any other relationships or obligations between Bureau and the USACE, or any other units of such Departments.

All rights in the _____ Borrow Area not expressly granted to the USACE and County by the OCSLA or this MOA are hereby reserved to the Bureau. The Bureau reserves the right to authorize other uses in the _____ Borrow Area that will not unreasonably interfere with activities authorized under this MOA. The Bureau will allow USACE and the County to review and comment on any proposed authorizations for the use of sand in the _____ Borrow Area while this MOA is in effect.

Nothing herein is intended to conflict with current USACE, County, or Bureau directives. If the terms of this MOA are inconsistent with existing directives of any of the parties entering into this MOA, then those portions of this agreement which are determined to be inconsistent shall be invalid, but the remaining terms and conditions not affected by the inconsistency shall remain in full force and effect. At the first opportunity for review of the MOA, all necessary changes will be accomplished either by an amendment to this MOA or by entering into a new MOA, whichever is deemed expedient to the interest of the parties.

_____

_____

_____ for
Offshore Energy and Minerals Management
Bureau of Ocean Energy Management,
Regulation and Enforcement
Department of the Interior
Date: _____

_____

Colonel, U.S. Army
District Commander
Jacksonville District
U.S. Corps of Engineers
Date: _____

_____

Mayor, ~~Miami-Dade County~~
Date: _____

EXHIBIT 4

SAMPLE - Sovereign Submerged Lands Easement
State of Florida Borrow Areas

(SAMPLE) Sovereign Submerged Lands Easement
(State of Florida Borrow Areas and Rock Disposal Area)

This Instrument Prepared By:
James Wright
Recurring Revenue Section
Bureau of Public Land Administration
3900 Commonwealth Boulevard
Mail Station No. 125
Tallahassee, Florida 32399

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
OF THE STATE OF FLORIDA

SOVEREIGNTY SUBMERGED LANDS EASEMENT

NO. 41341
BOT FILE NO: 130235776
PA NO. 02955427-001-JC

THIS EASEMENT is hereby granted by the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, hereinafter referred to as the Grantor.

WITNESSETH: That for the faithful and timely performance of and compliance with the terms and conditions stated herein, the Grantor does hereby grant to Miami-Dade County, Florida, hereinafter referred to as the Grantee, a nonexclusive easement on, under and across the sovereignty lands, if any, contained in the following legal description:

A parcel of sovereignty submerged land 2.5 miles offshore,
East of Section 14, Township 53 South, Range 42 East,
in the Atlantic Ocean, Miami-Dade County, as is more particularly
described and shown on Attachment A, dated April 13, 2011.

TO HAVE THE USE OF the hereinabove described premises for a period of 10 years from March 25, 2011, the effective date of this easement. The terms and conditions on and for which this easement is granted are as follows:

1. USE OF PROPERTY: The above described parcel of land shall be used solely for a subaqueous rock (spoil) disposal area and Grantee shall not engage in any activity except as described in the State of Florida Department of Environmental Protection Consolidated Joint Coastal Permit No. 0295427-001-JC, dated March 25, 2011, incorporated herein and made a part of this easement by reference. All of the foregoing subject to the remaining conditions of this easement.

2. EASEMENT CONSIDERATION: In the event the Grantor amends its rules related to fees and the amended rules provide the Grantee will be charged a fee or an increased fee for this activity, the Grantee agrees to pay all charges required by such amended rules within 90 days of the date the amended rules become effective or by a date provided by an invoice from the Department, whichever is later. All fees charged under this provision shall be prospective in nature; i.e. they shall begin to accrue on the date that the amended rules become effective.

3. WARRANTY OF TITLE/GUARANTEE OF SUITABILITY OF USE OF LAND: Grantor neither warrants title to the lands described herein nor guarantees the suitability of any of the lands for any particular use.

4. RIGHTS GRANTED: The rights hereby granted shall be subject to any and all prior rights of the United States and any and all prior grants by the Grantor in and to the submerged lands situated within the limits of this easement.

5. DAMAGE TO EASEMENT PROPERTY AND INTERFERENCE WITH PUBLIC AND PRIVATE RIGHTS: Grantee shall not damage the easement lands or unduly interfere with public or private rights therein.

6. GRANTOR'S RIGHT TO GRANT COMPATIBLE USES OF THE EASEMENT PROPERTY: This easement is nonexclusive, and the Grantor, or its duly authorized agent, shall retain the right to enter the property or to engage in management activities not inconsistent with the use herein provided for and shall retain the right to grant compatible uses of the property to third parties during the term of this easement.

7. RIGHT TO INSPECT: Grantor, or its duly authorized agent, shall have the right at any time to inspect the works and operations of the Grantee in any matter pertaining to this easement.

8. INDEMNIFICATION/INVESTIGATION OF ALL CLAIMS: The Grantee shall investigate all claims of every nature at its expense. Each party is responsible for all personal injury and property damage attributable to the negligent acts or omissions of that party and the officers, employees and agents thereof. Nothing herein shall be construed as an indemnity or a waiver of sovereign immunity enjoyed by any party hereto, as provided in Section 768.28, Florida Statutes, as amended from time to time, or any other law providing limitations on claims.

[47]

9. ASSIGNMENT OF EASEMENT: This easement shall not be assigned or otherwise transferred without prior written consent of the Grantor or its duly authorized agent and which consent shall not be unreasonably withheld. Any assignment or other transfer without prior written consent of the Grantor shall be null and void and without legal effect.

10. TERMINATION: The Grantee, by acceptance of this easement, binds itself, its successors and assigns, to abide by the provisions and conditions herein set forth, and said provisions and conditions shall be deemed covenants of the Grantee, its successors and assigns. In the event the Grantee fails or refuses to comply with the provisions and conditions herein set forth or in the event the Grantee violates any of the provisions and conditions herein, this easement may be terminated by the Grantor upon 30 days written notice to Grantee. If terminated, all of the above-described parcel of land shall revert to the Grantor. All notices required to be given to Grantee by this easement or applicable law or administrative rules shall be sufficient if sent by U.S. Mail to the following address:

Miami-Dade County, Florida
Dept. of Environmental Resource Management
701 NW 1st Court, 5th Floor
Miami, Florida 33136

The Grantee agrees to notify the Grantor by certified mail of any changes to this address at least ten (10) days before the change is effective.

11. TAXES AND ASSESSMENTS: The Grantee shall assume all responsibility for liabilities that accrue to the subject property or to the improvements thereon, including any and all drainage or special assessments or taxes of every kind and description which are now or may be hereafter lawfully assessed and levied against the subject property during the effective period of this easement which result from the grant of this easement or the activities of Grantee hereunder.

12. REMOVAL OF STRUCTURES/ADMINISTRATIVE FINES: If the Grantee does not remove said structures and equipment occupying and erected upon the premises after expiration or cancellation of this easement, such structures and equipment will be deemed forfeited to the Grantor, and the Grantor may authorize removal and may sell such forfeited structures and equipment after ten (10) days written notice by certified mail addressed to the Grantee at the address specified in Item 10 or at such address on record as provided to the Grantor by the Grantee. However, such remedy shall be in addition to all other remedies available to Grantor under applicable laws, rules and regulations including the right to compel removal of all structures and the right to impose administrative fines.

13. ENFORCEMENT OF PROVISIONS: No failure, or successive failures, on the part of the Grantor to enforce any provision, nor any waiver or successive waivers on its part of any provision herein, shall operate as a discharge thereof or render the same inoperative or impair the right of the Grantor to enforce the same upon any renewal thereof or in the event of subsequent breach or breaches.

14. RECORDATION OF EASEMENT: The Grantee, at its own expense, shall record this fully executed easement in its entirety in the public records of the county within which the easement site is located within fourteen (14) days after receipt, and shall provide to the Grantor within ten (10) days following the recordation a copy of the recorded easement in its entirety which contains the O.R. Book and pages at which the easement is recorded.

15. AMENDMENT/MODIFICATIONS: This easement is the entire and only agreement between the parties. Its provisions are not severable. Any amendment or modification to this easement must be in writing and must be accepted, acknowledged and executed by the Grantee and Grantor.

16. ACOE AUTHORIZATION: Prior to commencement of construction and/or activities authorized herein, the Grantee shall obtain the U.S. Army Corps of Engineers (COE) permit if it is required by the COE. Any modifications to the construction and/or activities authorized herein that may be required by the COE shall require consideration by and the prior written approval of the Grantor prior to the commencement of construction and/or any activities on sovereign, submerged lands.

17. ADDITIONAL STRUCTURES OR ACTIVITIES/EMERGENCY STRUCTURAL REPAIRS: No additional structures shall be erected and/or activities undertaken, including but not limited to, dredging, relocation/realignment or major repairs or renovations made to authorized structures, on, in or over sovereignty, submerged lands without the prior written consent from the Grantor, with the exception of emergency repairs. Unless specifically authorized in writing by the Grantor, such activities or structures shall be considered unauthorized and a violation of Chapter 253, Florida Statutes, and shall subject the Grantee to administrative fines under Chapter 18-14, Florida Administrative Code. If emergency repairs are required to be undertaken in the interests of public health, safety or welfare, the Grantee shall notify the Grantor of such repairs as quickly as is practicable; provided, however, that such emergency activities shall not exceed the activities authorized by this easement.

18. UPLAND RIPARIAN PROPERTY INTEREST: During the term of this easement, Grantee must have satisfactory evidence of sufficient upland interest as defined in subsection 18-21.003(60), Florida Administrative Code, to the extent required by paragraph 18-21.004(3)(b), Florida Administrative Code, in order to conduct the activity described in this easement. If at any time during the term of this easement, Grantee fails to comply with this requirement, use of sovereignty, submerged lands described in this easement shall immediately cease and this easement shall terminate and title to this easement shall revert to and vest in the Grantor immediately and automatically.

WITNESSES:

Original Signature

Print/Type Name of Witness

Original Signature

Print/Type Name of Witness

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA

BY: _____ (SEAL)

Jeffery M. Gentry, Operations and Management Consultant Manager, Bureau of Public Land Administration, Division Division of State Lands, State of Florida Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida

"GRANTOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 11th day of August, 2011, by Jeffery M. Gentry, Operations and Management Consultant Manager, Bureau of Public Land Administration, Division of State Lands, State of Florida Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. He is personally known to me.

APPROVED AS TO FORM AND LEGALITY:

DEP Attorney

Notary Public, State of Florida

Printed, Typed or Stamped Name

My Commission Expires:

Notary Public State of Florida
Kathy C Griffin
My Commission DD727692
Expires 10/30/2011

Commission/Serial No.

WITNESSES:

Original Signature

Typed/Printed Name of Witness

Original Signature

Typed/Printed Name of Witness

Miami-Dade County, Florida (SEAL)

BY: _____

Original Signature of Executing Authority

Jack Osterholt

Typed/Printed Name of Executing Authority

Deputy Mayor

Title of Executing Authority

"GRANTEE"

STATE OF Florida

COUNTY OF Miami-Dade

The foregoing instrument was acknowledged before me this 10th day of August, 2011, by Jack Osterholt as Deputy Mayor, for and on behalf of Miami-Dade County, Florida. He is personally known to me or who has produced _____ as identification.

My Commission Expires:

Notary Public, State of

Commission/Serial No.

Printed, Typed or Stamped Name

JACQUELINE ANGHEL-NOVICK
Notary Public - State of Florida
My Comm. Expires Mar 23, 2013
Commission # DD 873507

ST. JOHNS COUNTY, FLORIDA

South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches

COASTAL STORM RISK MANAGEMENT PROJECT

DRAFT INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT

APPENDIX F
Public Access and Cost Sharing

March 2017

US Army Corps
of Engineers
Jacksonville District

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

Appendix F – St. Johns County CSRM Feasibility Study: Public Access and Cost Sharing Assessment

I. Overview

This appendix outlines cost sharing for the Recommended Plan as determined by shoreline ownership and use. The plan spans from the Florida Department of Environmental Protection's (FDEP) reference monuments R-103.5 to R-116.5 and consists of initial and periodic nourishments of the existing dune profile and an additional 60' berm extension. Boundaries for the segment to determine federal cost sharing extend from the northernmost point at the private Serenata Beach Club in South Ponte Vedra Beach an approximate 2.6 miles south into Vilano Beach. Tapers of a maximum length of 1,000 feet will be added at the northern and southern ends of the berm extension to stabilize the fill. The addition of tapers results in sand placement from R-102.5 to R117.5.

The current cost share estimates are based on policy guidance provided by Engineer Regulations (ER) 1105-2-100, Appendix E and ER 1165-2-130. Cost sharing for this project is determined by section 103(c)(5) of the Water Resources Development Act (WRDA) of 1986, which establishes a 65/35 (federal/non-federal) cost share for coastal storm risk management, except for private undeveloped shores or shorelines limited to private use. WRDA 1999 changed the cost sharing policy, previously provided by WRDA 1986, by setting a maximum federal share of periodic nourishment, carried out after 1 January 2003, to 50% for projects authorized for construction after 31 December 1999. Therefore, costs assigned to developed lands (publicly or privately owned) and undeveloped public lands are cost shared 65% federal and 35% non-federal for initial construction and 50% federal / 50% non-federal for periodic nourishment. Benefits from prevention of damages to transportation facilities are considered storm damage reduction benefits according to ER 1165-2-130 and are cost shared 65% federal and 35% non-federal for initial construction. "Transportation facilities" in the project area include street ends. Costs assigned to undeveloped, privately owned lands, even publicly accessible, are not federally cost shared (100% non-federal). Note that, for the purposes of this report, "developed" indicates the presence of buildings and/or other infrastructure such as roadways. Parks, parking lots, and vacant lots are not considered to be "developed" lands. If lands are not within ¼ mile north or ¼ mile south of public access and public parking, then the associated costs will be 100% non-federal. The cost sharing for the project is determined to be 23.0% federal, 77.0% non-federal for initial construction. **Table 1** shows the cost sharing estimates for initial construction and subsequent periodic nourishments.

Table 1: General Cost Sharing Summary for Initial Construction

	Initial Construction Federal Participation	Initial Construction Non-Federal Participation	Periodic Nourishment Federal Participation	Periodic Nourishment Federal Participation
R-103.5 to R-116.5	23.0%	77.0%	17.7%	82.3%

II. Segment Description

The total shoreline length, based on shorefront length information provided by the St. Johns County Property Appraiser's office (verified using Google Earth), is estimated to be about 13,498 feet (or 2.6 miles) long. Federal cost-sharing is calculated for all parcels within ¼ mile north and ¼ mile south of public access points with parking throughout the segment. **Figure 1** includes public access and parking for the Recommended Plan area.



Figure 1: Shoreline image for subject area depicting FDEP R-monuments and public access points.

There are no federally owned lands in the subject segment. In the southern portion of the subject area there are 22 parcels that are located within a Coastal Barrier Resources Act (CBRA) zone, totaling approximately 2,190 feet. CBRA zones were developed as part of the Coastal Barrier Resources Act of 1982 along the Atlantic and Gulf coasts to encourage the conservation of hurricane prone, biologically rich coastal barriers by restricting federal expenditures that encourage development, such as federal flood insurance. CBRA zones are not cost-shared, and therefore the costs associated with these areas are covered 100% by the non-federal sponsor.

There are multiple parcels that are publicly or privately owned and not publicly accessible, i.e., they are not located within ¼ mile of public access and public parking. The combined shorefront length of these properties is 5,922 feet. These properties are not cost-shared, and therefore the costs associated with these areas are covered 100% by the non-federal sponsor. There are five properties that are privately owned, undeveloped and publicly accessible. The combined shorefront length of these properties is 603 feet. The costs associated with these areas are covered 100% by the non-federal sponsor. Per 1165-2-130, "all costs assigned to the prevention of losses of undeveloped private lands are non-federal, even though the beach may be public."

There are approximately 948 feet of the shoreline composed of undeveloped public lands, which are cost-shared at 65% federal, 35% non-federal. The rest of the properties in the segment, totaling an estimated 3,835 feet, are publicly accessible, developed public or private lands including transportation facilities comprised of street ends, and the cost share for these lands for initial construction is covered 65% federal, 35% non-federal. Appendix E from ER 1105-2-100 and ER 1165-2-130 were used as references to determine these shares.

Overall, the cost share for the subject segment is estimated to be 23.0% federal, 77.0% non-federal for initial construction and 17.7% federal, 82.3% non-federal for periodic nourishment. As seen in **Table 2**, the cost share for periodic nourishment is lower than initial construction as a result of the WRDA 1999 that set a maximum federal share for

periodic nourishment, carried out after 1 January 2003, to 50% for projects authorized for construction after 31 December 1999. A detailed parcel-by-parcel list of shoreline ownership, used, and associated cost sharing is given in **Table 3**.

Table 2: Detailed Cost Sharing Summary for Initial Construction and Periodic Nourishment

	INITIAL CONSTRUCTION				PERIODIC NOURISHMENT*		
Shore Ownership and Project Purpose (as defined in ER 1105-2-100)	Maximum Level of Federal Participation in Construction Costs	Shoreline Length (feet)	Shoreline Length x Federal Participation %	Shoreline Length x non-Federal Participation %	% of Federal Participation for Periodic Nourishment	Shoreline Length x Federal Participation %	Shoreline Length x non-Federal Participation %
I. Federally Owned	100%	0	0	0	100%	0	0
II. Publicly and Privately Owned, Protection Results in Public Benefits							
A. Coastal Storm Risk Management (CSRM) on Developed Lands (Public/Private)	65%	3,835	2,493	1,342	50%	1,918	1,918
B. CSRM on Undeveloped Public Lands **	65%	948	616	332	50%	474	474
C. CSRM on Undeveloped Private Lands	0%	603	0	603	0%	0	603
III. Privately Owned, Use Limited to Private Interests (No public access within 1/4 mile)	0%	5,922	0	5,922	0%	0	5,922
IV. CBRA Zone	0%	2,190	0	2,190	0%	0	2,190
	Total Distance:	13,498	3,109	10,389	Total Distance:	2,392	11,107
	Cost Shares:		23.0%	77.0%	Cost Shares:	17.7%	82.3%

*Periodic nourishment is considered "construction."

**Non-Federal public shores dedicated to recreation or fish and wildlife purposes.

Table 3: Shoreline ownership, use, and associated cost sharing for parcels within the Recommended Plan area.

PARCEL NO	SHORELINE LENGTH (IN FEET)	PROPERTY ADDRESS	DESCRIPTION	OWNERSHIP	WITHIN 1/4 MILE OF ACCESS WITH PARKING	SHORELINE OWNERSHIP & PROJECT PURPOSE	INITIAL CONSTRUCTION LEVEL OF FEDERAL PARTICIPATION (%)	PERIODIC NOURISHMENT LEVEL OF FEDERAL PARTICIPATION (%)	INITIAL CONSTRUCTION % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	PERIODIC NOURISHMENT % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	Parking Spaces (#)	Notes
142230 1000	154	Serenata Drive	Developed	Private	N	III	0%	0%	0	0	0	Parcel is 1033 lf, however only 153ft are inlcuded in the optimization
142230 0210	289	COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
							R104					
142290 0750	88	4600 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142290 0748	69	Kingston Dunes HOA	Developed	Private	N	III	0%	0%	0	0	0	
142290 0760	87	4588 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142290 0770	87	4582 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142290 0780	87	4576 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142290 0790	87	4570 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142300 0010	10	4585 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
142310 0040	61	4580 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
142310 0000	312	4575 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
142311 0140	70	4520 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	GOOGLE EARTH HAS IDENTIFIED AS 1423100010
142311 0004	10	HOA	Undeveloped	Private	N	III	0%	0%	0	0	0	INTERSECTION OF EDEN BAY DRIVE AND COASTAL HWY-JK VILANO BEACH LLC; IN BTWN 4520 AND 4510 COASTAL HWY
142311 0150	70	4510 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	GOOGLE EARTH HAS IDENTIFIED AS 1423200010
142311 0160	75	4500 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	GOOGLE EARTH HAS IDENTIFIED AS 1423200020
142320 0020	101	4480 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
142320 0030	99	4470 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142320 0040	100	4460 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142320 0050	97	4450 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142340 0000	61	4436 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0010	79	4430 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0020	80	4424 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0030	79	4418 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0040	82	4412 COASTAL HWY	Undeveloped	Private	N	III	0%	0%	0	0	0	
							R106					
142341 0050	82	4406 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0060	79	4400 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0070	81	4388 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0080	80	4382 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0090	81	4376 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0100	80	4370 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0110	80	4364 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0120	82	4348 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0130	81	4342 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0140	77	4336 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0150	78	4330 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142341 0160	94	4324 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142345 0040	59	4320 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
142345 0030	85	4312 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
145220 0000	102	4300 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
145210 0001	60	ROW 3RD STREET	Developed	Public	N	III	0%	0%	0	0	0	
145570 0010	101	4280 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
145570 0020	101	4270 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
145210 0001	60	ROW 4TH STREET	Developed	Public	Y	IIA	65%	50%	39	30	0	
145579 0000	76	4260 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	49	38	0	
145580 0000	127	4250 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	83	64	0	
145210 0001	60	ROW 5TH STREET	Developed	Public	Y	IIA	65%	50%	39	30	0	
145600 0000	102	4240 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	66	51	0	
145600 0030	102	4230 COASTAL HWY	Undeveloped	Private	Y	IIC	0%	0%	0	0	0	
145210 0001	60	ROW	Developed	Public	Y	IIA	65%	50%	39	30	0	
145610 0010	204	4201 COASTAL HWY	Undeveloped	Private	Y	IIC	0%	0%	0	0	0	
							R108					
145210 0001	60	ROW	Developed	Public	Y	IIA	65%	50%	39	30	0	
145650 0000	59	4190 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	38	30	0	
145650 0020	67	4180 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	44	34	0	
145650 0040	76	4170 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	49	38	0	
145210 0001	60	ROW	Developed	Public	Y	IIA	65%	50%	39	30	0	
145660 0000	76	4160 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	49	38	0	
145660 0030	76	4150 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	49	38	0	
145670 0000	51	4130 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	33	26	0	
145210 0001	100	ROW	Developed	Public	Y	IIA	65%	50%	65	50	45	ADJ TO REEF PARKING LOT. FDEP notes 10 sites but there are additional.
145723 0000	202	4100 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	131	101	0	RESTAURANT PARKING SEPARATED FROM RESTAURANT BY ROW

PARCEL NO	SHORELINE LENGTH (IN FEET)	PROPERTY ADDRESS	DESCRIPTION	OWNERSHIP	WITHIN 1/4 MILE OF ACCESS WITH PARKING	SHORELINE OWNERSHIP & PROJECT PURPOSE	INITIAL CONSTRUCTION LEVEL OF FEDERAL PARTICIPATION (%)	PERIODIC NOURISHMENT LEVEL OF FEDERAL PARTICIPATION (%)	LENGTH ELIGIBLE FOR FEDERAL PARTICIPATION (IN FEET)	INITIAL CONSTRUCTION % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	PERIODIC NOURISHMENT % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	Parking Spaces (#)	Notes
143210 0001	60	ROW	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
143723 0000	203	4100 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	203	132	102	0	The Reef Restaurant
143210 0001	60	ROW EUCLID AVE	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
143790 0000	101	102 TENTH ST	Undeveloped	Private	Y	IIC	0%	0%	101	0	0	0	
143790 0030	101	4070 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	101	66	51	0	
143210 0001	60	ROW 11TH STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
143810 0000	101	4060 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	101	66	51	0	
143810 0030	101	4050 COASTAL HWY	Developed	Private	Y	IIA	65%	90%	101	66	51	0	
143210 0001	60	ROW 12TH STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
143950 0000	101	4040 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	101	66	51	0	
143955 0000	101	4030 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	101	66	51	0	
143210 0001	60	ROW 13TH STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
143960 0030	93	4020 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
							R110						
143960 0030	108	4010 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW 14TH STREET	Developed	Public	N	III	0%	0%	0	0	0	0	
146000 0000	59	3990 D COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0020	40	3990 C COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0010	59	3978 B COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0030	46	3978 A COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW 15TH STREET	Developed	Public	N	III	0%	0%	0	0	0	0	
146000 0200	42	3966 C COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0202	24	3966 B COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0203	39	3966 A COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146000 0991	101	3960 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	LOCATED IN BTWN 3966 AND 3940 COASTAL HWY- listed in property appraiser as 0 Coastal Hwy
143210 0001	60	ROW 16TH STREET	Developed	Public	N	III	0%	0%	0	0	0	0	
146007 0100	100	3940 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146007 0200	99	3930 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW 17TH STREET	Developed	Public	N	III	0%	0%	0	0	0	0	
146008 0000	58	3920 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146008 0005	63	3912 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146008 0830	89	3910A COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW BOATING CLUB RD	Developed	Public	N	III	0%	0%	0	0	0	0	
146120 0000	93	3890 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146190 0000	101	3880 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW 19TH STREET	Developed	Public	N	III	0%	0%	0	0	0	0	
146152 0010	100	3870 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
146152 0030	99	3860 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	0	
143210 0001	60	ROW 20TH STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
146159 0010	103	3840 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	103	67	52	0	
146159 0030	100	3830 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	100	65	50	0	
143210 0001	60	ROW 21ST STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
146160 0010	101	3820 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	101	66	51	0	
							R112						
146160 0011	103	3810 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	103	67	52	0	
143210 0001	60	ROW 22ND STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
146200 0005	106	3790 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	106	69	53	0	
146206 0000	95	3780 COASTAL HWY	Undeveloped	Private	Y	IIC	0%	0%	95	0	0	0	
143210 0001	60	ROW 23RD STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
146210 0010	99	3750 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	99	64	50	0	
146210 0030	101	3740 COASTAL HWY	Undeveloped	Private	Y	IIC	0%	0%	101	0	0	0	
143210 0001	60	ROW 24TH STREET	Developed	Public	Y	IIA	65%	50%	60	39	30	0	
146218 0010	104	3730 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	104	68	52	0	
146218 0120	99	3726 COASTAL HWY	Undeveloped	Public	Y	IIB	65%	50%	99	64	50	0	
143210 0001	86	ROW	Developed	Public	Y	IIA	65%	50%	60	39	30	92	
146219 0000	277	3710 COASTAL HWY	Undeveloped	Public	Y	IIB	65%	50%	277	180	139	0	
142380 0020	572	3680 COASTAL HWY	Undeveloped	Public	Y	IIB	65%	50%	572	372	286	0	
142460 0001	213	101 VILLAGE DR	Developed	Private	Y	IIA	65%	50%	213	138	107	0	SUBSTANTIAL WALKOVER LOCATED ON PARCEL
	39	ROW	Developed	Public	Y	IIA	65%	50%	39	25	20	0	
							R114						
142470 0000	100	3580 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	100	65	50	0	
142480 0000	88	3570 COASTAL HWY	Developed	Private	Y	IIA	65%	50%	88	57	44	0	THE REST OF PROPERTY IS LOCATED W/IN THE CBRA ZONE
142480 0000	12	3570 COASTAL HWY	Developed	Private	Y	IV	0%	0%	12	0	0	0	
142500 0000	100	3560 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	0	
142413 0000	41	3503 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	0	
142540 0020	100	3550 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	0	
142540 0000	120	3500 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	0	
142550 0000	80	3458 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	0	

PARCEL NO	SHORELINE LENGTH (IN FEET)	PROPERTY ADDRESS	DESCRIPTION	OWNERSHIP	WITHIN 1/4 MILE OF ACCESS WITH PARKING	SHORELINE OWNERSHIP & PROJECT PURPOSE	INITIAL CONSTRUCTION LEVEL OF FEDERAL PARTICIPATION (%)	PERIODIC NOURISHMENT LEVEL OF FEDERAL PARTICIPATION (%)	INITIAL CONSTRUCTION % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	PERIODIC NOURISHMENT % FEDERAL PARTICIPATION x SHORELINE LENGTH (IN FEET)	Parking Spaces (#)	Notes
142560 0000	48	3494 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	
142570 0000	100	3490 COASTAL HWY	Developed	Private	N	IV	0%	0%	0	0	0	
142580 0000	52	3490 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
142590 0000	100	3470 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
	34	ROW	Developed	Public	N	IV	0%	0%	0	0	0	
142610 0010	168	3465 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
142620 0010	227	3455 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	LISTED IN PROPRTY APPRAISER AS 3401
	41	ROW	Developed	Public	N	IV	0%	0%	0	0	0	
142630 0000	104	3420 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
142640 0000	103	3410 COASTAL HWY	Undeveloped	Public	N	IV	0%	0%	0	0	0	
142650 0000	101	3390 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
142650 0010	106	3380 COASTAL HWY	Undeveloped	Public	N	IV	0%	0%	0	0	0	OWNED BY Trustees of the Internal Improvement Trust Fund (TIITF)-STATE OWNED
	39	ROW	Developed	Public	N	IV	0%	0%	0	0	0	
142660 0000	379	3350 COASTAL HWY	Undeveloped	Public	N	IV	0%	0%	0	0	0	mussallem beachfront park-county owned
							R116					
142670 0000	53	3340 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
142670 0001	81	3340 COASTAL HWY	Undeveloped	Private	N	IV	0%	0%	0	0	0	
149090 0000	100	3312 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
148860 0000	87	3308 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
148870 0000	60	3304 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	
148880 0000	95	3300 COASTAL HWY	Developed	Private	N	III	0%	0%	0	0	0	

ST. JOHNS COUNTY, FLORIDA

South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches

COASTAL STORM RISK MANAGEMENT PROJECT

DRAFT INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT

APPENDIX G
Environmental

March 2017

US Army Corps of Engineers
Jacksonville District

U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

APPENDIX G-1

SECTION 404(B)1 DETERMINATION

St. Johns County, Florida
Coastal Storm Risk Management Project
South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches
SECTION 404(B) EVALUATION

I. PROJECT DESCRIPTION

A. Location

The project is located in St. Johns County on the Atlantic Coast of Florida approximately 34 miles south of the mouth of the St. Johns River. The South Ponte Vedra Beach and Vilano Beach study reaches are located north of the St. Augustine Inlet, while the Summer Haven reach is located approximately 14 miles to the south of the inlet, south of Matanzas Inlet.

B. General Description

The Tentatively Selected Plan (TSP) includes dredging shoaled material from within the St. Augustine Inlet and placing that material onto the beach between Florida Department of Environmental Protection range monuments (R-Monuments) 102.5 and 117.5, which includes 1,000 foot tapers at the north and south ends. Several offshore sand sources were also evaluated for potential use in the future.

C. Authority and Purpose

The St. Johns County Coastal Storm Risk Management (CSRM) feasibility study with integrated Environmental Assessment evaluates the project to determine if there is a Federal interest in cost-sharing in the construction of the project.

D. General Description of Dredged or Fill Material

1) General Characteristics of Material

The materials in the St. Augustine Inlet system are generally moderately well sorted, quartz-rich, fine to medium-grained sand with varying amounts of shell fragments, and grey or light grey in color. The ebb and flood shoals are composed almost entirely of beach-quality sand.

The materials in the North Offshore Borrow Area (NOBA) consist principally of quartz sand, having fine to medium-grained sand-sized particles, with varying amounts of shell fragments. The moist Munsell color of the material is predominately a value of 5 or lighter (gray to grayish brown); occasionally, there are some samples at deeper locations that are darker than 5.

The materials in the South Offshore Borrow Area (SOBA) consist primarily of quartz-rich, fine-grained sand with varying amounts of shell fragments. The moist Munsell color of the materials is predominately a value of 5 or lighter; occasionally there are some samples at deeper locations appear darker than 5.

2) Quantity of Material

Approximately 1.31 million cubic yards of material will be placed in the fill template of the TSP for the initial construction, and future nourishments would place approximately 866,000 cubic yards of material every 12 years.

3) Source of Material

The TSP uses the St. Augustine Inlet system as the primary sand source for the project.

E. Description of the Proposed Discharge Site

1) Location and Size

The project includes nourishment of a 60-foot beach berm over 2.6 miles of shoreline with 1,000-foot tapers. The initial construction includes the reconstruction and planting of the existing dune feature; however, future nourishments do not include dune construction or planting.

2) Type of Site

The project site is a sandy beach with some existing, eroding dune features.

3) Type of Habitat

The laboratory analyses characterize the existing sediments at South Ponte Vedra Beach and Vilano Beach as shelly, poorly sorted, fine to medium-grained sand-sized quartz and carbonate material. In general, these materials have a high shell content and are coarser than the potential sand source materials. Samples collected at the mid-berm and at mid-tide locations have especially high shell contents caused by deposits from the Anastasia formation, which also cause the typical brownish grey color of St. Johns County beaches.

4) Timing and Duration of Discharge

Dredging and disposal is expected to begin as early as the winter of 2020, and is expected to take approximately four months.

F. Description of Disposal Method

Material would likely be discharged from a pipeline attached to a hydraulic dredge; however, a mechanical dredge could also be utilized for the dredge operations.

II. FACTUAL DETERMINATION

A. Physical Substrate Determination

1) Substrate Elevation and Slope

Top elevation of the construction beach fill will be +8.0 feet North American Vertical Datum 1988 (NAVD 88). The equilibrium profile for the beach fill will vary along the project beach depending on wave/current distribution of the fill material. Generally, the width of the beach above the mean high water line will narrow over time, and the beach slope will become slightly steeper than the constructed beach as the beach equilibrates.

2) Sediment Type

The sediment from the St. Augustine Inlet system is predominantly fine quartz sand with varying amounts of shell. The fines content is less than 2% overall, within the state regulations.

3) Dredge/Fill Material Movement

The fill material will be subject to erosion by waves with the net movement of fill material to the south toward St. Augustine Inlet.

4) Physical Effects on Benthos

The fill will bury some infaunal benthic organisms in the beach. Most organisms in this high energy wave ecosystem are adapted for existence in an area with considerable substrate movement, and some will be able to burrow up through the fill material. Material placed on the beach will be similar to that of the existing beach, and the fill placement area is relatively small as compared to similar adjacent habitat. This minimizes impacts to infauna such as the coquina clam and mole crab, which play an important role in the food web (specifically to foraging birds). Full recovery should begin within 1 year, as has been documented with previous projects.

B. Water Circulation, Fluctuation and Salinity Determination.

1) Water

The placement of fill on the beach will increase turbidity in the nearshore area. Because the immediate nearshore area is a high energy system and subject to naturally-occurring elevated turbidity, increases due to the project will not be significant. Fill placement will have no 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 from the north to the south. Placement of the fill on the beach will have no effect on the currents.

3) Normal Water Level Fluctuations and Salinity Gradients

Tides in the project area are a mixture of semi-diurnal and diurnal types. During part of each month two high and two low tides occur each day, and during the balance of the month only one high and one low tide occur each day. The mean tide level is 1.8 feet, referenced to mean low water (MLW). Salinity is that of ocean water. Fill placement will not affect normal tide fluctuations or salinity.

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 temporary increase in turbidity levels in the project area during discharge. Turbidity will be short term and localized and no significant adverse impacts are expected. Turbidity will be monitored per State standards. If at any time the turbidity standard is exceeded, those activities causing the violation will cease.

2) Effects on the Chemical and Physical Properties of the Water Column

(a) Light Penetration. Light penetration will decrease during discharge in the immediate area where sand is being deposited on the beach. This effect will be temporary and will have no significant adverse impact on the environment.
(b) Dissolved Oxygen. Dissolved oxygen levels will not be altered significantly by this project due to high-energy wave action and associated adequate re-aeration rates.
(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. Primary productivity is not a recognized, significant phenomenon in the surf zone, where a temporary increased level of suspended particulates will occur. There will be no effect on the nearshore productivity as a result of the proposed beach re-nourishment.
(b) Suspension/Filter Feeders. There will be no long-term adverse impact to suspension/filter feeders.
(c) Sight feeders. There will be no long-term adverse impact to sight feeders.

D. Contaminant Determinations

Deposited fill material will not introduce, relocate, or increase contaminants.

E. Aquatic Ecosystem and Organism Determinations

The fill material that will be placed on the beach will consist primarily of fine to medium grained sand-sized quartz that is similar enough to the existing substrate so that no impacts are expected.

1) Endangered and Threatened Species

Sea turtle nesting could occur in the project area during the time of the dredging and beach disposal. A nest relocation program will be implemented to discover, mark and relocate these nests. All sea turtle nests discovered within the beach disposal area will be removed and relocated to a nearby self-release beach hatchery. All relocation and incubation efforts will

conform to the guidelines in the "Manual of Sea Turtle Research and Conservation Techniques", Second Edition, 1983, prepared for the Western Atlantic Sea Turtle Symposium and distributed by the Florida Department of Environmental Protection.

2) Hardbottom Habitat

No hardbottom habitat is known to exist 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

The work will be conducted in accordance with the Water Quality Certification that will be issued for this project.

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 may be temporarily impacted by the dredging of material and the placement of the material on the beach, but these impacts should be minimal and no long-term impacts are anticipated.
(c) Water Related Recreation. Water related recreation will be temporarily impacted during construction, but will be preserved and enhanced by the nourishment of the beach. Depending on the portion of the St. Augustine Inlet system that is dredged, recreational vessels may benefit from improved navigation.
(d) Aesthetics. The stabilization of an eroding beach will improve aesthetics.
(e) Parks, National and Historic Monuments, National Seashores Wilderness Areas, Research Sites, and Similar Preserves. Anastasia State Park is located along the southern shoreline of the St. Augustine Inlet. Historic dredging of the inlet has caused

G. Determination of Cumulative Effects on the Aquatic Ecosystem

There will be no cumulative impacts that result in a major impairment of water quality of the existing aquatic ecosystem as a result of the placement of fill at the project site. Subsequent re-nourishment events will occur approximately every 12 years. The impact of depositing material on the beach during these events will be minor.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS OF DISCHARGE

A. No significant adaptations of the guidelines were made relative to this evaluation.

B. No practicable alternative exists which meets the objectives of re-nourishment of the beach that does not involve placing fill into waters of the United States.

C. The discharge of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, 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 disposal of dredged material on the beach 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 significantly adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

F. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

APPENDIX G-2

COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

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: Dredging of sand from the sand source locations and placing it on the beach for re-nourishment will not violate the intent of this chapter and meets all regulations therein. The proposed plans and information will be 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 work has been planned with the cooperation of the State and will be coordinated with the relevant agencies during the comment period.

3. Chapter 252, Disaster Preparation, Response, and Mitigation.

This chapter creates a State emergency management agency with 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: This chapter is not applicable to the re-nourishment of the St. Johns County Coastal Storm Damage Reduction project.

4. Chapter 253, State Lands.

This chapter governs the management of submerged State lands and resources within State lands. This includes archeological and historic 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 project is intended to preserve beach resources, provide needed sea turtle nesting beaches, and comply with pertinent State regulations and the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition.

These chapters authorize the State to acquire land to protect environmentally sensitive areas.

Response: The project would not have an adverse effect on environmentally sensitive lands, and does not interfere with the authority set forth in these chapters.

6. Chapter 258, State Parks and Aquatic Preserves.

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

Response: This project will have no direct adverse impact on any state parks or preserves. While the Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR) is located north of the project area, net transport of sand is to the south in this region. Any indirect adverse impacts resulting from the project are not likely to be observed at the GTMNERR.

7. Chapter 267, Historic Preservation.

This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the Florida State Historic Preservation Officer. Historic preservation compliance will be completed to meet all responsibilities under Chapter 267.

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: Economic contribution from the project area will not be compromised by this action. The dredging and beach fill project will encourage recreational use of the area, which is consistent with the goals of this chapter.

9. Chapters 334 and 339, Public Transportation.

These chapters authorize the planning and development of a safe, balanced, and efficient transportation system.

Response: There will be no impacts to public transportation systems associated with this action.

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 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: Based upon the overall impacts of this work, this project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources.

This chapter establishes the Florida Fish and Wildlife Conservation Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: Coordination with the Florida Fish and Wildlife Conservation Commission during the permit process to obtain water quality certification from the state of Florida will determine if this action is consistent with State policies and practices as set forth in this chapter.

12. Chapter 373, Water Resources.

This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This work does not involve water resources as described in 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: This action does not involve the transportation or discharging of pollutants. Environmental protection measures will be employed during construction and operation of the site to avoid inadvertent spills or other sources of pollution. Therefore, this action will be in compliance with this chapter.

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 work does not involve the exploration, drilling, or production of oil, gas, or other petroleum product; therefore, this Chapter is not applicable to the project.

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 work has been determined to be consistent with the intent 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 work would 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 FDEP.

Response: Water quality certification from the FDEP will be required for this project. No air pollution permits are required for the project. Effects of the operation of construction equipment on air quality will be minor and conform to State of Florida emission standards. Therefore, the work will comply with 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 on-site and on adjoining properties affected by the work. Particular attention will be given to work on or adjacent to agricultural lands.

Response: This work does not involve agricultural lands as described in this chapter.

APPENDIX G-3

CORRESPONDENCE

United States Department of the Interior
Office of the Secretary
Office of Environmental Policy and Compliance
1849 C Street, NW - MS 5538 - MIB
Washington, D.C. 20240

JUN 2 6 2017

9043.1
PEP/NRM

ER 17/0187

Mr. Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works
U.S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

Re: St. Johns County, Florida – Coastal Storm Risk Management Feasibility Study, Environmental Assessment and draft Chief of Engineers' Report

Dear Mr. Brown:

The Department of the Interior (Department) would like to thank the U.S. Army Corps of Engineers (USACE) for responding to the Department's comment letter, dated May 15, 2017, on the St. Johns County - Florida Coastal Strom Risk Management Study, Environmental Assessment, and draft Chief of Engineers' Report. We have reviewed the USACE's response letter, dated June 1, 2017, and find that the USACE has adequately addressed our concerns. As stated in the letter, USACE will work with the National Park Service (NPS) as the study proceeds. The NPS contact is Anita Barnett. Anita can be reached at 404-507-5706 or at anita_barnett@nps.gov.

Sincerely,

Michaela E. Noble
Director, Office of Environmental Policy
and Compliance

TRANSMITTED ELECTRONICALLY – NO HARDCOPY TO FOLLOW

cc: Joyce Stanley, Department of the Interior, Atlanta, joyce_stanley@ios.doi.gov
Anita Barnett, National Park Service, anita_barnett@nps.gov

Electronic distribution: Aubree Hershorin, USACE, Aubree.G.Hershorin@usace.army.mil

TRANSMITTED ELECTRONICALLY – NO HARD COPY TO FOLLOW

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

JUN 01 2017

Planning and Policy Division

Ms. Michaela E. Noble
Office of Environmental Policy
United States Department of the Interior
1849 C Street, N.W.
Washington, D.C. 20240

Dear Ms. Noble:

This letter is in response to your comments on the St. Johns County, Florida Coastal Storm Risk Management Integrated Feasibility Study and Environmental Assessment provided on May 12, 2017. The Department of the Interior (DOI) expressed concern that the removal of sand from the ebb shoal would impact the St. Augustine Inlet system. The U.S. Army Corps of Engineers (USACE) understands and acknowledges the DOI's concern that changing one part of the inlet system can potentially affect other parts of the system. A detailed response to your specific comments on the study is enclosed.

We will continue to coordinate with the National Park Service as the study proceeds. We trust that the information in this letter sufficiently addresses any of your unresolved concerns. If you would like to discuss these issues further, please contact Aubree Hershorin at 904-232-2136 or Aubree.G.Hershorin@usace.army.mil.

Sincerely,

Theodore A. Brown

Encl

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosure: Response to Comments from May 12, 2017 Department of Interior Letter on the St Johns County, Florida Coastal Storm Risk Management Study

St. Augustine Inlet System Cumulative Impacts

Man-made activities that have occurred to the St. Augustine Inlet system include the initial construction of the channel through Vilano with construction of a rock jetty and terminal groin in the early 1940s, periodic maintenance dredging of the inlet and Intracoastal Waterway (IWW), and periodic dredging of the ebb shoal, inlet, and Vilano Point for beach nourishment at St. Augustine Beach (St. Johns County Shore Protection Project). The new change proposed by the Feasibility Study calls for dredging sand from the inlet complex for dune and beach nourishment in Vilano Beach.

Previous USACE sediment budget analyses and Coastal Modeling System modeling efforts investigated the impacts of dredging the ebb shoal on the inlet system. The findings of these previous efforts are documented in three technical reports published in 2012:
(https://erdc-library.erdc.dren.mil/xmlui/handle/11681/7343,
https://erdc-library.erdc.dren.mil/xmlui/handle/11681/7350,
https://erdc-library.erdc.dren.mil/xmlui/handle/11681/7322). These reports are referenced in Appendix G-5 (Responses to Public Comments) of the feasibility report. The reports made recommendations for how to best use the shoal complex as a sand source for beach nourishment without causing large scale morphological change to the ebb shoal and inlet system. These findings were used to update the St. Augustine Inlet Management Implementation Plan, which the Florida Department of Environmental Protection (FDEP) adopted in 2014.

Currently, there is approximately 6.5 million cubic yards of compatible sand available within the inlet system as detailed in the Feasibility Study. This volume is more than adequate to meet the initial construction volume. The periodic nourishment volume is 866,000 cubic yards every 12 years. The inlet management plan states that the bypassing objective is 278,000 cubic yards per year (cy/yr), of which one third (93,000 cy/yr) should go to beaches to the north and the remaining two thirds (185,000 cy/yr) to the south. Over 12 years, 1.1 million cubic yards would be available to meet the 866,000 cubic yard need for a periodic nourishment event (i.e. 93,000 cy/yr times 12 years). Since the volume requirements will not exceed the limitations stated in the St. Augustine Inlet Management Implementation Plan based on previous modeling and analysis, impacts are not anticipated for the additional dredging associated with the recommended plan outlined in the Feasibility Study. The previous modeling and analysis described above and referenced in the Feasibility Study should address the Department's first request regarding cumulative impacts on the inlet system.

Storm Surge Modeling

Monitoring efforts associated with recent dredging events will be used to update the amount of material available in the existing ebb shoal borrow area, and to best manage the sediments in the inlet system for all future projects that use the inlet complex as a borrow source. It is appropriate to complete modeling to assess potential storm surge and wave impacts associated with any future dredging in new areas of the inlet system in the Pre-construction Engineering and Design (PED) phase prior to construction, rather than as part of the Feasibility Study. This allows for additional monitoring of the ebb shoal and of the inlet system's performance following the next nourishment of St. Augustine Beach (anticipated for 2017) and any additional beneficial use or local maintenance work that might occur prior to construction at Vilano Beach. If the required volume for the recommended plan is available in the areas of the south lobe of the ebb shoal and navigation channel previously permitted for the St. Augustine Beach nourishment project, then those impacts have already been modeled as part of previous efforts. Any deviations from past events to dredge new areas of the inlet system or to dredge the existing areas deeper (for either the Vilano Beach or St. Augustine Beach projects) will undergo modeling by USACE during the PED phase to help ensure that negative impacts to the overall inlet system are avoided.

Prior to construction, USACE obtains water quality certification under the Clean Water Act from the FDEP through a Joint Coastal Permit. The FDEP reviews the specific sand source locations and the modeling to ensure that the proposed project complies with state and federal laws, and with the St. Augustine Inlet Management Implementation Plan. The modeling during the PED phase and the additional FDEP review prior to construction should address the Department's second request regarding a modeling study on storm surge and wave impacts.

