



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

AUG 28 2018

CECW-SAD

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Jupiter Carlin Segment of the Palm Beach County Shore Protection Project, Final Integrated Section 934 Report and Environmental Assessment

1. Purpose: To provide for your review and approval the Final Integrated Section 934 Report and Environmental Assessment for the Jupiter Carlin Segment of the Palm Beach County Shore Protection Project. This report was prepared in response to Section 156 of the Water Resources Development Act (WRDA) of 1976 (Public Law (PL) 94-587), as amended by Section 934 of the WRDA of 1986 (PL 99-662) (often referred to simply as "Section 934") which authorized the Secretary of the Army to extend the nourishment period by up to 50 years, potentially allowing federal participation in the Jupiter Carlin Segment of the Palm Beach County Shore Protection Project to be extended to 2045. This report constitutes the final report in response to this legislation.

2. Background: The Jupiter Carlin Segment of the Palm Beach County Shore Protection Project was authorized under Section 101 of the Rivers and Harbors Act of 1962 (PL 87-874), approved by Senate Committee Resolution dated 23 October 1962 and House Committee Resolution dated 23 October 1962 (Chief of Engineers Report issued on 08 May 1961). The government and the non-federal sponsor entered into a Project Cooperation Agreement, dated 21 May 1995, for construction of the initial fill of the Jupiter Carlin Segment of the Palm Beach County Shore Protection Project.

3. Discussion:

a. The recommended beach fill template is defined as a 0-foot extension of the project baseline (the 1990 mean high water line) at an elevation of +7.5 ft-NAVD88. Project slopes include a foreshore slope of 1V:10H above mean low water (MLW) that transitions to a nearshore slope of 1V:25H from MLW to the intersection with the existing profile. Planned project nourishments consist of a 30-foot advance/sacrificial berm placed at an average periodic nourishment interval of every six years. The average volume of each nourishment interval was calculated to be approximately 193,000 cubic yards for the four nourishment events expected throughout the remaining 26-year period of analysis.

b. Palm Beach County, Florida, represented by the chairperson from the Palm Beach County Board of Commissioners, is the non-federal cost-sharing sponsor for the project. Based on fiscal year (FY) 2018 price levels, the estimated project total cost is

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\$47,551,000, which includes the cost of four periodic nourishment events for the extended period of federal participation. The total project cost includes an estimated \$153,000 associated with lands, easements, rights-of-way, relocations, and dredged or excavated material disposal, consisting entirely of federal administrative costs for project real estate planning and review. The total estimated federal and non-federal shares of the project cost are \$29,957,000 and \$17,594,000, respectively, which equates to 63.0% percent federal and 37.0% percent non-federal, as apportioned in accordance with the cost sharing provisions of Section 103(d) of WRDA 1986. The estimated cost for operations, maintenance, repair, replacement, and rehabilitation of the project (OMRR&R) is \$10,000 per year. OMRR&R is a 100% non-federal cost.

c. Based on FY 2018 price levels, a 2.75-percent discount rate, and a 26-year period of analysis, the total equivalent average annual costs of the project are estimated to be \$2,082,000. The average annual equivalent benefits are estimated to be \$3,097,000, which include incidental recreation benefits of \$1,864,000. The average annual net benefits are approximately \$1,014,000 and the benefit-to-cost ratio is 1.5.

d. 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. 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 the Jupiter Carlin Segment of the Palm Beach County Shore Protection Project over the 26-year period of analysis. 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.

e. 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 provided guidance in the form of Engineering Regulation 1100-2-8162. Three estimates are required by the guidance: a Baseline estimate representing the minimum expected sea level change, an Intermediate estimate, and a High estimate representing the maximum expected sea level change. Sea levels could rise by 0.2 feet (baseline), 0.4 feet (intermediate), and 1.0 feet (high) over the next 26 years. 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.

f. In accordance with the USACE Engineering Circular 1165-2-214, review of all technical, engineering and scientific work in decision documents underwent an open, dynamic and vigorous review process to ensure technical quality. This included District Quality Control, Agency Technical Review, Major Subordinate Command review, Policy

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and Legal Compliance Review, and Cost Engineering Mandatory Center of Expertise for Civil Works Review and Certification. All comments and concerns from these reviews have been addressed and incorporated into the final report. The requirement to perform Independent External Peer Review was waived since there was no Environmental Impact Statement for the study, it had negligible adverse impacts to the environment, and is not controversial.

4. Conclusion and Recommendation: I have reviewed the Final Integrated Section 934 Report and Environmental Assessment for Jupiter Carlin Segment of the Palm Beach County Shore Protection Project. Based on this review, I find the proposed plan is technically and environmentally sound, justified based on the monetary and non-monetary benefits it provides, and is socially acceptable. The proposed projects complies with applicable USACE planning procedures and regulations. Also, the views of interested parties, including federal, state, and local agencies, have been considered. Accordingly, I recommend approving the subject report, thereby extending federal participation in periodic renourishments of the authorized Jupiter Carlin Segment of the Palm Beach County, Florida Shore Protection Project up to 2045, and delegating signature of the Finding of No Significant Impact to the Jacksonville District Commander.



JAMES C. DALTON, PE
Director of Civil Works

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