United States Department of the Interior
Office of the Secretary
Office of Environmental Policy and Compliance
1849 C Street, NW - MS 5538 - MIB
Washington, D.C. 20240

9043.1
PEP/NRM

ER 17/0187

MAY 12 2017

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works
U.S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

Re: St. Johns County, Florida – Coastal Storm Risk Management Feasibility Study, Environmental Assessment and draft Chief of Engineers Report

Dear Mr. Brown:

The Department of the Interior (Department) has reviewed the U.S. Army Corps of Engineers' (USACE) three referenced documents regarding stabilizing beach areas within St. Johns County, Florida. We submit the following comments for USACE's consideration. Our comments pertain to the proposed removal of additional sand and whether that removal would result in impacts to the St. Augustine inlet system, especially the ebb shoal. Potential impacts may include: failing of the inlet system to recover between nourishment events, the ebb shoal reducing in size or becoming deflated, or the change in configuration of the inlet system. Changes to the inlet system and the ebb shoal may have impacts on the Castillo de San Marcos National Monument, a unit of the National Park Service (NPS).

The Castillo de San Marcos National Monument is near the study area and recently suffered significant flooding due to storm surge during Hurricane Matthew in October 2016. Any increase in storm surge or storm wave heights could have consequences for Castillo de San Marcos, the oldest masonry fort and the best-preserved example of a Spanish colonial fortification in the continental United States.

The Department requests that the Draft Integrated Feasibility Study and Environmental Assessment for the St. Johns County Coastal Storm Risk Management Project be revised to include: 1) an analysis of the cumulative impacts on the St. Augustine Inlet system (or shoal complex), which is the designated borrow source in the Tentatively Selected Plan (TSP); and (2) a modeling study to investigate potential effects on storm surge and storm waves that impact the barrier island shoreline adjacent to the Inlet, as well as the shoreline within St. Augustine Inlet including the St. Augustine Harbor waterfront itself.

TRANSMITTED ELECTRONICALLY – NO HARDCOPY TO FOLLOW

St. Augustine Inlet System Cumulative Impacts

The St. Augustine Inlet system as described in the Feasibility Study consists of the ebb and flood shoals, Vilano Point shoals, the Federal navigation channel and any associated shoals. This inlet system, particularly the ebb shoal and inlet channel, are also used as a borrow source for the St. Johns County Federal Shore Protection project which places the sand on St. Augustine Beach. Although the Feasibility Study, as detailed in the Geotechnical Appendix D, indicates that there is more than adequate volume of beach quality sand within the inlet system to meet the needs of the TSP, these volume estimates appear to be based on geological cross sections developed from vibracore borings taken before more recent dredging events that removed significant volumes of sand from the ebb shoal (2.1 million cubic yards) and Federal navigation channel (150,000 cubic yards). Volumes of sand currently available for the TSP will need to be recalculated to reflect the current conditions. The estimates of the available volume of beach quality sand within the ebb shoal apparently include the northern section of the ebb shoal which is not included within the designated borrow area in the St. Augustine Inlet Management Plan. Only the southern portion of the ebb shoal is apparently dredged for material that is placed on the St. Augustine Beach. These factors indicate that the estimates of available volumes of sand, particularly within the ebb shoal need to be updated.

Based upon these factors, which may affect the current quantity of available beach quality sand, especially within the ebb shoal, we recommend that a more complete and thorough analysis of the potential cumulative impacts on the St. Augustine Inlet system from multiple projects be included within the Feasibility Study. Our concern is whether the removal of additional sand volumes for this project will result in the inlet system (especially the ebb shoal) failing to recover between nourishment events, and that it will eventually become reduced in size or deflated, or possibly undergo a change in configuration.

Storm Surge Modeling

The Department also requests that USACE conduct a modeling study to investigate potential effects on storm surge and storm waves that impact the barrier island shoreline adjacent to the Inlet, as well as the shoreline within St. Augustine Inlet including the St. Augustine Harbor waterfront itself. The Feasibility Study indicated that the USACE modeled the sediment transport patterns in the ebb shoal of the inlet and concluded that dredging the ebb shoal in the quantities proposed in the TSP would not increase shoaling rates associated with the inlet. But the Feasibility Study does not discuss any other modeling studies on potential cumulative effects to the ebb shoal or inlet system from multiple projects. If cumulative impacts should result in changes in the volume or configuration of the ebb shoal, then these changes could lead to possible subsequent increases in storm surge and storm wave heights within and adjacent to the inlet. Any increase in storm surge or storm wave heights could have consequences for the St. Augustine waterfront, which includes Castillo de San Marcos National Monument. As noted previously the Castillo de San Marcos National Monument, recently suffered significant flooding due to storm surge during Hurricane Matthew in October 2016.

Thank you for the opportunity to review and provide comments. If you have any questions concerning these comments, please contact Anita Barnett, of the National Park Service, at 404-507-5706 or anita_barnett@nps.gov.

Sincerely,

Michaela E. Noble
Director, Office of Environmental Policy
and Compliance

cc: Joyce Stanley, Department of the Interior, Atlanta, joyce_stanley@ios.doi.gov
Anita Barnett, National Park Service, anita_barnett@nps.gov
Jeremy LaDart, USACE, Jeremy.m.ladart@usace.army.mil
Patricia Bee, USACE, patricia.l.bee@usace.army.mil

Electronic distribution: St.Johns-chiefs-report@usace.army.mil

TRANSMITTED ELECTRONICALLY – NO HARD COPY TO FOLLOW

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

CECW-PC

APR 13 2017

MEMORANDUM FOR Commander, South Atlantic Division, 60 Forsyth Street, SW, Atlanta, Georgia 30303

SUBJECT: St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study

1. Reference page H-9 of ER 1105-2-100, 22 April 2000.

2. Washington level processing of subject report includes mailing letters to state and federal agencies requesting 30-day review of the proposed report of the Chief of Engineers and the report of the district engineer.

3. To expedite review of these reports, we are sending via Express Mail the package of these mailings, with instructions and mailing list, directly to the Jacksonville District. The Headquarter point of contact is Jeremy LaDart, who can be contacted at (202) 734-1861.

Theodore A. Brown

THEODORE A. BROWN, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

CF:
CESAF-PDP (Stratton)

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

The Honorable Richard L. Scott
Governor of Florida
Office of the Governor
400 S. Monroe Street
Tallahassee, Florida 32399

Dear Governor Scott:

The purpose of this letter is to notify you of the distribution of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, and the State process instituted by Florida; Public Law 78-534 (as amended by Public Law 104-303) pertaining to coordination procedures on water resources reports; and Public Law 85-624 pertaining to fish and wildlife, we have requested comments on the proposed report from single point of contact, Mr. Chris Stahl, Department of Environmental Protection. We will consider State process comments provided by the single point of contact to be the position of the State of Florida regarding the recommendation of the Chief of Engineers.

Comments of the State of Florida will be considered in determining whether the proposed report of the Chief of Engineers should be changed prior to its transmittal to the Secretary of the Army. These comments will be included with the report when it is transmitted to Congress.

Receipt of State views and recommendations within 30 days will facilitate expeditious processing of the final report of the Chief of Engineers.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

Office of the Governor
Attn: Ms. Sally Bradshaw
400 S. Monroe Street
Tallahassee, Florida 32399

Dear Ms. Bradshaw:

The purpose of this letter is to notify you of the distribution of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, and the State process instituted by Florida; Public Law 78-534 (as amended by Public Law 104-303) pertaining to coordination procedures on water resources reports; and Public Law 85-624 pertaining to fish and wildlife, we have requested comments on the proposed report from single point of contact, Mr. Chris Stahl, Department of Environmental Protection. We will consider State process comments provided by the single point of contact to be the position of the State of Florida regarding the recommendation of the Chief of Engineers.

Comments of the State of Florida will be considered in determining whether the proposed report of the Chief of Engineers should be changed prior to its transmittal to the Secretary of the Army. These comments will be included with the report when it is transmitted to Congress.

Receipt of State views and recommendations within 30 days will facilitate expeditious processing of the final report of the Chief of Engineers.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

Office of Environmental Policy
and Compliance
Attn: Ms. Lisa Treichel
1849 C Street NW/MS 2442-MIB
Washington, DC 20240

Dear Ms. Treichel:

Enclosed for your review and comment are two electronic copies of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

The final feasibility report and technical appendices supporting this Chief's Report are available for download from the following website:

http://www.saj.usace.army.mil/Missions/Civil-Works/Shore-Protection/St-Johns/

In accordance with established coordination procedures on water resources reports, please furnish your comments and recommendations on any aspect of the report for which your agency has jurisdiction by law or has special expertise. In order to facilitate processing of this document in a timely manner, you are requested to provide any comments or recommendations within 30 days. Send your reply to me via email at St. Johns-chiefs-report@usace.army.mil or to the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

Printed on Recycled Paper

I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

Sincerely,

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

Environmental Protection Agency
Attn: Ms. Heather McTeer Toney
Regional Administrator, Region 4
61 Forsyth Street SW
Atlanta, Georgia 30303

Dear Ms. Toney:

Enclosed for your review and comment are two copies of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

In accordance with established coordination procedures on water resources reports, please furnish your comments and recommendations on any aspect of the report for which your agency has jurisdiction by law or has special expertise. In order to facilitate processing of this document in a timely manner, you are requested to provide any comments or recommendations within 30 days. Send your reply to me at the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

Response by email is acceptable at St. Johns-chiefs-report@usace.army.mil.
I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

NOAA Fisheries Southeast Region
Attn: Mr. Noah Silverman
263 13th Avenue South
St. Petersburgh, Florida 33701

Dear Mr. Silverman:

Enclosed for your review and comment is a copy of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

In accordance with established coordination procedures on water resources reports, please furnish your comments and recommendations on any aspect of the report for which your agency has jurisdiction by law or has special expertise. In order to facilitate processing of this document in a timely manner, you are requested to provide any comments or recommendations within 30 days. Please send your reply to me via email at St. Johns-chiefs-report@usace.army.mil or to the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

National Oceanic and Atmospheric Administration
Attn: Ms. Rachel Lipsy
1315 East West Highway, SSMC3, Room 15123
Silver Spring, Maryland 20910

Dear Ms. Lipsy:

Enclosed for your review and comment is a copy of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

In accordance with established coordination procedures on water resources reports, please furnish your comments and recommendations on any aspect of the report for which your agency has jurisdiction by law or has special expertise. In order to facilitate processing of this document in a timely manner, you are requested to provide any comments or recommendations within 30 days. Please send your reply to me via email at St. Johns-chiefs-report@usace.army.mil or to the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

Federal Emergency Management
Administration, Region IV
Attn: Ms. Chelsea Klein
Senior Environmental Specialist
3003 Chamblee Tucker Road
Atlanta, Georgia 30341

Dear Ms. Klein:

Enclosed for your review and comment are two copies of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

In accordance with established coordination procedures on water resources reports, please furnish your comments and recommendations on any aspect of the report for which your agency has jurisdiction by law or has special expertise. In order to facilitate processing of this document in a timely manner, you are requested to provide any comments or recommendations within 30 days. Please send your reply to me via email at St. Johns-chiefs-report@usace.army.mil or to the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

Sincerely,

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

The Honorable John Barrasso
Chairman, Committee on Environment
and Public Works
United States Senate
410 Dirksen Senate Office Building
Washington, DC 20510

Dear Mr. Chairman:

Enclosed for your information is a copy of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study. The district engineer's report is currently under review by the Office of Water Project Review. Upon completion of that review and receipt of comments on the proposed report from Federal agencies and the State, the Chief of Engineers will forward his final report to the Secretary of the Army.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

Mr. Greg Caldwell
Assistant Public Works Director
2740 Industry Center Road
St. Augustine, Florida 32084

Dear Mr. Caldwell:

For your information, enclosed is a copy of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

The district engineer's report is currently under review by the Office of Water Project Review. Upon completion of that review and receipt of comments on the proposed report from Federal agencies and the State, the Chief of Engineers will forward his final report to the Secretary of the Army.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

State of Florida
Department of Environmental Protection
Attn: Mr. Chris Stahl
2600 Blair Stone Road, Mail Station 47
Tallahassee, Florida 32399

Dear Mr. Stahl:

Enclosed are thirteen copies of the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study.

In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, and the State process instituted by Florida, we request your comments and recommendations, as the State single point of contact, on the proposed report. As set forth in Public Law 78-534 (as amended by Public Law 104-303) pertaining to coordination procedures on water resources reports and Public Law 85-624 pertaining to fish and wildlife, please submit your comments and recommendations (including the views of the agency responsible for fish and wildlife) within 30 days. Please send your reply to me via email to St. Johns-chiefs-report@usace.army.mil or to the following address:

Headquarters
U. S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

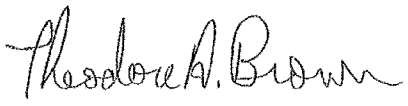
I appreciate your assistance with this review. Any questions on the proposed project or this request can be addressed to Jeremy LaDart at (202) 734-1861.

The position of the State of Florida will be considered in determining whether the proposed report of the Chief of Engineers should be changed prior to its transmittal to the Secretary of the Army. If all State process recommendations cannot be

Printed on Recycled Paper

accommodated in the final report of the Chief of Engineers, you will be so informed. Your comments will be included with the report when it is transmitted to Congress. A copy of the transmittal letter will be provided when the Secretary of the Army transmits the report to Congress.

Sincerely,



Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

The Honorable Marcellus W. Osceola, Jr.
Chairman, Seminole Tribe of Florida
6300 Stirling Road
Hollywood, Florida 33024

Dear Chairman:

Enclosed for your information please find included a CD that contains the proposed report of the Chief of Engineers and the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study. These documents can also be downloaded at:

http://www.saj.usace.army.mil/missions/civil-works/shore-Protection/St-Johns/

The district engineer's report is currently under review by the Office of Water Project Review. Upon completion of that review and receipt of comments on the proposed report from federal agencies and the State, the Chief of Engineers will forward his final report to the Secretary of the Army.

Sincerely,

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosure

Cc (without enclosure):
Dr. Paul N. Backhouse, Ph.D.
Seminole Tribe of Florida
Tribal Historic Preservation Officer
Ah-Tah-Thi-Ki Museum
30290 Josie Billie Hwy
PMB 1004
Clewiston, Florida 33440

Cherise Maples, Director
Environmental Resource Management
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Patricia Powers
Bose Public Affairs Group
2000 M Street, N.W., Suite 520
Washington, D.C. 20036

Jim Shore
General Counsel, Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Stephen A. Walker
Outside Counsel
Lewis, Longman and Walker
515 North Flagler Drive, Suite 1500
West Palm Beach, FL 33401

Michelle Diffenderfer
Outside Counsel
Lewis, Longman and Walker
515 North Flagler Drive, Suite 1500
West Palm Beach, FL 33401

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

Planning and Policy Division

APR 13 2017

The Honorable Billy Cypress
Chairman, Miccosukee Tribe of Indians
of Florida
Post Office Box 440021
Tamiami Station
Miami, Florida 33144

Dear Chairman:

Enclosed for your information is a hard copy of the proposed report of the Chief of Engineers and of the report of the district engineer on the St. Johns County, Florida, Coastal Storm Risk Management Feasibility Study. These documents can also be downloaded at:

http://www.saj.usace.army.mil/missions/civil-works/shore-Protection/St-Johns/

The district engineer's report is currently under review by the Office of Water Project Review. Upon completion of that review and receipt of comments on the proposed report from federal agencies and the State, the Chief of Engineers will forward his final report to the Secretary of the Army.

Sincerely,

Theodore A. Brown

Theodore A. Brown, P.E.
Chief, Planning and Policy Division
Directorate of Civil Works

Enclosures

Cc (with hard copy):
Fred Dayhoff
NAGPRA Representative
Consultant to Miccosukee Tribe
HC 61 SR 68 Old Loop Road
Ochopee, FL 34141

Cc (without enclosures):
Kevin Donaldson
Real Estate Services
Miccosukee Tribe of Indians of Florida
P.O. Box 440021
Tamiami Station
Miami, FL 33144

Gene Duncan
Director, Water Resources Department
Miccosukee Tribe of Indians of Florida
P.O. Box 440021
Tamiami Station
Miami, FL 3314

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Ryan E. Matthews
Interim Secretary

February 22, 2017

Aubree Hershorin, Ph.D.
Plan Formulation Branch
Coastal/Nav Section Planning and Policy Division
U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, FL 32207

RE: Department of the Army - District Corps of Engineers - Integrated Draft Feasibility Study and Environmental Assessment of a Coastal Storm Risk Management Project, St. Johns County, Florida.
SAI # FL201602247563C

Dear Ms. Hershorin:

The Florida State Clearinghouse has coordinated the state's review of the Draft IFS/EA under the following authorities: Presidential Executive Order 12372; Section 403.061(42), *Florida Statutes*; the Coastal Zone Management Act (16 U.S.C. §§ 1451 *et seq.*, as amended); and the National Environmental Policy Act (42 U.S.C. §§ 4321-4347, as amended).

The Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission submitted comments, concerns and recommendations regarding the Draft IFS/EA in the attached memorandum, letter and Clearinghouse database report, which are incorporated herein by this reference and made an integral part of this letter.

Based on the information contained in the Draft IFS/EA and the enclosed state agency comments, the state has determined that, *at this stage*, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP) and should not compromise state water quality standards. To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activities' compliance with FCMP authorities, including federal and state monitoring of the activities to ensure their continued conformance, and the adequate resolution of issues

identified during this and subsequent regulatory reviews. The state's final concurrence of the project's consistency with the FCMP and water quality certification will be determined during the environmental permitting process, in accordance with Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please don't hesitate to contact me at Chris.Stahl@dep.state.fl.us or (850) 717-9076.

Yours sincerely,

Chris Stahl

Chris Stahl, Coordinator
Florida State Clearinghouse
Office of Intergovernmental Programs

Enclosures

cc: Roxane Dow, DEP BMESP
Scott Sanders, FWC

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Ryan E. Matthews
Interim Secretary

Memorandum

TO: Chris Stahl, Coordinator, Florida State Clearinghouse
FROM: Roxane Dow, Beaches, Inlets and Ports Program
SUBJECT: Draft Integrated Feasibility Study and Environmental Assessment (EA) for St. John's County.
DATE: February 22, 2017

The Army Corps of Engineers (Corps) examined opportunities to reduce the risk of coastal damages and improve conditions on roughly 9.8 miles of beach. The study area consisted of 3.8 miles in the South Ponte Vedra area, 3.7 miles in Vilano Beach and 2.3 in Summer Haven.

The tentatively selected plan (TSP) includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach (R103.5-116.5). During the study process, the team screened out the Summer Haven area because St. Johns County is already conducting managed retreat; and, most of the South Ponte Vedra area due to its lack of public parking and access.

The TSP design consists of a 60-foot seaward berm extension and maintenance of the existing dune along 2.6 miles, approximately from the southern end of the Serenata Beach Club to San Pelayo Court. Initial construction would use about 1.3 million cubic yards of material and the periodic nourishments would use roughly 866,000 cubic yards each. The sand source is the St. Augustine Inlet system, in accordance with the St. Augustine Inlet Management Plan.

Staff from the Division of Water Resource Management worked with the Corp on the study and concur that the study and EA are consistent with our authorities under the Coastal Zone Management Plan. Final consistency for construction will be in the form for a permit issued by the Department.

cc. Lainie Edwards

Florida Fish and Wildlife Conservation Commission

Commissioners
Brian Yablonski
Chairman
Tallahassee

Aliese P. "Liesa" Priddy
Vice Chairman
Immokalee

Ronald M. Bergeron
Fort Lauderdale

Richard Hanas
Oviedo

Bo Rivard
Panama City

Charles W. Roberts III
Tallahassee

Robert A. Spottswood
Key West

Executive Staff
Nick Wiley
Executive Director

Eric Sutton
Assistant Executive Director

Jennifer Fitzwater
Chief of Staff

Office of the
Executive Director
Nick Wiley
Executive Director

(850) 487-3796
(850) 921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

March 31, 2016

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Blvd, M.S. 47
Tallahassee, FL 32399-3000
Chris.Stahl@dep.state.fl.us

Re: SAI #FL201602247563C, Department of the Army, Jacksonville District Corps of Engineers, Draft Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management Project, St. Johns County

Dear Mr. Stahl:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the above-referenced project, and provides the following comments and recommendations for your consideration in accordance with Chapter 379, Florida Statutes, and the Coastal Zone Management Act, Florida's Coastal Management Program.

Project Description

The U.S. Army Corps of Engineers (USACE) is conducting a feasibility study to investigate alternatives for coastal storm risk management of three reaches along the Atlantic coast of St. Johns County: 1) South Ponte Vedra from Florida Department of Environmental Protection (FDEP) monuments R-84 to R-104 (3.8 miles), 2) Vilano Beach from R-104 to R-117 (2.6 miles) and R-117 to the St. Augustine Inlet North Sand-trap Groin (1.1 miles), and 3) Summer Haven from R-197 to R-209 (2.3 miles). The USACE has prepared an interim Draft Integrated Feasibility Study and Environmental Assessment report that describes existing conditions of these three areas: projected conditions if a project is not implemented to address impacts from storm-induced beach erosion; formulation of plan alternatives; and environmental effects that may be associated with a plan.

The USACE has examined and conducted modeling of structural and non-structural management measures with the goal of arriving at a plan that would address erosion-related problems while maximizing benefits, including protection and enhancement of natural resources. The tentatively selected plan consists of:

- Construction of a 60-foot berm extension, a portion reflecting the average 2015 dune position, and tapers extending from monument R-102.5 to R-117.5.
- Dune construction material will consist of sand hydraulically dredged from the St. Augustine Inlet system, including the ebb, flood, Vilano Point Shoals, federal navigation channel, and associated shoals.
- Construction will include an initial event and four periodic nourishment events over 12-year intervals.

As discussed in Section 3.8 of the report, the USACE has eliminated the Summer Haven reach from further analysis based in part on the following:

- Major infrastructure, such as State Road A1A, has already been relocated landward due to erosion.
- The project's local sponsor, St. Johns County, has been purchasing properties within the Summer Haven beach area and is precluding them from development.
- With the number of structures in the area getting smaller, the USACE believes it unlikely that damages would justify a federal Coastal Storm Risk Management project.

Potentially Affected Resources

Section 2.3.3 of the draft report identifies the following as species for which the proposed project areas may provide habitat:

- Green sea turtle (*Chelonia mydas,* Federally Endangered [FE])
- Loggerhead sea turtle (*Caretta caretta,* Federally Threated [FT])
- Leatherback sea turtle (*Dermochelys coriacea,* FE)
- Kemp's ridley sea turtle (*Lepidochelys kempii*, FE)
- Hawksbill sea turtle (*Eretmochelys imbricate*, FE)
- West Indian manatee (Florida manatee, *Trichechus manatus latirostris,* FE)
- Smalltooth sawfish (*Pristis pectinate*, FE)
- Piping plover (*Charadrius melodus,* FT)
- Red knot (*Calidris canutus*, FT)
- Anastasia Island beach mouse (*Peromyscus polionotus phasma*, FE)
- North Atlantic right whale (*Eubalaena glacialis*, FE)

In addition, portions of the proposed project area are known to provide habitat for least terns (*Sterna antillarum*, State Threatened).

Comments

Section 4 of the report addresses anticipated effects that may result from the tentatively selected plan. The USACE has determined that the tentatively selected plan "may affect but is not likely to adversely affect" sea turtles in the water, manatees, right whales, or the smalltooth sawfish. FWC staff recognizes that a number of measures for avoiding and minimizing potential impacts to these species are identified in the report, including:

- Adherence to the terms and conditions of the National Marine Fisheries Service (NMFS) South Atlantic Division Regional Biological Opinions (SARBO) that are intended to minimize incidental take of marine turtles.
- Adherence to the U.S. Fish and Wildlife Service's revised State Programmatic Biological Opinion, dated August 22, 2011, for the USACE planning and regulatory sand placement activities and their effects on sea turtles and beach mice.
- Specific protective measures for manatees and North Atlantic right whales.
- Implementation of USACE migratory bird protection measures if construction occurs in summer months.

FWC staff is available to assist in refining measures discussed in the report, as well as formulating additional avoidance and minimization measures for fish and wildlife resources as project specifications are developed.

While the Summer Haven reach has been excluded from further consideration, FWC staff provides the following information should this beach area be discussed at some future point in the

project study. FDEP issued Joint Coastal Permit (JCP) Number 0313002-001-JC to the St. Augustine Port, Waterway, and Beach District on February 6, 2014, for excavation of sand from the Summer Haven River, placement of the sand onto the adjacent beach for restoration of a dune system between monuments R-200 and R-208, and creation of least tern habitat. In 2008, a breach occurred on the south side of R-200 and natural coastal processes subsequently deposited sand into the river closing the breach in 2011. Since 2010 the beach area between R-200 and R-202 has provided habitat for a nesting colony of least terns. The project authorized by the JCP will result in "take" of the state-listed least tern (as defined in Chapter 68A-27, Florida Administrative Code), and therefore necessitated issuance of an Incidental Take Permit from FWC. Should a project be proposed by the USACE in the Summer Haven reach or any other area within least tern or other listed species habitat, the requirements of Chapter 68A-27 would apply.

We appreciate the opportunity to review the Draft Feasibility Study and EA and we look forward to further coordination during preparation of the final reports to ensure that potential impacts to fish and wildlife resources are minimized. We find the information submitted in this conceptual Draft Integrated Feasibility Study and Environmental Assessment consistent with FWC's authorities under Chapter 379, F.S. We will continue to work with the applicant as new information is incorporated into the Draft Integrated Feasibility Study and Environmental Assessment to help ensure the project remains consistent with Chapter 379, F.S. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or by email at FWCConservationPlanningServices@MyFWC.com. If you have specific technical questions regarding the content of this letter, please contact Laura DiGruttolo by phone at (352) 732-1225 or by email at Laura.Digruttolo@MyFWC.com.

Sincerely,

Jennifer D. Goff
Land Use Planning Administrator
Office of Conservation Planning Services

jdg/ld
ENV 1-3-2
Coastal Storm Risk Management Project EA_30540_033116

cc: Aubree Hershorin, Ph.D., USACE, Aubree.G.Hershorin@usace.army.mil

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 SAN MARCO BOULEVARD
JACKSONVILLE, FLORIDA 32207-0019

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

FEB 14 2017

Ms. Virginia Fay
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, Florida 33701-5505

Dear Ms. Fay:

This letter acknowledges the U. S. Army Corps of Engineers (Corps), Jacksonville District, receipt of your January 20, 2017 letter regarding the Essential Fish Habitat (EFH) consultation for the Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management Project, South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches, St. Johns County, Florida. The National Marine Fisheries Service (NMFS) continues to express concern regarding potential impacts to EFH resulting from this project. The Corps reviewed and considered the remaining concerns presented by NMFS in its most recent letter, and has prepared the enclosed responses as required under the Magnuson-Stevens Fisheries Conservation and Management Act [MSFCMA; 50 CFR § 600.920(k)].

The Corps appreciates the input provided by NMFS on this project to develop measures that avoid impacts to National Oceanic and Atmospheric Association's trust resources. The submission of the enclosed responses completes the Corps' requirements for EFH consultation under the MSFCMA's EFH provisions. Any questions regarding this project should be directed to Dr. Aubree Hershorin at the letterhead address, or by telephoning 904-232-2136.

Sincerely,

Gina Paduano Ralph, Ph.D.
Chief, Environmental Branch

Enclosure

Copy Furnished:

Dr. Ken Riley, 101 Pivers Island Road, Beaufort, North Carolina, 28516-9722

FEB 1 4 2017

INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT
COASTAL STORM RISK MANAGEMENT PROJECT
South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches
St. Johns County, Florida

U.S. Army Corps of Engineers (Corps) Responses to
National Marine Fisheries Service 10-Day Letter (January 20, 2017)

National Marine Fisheries Service (NMFS) conservation recommendations are listed below in bold, with their subsequent comments in italics and the U.S. Army Corps of Engineers Jacksonville District (Corps) response is provided for each.

1. **Best management practices, such as restricting the time of year that construction activities including sand mining, beach and dune nourishment, and berm erection, should be included to reduce impacts to EFH and vulnerable life stages of federally managed fishery species.**

The District's letter indicates the CSRM project will implement best management practices during project construction to minimize impacts to EFH while also considering risks to other protected species. The NMFS believes the District's letter minimally addresses the specific timing or environmental window for scheduling in-water construction and dredging. The NMFS believes the CSRM project would minimize impacts to larval and juvenile fishes as well as benthic fauna by maintaining the requirement for in-water construction to occur only during the winter months (November 1 to April 30). Adherence to this window would ensure sediment removal and placement occurs before the spring recruitment period for fish and invertebrates and seasonal peaks in biological productivity. The NMFS concludes more information is needed on build plans and construction timing to fully address conservation recommendation 2.

The Corps maintains that the impacts that may occur to larval fishes, juvenile fishes, and benthic fauna are temporary in nature and limited in scope to a small dredge area. Turbidity impacts are anticipated to be minimal and localized in nature due to the coarse sand located in the sand source area. Further, the renourishment interval for this project is 12 years; therefore, impacts will occur infrequently.

The Corps will attempt to manage construction timeframes to minimize impacts to EFH while also considering the risks to other protected species (including sea turtles and shorebirds). Funding restrictions and limitations must also be taken into account when managing construction schedules. The NMFS-recommended windows will be taken into consideration to the maximum extent practicable. The Corps maintains that the temporary, limited, and infrequent dredging proposed at the ebb shoal of the St. Augustine Inlet will have minimal effects on essential fish habitat.

2. A scientifically supported rationale should be provided for concluding impacts to benthic communities at beach nourishment sites would be minimal. Alternatively, best management practices should be included in the design of beach and dune nourishment and a monitoring program should be in place to evaluate the effectiveness of those best management practices.

The District indicates a substantial number of studies demonstrate the effects of beach nourishment on benthic invertebrates. While we generally agree, there is a need for regional appraisal of impacts on nourished beaches and indirect impacts on prey resources and foraging habitat provided by the beach shoreline complex. The District's letter references two peer-reviewed studies that are quite distant from the project location (i.e., North Carolina and Australia). The District should base its recovery rate forecasts on relevant peer-reviewed studies conducted within the same biogeographic province as the project. The CSRM project should include a biological monitoring and adaptive management plan that reflects substantive input from NMFS to assess degradation of benthic habitats along the 60-foot equilibrated seaward berm extension. Additionally, the NMFS recommends the Jacksonville District consider modifications to engineering and construction practices referenced in Schlacher et al. (2012) to minimize ecological impacts. Most notable is the guidance for sand fill to minimize mortality by burial and preservation of unfilled intertidal areas that foster re-colonization of resident fauna. The NMFS concludes more information and a scientifically supported rationale is needed to conclude impacts to benthic communities at beach nourishment sites would be temporary and minimal.

While the Corps generally agrees that additional site-specific information on impacts to benthic communities at beach nourishment sites would be beneficial, studies conducted at other sites provide adequate basis for concluding that minimal, temporary impacts to the benthic communities at the placement site would occur. While these studies may have limitations, it is outside of the authority provided under the Corps' flood risk management program to conduct research.

In addition to the studies previously cited, Bowen and Marsh (1988) studied benthic faunal colonization of a borrow pit associated with the Delray Beach, Florida, beach nourishment project. They found abundance of organisms peaked at 170 days post-dredging, and species richness peaked at 296 days post-dredging.

The recovery after 296 days was found to mimic that of a five-year-old borrow pit, although they noted differences in species composition between the two pits. Wilber et al. (2003) conducted extensive sampling of surf zone fisheries between 1995 and 1999 on the northern coast of New Jersey. They noted that the impacts of beach nourishment on the species monitored were primarily attraction and avoidance responses to the construction operation. They recommended future studies focus on specific mechanisms of impacts to species of concern. An unpublished study by Lacharmoise, Barrailler, and Horwell (2003) found that *Emerita* and *Donax* spp. populations, while impacted during nourishment, had fully recovered by the year following nourishment. Finally, Hayden and Dolan (1974) suggested that beach nourishment most likely causes the redistribution of sand crabs (*Emerita talpoida*) rather than massive mortality, which is more apparent with higher fines content. Since the time of the Hayden and Dolan study, most states have implemented strict standards and sand grain size and color for sediments intended for beach placement. The sediment located in the St. Augustine Inlet system is within the sand sharing system of the adjacent beaches, and is compatible with the sediment at the placement site.

Sand placement occurs primarily above the mean low water line. Sand movement during the beach equilibration process is gradual, and impacts to benthic species are likely to be similar to those experienced during a large storm event. The purpose of this project is to provide flood protection to coastal infrastructure from coastal storms. While the recommendations made in Schlacher, et al. (2012), may be implementable for projects beneficially using dredged materials, their implementation as part of a coastal storm risk management project would not meet the project's objectives.

REFERENCES:

Bowen, P. R., & Marsh, G. A. (1988). Benthic faunal colonization of an offshore borrow pit in Southeastern Florida. US Army Corps of Engineers, Environmental Laboratory.

Hayden, B., & Dolan, R. (1974). Impact of Beach Nourishment on Distribution of Emerita Talpoioa, the Common Mole Crab. Journal of the Waterways, Harbors and Coastal Engineering Division, 100(2), 123-132.

Lacharmoise, F., V. Barrailler, and T. Horwell. (2003). Beach Nourishment on Invertebrate Population Densities. (unpublished) Brevard County, Florida.

Wilber, D. H., Clarke, D. G., Ray, G. L., & Burlas, M. H. (2003). Surf zone fish responses to beach nourishment on the northern coast of New Jersey. *Marine Ecology Progress Series, 250*, 231-246.

United States Senate
WASHINGTON, DC 20510-0905

BILL NELSON
FLORIDA

February 2, 2017

Lieutenant General Todd Semonite
Commanding General and Chief of Engineers
U.S. Army Corps of Engineers
441 G Street NW
Washington, DC 20314

Dear Lieutenant General Semonite,

I urge you to expedite two important beach renourishment projects in St. Johns that are critical to helping the county recover from Hurricane Matthew and protect coastal infrastructure against future storms.

The first project, the St. Johns County Coastal Storm Risk Management Project, needs federal funding for the design phase, which can be paid for with disaster relief funding that Congress provided the Army Corps in the recently passed Continuing Resolution (P.L. 114-254).

The second project, the St. Johns County Beach Erosion Control Project, is scheduled to receive renourishment funding this spring. I ask that you do everything in your power to ensure this renourishment is completed as quickly as possible.

Together, these two projects would bolster the shoreline in St. Johns County, protect the area from future storm damage, and provide important habitat for nesting sea turtles. The Army Corps should work with the local community to complete them in a timely manner.

Thank you for consideration of this request.

Sincerely,

Bill Nelson

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

January 20, 2017 F/SER47:KR/pw

(Sent via Electronic Mail)

Colonel Jason A. Kirk, Commander
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Attention: Aubree G. Hershorin

Dear Colonel Kirk:

NOAA's National Marine Fisheries Service (NMFS) reviewed the letter dated, December 28, 2016, from the Jacksonville District regarding the draft *Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management Project, South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches, St. Johns County, Florida* (CSRM). The Jacksonville District proposes projects to increase beach and shoreline protection along 9.8 miles of beach in St. Johns County. The letter replies to conservation recommendations the NMFS provided by letter dated April 4, 2016, to protect essential fish habitat (EFH).

The NMFS recommended:

1. A scientifically supported rationale should be provided for assessment of alternative sand sources not included in the TSP; preferably from offshore sources or upland dredged material management areas; and capable of providing the required beach compatible sand while reducing impacts to critically important EFH associated with tidal inlets.
2. Best management practices, such as restricting the time of year that construction activities including sand mining, beach and dune nourishment, and berm erection, should be included to reduce impacts to EFH and vulnerable life stages of federally managed fishery species.
3. A scientifically supported rationale should be provided for concluding impacts to benthic communities at beach nourishment sites would be minimal. Alternatively, best management practices should be included in the design of beach and dune nourishment and a monitoring program should be in place to evaluate the effectiveness of those best management practices.
4. A scientifically supported rationale should be provided for concluding impacts to nearshore hardbottom communities within the project area would be minimal. Alternatively, environmental and geological surveys would assess the extent of nearshore hardbottom habitat that would be impacted and a monitoring program should be in place to avoid and minimize sand placement on nearshore hardbottom habitats.

The District describes the extensive sand search undertaken to locate sand resources suitable for placement at the project site. Available offshore sand sources are distant and insufficient in quantity to be cost effective. The NMFS concludes the rationale provided addresses conservation recommendation 1.

The District's letter indicates the CSRM project will implement best management practices during project construction to minimize impacts to EFH while also considering risks to other protected species. The NMFS believes the District's letter minimally addresses the specific timing or environmental window for scheduling in-water construction and dredging. The NMFS believes the CSRM project would minimize impacts to larval and juvenile fishes as well as benthic fauna by maintaining the requirement for in-water construction to occur only during the winter months (November 1 to April 30). Adherence to this window would ensure sediment removal and placement occurs before the spring recruitment period for fish and invertebrates and seasonal peaks in biological productivity. The NMFS concludes more information is needed on build plans and construction timing to fully address conservation recommendation 2.

The District indicates a substantial number of studies demonstrate the effects of beach nourishment on benthic invertebrates. While we generally agree, there is a need for regional appraisal of impacts on nourished beaches and indirect impacts on prey resources and foraging habitat provided by the beach shoreline complex. The District's letter references two peer-reviewed studies that are quite distant from the project location (i.e., North Carolina and Australia). The District should base its recovery rate forecasts on relevant peer-reviewed studies conducted within the same biogeographic province as the project. The CSRM project should include a biological monitoring and adaptive management plan that reflects substantive input from NMFS to assess degradation of benthic habitats along the 60-foot equilibrated seaward berm extension. Additionally, the NMFS recommends the Jacksonville District consider modifications to engineering and construction practices referenced in Schlacher et al. (2012[1]) to minimize ecological impacts. Most notable is the guidance for sand fill to minimize mortality by burial and preservation of unfilled intertidal areas that foster re-colonization of resident fauna. The NMFS concludes more information and a scientifically supported rationale is needed to conclude impacts to benthic communities at beach nourishment sites would be temporary and minimal.

The District's letter indicates there are no known nearshore hardbottom communities located in the project area. In email correspondence with the project manager, dated January 9, 2017, the Jacksonville District provided supplemental information and reports including the 1994 sidescan sonar survey and geological surveys. The NMFS concludes the data and rationale provided fully addresses conservation recommendation 4.

Based on the information provided, the NMFS concludes the Jacksonville District could take additional steps to conserve EFH, and the NMFS continues to recommend the final CSRM include a focused discussion of EFH and Habitat Areas of Particular Concern (HAPCs) within the project area to satisfy fully the NEPA and complete the EFH consultation. In accordance with the intentions of 50 CFR 600.920(k)(2), the NMFS requests continued coordination

[1] Schlacher, T. A., Noriega, R., Jones, A., and Dye, T. (2012). The effects of beach nourishment on benthic invertebrates in eastern Australia: Impacts and variable recovery. Science of the Total Environment, 435, 411-417.

between the Jacksonville District and the NMFS Habitat Conservation Division on the issues pertaining to the EFH recommendations for the reasons provided above.

The NMFS looks forward to further cooperation with the Jacksonville District on this project to ensure conservation and protection of fish habitat. Please direct related questions or comments to the attention of Dr. Ken Riley at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 728-8750.

Sincerely,

Pete Willis

/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Aubree.G.Hershorin@usace.army.mil
EPA, Miedema.Ron@epa.gov
USFWS, John.Milio@fws.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Ken.Riley@noaa.gov

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 SAN MARCO BOULEVARD
JACKSONVILLE, FLORIDA 32207-0019

REPLY TO
ATTENTION OF

DEC 2 8 2016

Planning and Policy Division
Environmental Branch

Ms. Virginia Fay
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, Florida 33701-5505

Dear Ms. Fay:

This letter acknowledges the U.S. Army Corps of Engineers (Corps) receipt of your April 4, 2016 letter regarding the Essential Fish Habitat (EFH) consultation for the Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management (CSRM) Project, South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches, St. Johns County, Florida. In that letter, the National Marine Fisheries Service (NMFS) staff expressed concern regarding potential impacts to EFH resulting from this project. The Corps has reviewed and considered the concerns and recommendations presented by NMFS in its letter and has prepared the enclosed responses to these recommendations as required under the Magnuson-Stevens Fisheries Conservation and Management Act [MSFCMA; 50 CFR § 600.920(k)].

The Corps appreciates the input provided by NMFS on this project to develop measures that avoid impacts to NOAA trust resources. The submission of the enclosed responses completes the Corps' requirements for EFH consultation under the MSFCMA's EFH provisions. Any questions regarding this project should be directed to Aubree Hershorin at the letterhead address or by telephoning 904-232-2136.

Sincerely,

Gina Paduano Ralph, Ph.D.
Chief, Environmental Branch

Enclosure

cc:
Dr. Ken Riley, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722

INTEGRATED FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT
COASTAL STORM RISK MANAGEMENT PROJECT
South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches
St. Johns County, Florida

U.S. Army Corps of Engineers (Corps) Responses to
National Marine Fisheries Service Conservation Recommendations

National Marine Fisheries Service (NMFS) conservation recommendations are listed below in italics, and the U.S. Army Corps of Engineers Jacksonville District (Corps) response is provided below each recommendation.

1) *A scientifically supported rationale should be provided for assessment of alternative sand sources not included in the TSP; preferably from offshore sources or upland dredged material management areas; and capable of providing the required beach compatible sand while reducing impacts to critically important EFH associated with tidal inlets.*

The Corps conducted an extensive sand search in an attempt to locate sand resources that would be suitable for placement at the project site. Available offshore sand sources were too far from the project area to be cost effective. There are no dredged material management areas with sufficient sand located in the vicinity of the project area. In addition, the use of the St. Augustine Inlet system is consistent with state guidance for the management of the inlet. The FDEP "Final Order Adopting St. Augustine Inlet Management Implementation Plan," directs that strategies should be implemented to:

- Continue to transfer sediment from the inlet system to the adjacent beaches, meeting a bypassing objective of 278,000 cubic yards per year, as determined by the Inlet Sink Analysis, provided in the document, Regional Sediment Budget for St. Augustine Inlet and St. Johns County, FL, 1998/1999-2010 (USACE, 2012). The material obtained from the inlet system shall be distributed to the adjacent Atlantic Ocean-fronting beaches, with a placement ratio of approximately one-third of material placement to the north and two-thirds of material placement to the south.

- Inlet sand transfer material shall be placed in designated critically eroded areas to the north or south of the inlet between R84 and R152, St. Johns County, in accordance with Implementation Strategy #1.

- Inlet dredge material may be obtained from the Federal navigation channel, the intracoastal waterway channel, and encroaching flood shoals adjacent to the Federal channel, including the Porpoise [Vilano] Point borrow area, for placement in accordance with Implementation Strategies #1 and #2.

Finally, the use of the inlet system implements a Regional Sediment Management (RSM) strategy where maintenance of Federal navigation features can be combined with a Federal CSRM project. The beneficial use of maintenance material from the navigation channel minimizes the frequency in which dredging occurs, since the projects are dredged concurrently.

2) *Best management practices, such as restricting the time of year that construction activities including sand mining, beach and dune nourishment, and berm erection, should be included to reduce impacts to EFH and vulnerable life stages of federally managed fishery species.*

The Corps will implement best management practices during the construction of the project. The timing of project construction will be managed to minimize impacts to EFH while also considering the risks to other protected species (including sea turtles and shorebirds). Only beach quality sand that is compatible with the native sediment on the existing beach will be used for placement at the project site. The use of beach compatible sand will minimize turbidity impacts associated with fine sediments during dredging and placement operations. Turbidity monitoring will be implemented at the dredge and placement sites to ensure compliance with Florida's state water quality guidelines and confine turbidity values to under 29 NTUs above ambient levels. Additionally, sediment placed on the beach will be managed to reduce turbidity and sedimentation impacts by constructing parallel dikes at the discharge pipe to allow for settling of sediment before return water enters the swash zone.

3) *A scientifically supported rationale should be provided for concluding impacts to benthic communities at beach nourishment sites would be minimal. Alternatively, best management practices should be included in the design of beach and dune nourishment and a monitoring program should be in place to evaluate the effectiveness of those best management practices.*

While the Corps generally agrees that additional site-specific information on impacts to benthic communities at beach nourishment sites would be beneficial, studies conducted at other sites provide adequate basis for concluding that minimal, temporary impacts to the benthic communities at the placement site would occur[1][2]. While these studies may have limitations, it is outside of the authority provided under the Corps' flood risk management program to conduct research. Physical monitoring (bathymetric and beach topographic surveys) will occur to monitor the status of the project, including any erosion of placed material in the project area.

---

[1] Schlacher, T., et al. 2012. The effects of beach nourishment on benthic invertebrates in eastern Australia: Impacts and variable recovery. *Science of the Total Environment*, 435-436: 411-417.
[2] Stull, K.J., Cahoon, L.B. and Lankford, T.E., 2015. Zooplankton Abundance in the Surf Zones of Nourished and Unnourished Beaches in Southeastern North Carolina, USA. *Journal of Coastal Research*, *32*(1), pp.70-77.

4) *A scientifically supported rationale should be provided for concluding impacts to nearshore hardbottom communities within the project area would be minimal. Alternatively, environmental and geological surveys would assess the extent of nearshore hardbottom habitat that would be impacted and a monitoring program should be in place to avoid and minimize sand placement on nearshore hardbottom habitats.*

There are no known nearshore hardbottom communities located in the project area. As discussed in the report, a side-scan sonar survey was conducted over 2.7 square miles of nearshore substrate in 1994 to determine the presence and extent of hard bottom areas in the vicinity of the project. There were no distinguishable bottom features that could be classified as exposed hard bottom or outcrops. Based on core borings, there are no rock formations existing within the placement area. The existing geologic formation is covered with approximately 10-20 feet of sand.

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log No. 04EF1000-2016-E-00081
FWS Log No. 04EF1000-2011-F-0170

December 22, 2016

Ms. Gina Paduano Ralph, Chief
Environmental Branch
Planning and Policy Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232
(Attn: Aubree Hershorin)

Re: St. Johns County Coastal Storm Risk Management Project– Usinas Beach and Vilano Beach, St. Johns County, Florida

Dear Ms. Paduano:

The U.S. Fish and Wildlife Service (Service) has reviewed the U.S. Army Corps of Engineers' (Corps) letter dated May 25, 2016, and its accompanying information. The Corps proposes to construct a 60-foot beach berm along 2.6 miles of beach from Florida Department of Environmental Protection (DEP) monument R-103.5 to R-116.5. One thousand foot tapers at either end connecting the berm to the existing shorelines extend the area of sand placement to between monuments R-102.5 and R-117.5, along 3 miles of shorelines. The project template includes a dune feature that reflects the average 2015 dune season. The initial construction would require approximately 1.3 mcy of sand, which would be obtained from the St. Augustine Inlet System, including the ebb, flood, and Vilano (Porpoise Point) shoals, the Federal navigation channel, and any associated shoals. The anticipated duration of the initial construction would be approximately 3.3 months. Future nourishments would require approximately 866,000 cy of material, and the nourishment interval for this project is about 12 years. The project site is located in the vicinity of the St. Augustine Inlet and Atlantic Ocean shoreline within Sections 4/5/9/16, Township 7 South, Range 30E, and Sections 29/32/44, Township 6S, Range 30E within Usinas and Vilano Beaches, St. Johns County, Florida. We provide the following comments in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), and the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 *et seq.*)

Endangered Species Act

The Corps determined that the proposed project occurs within the range of the federally listed, West Indian (Florida) manatee (*Trichechus manatus latirostris*), the Anastasia Island beach mouse (*Peromyscus polionotus phasma*), piping plover (*Charadrius melodus*), rufa red knot (Calidris canutus rufa), and loggerhead (Caretta caretta), green (Chelonia mydas), leatherback (*Dermochelys coriacea)*, and Kemp's ridley, (*Lepidochelys kempii*) sea turtles. The Corps has determined that the proposed work is likely to adversely affect nesting sea turtles, and that the Statewide Programmatic Biological Opinion (SPBO) for beach placement and shore protection is appropriate to apply to this project. The Corps also determined that the project is not likely to adversely affect the manatee, beach mouse, piping plover, and rufa red knot. The determination of effect for the piping plover was based on a review of the Programmatic Piping Plover Biological Opinion, and a finding that the activity will not occur in "optimal" piping plover habitat. The Corps as a conservation measure for the manatee will incorporate the 2011 Standard Manatee Conditions for In-Water Work into the project plans and specifications.

West Indian (Florida) Manatee

We agree, with qualifications, with the Corps' application of the SPBO to this project for the manatee and sea turtles. Regarding the manatee, there are three additional conditions provided in the "Introduction" section of the SPBO that the Corps must incorporate into the project plans and specifications **"for all dredging activities within estuaries and adjacent to the shore, inlets, and/or inshore areas including channels associated with submerged borrow areas and navigation channels"**. Based on the project's proposed sand sources, this stipulation applies to the dredging of all sand sources except for the offshore borrow site and its borrow channel. According to the SPBO, the Service can concur with the Corps' effects determination only if it makes the conditions part of the project plans and specifications. The Corps has agreed to do this, and the Service as a result concurs with the "may affect, not likely to adversely affect" determination for the manatee. The conditions are as follows.

1. Barges shall install mooring bumpers that provide a minimum 4-foot standoff distance under maximum compression between other moored barges and large vessels, when in the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate.

2. Pipelines shall be positioned such that they do not restrict manatee movement to the maximum extent possible. Plastic pipelines shall be weighted or floated. Pipelines transporting dredged material within the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate shall be weighted or secured to the bottom substrate as necessary to prevent movement of the pipeline and to prevent manatee entrapment or crushing.

3. In the event that such positioning has the potential to impact submerged aquatic

vegetation (SAV) or nearshore hardbottom, the pipeline may be elevated or secured to the bottom substrate to minimize impacts to SAV.

Sea Turtles

The addition of beach quality sand to a critically eroded shoreline is expected to benefit nesting sea turtles over the project's estimated 12-year nourishment interval. However, it was not clear from the accompanying information if the proposed construction of a dune feature based on the average 2015 dune position will cover existing hardened shoreline stabilization structures such as bulkheads, riprap, etc. within the project footprint. Construction of such structures along ocean shorelines historically has occurred at or near the toe end of a natural dune, or at the waterward end of improved grounds. Such positioning usually places these structures at the landward end of sea turtle nesting habitat. Past and current information within St. Johns County and other Florida coastal counties indicates that sea turtles emerging from the ocean to nest and encountering such structures may abandon the nesting attempt, or false crawl, even if suitable sand occurs contiguous to the structure. False crawls are a form of harassment, which is part of the definition of "take" under the Act. The proposed sand placement is expected to increase the availability of suitable nesting habitat compared to the existing beach. Post-construction monitoring of other renourished beaches has revealed an increase in false crawls during the first nesting season post-construction. Since the distance a nesting turtle crawls on a nourished beach before nesting or abandoning a nesting attempt is variable, it is our view that increased nesting attempts on a nourished beach also increase the probability of a false crawl resulting from an encounter with a hardened shoreline. Landward gaps between hardened shorelines and eroded dune features also may present an entrapment hazard to nesting sea turtles where the height of the beach berm enables turtles to access the top of the hardened structure.

Based on the preceding, the Corps provided additional information that demonstrated that any hardened shoreline would be behind the reconstructed dune crest, which would range in height between 14 and 20 feet to match the 2015 dune profile. The dune face would be constructed at a slope of 5H:1V for approximately 20 feet, ending in a beach berm having a typical slope of between 10:1 and 20:1 and a width of at least 8 feet. These dune and beach profiles are consistent with the relative dimensions of these coastal features north of the St. Augustine Inlet compared to south of the inlet. Although the proposed dune profile is different than that required in Term and Condition 5 of the SPBO for high erosion beaches, following discussion with the Corps, we have concluded that its desire to match the proposed project area to the local natural dune and beach profiles meets the intent of the SPBO.

Regarding potential entrapment, the Corps stated that where gaps exist behind the hardened structure and eroded dune, these gaps would have to be filled in with comparable material by the landowner or St. Johns County, the local sponsor, prior to dune reconstruction. The importance of this fill is to insure that the integrity and position of the hardened structure is not compromised by the weight of material used to construct the beach and dune. If no backfilling occurs, due to the potential liability issue, the Corps is unlikely to place dune and beach material at that location. Based on this scenario, we have concluded that the likelihood of entrapment of a nesting sea turtle behind a hardened structure is insignificant or discountable.

The Corps as part of the project plans and specifications will monitor and maintain the constructed beach and dune throughout the project's estimated lifecycle. The physical monitoring will consist of 7 beach profile surveys; a pre-construction, post-construction, and 5 annual monitoring surveys. After 5 years, survey requirements are extended to every other year or as needed. When 50% of the berm portion of the project template has eroded at any point along the project (if a profile survey at any of the FDEP R-monuments shows that the berm has eroded to within 30 feet of the dune), and the total volume eroded from the entire length of the project has reached 750,000 cubic yards, then a renourishment event takes place. Since the Corps works on a 3-year budget cycle process, regular monitoring is critical to insure that if the monitoring detects erosion trends, a funding request is made before these triggers are reached. If a major storm causes the thresholds to be reached or exceeded, the Corps will pursue an emergency nourishment/dune reconstruction as needed.

In case of delays in funding authorization requests that respond to chronic or acute erosion events that could expose nesting sea turtles to hardened shorelines, it is our view that the following additional take statement addressing this possibility needs to be added to the SPBO for this project. (*italics*). We have also modified the SPBO's reasonable and prudent measure and associated term and condition that address dune reconstruction to reflect the project's response to the presence of hardened shorelines within the dune reconstruction footprint (*italics*).

AMOUNT OR EXTENT OF ANTICIPATED TAKE

Sea Turtles

Take is expected to be in the form of.....(6) behavior modification of nesting females due to escarpment formation and encounters with exposed, *post-construction hardened shoreline stabilization structures within the project area during a nesting season*, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; .....

REASONABLE AND PRUDENT MEASURES for:

A. Projects involving sand placement from beach nourishment, sand bypass, *dune reconstruction*, and sand back pass activities primarily for shore protection (these projects are usually larger scaled) shall include the following measures:

A6. *For dune reconstruction*, the placement and design of the dune shall emulate the natural dune system to the maximum extent possible, including the dune configuration and shape, *and burial of any existing hardened shoreline stabilization structures contiguous to the beach berm.*

TERMS AND CONDITIONS for:

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

A5. .....Dunes and other construction features must be constructible without impacting other resources. If a recommended dune is not possible, the Corps will contact the Service to see if consultation needs to be reinitiated or discuss features incorporated with the profile *that will restore the dune system to pre-storm conditions. If such information is not available*, dune features will include a slope of 1.5:1 followed by a gradual slope of 4:1 for approximately 20 feet seaward on a high erosion beach (**Figure 13**) or a 4:1 slope (**Figure 14**) on a low erosion beach. The seaward toe of the dune should be at least 20 feet from the waterline. *Where a hardened shoreline structure occurs, the recommended dune slopes and distances of the seaward toe of the dune from the waterline may need to be adjusted to insure sufficient burial of the structure beneath the reconstructed dune feature. No part of the top and waterward end of the hardened structure shall to the maximum possible extent be less than three feet beneath the surface of the dune.*

Piping Plover and Red Knot

With respect to the piping plover, the available information indicates that wintering individuals have been observed within and in the immediate vicinity of the St. Augustine Inlet. Their number and frequency of use suggest that this area does not represent a season-long, overwintering location but rather a temporary stopover in route to the species' historic wintering sites along the Florida Atlantic Coast. Habitats within the area affected by the action that represent suitable roosting and/or foraging sites include emergent flood shoals, emergent islands, estuarine, inlet, and ocean shorelines within Anastasia State Park, the inlet shoreline associated with Porpoise Point, and ocean shorelines within Usinas Beach and Vilano Beach. Estimates of linear shoreline lengths and widths (mean low water through the upper beach) of these habitats since 1999 using Google Earth imagery indicated that except for Porpoise Point, shoreline lengths exhibited little change between 1999 and 2015. Changes in width were more pronounced and varied, particularly within the ocean-fronting shorelines north and south of the inlet. At Porpoise Point, both shoreline length and widths varied significantly over the same timeframe, with the length near the end of 2015 approximately 700 feet less than at the beginning of 1999. Although total length fluctuated between 1999 and 2010, a consistent decrease has been occurring since 2011. This trend roughly coincided with the mining of the inner harbor shoal borrow area and navigation channel adjacent to Porpoise Point for the 2012 beach renourishment project. The combined decrease in shoreline length and width at Porpoise Point along the north side of the St. Augustine Inlet represents in our view a decrease in both foraging and roosting habitat for piping plovers.

Regarding the red knot, like the piping plover, emergent shoals and shorelines in the vicinity of inlets represent important roosting and foraging habitats during the species' spring and fall migrations. Red knots also occur along beaches not associated with inlets. Available information revealed a few red knot sightings around the St. Augustine Inlet, and larger numbers on Anastasia Island south of the St. Augustine Beach Pier. Red knots often alternate among different, co-located roosting and foraging sites whose availability is dictated by the local tides. The emergent shoals and shorelines associated with the St. Augustine Inlet represent such alternative habitats.

The proposed project initially is expected to require approximately 1.3 mcy of sand, and take approximately 3.3 months to construct. Unless the construction is limited to the months of June

through August, there is a possibility that construction will temporarily displace foraging and roosting piping plovers and red knots from the sand placement site and emergent flood shoals inside the St. Augustine Inlet. If such displacement does occur, due to the availability of other roosting and foraging habitat within the area affected by the action, it is our view that any such temporary displacement will not rise to the level of "take" of either species.

Proposed dredging of the emergent portions of the flood shoal has the potential to directly impact roosting and foraging piping plovers and red knots that may use this site as a temporary stopover in route to traditional wintering and migratory sites, respectively. Likewise, mining of the Porpoise Point borrow area (shoal) within the inlet may further reduce the length of shoreline along the north shore of the inlet, and represent a further reduction in roosting and foraging habitat for these species. The most recent updated St. Augustine Inlet Management Implementation Plan, which prescribes sand bypass objectives and limits on the annual removal of sand from the south lobe of the ebb tidal shoal, does not include individual removal limits from the other sand sources within the system. It is our view that limits to the removal of the emergent portion of the flood shoal and Porpoise Point shoals are needed to reduce the probability of adverse effects to roosting and foraging piping plovers and migrating red knots from habitat loss. As a result, we recommend that the following conditions be added to the project plans and specifications.

- Restrict dredging of the Porpoise Point borrow area (shoal) along the north side of the St. Augustine Inlet, to that area encroaching on, and expected to encroach on between the maintenance dredging cycles, the authorized navigation channel
- Restrict dredging of the flood tidal shoals to those sections that remain submerged ($\geq$ 1 foot) at mean low lower water (MLLW)

The addition of these conditions will reduce the probability of take of piping plover and red knot through habitat loss, to insignificant or discountable levels. The Corps has agreed to include these conditions in its project plans and specifications. Based on this response, with the inclusion of these conditions, we concur with the Corps' determination that the project is not likely to adversely affect the piping plover or red knot.

Anastasia Island Beach Mouse

A review of the history of Anastasia Island beach mouse dune habitat within Anastasia State Park (ASP) since reauthorization of the St. Johns County Shore Protection Project (SJCSPP) in 1999, and the subsequent beach renourishments, has revealed the following.

- Stability or increase in such habitat from DEP monument T-129 to R-141, the southern boundary of ASP, through November 2015
- A minor to significant net loss of beach mouse habitat from DEP monument R-123 to T-129.

The two SJCSPP projects completed in January 2003 and September 2012 removed 6.3 mcy of material from the St. Augustine Inlet sand system. An additional project authorized due to storm impacts in 2004, and completed in November 2005, removed 2.8 mcy from the system. The

southern lobe of the ebb tidal shoal was used as a sand source in each of those projects. The total amount of sand removed from that location for all three projects is undetermined. The north lobe of the ebb tidal shoal also was used in the 2003 and 2005 projects, but not the 2012 project due to concerns over impacts to the inlet and north beach shorelines, as well as a reduction in natural bypassing of inlet sediment. Some of the sand placement occurred within ASP for all three projects, but not north of T-132. Subsequent nourishments in 2012 and 2013 from maintenance dredging of the AICW and inlet navigation channels resulted in additional sand placement of approximately 300,000 cy within ASP, including between R-127 and R-131A. No sand had been placed north of the R-127, yet some net accretion occurred between R-127 and R-123 through November 2015 following these events. This was likely the result of northward sand transport typical along a shoreline immediately south of an inlet, and the eventual advancement of sand landward from the north and south lobes of the ebb shoal following Hurricane Sandy and nor'easters.

The significant net loss of beach mouse habitat at the northern end of ASP began about a year and a half after the unplanned 2005 beach renourishment event, and continued at certain locations through the beginning of 2014. The assumed high volumes of sand removed from the south lobe of the ebb tidal shoal in 2003, 2005, and 2012, coupled with the lack of significant storms aiding natural beach sand recruitment from 2005 through October 2012, and the incomplete infilling of that offshore sand source likely combined to contribute to the severe net erosion of habitat along the northernmost section of ASP. The DEP in its 2104 updated St. Augustine Inlet Management Implementation Plan (SAIMIP) admitted its concern about potential erosion impacts to the beaches adjacent to the inlet from exceedance of the original, average annual bypass objective of 510, 000 cy of sand from the inlet shoals. As a result, and consistent with the 1998/1999 – 2010 U.S. Army Corps of Engineers' regional sediment budget and analysis, and the DEP's 2011 Inlet Management Restudy for the St. Augustine Inlet, the updated plan adopted strategies that reduced the annual average bypassing objective to 278, 000 cy, and limited (except for maintenance dredging of the federal navigation channel) the amount of sand removed from the south lobe of the ebb shoal and that channel to a maximum of 179,000 cy per year times the number of years between beach nourishment events. The DEP also recognized that the future sediment budget is dependent upon meteorological conditions and the resulting wave climate, which cannot be predicted with any reasonable accuracy, and that it is not appropriate to modify the fill placement protocol as a result of the impact of major storms or short term influences (< 5 years). It is our view, however, that it is the frequency, extent, and timing of such meteorological conditions that combined with the sand bypass strategies, can significantly influence the accretion/erosion cycle of beach mouse habitat at the northern end of ASP.

Based on the preceding, it is our position that the proposed reductions in the annual sand bypassing volume and sand removal from the south lobe of the ebb tidal shoal for the proposed project cannot guarantee under all circumstances that a loss of beach mouse habitat within the northern section of ASP, will not re-occur during the project's approximate 12-year nourishment interval. In addition, the observed and projected renourishment intervals for sand placement south of the inlet have been seven and five to eight years, respectively. Shorter sand retention intervals than projected suggest a potential for a modification of the SAIMIP to allow for more frequent use of the St. Augustine Inlet shoal system. More frequent use, especially of the south lobe of the ebb tidal shoal, could under certain meteorological conditions, result in additional net loss of beach mouse habitat at the northern end of ASP.

In order to reduce the probability of future habitat loss from the northernmost section of ASP under certain meteorological conditions, we recommend periodic beach placement of about 225,000 cy of state-qualified sand between DEP monuments R-127 and R-131A. This recommendation is identical to the 2013 beach placement of 184,000 cy of material from the Federal navigation channel between R-127 and R-131A. Since the SAIMIP allows additional sand above the annual, two-source limit to be removed from the authorized navigation channel when necessary for required interim navigation channel maintenance dredging, we further recommend that this be the source for this additional beach sand placement. The frequency of placement therefore would coincide with the approximate need for interim navigation channel maintenance dredging. The expectation is that some of this placement would both increase the dune structure within the placement area, and also enter the northward littoral drift, eventually moving towards and onto the northernmost beaches landward and enhancing or stabilizing the existing dune structure in that area.

It is our view that the recommendation to periodically renourish the beach within the northern section of ASP will reduce to insignificance or discountability, the probability of take of occupied beach mouse habitat from the coincidence of certain meteorological conditions with the dredging of the south lobe of the ebb tidal shoal as part of the proposed project. The Corps has agreed to include this recommendation in its project plans and specifications. We as a result concur with the Corps' determination that the proposed project is not likely to adversely affect the Anastasia Island beach mouse.

Fish and Wildlife Coordination Act

The proposed project will relocate sand in and around the St. Augustine Inlet. The actions will remove submerged sand from the flood and ebb (south lobe) tidal shoals, the inlet and Intracoastal Waterway navigation channels, and a portion of the Porpoise Point/Vilano inlet shoal encroaching on the inlet, and transport it to a critically eroded beach beginning approximately one mile north of the inlet, for a distance of 3.1 miles. This action is consistent with the Corps' 2010 sediment budget analysis of the St. Augustine Inlet area, and the Florida Department of Environmental Protection's updated 2014 St. Augustine Inlet Management Plan.

The proposed actions and the habitat impact minimization requirements described in the ESA section of this letter are expected to result in only temporary effects on beach and benthic invertebrates, and foraging and loafing shorebirds and seabirds. Beneficial effects are expected for nesting sea turtles within the renourished section of critically eroded beach, as well as to Anastasia Island beach mouse habitat within the northern section of Anastasia State Park.

Based on the preceding analysis, we have concluded that the proposed project will not result in significant temporary or permanent negative impacts to other Federal Trust and natural resources within the area affected by the action.

This concludes section 7 consultation and FWCA comment on subject action. If you have any questions regarding this response, please contact Mr. John F. Milio of my staff at john_milio@fws.gov, or by calling 904-731-3098.

Sincerely,

for Annie Dziergowski

Jay B. Herrington
Field Supervisor

cc: FWC, Tallahassee, Florida (Ron Mezich)
DEP, Parks and Recreation, Tallahassee (Parks Small)

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log No. 04EF1000-2016-CPA-0042

October 25, 2016

Gina P. Ralph, Ph.D.
Jacksonville District Corps of Engineers
Planning and Policy Division Environmental Branch
701 San Marco Boulevard
Jacksonville, FL 32207

Re: St. Johns County Storm Risk Feasibility Study CBRA Consistency

Dear Dr. Ralph:

Thank you for your email correspondence and attachments received on May 25, 2016 and October 12, 2016 requesting the U.S. Fish and Wildlife Service determine whether the U.S. Army Corps of Engineers (USACE) St. Johns County Storm Risk Feasibility Study (Recommended Plan) is consistent with the Coastal Barrier Resources Act (CBRA).

Your request of October 12, 2016 stated: "The Recommended Plan includes the construction of a 60 ft. berm along 2.6 miles of beach from R-103.5 to R-116.5. The project template will include a dune feature that reflects the average 2015 dune position. One thousand foot tapers will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along three miles of shoreline. The initial construction would require approximately 1.3 mcy of sand, which would be obtained from the St. Augustine Inlet system, including the ebb, flood, and Vilano Point shoals, the Federal navigation channel, and any associated shoals. The anticipated duration of the initial construction would be approximately 3.3 months. Future nourishments would require approximately 866,000 cy of material, and the nourishment interval for this project is approximately 12 years.

Your May 25, 2016, consultation request stated: "The placement site is located adjacent to and within two designated units of the John H. Chafee Coastal Barrier Resources System (CBRS), including Usinas Beach (Unit P04A) and Conch Island (Unit P05; see enclosed map of the CBRS units). The Coastal Barrier Resources Act (CBRA) of 1982 and the Coastal Barrier Resources Improvement Act (CBRIA) of 1990 limit federally subsidized development in CBRS Units to limit the loss of human life by discouraging development in high risk areas, to reduce wasteful expenditures of Federal resources, and to protect the natural resources associated with coastal barriers."

USACE included a map of the CBRS unit boundaries with the consultation letter using the boundaries found on the USFWS website. However, the USACE noted that the GIS layers did

not extend to the -30 ft. contour, which is the actual extent of the CBRS unit. We have reviewed the revised map that shows the full extent of the CBRS unit boundary and the inclusion of the inlet system sand source in CBRS unit P05.

The USACE has indicated the Recommended Plan is consistent with the current St. Augustine Inlet Management Plan, which has been ongoing since it was first approved by the Florida Department of Environmental Protection (FDEP) in 2014.

The St. Augustine Inlet was created and stabilized in the early 1940s. Since the stabilization and prior to the CBRA of 1982, maintenance of the inlet and associated Federal navigation channel has affected transport of sand in the surrounding areas. The south lobe of the ebb shoal and the inlet complex have been used for the Federal St. Augustine Beach project since its authorization in 1998. Since the initial nourishment, St. Augustine Beach has stabilized and the seawall has been almost constantly buried by sand, ensuring the beach is resilient to storm events. Following the removal of sediment from the ebb shoal in the early 2000s, FDEP and USACE have conducted significant modeling of the inlet system to identify its sediment transport mechanisms.

As a result, sea turtle nesting habitat has improved at St. Augustine Beach due to beach nourishment. Similarly, material placed at Anastasia Island State Park has helped the formation of dune habitat through direct placement (during initial project construction) and through Aeolian transport of beach sand. Cooperation between State and Federal agencies has improved sand management of the inlet complex in a way that contributes to habitat for protected species, while mitigating for the change to sediment transport caused by the creation of the inlet in the early 1940s.

After careful review of the June 12, 1995 letter from the Department of the Interior to the USACE regarding CBRA and a beach renourishment project at Folly Beach, SC; section 6 of CBRA which allows nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system; and the best available scientific information regarding the history of sand management, renourishment, and its effects on trust resources, the Service has determined that the Recommended Plan is consistent with CBRA. The Service, in accordance with section 7 of the Endangered Species Act of 1973, will continue to work with the USACE to ensure that impacts will be minimized and benefits maximized in regard federally threatened and endangered species.

If you have any questions or concerns about this consultation, please feel free to contact Zakia Williams of my staff at 904-731-3119.

Sincerely,

for Jay B. Herrington
Field Supervisor

FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Ms. Gina P. Ralph, Ph.D.
Chief, Environmental Branch
Jacksonville District USACE
701 San Marco Boulevard
Jacksonville, Florida 32207-8175

October 24, 2016

RE: DHR Project File No.: 2016-3627 / Received by DHR: September 6, 2016
Project: St. Johns County Shoreline Risk Management Study
Tentatively Selected Plan (TSP) Beach and Dune Nourishment within Vilano Beach Reach and Small Portion of South Ponte Vedra Reach, St. Johns County

Dr. Ralph:

The Florida State Historic Preservation Officer reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966,* as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

This office concurs that the proposed project will have no adverse effect on historic properties if the following conditions are met:

- Buffer areas are maintained around any untested targets during dredging activities.
- 150 Foot buffer is maintained around the Dixie Crystal shipwreck site 8SJ4889.
- 300 foot buffer is maintained around the North Shoals Vessel, 8SJ4784.

For questions, please contact Robin Jackson, Historic Preservationist, Compliance and Review at *Robin.Jackson@dos.myflorida.com*, or by telephone at 850.245.6496 or 800.847.7278.

Sincerely,

Jason Aldridge
For

Timothy A. Parsons, Ph.D., RPA
Director, Division of Historical Resources and
State Historic Preservation Officer

From: John Milio
To: Hershorin, Aubree SAJ
Cc: Heath Rauschenberger; Billy Brooks; AnnMarie Lauritsen
Subject: [EXTERNAL] RE: St. Johns County Coastal Storm Risk Management Project
Date: Friday, August 05, 2016 2:49:58 PM

Aubree:

I have reviewed the U.S. Army Corps of Engineers' (Corps) letter, dated May 25, 2016, and its accompanying information, regarding the Corps' determination of effects on federally-listed species from the proposed St. Johns County Coastal Storm Risk Management project. The Corps proposes to dredge approximately 1.3 million cubic yards (mcy) of beach quality sand (bqs) from the St. Augustine Inlet sand system for the purpose of constructing a 60- foot beach berm with 1000-foot tapers at each end, and dune features reflecting the average 2015 dune position, along a three-mile long section of beach north of the St. Augustine Inlet. This work will be done in accordance with the State of Florida's St. Augustine Inlet Management Implementation Plan (SAIMIP). The SAIMIP includes implementation strategies that call for a sand bypassing objective of 278,000 cubic yards per year, with no more than 179,000 cubic yards per year times the number of years between nourishment events, coming from the south lobe of the ebb tidal shoal and federal navigation channel. This was based on a 2011 inlet restudy that recommended no sand be removed from the north lobe of the ebb shoal, and dredging of the south lobe of the ebb shoal be limited. According to the Draft Integrated Feasibility Study and Environmental Assessment for this project, dated February 2016, the estimated quantities of dredgeable beach quality sand within the St. Augustine Inlet system is 2mcy each for the flood shoal and south lobe of the ebb shoal, 0.1-0.2 mcy from the federal navigation channel, and an undetermined quantity from the Vilano Point shoals.

Based on the above, the progressive loss of Anastasia Island beach mouse habitat within the northern third of Anastasia State Park (ASP) over the last 10-12 years that roughly coincides with ebb shoal dredging and beach placement within central and southern sections of ASP and St. Augustine Beach, and concerns over the impacts of the project on shoreline stabilization structures within the project footprint and sea turtle nesting, we request the Corps provide the following additional information.

- quantitative estimates of the amount of material dredged from the south lobe of the ebb tidal shoal during the 2003 and 2005 dredging and beach nourishment events
- quantitative estimates of the amounts (and location in the case of the flood shoal) of sand from the St. Augustine inlet system proposed to be dredged from the flood shoal, Federal navigation channel, Vilano Point shoals, and south lobe of the ebb shoal for the currently proposed project
- statement as to the use/non-use of the north lobe of the ebb shoal for this project, and if used, how many mcy of bqs
- rationale for using the average 2015 dune position as the reference point for construction of a dune feature
- how dune feature construction will occur where shoreline stabilization structures are present

Please don't hesitate to call me if you need any clarification regarding these requests. Thanks.

John
****
John F. Milio
U.S. Fish and Wildlife Service
North Florida Ecological Services Office
7915 Baymeadows Way, Suite 200
Jacksonville, Florida 32256-7517

Phone: (904)-731-3098
Email: john_milio@fws.gov

-----Original Message-----
From: Hershorin, Aubree SAJ [mailto:Aubree.G.Hershorin@usace.army.mil]
Sent: Friday, July 29, 2016 3:01 PM
To: John Milio
Cc: Spinning, Jason J SAJ; Williams, Zakia
Subject: RE: St. Johns County Coastal Storm Risk Management Project

Hi John,

I just wanted to touch base with you on the status of the consultation for the St. Johns Feasibility Study. Zakia and I had coordinated on the CBRS unit concerns, which I think we have finalized. We do not plan to cost-share in the portion of the project located in the CBRS unit.

For the ESA species, we plan to use the SPBO for impacts to marine turtles. We determined the project was not likely to adversely affect plovers or red knots.

Please let me know if there's anything else we need to do to complete consultation.

Thanks, and have a great weekend!
Aubree

-----Original Message-----
From: Hershorin, Aubree SAJ
Sent: Wednesday, May 25, 2016 1:22 PM
To: John Milio <john_milio@fws.gov>; Williams, Zakia <zakia_williams@fws.gov>
Cc: Spinning, Jason J SAJ <Jason.J.Spinning@usace.army.mil>
Subject: St. Johns County Coastal Storm Risk Management Project

John/Zakia,

Please find attached the ESA/CBRA consultation letter for the St. Johns County Coastal Storm Risk Management project. This project proposes to dredge material from the St. Augustine Inlet complex and place it north of the inlet. The 2015 dune profile will also be maintained as part of this project.

If you have any questions, please let me know.

Thanks,
Aubree

~~~
~~~

From: Hershorin, Aubree SAJ
To: chris.stahl@DEP.state.fl.us
Subject: St. Johns County Feasibility Study
Date: Monday, August 01, 2016 11:15:35 AM
Attachments: Review Request for 16-7563C.pdf

Chris,

We have not yet received a response from the Clearinghouse for the St. Johns County Feasibility Study on our determination of consistency with the state's Coastal Management Program per the CZMA. The SAI# is FL201602247563C (see attached), and comments were due on 3/25/2016. Would it be possible to get an update on it? We're finalizing the document now.

Thank you for your assistance,
Aubree

~~~~~~

Aubree Hershorin, Ph.D.
Plan Formulation Branch, Coastal/Nav Section
Planning and Policy Division
U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, FL 32207
Office: (904) 232-2136
~~~~~~

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

MAY 25 2016

Mr. Jay Herrington
U.S. Fish and Wildlife Service
North Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960-3559

Dear Mr. Herrington:

The U.S. Army Corps of Engineers, Jacksonville District (USACE), is evaluating the feasibility of providing coastal storm risk management to the shores of St. Johns County, Florida. The most immediate and critical needs of the local communities are to address beach and dune erosion and to protect State Road A1A and environmental attributes. The Federal interest in participating in a locally supported, cost-shared shore protection project to address St. Johns County's coastal issues is under consideration.

The Tentatively Selected Plan (TSP) includes the construction of a 60 ft. berm along 2.6 miles of beach from R-103.5 to R-116.5. The project template will include a dune feature that reflects the average 2015 dune position. One thousand foot tapers will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement from R102.5 to R117.5 along 3 miles of shoreline. The initial construction would require approximately 1.3 mcy of sand, which would be obtained from the St. Augustine Inlet system, including the ebb, flood, and Vilano Point shoals, the Federal navigation channel, and any associated shoals. The anticipated duration of the initial construction would be approximately 3.3 months. Future nourishments would require approximately 866,000 cy of material, and the nourishment interval for this project is approximately 12 years.

Endangered Species Act

This letter notifies your office that the Corps has determined that the Statewide Programmatic Biological Opinion (SPBO) for beach placement and shore protection is appropriate to apply to the St. Johns County Coastal Storm Risk Management project. The Corps determination is that the proposed activity is likely to adversely affect nesting sea turtles, and is not likely to adversely affect manatees or beach mice. There are no identified terms and conditions, or any other criteria outlined in the SPBO, that would not be followed. Standard manatee protection measures would be imposed on activities in the water. With respect to sea turtles, all other terms and conditions of the SPBO would be followed.

This letter also notifies your office with respect to the Programmatic Piping Plover Biological Opinion (P3BO). The activity will not occur in "optimal" Piping Plover habitat and is not likely to adversely affect the Piping Plover.

Finally, the Corps has determined that the project is not likely to adversely affect the *rufa* red knot.

Should you determine that the proposed activity is not within the scope of the SPBO or the P3BO, please consider this letter initiation of consultation pursuant to Section 7 of the Endangered Species Act. For consultation on the red knot, we request that you review our determination and provide your concurrence as appropriate.

Coastal Barrier Resources Act

The placement site is located adjacent to and within two designated units of the John H. Chafee Coastal Barrier Resources System (CBRS), including Usinas Beach (Unit P04A) and Conch Island (Unit P05; see enclosed map of the CBRS units). The Coastal Barrier Resources Act (CBRA) of 1982 and the Coastal Barrier Resources Improvement Act (CBRIA) of 1990 limit federally subsidized development in CBRS Units to limit the loss of human life by discouraging development in high risk areas, to reduce wasteful expenditures of Federal resources, and to protect the natural resources associated with coastal barriers.

The TSP includes placement of sand on P04A to protect Highway A1A from storm-related damages. Highway A1A is the primary hurricane evacuation route for the island, and is an essential link to the larger hurricane evacuation network. As the project is intended to maintain this roadway and prevent it from being undermined as a result of storm damage, federal expenditures in this area would be excepted from the requirements under CBRA pursuant to 16 U.S.C. § 3505(a)(3).

In addition to protecting and maintaining Highway A1A, the proposed project is a nonstructural project that is designed to mimic and restore the natural stabilization system. The project includes the maintenance of the 2015 dune profile, which is important for nesting green turtles. The beach profile will be sloped to reduce the likelihood of escarpments from forming and to more closely mimic the natural beach profile.

For the reasons stated above, USACE determined that the project is consistent with the three purposes of CBRA, which are to minimize: (1) the loss of human life; (2) wasteful expenditure of federal revenues; and (3) the damage to fish, wildlife, and other natural resources associated with coastal barriers. As such, the project meets the criteria outlined in 16 U.S.C. § 3505(a)(6).

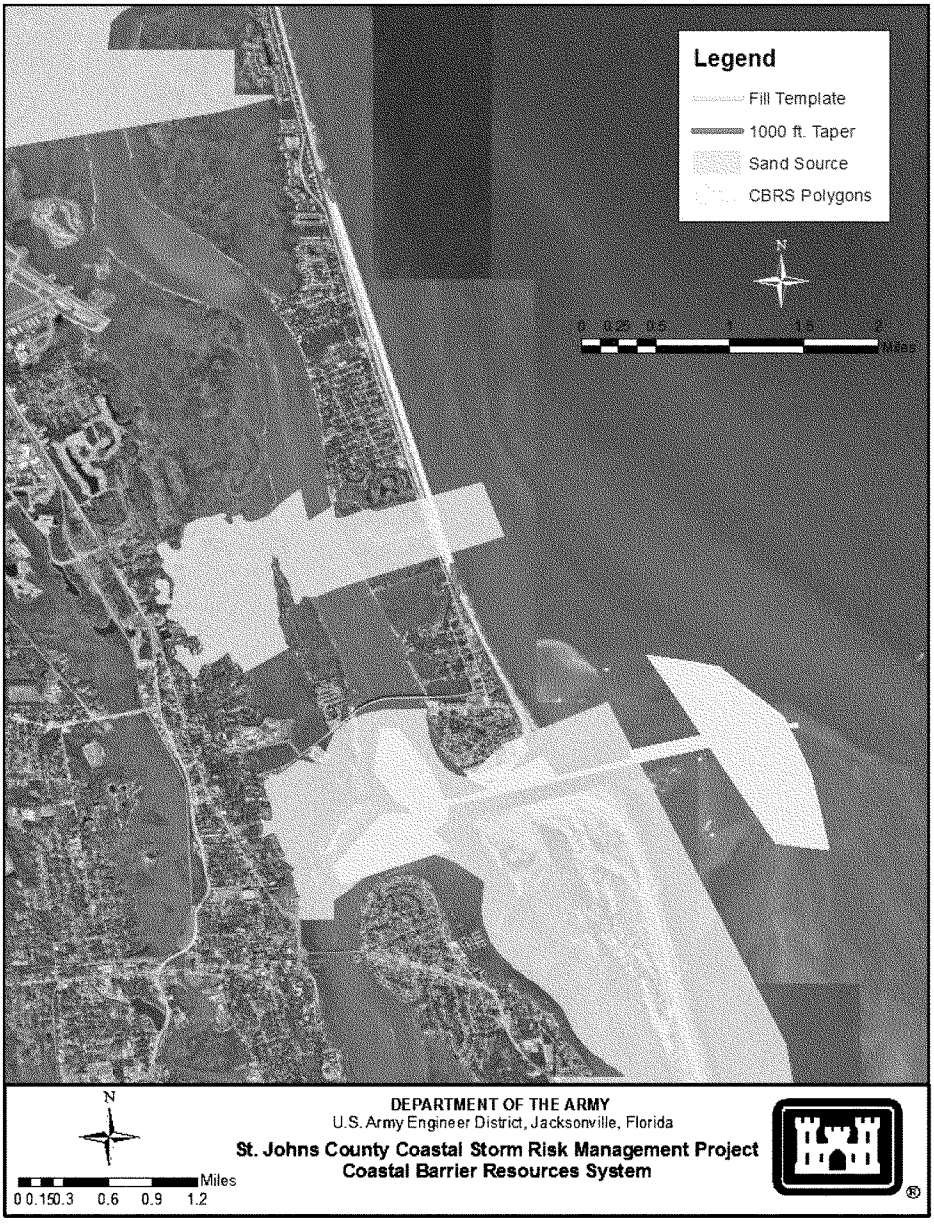
Therefore, Corps has determined that the proposed project is consistent with CBRA and CBRIA, and we request your confirmation of this determination.

If you have any questions, please contact me at (904) 232-2336 or the technical point of contact. The technical point of contact for this action is Aubree Hershorin, who can be reached at (904) 232-2136.

Sincerely,

Gina Paduano. Ralph, Ph.D.
Chief, Environmental Branch

Enclosures


Legend
Fill Template
1000 ft. Taper
Sand Source
CBRS Polygons
N
0 0.25 0.5 1 1.5 2
Miles
N
0 0.150.3 0.6 0.9 1.2
Miles
DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Jacksonville, Florida
St. Johns County Coastal Storm Risk Management Project
Coastal Barrier Resources System

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

MAY 20 2015

Geoffrey Wikel, Chief
Branch of Environmental Coordination
Division of Environmental Assessment
Office of Environmental Programs
Bureau of Ocean Energy Management
45600 Woodland Road, VAM OEP
Sterling VA 20166

Dear Mr. Wikel:

In accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6), I am formally inviting your agency to become a cooperating agency for an Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida.

Please note that cooperating agency status involves actions and responsibilities beyond that normally associated with a commenting or permitting agency. Your agency is being specifically requested to provide special expertise on natural resources in this area.

The formulation of the project, alternatives, and mitigation will be in accordance with Engineer Regulation ER 1105-2-100 and will fully consider a range of environmental, economic, and social factors. As a cooperating agency, you must fully consider the views, needs, and benefits of competing interests.

No cooperating agency will have "veto" over the selection of the project plan, alternatives, or mitigation measures. Under your status as a commenting agency, you may recommend actions not ultimately adopted or implemented by the lead agency. You may also impose requirements to the extent allowed under your legal authority as a permitting agency. Conflict with the lead agency may be resolved through mediation, placing a dissenting opinion in the EA, withdrawing your cooperating agency status, or the Lead agency pursuing an EA without you as a cooperating agency.

For additional information see the enclosed "Rights and Responsibilities of Lead and Cooperating Agencies" (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Council on Environmental Quality, 1981).

Please indicate whether you accept this invitation to become a cooperating agency (as described above) within 30 days of the date of this letter. If you have any questions, please contact Mr. Paul DeMarco at 904-232-1897.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosure

Dinkens/CESAJ-PD/1867
DeMarco/CESAJ-PD-EC/1897
Spinning/CESAJ-PD-EC
Burch/CESAJ-DP-C
Summa/CESAJ-PD-E

L: group/pdec/DeMarco/St. Johns Co/BOEM St. Johns GI CoopAgency ltr.docx

Excerpt: Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations (Council on Environmental Quality, 1981)

14a. **Rights and Responsibilities of Lead and Cooperating Agencies.** What are the respective rights and responsibilities of lead and cooperating agencies? What letters and memoranda must be prepared?

A. After a lead agency has been designated (Sec. 1501.5), that agency has the responsibility to solicit cooperation from other federal agencies that have jurisdiction by law or special expertise on any environmental issue that should be addressed in the EIS being prepared. Where appropriate, the lead agency should seek the cooperation of state or local agencies of similar qualifications. When the proposal may affect an Indian reservation, the agency should consult with the Indian tribe. Section 1508.5. The request for cooperation should come at the earliest possible time in the NEPA process.

After discussions with the candidate cooperating agencies, the lead agency and the cooperating agencies are to determine by letter or by memorandum which agencies will undertake cooperating responsibilities. To the extent possible at this stage, responsibilities for specific issues should be assigned. The allocation of responsibilities will be completed during scoping. Section 1501.7(a)(4).

Cooperating agencies must assume responsibility for the development of information and the preparation of environmental analyses at the request of the lead agency. Section 1501.6(b)(3). Cooperating agencies are now required by Section 1501.6 to devote staff resources that were normally primarily used to critique or comment on the Draft EIS after its preparation, much earlier in the NEPA process -- primarily at the scoping and Draft EIS preparation stages. If a cooperating agency determines that its resource limitations preclude any involvement, or the degree of involvement (amount of work) requested by the lead agency, it must so inform the lead agency in writing and submit a copy of this correspondence to the Council. Section 1501.6(c).

In other words, the potential cooperating agency must decide early if it is able to devote any of its resources to a particular proposal. For this reason the regulation states that an agency may reply to a request for cooperation that "other program commitments preclude any involvement or the degree of involvement requested in the action that is the subject of the environmental impact statement." (Emphasis added). The regulation refers to the "action," rather than to the EIS, to clarify that the agency is taking itself out of all phases of the federal action, not just draft EIS preparation. This means that the agency has determined that it cannot be involved in the later stages of EIS review and comment, as well as decision making on the proposed action. For this reason, cooperating agencies with jurisdiction by law (those which have permitting or other approval authority) cannot opt out entirely of the duty to cooperate on the EIS. See also Question 15, relating specifically to the responsibility of EPA.

14b. How are **disputes resolved between lead and cooperating agencies** concerning the scope and level of detail of analysis and the quality of data in impact statements?

A. Such disputes are resolved by the agencies themselves. A lead agency, of course, has the ultimate responsibility for the content of an EIS. But it is supposed to use the environmental analysis and recommendations of cooperating agencies with jurisdiction by law or special expertise to the maximum extent possible, consistent with its own responsibilities as lead agency. Section 1501.6(a)(2).

If the lead agency leaves out a significant issue or ignores the advice and expertise of the cooperating agency, the EIS may be found later to be inadequate. Similarly, where cooperating agencies have their own decisions to make and they intend to adopt the environmental impact statement and base their decisions on it, one document should include all of the information necessary for the decisions by the cooperating agencies. Otherwise they may be forced to duplicate the EIS process by issuing a new, more complete EIS or Supplemental EIS, even though the original EIS could have sufficed if it had been properly done at the outset. Thus, both lead and cooperating agencies have a stake in producing a document of good quality. Cooperating agencies also have a duty to participate fully in the scoping process to ensure that the appropriate range of issues is determined early in the EIS process.

Because the EIS is not the Record of Decision, but instead constitutes the information and analysis on which to base a decision, disagreements about conclusions to be drawn from the EIS need not inhibit agencies from issuing a joint document, or adopting another agency's EIS, if the analysis is adequate. Thus, if each agency has its own "preferred alternative," both can be identified in the EIS. Similarly, a cooperating agency with jurisdiction by law may determine in its own ROD that alternative A is the environmentally preferable action, even though the lead agency has decided in its separate ROD that Alternative B is environmentally preferable.

14c. What are the specific responsibilities of federal and state **cooperating agencies to review draft EISs**?

A. Cooperating agencies (i.e., agencies with jurisdiction by law or special expertise) and agencies that are authorized to develop or enforce environmental standards, must comment on environmental impact statements within their jurisdiction, expertise or authority. Sections 1503.2, 1508.5. If a cooperating agency is satisfied that its views are adequately reflected in the environmental impact statement, it should simply comment accordingly. Conversely, if the cooperating agency determines that a draft EIS is incomplete, inadequate or inaccurate, or it has other comments, it should promptly make such comments, conforming to the requirements of specificity in section 1503.3.

14d. How is the lead agency to treat the comments of another agency with jurisdiction by law or special expertise which has **failed or refused to cooperate or participate in scoping or EIS preparation**?

A. A lead agency has the responsibility to respond to all substantive comments raising significant issues regarding a draft EIS. Section 1503.4. However, cooperating agencies are generally under an obligation to raise issues or otherwise participate in the EIS process during scoping and EIS preparation if they reasonably can do so. In practical terms, if a cooperating agency fails to cooperate at the outset, such as during scoping, it will find that its comments at a later stage will not be as persuasive to the lead agency.

United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

JUN 04 2015

Mr. Eric Summa, Chief
Environmental Branch
U.S. Army Corps of Engineers-Jacksonville District
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Summa:

Thank you for your May 20, 2015, letter requesting that the Bureau of Ocean Energy Management (BOEM) become a cooperating agency during the preparation of an Environmental Assessment (EA) for evaluation of the feasibility of providing shoreline erosion protection and hurricane and storm damage reduction along the shores of St. Johns County, Florida. The U.S. Army Corp of Engineers Jacksonville District (Corps) is currently evaluating alternatives, consisting of an array of various structural and non-structural measures, to accomplish the identified project planning goals and objectives. Beach nourishment and dune construction were included among the structural measures carried forward within the final array of alternative plans being evaluated. These measures may require use of federal sand resources located within the Outer Continental Shelf (OCS). Section 8(k) of the Outer Continental Shelf Lands Act (OCSLA) grants BOEM the authority to convey, on a noncompetitive basis, the rights to OCS sand, gravel, or shell resources for shore protection, beach or wetlands restoration, or for use in construction projects funded in whole or part or authorized by the federal government.

BOEM welcomes the opportunity to participate in this National Environmental Policy Act (NEPA) effort and agrees to serve as a cooperating agency since BOEM has sole jurisdiction over mineral leasing on the OCS. As a cooperating agency, BOEM expects to: participate and provide input in the NEPA process at the earliest possible time; assume, on the request of the Corps, responsibility for developing information and preparing environmental analyses for which BOEM has special expertise; make available staff support, at the lead agency's request, to enhance the interdisciplinary capability of the Corps; provide comment on draft versions of the EA when requested; and use our own funds to accomplish these responsibilities. Several NEPA documents have been previously prepared by the Corps and/or BOEM considering the potential environmental effects of dredging offshore sand resources within the vicinity of the project area. BOEM expects to collaborate with the Corps to identify the existing NEPA analyses that can be used to ensure the most efficient and effective treatment of potential effects, while also considering and incorporating new information and science when appropriate.

BOEM recognizes the importance of initiating and agrees to participate in the required Endangered Species Act (ESA) Section 7 consultation; the Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat (EFH) consultation (Section 305); the National Historic Preservation Act Section (NHPA) Section 106 process; and the Coastal Zone Management Act (CZMA) Section 307 consistency process. The lead agency in ESA Section 7

consultation for potential impacts on protected species will be designated by jurisdiction and in accordance with 50 CFR §402.07. BOEM is a joint consulting agency with the Corps in the ongoing re-initiated consultation for the South Atlantic Regional Biological Opinion (SARBO), for which this project would be included as a component of the proposed action. BOEM anticipates that this consultation will be concluded prior to any planned construction date for this project and will serve as the consultation mechanism for the in-water dredging and placement activities of both agencies. The Corps would be the lead agency and consult with the U.S. Fish and Wildlife Service (FWS) concerning effects from placement activities for species under their purview (i.e., nesting sea turtles) and will notify FWS of BOEM's interconnected action and cooperating role. BOEM and the Corps will consult jointly with NMFS Habitat Conservation Division on essential fish habitat. BOEM anticipates that the Corps will be the lead federal agency for ensuring NHPA Section 106 compliance. BOEM expects to act in a consulting role, especially when coordinating with the Florida State Historic Preservation Officer (SHPO) concerning the use of OCS sand resources and all related cultural resource survey activities. BOEM requests that the Corps involve BOEM in all deliberations with the SHPO or Tribal Historic Preservation Officers so that BOEM's involvement in the undertaking is understood. The Corps will be following Subpart C procedures to obtain a consistency concurrence from the Florida Department of Environmental protection through the Joint Coastal Permit process in compliance with Section 307 of the Coastal Zone Management Act (CZMA).

BOEM looks forward to working with the Corps during this process. We would greatly appreciate it if the Corps would include us on all public notices and correspondence to other federal and state agencies concerning this project. If you would like to discuss any of these items further, please contact Doug Piatkowski at (703) 787-1833 or by e-mail at douglas.piatkowski@boem.gov.

Sincerely,

Geoffrey Wikel
Chief, Branch of Environmental Coordination
Division of Environmental Assessment

cc: Jeffrey Reidenauer, Leasing Division
Bureau of Ocean Energy Management

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Interim Secretary

June 24, 2015

Mr. Eric P. Summa, Chief
Environmental Branch, Jacksonville District
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Draft Supplemental Environmental Assessment, North Beach and Nearshore Placement, Maintenance Dredging St. Augustine Inlet and Adjacent Intracoastal Waterway – St. Johns County, Florida.
SAI # FL201505017280C

Dear Mr. Summa:

The Florida State Clearinghouse has coordinated a review of the subject Draft Supplemental Environmental Assessment (SEA) under the following authorities: Presidential Executive Order 12372; § 403.061(42), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

The following agencies submitted comments, concerns and recommendations regarding the Draft SEA, all of which (memorandum and letters) are attached hereto, incorporated herein by this reference, and made an integral part of this letter:

- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- Florida Department of State, Division of Historical Resources

Based on the information contained in the Draft SEA and enclosed state agency comments, the state has determined that, at this stage, the proposed federal action is consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activities' compliance with FCMP authorities, including federal and state monitoring of the activities to ensure their continued conformance, and the adequate resolution of issues

identified during this and any subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process, in accordance with Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please don't hesitate to contact me at Lauren.Milligan@dep.state.fl.us or (850) 245-2170.

Yours sincerely,

Lauren P. Milligan

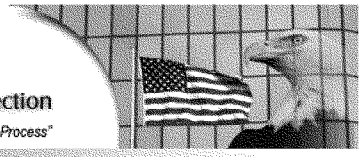
Lauren P. Milligan, Coordinator
Florida State Clearinghouse
Office of Intergovernmental Programs

Enclosures

ec: Roxane Dow, DEP, DWRM
Rebecca Prado, DEP, FCO
Cheri Albin, DEP, FPS
Scott Sanders, FWC
Timothy Parsons, DOS



Florida
Department of Environmental Protection
"More Protection, Less Process"



Categories

Project Information	
Project:	FL201505017280C
Comments Due:	06/12/2015
Letter Due:	06/30/2015
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT, NORTH BEACH AND NEARSHORE PLACEMENT, MAINTENANCE DREDGING ST. AUGUSTINE INLET AND ADJACENT INTRACOASTAL WATERWAY - ST. JOHNS COUNTY, FLORIDA.
Keywords:	ACOE - MAINTENANCE DREDGING ST. AUGUSTINE INLET AND IWW - ST. JOHNS CO.
CFDA #:	12.107

Agency Comments:

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP's Division of Water Resource Management finds the Draft SEA to be consistent with its authorities under the FCMP. The document addresses recommendations in the St. Augustine Inlet Management Plan, and one nearshore placement event has already been permitted under Joint Coastal Permit Modification No. 0251706-006-JN. The DEP's Florida Coastal Office also offers the following specific comments: The proposed South Ponte Vedra placement areas (between R-84 and R-98) are within the Guana River Marsh Aquatic Preserve and the Guana Tolomato Matanzas NERR. This area is a State Sea Turtle Index beach with a monitoring dataset beginning in 1987; any artificial manipulation during sea turtle nesting season could compromise the integrity of this long-standing data. The waters of the aquatic preserve are also classified as an OFW. The Draft SEA uses data collected between 2001 and 2008. Since that time, the area has seen a significant increase in nesting. Staff suggests that more recent data be used, including this year's nests: a Leatherback nest documented near R-105 on May 17, 2015, and a Kemp's Ridley nest documented near R-102 on May 23, 2015. It is likely that the "nest per kilometer" ranking has changed as well. Although alterations to the beach could compromise the beach as an index beach, staff will defer to the FWC's recommendations, as they are the lead agency for protected species. The beaches within the Guana River Marsh Aquatic Preserve have not been previously nourished. Therefore, it is recommended that that sand placed on these beaches be carefully selected and monitored to ensure that the original grain size is preserved. Sediment samples used to determine the native beach grain size should be obtained from beaches within the aquatic preserve that have not been previously nourished....

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

The FWC notes that Section 4 of the draft SEA addresses environmental effects, proposed minimization measures, and environmental commitments. The USACE has determined that the nearshore placement "may affect but is not likely to adversely affect" sea turtles in the water, manatees, right whales, or the smalltooth sawfish, and that the north beach placement is "not likely to adversely affect" these species. FWC staff offers the following additional recommendations for consideration in the final SEA. Placement of sand in the nearshore along a marine turtle nesting beach from May 1 through October 31 can interfere with nesting or hatchling marine turtles. Vessels operating along the nesting beach at night can block access to or from the beach. Lights on the dredge and other vessels operating in proximity to the nesting beach could be visible for miles along the shoreline, causing disorientation of nesting and/or hatchling sea turtles. Minimization measures need to be proposed to ensure that nesting and hatchling marine turtles are protected if nearshore placement occurs at night during the nesting season. FWC staff may provide more specific recommendations once project specifications have been finalized, such as during the permit review process. The draft SEA states that the USACE would implement its migratory bird protection policy should dredged sand be placed on the beach during the April 1 through August 31 seabird and shorebird nesting season. It is stated that the policy requires monitoring and a buffer of at least 200 feet around nests. FWC's standard shorebird conditions recommend a buffer distance of 300 feet. Buffer zones and other avoidance measures can be used to reduce the potential for "take" of state-listed species, as defined in Chapter 68A-27, F.A.C., which would eliminate the need to obtain an Incidental Take Permit from the FWC. Staff is available to assist with determining avoidance and minimization measures or discuss permitting alternatives.

STATE - FLORIDA DEPARTMENT OF STATE

The DOS notes that a new cultural resource assessment survey will be conducted by the USACE of the South Ponte Vedra (SPV) Near Shore Placement Area. Staff looks forward to receiving a copy of this survey for review. Regarding the proposed maintenance dredging activities, the DOS' May 8, 2015 comments concerning the maintenance of buffers around known targets and magnetic anomalies are still applicable. DOS notes that these concerns are addressed in the Draft SEA (April 2015). If the above conditions are met, the DOS concurs with the USACE's determination that the proposed undertakings will have no adverse effect on historic properties.

ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

SJRWMD has no comments.

NE FLORIDA RPC - NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL

The NEFRC and St. Johns County have no comments on the proposal.

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Interim Secretary

MEMORANDUM

TO: Lauren Milligan, Office of Intergovernmental Programs

FROM: Roxane Dow, Division of Water Resource Management

Rebecca Prado, Florida Coastal Office

Cheri Albin, Florida Park Service

SUBJECT: Department of the Army, Jacksonville District Corps of Engineers – Draft Supplemental Environmental Assessment (SEA), North Beach and Nearshore Placement, Maintenance Dredging St. Augustine Inlet and Adjacent Intracoastal Waterway – St. Johns County, Florida. SAI # FL201505017280C

DATE: June 15, 2015

Staff of the Department's Division of Water Resource Management finds the Draft SEA to be consistent with its authorities under the Florida Coastal Management Program. The document addresses recommendations in the St. Augustine Inlet Management Plan (IMP), and one nearshore placement event has already been permitted under Joint Coastal Permit Modification No. 0251706-006-JN.

The Department's Florida Coastal Office also offers the following specific comments:

The proposed South Ponte Vedra placement areas (between range monuments R-84 and R-98) are within the Guana River Marsh Aquatic Preserve and the Guana Tolomato Matanzas National Estuarine Research Reserve. This area is a State Sea Turtle Index beach with a monitoring dataset beginning in 1987; any artificial manipulation during sea turtle nesting season could compromise the integrity of this long-standing data. The waters of the aquatic preserve are also classified as Outstanding Florida Waters (OFW).

The Draft SEA uses data collected between 2001 and 2008. Since that time, the area has seen a significant increase in nesting. Staff suggests that more recent data be used, including this year's nests: a Leatherback sea turtle nest documented near monument R-105 on May 17, 2015, and a Kemp's Ridley sea turtle nest documented near R-102 on May 23, 2015. It is

likely that the "nest per kilometer" ranking has changed as well. Although alterations to the beach could compromise the beach as an index beach, staff will defer to the Florida Fish and Wildlife Conservation Commission's recommendations, as they are the lead agency for protected species.

The beaches within the Guana River Marsh Aquatic Preserve have not been previously nourished. Therefore, it is recommended that that sand placed on these beaches be carefully selected and monitored to ensure that the original grain size is preserved. Sediment samples used to determine the native beach grain size should be obtained from beaches within the aquatic preserve that have not been previously nourished. This should not only help reduce turbidity to the OFW classified waters, but also lead to quicker stabilization of the beach profile, reduce erosion and serve to maximize the interval between future nourishments.

For further information and assistance, please contact Mr. Mike Shirley or Ms. Andrea Noel in the Florida Coastal Office's East Coast Region at (904) 823-4500.

The following comments are provided by the Department's Florida Park Service (FPS):

The FPS recognizes the St. Augustine IMP and will work with the Division of Water Resource Management to provide support and further the objectives of the plan, particularly optimizing the protection of beach habitat and beach front recreation at Anastasia State Park.

In recent years, FPS staff has observed increased erosion on the north end of Anastasia State Park following dredging projects north of and offshore the park. These alterations have led to the loss of significant beach front, and endangered beach mouse and shorebird nesting habitat in the northernmost strand of the park. The FPS, therefore, requests that sand transfer material be placed south of the inlet between R-125 and R-127 in an effort to replace loss of this significant habitat and recreational area on the park's north end. Placement of sand as noted above would further the objective to replicate the natural drift of sand that has been interrupted or altered, and to place sand on adjacent eroding beaches put forward in the IMP.

If you have any questions, please contact Ms. Cheri Albin in the FPS Bureau of Natural and Cultural Resources at (850) 245-3105.

Florida Fish and Wildlife Conservation Commission

Commissioners
Richard A. Corbett
Chairman
Tampa

Brian Yablonski
Vice Chairman
Tallahassee

Ronald M. Bergeron
Fort Lauderdale

Richard Hanas
Oviedo

Aliese P. "Liesa" Priddy
Immokalee

Bo Rivard
Panama City

Charles W. Roberts III
Tallahassee

Executive Staff
Nick Wiley
Executive Director

Eric Sutton
Assistant Executive Director

Jennifer Fitzwater
Chief of Staff

Office of the Executive Director
Nick Wiley
Executive Director

(850) 487-3796
(850) 921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

June 16, 2015

Lauren P. Milligan, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Blvd, M.S. 47
Tallahassee, FL 32399-3000
Lauren.Milligan@dep.state.fl.us

Re: SAI #FL201505017280C, Department of the Army, Jacksonville District Corps of Engineers, Draft Supplemental Environmental Assessment (SEA), Maintenance Dredging of St. Augustine Inlet with Beach and Nearshore Placement, St. Johns County

Dear Ms. Milligan:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the above-referenced project, and provides the following comments and recommendations for your consideration in accordance with Chapter 379, Florida Statutes, and the Coastal Zone Management Act, Florida's Coastal Management Program.

Project Description

The U.S. Army Corps of Engineers (USACE) proposes to conduct periodic maintenance dredging of the St. Augustine Inlet, including Intracoastal Waterway (IWW) Cuts SJ-28 to SJ-30, a portion of the inlet flood shoal, and a portion of the inlet entrance channel along Porpoise Point. The proposed project includes placement of beach-compatible dredge spoil along the shorelines of: 1) Anastasia State Park and St. Augustine Beach from Florida Department of Environmental Protection (FDEP) monuments R-132 to R-152 located south of the inlet, 2) South Ponte Vedra from R-84 to R-98 located north of the inlet, and 3) Vilano Beach from R-109 to R-117 north of the inlet. Dredge spoil that is not beach-compatible is proposed to be placed in near-shore placement areas from FDEP monuments R-141 to R-146 south of the inlet or from R-84 to R-98 and R-109 to R-117 north of the inlet.

An Environmental Assessment was completed in 2011 for the proposed maintenance dredging with spoil disposal on the beach and nearshore areas south of the inlet with a Finding of No Significant Impact. In 2014 the FDEP issued the "Critically Eroded Beaches in Florida" report, which identified 11.5 miles of critically eroded shoreline in St. Johns County and a revision to the St. Augustine Inlet Management Plan. The plan recommended placement of dredged beach-compatible dredge spoil on designated critically eroded shorelines to the north or south of the inlet. The subject draft SEA is intended to only evaluate placement of dredge spoil north of the inlet. It is noted that the FDEP issued Joint Coastal Permit (JCP) Modification No. 0251706-006-JN on April 21, 2015, for nearshore placement of dredge spoil at Vilano Beach.

Potentially Affected Resources

As discussed in Section 3.3 of the draft SEA, the project areas may provide habitat for the following federally listed species:

- Green sea turtle (*Chelonia mydas,* Federally Endangered [FE])
- Loggerhead sea turtle (*Caretta caretta,* Federally Threated [FT])
- Leatherback sea turtle (*Dermochelys coriacea,* FE)
- Kemp's ridley sea turtle (*Lepidochelys kempii*, FE)
- Florida manatee (*Trichechus manatus latirostris,* FE)
- Smalltooth sawfish (*Pristis pectinate*, FE)
- Piping plover (*Charadrius melodus,* FT)
- Anastasia Island beach mouse (*Peromyscus polionotus phasma*, FE)
- North Atlantic right whale (*Eubalaena glacialis*, FE)

The draft SEA notes that the project area is located within critical habitat for the loggerhead sea turtle, designated by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) in July 2014. It is also noted that the project site is located within NMFS-designated critical habitat for the North Atlantic right whale. Section 3.6 of the draft SEA notes that species common to northeast Florida may be found within the dredge spoil placement areas, including wading birds, shorebirds and other colonial nesting birds, gopher tortoises, and benthic organisms.

Comments and Recommendations

Section 4 of the draft SEA addresses environmental effects, proposed minimization measures, and environmental commitments. The USACE has determined that the nearshore placement "may affect but is not likely to adversely affect" sea turtles in the water, manatees, right whales, or the smalltooth sawfish, and that the north beach placement is "not likely to adversely affect" these species.

Marine Turtles

The draft SEA notes that the terms and conditions of the NMFS South Atlantic Division Regional Biological Opinions (SARBO) that are intended to minimize incidental take of marine turtles will be followed. The draft SEA also includes measures to minimize potential adverse impacts to marine turtles. FWC staff offers the following additional recommendations for consideration in preparing the final SEA. Placement of sand in the nearshore along a marine turtle nesting beach from May 1 through October 31 can interfere with nesting or hatchling marine turtles. Vessels operating along the nesting beach at night can block access to or from the beach. Lights on the dredge and other vessels operating in proximity to the nesting beach could be visible for miles along the shoreline, causing disorientation of nesting and/or hatchling sea turtles. Minimization measures need to be proposed to ensure that nesting and hatchling marine turtles are protected if nearshore placement occurs at night during the nesting season. FWC staff

may provide more specific recommendations once project specifications have been finalized, such as during the permit review process.

Seabirds and Shorebirds

The draft SEA states that the USACE would implement its migratory bird protection policy should dredged sand be placed on the beach during the April 1 through August 31 seabird and shorebird nesting season. It is stated that the policy requires monitoring and a buffer of at least 200 feet around nests. The FWC standard shorebird conditions recommends a buffer distance of 300 feet. Buffer zones and other avoidance measures can be used to reduce the potential for "take" of state-listed species, as defined in Chapter 68A-27, Florida Administrative Code (Rules Relating to Endangered or Threatened Species), which would eliminate the need to obtain an Incidental Take Permit from the FWC. FWC staff is available to assist with determining avoidance and minimization measures or to discuss permitting alternatives.

We appreciate the opportunity to review the draft SEA and FWC staff is available to provide technical assistance as needed in preparation of the final SEA to ensure that potential impacts to fish and wildlife resources are minimized. We find the information submitted in the draft SEA consistent with FWC's authorities under Chapter 379, F.S. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or by email at FWCConservationPlanningServices@MyFWC.com. If you have specific technical questions regarding the content of this letter, please contact Laura DiGruttolo by phone at (352) 732-1225 or by email at Laura.Digruttolo@MyFWC.com.

Sincerely,

Jennifer D. Goff
Land Use Planning Administrator
Office of Conservation Planning Services

jdg/ld
ENV 1-3-2
St Augustine Inlet and IWW North Placement Draft EA_21077_061615

cc: Paul Demarco, USACE, paul.m.demarco@usace.army.mil



FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Mr. Eric P. Summa
Jacksonville USACE, Planning & Policy Division
Environmental Branch
701 San Marco Boulevard
Jacksonville, Florida 32207-8175

June 2, 2015

Re: DHR Project: 2015-2095/ Received by DHR: May 4, 2015
Sponsor: Florida Inland Navigation District, St. Augustine Port, Waterway and Beach District
Project: U.S. Army Corp of Engineers, Maintenance Dredging for Proposed Cuts 27A to 30A of the IWW and the St. Augustine Inlet Channel and Settling Basins
Disposal Alternatives for Beach Placement above Mean High Water: St. Augustine Beach or Anastasia State Park (Between DEP Monuments R-131-A to R-148)
Nearshore Placement Alternatives below Mean Lower Low Water between DEP Monument R-141 to R-146
Additional Placement Areas for Critically Eroding Areas in South Ponte Vedra (SPV) and Vilano Beach (VB)
St. Johns County

Dear Mr. Summa:

This office reviewed the referenced project for possible effects on historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties.*

We note that a new cultural resource assessment survey will be conducted by the Corps of the South Ponte Vedra (SPV) Near Shore Placement Area. We look forward to receiving a copy of this survey for review. Regarding the above referenced maintenance dredging activities: our comment of May 8, 2015 (DHR Project File # 2015-1661 copy attached) still stand. We note that these concerns are addressed in the Draft Environmental Assessment (April 2015).

If the above conditions are met, we concur with the Corps' determination that the proposed undertakings will have no adverse effect on historic properties.

For any questions concerning our comments, please contact Robin Jackson, Historic Preservationist, Compliance and Review, by electronic mail at robin.jackson@dos.myflorida.com, or at 850.245.6333, or 800.847.7278.

Sincerely

Robert F. Bendus, Director
Division of Historical Resources
& State Historic Preservation Officer



FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Mr. Eric P. Summa
Jacksonville USACE, Permits Section
701 San Marco Boulevard. RM 372
Jacksonville, Florida 32207

May 08, 2015

Re: DHR No.: 2015-1661/ Received by DHR: April 09, 2015
Applicant: U.S. Army Corps of Engineers
Project: St. Augustine Maintenance Dredge – Cuts SJ 28, 29, 29A, 30 and 30A

Dear Mr. Summa:

Our office received and reviewed the project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and the *National Environmental Policy Act of 1969*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (archaeological, architectural, and historical resources) listed, or eligible for listing, in the National Register of Historic Places, assessing the project's effects, and considering alternatives to avoid or minimize adverse effects.

- Maintain a 200 foot buffer from these four known targets (SA-T-5, SA-OS-2, SA-OS-3 & SA-OS-4)
- We would like to remind the applicant of our previous recommendation regarding dredging of the St. Augustine Inlet Channel. There are 20 magnetic anomalies (Cluster SR 1-6) within the South Reach Cuts SJ-29, 29A and 30. Our recommendation for a 100 foot buffer to be maintained still stands.
- Maintain a 150 foot buffer around site 8SJ4889, Target 1 (Dixie Crystal Wreck)
- We recommend that the applicant make contingency plans in the case of fortuitous finds or unexpected discoveries during ground disturbing activities within the project area:

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





- Any anomalies that cannot be avoided by project activities will need to be subjected to diver investigation to determine if they represent significant cultural resources that may be impacted by the proposed undertaking.

For any questions concerning our comments, please contact Mary Berman, Historic Preservationist, Compliance and Review at 850.245.6333, or by electronic mail at Mary.Berman@dos.myflorida.com.

Sincerely,

Robert F. Bendus, Director
Division of Historical Resources
and State Historic Preservation Officer

Northeast Florida Regional Council

RECEIVED
JUN 09 2015
DEP Office of
Intergovt'l Programs

Bringing Communities Together
Baker • Clay • Duval • Flagler • Nassau • Putnam • St. Johns

June 5, 2015

Lauren P. Milligan
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 47
Tallahassee, Florida 32399-3000

SAI # FL201505017280C
NEFRC # FSC-15-R004

Project Description: Department of the Army, Jacksonville District Corps of Engineers – Draft Supplemental Environmental Assessment, North Beach and Nearshore Placement, Maintenance Dredging St. Augustine Inlet and Adjacent Intracoastal Waterway – St. Johns County, Florida .

Attn: Florida State Clearinghouse

Pursuant to the provisions of Presidential Executive Order 12372, Governor's Executive Order 95-359 and Chapter 29E-6 Florida Administrative Code, the staff of the Northeast Florida Regional Council (NEFRC) has reviewed the above referenced project for dredging and nearshore replacement in St. Johns County. After review, staff at the Northeast Florida Regional Council has no comments.

All the best,

Eric B. Anderson

Eric B. Anderson, AICP
Senior Regional Planner
Intergovernmental Coordination & Review
Northeast Florida Regional Council
(904) 279-0885 x178
eanderson@nefrc.org

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

June 29, 2015 F/SER47:BH/pw

(Sent via Electronic Mail)

Colonel Alan M. Dodd, Commander
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Attention: Paul Demarco

Dear Colonel Dodd:

NOAA's National Marine Fisheries Service (NMFS) reviewed the Jacksonville District's public notice dated May 1, 2015, and Draft *Supplemental Environmental Assessment, Maintenance Dredging St. Augustine Inlet and Adjacent Intracoastal Waterway, St. Johns County, Florida* (SEA), dated April 2015. The Jacksonville District proposes to maintenance dredge approximately 200,000 cubic yards of material from Cuts 27A to 30A of the Intracoastal Waterway (IWW) and the St. Augustine Inlet entrance channel and settling basins. The IWW would be dredged to -12 feet mean lower low water (MLLW) plus 2 feet of allowable over dredge, and the inlet entrance channel and settling basins would be dredged to -16 feet MLLW plus 2 feet of allowable over dredge. Dredge material disposal alternatives include:

- Beach placement above mean high water on St. Augustine Beach or Anastasia State Park between Florida Department of Environmental Protection (FDEP) monuments R-131A to R148.
- Nearshore (subtidal) placement between FDEP monuments R-141 to R-146.
- Placement in FDEP-designated critically eroding areas in South Ponte Vedra and Vilano Beach between FDEP Monuments R-84 to R-98 and between R109 to R-117, respectively. Adding this disposal area is the primary reason for the SEA.

The initial determination by the Jacksonville District is the proposed maintenance dredging of sand from St. Augustine Inlet, which the South Atlantic Fishery Management Council designates a Habitat Area of particular Concern (HAPC) and the IWW and disposal onto the beach and into nearshore waters SAFMC designates essential fish habitat (EFH), would not have a substantial adverse impact on EFH or federally managed fishery species. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, NMFS provides the following comments and recommendations pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Consultation History
The Jacksonville District initiated EFH consultation by letter dated November 18, 2009, and provided a the Draft *Environmental Assessment, St. Augustine Inlet and Atlantic Intracoastal*

Waterway, Maintenance Dredging with Beach Placement, St. Johns County, Florida (EA), dated October 2009. By letter dated March 2, 2010, the NMFS provided three EFH conservation recommendations for the work, and the Jacksonville District responded to the EFH conservations recommendations by letter on May 10, 2010:

- The NMFS recommended Best Management Practices, such as restricting the time of year the dredging is done, be followed to reduce impacts to EFH and vulnerable life stages of federally managed fishery species. The Jacksonville District responded indicating it would follow to the extent practicable a schedule of seasonal sediment placement (August to March) to reduce these impacts.
- The NMFS requested the Final EA provide additional information supporting the District's contention that impacts to benthic communities at the nearshore disposal area would be minimal or, better, include a monitoring program to evaluate the impacts from nearshore disposal. The Jacksonville District provided additional citations of scientific reports concluding impacts to nearshore benthic communities may be minimal.
- The NMFS requested the Final EA provide additional information supporting the District's contention that benthic communities in the beach disposal areas would recover between dredging events, or better, include a monitoring program to evaluate the impacts from frequent disposal on the bench communities. The Jacksonville District provided additional citations of scientific reports concluding impacts to the beach communities may be minimal despite the frequent disposal events.

Due to staffing limitations, the NMFS did not further pursue the recommended monitoring programs, and the Jacksonville District released the Final EA and Finding of No Significant Impact (FONSI) on January 19, 2011.

Essential Fish Habitat in the Project Area

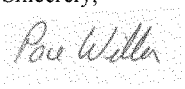
As is normal for an SEA, the discussion of impacts to EFH rely heavily on the discussion in the Final EA and focus on the areas not covered previously, i.e., the new disposal areas South Ponte Vedra Beach and Vilano Beach (Draft SEA Sections 3.5 and 4.3). Hardbottom habitat is not present near the new disposal area and the predominant EFH present is sandy bottom. Draft SEA Section 3.5 lists hard clams and menhaden as federally managed fishery species. While these species are important components of marine food webs in the project area, they are not federally managed. Additionally, this section identifies flounder (*Paralichthys* sp.) as a federally managed fishery species. Summer flounder (*Paralichthys dentatus*) is a federally managed species; however, it is not abundant in the area and could be removed from the EFH section of the Final SEA. Draft SEA Sections 4.3.2 and 4.3.3 affirm the Jacksonville District's commitment made in the Final EA to minimize impacts to vulnerable life stages of federally managed fishery species by restricting dredging to the fall and winter as funding and scheduling allow.

Recommendations

The NMFS affirms its earlier recommendations for monitoring programs to guide appropriate balancing of the timing and frequency of dredging needed for safe navigation with the time periods needed for recovery of foraging areas used by fishery species. In the absence of such monitoring to guide development of best management practices for this inlet, the proposed environmental window is acceptable.

Thank you for the opportunity to provide comments. Please direct related questions or comments to the attention of Brandon Howard at 400 N Congress Avenue, Suite 110, West Palm Beach, Florida 33401. He may be reached by telephone at 561-249-1652 or by e-mail at Brandon.Howard@noaa.gov.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Paul.M.Demarco@usace.army.mil
FWS, Ashleigh_Blackford@fws.gov
EPA, Eric.H.Hughes@usace.army.mil
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov, Brandon.Howard@noaa.gov

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

FEB 17 2016

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act (NEPA) and U.S. Army Corps of Engineers (Corps) regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the proposed Finding of No Significant Impact (FONSI) and integrated draft Feasibility Study and Environmental Assessment (EA) of a Coastal Storm Risk Management project in St. Johns County, Florida. The Tentatively Selected Plan includes the use of material from the St. Augustine Inlet system for placement on approximately three miles of shoreline in South Ponte Vedra and Vilano Beaches.

The draft Feasibility Study and EA is available for review online at:

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

We welcome your views and comments on the draft report, as well as information about resources and important features within the described project area. **Please provide any written comments by April 4, 2016 to:**

U.S. Army Corps of Engineers
Jacksonville District
Planning and Policy Division, Environmental Branch
Attn: Aubree Hershorin, Ph.D.
P.O. Box 4970
Jacksonville, FL 32232-0019

Or via email to:

Aubree.G.Hershorin@usace.army.mil

Questions concerning the EA and FONSI should be directed to Aubree Hershorin at (904) 232-2136 or via e-mail at Aubree.G.Hershorin@usace.army.mil.

Sincerely,

Jason J. Spinning
Acting Chief, Environmental Branch

Enclosure

COUNTY: ST. JOHNS

DATE: 2/22/2016
COMMENTS DUE DATE: 3/25/2016
CLEARANCE DUE DATE: 4/22/2016
SAI#: FL201602247563C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
x ENVIRONMENTAL PROTECTION			
FISH and WILDLIFE COMMISSION			
STATE			
TRANSPORTATION			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

_ **Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.**

X **Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.**

_ **Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.**

_ **Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.**

Project Description:

DEPARTMENT OF THE ARMY - DISTRICT CORPS OF ENGINEERS - INTEGRATED DRAFT FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT OF A COASTAL STORM RISK MANAGEMENT PROJECT, ST. JOHNS COUNTY, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190
EMAIL: state.clearinghouse@dep.state.fl.us

EO. 12372/NEPA

☐ No Comment
☐ Comment Attached
☐ Not Applicable

Federal Consistency

☐ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau: _____

Reviewer: _____

Date: _____

RECEIVED
FEB 22 2016
DEP Office of
Intergovt'l Programs

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

FEB 17 2016

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act (NEPA) and U.S. Army Corps of Engineers (Corps) regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the proposed Finding of No Significant Impact (FONSI) and integrated draft Feasibility Study and Environmental Assessment (EA) of a Coastal Storm Risk Management project in St. Johns County, Florida. The Tentatively Selected Plan includes the use of material from the St. Augustine Inlet system for placement on approximately three miles of shoreline in South Ponte Vedra and Vilano Beaches.

The draft Feasibility Study and EA is available for review online at:

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

We welcome your views and comments on the draft report, as well as information about resources and important features within the described project area. **Please provide any written comments by April 4, 2016 to:**

U.S. Army Corps of Engineers
Jacksonville District
Planning and Policy Division, Environmental Branch
Attn: Aubree Hershorin, Ph.D.
P.O. Box 4970
Jacksonville, FL 32232-0019

Or via email to:

Aubree.G.Hershorin@usace.army.mil

Questions concerning the EA and FONSI should be directed to Aubree Hershorin at (904) 232-2136 or via e-mail at Aubree.G.Hershorin@usace.army.mil.

Sincerely,

Jason J. Spinning
Acting Chief, Environmental Branch

Enclosure

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

REPLY TO
ATTENTION OF

PROPOSED FINDING OF NO SIGNIFICANT IMPACT

ST. JOHNS COUNTY COASTAL STORM RISK MANAGEMENT PROJECT SOUTH PONTE VEDRA BEACH, VILANO BEACH, AND SUMMER HAVEN REACHES

ST. JOHNS COUNTY, FLORIDA

I have reviewed the Environmental Assessment (EA) of the alternatives for providing coastal storm damage reduction to the South Ponte Vedra Beach, Vilano Beach, and Summer Haven reaches of the St. Johns County Coastal Storm Risk Management project in St. Johns County, Florida. The proposed activity includes sand placement from Florida Department of Environmental Protection (FDEP) reference monuments 102.5 to 117.5. The sand source is the St. Augustine Inlet system; however, the EA also evaluates offshore sand sources. The Draft EA for the project has been forwarded to the U.S. Environmental Protection Agency Region 4, the U.S. Fish and Wildlife Service, Vero Beach Field Office, the National Marine Fisheries Service, Southeast Region, the Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, and the State Historic Preservation Officer, as well as all other known interested parties for review and comment.

This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. The work will be conducted in accordance with Biological Opinions issued by the US Fish and Wildlife Service for impacts to nesting sea turtles and endangered Piping Plovers and the Regional Biological Opinion issued by the National Marine Fisheries Service for impacts to sea turtles in the water. The U.S. Army Corps of Engineers, Jacksonville District (Corps), will take measures to minimize the effects to threatened and endangered species, including sea turtles. The project will not jeopardize the continued existence of any federally listed species or adversely modify designated critical habitat, and the Preferred Alternative will have beneficial effects to protected species habitat within the project area. Reasonable and prudent measures will be taken to substantially minimize the impact of incidental take to listed species.

b. I have determined that the Recommended Plan, as proposed, will have no adverse effect on significant historic properties. Coordination with the Florida State Historic Preservation Officer and appropriate federally recognized tribes has been initiated. As stated in the EA, identified targets will be buffered where possible; otherwise, additional investigations will be conducted prior to construction.

c. This project is being coordinated with the State of Florida, and all applicable water quality standards will be met. Water Quality Certification in the form of a Joint Coastal Permit will be obtained by the FDEP prior to construction.

d. The Corps has determined that the proposed project is consistent with the Florida Coastal Zone Management Program. The final concurrence from the State will be issued with the FDEP permit.

e. The proposed project has been evaluated pursuant to the Migratory Bird Treaty Act. The Jacksonville District's Migratory Bird Protection procedures will be implemented for this project. These procedures have been coordinated with the U.S. Fish and Wildlife Service (USFWS) and the State of Florida.

f. Benefits to the public will include the restoration of habitat for protected species, fish, and wildlife; protection of upland structures from storm damage; and enhanced opportunity for recreation.

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

1. Dredging and placement activities will occur within the template of authorized and permitted areas;
2. Water-based activities will follow standard sea turtle and smalltooth sawfish protection measures and the conditions of the National Marine Fisheries Service (NMFS) South Atlantic Regional Biological Opinion (SARBO);
3. Dredged material placement will comply with the shoreline protection measure conditions of any biological opinion issued by the USFWS; and
4. Any water based activity would follow standard manatee protection measures.

In consideration of the information summarized, I find that the proposed action will not significantly affect the human environment and does not require an Environmental Impact Statement. This document will be available to the public at the following website:

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

JASON A. KIRK
Colonel, Corps of Engineers
Commanding

Date

Florida Fish and Wildlife Conservation Commission

Commissioners
Brian Yablonski
Chairman
Tallahassee

Aliese P. "Liesa" Priddy
Vice Chairman
Immokalee

Ronald M. Bergeron
Fort Lauderdale

Richard Hanas
Oviedo

Bo Rivard
Panama City

Charles W. Roberts III
Tallahassee

Robert A. Spottswood
Key West

Executive Staff
Nick Wiley
Executive Director

Eric Sutton
Assistant Executive Director

Jennifer Fitzwater
Chief of Staff

Office of the
Executive Director
Nick Wiley
Executive Director

(850) 487-3796
(850) 921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: (850) 488-4676

Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)

MyFWC.com

March 31, 2016

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Blvd, M.S. 47
Tallahassee, FL 32399-3000
Chris.Stahl@dep.state.fl.us

Re: SAI #FL201602247563C, Department of the Army, Jacksonville District Corps of Engineers, Draft Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management Project, St. Johns County

Dear Mr. Stahl:

Florida Fish and Wildlife Conservation Commission (FWC) staff has reviewed the above-referenced project, and provides the following comments and recommendations for your consideration in accordance with Chapter 379, Florida Statutes, and the Coastal Zone Management Act, Florida's Coastal Management Program.

Project Description

The U.S. Army Corps of Engineers (USACE) is conducting a feasibility study to investigate alternatives for coastal storm risk management of three reaches along the Atlantic coast of St. Johns County: 1) South Ponte Vedra from Florida Department of Environmental Protection (FDEP) monuments R-84 to R-104 (3.8 miles), 2) Vilano Beach from R-104 to R-117 (2.6 miles) and R-117 to the St. Augustine Inlet North Sand-trap Groin (1.1 miles), and 3) Summer Haven from R-197 to R-209 (2.3 miles). The USACE has prepared an interim Draft Integrated Feasibility Study and Environmental Assessment report that describes existing conditions of these three areas: projected conditions if a project is not implemented to address impacts from storm-induced beach erosion; formulation of plan alternatives; and environmental effects that may be associated with a plan.

The USACE has examined and conducted modeling of structural and non-structural management measures with the goal of arriving at a plan that would address erosion-related problems while maximizing benefits, including protection and enhancement of natural resources. The tentatively selected plan consists of:

- Construction of a 60-foot berm extension, a portion reflecting the average 2015 dune position, and tapers extending from monument R-102.5 to R-117.5.
- Dune construction material will consist of sand hydraulically dredged from the St. Augustine Inlet system, including the ebb, flood, Vilano Point Shoals, federal navigation channel, and associated shoals.
- Construction will include an initial event and four periodic nourishment events over 12-year intervals.

As discussed in Section 3.8 of the report, the USACE has eliminated the Summer Haven reach from further analysis based in part on the following:

- Major infrastructure, such as State Road A1A, has already been relocated landward due to erosion.
- The project's local sponsor, St. Johns County, has been purchasing properties within the Summer Haven beach area and is precluding them from development.
- With the number of structures in the area getting smaller, the USACE believes it unlikely that damages would justify a federal Coastal Storm Risk Management project.

Potentially Affected Resources

Section 2.3.3 of the draft report identifies the following as species for which the proposed project areas may provide habitat:

- Green sea turtle (*Chelonia mydas,* Federally Endangered [FE])
- Loggerhead sea turtle (*Caretta caretta,* Federally Threated [FT])
- Leatherback sea turtle (*Dermochelys coriacea,* FE)
- Kemp's ridley sea turtle (*Lepidochelys kempii*, FE)
- Hawksbill sea turtle (*Eretmochelys imbricate*, FE)
- West Indian manatee (Florida manatee, *Trichechus manatus latirostris,* FE)
- Smalltooth sawfish (*Pristis pectinate*, FE)
- Piping plover (*Charadrius melodus,* FT)
- Red knot (*Calidris canutus*, FT)
- Anastasia Island beach mouse (*Peromyscus polionotus phasma*, FE)
- North Atlantic right whale (*Eubalaena glacialis*, FE)

In addition, portions of the proposed project area are known to provide habitat for least terns (*Sterna antillarum*, State Threatened).

Comments

Section 4 of the report addresses anticipated effects that may result from the tentatively selected plan. The USACE has determined that the tentatively selected plan "may affect but is not likely to adversely affect" sea turtles in the water, manatees, right whales, or the smalltooth sawfish. FWC staff recognizes that a number of measures for avoiding and minimizing potential impacts to these species are identified in the report, including:

- Adherence to the terms and conditions of the National Marine Fisheries Service (NMFS) South Atlantic Division Regional Biological Opinions (SARBO) that are intended to minimize incidental take of marine turtles.
- Adherence to the U.S. Fish and Wildlife Service's revised State Programmatic Biological Opinion, dated August 22, 2011, for the USACE planning and regulatory sand placement activities and their effects on sea turtles and beach mice.
- Specific protective measures for manatees and North Atlantic right whales.
- Implementation of USACE migratory bird protection measures if construction occurs in summer months.

FWC staff is available to assist in refining measures discussed in the report, as well as formulating additional avoidance and minimization measures for fish and wildlife resources as project specifications are developed.

While the Summer Haven reach has been excluded from further consideration, FWC staff provides the following information should this beach area be discussed at some future point in the

project study. FDEP issued Joint Coastal Permit (JCP) Number 0313002-001-JC to the St. Augustine Port, Waterway, and Beach District on February 6, 2014, for excavation of sand from the Summer Haven River, placement of the sand onto the adjacent beach for restoration of a dune system between monuments R-200 and R-208, and creation of least tern habitat. In 2008, a breach occurred on the south side of R-200 and natural coastal processes subsequently deposited sand into the river closing the breach in 2011. Since 2010 the beach area between R-200 and R-202 has provided habitat for a nesting colony of least terns. The project authorized by the JCP will result in "take" of the state-listed least tern (as defined in Chapter 68A-27, Florida Administrative Code), and therefore necessitated issuance of an Incidental Take Permit from FWC. Should a project be proposed by the USACE in the Summer Haven reach or any other area within least tern or other listed species habitat, the requirements of Chapter 68A-27 would apply.

We appreciate the opportunity to review the Draft Feasibility Study and EA and we look forward to further coordination during preparation of the final reports to ensure that potential impacts to fish and wildlife resources are minimized. We find the information submitted in this conceptual Draft Integrated Feasibility Study and Environmental Assessment consistent with FWC's authorities under Chapter 379, F.S. We will continue to work with the applicant as new information is incorporated into the Draft Integrated Feasibility Study and Environmental Assessment to help ensure the project remains consistent with Chapter 379, F.S. If you need any further assistance, please do not hesitate to contact Jane Chabre either by phone at (850) 410-5367 or by email at FWCConservationPlanningServices@MyFWC.com. If you have specific technical questions regarding the content of this letter, please contact Laura DiGruttolo by phone at (352) 732-1225 or by email at Laura.Digruttolo@MyFWC.com.

Sincerely,

Jennifer D. Goff
Land Use Planning Administrator
Office of Conservation Planning Services

jdg/ld
ENV 1-3-2
Coastal Storm Risk Management Project EA_30540_033116

cc: Aubree Hershorin, Ph.D., USACE, Aubree.G.Hershorin@usace.army.mil

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

April 4, 2016 F/SER47:KR/pw

(Sent via Electronic Mail)

Colonel Jason A. Kirk, Commander
Jacksonville District Corps of Engineers
PO Box 4970
Jacksonville, Florida 32232-0019

Attention: Aubree G. Hershorin

Dear Colonel Kirk:

NOAA's National Marine Fisheries Service (NMFS) reviewed the draft *Integrated Feasibility Study and Environmental Assessment, Coastal Storm Risk Management Project, South Ponte Vedra Beach, Vilano Beach, and Summer Haven Reaches, St. Johns County, Florida* (CSRM), dated February 2016, and the corresponding public notice dated February 17, 2016. The Jacksonville District proposes projects to increase beach and shoreline protection in the interest of hurricane protection, storm damage reduction, beach erosion control, and protection of public trust natural resources for three reaches along the Atlantic shoreline of St. Johns County. The St. Johns County shoreline is approximately 42 miles long, and the tentatively selected plan (TSP) would reduce the long-term risk of storm damage due to erosion, inundation, and wave damage for approximately 9.8 miles of beach. The study area for the draft CSRM consisted of 3.8 miles of shoreline in South Ponte Vedra between Florida Department of Environmental Protection (FDEP) Monuments R84 and R104; 3.7 miles of shoreline in Vilano Beach between R104 to the St. Augustine North Sand-trap Groin; and 2.3 miles of shoreline in Summer Haven between R197 and R209. The District developed the draft CSRM and TSP using a 50-year planning horizon with sea level rise considerations up to the year 2120. A significant component of the draft CSRM addresses efforts to reduce shoreline erosion affecting Florida State Road A1A, the only north-south evacuation route for coastal communities.

The Jacksonville District proposes to provide beach and dune nourishment within the Vilano Beach reach and the South Ponte Vedra Beach reach. The TSP also includes construction of a 60-foot equilibrated seaward berm extension from South Ponte Vedra (R103.5) to Vilano Beach (R116.5). The Jacksonville District has determined the TSP would require an initial construction event requiring 1.3 million cubic yards of sand material and four periodic nourishment events requiring 866,000 cubic yards of material each distributed at 12-year intervals. Sand material, meeting Florida's standards for beach compatibility, would be sourced from the St. Augustine Inlet system, Vilano Point Shoals, and the federal navigation channel. The Jacksonville District's initial determination is the environmental effects associated with the TSP would be temporary in nature and the proposed action would not have a substantial adverse impact on essential fish habitat (EFH) or federally managed species along the eastern coast of Florida. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the NMFS provides the following comments pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Consultation History
The Jacksonville District initiated EFH consultation through a request for scoping comments dated August 17, 2005. The National Marine Fisheries Service (NMFS) provided initial comments on September 13, 2005, and requested any National Environmental Policy Act (NEPA) document associated with the project include a comprehensive EFH assessment noting the importance of nearshore waters in the study area as foraging habitat for federally managed fishery resources.

Similarly, the NMFS provided consultation by letter dated March 2, 2010, on a related project, *Environmental Assessment, St. Augustine Inlet and Atlantic Intracoastal Waterway, Maintenance Dredging with Beach Placement, St. Johns County, Florida*. The NMFS provided EFH conservation recommendations for the work, and several of these recommendations are pertinent to draft CSRM because the dredged areas are considered sources of material for beach and dune nourishment within the TSP. The EFH conservation recommendations pertinent to the draft CSRM include: (1) best management practices restricting the time of year for dredging to reduce impacts to EFH and vulnerable life stages of federally managed fishery species, and (2) development of a scientifically supported rationale and monitoring program to assess impacts of beach disposal (nourishment) to benthic shoreline communities.

Essential Fish Habitat within the Project Area
Pursuant to the Magnuson-Stevens Act, the South Atlantic Fisheries Management Council (SAFMC) has designated EFH within the study area to encompass nearshore hardbottom habitat, unconsolidated substrate, and high salinity ocean surf zones. Section 2.3.4 of the draft CSRM describes EFH within the project area.

The NMFS believes the draft CSRM minimally addresses EFH and Habitat Areas of Particular Concern (HAPC) considerations and the topic receives no focused discussion. Substantial review of these considerations should be included in preparation of materials to satisfy the NEPA and to assess the potential environmental impacts by proposed actions outlined in the draft CSRM. The EFH and HAPC characterizations should include a summary of designations for each federally managed species in the project area including habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages) and time of year of occurrence. The draft CSRM fails to recognize the project area includes an HAPC for penaeid shrimp and species among the snapper-grouper complex. Additionally, coastal inlets are considered EFH and provide critical habitat functions for Coastal Migratory Pelagics, which include king mackerel (*Scomberomorus cavalla*), Atlantic Spanish mackerel (*Scomberomorus maculatus*), and cobia (*Rachycentron canadum*). The ecological function of tidal inlets (including their ebb and flood tide shoals) is widely recognized for its contributions to spawning, egg and larval dispersal, juvenile recruitment, and as foraging habitat. The SAFMC provides additional information on EFH and its support of federally managed fishery species in *Fishery Ecosystem Plan of the South Atlantic Region*, which is available at *www.safmc.net*.

In St. Johns County, the nearshore hardbottom habitats, such a coquina and worm reefs, occurring along the shoreline provide unique natural habitat and serving a variety of ecosystem functions (Lindemann et al. 2009[1]). It is unclear if the CSRM project area includes nearshore natural hardbottom habitats, although reference is made to a neighboring shoreline reach with "a long and relatively significant headland feature" that extends from FDEP monuments R15 to R75. The draft CSRM suggests nearshore hardbottom habitats may exist in the vicinity of the project area as determined by the presence of coquina-derived shell along the shoreline. It is likely the subtidal nearshore hardbottom habitats are ephemeral, meaning they are periodically covered and uncovered by natural sediment transport, and mapping would

[1] Lindeman, K., D. McCarthy, K. Holloway-Adkins, and D. Snyder. 2009. Ecological Functions of Nearshore Hardbottom Habitat in East Florida: A Literature Synthesis. Florida Department of Environmental Protections Bureau of Beaches and Coastal Systems, Tallahassee, FL. 186 pages.

be required to determine the exact location of nearshore hardbottom habitats. The extent and complexity of these structural forms and their contributions to EFH within the project area should be described (*e.g.*, connectivity in recruitment from inshore areas to offshore hardbottom reefs).

The draft CSRM does not adequately describe the technical details of the TSP and alternatives required for a comprehensive EFH assessment. Among the most notable omissions are technical analyses of individual and cumulative effects on EFH, federally managed fisheries, and associated species such as major prey species, including affected life stages. The final CSRM and its environmental assessment (EA) should include these discussions.

Impacts to Essential Fish Habitat
The NMFS primary concern with the TSP is a comprehensive sand search and inventory was not preformed to locate alternative sources of beach compatible sand within the region. The draft CSRM largely focuses on mining sand from the St. Augustine Inlet, including the ebb and flood shoal complexes. Frequent mining of the inlet may have cumulative impacts on EFH when considered with the frequency of inlet dredging utilized in navigation projects and other shoreline protection projects in the region. Secondarily, the NMFS is concerned about the impacts of beach nourishment on sand coverage of nearshore hard grounds and impacts of prey resources and foraging habitat provided by the beach shoreline complex.

St. Augustine Inlet Sand Sources: Inlets serve as migratory corridors for larvae entering nursery areas and for sub-adults leaving nursery areas for maturation and spawning offshore; there is no alternative location for this ingress or egress. Systematic mining of the inlet and the federal navigation channel may result in unanticipated changes in habitat quality, including increasing the concentration of suspended sediments that may clog gills in young, less mobile fish and invertebrates and thereby increasing their mortality rate[2]. The extent of negative effects is dependent on the life history stages of the species present and the duration of exposure to high concentrations of suspended sediments. Adherence to the Florida State Water Quality Criteria for turbidity at the edge of a 150-meter mixing zone is normally sufficiently protective of fishery resources. The NMFS requests the Jacksonville District evaluate in the final CSRM whether a seasonal restriction on mining and dredging would be a practicable way to minimize impacts to larvae entering the estuary areas and for juveniles leaving the estuary. Additionally, the NMFS requests the Jacksonville District survey and monitor mining activities along the southeast ebb-tidal shoal and bypassing bar. Surveys of hardbottom habitat indicate that hardbottom is present approximately 0.8 miles southeast of St. Augustine Inlet (SEAMAP-SA 2001[3]). If hardbottom is present, an appropriate buffer between it and dredging areas should be used.

Beach Nourishment: The Jacksonville District should continue to consult with the NMFS regarding sand placement templates as well as the downdrift areas for beach nourishment within the Vilano Beach reach and the South Ponte Vedra Beach reach. Intertidal and subtidal communities along the shoreline provide feeding, resting, and staging habitat for a variety of commercially, recreationally, and ecologically important fish species[4]. While beachfront and shoreline are subject to erosion caused by storms and

[2] Wilber, D., and D. Clarke. 2001. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management* 21:855-87.
[3] Southeast Area Monitoring and Assessment Program - South Atlantic (SEAMAP-SA). 2001. Distribution of Bottom Habitat on the Continental Shelf from North Carolina through the Florida Keys. SEAMAP-SA Bottom Mapping Project, Atlantic States Marine Fisheries Commission, Washington, DC. 166 pages.
[4] Hackney, C., M. Posey, S. Ross, and A. Norris (editors). 1996. A Review and Synthesis of Data on Surf Zone Fishes and Invertebrates in **the** South Atlantic Bight and the Potential Impacts from Beach Renourishment. Prepared for the U.S. Army Corps of Engineers Wilmington District, Wilmington, NC. 119 pages.

natural shoreline processes, the beachfront, intertidal, and surf zone are nonetheless established seascape features providing valuable habitat for fishery resources migrating between nearshore and offshore habitats as part of their life cycle. The NMFS requests the Jacksonville District evaluate in the final CSRM whether a seasonal restriction on beach nourishment would be a practicable way to minimize impacts to larvae and juveniles migrating along the shoreline. If a seasonal restriction is not practicable, an evaluation of the duration the larvae and juvenile fish would be exposed to high levels of suspended sediments should be provided.

Benthic infaunal communities within beach shoreline communities are composed of populations of opportunistic invertebrates that may repopulate after sand nourishment if certain biotic and abiotic conditions exist. The NMFS requests the Jacksonville District evaluate and monitor long-term degradation of benthic habitats within the project area, especially along the 60-foot equilibrated seaward berm extension. While many studies of beach nourishment projects report benthic communities recover quickly, many of these studies are technically flawed or define recovery in overly simplistic manners (e.g., total abundance rather than community composition)[5]. The draft CSRM was developed to address long-term shoreline stabilization and the TSP prescribes periodic nourishment events. Adverse environmental impacts at nourishment sites include desiccation of organisms, machinery crushing organisms, burial of habitat, and physical damage to the intertidal and surf zone from fill equilibrating over time. The NMFS requests the Jacksonville District evaluate the degree to which recovery of benthic communities are likely to occur or measures that may minimize impacts to shoreline communities.

Nearshore Hardbottom Habitat: Nearshore hardbottom habitats are present in the vicinity of the project area. The NMFS requests that the Jacksonville District complete a baseline environmental assessment of the project area, including an acoustic survey to produce a photo mosaic to detect the presence of nearshore hardbottom habitat. Fish assemblages at nearshore hardbottom habitats are not only biologically diverse and juvenile dominated, but they are also reef-species dominated. The NMFS requests the Jacksonville District avoid sand placement on nearshore hardbottom habitats to the extent practicable.

EFH Conservation Recommendations

Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH Conservation Recommendations for any federal action or permit which may result in adverse impacts to EFH. Therefore, NMFS recommends the following to ensure the conservation of EFH and associated fishery resources:

- A scientifically supported rationale should be provided for assessment of alternative sand sources not included in the TSP; preferably from offshore sources or upland dredged material management areas; and capable of providing the required beach compatible sand while reducing impacts to critically important EFH associated with tidal inlets.
- Best management practices, such as restricting the time of year that construction activities including sand mining, beach and dune nourishment, and berm erection, should be included to reduce impacts to EFH and vulnerable life stages of federally managed fishery species.
- A scientifically supported rationale should be provided for concluding impacts to benthic communities at beach nourishment sites would be minimal. Alternatively, best management practices should be included in the design of beach and dune nourishment and a monitoring program should be in place to evaluate the effectiveness of those best management practices.

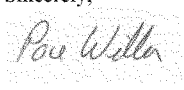
[5] Peterson, C., and M. Bishop. 2005. Assessing the environmental impacts of beach nourishment. *BioScience* 55:887-896. Wilber, D., D. Clarke, R. VanDolah, and G. Ray. 2009. Pages 262-274 in: Lessons learned from biological monitoring of beach nourishment projects. Proceedings of the Western Dredging Association's Twenty-Ninth Technical Conference, Tempe, Arizona.

- A scientifically supported rationale should be provided for concluding impacts to nearshore hardbottom communities within the project area would be minimal. Alternatively, environmental and geological surveys would assess the extent of nearshore hardbottom habitat that would be impacted and a monitoring program should be in place to avoid and minimize sand placement on nearshore hardbottom habitats.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and implementing regulation at 50 CFR Section 600.920(k) require the Jacksonville District to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with the "findings" with the Jacksonville District, an interim response should be provided to the NMFS. A detailed response then must be provided prior to final approval of the action. The detailed response must include a description of measures proposed by the Jacksonville District to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with the EFH conservation recommendations, the Jacksonville District must provide a substantive discussion justifying the reasons for not following the recommendations.

Thank you for the opportunity to provide these comments. Please direct related questions or comments to the attention of Dr. Ken Riley at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 728-8750.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: COE, Aubree.G.Hershorin@usace.army.mil
EPA, Miedema.Ron@epa.gov
USFWS, John.Milio@fws.gov
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Ken.Riley@noaa.gov

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE
AH-TAH-THI-KI MUSEUM

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

30290 JOSIE BILLIE HWY
PMB 1004
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI
MUSEUM
A PLACE TO LEARN. A PLACE TO REMEMBER.

TRIBAL OFFICERS

CHAIRMAN
JAMES E. BILLIE

VICE CHAIRMAN
MITCHELL CYPRESS

SECRETARY
LAVONNE ROSE

TREASURER
PETER HAHN

April 4, 2016

Aubree Hershorin, Ph.D
U.S. Army Corps of Engineers Jacksonville District
Planning and Policy Division, Environmental Branch
P.O. Box 4970
Jacksonville, FL 32232-0019
Aubree.G.Hershorin@usace.army.mil

Subject: St. Johns County Coastal Storm Risk Management Draft Feasibility Study and EA/FONSI, St. Johns County, Florida
THPO#: 0029084

Dear Ms. Hershorin:

Thank you for contacting the Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) regarding the St. Johns County Coastal Storm Risk Management Draft Feasibility Study and EA/FONSI in St. Johns County, Florida. This letter is to acknowledge that the STOF-THPO has reviewed EA and FONSI and has no immediate concerns regarding cultural or historic resources at this time. However, as specified in the document, STOF-THPO would like to be consulted prior to project implementation in accordance with Section 106 of the National Historic Preservation Act and as part of the Corps' trust responsibility to the Tribe. Thank you and we look forward to working with you throughout the course of this project.

Respectfully,

Andrew J. Weidman, MA, RPA
STOF-THPO, Compliance Review Section
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440
Office: 863-983-6549 x12216
Email: andrewweidman@semtribe.com

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

Mr. Mike Barnett
Bureau of Beaches and Coastal Systems
Department of Environmental Protection
5050 West Tennessee Street
Building B, Room 161
Tallahassee, Florida 32304

Dear Mr. Barnett:

Pursuant to Section III. B. 3. b. of the Interagency Coordination Agreement for Civil Works Projects (February 28, 2006), please designate a representative to the U.S. Army Corps of Engineers' Project Delivery Team for participation in the St. Johns County Shore Protection Project Feasibility Study. Various alternatives are currently being considered for beach construction in the South Ponte Vedra Beach, Vilano Beach, and Summer Haven Beach areas.

Also, the Department of Environmental Protection's participation during NEPA coordination would provide the opportunity for the early identification of potential environmental issues that could be associated with this project. Such participation early in the process would correspondingly allow for a timely resolution of such issues.

If you need additional information, please contact Mr. Mike Hollingsworth at 904-232-1687.

Sincerely,

Bradd R. Schwichtenberg
Acting Chief, Planning Division

Copy Furnished:

Mr. Marty Seeling, Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems, 5050 West Tennessee Street, Building B, Room 161, Tallahassee, Florida 32304

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

SEP 16 2008

To Whom It May Concern:

The U.S. Army Corps of Engineers, Jacksonville District, is gathering information to prepare either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida. A reconnaissance report has been completed and resulted in the recommendation to continue the study into the feasibility phase. The most immediate and critical needs of the local communities are to address beach and dune erosion and protect State Highway A1A and environmental attributes. This study will determine the Federal interest in participating in a locally supported, cost-shared shore protection project to address St. Johns County's coastal issues. This scoping letter amends a previous scoping letter dated August 17, 2005 to include the South Ponte Vedra critically eroding area which was designated by the Department of Environmental Protection subsequent to that date.

The study area, enclosed, covers approximately 42 miles of shoreline, including 14 miles in two parks managed by the State of Florida. The entire coastline of St. Johns County is subject to storm damage and shoreline erosion but three of the four most critically eroding areas are located at South Ponte Vedra, Vilano Beach and Summer Haven Beach. The fourth critical erosion area, St. Augustine Beach, was addressed under a previously authorized Shore Protection Project and is not included in this study. Sand search areas to be investigated for potential borrow sources are also shown on the enclosure, however other sources may be developed.

We welcome your views, comments and information about Environmental and Cultural resources, study objectives and important features within the described project area, as well as any suggested improvements. Letters of comment or inquiry should be addressed to the letterhead address to the attention of Paul DeMarco (telephone number 904-232-1897 or email: Paul.M.DeMarco@usace.army.mil), Planning Division, Environmental Branch and received by this office within 30 days of the date of this letter.

Sincerely,

Eric P. Summa
Acting Chief, Environmental Branch

Enclosure

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

OCT 2 0 2008

Mr. Ric Ruebsamen
National Marine Fisheries Service Panama City
Habitat Conservation Division
3500 Delwood Beach Road
Panama City, Florida 32408

Dear Mr. Ruebsamen:

In accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6), I am formally inviting your agency to become a cooperating agency for either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida. Informal coordination with your agency was initiated via public notice dated September 16, 2008 (enclosed) and subsequent conversations between Habitat Conservation Division personnel and our staff.

Please note that cooperating agency status involves actions and responsibilities beyond that normally associated with a commenting or permitting agency. Your agency is being specifically requested to provide special expertise on natural resources in this area.

The formulation of the project, alternatives, and mitigation will be in accordance with Engineer Regulation ER 1105-2-100 and will fully consider a range of environmental, economic, and social factors. As a cooperating agency, you must fully consider the views, needs, and benefits of competing interests.

No cooperating agency will have "veto" over the selection of the project plan, alternatives, or mitigation measures. Under your status as a commenting agency, you may recommend actions not ultimately adopted or implemented by the lead agency. You may also impose requirements to the extent allowed under your legal authority as a permitting agency. Conflict with the lead agency may be resolved through mediation, placing a dissenting opinion in the EIS, withdrawing your cooperating agency status, or the Lead agency pursuing an EIS without you as a cooperating agency. For additional information see the enclosed "Rights and Responsibilities of Lead and Cooperating Agencies" (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Council on Environmental Quality, 1981).

Please indicate whether you accept this invitation to become a cooperating agency (as described above) within 30 days of the date of this letter. If you have any questions, please contact Mr. Paul DeMarco at 904-232-1897.

Sincerely,

Kenneth Dupper

for Eric P. Summa
Chief, Environmental Branch

Enclosure

Copies Furnished:

Mr. Miles Croom, NOAA Fisheries Service, Habitat Conservation Division, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Florida 33701-5511
Mr. Pace Wilbur, Atlantic Branch Supervisor, NOAA Fisheries Service, Habitat Conservation Division, 215 Fort Johnson Road, Post Office Box 12559, Charleston, South Carolina 29422
Dr. Roy Crabtree, NOAA Fisheries Service, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Florida 33701-5511
Mr. George Getsinger, NOAA Fisheries Service, Habitat Conservation Division, Northeast Florida Field Office, 9741 Ocean Shore Boulevard, St. Augustine, Florida 32080-8618

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

OCT 2 0 2008

Mr. Ric Ruebsamen
National Marine Fisheries Service Panama City
Habitat Conservation Division
3500 Delwood Beach Road
Panama City, Florida 32408

Dear Mr. Ruebsamen:

In accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6), I am formally inviting your agency to become a cooperating agency for either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida. Informal coordination with your agency was initiated via public notice dated September 16, 2008 (enclosed) and subsequent conversations between Habitat Conservation Division personnel and our staff.

Please note that cooperating agency status involves actions and responsibilities beyond that normally associated with a commenting or permitting agency. Your agency is being specifically requested to provide special expertise on natural resources in this area.

The formulation of the project, alternatives, and mitigation will be in accordance with Engineer Regulation ER 1105-2-100 and will fully consider a range of environmental, economic, and social factors. As a cooperating agency, you must fully consider the views, needs, and benefits of competing interests.

No cooperating agency will have "veto" over the selection of the project plan, alternatives, or mitigation measures. Under your status as a commenting agency, you may recommend actions not ultimately adopted or implemented by the lead agency. You may also impose requirements to the extent allowed under your legal authority as a permitting agency. Conflict with the lead agency may be resolved through mediation, placing a dissenting opinion in the EIS, withdrawing your cooperating agency status, or the Lead agency pursuing an EIS without you as a cooperating agency. For additional information see the enclosed "Rights and Responsibilities of Lead and Cooperating Agencies" (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Council on Environmental Quality, 1981).

Please indicate whether you accept this invitation to become a cooperating agency (as described above) within 30 days of the date of this letter. If you have any questions, please contact Mr. Paul DeMarco at 904-232-1897.

Sincerely,

Kenneth Dupper

for Eric P. Summa
Chief, Environmental Branch

Enclosure

Copies Furnished:

Mr. Miles Croom, NOAA Fisheries Service, Habitat Conservation Division, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Florida 33701-5511
Mr. Pace Wilbur, Atlantic Branch Supervisor, NOAA Fisheries Service, Habitat Conservation Division, 215 Fort Johnson Road, Post Office Box 12559, Charleston, South Carolina 29422
Dr. Roy Crabtree, NOAA Fisheries Service, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Florida 33701-5511
Mr. George Getsinger, NOAA Fisheries Service, Habitat Conservation Division, Northeast Florida Field Office, 9741 Ocean Shore Boulevard, St. Augustine, Florida 32080-8618

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

SEP 16 2008

To Whom It May Concern:

The U.S. Army Corps of Engineers, Jacksonville District, is gathering information to prepare either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida. A reconnaissance report has been completed and resulted in the recommendation to continue the study into the feasibility phase. The most immediate and critical needs of the local communities are to address beach and dune erosion and protect State Highway A1A and environmental attributes. This study will determine the Federal interest in participating in a locally supported, cost-shared shore protection project to address St. Johns County's coastal issues. This scoping letter amends a previous scoping letter dated August 17, 2005 to include the South Ponte Vedra critically eroding area which was designated by the Department of Environmental Protection subsequent to that date.

The study area, enclosed, covers approximately 42 miles of shoreline, including 14 miles in two parks managed by the State of Florida. The entire coastline of St. Johns County is subject to storm damage and shoreline erosion but three of the four most critically eroding areas are located at South Ponte Vedra, Vilano Beach and Summer Haven Beach. The fourth critical erosion area, St. Augustine Beach, was addressed under a previously authorized Shore Protection Project and is not included in this study. Sand search areas to be investigated for potential borrow sources are also shown on the enclosure, however other sources may be developed.

We welcome your views, comments and information about Environmental and Cultural resources, study objectives and important features within the described project area, as well as any suggested improvements. Letters of comment or inquiry should be addressed to the letterhead address to the attention of Paul DeMarco (telephone number 904-232-1897 or email: Paul.M.DeMarco@usace.army.mil), Planning Division, Environmental Branch and received by this office within 30 days of the date of this letter.

Sincerely,

Eric P. Summa
Acting Chief, Environmental Branch

Enclosure

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

November 14, 2008

Mr. Paul M. DeMarco
Jacksonville District, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers
Scoping Notice – Feasibility Study, St. Johns County Shore Protection Project – St. Johns County, Florida.
SAI # FL200809194439C (Reference SAI # FL200508241461C)

Dear Mr. DeMarco:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the subject scoping notice.

The Florida Department of Environmental Protection's (DEP) Bureau of Beaches and Coastal Systems is very supportive of the study and is participating in cost-sharing associated with the project. The South Ponte Vedra area was designated critically eroded in 2007, and several structures are threatened. Based on previous studies, DEP has no objection to investigating the offshore borrow areas for compatible sand. Geotechnical investigations should be conducted in accordance with the DEP Bureau's requirements for Quality Assurance and Quality Control, and comprehensive enough to document the compatibility of sand in the proposed borrow area(s) to the existing (natural) beach. The beaches in St. Johns County have high variability, and multiple borrow sites may be required. Use of nearshore borrow areas would require adequate numerical modeling supported by accurate data to provide "reasonable assurance" that the potential borrow area would not cause additional or relocated erosion to the shoreline. The Bureau has also requested to participate directly in formulating the Feasibility Study by including staff on the Project Delivery Team, as outlined in the Interagency Cooperative Agreement.

The Florida Department of State (DOS) has reviewed the Florida Master Site File and its records for information to be addressed in the proposed NEPA document and notes that a number of recorded shipwrecks are located directly within or in close proximity to the St.

Augustine Inlet Ebb Shoal Borrow Area and Nearshore Sand Search Area. DOS staff strongly recommends that these areas be eliminated from consideration unless absolutely necessary. If it is necessary to use these areas, steps must be taken to relocate all sites within the area to provide the proper buffer. Once potential borrow areas have been determined, the DOS will comment on whether an underwater assessment survey must be conducted. Staff looks forward to reviewing the results of the study prior to the submission of an EIS/EA for the project and coordinating in the protection and preservation of significant cultural resources. Please refer to the enclosed DOS letter.

Based on the information contained in the notice and the enclosed state agency comments, the state has determined that, at this stage, the proposed federal action is consistent with the Florida Coastal Management Program (FCMP). The concerns identified by our reviewing agencies must, however, be addressed prior to project implementation. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Thank you for the opportunity to review this project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

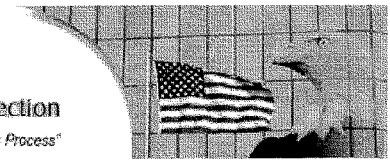
SBM/lm
Enclosures

cc: Roxane Dow, DEP, BBCS
Laura Kammerer, DOS



Florida
Department of Environmental Protection

"More Protection, Less Process"



Categories

Project Information	
Project:	FL200809194439C
Comments Due:	10/24/2008
Letter Due:	11/03/2008
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SCOPING NOTICE - FEASIBILITY STUDY, ST. JOHNS COUNTY SHORE PROTECTION PROJECT - ST. JOHNS COUNTY, FLORIDA.
Keywords:	ACOE - SCOPING NOTICE - ST. JOHNS COUNTY SHORE PROTECTION PROJECT
CFDA #:	12.101

Agency Comments:

NE FLORIDA RPC - NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL

No Comments

ST. JOHNS - ST. JOHNS COUNTY

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

No Comments Received

STATE - FLORIDA DEPARTMENT OF STATE

The DOS has reviewed the Florida Master Site File and its records for information to be addressed in the proposed NEPA document and notes that a number of recorded shipwrecks are located directly within or in close proximity to the St. Augustine Inlet Ebb Shoal Borrow Area and Nearshore Sand Search Area. DOS staff strongly recommends that these areas be eliminated from consideration unless absolutely necessary. If it is necessary to use these areas, steps must be taken to relocate all sites within the area to provide the proper buffer. Once potential borrow areas have been determined, the DOS will comment on whether an underwater assessment survey must be conducted. Staff looks forward to reviewing the results of the study prior to the submission of an EIS/EA for the project and coordinating in the protection and preservation of significant cultural resources.

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP Bureau of Beaches and Coastal Systems is very supportive of the study and is participating in cost-sharing associated with the project. The South Ponte Vedra area was designated critically eroded in 2007, and several structures are threatened. Based on previous studies, DEP has no objection to investigating the offshore borrow areas for compatible sand. Geotechnical investigations should be conducted in accordance with the DEP Bureau's requirements for Quality Assurance and Quality Control, and comprehensive enough to document the compatibility of sand in the proposed borrow area(s) to the existing (natural) beach. The beaches in St. Johns County have high variability, and multiple borrow sites may be required. Use of nearshore borrow areas would require adequate numerical modeling supported by accurate data to provide "reasonable assurance" that the potential borrow area would not cause additional or relocated erosion to the shoreline. The Bureau has also requested to participate directly in formulating the Feasibility Study by including staff on the Project Delivery Team, as outlined in the Interagency Cooperative Agreement.

ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

SJRWMD has no comments.

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Florida Department of
Memorandum **Environmental Protection**

DATE: October 31, 2008

TO: Lauren P. Milligan, Office of Intergovernmental Programs

FROM: Roxane R. Dow, Bureau of Beaches and Coastal Systems

SUBJECT: U.S. Army Corps of Engineers – Scoping Notice – Feasibility Study, St. Johns County Shore Protection Project – St. Johns County, Florida.
SAI #: FL08-4439C

The Bureau of Beaches and Coastal Systems is very supportive of this study and is cost-sharing the non-federal costs associated with it. The South Ponte Vedra area was designated critically eroded in 2007, and several structures are threatened.

Based on previous studies, we have no objection to investigating the off shore borrow areas for compatible sand. Geotechnical investigations should be conducted in accordance with the Bureau's requirements for Quality Assurance and Quality Control, and comprehensive enough to document the compatibility of sand in the proposed borrow area(s) to the existing (natural) beach. The beaches in St. Johns County have high variability, and multiple borrow sites may be required.

Use of nearshore borrow areas would require adequate numerical modeling supported by accurate data to provide "reasonable assurance" that the potential borrow area would not cause additional or relocated erosion to the shoreline.

The Bureau would like to participate directly in formulating this Feasibility Study. We requested inclusion of members on the Project Delivery Team, as outlined in the Interagency Cooperative Agreement, but have not received an official request to appoint anyone.

cc: Robert Brantly
Michael Barnett
Guy Weeks
Paden Woodruff

RECEIVED
OCT 27 2008
DEP Office of
Intergovt'l Programs

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Laura Milligan
Florida State Clearing House
3900 Commonwealth Boulevard, MS-47
Tallahassee, Florida 32399-3000

October 23, 2008

RE: DHR No.: 2008-06146 / Date Received: September 25, 2008
St. Johns County Shore Protection Project (SPP) Study Area
St. Johns County

Dear Ms. Milligan:

Our office is reviewing the referenced application in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, as well as with Chapters 267, *Florida Statutes,* and Florida's Coastal Zone Consistency Program. The purpose of our review is to identify possible impact to historic resources listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The State Historic Preservation Officer is to advise and assist state and federal agencies and applicants to identify historic resources, assess effects on them, and considerations of alternatives to avoid or minimize adverse effects.

We reviewed the Florida Master Site File and our records for information to be addressed in either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County. We note that a number of recorded shipwrecks are located directly within or in close proximity to the St. Augustine Inlet Ebb Shoal Borrow Area, and the Nearshore Sand Search Area. This office strongly recommends that these areas be eliminated from consideration unless absolutely necessary. Furthermore, if it is a necessity to use these areas, steps will have to be undertaken to relocate all sites within the area in order to provide the proper buffer.

Once potential borrow areas have been determined, this office will comment on whether or not an underwater assessment survey must be conducted. We look forward to reviewing the results of the study prior to the submission of an *Environmental Impact Statement/Environmental Assessment* for the St. Johns County Shoreline Protection Project and coordinating in the protection and preservation of significant cultural resources.

If there are any questions concerning our comments, please contact Michael Hart, Historic Sites Specialist, by electronic mail at mrhart@dos.state.fl.us, or by telephone at 850/245-6333. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

Xc: Eric Summa/ Jacksonville District Army Corps of Engineers

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5317; FAX (727) 824-5300
http://sero.nmfs.noaa.gov/

June 24, 2009 F/SER4:GG/pw

(Sent via Electronic Mail)

Mr. Eric Summa
Chief, Environmental Branch, Planning Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Attention: Paul DeMarco

Dear Mr. Summa:

NOAA's National Marine Fisheries Service (NMFS) reviewed your invitation, dated October 29, 2008, to become a cooperating agency for the development of either an Environmental Impact Statement or Environmental Assessment that will evaluate the feasibility of providing shoreline erosion protection and hurricane and storm damage reduction to the shores of St. Johns County, Florida. The invitation was extended in accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6). We understand that acceptance of the cooperating agency status involves actions and responsibilities beyond those normally associated with a commenting agency and that NMFS is being asked to provide special expertise on the habitats used by estuarine and marine species in the area.

NMFS accepts the invitation to serve as a cooperating agency. Due to staffing constraints, our participation may be limited to technical reviews, development of short sections of environmental documents, and occasional project related travel. Mr. George Getsinger, at our Jacksonville Office, will be available for further consultation as needed. He may be reached at 9741 Ocean Shore Drive, St. Augustine, Florida 32080, by telephone at (904) 461-8674, or by email at George.Getsinger@noaa.gov.

Sincerely,

/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:

COE Eric.P.Summa@usace.army.mil, Paul.M.DeMarco@usace.army.mil
F/SER47 George.Getsinger@noaa.gov

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lainie Edwards
Department of Environmental Protection – MB 3700
Bureau of Beaches and Coastal Systems
3900 Commonwealth Boulevard, MS-300
Tallahassee, Florida 32399-3000

September 18, 2009

Re: DHR Project No.: 2009-5085 / Date Received: August 18, 2009
Applicant: USACE – Eric Summa
Application No.: 0295429-001-JC
St. Johns County Shore Protection Project – Beach Nourishment
St. Johns County

Dear Ms. Edwards:

Our office is reviewing the referenced application in accordance with Chapters 373 and 267, *Florida Statutes,* and Florida's Coastal Zone Consistency Program. The purpose of our review is to identify possible impact to historic resources listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The State Historic Preservation Officer is to advise and assist state and federal agencies and applicants to identify historic resources, assess effects on them, and considerations of alternatives to avoid or minimize adverse effects.

We reviewed the Florida Master Site File and our records for information. We note that a number of recorded shipwrecks are located directly within or in close proximity to the St. Augustine Inlet Ebb Shoal Borrow Area, and that previous remote-sensing surveys were conducted in the borrow area. However, our files indicate that during the 2005 St. Johns County beach nourishment e project monitoring, the dredge pumped artifacts from a specific area of the Ebb Shoal Borrow Area

It is the opinion of this office that this strongly suggests that previous remote-sensing surveys of the Ebb Shoal Borrow Area were not able to adequately identify all resources in the area. We concur with the recommendation of archaeologists that conducted the 2005 monitoring of the nourishment project for the Army Corps of Engineers (Corps) that this may be "due to several factors including the depth of the sediment covering older resources, and to out-dated methodologies for locating deeply buried wrecks.

Therefore, prior to any additional dredging from the Ebb Shoal Borrow Area the blocks which have a high potential of containing the shipwrecks that were encountered during the 2005

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lainie Edwards
Department of Environmental Protection – MB 3700
Bureau of Beaches and Coastal Systems
3900 Commonwealth Boulevard, MS-300
Tallahassee, Florida 32399-3000

September 18, 2009

Re: DHR Project No.: 2009-5085 / Date Received: August 18, 2009
Applicant: USACE – Eric Summa
Application No.: 0295429-001-JC
St. Johns County Shore Protection Project – Beach Nourishment
St. Johns County

Dear Ms. Edwards:

Our office is reviewing the referenced application in accordance with Chapters 373 and 267, *Florida Statutes,* and Florida's Coastal Zone Consistency Program. The purpose of our review is to identify possible impact to historic resources listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The State Historic Preservation Officer is to advise and assist state and federal agencies and applicants to identify historic resources, assess effects on them, and considerations of alternatives to avoid or minimize adverse effects.

We reviewed the Florida Master Site File and our records for information. We note that a number of recorded shipwrecks are located directly within or in close proximity to the St. Augustine Inlet Ebb Shoal Borrow Area, and that previous remote-sensing surveys were conducted in the borrow area. However, our files indicate that during the 2005 St. Johns County beach nourishment e project monitoring, the dredge pumped artifacts from a specific area of the Ebb Shoal Borrow Area

It is the opinion of this office that this strongly suggests that previous remote-sensing surveys of the Ebb Shoal Borrow Area were not able to adequately identify all resources in the area. We concur with the recommendation of archaeologists that conducted the 2005 monitoring of the nourishment project for the Army Corps of Engineers (Corps) that this may be "due to several factors including the depth of the sediment covering older resources, and to out-dated methodologies for locating deeply buried wrecks.

Therefore, prior to any additional dredging from the Ebb Shoal Borrow Area the blocks which have a high potential of containing the shipwrecks that were encountered during the 2005

monitoring project should be subjected to an underwater remote-sensing survey and diver identification efforts in order to locate the source of the artifacts. The location data of the areas of the borrow area that need to be investigated is available in our files and the files Corps Environmental Branch. Methodologies for the survey investigations should include smaller line spacing for the remote sensing, diver identification of larger number of medium-to-lower probability targets, and the use of a sub-bottom profiler.

Until these investigations are conducted this agency cannot provide final comment on this application.

Because this letter and its contents are a matter of public record, archaeological consultants who have knowledge of our recommendations may contact the applicant or their agent. This should in no way be interpreted as an endorsement by this agency. The Division of Historical Resources does not maintain a list of professional archaeologists who are qualified to work in the State of Florida and/or who meet the Secretary of the Interior's Standards for federally involved archeological projects as specified in 36 CFR 61, Appendix A. However, the Register of Professional Archaeologists (RPA) maintains a membership directory that may be useful in locating professional archaeological consultants (http://www.rpanet.org/about.htm) in your area. Many qualified archaeologists are not members of RPA, and omission from the list does not imply that an archaeologist does not meet the Secretary's Standards or that the resultant work would not be acceptable. Conversely, inclusion on the list is no guarantee that an archaeologist's work will automatically be acceptable. As with any contractor you should request and check references and recent work history. The American Cultural Resources Association also maintains a listing of professional consultants at (http://www.acra-crm.org/southeast.html). The same conditions above apply.

If you have any questions concerning our comments, please contact Laura Kammerer, Deputy State Historic Preservation Officer for Review and Compliance, at 850-245-6333 or lkammerer@dos.state.fl.us. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Eric Summa, Chief - Jacksonville District Army Corps of Engineers, Environmental Branch
Robin Moore, RPA - St. Johns County Planning Department
Florida Coastal Zone Management – FDEP

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Laurie Milligan
Florida State Clearing House
3900 Commonwealth Boulevard, MS-47
Tallahassee, Florida 32399-3000

December 11, 2009

Re: DHR Project File No. 2009-06862/ Received by DHR: October 29, 2009
Applicant Name: U.S. Army Corps of Engineers
Application No.: FL200910284998C
Project Description: St. Augustine Inlet and Vicinity Maintenance Dredge
County: St. Johns

Dear Ms. Milligan:

Our office received and reviewed the above referenced project application in accordance with Section 106 of the National Historic Preservation and the National Environmental Policy Acts as amended, to assess possible adverse impacts to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places.

Our office concurs with the USACE's recommendation for a cultural resource survey. The resultant survey report must conform to the specification set forth in Chapter 1A-46, *Florida Administrative Code*, and be forwarded to this agency in order to complete the reviewing process for this proposed project and its impacts.

If you have any questions concerning our comments, please contact Michael Hart, Historic Sites Specialist, by phone at (850) 245-6333, or by electronic mail at mrhart@dos.state.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Jim Jeffords, Jr. P.E./ Jacksonville District Corps of Engineers

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

OCT 19 2009

Barbara Mattick, Ph.D.
Division of Historical Resources
State Historic Preservation Officer
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Dr. Mattick:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the effects of maintenance dredging in the Intracoastal Waterway (IWW) in St. Johns County, Florida. Located near St. Augustine, Florida, the project consists of maintenance dredging along Cuts S-28 thru S-30 along the IWW. Shoaling within the IWW is causing hazards to navigation and requires maintenance dredging to bring the channel back to its authorized depths.

The Corps has determined that this project had a potential to affect historic properties and that a Phase I Archaeological Survey was needed. The purpose of the survey was to determine if any resources exist within the project area and evaluate their significance. The Jacksonville District contracted Southeastern Archaeological Research, Inc. (SEARCH) to conduct this survey, and enclosed is their draft report, "*Historic Assessment and Remote Sensing Survey of Intracoastal Waterway Near St. Augustine, Fl.*" SEARCH identified a total of 73 potential significant anomalies within 17 clustered areas within the project area. One cluster is represented by the previously recorded site 8SJ4889, the Dixie Crystal. Please note that upon preliminary review of the document by staff, it was determined that in addition to the recommended potential significant targets identified by the consultant, the Corps is recommending that Target SS-1 be re-evaluated as a potentially significant target as this side-scan target may represent a potential cultural resource.

I request your comments on the enclosed, "*Historic Assessment and Remote Sensing Survey of Intracoastal Waterway near St. Augustine, Florida*". If there are any questions, please contact Mr. Dan Hughes at 904-232-3028 or e-mail at daniel.b.hughes@usace.army.mil.

Sincerely,

(for) Barbara B. Cox

Eric P. Summa
Chief, Environmental Branch

Enclosure

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

HC-61, BOX 21A
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

TRIBAL OFFICERS
CHAIRMAN
MITCHELL CYPRESS
VICE CHAIRMAN
RICHARD BOWERS JR.
SECRETARY
PRISCILLA D. SAYEN
TREASURER
MICHAEL D. TIGER

Dan Hughes
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

THPO: 005568

April 7, 2010

Subject: Assessment of Effects for the Proposed St. Johns County Shore Protection Project, St. Johns County, Florida

Dear Mr. Hughes,

The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) has received the Corps of Engineers correspondence concerning the aforementioned project. The STOF-THPO has no objection to your findings at this time. However, the STOF-THPO would like to be informed if cultural resources that are potentially ancestral or historically relevant to the Seminole Tribe of Florida are inadvertently discovered during the construction process. We thank you for the opportunity to review the information that has been sent to date regarding this project. Please reference ***THPO-005568*** for any related issues.

We look forward to working with you in the future.

Sincerely,

Willard Steele,
Tribal Historic Preservation Officer
Seminole Tribe of Florida

Direct routine inquiries to:

Anne Mullins,
Compliance Review Supervisor
annemullins@semtribe.com

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric Summa
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

September 24, 2010

Re: DHR Project File No.: 2010-04036
Received by DHR: September 3, 2010
1A-32 Permit No.: 0910.035
Addendum Report: Archaeological Diver Identification and Evaluation of Twenty-Eight Potentially Significant Submerged Targets, St. Johns County Beach Erosion Control Project, St. Johns County, Florida

Dear Mr. Summa:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes*, for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In March 2010, Southeastern Archaeological Research, Inc. (SEARCH) conducted an archaeological diver assessment of twenty-eight potentially significant targets identified during a previous remote sensing survey. The targets are within the proposed Ebb Shoal Borrow Area that will be used in association with the St. Johns County Beach Erosion Control Project. The survey was conducted on behalf of the US Army Corps of Engineers. SEARCH determined that most of the targets were either modern debris or too deeply buried to be identified or impacted by the proposed undertaking.

SEARCH determined that cluster 8 is the remains of the North Shoals Vessel (8SJ4784), which they consider potentially eligible for listing in the NRHP. SEARCH recommends that the site be avoided with a 100 meter protective buffer zone.

Based on the information provided, our office finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*. However, there is insufficient information about the historic shipwreck to assess its eligibility for listing in the NRHP. Contingent upon its avoidance, our office concurs with the US Army Corps of Engineers determination of no adverse effect on historic properties for the proposed undertaking.

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at 850.245.6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Jason Burns, Southeastern Archaeological Research, Inc.

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric Summa
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

September 24, 2010

Re: DHR Project File No.: 2010-04036
Received by DHR: September 3, 2010
1A-32 Permit No.: 0910.035
Addendum Report: Archaeological Diver Identification and Evaluation of Twenty-Eight Potentially Significant Submerged Targets, St. Johns County Beach Erosion Control Project, St. Johns County, Florida

Dear Mr. Summa:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In March 2010, Southeastern Archaeological Research, Inc. (SEARCH) conducted an archaeological diver assessment of twenty-eight potentially significant targets identified during a previous remote sensing survey. The targets are within the proposed Ebb Shoal Borrow Area that will be used in association with the St. Johns County Beach Erosion Control Project. The survey was conducted on behalf of the US Army Corps of Engineers. SEARCH determined that most of the targets were either modern debris or too deeply buried to be identified or impacted by the proposed undertaking.

SEARCH determined that cluster 8 is the remains of the North Shoals Vessel (8SJ4784), which they consider potentially eligible for listing in the NRHP. SEARCH recommends that the site be avoided with a 100 meter protective buffer zone.

Based on the information provided, our office finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.* However, there is insufficient information about the historic shipwreck to assess its eligibility for listing in the NRHP. Contingent upon its avoidance, our office concurs with the US Army Corps of Engineers determination of no adverse effect on historic properties for the proposed undertaking.

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at 850.245.6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Jason Burns, Southeastern Archaeological Research, Inc.

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Robert Riddell
Operations Division
Jacksonville USACE
P.O. Box 4970
Jacksonville, Florida 32232-0019

January 19, 2010

Re: DHR Project File No. 2009-06415/ Received by DHR: October 28, 2009
Public Notice No.: PN-OD-IWW-287
Project: St. Augustine Inlet Maintenance Dredge
County: St. Johns

Dear Mr. Riddell:

Our office received and reviewed the above referenced project application in accordance with Section 106 of the National Historic Preservation and the National Environmental Policy Acts as amended, to assess possible adverse impacts to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places.

Our office concurs with the recommendations of your agency for the necessity for cultural resource surveys of the area of potential effect for the proposed project.. We look forward to reviewing the resultant survey report(s). The resultant survey report must conform to the specification set forth in Chapter 1A-46, *Florida Administrative Code,* and be forwarded to this agency in order to complete the review and consultation processes for this undertaking and its impacts to historic properties. The results of the analysis will determine if significant cultural resources would be disturbed by this development. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that must be taken to avoid or minimize adverse impacts to archaeological sites and historical properties identified that are eligible for listing in the NRHP.

If you have any questions concerning our comments, please contact Michael Hart, Historic Sites Specialist, by phone at 850.245.6333, or by electronic mail at mrhart@dos.state.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office
850.245.6300 • FAX: 245.6436

☐ Archaeological Research
850.245.6444 • FAX: 245.6452

✓ Historic Preservation
850.245.6333 • FAX: 245.6437

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric Summa
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

March 29, 2010

Re: DHR Project File No.: 2010-00839 / Received by DHR: February 11, 2010
1A-32 Permit No.: 0809.094
Historic Assessment and Remote Sensing Survey of the St. Johns County Beach Erosion Control Project, St. Johns County, Florida

Dear Mr. Summa:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In June 2009, Southeastern Archaeological Research, Inc. (SEARCH) conducted an archaeological and historical underwater remote sensing survey of the proposed Ebb Shoal borrow area near the St. Augustine entrance channel. The survey was conducted on behalf of U.S. Army Corps of Engineers. SEARCH identified one hundred nineteen (119) magnetic anomalies and twenty-eight (28) side-scan sonar targets within the project area during the investigation. SEARCH relocated the previously recorded North Shoals Vessel historic shipwreck (8SJ4784).

SEARCH recommends that sixty-seven (67) magnetic anomalies and three side-scan sonar anomalies contained in twenty-five (25) clusters and two isolated anomalies be avoided during project activities. The majority of these anomalies and clusters should be avoided with thirty (30) meter diameter buffer areas. Previously recorded archaeological site 8SJ4784, represented by anomalies M39, M41, M45, M48, M53, M56, and M59, needs to be avoided with a fifty (50) meter diameter buffer zone.

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.*

Please note that for future underwater survey projects, the Unanticipated Discoveries section should in include language applicable to project for which the survey was conducted – in this case the sand borrow area and the erosion control project. This section should address the expected types of resources/artifacts/features associated with submerged sites, i.e., shipwrecks, like the North Shoal Vessel, 8SJ4784. In most cases, human remains discoveries would not relevant to this type of project either. The purpose of this section of the report is to inform the project managers and other involved parties about the nature of the resources that could be encountered and the steps that must be taken in that situation. The point of contact regarding human remains discoveries, and new discoveries on state sovereign submerged lands is Dr. Wheeler, whose address is not correct in this document. For all discoveries in a federal or state project a second point of contact should be the State Historic Preservation Officer, Division Director and the Compliance and Review Section. Thank you for you attention to this matter.

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at 850.245.6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Louis Tesar, Interoffice Mail Station 8B
Jason Burns, Southeastern Archaeological Research, Inc. – Pensacola, FL

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric P. Summa
Department of the Army
Jacksonville District Corps of Engineers
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

December 1, 2009

Re: DHR Project File No.: 2009-06256 / 1A-32 Permit No.: 0809.109
Received by DHR: October 22, 2009
Draft Report: *Historic Assessment and Remote Sensing Survey of the Intracoastal Water Way near St. Augustine, St. Johns County, Florida*

Dear Dr. Hoffman:

Our office received and reviewed the above referenced draft survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In June 2009, Southeastern Archaeological Research, Inc. (SEARCH) conducted a remote sensing archaeological and historical survey of the proposed dredging areas within the Intracoastal Water Way. SEARCH identified seventy-five (75) magnetic anomalies within the North Reach, eighty-one (81) magnetic anomalies and five (5) sonar targets in the Mid Reach, and one hundred seventeen (117) magnetic anomalies within the South Reach. SEARCH recommends avoidance of seventy-three (73) anomalies.

Based on the information provided, it appears that the final report will be complete and sufficient in accordance with Chapter 1A-46 of the *Florida Administrative Code.* However, we recommend the following revisions for the final report:

- **Figures 55 and 56:** Both figures 55 and 56 are labeled as representing the location of anomalies MR-55 and MR-63. It appears that one figure may be for anomalies MR-62 and MR-67 instead.

- **Larger Figures:** The figures showing magnetic contours of the survey areas are too small to represent the data. For example, Figures 18, 19, 20, 41, 42, 70, and 71 would be more useful if they were included at a larger scale.

Our agency looks forward to the receipt and review of the final report for the above-referenced survey.

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at (850) 245-6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Historic Preservationist Supervisor
Compliance Review Section
Bureau of Historic Preservation

Pc: Louis Tesar, Interoffice Mail Station 8B
Michael Krivor, Southeastern Archaeological Research, Inc. – Jonesville office

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Eric P. Summa
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

May 27, 2010

Re: DHR Project File No.: 2010-02392
Received by DHR: March 31, 2010
Cultural Resources Survey for the St. Johns County Shore Protection Project, St. Johns County, Florida

Dear Mr. Summa:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*, and Chapter 267, *Florida Statutes,* for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In August and September 2009, New South Associates (NSA) conducted an archaeological and historical Phase I and remote sensing survey of the proposed project area for shoreline protection and dredge material disposal. NSA identified a deeply buried anomaly that may represent previously recorded archaeological site 8SJ3318. NSA did not relocate previously recorded site 8SJ4873 and determined it is unlikely to be present within the area of potential effect.

The U.S. Army Corps of Engineers determined that the proposed undertaking will have no adverse effect on cultural resources listed, or eligible for listing, on the NRHP. No further investigation is recommended in association with the proposed project.

Based on the information provided, our office concurs with the determinations of the U.S. Army Corps of Engineers and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.*

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office
850.245.6300 • FAX: 245.6436

☐ Archaeological Research
850.245.6444 • FAX: 245.6452

☑ Historic Preservation
850.245.6333 • FAX: 245.6437

For any questions concerning our comments, please contact Rudy Westerman, Historic Preservationist, by electronic mail at rjwesterman@dos.state.fl.us, or by phone at 850.245.6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Greg Smith, New South Associates

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

HC-61, BOX 21A
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

TRIBAL OFFICERS
CHAIRMAN
MITCHELL CYPRESS
VICE CHAIRMAN
RICHARD BOWERS JR.
SECRETARY
PRISCILLA D. SAYEN
TREASURER
MICHAEL D. TIGER

Dan Hughes
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

THPO: 005222

February 25, 2010

Subject: Historic Assessment and Remote Sensing Survey of the St. Johns County Beach Erosion Control Project, St. Johns County, Florida

Dear Mr. Hughes,

The Seminole Tribe of Florida's Tribal Historic Preservation Office (STOF-THPO) has received the Corps of Engineers correspondence concerning the aforementioned project. The STOF-THPO has no objection to your findings at this time, given that the conditions provided by SEARCH archaeologists will be met. The STOF-THPO would like to be informed if cultural resources that are potentially ancestral or historically relevant to the Seminole Tribe of Florida are discovered during the construction process. We thank you for the opportunity to review the information that has been sent to date regarding this project. Please reference ***THPO-005222*** for any related issues.

We look forward to working with you in the future.

Sincerely,

Direct routine inquiries to:

Willard Steele,
Tribal Historic Preservation Officer
Seminole Tribe of Florida

Anne Mullins,
Compliance Review Supervisor
annemullins@semtribe.com

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

CESAJ-PD-EC

MAR 2 6 2010

MEMORANDUM FOR Commander, U.S. Army Records Management and Declassification Agency, ATTN: AHRC-PDD-RP Casey Bldg., Rm. 102, 7701 Telegraph Road, Alexandria, Virginia 22315-3860

SUBJECT: Notice of Intent to Prepare a Draft Environmental Impact Statement

Enclosed for publication in the Federal Register are three signed original copies of the Notice of Intent to prepare a Draft Environmental Impact Statement for Hurricane and Storm Damage Reduction for South Ponte Vedra Beach, Vilano Beach, and Summer Haven Beach Reaches, St. Johns County, FL. The billing code is 3710-AJ.

FOR THE COMMANDER:

ERIC P. SUMMA
Chief, Environmental Branch

Encl

CF (w/encl):
CESAD-CM-P

e. *Agency Role:* As the cooperating agency, NMFS HCD and FDEP BBCS will provide information and assistance on the resources to be impacted, mitigation measures and alternatives. Other agencies having either regulatory authority or special expertise may also be invited to become a cooperating agency in preparation of the EIS. Specifically, as a Federal agency with jurisdiction to manage resources available on the Outer Continental Shelf (OCS), the U.S. Minerals Management Service would be invited should potential borrow areas be identified within Federal waters (outside the 3-mile State statutory limit).

f. *Draft Environmental Impact Statement Availability.* The study schedule is dependent upon Congressional funding and the current estimate is for the Draft Environmental Impact Statement to be available on or after 2012.

25 Mar 2010
DATE

Eric P. Summa
Chief, Environmental Branch

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 2 6 2010

Mr. David Hankla, Field Supervisor
U.S. Fish and Wildlife Service
7915 Baymeadows Way, Suite 200
Jacksonville, Florida 32256-7517

Dear Mr. Hankla:

The U.S. Army Corps of Engineers (Corps) and the Minerals Management Service (MMS) would like to initiate formal Endangered Species Act consultation for the Duval County Hurricane and Storm Damage Reduction project. The MMS is a cooperating agency during the National Environmental Policy Act process for this project and is also serving as a joint agency under this ESA consultation. The Corps will remain the lead agency. Approximately 1,500,000 cubic yards of shoal material would be dredged from the Duval borrow area and used to construct a protective beach berm between monuments V-501 to R-80. Consultation was previously completed for this project in 1993 and 2005.

Enclosed is our biological assessment. The Corps and MMS have determined that the proposed beach nourishment project may affect nesting sea turtles and would be not likely to adversely affect manatees with inclusion of the Service's standard manatee protection measures.

We request your concurrence in this matter pursuant to Section 7 of the Endangered Species Act. If you have any questions regarding this project, please contact Mr. Paul DeMarco at 904-232-1897.

Sincerely,

Eric P. Summa
Chief, Environmental Branch

Enclosures

by the IPHC between the commercial and charter vessel fisheries. If approved by the Secretary of Commerce, this new allocation program would not be effective before 2012.

Authority: 16 U.S.C. 773 *et seq.*

Dated: March 30, 2010.

Emily H. Menashes,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2010–7626 Filed 4–2–10; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

Economic Development Administration

Notice of Petitions by Firms for Determination of Eligibility To Apply for Trade Adjustment Assistance

AGENCY: Economic Development Administration, Department of Commerce.

ACTION: Notice and opportunity for public comment.

Pursuant to Section 251 of the Trade Act of 1974 (19 U.S.C. 2341 *et seq.*), the Economic Development Administration (EDA) has received petitions for certification of eligibility to apply for Trade Adjustment Assistance from the firms listed below. EDA has initiated separate investigations to determine whether increased imports into the United States of articles like or directly competitive with those produced by each firm contributed importantly to the total or partial separation of the firm's workers, or threat thereof, and to a decrease in sales or production of each petitioning firm.

LIST OF PETITIONS RECEIVED BY EDA FOR CERTIFICATION OF ELIGIBILITY TO APPLY FOR TRADE ADJUSTMENT

[3/23/2010 through 3/30/2010]

Firm	Address	Date accepted for filing	Products
Mansfield Plumbing Products, LLC	150 E. 1st St., Perrysville, OH 44864.	3/23/2010	Sinks and lavatories made of porcelain or china.
Hurst Manufacturing	1551 East Broadway, Princeton, NJ 47670.	3/24/2010	Electric Motors, Brushless DC, AC Induction, Stepper and Synchronous.
Adams USA, Inc	610 S Jefferson Avenue, Cookeville, TN 38501.	3/25/2010	The firm produces sporting goods equipment; primary materials include plastic and fabric.
Bailey Knit Corporation	1606 Sanders Ave, NE., Fort Payne, AL 35967.	3/25/2010	The firm produces socks; primary materials include cotton and synthetic fibers.
Development Associates, Inc	300 Old Baptist Road, North Kingston, RI 02852.	3/25/2010	Development Associates manufactures polyurethane Resin, clear polyurethane resin—auto grade, non-yellowing, uv stable, mercury free, urethane Adhesive, epoxy primer, wire and cable coating.
Hawaiian Sun Products, Inc	259 Sand Island Access, Honolulu, HI 96819.	3/25/2010	Hawaiian Sun produces tropical fruit juices, preserves, chocolate covered food products, macadamia nuts, and a variety of other food products.
Pierce Aluminum Company, Inc	34 Forge Park, Franklin, MA 02038.	3/25/2010	Pierce Aluminum specializes in aluminum products for use in the marine, transportation, defense, Architectural, and general manufacturing. They also provide finished aluminum products for first line production capabilities for the same industries.
Alpha Machining & Manufacturing, Inc.	1604 N. 161st East Avenue, Tulsa, OK 74116.	3/29/2010	Machined parts for the aircraft industry.

Any party having a substantial interest in these proceedings may request a public hearing on the matter.

A written request for a hearing must be submitted to the Trade Adjustment Assistance for Firms Division, Room 7106, Economic Development Administration, U.S. Department of Commerce, Washington, DC 20230, no later than ten (10) calendar days following publication of this notice.

Please follow the procedures set forth in section 315.9 of EDA's final rule (71 FR 56704) for procedures for requesting a public hearing. The Catalog of Federal Domestic Assistance official program number and title of the program under which these petitions are submitted is 11.313, Trade Adjustment Assistance.

Dated: March 30, 2010.

Bryan Borlik,

Program Director.

[FR Doc. 2010–7587 Filed 4–2–10; 8:45 am]

BILLING CODE 3510–24–P

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement for Hurricane and Storm Damage Reduction for South Ponte Vedra Beach, Vilano Beach, and Summer Haven Beach Reaches, St. Johns County, FL

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The U.S. Army Corps of Engineers, Jacksonville District, intends to prepare a Draft Environmental Impact Statement (DEIS) for evaluation of the feasibility of providing hurricane and storm damage reduction (HSDR), and related purposes to the shores of St. Johns County, Florida. In cooperation with St. Johns County, the study will evaluate alternatives that will maximize HSDR while minimizing environmental impacts within three reaches designated critically eroded by Florida Department of Environmental Protection (FDEP): (1) South Ponte Vedra Beach (R84–R110/5 miles), (2) Vilano Beach (R110–R122/2.5 miles) and (3) Summer Haven Beach (R197–R209/2.3 miles).

ADDRESSES: U.S. Army Corps of Engineers, Planning Division, Environmental Branch, P.O. Box 4970, Jacksonville, FL 32232–0019.

FOR FURTHER INFORMATION CONTACT: Mr. Paul M. DeMarco, by e-mail *Paul.M.DeMarco@usace.army.mil* or by telephone at 904–232–1897.

SUPPLEMENTARY INFORMATION:

a. *Proposed Action.* The Rivers and Harbors Act of 1962 gave the Secretary of the Army broad authorization to survey coastal areas of the United States and its possessions in the interest of beach erosion control, hurricane protection and related purposes, provided that surveys of particular areas would be authorized by appropriate resolutions (Pub. L. 87–874, Section 110). As a result, portions of the St. Johns County shoreline experiencing severe erosion were studied extensively. The St. Johns County, Florida General Reevaluation Report (GRR) (USACE 1998), recommended beach nourishment along St. Augustine Beach. Initial fill was completed in January 2003.

Authority for the proposed study is House Resolution 2646 adopted June 21, 2000. A Reconnaissance Report completed in March 2004, by the Corps, concluded based on preliminary findings, there was a federal interest in pursuing HSDR for the Vilano Beach and Summer Haven Beach reaches. Subsequent to the completion of that report, South Ponte Vedra Beach experienced severe erosion, was designated as a critically eroded beach by FDEP, and therefore added to the scope of the Federal study.

b. *Alternatives.* Project's alternatives include no action and various levels of protection along approximately 9.8 miles of coastal shoreline along three reaches designated as critically eroded areas. In addition to various levels of beach nourishment and periodic renourishment, the Corps will consider other management measures such as nearshore placement of sand, breakwaters, submerged artificial reef, groins, revetments, seawalls, dunes/vegetation, change to the Coastal Construction Control Line, relocation of structures, moratorium on construction, establish a no-growth program, relocation of structures, flood proofing of structures, and condemnation of structures with land acquisition.

c. *Scoping Process.* The scoping process as outlined by the Council on Environmental Quality has been and will continue to be utilized to involve Federal, State, and local agencies, affected Indian tribes, and other interested persons and organizations. Scoping letters were sent to the appropriate parties requesting their comments and concerns on August 17, 2005, for the Summer Haven and Vilano Beach reaches of the study area. After that time, FDEP designated the South Ponte Vedra Reach as critically eroding. A second scoping letter was sent out on September 16, 2008, to include the South Ponte Vedra Reach in the study area. Initial comments and concerns have been received. Any additional persons and organizations wishing to participate in the scoping process should contact the U.S. Army Corps of Engineers at the above address.

Significant issues to be analyzed in the DEIS would include effects on Federally listed threatened and endangered species, and Essential Fish Habitat. Other issues would be health and safety, water quality, aesthetics and recreation, fish and wildlife resources, cultural resources, and socio-economic resources. Issues identified through scoping and public involvement thus far include loss of land and property due to erosion, lack of protection from hurricanes, loss of recreational beach, concern over impacts to sea turtles and shore birds from renourishment, concern over impacts to benthic organisms from mining and fill, concern over protecting surfing spots and the revenue they generate, concern over wasting Federal tax dollars, too much time since the first studies without positive results, and concern that revetments and seawalls harm sea turtle nesting.

Any proposed action would be coordinated with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act, and with the State Historic Preservation Officer. The NMFS Habitat Conservation Division (HCD) has accepted cooperating agency status on the study.

Any proposed action would also involve evaluation for compliance with guidelines pursuant to section 404(b) of the Clean Water Act; application (to the State of Florida) for Water Quality Certification pursuant to section 401 of the Clean Water Act; certification of state lands, easements, and rights of way; and determination of Coastal Zone Management Act consistency. The FDEP Bureau of Beaches and Coastal Systems (BBCS) has also accepted cooperating agency status on the study.

The U.S. Army Corps of Engineers and the non-Federal sponsor, St. Johns County, would provide extensive information and assistance on the resources to be impacted and alternatives.

d. *Scoping Meetings.* Public scoping meetings could be held. Exact dates, times, and locations would be published in local papers.

e. *Agency Role.* As the cooperating agency, NMFS HCD and FDEP BBCS will provide information and assistance on the resources to be impacted, mitigation measures and alternatives. Other agencies having either regulatory authority or special expertise may also be invited to become a cooperating agency in preparation of the EIS. Specifically, as a Federal agency with jurisdiction to manage resources available on the Outer Continental Shelf (OCS), the U.S. Minerals Management Service would be invited should potential borrow areas be identified within Federal waters (outside the 3-mile State statutory limit).

f. *Draft Environmental Impact Statement Availability.* The study schedule is dependent upon Congressional funding and the current estimate is for the Draft Environmental Impact Statement to be available on or after 2012.

Dated: March 25, 2010.

Eric P. Summa,

Chief, Environmental Branch.

[FR Doc. 2010–7598 Filed 4–2–10; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF DEFENSE

Department of the Army

Draft Environmental Impact Statement (DEIS) for Training Range and Garrison Support Facilities Construction and Operation at Fort Stewart, GA

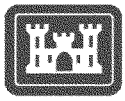
AGENCY: Department of the Army, DoD.

ACTION: Notice of Availability (NOA).

SUMMARY: The Department of the Army has prepared a DEIS to analyze the environmental and socioeconomic impacts resulting from the proposed construction of 12 range projects and 2 garrison support facilities at Fort Stewart, Georgia. Completion of these projects will better allow the Army to support Soldier training requirements and will support Fort Stewart's existing and future units. Construction of these projects will help to ensure Fort Stewart can meet unit training requirements if and when the pace of operational deployments slows.

DATES: The public comment period will end 45 days after the publication of an NOA in the **Federal Register** by the U.S. Environmental Protection Agency.

ADDRESSES: For further information regarding the EIS, please contact Mr. Charles Walden, Project Manager, Directorate of Public Works, Prevention and Compliance Branch, Environmental Division, 1550 Frank Cochran Drive, Building 1137–A, Fort Stewart, Georgia



US Army Corps of Engineers ®
Jacksonville District

You are invited to attend a Feasibility Scoping Meeting (FSM) for the *St. Johns County Hurricane and Storm Damage Reduction Study (HSDR)*. This meeting will take place:

Where: Jacksonville District Office, located at 701 San Marco Blvd, Jacksonville, FL, 32207 in the Executive Conference Room

When: March 15, 2011, 9:00 a.m. to 12:00 p.m.

Additionally, a Teleconference and Web Meeting will be established for remote attendance; the link for this conference site is below.

The purpose of the FSM is to collect input from affected resource agencies by discussion of:

- The "Future Without Project" anticipated conditions in the study area,
- Related issues on the affect to resources for moving the study forward, with specific reference to the alternatives identified in the Draft Feasibility Study Report
- Focus on the feasibility study tailored to the key alternatives
- Further definition of the required depth of analysis, as well as defined study constraints.

Please contact Paul DeMarco at (904)232-1897, or Matt Schrader at (904)232-2043, or by e-mail at Paul.M.DeMarco@usace.army.mil; Matthew.H.Schrader@usace.army.mil. We look forward to your participation; more details regarding this meeting will be provided soon.

AUDIO CONFERENCE ACCESS INFORMATION:
---
* USA Toll-Free: (888)830-6260
* PARTICIPANT CODE: 383416

WEB MEETING ACCESS INFORMATION:
---
* Web Meeting Address: https://www.webmeeting.att.com
* Meeting Number(s): (888)830-6260
* PARTICIPANT CODE: 383416

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

July 11, 1997

Mr. Donald Fore
Construction-Operations Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Scott B. Edwards
Historic Sites Specialist
Project File No. 973141

RE: Cultural Resource Assessment Request
Public Notice No. PN-IWW-216
Maintenance Dredging of the IWW in the St. Augustine Inlet and the Matanzas Inlet and the placement of material along the beaches south of the inlets.
St. Johns County, Florida

Dear Mr. Fore:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced projects for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

A review of the Florida Master Site File indicated that there are no underwater archaeological sites recorded within the above referenced inlet areas. However, it is the opinion of this agency, that there is a reasonable probability of project activities impacting unrecorded historic shipwreck sites that may be potentially eligible for listing in the *National Register of Historic Places.*

Since potentially significant historic shipwreck sites may be present, it is our recommendation that, prior to initiating any bottom disturbing activities within the project areas, it should be subjected to a professional magnetometer survey. In the event that significant submerged cultural resources are located during the course of the magnetometer survey, it will be the recommendation of this office that those sites be avoided. If avoidance is not possible, then other appropriate mitigation would be recommended to reduce adverse impacts on these cultural resources. The resultant survey report must be forwarded to this agency in order to complete the process of reviewing the impact of this project on cultural resources.

As for the beach disposal areas, because of the project locations and/or nature it is unlikely that any significant archaeological or historical sites will be affected. Therefore, it is the opinion of this office that the proposed projects will have no effect on historic properties listed, or eligible for listing, in the *National Register of Historic Places.*

If you have any questions concerning our comments please do not hesitate to contact us. Your interest and cooperation in helping to protect Florida's archaeological and historical resources are appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Ese

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

July 18, 1997

Mr. Donald Fore
Construction-Operations Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Scott B. Edwards
Historic Sites Specialist
Project File No. 973141**B**

RE: Cultural Resource Assessment Request
Public Notice No. PN-IWW-216
Maintenance Dredging of the IWW in the St. Augustine Inlet and the Matanzas Inlet and the placement of material along the beaches south of the inlets.
St. Johns County, Florida

Dear Mr. Fore:

In our July 11 letter we were unclear in our recommendation as to the professional magnetometer survey. The survey applies only to the St. Augustine Inlet and all other projects associated with the permit are cleared by this office to proceed without any condition. If you have any questions concerning our comments please do not hesitate to contact us. Your interest and cooperation in helping to protect Florida's archaeological and historical resources are appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Ese

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

September 19, 1997

Mr. Dennis R. Duke
Planning Division, Environmental Branch
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Scott B. Edwards
Historic Sites Specialist
Project File No. 973678

RE: Cultural Resource Assessment Review Request
Final Draft Report - *Submerged Properties Survey, St. Johns County, Florida*
By Mid-Atlantic Technology, July 1997.

Dear Mr. Duke:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced draft historic properties survey and find it sufficient. Please forward a Survey Log sheet with the final survey report.

We have reviewed the above referenced project and note that twelve anomalies Target Inlets A-L, were identified during the course of the marine magnetometer and side scan sonar survey. Of the twelve anomalies, six (Inlet B, E, F, G, H, and I) were determined to have the potential to be significant and five (Inlet C, D, J, K, and L) appear to be single objects. Finally, Target Inlet A has positively been identified as a modern wreck of a shrimp boat and requires no further investigations. It is our understanding that diver investigations will be conducted on the eleven potentially significant targets and that the results from these diver investigations will be forwarded to this office in order to complete our review. We concur with the Corps with these determinations and look forward to receiving the results of the investigations.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Ese

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

September 19, 1997

Mr. Dennis R. Duke
Planning Division, Environmental Branch
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Scott B. Edwards
Historic Sites Specialist
Project File No. 973678

RE: Cultural Resource Assessment Review Request
Final Draft Report - *Submerged Properties Survey, St. Johns County, Florida*
By Mid-Atlantic Technology, July 1997.

Dear Mr. Duke:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced draft historic properties survey and find it sufficient. Please forward a Survey Log sheet with the final survey report.

We have reviewed the above referenced project and note that twelve anomalies Target Inlets A-L, were identified during the course of the marine magnetometer and side scan sonar survey. Of the twelve anomalies, six (Inlet B, E, F, G, H, and I) were determined to have the potential to be significant and five (Inlet C, D, J, K, and L) appear to be single objects. Finally, Target Inlet A has positively been identified as a modern wreck of a shrimp boat and requires no further investigations. It is our understanding that diver investigations will be conducted on the eleven potentially significant targets and that the results from these diver investigations will be forwarded to this office in order to complete our review. We concur with the Corps with these determinations and look forward to receiving the results of the investigations.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Ese

Page 1

Ent D (FMSF only) / /

Survey Log Sheet

Florida Master Site File
Version 2.0 9/97

Survey # (FMSF only)

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (Name and project phase) ST JOHNS COUNTY SHORE PROTECTION PROJECT BORROW AREA DIVER INVESTIGATION & EVALUATION

Report Title (exactly as on title page) ARCHEOLOGICAL DIVER INVESTIGATION & EVALUATION OF Eleven Potentially Significant Submerged TARGETS in The Proposed Borrow AREA, St. Johns County FL

Report Author(s) (as on title page-- individual or corporate; last names first) WES HALL, Mid-Atlantic Technology

Publication Date (year) 1998 Total Number of Pages in Report (Count text, figures, tables, not site forms) 23

Publication Information (If relevant, series and no. in series, publisher, and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*: see *Guide to the Survey Log Sheet*.)

Supervisor(s) of Fieldwork (whether or not the same as author(s); last name first) HALL, WES

Affiliation of Fieldworkers (organization, city) Mid-Atlantic Technology, Castle Hayne NC

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Put the most important first. Limit each word or phrase to 25 characters.)

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)

Name U.S. Army Corps of Engineers

Address/Phone P.O. Box 4970, Jacksonville FL 32202 904-232-2016

Recorder of *Log Sheet* Date *Log Sheet* Completed 8/19/98

Is this survey or project a continuation of a previous project? ☐ No ☒ Yes: Previous survey #(s) (FMSF only)

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) St. Johns Co.

USGS 1:24,000 Map(s): Map Name/Date of Latest Revision (use supplement sheet if necessary): St. Augustine FL

Description of Survey Area

Dates for Fieldwork: Start 5/30/98 End 6/2/98 Total Area Surveyed (fill in one) _____ hectares _____ acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each): Width _____ meters 4780 feet Length _____ kilometers 7260 feet miles

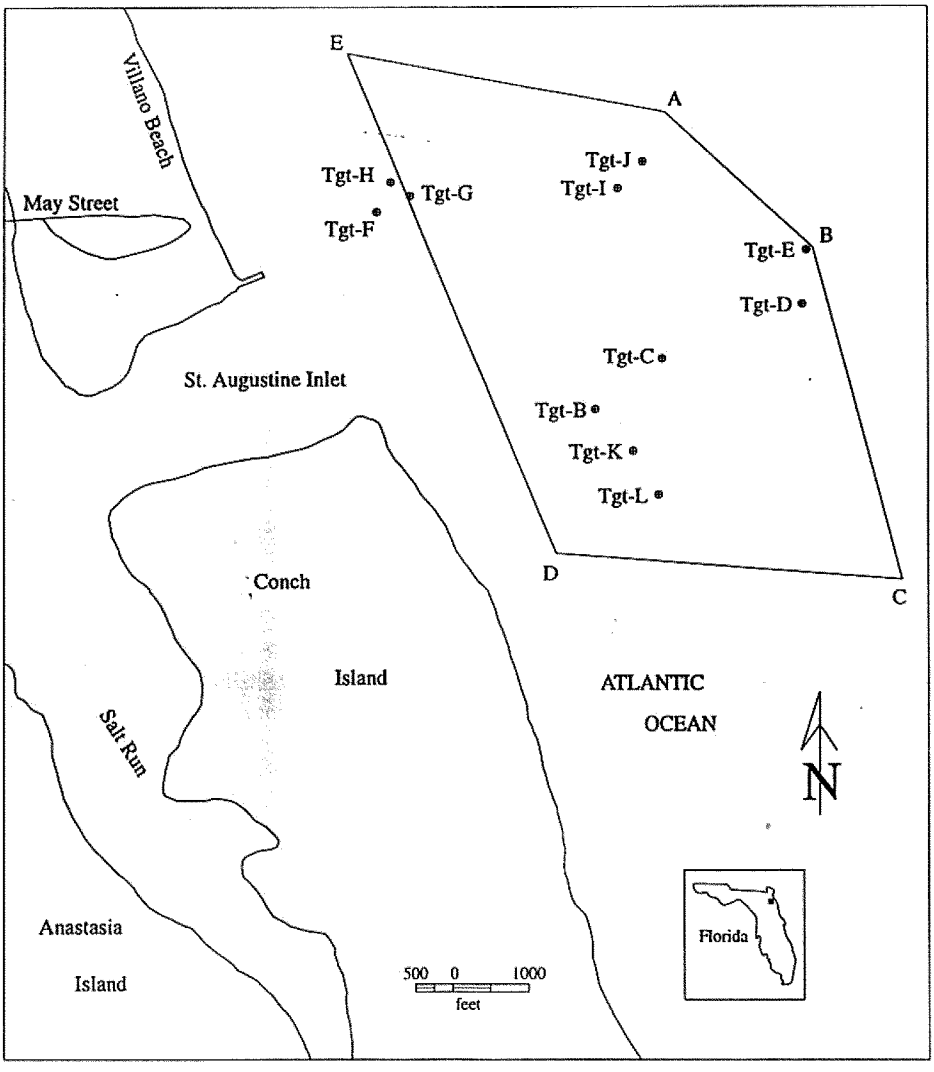


Figure 1. Study area and target location map.

Planning Division
Environmental Branch

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Percy:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects of a shore protection project in St. Johns County, Florida.

Environmental studies have included archival research and a remote sensing survey to locate potentially significant historic properties in the proposed borrow area. Results of these investigations are included in the draft final report *Submerged Properties Survey, St. Johns County, Florida*, prepared by Mr. Wes Hall, Mid-Atlantic Technology. Investigations for this report were conducted under the direct supervision of a qualified marine survey archeologist. A copy of the draft report is enclosed.

During the field investigations, 12 targets were identified through use of a magnetometer and side scan sonar. Of those targets, six have the potential to be significant historic properties. Five of the targets appear to be single objects. Target A has been positively identified as the 1997 wreck of a modern shrimp boat and requires no further investigation.

We intend to conduct archeological diver investigation of identified targets. Because the potentially significant targets are spread throughout the borrow area, establishment of "no effect" buffer zones would make the borrow area difficult to use efficiently.

We are aware of the research being conducted by Southern Oceans Archeological Research (SOAR) and the historic properties that have recently been identified near the Federal project. We are also concerned about the effects of dredging in the St. Augustine vicinity. Removal of large volume of sand may affect the dynamics of the inlet and cause erosion of historic sediments from buried portions of shipwrecks. Fragile artifacts and organic features now protected might then be exposed and lost to wave action, currents, and marine organisms.

July 24, 1997

Planning Division
Environmental Branch

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Percy:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects of a shore protection project in St. Johns County, Florida.

Environmental studies have included archival research and a remote sensing survey to locate potentially significant historic properties in the proposed borrow area. Results of these investigations are included in the draft final report *Submerged Properties Survey, St. Johns County, Florida*, prepared by Mr. Wes Hall, Mid-Atlantic Technology. Investigations for this report were conducted under the direct supervision of a qualified marine survey archeologist. A copy of the draft report is enclosed.

During the field investigations, 12 targets were identified through use of a magnetometer and side scan sonar. Of those targets, six have the potential to be significant historic properties. Five of the targets appear to be single objects. Target A has been positively identified as the 1997 wreck of a modern shrimp boat and requires no further investigation.

We intend to conduct archeological diver investigation of identified targets. Because the potentially significant targets are spread throughout the borrow area, establishment of "no effect" buffer zones would make the borrow area difficult to use efficiently.

We are aware of the research being conducted by Southern Oceans Archeological Research (SOAR) and the historic properties that have recently been identified near the Federal project. We are also concerned about the effects of dredging in the St. Augustine vicinity. Fragile artifacts and organic features now protected might then be exposed and lost to wave action, currents, and marine organisms.

It is the Corps' determination that dredging within the borrow area may affect significant historic properties, therefore we intend to conduct diver investigations prior to dredging in this borrow area. Diver investigations will be conducted by qualified marine survey archeologists. Results of diver investigations will be coordinated with your office according to normal procedures.

We request your concurrence with our determination of effect. Your comments on the enclosed draft report are also requested. A response within 30 calendar days would be appreciated. Please contact Ms. Janice Adams at 904-232-2016 if you have any questions.

Sincerely,

Dennis R. Duke
Acting Chief, Planning Division

Enclosure

bcc (wo/encl):
CESAJ-DP-I (McMillen)
CESAJ-PD-PC (Smith)

Adams/CESAJ-PD-ER/2016/mw
Dugger/CESAJ-PD-ER
Smith/CESAJ-PD-E
Strain/CESAJ-PD-P
Duke/CESAJ-PD

l:\group\pde\adams\stj-drft.doc

NOV 19 1997

Planning Division
Environmental Branch

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Percy:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is studying the environmental effects of the St. Johns County shore protection project. These studies have included historic property investigations to locate and identify potentially significant historic properties which may be located in proposed borrow area.

Enclosed is a copy of the final report *Submerged Historic Properties Survey Shore Protection Project, St. Johns County, Florida* prepared by Mr. Wes Hall, Mid-Atlantic Technology and Environmental Research. A draft of this report was coordinated with your office earlier this year in accordance with the requirements established in 36 CFR Part 800 and Section 106 of the National Historic Preservation Act of 1966, as amended.

If there are any questions regarding this matter, please contact Ms. Janice Adams at 904-232-2016.

Sincerely,

John R. Hall
Acting Chief, Planning Division

Enclosure

Adams/CESAJ-PD-ER/2016/ljd
Dugger/CESAJ-PD-ER
Smith/CESAJ-PD-E
Strain/CESAJ-PD-P
Hall/CESAJ-PD

l:\group\pde\adams\stj-fnl.doc

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

August 19, 1998

Mr. George M. Strain
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Frank J. Keel
Historic Preservation Planner
Project File No. 985460

RE: Cultural Resource Assessment Review Request
Archeological Diver Identification and Evaluation of eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida. By Mid-Atlantic Technology and Environmental Research, Inc. July 22, 1998

Dear Mr. Strain:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), as well as with the provisions contained in Chapter 1A-46, *Florida Administrative Code*, we have reviewed the results of the investigations for the referenced project and find them to be complete and sufficient.

We note that diver investigations of Targets B, F, G, H, and K represents remains of modern wrecks, or debris associated with modern navigational aids or fishing. Therefore, it is the opinion of this agency that because of the proposed undertaking will have no effect on any sites listed, or eligible for listing, in the *National Register of Historic Places.*

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Kfk

AUG 4 1998

Planning Division
Environmental Branch

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee Florida 32399-0250

Dear Mr. Percy:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is conducting environmental investigations of a proposed borrow area for the St. Johns County Shore Protection Project.

These investigations have included a 1997 remote sensing survey to identify potentially significant submerged historic properties and diver investigation and evaluation of 11 identified targets. The results of the diver investigations are included in the draft report *Archeological Diver Identification and Evaluation of Eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County*. A copy of Mid-Atlantic Technology's 1998 draft report is enclosed.

Each of the targets were identified, evaluated, and determined to be the remains of modern fishing vessels or navigation aids. These remains do not meet the criteria for nomination to the National Register of Historic Places. It is the Corps' determination that the proposed dredging within this borrow area for the St. Johns County Shore Protection Project will have no effect on significant historic properties.

We request your concurrence with the no effect determination. We also request comments on the enclosed draft report. A response would be appreciated within 30 calendar days. If there are any questions regarding this matter, please contact Ms. Janice Adams at 904-232-2016.

Sincerely,

George M. Strain
Acting Chief, Planning Division

Enclosure

bcc (w/encl): CESAJ-DP-I (McMillen)
CESAJ-PD-PC (Peterson)
CESAJ-PD-ER (Lang)
\
Adams/CESAJ-PD-ER/2016/ljd
Kruger/CESAJ-PD-ER
Smith/CESAJ-PD-E
Strain/CESAJ-PD

l:\group\pde\adams\sjdivshp.doc

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State

DIVISION OF HISTORICAL RESOURCES

November 19, 1999

Mr. James C. Duck
Jacksonville District Corps of Engineers
Planning Division, Environmental Branch
P. O. box 4970
Jacksonville, FL32232-0019

RE: DHR Project File No. 994884
Archaeological Diver Identification and Evaluation of Eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida. By Mid-Atlantic Technology and Environmental Research, Inc., July *22, 1999*.

Dear Mr. Duck:

Thank you for forwarding the final copy of the above referenced report. As you noted in your letter, this survey report has been previously coordinated with this office and found to be satisfactory. If you have any questions concerning our comments, please contact Ms. Robin Jackson, Historic Sites Specialist at (850) 487-2333 or 1-(800) 847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for Janet Snyder Matthews, Ph.D
State Historic Preservation Officer

JSM/Jrj

Planning Division
Environmental Branch

JUL 02 1999

Mr. George W. Percy
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Percy:

We have enclosed a copy of the final report *Archaeological Diver Identification and Evaluation of Eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida*. Mid-Atlantic Technology and Environmental Research prepared this report for the U.S. Army Corps of Engineers, Jacksonville District.

Earlier this year, we coordinated a draft of this report with your office in compliance with 36 CFR Part 800 and Section 106 of the National Historic Preservation Act of 1966, as amended. If there are any questions regarding the final report, please contact Ms. Janice Adams at 904-232-2016.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Adams/CESAJ-PD-ES/2016/als 7/1/99
Kurzbach/CESAJ-PD-ES
Smith/CESAJ-PD-E
McMillen/CESAJ-DP-I
Strain/CESAJ-PD-P
Brock/CESAJ-PD

l:\group\pde\adams\StJohnsCofnl.doc

Mailed out 7/2/99.

Planning Division
Environmental Branch

JUN 04 1999

Mr. Wes Hall
Mid-Atlantic Technology
and Environmental Research, Inc.
441 Blossoms Ferry Road
Castle Hayne, North Carolina 28429

Dear Mr. Hall:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, has reviewed and accepted the revised draft report *Archeological Diver Identification and Evaluation of Eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida*.

Request that you submit a camera-ready copy and 15 bound copies of the revised draft report to the Corps within 21 calendar days. A final invoice for the balance of the contract should also be prepared and submitted according to the terms of the contract.

If there are any questions regarding this, please contact Ms. Janice Adams at 904-232-2016.

Sincerely,

James C. Duck
Chief, Planning Division

Adams/CESAJ-PD-Es/2016/pjo
Kurzbach/CESAJ-PD-ES
[illegible]/CESAJ-PD-E
McMillen/CESAJ-DP-I
Duck/CESAJ-PD

l:\group\pde\adams\SJCoHallfinal.doc

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

November 19, 1999

Mr. James C. Duck
Jacksonville District Corps of Engineers
Planning Division, Environmental Branch
P. O. box 4970
Jacksonville, FL32232-0019

RE: DHR Project File No. 994884
Archaeological Diver Identification and Evaluation of Eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida. By Mid-Atlantic Technology and Environmental Research, Inc., July *22, 1999.*

Dear Mr. Duck:

Thank you for forwarding the final copy of the above referenced report. As you noted in your letter, this survey report has been previously coordinated with this office and found to be satisfactory. If you have any questions concerning our comments, please contact Ms. Robin Jackson, Historic Sites Specialist at (850) 487-2333 or 1-(800) 847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for Janet Snyder Matthews, Ph.D
State Historic Preservation Officer

JSM/Jrj

FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Administrative Services
Division of Corporations
Division of Cultural Affairs

MEMBER OF THE FLORIDA CABINET
Division of Library & Information Services
Division of Historical Resources
Ringling Museum of Art
Division of Licensing
Division of Elections

FLORIDA DEPARTMENT OF STATE
Sandra B. Mortham
Secretary of State
DIVISION OF HISTORICAL RESOURCES

August 19, 1998

Mr. George M. Strain
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

In Reply Refer To:
Frank J. Keel
Historic Preservation Planner
Project File No. 985460

RE: Cultural Resource Assessment Review Request
Archeological Diver Identification and Evaluation of eleven Potentially Significant Submerged Targets in the Proposed Borrow Area, St. Johns County, Florida. By Mid-Atlantic Technology and Environmental Research, Inc. July 22, 1998

Dear Mr. Strain:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), as well as with the provisions contained in Chapter 1A-46, *Florida Administrative Code*, we have reviewed the results of the investigations for the referenced project and find them to be complete and sufficient.

We note that diver investigations of Targets B, F, G, H, and K represents remains of modern wrecks, or debris associated with modern navigational aids or fishing. Therefore, it is the opinion of this agency that because of the proposed undertaking will have no effect on any sites listed, or eligible for listing, in the *National Register of Historic Places*.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

for Laura A. Kammerer
George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Kfk

However, in order to be complete and sufficient under 1A-46, *Florida Administrative Code,* the report must be revised to include the following:

- **Historical Narrative:** Revise the historical narrative to include a specifically maritime history of the St. Augustine area, including known vessel losses nearby.

- **Unexpected Discoveries:** Include a statement outlining the procedures for dealing with unexpected discoveries.

- **Errata:** Page 2 cites Section 276.12, *Florida Statutes*, which should be Chapter 267.12

For any questions concerning our comments, please contact April Westerman, Historic Preservationist, by electronic mail at amwesterman@dos.state.fl.us, or by phone at (850) 245-6333. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

Xc: Andrew Lydecker, Panamerican Consultants, Inc. (Memphis TN)

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James J. McAdams
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

March 24, 2007

Re: DHR No.: 2008-00887 / Received by DHR: February 25, 2008
Final Report: Remote Sensing Survey, Historic Assessment and Diver Evaluations of Suspected Submerged Resources Near St. Augustine, St. Johns County, Florida

Dear Mr. McAdams:

Our office received and reviewed the above referenced survey report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992; *36 C.F.R., Part 800: Protection of Historic Properties*; and Chapter 267, *Florida Statutes*, for assessment of possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the *National Register of Historic Places (NRHP)*, or otherwise of historical, architectural or archaeological value.

In March 2007, Panamerican Consultants, Inc. (PCI) conducted a remote sensing survey of an offshore borrow area used in a beach renourishment project at St. Augustine that produced historic artifacts during dredging. PCI also conducted diver evaluations of twelve targets identified in the remote sensing survey. Both investigations were conducted on behalf of the U.S. Army Corps of Engineers (Corps). PCI identified 55 magnetic anomalies, seven sidescan sonar targets, and 21 subbottom feature targets during the investigation and consolidated these into twelve dive targets. PCI divers did not identify any historic resources during the evaluation of the dive targets.

PCI recommends no further investigation of any of the targets located during the survey. However, if sand removal operations are to occur in the vicinity of the collapsed navigation tower, PCI recommends that a possible midden feature located in the subbottom data be investigated.

Based on the information provided, our office concurs with these determinations.

Planning Division
Environmental Branch

FEB 12 2007

Ms. Andrea White
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Ms. White:

This letter is in response to your request for information regarding planned cultural resources investigations offshore of St. Augustine in St. Johns County. We have contracted with Panamerican Consultants, Inc. to investigate four sites located during the recent St. Johns County Shore Protection Project. Great Lakes Dredge and Dock Company impacted the sites during their dredging operations to place sand on the beach. The Jacksonville District, COE is fulfilling its responsibilities according to the National Historic Preservation Act and the Advisory Council's implementing regulations to identify and evaluate these unanticipated discoveries impacted during construction activities. Two of the sites are located in the borrow area and two in near shore areas. Construction activities occurred between June and November 2005 and there was approximately 2,750,000 cubic yards of sand dredged during the project and placed on the beach. The borrow area was dredged to a depth of -30 MLW. We, therefore, request preclusion for the need for a DEP permit to conduct cultural resources investigations.

If you have any questions regarding this report, please contact Mr. Tommy Birchett, RPA, at (904)232-3834.

Sincerely,

Marie G. Burns
Chief, Environmental Branch

RAB MGB Birchett/CESAJ-PD-EC/3834/
Dugger/CESAJ-PD-EC
Burns/CESAJ-PD-E

L:\group\pde\birchett\StJohnsdivepermitshpo.doc

NOV 2 6 2007

Planning Division
Environmental Branch

Mr. Andrew D. W. Lydecker
Panamerican Consultants, Inc.
91 Tillman Street
Memphis, Tennessee 38111

Dear Mr. Lydecker:

The U.S. Army Corps of Engineers, Jacksonville District, has reviewed the draft report, *Remote Sensing Survey, Historic Assessment and Diver Evaluations of Suspected Submerged Resources Near St. Augustine, St. Johns County, Florida.*

Overall, the draft report is thorough and informative. Please make the appropriate editorial corrections to the final report as referenced in the enclosed draft. Also, address the SHPO comments as referenced in their letter of November 6, 2007. Once corrections have been made, request that you submit 35 bound copies and 3 CDs of the Final Technical Report as per the Scope of Work.

If there are any questions regarding the comments, please contact Mr. Thomas Birchett at 904-232-3834.

Sincerely,

Kenneth R. Dugger
Acting Chief, Environmental Branch

Enclosure

Bivens/CESAJ-PD-P 11/26
Birchett/CESAJ-PD-EC/3834
Dugger/CESAJ-PD-EC

L:\group\pde\birchett\fPCIStJohnsdive.doc

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

August 10, 2001

Mr. James C. Duck
Attn: Mr. Tommy Birchett
Jacksonville District US Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

RE: DHR No. 2001-321
Date Received by DHR: January 3, 2001
Agency: United States Army Corps of Engineers
Project Name: *Cultural Resources Marine Remote Sensing Survey and Terrestrial Survey at St. Augustine Entrance Channel*
St. Johns County, Florida

Dear Mr. Duck:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer (SHPO) is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

Results of the investigations revealed that a total of six magnetic anomalies not previously identified. It is the opinion of the project archaeologist that targets SA-OS-1 and SA-T-6 have limited potential to be associated with significant cultural resources. However, targets SA-OS-2, -3, -4, and –6 are recommended for avoidance by establishing a 200-feet buffer zone around the anomalies, or additional investigation should be conducted.

Based on the information provided, this agency concurs with these determinations and finds the submitted report complete and sufficient. Please note that future submissions to our office for review and comment must adhere to the Division of Historical Resources' recently revised Performance Standards for Submerged Remote Sensing Surveys.

If you have any questions concerning our comments, please contact Brian Yates, Historic Sites Specialist, at byates@mail.dos.state.fl.us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Yby

FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lizbeth Meigs
Bureau of Beaches & Coastal Systems
3900 Commonwealth Blvd., M.S. 300
Tallahassee, Florida 32399-3000

February 16, 2005

Re: DHR No. 2005-775/ Received by DHR: January 21, 2005
Application No. 0158721-004
Applicant: St. Johns County
Project: St. Johns County Shore Protection Project
St. Johns County

Dear Ms. Meigs:

Our office received and reviewed the referenced project in accordance with Chapters 267 and 373, *Florida Statutes*, Florida's Coastal Management Program, and implementing state regulations, for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The State Historic Preservation Officer is to advise and assist state and federal agencies when identifying historic properties, assessing effects upon them, and considering alternatives to avoid or minimize adverse effects.

Our review of the location for proposed borrow area indicates that portions of the area fall outside of any previously survey location (See Enclosures). A submerged properties survey was perform in 1997 along with subsequent diver investigation in 1998 by Mid-Atlantic Technology (FMSF SV# 5214 & 5376). The survey resulted in the identification of twelve anomalies which were all later confirmed by divers to be the remains of modern fishing vessels or debris associated with modern navigational aids or the fishing industry. The 1997 and 1998 surveys appear to be the only investigations specifically intended to research the area for potential borrow usage. The specific location of the previous borrow area is not known at this time, but should have been within the specific survey boundaries.

The current proposed borrow area also has portions entering into two other previous survey areas. In 1998 a maritime survey of St. Augustine was performed by Southern Oceans Archaeological Research and resulted in the identification of a 19th century steam vessel and an 18th century British sailing vessel (FMSF SV#5095). In addition, multiple other magnetic targets were investigated, for which the source of the anomaly was could not determine. A cultural resource marine remote sensing survey at the St. Augustine Entrance Channel was

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☒ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433

☐ Southeast Regional Office (954) 467-4990 • FAX: 467-4991
☐ Northeast Regional Office (904) 825-5045 • FAX: 825-5044
☐ Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

conducted in 2000 by Mid-Atlantic Technology (FMSF SV#6565) identified six magnetic anomalies; however all appears to well outside of the current proposed borrow location. Further consultation with individuals more familiar with the St. Augustine area revealed that during the original borrow action; artifacts dating to the 16th Century were being recovered at the site of the dredge deposition. The origin of these artifacts is unclear, but historical information indicates a strong potential for historic shipwrecks occurring in the vicinity of the proposed borrow area.

Since potentially significant archaeological or historical sites may be present, it is the recommendation of this office that all portion of the proposed project lying outside of these previously survey areas should be subjected to a professional, underwater cultural resource survey. This survey shall include the usage of a magnetometer, sidescan sonar, and sub-bottom profiler of the area. The purpose of this survey will be to locate and assess the significance of historic properties present. The resultant survey report should conform to the specifications set forth in Chapter 1A-46, *Florida Administrative Code*, and will need to be forwarded to this agency in order to complete the process of reviewing the impact of this proposed project on historic properties. The results of the investigations will determine if significant historic properties would be disturbed by this project. In addition, if significant remains are located, the data described in the report and the consultant's conclusions will assist this office in determining measures that must be taken to avoid, minimize, or mitigate adverse impacts to historic properties listed, or eligible for listing in the *National Register of Historic Places*, or otherwise of historic or archaeological significance.

Because this letter and its contents are a matter of public record, consultants who have knowledge of our recommendations may contact the project applicant. This should in no way be interpreted as an endorsement by this agency. The Registry of Professional Archaeologists (RPA) is the national certifying organization for archaeologists. A listing of archaeologists who are RPA Certified Professional Archaeologists is available at www.rpanet.org. It should be noted that not all archaeologists listed on the RPA website are trained to perform the underwater investigations recommended in this letter.

If there are any questions concerning our comments or recommendations, please contact Neal Engel, Historic Sites Specialist, by phone at (850)245-6371, or by electronic mail at nrengel@dos.state.fl.us. We appreciate your continued interest in protecting Florida's historic properties.

Sincerely,

Laura A. Kammerer

for Frederick Gaske, Director and
State Historic Preservation Officer

Xc: Kenneth Craig- Taylor Engineering, Inc.

Enclosures

Planning Division
Environmental Branch

SEP 19 2006

Mr. Frederick P. Gaske
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Gaske:

We have enclosed a revised copy of the draft report, *Submerged Cultural Resources Monitoring Report for the 2005 St. Augustine Beach Renourishment Project* by Lighthouse Archeological Maritime Program. Please review the report and provide us your comments, in accordance with the procedures contained in 36 CFR, Part 800 ("Protection of Historic Properties").

If you have any questions regarding this report, please contact Mr. Tommy Birchett, Archaeologist, at 904-232-3834. A response within 30 days after receipt of this letter would be appreciated.

Sincerely,

Marie G. Burns
Chief, Environmental Branch

Enclosure

Birchett/CESAJ-PD-EC/3834/als 18 Sep 06
Dugger/CESAJ-PD-EC
Burns/CESAJ-PD-E

L:\group\pde\birchett\dStJohnsmonitoringrevisedshpo.doc

Planning Division
Environmental Branch

AUG 2 4 2006

Mr. Frederick P. Gaske
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Gaske:

We have enclosed a single copy of the draft report, *Submerged Cultural Resources Monitoring Report for the 2005 St. Augustine Beach Renourishment Project* by Lighthouse Archeological Maritime Program. Please review the report and provide us your comments, in accordance with the procedures contained in 36 CFR, Part 800 ("Protection of Historic Properties").

If you have any questions regarding this report, please contact Mr. Tommy Birchett, Archaeologist, at (904)232-3834. A response within 30 days after receipt of this letter would be appreciated.

Sincerely,

Marie G. Burns
Chief, Environmental Branch

Enclosure

DBirchett/CESAJ-PD-EC/3834/
RDugger/CESAJ-PD-EC
MBurns/CESAJ-PD-E

L:\group\pde\birchett\dStJohnsmonitoringshpo.doc

Planning Division
Environmental Branch

NOV 1 3 2006

Mr. Robin E. Moore
St. Johns County Planning Division
4020 Lewis Speedway
St. Augustine, Florida 32084

Dear Mr. Moore:

The U.S. Army Corps of Engineers, Jacksonville District, has reviewed the draft report, *Submerged Cultural Resources Monitoring Report for the 2005 St. Augustine Beach Renourishment Project.*

Overall, the draft report is very thorough and informative. Please make the appropriate editorial corrections to the final report as referenced in the enclosed draft. Once corrections have been made, request that you submit 3 copies of the final report to this office.

If there are any questions regarding the comments, please contact Mr. Thomas Birchett at 904-232-3834.

Sincerely,

Marie G. Burns
Chief, Environmental Branch

Enclosure

Birchett/CESAJ-PD-EC/3834/18 13 Oct 06
Dugger/CESAJ-PD-EC
Burns/CESAJ-PD-E
Batoe

L:\group\pde\birchett\fMooremonitoringreport.doc

Dugger PD-E

FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Stuart Appelbaum
Jacksonville District Corps of Engineers
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

September 28, 2005

RE: DHR No.: 2005-9151 / Date Received: August 25, 2005
St. Johns County Shore Protection Project (SPP) Study Area
St. Johns County

Dear Appelbaum:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act* of 1966, as amended, and 36 *C.F.R.*, Part 800*: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (archaeological, architectural, and historical) listed, or eligible for listing, in the *National Register of Historic Places*, assessing the project's effects, and considering alternatives to avoid or minimize effects.

We reviewed the Florida Master Site File and our records for information to be addressed in either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County. We note that a number of recorded shipwrecks are located within the designated study area. This office recommends that these shipwrecks be avoided by all project activities. Therefore, the Florida Master Site File should be contacted at 850/245-6440, in order to obtain information about shipwrecks recorded within the study area's 42 miles of shoreline.

Our review further indicates that the location of the potential sand borrow areas are not identified, other than being shown on the *Enclosure St. Johns County SPP Study Area* as sources A6, A7 and B8. The other source areas that may be developed are unidentified as well. Because the borrow areas have not been surveyed previously, they should be investigated. Therefore, this office recommends that a standard systematic remote sensing survey be performed for the offshore borrow areas in order to avoid potential adverse effect to unrecorded shipwrecks.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6436
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437
☐ Historical Museums (850) 245-6400 • FAX: 245-6433
☐ Southeast Regional Office (954) 467-4990 • FAX: 467-4991
☐ Northeast Regional Office (904) 825-5045 • FAX: 825-5044
☐ Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

Should the borrow areas that may be developed occur on land, we recommend that they be subjected to the standard professional cultural resource survey to avoid possible impact to unrecorded sites. This office looks forward to coordinating with the Jacksonville District Corps of Engineers in the management and protection of historic properties associated with this project.

If there are any questions concerning our comments, please contact Janice Maddox, Historic Sites Specialist, by electronic mail at jmaddox@dos.state.fl.us, or by telephone at 850/245-6333. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

AUG 17 2005

TO THE ADDRESSEES ON THE ENCLOSED LIST:

The U.S. Army Corps of Engineers, Jacksonville District, is gathering information to prepare either an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of St. Johns County, Florida. A reconnaissance report has been completed and resulted in the recommendation to continue the study into the feasibility phase. The most immediate and critical needs of the local communities are to address beach and dune erosion and protect State Highway A1A and environmental attributes. This study will determine the Federal interest in participating in a locally supported, cost-shared shore protection project to address St. Johns County's coastal issues.

The study area, enclosed, covers about 42 miles of shoreline, including approximately 14 miles in two parks managed by the State of Florida. The entire coast of St. Johns County is subject to storm damage and shoreline erosion but two of the three most critically eroding areas are located at Vilano Beach (Reach 1) and Summer Haven Beach (Reach 2). The third critical erosion area is St. Augustine Beach, which was addressed under a previously authorized Shore Protection Project and is not included in this study. Potential sand borrow areas to be investigated are also shown on the enclosure as sources A6, A7 and B8 but other sources may be developed.

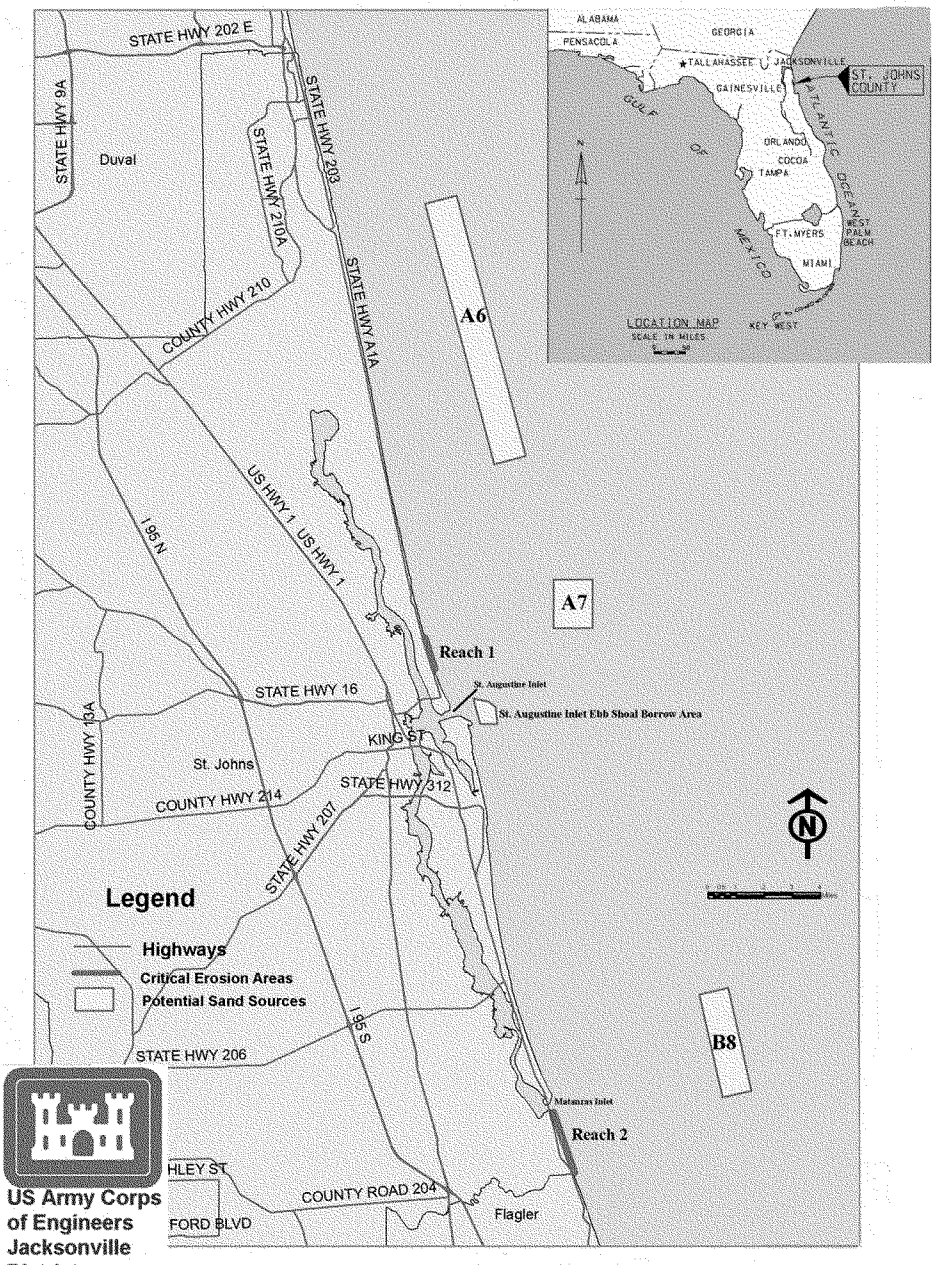
We welcome your views, comments and information about Environmental and Cultural resources, study objectives and important features within the described project area, as well as any suggested improvements. Letters of comment or inquiry should be addressed to the letterhead address to the attention of Paul DeMarco at telephone number 904-232-1897, Planning Division, Environmental Branch and received by this office within 30 days of the date of this letter.

Sincerely,

Stuart J. Appelbaum
Chief, Planning Division

Enclosure

ENCLOSURE St. Johns County SPP Study Area



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue S.
St. Petersburg, Florida 33701

September 13, 2005

Mr. Stuart J. Appelbaum
Chief, Planning Division
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Appelbaum:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the August 17, 2005, scoping letter regarding plans to prepare an Environmental Impact Statement or Environmental Assessment for evaluation of the feasibility providing shoreline erosion protection in St. Johns County, Florida. The study area includes 42 linear miles of shoreline, including 14 miles of public parks. The purpose of the proposed study is to determine federal interest in a cost-sharing project designed to address critical erosion of beaches and dunes, State Highway A1A, and environmental attributes.

General comments

The nearshore waters of St. Johns County supports essential fish habitat (EFH). Sand dredging and placement of sand on beaches would adversely impact these habitats and associated fishery resources. Categories of EFH in the project vicinity include the marine water column, submerged bottom, and marine nearshore and offshore habitats. Federally managed fishery resources associated with these habitats include postlarval and juvenile red drum (*Sciaenops ocellatus*), white shrimp (*Litopenaeus setiferus*), pink shrimp (*Farfantepenaeus duorarum*), and brown shrimp (*Farfantepenaeus aztecus*). Detailed information concerning federally managed fisheries and their EFH is provided in the 1998 comprehensive amendments of the Fishery Management Plans for the South Atlantic Fishery Management Council (SAFMC). The 1998 amendment was prepared in accordance with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (P.L. 104-297). The project area also serves as nursery and forage habitat for other species including black drum (*Pogonias cromis*), Atlantic menhaden (*Brevoortia tyrannus*), and blue crab (*Callinectes sapidus*) which serve as prey for other species (e.g., mackerels, snappers, and groupers) that are managed by the SAFMC, and for highly migratory species (e.g., billfishes and sharks) that are managed by NMFS.

Given the ecological importance of habitats found in the project area, any documents prepared in accordance with the National Environmental Policy Act should include an EFH assessment. At a minimum, the EFH assessment should include a detailed analysis of potential direct, secondary, and cumulative impacts of the proposed action on EFH, managed species, and associated species by life history stage; the Corps of Engineers' views regarding the effects of the proposed project on EFH; a description of all practicable and appropriate measures taken to first avoid and then minimize adverse impacts to EFH and managed species; and an evaluation of potential on-site and off-site compensatory mitigation options. If, during project planning and development, you determine that design features may adversely impact EFH, those impacts and any related mitigation should be fully described in the environmental assessment for the project. Specific requirements concerning activities that may affect EFH are found at 50 CFR 600.920, the regulation to implement the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Descriptions and locations of EFH found along the south Atlantic seaboard can be viewed by going to the website for the South Atlantic Fishery Management Council at www.safmc.net/.

Thank you for providing the opportunity to provide comments early in the planning process. Mr. George Getsinger, at our Marineland Office, is available if further assistance is needed. He may be reached at 9741 Ocean Shore Drive, St. Augustine, Florida 32080, or by telephone at (904) 461- 8674.

Sincerely,

David H. Rackley

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:
EPA, ATL
FWS, JAX
DEP, JAX
FFWCC, TAL
F/SER4
SAFMC

Thomas M. Schmidt
9179 Old A1A South
St. Augustine, FL 32080

September 14, 2005

Mr. Paul DeMarco
Planning Division
Environmental Branch
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Re: St. Johns County Shoreline Protection
Summer Haven Beach (Reach 2)

Dear Mr. DeMarco:

Thank you for inviting comments on this project. My homesteaded residence is 9179 Old A1A South, just to the north of the Reach 2 project area. My house was built in 1895; my great-grandfather bought it in 1899, so my family has witnessed this beach under all sorts of conditions. My comments are as follows:

1. Do not extend the rock revetment.
    a) This is the best remaining turtle nesting site in the County. This key ancient environmental asset should not be sacrificed to the special interests of a few lot and homeowners.
    b) Public beach recreation would disappear – the beach in front of the existing revetment disappears entirely at high tide. The accessible beach to the south of the revetment has been popular since the 1950's. Why should private special interests take this away from the public and other local beach users?
2. There is no entitlement to a road.
    a) by way of background, as you know, after A1A washed away in the 1960's, the state abandoned this location and the county now owns the right of way. The narrow strip of land between the ocean and Summer Haven river was platted early in the 1900's. About 20 houses have been built at the South end of the the Reach 1 area, served by the surviving remnant of old A1A, which joins new A1A near Marineland.
    b) About half a dozen lot owners in the "gap" area without a road have chosen to build houses there. My opinion is that they all should have been denied building permits from the beginning. This is a classic narrow

barrier island, and they built in front of the coastal setback line. They took their chances. The public should not have to bail them out (literally!)

c) Rather than accessing their properties by boat from the river, or by ATVs form the beach at low tide, they selfishly drove heavy vehicles on the dunes, gradually killing the beach grasses, causing erosion that has led directly to the breakthroughs of the Ocean into the Summer Haven River.

d) Driving over protected grasses and dunes is illegal by county, state and federal laws, but despite repeated complaints to the county by me and other residents, no law enforcement action was taken.

e) Driving to the north end of the Reach 2 area was also a trespass, not only over other private lots but also over four lots owned by the county. These lots were donated to the in the 1980s by my mother with the understanding that they would be held for conservation.

f) There is no ancient right of way here. Apparently there was one from the south to the Washington Oaks area. If people wanted to go from there north to Matanzas Inlet, they would have traveled on the beach, which was a half mile wide until the 1920's. My family has known Summer Haven since the 1880's, and have told me that there was no road on the dunes. This makes sense, because there was no road from Anastasia Island to the north until a bridge was built over Matanzas Inlet in 1920.

g) There is no way of necessity. As a lawyer, I know that this common law doctrine will not permit a land-locked owner to cross another owner's land unless there is no other possible access. The cases are quite strict about this. Here there are two possible alternative means of access. There is access by boat from the Summer Haven River. Most homeowners we are concerned with here have already built decks. Secondly, access is possible by ATV over the public right-of-way below mean high water on the beach.

3. There are alternate solutions, much cheaper and more environmentally friendly than building a revetment.

   a) Public safety access for ambulance service can be by A.T.V. Each affected homeowner can park at their cottage an A.T.V., which can travel on the beach. Rescue vehicles have gotten stuck. The ATVs can navigate soft sand. Fire trucks also have gotten stuck. Homeowners can plan for self protection with alarms, fire extinguishers and sprinkler systems. They can also buy generators and pumps to move water from the river in hoses to fight fire. (I note that at my property at the southern end of Summer Haven, the nearest hydrant is over 1,000 feet away, so even houses on the paved road face some of the same issues.)

   b) Beach erosion. The beach renourishments of the last few years have washed away because beach grasses have not been planted immediately in the spring, and irrigated, so that the roots can be established to help hold the sand during the Fall Storms. Nor have "snow fence" drift barriers been set up. The technology and the techniques are known to stabilize beach renourishments. However, the efforts are totally uncoordinated so

that millions in tax dollars are wasted because one agency does its part of the plan and leaves. Unbelievable! The beach can be stabilized to protect the houses.

c) Buy up the vacant lots. I believe in private property rights. Owners should be able to get out what they paid (not "fair market value!") I understand the majority of the vacant lots affected are owned by Mr. McMillan, and some others are available for about $1 million. Southern Realty (904-471-5903) has the details. It would be much cheaper to buy up the lots than build a revetment.

5.Government lack of Co-ordination should not cause loss of this very important environmental and public recreational asset to the special interests of a few property owners. The federal government didn't enforce its barrier island and setback legislation. The state government didn't enforce its dune and beach grasses laws. The county government is finally ordering a building moratorium in this area, when it should have done so long ago. However, the county assessor continues to value lots as if they were available and had road access, which is not fair. I understand there is support from elements of the county government which wish to use its equipment and to grant contracts to build revetments, etc.

6. Conclusion. The very important and significant environmental and public recreational benefits of the existing barrier island should not be ruined by extending a rock revetment and road from Summer Haven to Marineland, at a huge cost in tax money for the benefit of a few homeowners, who built with knowledge of existing conditions. We should heed the lessons of Hurricane Katrina.

Sincerely,

Tom Schmidt

Thomas M. Schmidt

Department of
Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

October 14, 2005

Mr. Paul DeMarco
Planning Division, Jacksonville District
U. S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers – Scoping Notice – Feasibility Study, St. Johns County Shore Protection Project – St. Johns County, Florida. SAI # FL200508241461C

Dear Mr. DeMarco:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the referenced scoping notice.

The Florida Department of Environmental Protection (DEP) notes that construction of the shore protection project will require state water quality certification in the form of a Joint Coastal Permit (JCP) from the DEP Bureau of Beaches and Coastal Systems. The Bureau is very supportive of the feasibility study and is participating in non-federal project cost-sharing. Additionally, initiation of the study is recommended in the 2004 Hurricane Recovery Plan for Florida's Beach and Dune System.

Based on previous studies, the Bureau has no objection to investigating borrow areas A6, A7 or B8 for compatible sand. Geotechnical investigations should be conducted in accordance with the Bureau's requirements for Quality Assurance and Quality Control and comprehensively document the compatibility of sand in the proposed borrow area(s) relative to the existing (natural) beach. Staff is concerned that use of the St. Augustine Inlet ebb shoal as source material for the project may have adverse impacts on the shoreline or the inlet. Prior to permitting use of the shoal as a potential borrow area, "reasonable assurance" must be provided in the form of extensive numerical modeling supported by accurate data.

The beaches at Reach 1 (Vilano Beach shoreline) are comprised of shelly materials, indicating the possible presence of hardbottom communities in the vicinity. A thorough investigation of the nearshore area will be required, as well as an evaluation of alternatives that will protect (or mitigate for unavoidable impacts) those habitats. In addition, the area is sand starved, indicating that structural alternatives would not be particularly effective. There are also rock outcrops on the emergent portion of the beaches and in the nearshore zone south of Reach 2

Florida State Clearinghouse

(Summerhaven). An investigation into the importance of the biological communities surrounding these rock outcroppings, and an analysis of longshore spreading of any fill material, should be conducted in order to evaluate alternatives. Bureau data indicates a mean tidal range of 1.4 m, a longshore transport variation from 112,000 m*3/yr to 336,000 m*3/yr, and the existence of a revetment between R140.5 and R146.

The Bureau would like to participate directly in formulating this feasibility study. They request that Mr. Michael R. Barnett, P.E., be officially placed on the Project Delivery Team. Please continue to coordinate with the Bureau and the Florida Fish and Wildlife Conservation Commission to resolve the above concerns and any outstanding issues regarding listed species protection measures and biological monitoring. For further information on JCP permitting requirements, please contact Mr. Martin Seeling at (850) 414-7728.

Based on the information contained in the notice and the enclosed comments provided by our reviewing agencies, the state has determined that, at this stage, the proposed activity is consistent with the Florida Coastal Management Program (FCMP). The applicant must, however, address the concerns identified by our reviewing agencies prior to project implementation. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Thank you for the opportunity to review the proposed project. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Sincerely,

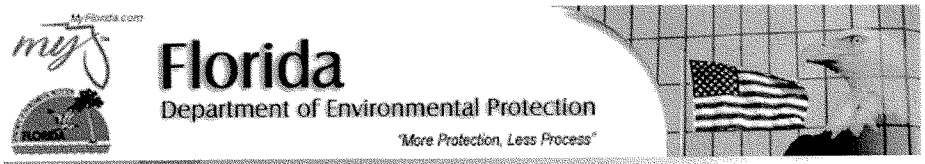
Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Roxane Dow, DEP, BBCS

Florida State Clearinghouse



Project Information	
Project:	FL200508241461C
Comments Due:	09/23/2005
Letter Due:	10/14/2005
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - SCOPING NOTICE - FEASIBILITY STUDY, ST. JOHNS COUNTY SHORE PROTECTION PROJECT - ST. JOHNS COUNTY, FLORIDA.
Keywords:	ACOE - SCOPING NOTICE - ST. JOHNS COUNTY SHORE PROTECTION PROJECT
CFDA #:	12.101

Agency Comments:
NE FLORIDA RPC - NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL
The project is generally consistent with the NEFRC's policies, plans, and programs.
ST. JOHNS - ST. JOHNS COUNTY
COMMUNITY AFFAIRS - FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
No Comments Received
STATE - FLORIDA DEPARTMENT OF STATE
No Comment
ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEP notes that construction of the shore protection project will require Joint Coastal Permit from the DEP Bureau of Beaches and Coastal Systems. The Bureau is very supportive of the feasibility study and is participating in non-federal project cost-sharing. Additionally, initiation of the study is recommended in the 2004 Hurricane Recovery Plan for Florida's Beach and Dune System. Based on previous studies, the Bureau has no objection to investigating borrow areas A6, A7 or B8 for compatible sand. Geotechnical investigations should be conducted in accordance with the Bureau's requirements for Quality Assurance and Quality Control and comprehensively document the compatibility of sand in the proposed borrow area(s) relative to the existing (natural) beach. Staff is concerned that use of the St. Augustine Inlet ebb shoal as source material for the project may have adverse impacts on the shoreline or the inlet. Prior to permitting use of the shoal as a potential borrow area, "reasonable assurance" must be provided in the form of extensive numerical modeling supported by accurate data. The beaches at Reach 1 (Vilano Beach shoreline) are comprised of shelly materials, indicating the possible presence of hardbottom communities in the vicinity. A thorough investigation of the nearshore area will be required, as well as an evaluation of alternatives that will protect (or mitigate for unavoidable impacts) those habitats. In addition, the area is sand starved, indicating that structural alternatives would not be particularly effective. There are also rock outcrops on the emergent portion of the beaches and in the nearshore zone south of Reach 2 (Summerhaven). An investigation into the importance of the biological communities surrounding these rock outcroppings, and an analysis of longshore spreading of any fill material, should be conducted in order to evaluate alternatives.
ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
No comments. The project appears to be located seaward of the Coastal Construction Control Line and would be outside of SJRWMD purview.

For more information please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161

Northeast Florida Regional Council

Bringing Communities Together

Baker • Clay • Duval • Flagler • Nassau • Putnam • St. Johns

September 26, 2005

Lauren Milligan
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Blvd.
Douglas Building - Mail Station 47
Tallahassee, Florida 32399-3000

SAI# FL200508241461C
NEFRC# SJ0001

Program title: Department of the Army, Jacksonville District Corps of Engineers- Scoping Notice- Feasibility Study, St. Johns County Shore Protection Project- St. John's County, Florida.

The Northeast Florida Regional Council has reviewed the above Activity. Response sheets were sent out to notify potentially affected agencies concerning project intentions. There were no endorsements received regarding this application.

This project is generally consistent with the Northeast Florida Regional Council's policies, plans and programs. This letter signifies that the Northeast Florida Regional Council has no objection to the above-cited activity.

Sincerely,

Audrey Smith
Regional Planner

Cc: Stuart J. Appelbaum, Planning Division Chief, Department of the Army, Jacksonville District Corps of Engineers, P.O. Box 4970, Jacksonville, Florida 32232-0019

RECEIVED
SEP 2 8 2005
OIP / OLGA

6850 Belfort Oaks Place • Jacksonville, FL 32216 • (904) 279-0880 • Fax (904) 279-0881 • Suncom 874-0880 • Suncom Fax 874-0881
Web Site: www.nefrc.org • Email: nefrc@nefrc.org
Equal Opportunity Employer

APPENDIX G-4

MAILING LIST

Name	Title	Organization	Address 1	Address 2	City, State, Zip
FEDERAL AGENCIES					
	Executive Director	Advisory Council on Historic Preservation	The Old Post Office Bldg Suite 80	1100 Pennsylvania Ave NW	Washington, DC 20004
	Eastern Regional Office	Bureau of Indian Affairs	545 Marriott Drive	Suite 700	Nashville, TN 37214
Mr. Doug Piatkowski	Bureau of Ocean Energy Manage	Department of the Interior	45600 Woodland Road, VAM-OEP		Sterling, VA 20166
Director of Federal Activities	Chair	Council on Environmental Quality	722 Jackson Place NW		Washington, DC 20006
Mr. Bryant L. Vanbrakle		Federal Aviation Administration	P.O. Box 20636		Washington, DC 20590
Magalie Roman Salas		Federal Emergency Management Administration	500 C Street SW, Room 714		Washington, DC 20472
Regional Director	Insurance & Mitigation Division	Federal Emergency Management Administration	3003 Chamblee-Tucker Rd		Atlanta, GA 30341
DOT Inspector General		Federal Highway Administration	1200 New Jersey Ave. SE		Atlanta, GA 30320
Mr. Douglas Murphy		Federal Highway Administration	227 N. Bronough St.		Tallahassee, FL 32301
Mr. David Vela	Regional Director	National Park Service	100 Alabama Street, SW	1924 Building	Atlanta, GA 30303
Canaveral National Seashore	Superintendent	National Park Service	212 S. Washington Ave.		Titusville, FL 32796-3521
Mr. David Bernhart		NOAA/NMFS - PRD	263 13th Avenue South		St. Petersburg, FL 33701
Mr. Andrew Strelcheck	Deputy Regional Administrator	NOAA/NMFS	263 13th Ave. S.		St. Petersburg, FL 33701
	Office of Constituent Services	NOAA/NMFS - Recreational Fisheries Branch	1315 East West Highway		Silver Spring, MD 20910
Mr. Ryan Hendren	Protected Resources Division	NOAA/NMFS SE Regional Office	263 13th Ave S		St. Petersburg, FL 33701
Mr. Pace Wilber	Atlantic Branch Supervisor	NOAA/NMFS-HCD	217 Fort Johnson Rd		Charleston, SC 29412
		SEC Federal Energy Rd. Comm	888 First St. NE		Washington, DC 20426
		SEC Federal Maritime Commission	800 North Capitol St. NW		Washington, DC 20573
Commander (OAN)		Seventh Coast Guard District	909 SE 1st Ave	Brickell Plaza Federal Building	Miami, FL 33131-3050
Nancy Sutley		U.S. Department of Commerce	HCHB SP Room 6117	14th & Constitution Ave. NW	Washington, DC 20230
		Office of Environmental Policy and Compliance, Atla	75 Spring Street, SW	Suite 1144	Atlanta, GA 30303
	Office of Environmental Policy ar	U.S. Department of the Interior	1849 C Street, NW	Main Interior Building, MS 2462	Washington, DC 20240
	Environmental Protection Agenc	Office of Policy 1804A	1200 Pennsylvania Avenue NW		Washington, DC 20460
Mr. Richard Harvey	South Florida Office	U.S. Environmental Protection Agency	400 N. Congress Ave	Ste 120	West Palm Beach, FL 33401
Mr. Paul Gagliano	Environmental Policy Section	U.S. Environmental Protection Agency, Region 4	61 Forsyth Street SW		Atlanta, GA 30303
Mr. Jay Herrington	North Florida Field Office	U.S. Fish & Wildlife Service	7915 Baymeadows Way	Suite 200	Jacksonville, FL 32256
Regional Director		U.S. Fish & Wildlife Service	1875 Century Blvd	Suite 400	Atlanta, GA 30345-3319
Ms. Cindy Fury	Wildlife Biologist	U.S. Fish & Wildlife Service	7915 Baymeadows Way	Suite 200	Jacksonville, FL 32256
	Southern Region Forester	U.S. Forest Service	1720 Peachtree Road NW		Atlanta, GA 30309
Marge Davenport	Regional Director, Southeast (Ac	U.S. Geological Survey	1770 Corporate Drive	Suite 500	Norcross, GA 30093
STATE/LOCAL GOVERNMENT					
Mr. Robert Bendus	Director	Div of Historical Resources - SHPO	500 South Bronough St		Tallahassee, FL 32399
	FFWCC - FMRI	Division of Marine Resources	100 Eigth Ave SE		St. Petersburg, FL 33701
BOT IITF		FDEP, Division of State Lands	3900 Commonwealth Blvd.	Mail Stop 100	Tallahassee, FL 32399
Office of the Secretary		FDEP	3900 Commonwealth Blvd.	Mail Station 49	Tallahassee, FL 32399
Mrs. Sally B. Mann		FDEP - Office of Intergovernmental Programs	3900 Commonwealth Blvd.	Mail Station 47	Tallahassee, FL 32399
Mr. Chris Stahl		FDEP - State Clearinghouse	3900 Commonwealth Blvd.	Mail Station 47	Tallahassee, FL 32399
Ms. Jane Herndon	Deputy Division Director	FDEP Div. of Water Resource Management	2600 Blair Stone Road	Mail Station 3500	Tallahassee, FL 32399

Ms. Lainie Edwards	Program Administrator	FDEP, Beaches, Inlets & Ports Permitting	2600 Blair Stone Road	Mail Station 3500	Tallahassee, FL 32399
Ms. Carmen Monroy	Director	FDOT	605 Suwannee St.		Tallahassee, FL 32399
Mr. Bob Emerson	State Seaport Manager	FDOT	605 Suwannee St.		Tallahassee, FL 32399
Ms. Nancy Douglass	Migratory Bird Coordinator	FFWCC	3900 Drane Field Rd		Lakeland, FL 33811-1299
Ms. Lisa Gregg	Div. of Marine Fisheries Manager	FFWCC	2590 Executive Center Circle East	Ste 203	Tallahassee, FL 32301
Director		FFWCC - Imperiled Species Management	620 South Meridian Street	Mail Station 6A	Tallahassee, FL 32399
Robbin N. Trindell		FFWCC - Office of Environmental Services	620 South Meridian Street		Tallahassee, FL 32399
		FL Dept of Agriculture & Consumer Services	3125 Conner Blvd. RM 269		Tallahassee, FL 32399
		Florida Coastal Management Program	3900 Commonwealth Blvd.	Mail Station 47	Tallahassee, FL 32399
John Stevely		Florida Cooperative Extension	1303 17th St. West		Palmetto, FL 34221
Mr. David Roach	Executive Director	Florida Inland Navigation District	1314 Marcinski Road		Jupiter, FL 33477-9498
Mr. Press Tompkins			2740 Industry Center Rd.		St. Augustine, FL 32084

ELECTED OFFICIALS

Honorable Marco Rubio		US Senate	316 Hart Senate Office Bldg.	Washington, DC 20510
Honorable Bill Nelson		US Senate	716 HART SENATE OFFICE BUILDING	Washington, DC 20510
Honorable Vern Buchanan		U.S. House of Representatives, Dist. 16	1051 Manatee Ave. West Suite 305	Bradenton, FL 34205
Hon Kathy Castor		U.S. House of Representatives, Dist. 14	4144 N Armenia Ave Suite 300	Tampa, FL 33607
Honorable Travis Hutson		Florida Senate, Dist. 6	4875 Palm Coast Parkway, NW Suite 5	Palm Coast, FL 32137
Rep. Paul Renner		Florida House, Dist. 24	4877 Palm Coast Parkway, NW Suite 1	Palm Coast, FL 32137
Rep. Cyndi Stevenson		Florida House, Dist. 17	3000 N. Ponce De Leon Blvd. Suite 1	St. Augustine, FL 32084
Gov. Rick Scott	Office of the Governor	The Capitol	400 S. Monroe St.	Tallahassee, FL 32399

STAKEHOLDERS/SPECIAL INTEREST GROUPS

Ms. Victoria Tschinkel		1000 Friends of Florida	926 East Park Ave.	PO Box 5948	Tallahassee, FL 32314
	Florida Program Director	Defenders of Wildlife	233 Third Street North	Suite 201	St. Petersburg, FL 33701
		Dredging Contractors of America (DCA)	503 D Street NW	Suite 150	Washington, DC 20001
	Director of the Southeast Office	Environmental Defense Fund	4000 Westchase Blvd.	Suite 510	Raleigh, NC 27607
Thomas Hawkins	Executive Director	Florida Defenders of the Environment	P.O. Box 357086		Gainesville, FL 32635
	Executive Director	Florida Shore & Beach Preservation Assoc	PO Box 13146		Tallahassee, FL 32317
		Florida Wildlife Federation	PO Box 6870		Tallahassee, FL 32314
Mr. John Hammond	Regional Executive Director	National Wildlife Federation	730 Peachtree St. NE	Suite 1000	Atlanta, GA 30308
Alberto Tamayo		OSAT International Cooperation	6550 NW 77th Ct.		Miami, Fl 33166
Mr. George Isiminger	Sr. Director of Engineering, Main	Port Manatee	300 Tampa Bay Way	#1	Palmetto, FL 34221
		Reefkeeper International	2829 Bird Ave.	Suite 5, PMB 162	Miami, FL 33133
Mr. Patrick Rose		Save the Manatee Club	500 N. Maitland Ave		Maitland, FL 32751
		Sea Turtle Conservancy	4424 NW 13th St.	Suite B-11	Gainesville, FL 32609
	Director	Sierra Club - Florida Regional Office	1990 Central Avenue		St. Petersburg, FL 33712
	The Ocean Conservancy	Florida Office	600 1st Ave. North	Suite 301	St. Petersburg, FL 33701
Mr. Robert Dendick		The Nature Conservancy - Florida Chapter	222 S. Westmonte Dr.	Suite 300	Altamonte Springs, FL 32714
		Florida Public Interest Research Group	310 N Monroe St		Tallahassee, FL 32301

TRIBAL/CULTURAL RESOURCE CONTACTS

	Tribal Historic Preservation Office	Poarch Creek Indians - Environmental Dept.		5811 Jack Springs Rd.	Atmore, AL 36502

Ms. Jennifer Johnson		Seminole Nation of Oklahoma	P.O. Box 1489		Wewoka, OK 74884
Dr. Paul N. Backhouse, Ph.D.	Museum Director and Tribal Hist	Seminole Tribe of Florida	Ah-Tah-Thi-Ki Museum	30290 Josie Billie Hwy, PMB 1004	Clewiston, FL 33440
Dr. Brent Weisman		Department of Anthropology	4202 East Fowler Ave.	SOC 104	Tampa, FL 33620
Mr. Bernie Roman		Miccosukee Tribe of Indians	Post Office Box 440021	Tamiami Station	Miami, FL 33144
Mr. Steve Terry		Miccosukee Tribe of Indians	P.O. Box 440021	Tamiami Station	Miami, FL 33144
Mr. Fred Dayhoff	NAGPRA Representative	Miccosukee Tribe of Indians	HC 61 SR 68 Old Loop Road		Ochopee, FL 34141
Mr. Curtis Osceola		Miccosukee Tribe of Indians	P.O. Box 440021	Tamiami Station	Miami, FL 33144
Mr. Rory Feeney		Miccosukee Tribe of Indians	P.O. Box 440021	Tamiami Station	Miami, FL 33144
Mrs. Joyce Bear	Muscogee (Creek) Nation of Okl	Cultural & Historical Tribal Complex	P.O. Box 580		Okmulgee, OK 74447
Mr. Ted Isham	Muscogee (Creek) Nation of Okl	Cultural & Historical Tribal Complex	P.O. Box 580		Okmulgee, OK 74447
The Honorable Roy Cypress	Chairman	Miccosukee Tribe of Indians of Florida	P.O. Box 440021	Tamiami Station	Miami, FL 33144
James M. Erskine	Acting Water Resources Director	Miccosukee Tribe of Indians of Florida	P.O. Box 440021	Tamiami Station	Miami, FL 33144
Guintas	Acting, Fish and Wildlife Director	Miccosukee Tribe of Indians of Florida	P.O. Box 440021	Tamiami Station	Miami, FL 33144
Council of Original Miccosukee Simanolee	Nation Aboriginal People		P.O. Box 1452		Lake Placid, Florida 33862
Chairman James Billie	Seminole Tribe of Florida		6300 Stirling Road		Hollywood, FL 33024
Cherise Maples	Director, Environmental Resourc	Seminole Tribe of Florida	6300 Stirling Road		Hollywood, FL 33024
Patricia Powers	Bose Public Affairs Group		2000 M Street, N.W.	Suite 520	Washington, D.C. 20036

PUBLIC LIBRARIES/MEDIA OUTLETS

St Johns County Public Library - Main Branch	1960 N. Ponce De Leon Blvd.		St. Augustine, FL 32084
St Johns County Public Library - Ponte Vedre Beach	101 Library Blvd		Ponte Vedra Beach, FL 32082

PROPERTY OWNERS

Gary Freeman		
Resident	3801 Woodmere Ln	Middleburg, FL 32068
Resident	3498 Coastal Hwy	Saint Augustine, FL 32084
Resident	20 Ocean Way	Saint Augustine, FL 32080
Resident	3942 A1A S	Saint Augustine, FL 32080
Resident	38662 Chrisholm Pl	Fremont, CA 94536
Resident	11512 Lake Mead Ave #523	Jacksonville, FL 32256
Resident	1324 Tall Maple Loop	Oviedo, FL 32765
Resident	3490 Coastal Hwy	Saint Augustine, FL 32084
Resident	4651 Salisbury Rd Ste 255	Jacksonville, FL 32256
Resident	Po Box 3143	Saint Augustine, FL 32085
Resident	9064 Regina Rd	Jacksonville, FL 32257
Resident	500 San Sebastian View	Saint Augustine, FL 32084
Resident	3358 Jordan Rd	Oakland, CA 94602
Resident	896 Shore Dr	Miramar Beach, FL 32550
Resident	201 Gull Circle	Ponte Vedra Beach, FL 32082
Resident	1125 S Marsh Wind Way	Ponte Vedra Beach, FL 32082
Resident	3109 S Ponte Vedra Blvd	Ponte Vedra Beach, FL 32082
Resident	Po Box 5292	Hollywood, FL 33083
Resident	6962 Almours Dr	Jacksonville, FL 32217
Resident	3885 Saint Johns Ave	Jacksonville, FL 32205
Resident	Po Box 444	Melrose, FL 32666
Resident	4125 Coastal Hwy	Saint Augustine, FL 32084
Resident	4370 Coastal Hwy	Saint Augustine, FL 32084

Resident	77 Almeria St	Saint Augustine, FL 32084
Resident	4800 Beach Blvd Ste 2	Jacksonville, FL 32207
Resident	4382 Coastal Highway	Saint Augustine, FL 32084
Resident	524 Stockton St	Jacksonville, FL 32204
Resident	4348 Coastal Hwy	Saint Augustine, FL 32084
Resident	1124 Nw 107Th Ter	Gainesville, FL 32606
Resident	4430 Coastal Hwy	Saint Augustine, FL 32084
Resident	4336 Coastal Hwy	Saint Augustine, FL 32084
Resident	5640 La Moya Ave	Jacksonville, FL 32210
Resident	1031 St James Crossing Ne	Atlanta, GA 30319
Resident	Po Box 5538	Saint Augustine, FL 32085
Resident	132 Zamora St	Saint Augustine, FL 32084
Resident	4312 Coastal Hwy	Saint Augustine, FL 32084
Resident	45 Last Resort Rd	Black Mountain, Nc 28711
Resident	3574 Waterchase Way	Jacksonville, FL 32224
Resident	1891 Park Ave	New York, NY 10035
Resident	4406 Coastal Hwy	Saint Augustine, FL 32084
Resident	161 Ginger Cake Trl	Fayetteville, GA 30214
Resident	4250 Coastal Hwy	Saint Augustine, FL 32084
Resident	Po Box 51247	Jacksonville Beach, FL 32240
Resident	4150 Coastal Hwy	Saint Augustine, FL 32084
Resident	4240 Coastal Hwy	Saint Augustine, FL 32084
Resident	4170 Coastal Hwy	Saint Augustine, FL 32084
Resident	10 Brookfield Cv	Little Rock, AR 72205
Resident	1107 Lido Rd	Jacksonville, FL 32216
Resident	830 A1A N Ste 13	Ponte Vedra Beach, FL 32082
Resident	3101 Colgan Ct	Saint Johns, FL 32259
Resident	63 Bay View Dr	Saint Augustine, FL 32084
Resident	3834 94Th Ave Ne	Yarrow, Wa 98004
Resident	2809 Forest Cir	Jacksonville, FL 32257
Resident	3978 Coastal Hwy # B	Saint Augustine, FL 32084
Resident	3912 Coastal Hwy	Saint Augustine, FL 32084
Resident	11955 Little Creek Ln	Jacksonville, FL 32223
Resident	1149 Morvenwood Rd	Jacksonville, FL 32207
Resident	2225 Miller Oaks Ct	Jacksonville, FL 32217
Resident	4130 Coastal Hwy	Saint Augustine, FL 32084
Resident	1801 Wedemeyer St Apt 223	San Francisco, CA 94129
Resident	4510 W Dale Ave	Tampa, FL 33609
Resident	3604 E Amanda Ct	Saint Johns, FL 32259
Resident	3890 Coastal Hwy	Saint Augustine, FL 32084
Resident	3870 Coastal Hwy	Saint Augustine, FL 32084
Resident	3860 Coastal Hwy	Saint Augustine, FL 32084
Resident	4617 Ortega Blvd	Jacksonville, FL 32210
Resident	C/O 331 San Juan Dr	Ponte Vedra Beach, FL 32082
Resident	4324 Coastal Hwy	Saint Augustine, FL 32084
Resident	3830 Coastal Hwy	Saint Augustine, FL 32084
Resident	4364 Coastal Hwy	Saint Augustine, FL 32084
Resident	19 Old Mission Ave	Saint Augustine, FL 32084
Resident	2737 Forest Mill Ln	Jacksonville, FL 32257
Resident	3003 Riverside Ave	Jacksonville, FL 32205
Resident	3910A Coastal Hwy	Saint Augustine, FL 32084
Resident	80 N Saint Andrews Dr	Ormond Beach, FL 32174
Resident	1898 S Clyde Morris Blvd Ste 500	Daytona Beach, FL 32119

Resident	3790 Coastal Hwy		Saint Augustine, FL 32084
Resident	2246 Tivoli Ln		Saint Johns, FL 32259
Resident	3840 Coastal Hwy		Saint Augustine, FL 32084
Resident	1217 Coral Way		Coral Gables, FL 33134
Resident	9399 Old A1A		Saint Augustine, FL 32080
Resident	7750 E Misty Ln		Inverness, FL 34450
Resident	Po Box 17705		Jacksonville, FL 32245
Resident	7709 Watermark Ln S		Jacksonville, FL 32256
Resident	9691 Nw 53Rd Dr		Gainesville, FL 32653
Resident	4232 Ortega Forest Dr		Jacksonville, FL 32210
Resident	1680 Tidewater Ln		Navarre, FL 32566
Resident	240 Southland Rd		Palm Beach, FL 33480
Resident	12611 Mission Hills Cir N		Jacksonville, FL 32225
Resident	Beachcomber Resorts	C/O Dep - 3900 Commonwealth B	Tallahassee, FL 32399
Resident	3304 Coastal Hwy		Saint Augustine, FL 32084
Resident	6170 A1A S Unit 223		Saint Augustine, FL 32080
Resident	2133 Sw 70Th Ave		Gainesville, FL 32608
Resident	441 E Woodhaven Dr		Ponte Vedra Beach, FL 32082
Resident	10104 Sw 17Th Pl		Gainesville, FL 32607
Resident	7403 Carmine St		Annandale, Va 22003
Resident	12305 Sw 38Th St		Ocala, FL 34481
Resident	10 W Adams St		Jacksonville, FL 32202
Resident	9337 Old A1A		Saint Augustine, FL 32080
Resident	9745 Touchton Rd Unit 524		Jacksonville, FL 32246
Resident	6349 A1A S		Saint Augustine, FL 32080
Resident	1175 State Road 206 E		Saint Augustine, FL 32086
Resident	2902 Sw 1St Ave		Gainesville, FL 32607
Resident	Hauptstr 95		63931 Kirchzell, Germany 0
Resident	Po Box 2821		Ponte Vedra Beach, FL 32004
Resident	Po Box 600435		Jacksonville, FL 32260
Resident	9349 Old A1A		Saint Augustine, FL 32080
Resident	701 W Broad St Ste 200		Bethlehem, PA 18018
Resident	411 Walnut St Pmb 4194		Green Cove Springs, FL 32043
Resident	3813 Wahoo Dr		Saint Augustine, FL 32084
Resident	5725 Laurel Oak Dr		Suwanee, GA 30024
Resident	4570 Coastal Hwy		Saint Augustine, FL 32084
Resident	4464 Rheims Pl		Dallas, TX 75205
Resident	1548 The Greens Way Ste 4		Jacksonville Beach, FL 32250
Resident	4576 Coastal Hwy		Saint Augustine, FL 32084
Resident	12977 S Highway 475		Ocala, FL 34480
Resident	Po Box 156		Meredith, NH 3253
Resident	4480 Coastal Hwy		Saint Augustine, FL 32084
Resident	12826 W Camelia Bay Dr		Jacksonville, FL 32223
Resident	9121 Old A1A		Saint Augustine, FL 32080
Resident	13054 Mandarin Rd		Jacksonville, FL 32223
Resident	2708 Shawnee Way		Saint Johns, FL 32259
Resident	6916 W University Ave		Gainesville, FL 32607
Resident	420 Lawrence Blvd		Keystone Heights, FL 32656
Resident	1 S Castillo Dr		Saint Augustine, FL 32084
Resident	Po Box 735		Fairburn, GA 30213
Resident	C/O Craig Coffey, County Adm.	1769 East Moody Blvd, Suite 302	Bunnell, FL 32110
Resident	Po Box 780		FLagler Beach, FL 32136
Resident	7853 Hunters Grove Rd		Jacksonville, FL 32256

Resident	Po Box 3402		Saint Augustine, FL 32085
Resident	3105 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	Guana River State Park	C/O Dep 3900 Commonwealth Bl	Tallahassee, FL 32399
Resident	2735 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	11869 Remsen Rd		Jacksonville, FL 32223
Resident	1105 Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	1143 W Roanoke Dr Ext		Fitzgerald, GA 31750
Resident	8406 Kim Rd		Jacksonville, FL 32217
Resident	C/O Pds Tax Services	Po Box 13519	Arlington, TX 76094
Resident	2733 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	3522 Loch Ct		Snellville, GA 30039
Resident	2837 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	Po Box 1172		Ponte Vedra Beach, FL 32004
Resident	4507 Gleneagles Dr		Boyton Beach, FL 33426
Resident	1292 Edgewood Ave S		Jacksonville, FL 32205
Resident	4206 Stacey Rd W		Jacksonville Beach, FL 32250
Resident	2789 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	Po Box 23627		Jacksonville, FL 32241
Resident	1708 Shoreline Pl		Orange Park, FL 32073
Resident	2783 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	1851 Woodmere Dr		Jacksonville, FL 32210
Resident	14600 Sw 136Th St		Miami, FL 33186
Resident	8795 Torrington Dr		Roswell, GA 30076
Resident	1467 Heritage Estates Trce		Jacksonville, FL 32220
Resident	Po Box 10339		Jacksonville, FL 32247
Resident	4623 Empire Ave		Jacksonville, FL 32207
Resident	20270 Nw 100 Avenue Rd		Micanopy, FL 32667
Resident	225 E Church St		Jacksonville, FL 32202
Resident	4841 River Point Rd		Jacksonville, FL 32207
Resident	1100 S Marsh Wind Way		Ponte Vedra Beach, FL 32082
Resident	2759 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	2954 Old Orchard Rd		Jacksonville, FL 32257
Resident	12778 Fenwick Island Ct W		Jacksonville, FL 32224
Resident	2753 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	24543 Deer Trace Dr		Ponte Vedra Beach, FL 32082
Resident	2749 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	7 Bayberry Rd		West Islip, NY 11795
Resident	8954 Regina Rd		Jacksonville, FL 32257
Resident	Le Moulin Dr Beauvoir	La Rue Du Moulin A Vent	Grouville Jersey JE3 9AL, UK
Resident	2741 S Ponte Vedra Blvd		Ponte Vedra Beach, FL 32082
Resident	313 Porpoise Point Dr		Saint Augustine, FL 32084
Resident	199 Oakmont Ct		Sherman, TX 75092
Resident	Wellington Shields & Co	140 Broadway	New York, NY 10005
Resident	D R Repass PA	111 Solana Rd, Unit B	Ponte Vedra, FL 32082
Resident	1724 Ocean Dunes Ter		Daytona Beach, FL 32118
Resident	9097 Old A1A		Saint Augustine, FL 32080
Resident	336 Amelia Ct		Saint Augustine, FL 32080
Resident	6391 Sw 85Th St		Miami, FL 33143
Resident	6730 Strawberry Ln		Jacksonville, FL 32211
Resident	C/O Storage Systems Midwest Inc	N16W23430 Stone Ridge Dr	Waukesha, WI 53188
Resident	271 East River Rd		E Palatka, FL 32131
Resident	8864 Old A1A Hwy		Saint Augustine, FL 32080
Resident	C/O Mark Smith	Po Box 191526	Atlanta, GA 31119

APPENDIX G-5

PUBLIC COMMENTS

Public Comments
St. Johns CSRM Feasibility Study and EA - DRAFT report

#	Commenter	Email	Address	Public comment	Date Received	SAJ Response	Response Date	Action Taken
1	Jim Bonnette	bonnette@aol.com		60-foot berms are only a temporary solution; a large storm could introduce saltwater into the GTMNERR and damage SR A1A; recommends building a jetty on the north side of the St. Augustine Inlet, and possibly a smaller jetty at the north end of South Ponte Vedra Beach. These would cut future maintenance dredging costs. Offered to meet with us to discuss.	2/28/16-3/1/16	The 60-foot berm design was selected because it maximizes net benefits over a 50 year period. The berm will need to be re-nourished every 12 years on average, although the time of re-nourishments may vary depending on the timing of storms and erosion. The design is based on a suite of probable storms that could impact the study area. There is always a residual risk that an unprecedented storm will still cause damages along the coast regardless of the measures implemented. Groins were considered as part of the study, however they were not found to be cost effective in the study area.	08/04/16	no changes made to the report
2	Jack Peter	jpeter@wghof.org	World Golf Hall of Fame & Museum 1 World Golf Place St. Augustine, FL 32092	Does "non-federal" mean that funding outside of the federal government would be the exclusive responsibility of St. Johns County? Or, would the State of Florida be required to supply funding; as State Road A1A is the primary road affected by both the erosion and the beach re-nourishment plan? What entity is ultimately responsibly for nonfederal funding?	02/29/16	The non-fed sponsor is ultimately responsible for the non-federal portion. That said, they are typically able to cost share their portion with the State of Florida along shorelines that the state has designated "critically eroded." The shoreline within the TSP area is critically eroded, as determined by the state.	02/29/16	no changes made to the report
3	Thomas McAteer	tmcateert@bellsouth.net	1823 Fruit Cove Woods Dr. St Johns, Florida, 32259	Generally opposed to the project as a waste of taxpayer dollars; suggests that a better use of these funds would be to move at-risk infrastructure, enact polices to remove at-risk dwellings at the owner's expense, and prevent future development on beaches.	03/02/16	Non-structural methods, including a moratorium on construction and relocation of structures, were evaluated in the study. Please see the Preliminary Screening Matrix included in Chapter 3 for a summary of all measures considered.	07/18/16	no changes made to the report
4	Karen Shields	karenshields7@gmail.com	2849 Ponte Vedra Blvd. Ponte Vedra, FL	Noticed erosion for the last 5 years, which seems to be tied to the dredging of the St. Augustine Inlet and the disruption of the sand bar that acting as a barrier to protect the shoreline; recently installed a retainer wall; supportive of project.	03/05/16	The latest studies conducted on St. Augustine Inlet, ERDC/CHL-TR-12-14: Reports 1, 2, & 3, indicate that inlet maintenance and dredging of the ebb shoal has not caused increased erosion north of the inlet. This analysis in these studies was eventually adopted by the State in the form of the Inlet Management Plan.	08/04/16	no changes made to the report
5	Dorothy Shelley		1724 Ocean Dunes Terrace Daytona Beach, FL 32118	Has owned property at 9033 Old A1A. Remembers rock placed at Summer Haven in 1963. Was a restaurant and parking lot prior to 1967 in front of her home that were washed away. Feels that sand just washes away, and is not a permanent solution to erosion. Notes that she does not recall any sea turtle nests in front of the rocks. Would prefer that permanent and enhanced rock infrastructure is the best solution.	03/08/16	See page 2-1 of Feasibility Study: "Such structures often protect one property while causing accelerated erosion to adjacent, unarmored properties, while cutting off the vital exchange of sand from dunes to the beach during storm events. By accelerating erosion and cutting off the dunes, the structures also negatively impact habitat of species such as nesting sea turtles." See also the section describing the Beach-FX modeling (Rough Order Costs can be found on pg 3-32).	08/04/16	no changes made to the report

6	Barbara Jenness	barbara@barbarajenness.com	313 Porpoise Point Drive St. Augustine, FL 32084	1) Can you tell me if either of these are in the TSP as there is so much to read to determine the location of the 3 miles of shoreline in South Ponte Vedra and Vilano. 2) What are the cost ramifications to the owners? 3) What are the timeframes for placement of sand?	03/28/16	1) Provided a map of the two properties in relation to the proposed beach placement area. Both properties are well north of the placement area in the Recommended Plan. 2) There are no direct cost ramifications to the property owners related to the project (i.e., property owners within the placement area are not asked individually to cost-share in the project, and USACE is not aware of any additional tax assessments). 3) The study is in the feasibility stage. It would need to be approved by USACE and the Assistant Secretary of the Army, and funding would need to be allocated by Congress, before the project could move forward. The base year for initial sand placement used in the report is 2020 (see section 2.4.4 on page 2-54 for more information on this).	03/28/16	no changes made to the report
7	FFWCC			Recognizing that the Summer Haven reach was screened out, commented for awareness that the breached area is now least tern nesting habitat. An FDEP permit issued in 2014 for sand placement on the beach required an ITP from FFWCC for take of these least terns. Any placement in the Summer Haven area would similarly require conditions for the protection of these species.	03/31/16	As the Summer Haven reach was screened out, it is no longer proposed for sand placement.	08/04/16	no changes made to the report
8	John Mark Nolan	jmarknolan@aol.com	Carcaba Road	Long-time resident; concerns about erosion to A1A and recommended beach nourishment as the best alternative compared to relocating A1A.	04/03/16	Noted	08/04/16	
9	John Mark Nolan	jmarknolan@aol.com	Carcaba Road	Concern about ongoing erosion to public beach areas set up at Mussallem Beachfront Park at the end of Carcaba Road, and at North Beach Park. Supports nourishment to protect these public parks.	04/03/16	Noted (unsure if benefits of protecting the wetlands was included in BC Ratio)	08/04/16	
10	Seminole Tribe of Florida	andrewweidman@semtribe.com	30290 Josie Billie Hwy, PMB 1004 Clewiston, FL 33440	No immediate concerns regarding cultural or historic resources. STOF-THPO would like to be consulted prior to project implementation.	04/04/16	Noted	08/04/16	
11	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		Desires federal relief along South Ponte Vedra. Recognizes that they do not meet the requirements for public beach access and parking but argues that the erosion is due to federal projects (St. Aug. Inlet and dredging of shoals). References 1979 Corps study that indicates that 50% of the erosion occuring 5 miles south of the inlet was inlet-induced and that the inlet caused a diversion of sand from both the north and south shorelines.	04/04/16	The latest studies conducted on St. Augustine Inlet, ERDC/CHL-TR-12-14: Reports 1, 2, & 3, indicate that inlet maintenance and dredging of the ebb shoal has not caused increased erosion north of the inlet. This analysis in these studies was eventually adopted by the State in the form of the Inlet Management Plan.	08/04/16	no changes made to the report
12	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		Concern about the designation of the north inlet jetty as a "sand trap groin". The comment states that there is no historical reference that describes the pupose of the north jetty as a sand trap. The jetty is also 75 years old and in poor condition (including leaks).	04/04/16	The 1947 Survey Review Report on St. Augustine Harbor and Vicinity, Florida states "The ocean shore north of the new inlet receded after the channel was cut through. This recession was checked by construction of the sand-trap groin in 1941. The groin impounded sand on its north side from the time of its construction until its impounding capacity was reached in 1943."	08/04/16	no changes made to the report

13	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The study does not consider the need and benefits of tightening and lenthening the north jetty. The structure is in poor condition but improving the jetty is not considered in the management alternatives. It is an obvious means by which to retain sand upon the Vilano Beach shoreline.	04/04/16	Groins were considered as part of the study, however they were not found to be cost effective in the study area. Sand tightening and lengthening the sand-trap groin on the north side of the inlet could impound additional sediment along the beach immediately north of the structure. However, the shoreline immediately north of the structure has been historically stable and infrastructure in this area is set back well landward of the beach, making modifications to this groin unlikely to be justified by storm damage reduction benefits that it would provide.	08/04/16	no changes made to the report
14	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The study concludes that the shorline erosion rates are "consistent" between periods of time but that is due to the periods of time that are selected for comparison.	04/04/16	The 'Historical Volume Change' section on page 22 of the Engineering Appendix shows the variability of volume change over time along the length of the study area. It is understood that the rates of volume change are variable over time and that the rates presented are specific to the periods that were analyzed. The modeling of future erosion in the study area is based on the long term average shoreline change across the entire period from 1972 to 2015. Using a long record provides a better estimate of long-term average trends and minimizes fluctuations that can be induced by high frequency storm events over short analysis periods.	08/04/16	no changes made to the report
15	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The study does not consider the use of the inlet as a sand source for St. Johns County. The sand that is dredged from the inlet is always placed to the south. The IMP recognizes that one-third of the inlet's impact accrues to the north shoreline but the sand is not placed there.	04/04/16	This study uses the inlet system as a sand source, and will address the erosion observed in the placement area north of the inlet.	08/04/16	no changes made to the report
16	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The study does not specify where the sand from the inlet would be dredged from.	04/04/16	The sand source is described in Section 4.2. Material would be obtained from the inlet system, which includes the ebb, flood, and Vilano Point shoals as well as the Federal navigation channel.	08/04/16	no changes made to the report
17	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		A 12-year nourishment interval is "physically improbable" given the severity of the erosion since 2003. The St. Augustine Beach SPP has exhibitted a 6-year re-nourishment cycle. Also, bypassing the sand to the north at half the frequency as to the south (12-years vs 6-years) is not in keeping with the principles in the IMP (2/3 - 1/3 rule)	04/04/16	The average re-nourishment interval associated with the TSP is based on the Beach-fx lifecycle modeling. It is understood that this interval could vary significantly depending on the timing of erosion and storm events. The selection of the TSP was based on maximizing net storm damage reduction benefits. Section 3.10.1 of the main report describes how the TSP volume requirements are consistent with the IMP. The TSP was formulated using the latest economic model which was different from that used for St. Augustine Beach. The site conditions of the TSP in Vilano, a relatively straight shoreline, differ from the protruding headland in St. Augustine, which also factors into the planned average nourishment interval.	07/19/16	no changes made to the report

18	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The study's cost analysis does not clarify if costs of dredge mobilization etc are shared with St. Johns County SPP. What cost efficiencies are gained to both the Vilano Beach and St. Augustine Beach projects if both share the same contract and dredge an offshore borrow source?	04/04/16	Costs of dredge mobilization are not shared with the St. Johns County SPP. Since these projects are not authorized together, USACE cannot guarantee that they would receive funding at the same time thereby capturing the cost savings. However, a rough value added is presented in Chapter 5, Recommendations, if they could be constructed together.	08/16/16	Revisions made to Chapter 5, Recommendations
19	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		Would the overall total and federal costs be reduced if use of an offshore borrow area reduced the erosion from both project segments, and if occasional dredging of the navigation channel by small dredge, or by small hopper and nearshore disposal was undertaken to supplement renourishment of both projects?	04/04/16	We considered initial dredging with the offshore borrow area followed by periodic nourishment from the ebb shoal/inlet for both segments (South Ponte Vedra and Vilano) for several sizes of nourishments. These options were not less costly than using the ebb shoal/inlet as the sole borrow area. We did not model nearshore placement.	08/16/16	no changes made to the report
20	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		It appears there are numerous opportunities for Regional Sand Management that have not been considered in the study. It is not clear why RSM principles are not included within alternatives considered in the study.	04/04/16	The use of the inlet system as a sand source for the Recommended Plan is a method of implementing Regional Sediment Management (RSM). RSM promotes using sediment already in the system, rather than obtain sediment from outside of the sediment system.	08/04/16	no changes made to the report
21	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		SPVVB is concerned that the proposed project does not address the erosion problems along South Ponte Vedra and that the federal cost share is modest along Vilano Beach due to public beach access and parking. We note that the potential federal (and State) cost-share could be incresed by providing some public beach parking at the public street-ends which qualify as public access but otherwise provide no cost-share benefit due to lack of parking.	04/04/16	Concur.	08/04/16	no changes made to the report
22	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		SPVVB is mostly concerned that the proposed project seeks to address beach erosion north of the inlet by continuing the inlet dredging practices that are largely responsible for causing the erosion in the first place. The SPVVB believes that dredging the inlet shoals as a sand source (beyond maintaining the navigation channel) is contributing to the erosion of the adjacent shores.	04/04/16	The latest studies conducted on St. Augustine Inlet, ERDC/CHL-TR-12-14: Reports 1, 2, & 3, indicate that inlet maintenance and dredging of the ebb shoal has not caused increased erosion north of the inlet. This analysis in these studies was eventually adopted by the State in the form of the Inlet Management Plan.	07/19/16	no changes made to the report
23	South Ponte Vedra - Vilano Beach Preservation Association, Inc. (SPVVB)	tturnage@turnageco.com		The IMP is not a directive to use the inlet as a sediment source. Instead it specifies maximum limits for dredging and describes the requisite distribution to the adjacent shores of sand that is ultimately dredged from the inlet, including for purposes of navigation. The IMP also requires investigation of alternate sand sources and north jetty improvements. If the project using offshore sand is not economically favorable by federal standards, then this cannot serve as the justification to use inlet sand that may ultimately lead to further shoreline damage or an endless cycle of costly dredging and renourishment.	04/04/16	The effects of the Future Without-Project Conditions are included in the study in Section 2. As the project at St. Augustine Beach is already authorized, the Future Without-Project Conditions include the use of the inlet system as a sand source for that project.	08/04/16	no changes made to the report

Hershorin, Aubree SAJ

From: Jim Bonnette <bonnette@aol.com>
Sent: Sunday, February 28, 2016 12:32 PM
To: Hershorin, Aubree SAJ
Cc: Jim Bonnette
Subject: [EXTERNAL] South Ponte Vedra Beach/Vilano Beach Florida beach erosion.

Hi Aubree:

I want to comment on the beach erosion. I live on the opposite side of State road A1A in South Ponte Vedra Beach for 17 years. I overlook Guana State preserve and will actually gain from any erosion or water level increase for kayaking, etc. But this does not change my opinion. I care about the people and the long term cost for the Corps. I come from an engineering family and currently have a brother lawyer/engineer in the EPA.
First, we both agree that there is massive erosion in this area. Within ten years homes will fall into the ocean. When you see it for 17 years you get good info. And with a few hurricanes this could be much sooner as you know.
Second, why is this happening. The dredging of the St. Augustine inlet for years has caused the sand to move south away from the affected area. And this will continue. But what we all worry about is how fast with storms. And how do we stop it.
Third, the suggestion of adding 60 foot berms will only be temporary solution. I will get into that later. But with the Corps as you know a solution could take years to start.
Fourth, something only a few people are thinking about. A new storm now could break through to State Road A1A and Salt water would enter into one of Americans best preserves. The EPA can tell you a lot about this Guana preserve that could be ruined. Massive oyster and animal life would be lost forever. The cost to repair this State road and damage would be in the billions as you know with maintenance if storms hit.
Fifth. My solution. Here is come and don't fall off your seat. I have changed a lot of what is done in the US in other areas. 1. Yes we need to fill in the erosion areas. That is simple. 2. But where does all that fill go over years? Into the St Augustine inlet and the Corps then digs that out. 3. We must have a long term solution. To keep the fill and stop the movement of the sand into the St Augustine inlet.
A. A large stone jetty must be built before the St Augustine inlet to hold the fill from moving into the inlet. This was done for the US Navy base Mayport just north of us and many other areas throughout the US. Another smaller jetty my be needed just at the north end of South Ponte Vedra Beach.
B. Land fill in the hundreds of tons must be only filled in after the Jetty is complete.
Aubree, this may at first sound expensive, but it will be a lot less expensive if we do nothing.

Best regards.
Jim Bonnette
145 Yellow Bill Lane
South Ponte Vedra Beach, Florida 32082
Bonnette@aol.com
904-808-8475

Sent from my iPad

From: Hershorin, Aubree SAJ
To: Jack Peter
Cc: Burch, Brandon S SAJ; Schrader, Matthew H SAJ
Subject: RE: [EXTERNAL] St. Johns County Shoreline Erosion (UNCLASSIFIED)
Date: Monday, February 29, 2016 4:39:13 PM

CLASSIFICATION: UNCLASSIFIED

Jack,

The non-fed sponsor is ultimately responsible for the non-federal portion. That said, they are typically able to cost share their portion with the State of Florida along shorelines that the state has designated "critically eroded." The shoreline within the TSP area is critically eroded, as determined by the state.

If you have any further questions, please don't hesitate to contact me.

Best,
Aubree

~~~~~~

Aubree Hershorin, Ph.D.
Environmental Branch, Coastal Section
Planning and Policy Division
U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, FL 32207
Office: (904) 232-2136

-----Original Message-----
From: Jack Peter [mailto:jpeter@wghof.org]
Sent: Saturday, February 27, 2016 1:53 PM
To: Hershorin, Aubree SAJ <Aubree.G.Hershorin@usace.army.mil>
Subject: [EXTERNAL] St. Johns County Shoreline Erosion

Aubree,

I've read the draft study on the plan to protect portions of St. Johns County shoreline and have a question.

The plan states, "Cost sharing for initial construction is 22 percent federal and 78 percent non-federal. The cost sharing for periodic nourishments is 17.7 percent federal and 82.3 percent non-federal."

Does "non-federal" mean that funding outside of the federal government would be the exclusive responsibility of St. Johns County? Or, would the State of Florida be required to supply funding; as State Road A1A is the primary road affected by both the erosion and the beach re-nourishment plan? What entity is ultimately responsibly for non-federal funding?

Thank you in advance for your help.

Jack

Jack Peter, Chairman, St. Johns County Tourism Development Council

Jack Peter
President
~~~~~~

World Golf Hall of Fame & Museum
1 World Golf Place
St. Augustine, FL 32092
904-940-4029 O.
904-612-7877 C.
Blockedwww.worldgolfhalloffame.org
jpeter@wghof.org

CLASSIFICATION: UNCLASSIFIED

From: bonnette@aol.com
To: Hershorin, Aubree SAJ
Subject: Re: [EXTERNAL] South Ponte Vedra Beach/Vilano Beach Florida beach erosion. (UNCLASSIFIED)
Date: Tuesday, March 01, 2016 4:41:30 PM

Thanks Aubree; the only thing I would like to add to the below is this Jetty would cut a lot of the future channel dredging for the Corps and cut future cost.
I do know of other ideas like natural reefs off the coast that could help. All of you are welcome to meet at my home to discuss any time. I travel around the world at least ten times per year so would need a good notice. All I want is it to be done right.
Best regards.
Jim B
Bonnette@aol.com

Sent from my iPhone

> On Feb 29, 2016, at 4:41 PM, Hershorin, Aubree SAJ <Aubree.G.Hershorin@usace.army.mil> wrote:
>
> CLASSIFICATION: UNCLASSIFIED
>
> Mr. Bonnette,
>
> Thank you for your comments. They will be included in the record and addressed in the final report.
>
> If you have any further questions/comments, please do not hesitate to contact me.
>
> Best,
> Aubree
>
> ~~~

> Second, why is this happening. The dredging of the St. Augustine inlet for years has caused the sand to move south away from the affected area. And this will continue. But what we all worry about is how fast with storms. And how do we stop it.
> Third, the suggestion of adding 60 foot berms will only be temporary solution. I will get into that later. But with the Corps as you know a solution could take years to start.
> Fourth, something only a few people are thinking about. A new storm now could break through to State Road A1A and Salt water would enter into one of Americans best preserves. The EPA can tell you a lot about this Guana preserve that could be ruined. Massive oyster and animal life would be lost forever. The cost to repair this State road and damage would be in the billions as you know with maintenance if storms hit.
> Fifth. My solution. Here is come and don't fall off your seat. I have changed a lot of what is done in the US in other areas. 1. Yes we need to fill in the erosion areas. That is simple. 2. But where does all that fill go over years? Into the St Augustine inlet and the Corps then digs that out. 3. We must have a long term solution. To keep the fill and stop the movement of the sand into the St Augustine inlet.
> A. A large stone jetty must be built before the St Augustine inlet to hold the fill from moving into the inlet. This was done for the US Navy base Mayport just north of us and many other areas throughout the US. Another smaller jetty my be needed just at the north end of South Ponte Vedra Beach.
> B. Land fill in the hundreds of tons must be only filled in after the Jetty is complete.
> Aubree, this may at first sound expensive, but it will be a lot less expensive if we do nothing.
>
> Best regards.
> Jim Bonnette
> 145 Yellow Bill Lane
> South Ponte Vedra Beach, Florida 32082
> Bonnette@aol.com
> 904-808-8475
>
> Sent from my iPad
> CLASSIFICATION: UNCLASSIFIED
>

From: Thomas McAteer
To: Hershorin, Aubree SAJ
Subject: [EXTERNAL] St John"s County Shoreline Project Concerns
Date: Wednesday, March 02, 2016 11:30:06 AM

To the Corps of Engineering,

As a long time resident of St John's County (33 years) I am opposed to spending any County, State or federal money on nourishing the beaches of this county or in this state. It is pure fact and part of nature the shorelines and beaches shift and change by normal tides, wind and weather. It is both fruitless and irresponsible to spend any more time or money thinking we can change this.

The homeowners who built so close to the ocean knew the risks of doing so. It should not be the rest of the states' responsibility to fix their problems of an eroding beach front. If your abode is at risk, it should be condemned and the state should help them remove the dwelling and restore that portion of the beach to natural settings. We SHOULD NOT spend our tax money dredging, building walls or anything else to put sand back where nature has moved it.

As far as the infrastructure is concerned, move it. Relocate the roads (A1A) more inland away from the encroachment of the ocean. Use the money allotted for nourishing beach front homes toward moving the infrastructure. Do the studies on longer term erosion to determine which infrastructure locations are at risk and where it is the best place to relocate it for the near and long term. Put a multi-year plan in place that will relocate at-risk infrastructure, monitor the erosion progression, and continue this cycle spending tax money to keep the state/county safe.

Spending any more money on trying to correct or prevent beach erosion is the same as building sand castles on the beach. Looks nice for a while but it won't be very long before you have to do it again. Stop allowing building on the beaches. Enact building codes and policy that will remove dwellings at risk from erosion at the owners expense.

I am opposed to any beach nourishment project from the study (Blockedwww.saj.usace.army.mil/Missions/CivilWorks/ShoreProtection/StJOhns.aspx). It is almost laughable to even call it a "ShoreProtection" project. The only thing this project needs to "protect" is the state/count infrastructure currently at risk of the public safety. This should be a short term solution with the long term goal of relocation to safer locations from erosion. Homeowners on the beach should be told they can not build, erect or change the shorelines in any way. If there abode is at risk, be prepared for it to be condemned and for the shoreline to be restored to it's natural setting.

Sincerely,
Mr. Thomas J McAteer
1823 Fruit Cove Woods Dr.
St Johns, Florida, 32259

From: Karen Shields
To: Hershorin, Aubree SAJ
Subject: [EXTERNAL] Erosion South Ponte Vedra Beach
Date: Saturday, March 05, 2016 8:47:54 AM

Hello

We are homeowners at 2849 Ponte Vedra Blvd Ponte Vedra Fl ,,, we had experienced severe erosion for about the last 5 years and had to
put up a retainer wall.

The erosion is moving south , but it seems to be tied to the dreading of the inlet and the disruption of the natural sand bar that use to act as a barrier to protect the shoreline.

We had a thick vegetated dune and now we have a sparse dune ,,, its so sad to see.

I hope the Army Corp can do something to stop and prevent this ,,,,

The negative impact of this dredging really needs to be reassessed and some
type of re nourishment needs to be in place for help !

Regards
Karen Shields
904 343 0089

700

Dorothy D. Shelley
9033 Old A1A
Summer Haven, Florida 32080

March 8, 2016

Aubree Hershorin, Ph.D
U.S. Army Corps of Engineers
Jacksonville District
Planning and Policy Division, Environmental Branch
PO Box 4970
Jacksonville, FL 32232-0019

Dear Doctor Hershorin:

My name is Dorothy Shelley, and I have lived at Summer Haven located at Matanzas Inlet since 1963. Over the years, I've seen many changes. The oceanfront rocks at the south end of Summer Haven were installed in 1963. This process involved initial excavation and then a layer of small pea rock was placed underneath before placing layers of larger rock. These are the ones that show more than the others at the north end where I live.

My home is at 9033 Old A1A. In front of my house, there used to be a restaurant and parking lot which were washed away. This was before 1967 when I built my house. Several years ago, they pumped sand over from the Intracoastal Waterway and other areas in a beach renourishment project. This sand lasted one season, and then the current washed it into the inlet or some other unexpected location.

As far as the turtles, I haven't seen a turtle nest on the beach in front of the rocks for a long time. Fortunately, we had high numbers of turtle nests all along the Florida coast this year. In front of these rocks, however, it is not a desirable location for nesting turtles. Over time, these heavy rocks have recessed into the sand and I believe have formed a good solid foundation for enhancements. When we have our next storm, I hope the water doesn't come over the rocks and wash away the road. I respectfully request that you do not use sand or other loose material alone to correct the situation. As we have learned, it just doesn't stay, but rather fills up the inlet.

I hope these thoughts will help in your decision-making process. Please use the history of sand movement in the Matanzas Inlet as a guide. Permanent and enhanced rock infrastructure is the only thing that will stand the test of time.

Sincerely,

Dorothy D. Shelley

PS: As I was driving by Marineland the other day, I noticed rocks have recently been added to enhance the durability of the shoreline. Please also consider this. In addition, should you need to contact me, **my mailing address is: 1724 Ocean Dunes Terrace, Daytona Beach, FL 32118.**

From: Barbara Jenness
To: Hershorin, Aubree SAJ
Subject: RE: [EXTERNAL] St. Johns County Coastal Storm Risk Management Project
Date: Monday, March 28, 2016 2:45:37 PM

Thank you for your prompt responses!

<Blockedhttp://BarbaraJenness.com>
Barbara Jenness <Blockedhttp://BarbaraJenness.com> - Licensed Real Estate Broker
ABR, CDPE, CRS, e-PRO, GRI, PMN, TRC
Barbara B. Jenness, P.A.
313 Porpoise Point Drive
St. Augustine, FL 32084

Phone: 904-823-0027 | Fax: 904-823-0028
<Blockedhttp://www.zillow.com/profile/BarbaraJenness/?scrnnm=BarbaraJenness>

Search for Homes: Blockedhttp://www.staugustinemls.com/

Website:Blockedhttp://BarbaraJenness.com
HousingTrends Newsletter <Blockedhttp://BarbaraJenness.housingtrendsenewsletter.com>
Follow Me: <Blockedhttp://www.facebook.com/pages/Barbara-B-Jenness-PA/193566380680967>
<Blockedhttp://linkedin.com/in/BarbaraJenness> <Blockedhttp://www.twitter.com/BarbaraJenness>

----- Original Message -----
From: Aubree.G.Hershorin@usace.army.mil <mailto:Aubree.G.Hershorin@usace.army.mil>
To: Barbara@BarbaraJenness.com <mailto:Barbara@BarbaraJenness.com>
CC: Brandon.S.Burch@usace.army.mil;
Sent: 3/28/2016 2:13:00 PM
Subject: RE: [EXTERNAL] St. Johns County Coastal Storm Risk Management Project

The full template would be from approximately 3200 S. Ponte Vedra Blvd. to 3280 Coastal Hwy. There are 1000 foot tapers at either end, which extend from approximately 3175 S. Ponte Vedra Blvd. to 3216 Coastal Hwy.

From looking at Google Earth, it seems like the full template stops at the southern end of the Serenata Beach Club, and the taper extends north to about where the pool is located.

-----Original Message-----
From: Barbara Jenness [mailto:barbara@barbarajenness.com]
Sent: Monday, March 28, 2016 1:32 PM
To: Hershorin, Aubree SAJ <Aubree.G.Hershorin@usace.army.mil>
Subject: RE: [EXTERNAL] St. Johns County Coastal Storm Risk Management Project

Thank you! Do you have the approximate street numbers for the north and south end of the TSP? Trying to see if Serenata is in the TSP.

<Blockedhttp://BarbaraJenness.com> <Blockedhttp://BarbaraJenness.com >>

Barbara Jenness <Blockedhttp://BarbaraJenness.com> - Licensed Real Estate Broker
<Blockedhttp://BarbaraJenness.com >>
ABR, CDPE, CRS, e-PRO, GRI, PMN, TRC
Barbara B. Jenness, P.A.
313 Porpoise Point Drive
St. Augustine, FL 32084

Phone: 904-823-0027 | Fax: 904-823-0028
<Blockedhttp://www.zillow.com/profile/BarbaraJenness/?scrnnm=BarbaraJenness>
<Blockedhttp://www.zillow.com/profile/BarbaraJenness/?scrnnm=BarbaraJenness>>

Search for Homes: Blockedhttp://www.staugustinemls.com/

Website:Blockedhttp://BarbaraJenness.com
HousingTrends Newsletter <Blockedhttp://BarbaraJenness.housingtrendsenewsletter.com>
<Blockedhttp://BarbaraJenness.housingtrendsenewsletter.com >>
Follow Me: <Blockedhttp://www.facebook.com/pages/Barbara-B-Jenness-PA/193566380680967>
<Blockedhttp://linkedin.com/in/BarbaraJenness> <Blockedhttp://www.twitter.com/BarbaraJenness>
<Blockedhttp://www.facebook.com/pages/Barbara-B-Jenness-PA/193566380680967 >>

----- Original Message -----
From: Aubree.G.Hershorin@usace.army.mil <mailto:Aubree.G.Hershorin@usace.army.mil>
To: barbara@barbarajenness.com <mailto:barbara@barbarajenness.com>
CC: Brandon.S.Burch@usace.army.mil;
Sent: 3/28/2016 12:06:00 PM
Subject: RE: [EXTERNAL] St. Johns County Coastal Storm Risk Management Project

Ms. Jenness,

Thank you for letting me know about the misdirected link. Appendix G1 is attached for your reference. We will hopefully be able to correct the link in the next few days.

In response to your questions:
1) I've attached a map of the two properties you reference in relation to the proposed beach placement area (shown in green). Both properties are well north of the TSP.
2) If I'm understanding your second question correctly, there are no direct cost ramifications to the property owners related to the project (i.e., property owners within the TSP location are not asked individually to cost-share in the project, and I am not aware of any additional tax assessments).
3) The study is in the feasibility stage. It would need to be approved by USACE and the Assistant Secretary of the Army, and funding would need to be allocated by Congress, before the project could move forward. The base year for initial sand placement used in the report is 2020 (see section 2.4.4 on page 2-54 for more information on this).

I hope that answers your questions. If you have any further questions, please don't hesitate to contact me.

Very respectfully,
Aubree

~~~~~~

Aubree Hershorin, Ph.D.
Environmental Branch, Coastal Section
Planning and Policy Division
~~~~~~

U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, FL 32207
Office: (904) 232-2136

-----Original Message-----
From: Barbara Jenness [mailto:barbara@barbarajenness.com]
Sent: Monday, March 28, 2016 9:28 AM
To: Hershorin, Aubree SAJ <Aubree.G.Hershorin@usace.army.mil>
Subject: [EXTERNAL] St. Johns County Coastal Storm Risk Management Project

I received a letter from you and went to the link. I am unable to download Appendix G1---it brings up Appendix F. Please let me know when this is corrected.

I own 2729 S. Ponte Vedra Blvd (vacant lot) and have 2423 S. Ponte Vedra Blvd (vacant lot) listed for sale.
1) Can you tell me if either of these are in the TSP as there is so much to read to determine the location of the 3 miles of shoreline in South Ponte Vedra and Vilano.
2) What are the cost ramifications to the owners?
3) What are the timeframes for placement of sand?
If you can point me to the specific places this is shown in your study I would appreciate it.
Thanks!

Barbara B. Jenness, P.A. <BlockedBlockedhttp://BarbaraJenness.com> <Blockedhttp://BarbaraJenness.com >> <Blockedhttp://BarbaraJenness.com >>
313 Porpoise Point Drive
St. Augustine, FL 32084

Phone: 904-823-0027 | Fax: 904-823-0028

e-mail: Barbara@BarbaraJenness.com <mailto:Barbara@BarbaraJenness.com>
Website: BarbaraJenness.com <BlockedBlockedhttp://BarbaraJenness.com> <Blockedhttp://BarbaraJenness.com >> <Blockedhttp://BarbaraJenness.com >>

<Blocked Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign= sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b>Virus-free.BlockedBlockedwww.avast.com<BlockedBlockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b><https://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b>> <Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=>

<Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content= emailclient&utm_term=oa-2115-v2-b>Virus-free.Blockedwww.avast.com<Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b> <Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b>>

<Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b> Virus-free. Blockedwww.avast.com <Blockedhttps://www.avast.com/sig-email?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient&utm_term=oa-2115-v2-b>

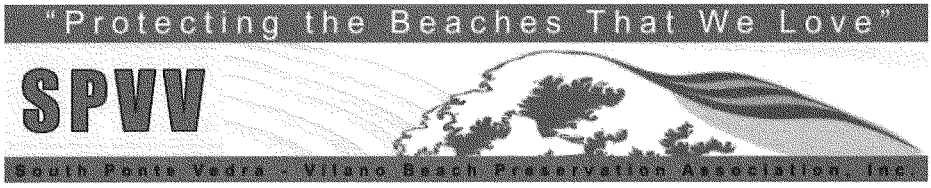
From: Mark
To: Hershorin, Aubree SAJ
Subject: [EXTERNAL] In favor Comment on Vilano Beach Renourishment plan.
Date: Sunday, April 03, 2016 2:45:41 PM

I am a resident of St. Johns County and I have owned property for almost forty years on Carcaba Road which is near the center of the proposed Vilano Beach Renourishment. I have witnessed firsthand the erosion of the seashore towards A1A over those decades. There is some urgency in undertaking this project because it is not a matter of whether the erosion will reach A1A, but how soon. At this time, a large storm probably would compromise about a half mile stretch of current A1A. It is therefore economical and sensible to pursue beach renourishment as a cheaper alternative to rebuilding or relocating the A1A highway. Relocation of A1A to the west in that area would also compromise a fragile coastal wetland environment that the State of Florida, St. Johns County and the Federal Government have sought for decades to preserve.

There is also a great public interest to be served, because of the beach areas that have been set aside for public access and recreation at Mussallem Beachfront Park, at the end of Carcaba Road, and at North Beach Park. Renourishment will preserve and protect these beaches for public use, so once again it makes economic sense to preserve these non-private public beaches, rather than have them continually degrade due to erosion.

I see a lot of positives for implementing the proposed Vilano Beach Renourishment Plan. For the sake of brevity in my remarks I have only focused on the economic sensibility of protecting A1A and the public's access to beaches.

Thank you,
John Mark Nolan



April 4, 2016

U.S. Army Corps of Engineers, Jacksonville District
Planning and Policy Division, Environmental Branch
Attn: Aubree Hershorin, Ph.D.
P.O. Box 4970
Jacksonville, FL 32232-0019
Aubree.G.Hershorin@usace.army.mil

RE: St. Johns County FL – South Ponte Vedra Beach, Vilano Beach, and Summer Haven Beaches.
Coastal Storm Risk Management Project.
Draft Integrated Feasibility Study and Environmental Assessment. February 2016.

Dear Dr. Hershorin:

The following comments are provided on behalf of the South Ponte Vedra – Vilano Beach Preservation Association, Inc. (SPVVB) in regard to the above-referenced Study, and with particular regard to the South Ponte Vedra and Vilano Beach shoreline segments. SPVVB is an association of property owners with homes, lands, and related interests along the St. Johns County shoreline north of St. Augustine Inlet, within the Study area. This shoreline has suffered significant, unprecedented beach erosion beginning about 12 years ago – resulting in substantial property damage, land loss, and resultant coastal armoring.

The Tentatively Selected Plan (TSP) addresses Vilano Beach but provides no federal project recommendation or relief along South Ponte Vedra. We recognize that this finding reflects federal requirements for public beach access and parking. However, this finding fails to recognize that the beach erosion is due, in significant part to prior federal projects; i.e., the relocation of St. Augustine Inlet in 1940 to its present location, the resultant inherent formation of inlet shoals that diverted sand from both inlet-adjacent shorelines, and the over-dredging of the inlet shoals to nourish the St. Johns County (St. Augustine Beach) federal shore protection project since 2003. The Corps' 1979 study concluded that 50% of the erosion occurring 5 miles south of the relocated inlet was inlet-induced. A comparable finding appears relevant to the north shoreline. The formation of the extensive shoals in the new inlet, after 1940, clearly came from the diversion of sand from both adjacent shorelines, without respect to public beach parking.

The Study describes the greatest density of property value and predicted damages are from about R95 to R102. This is immediately north of and excluded from the proposed project limits, presumably owing to public beach access and parking considerations.

The Study repeatedly refers to the inlet's north jetty as a "sand trap groin". We are unaware of any historical reference that describes the north jetty as such. To our knowledge, the north jetty was never intended as a weir-groin, and the inlet was never designed to feature a sand trap nor regular

bypassing there from. It seems unlikely that the north jetty was "designed" to allow sand to deposit in the inlet and create what is now the anthropogenic landform of Porpoise Point. Instead, the north jetty is/was a simple terminal structure, now over 75 years old, derelict, and leaky. If it were to act as a "sand trap groin" then the sand which it leaks would need to be returned to the north shoreline. It seems to make little physical or economic sense to allow sand to pass into the inlet from the north shoreline -- through a "sand trap groin" -- only so that it can be dredged and placed back to the north shoreline from which the sand came.

The Study does not consider the need for -- and the physical, economic and environmental benefit of – sand-tightening and lengthening the St. Augustine Inlet north jetty. Fundamental observation from the beach and aerial photographs indicate that the structure is almost wholly transparent: increasing both shoreline erosion of Vilano Beach and the shoaling of the navigation channel. Improvement to the north jetty is never listed in the considered management alternatives nor considered in the Study; but it is described in the Inlet Management Plan as an alternative to be studied. It is an obvious means by which to retain sand upon the Vilano Beach shoreline that is otherwise lost to the inlet and Porpoise Point and shoals the navigation channel -- thereby potentially reducing renourishment requirements of the updrift shoreline, reducing maintenance dredging requirements, and reducing overall project costs.

The Study concludes that the shoreline erosion rates are "consistent" between periods of time, but that is largely a function of the periods of time that are selected for comparison. In contrast, it is evident that shoreline erosion became problematic along South Ponte Vedra and Vilano Beach after 2003, when large-scale dredging of the inlet ebb shoal began; and erosion appears to peak after inlet dredging events.

The Study does not consider that the use of the inlet as a sand source for the St. Johns County (St. Augustine Beach) federal shore protection project is a potential, principal cause of the beach erosion along South Ponte Vedra and Vilano Beach. To wit, the Corps has dredged St. Augustine Inlet three times in one decade and placed the sand to the south beach for that project: in January 2003 (4.2 mcy), September 2005 (2.8 mcy), and August 2012 (2.2 mcy). That is a total of 9.2 mcy of sand removed from the inlet and placed to the south. Since 2003, and projected to 2017, that equates to 657,100 cubic yards per year. Assuming a 5-year life, the last dredging in August 2012 equates to 440,000 cubic yards per year. Those dredging volumes grossly exceed the IMP's *total* estimated sink effect and bypassing quantities (278,100 cy/yr) by a factor of 2.4 and 1.6, respectively. All of that sand removed from the inlet was placed to the south, and none to the north. Noting that the IMP recognizes that one-third of the inlet's impact accrues to the north shoreline, it is little wonder that the SPVVB beaches – north of the inlet – have exhibited extraordinary increases in beach erosion since 2003 and a consequent proliferation of shoreline armoring.

The Study does not specifically describe where the sand from the inlet would be dredged for purposes of constructing the Vilano Beach project. And, the Study does not include the results of the contemporary monitoring data that are to describe how the inlet (and its borrow areas) have responded to the prior dredging, particularly since the 2012 dredging event.

A 12-year renourishment interval, described for the TSP, appears physically improbable given the severity of the observed erosion since 2003 and the fact that the St. Augustine Beach shore protection project has exhibited a 6-year renourishment requirement. Further, bypassing sand to the north at half the frequency as to the south (i.e., 12-years versus 6-years) is not in keeping with the principles of the Inlet Management Plan. It would ostensibly allow a sand deficit to accrue along the north shoreline at twice the duration as along the south shoreline.

The Study's cost analysis does not clarify if costs of dredge mobilization etc. are shared with the St. Johns County (St. Augustine Beach) shore protection project. What cost efficiencies are gained to

both the Vilano Beach and St. Augustine Beach projects if both share the same contract and dredge, and/or an offshore borrow source? Would the overall total and federal costs be reduced, particularly if use of an offshore borrow area (in lieu of an inlet borrow area) reduced the erosion from both project segments – and if occasional dredging of the navigation channel by small dredge, or by small hopper & nearshore disposal was undertaken to supplement renourishment of both projects? It appears that there are numerous opportunities for Regional Sand Management (RSM) that have not been considered in the Study. It is not clear why RSM principles are not included within the alternatives considered in the Study.

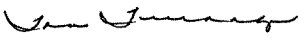
SPVVB is concerned that the proposed project does not address the erosion problems along South Ponte Vedra and that the federal cost share is modest (22% for initial construction and 17% for renourishments) along Vilano Beach, principally because of public beach access and/or parking. We note that the potential federal (and State) cost-share could be increased by providing some public beach parking at the public street-ends which qualify as public access but otherwise provide no cost-share benefit due lack of parking (though we recognize that this is not within the scope of federal actions).

Overall, SPVVB is mostly concerned that the proposed project seeks to address beach erosion north of the inlet by continuing the inlet dredging practices that are largely responsible for causing the erosion in the first place. We believe that continued use (dredging) of the inlet shoals as a sand source – beyond that fundamentally necessary to maintain the navigation channel – is substantially contributing to the erosion of the adjacent shores. It therefore appears to make little physical sense to address a problem by exacerbating its root cause; i.e., by continuing to dredge the inlet beyond the navigation requirements.

The Inlet Management Plan is not, or should not be, a directive to use the inlet as a sediment source. Instead, it specifies maximum limits for dredging and describes the requisite distribution to the adjacent shores of sand that is ultimately dredged from the inlet; i.e., including for purposes of navigation. The IMP also requires investigation of (i) alternate sand sources and (ii) north jetty improvements. Both features would benefit the Study area shoreline. If a project using offshore sand is not economically favorable by federal standards, then this cannot serve as the justification to use inlet sand that may ultimately lead to further shoreline damage or an endless cycle of costly dredging and renourishment. Offshore sand sources of at least 30 million cubic yards (developed) are available, as described in the Study. The ultimate, overall least cost solution is to simply stop using the inlet as a sand source; viz., to reduce the influx of sand past the north jetty and to stop dredging the inlet beyond that which is necessary for maintenance of the navigation channel.

Please do not hesitate to contact me at tturnage@turnageco.com if you have any questions regarding these observations, and thank you for the opportunity to offer these comments.

Sincerely,



Tom Turnage
South Ponte Vedra–Vilano Beach Preservation Assn., Inc.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

DEC 0 1 2016

The Honorable Marco Rubio
United States Senate
201 S. Orange Avenue, Suite 350
Orlando, Florida 32801

Dear Senator Rubio:

This is in response to your letter, dated October 31, 2016, relaying concerns of your constituents, Mr. and Mrs. Guy Rasch of Ponte Vedra Beach, St. John's County, Florida. Mr. and Mrs. Rasch expressed concern about the impact of Hurricane Matthew on the northeast coast of Florida in the South Ponte Vedra beach area.

The Jacksonville District of the U.S. Army Corps of Engineers is currently conducting the St. Johns County Coastal Storm Risk Management feasibility study. The study is examining the feasibility of providing a project to address erosion problems and reduce the potential storm damage susceptibility of structures along the Atlantic Coast shoreline in St. Johns County.

The tentatively selected plan for this project includes beach and dune nourishment within the Vilano Beach reach and a small portion of the South Ponte Vedra Beach reach. The design includes construction of a 60-foot equilibrated berm extension along 2.6 miles of shoreline. The project template will also include a dune feature varying in height between 14 and 20 feet, reflecting the average dune position from the year 2015. One thousand foot tapers will extend from the northern and southern ends of the berm extension, connecting the extension to the existing shoreline. The addition of tapers results in sand placement along three miles of shoreline. The tentatively selected plan does not include armoring.

The feasibility study is currently scheduled to be completed and a Chief of Engineers Report signed in May 2017. Once the Corps completes the report, funding will be needed to design the project and Congress will need to authorize construction of the project. Funds to design and construct the recommended plan are subject to future congressional appropriations.

I hope this response has adequately addressed your concerns and questions related to this matter. If you have additional questions, please contact me or a member of your staff may contact Ms. Stacey Brown, Deputy Chief, South Atlantic Division Regional Integration Team, at (202) 761-4106.

Sincerely,

James C. Dalton, P.E.
Director of Civil Works