

Bakers Haulover Inlet: Revised Management Plan and Pre-Construction Beach and Wave Monitoring

Proposal to: Florida Inland Navigation District

Jupiter, Florida

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Proposal Summary

Miami-Dade County proposes a waterway improvement project at Bakers Haulover Inlet in order to facilitate public navigation and provide better public waterway access for fishing and sightseeing at Haulover Park by extending the north inlet jetty. The extended jetty would also impound the southward flowing sand in the littoral drift system, which would minimize dredging operations of the flood tidal delta/shoal that extends into the Intracoastal Waterway (ICW). Pre-construction beach and wave monitoring is necessary in order to establish baseline conditions for comparison to the post-construction wave field and sediment transport patterns in the navigational inlet, including both the ebb and flood tidal deltas/shoals.

Introduction

Bakers Haulover Inlet was first constructed in 1925 to service recreational boaters and provide better flushing of Biscayne Bay. This inlet is characterized by very high current velocities (e.g., estimated at 1 m/s), which have scoured the channel to bedrock.

Sediment entering the inlet, largely because of the dominantly southerly littoral drift, is carried inside the inlet to form a large flood tidal delta/shoal. During falling tides, beach sediment moved into the inlet is jettied offshore to form the lunate-shaped ebb tidal delta/shoal (Figure 1). Both shoals have been utilized to bypass sand to downdrift Bal Harbor Beach.

The longshore sediment transport rate at Bakers Haulover Inlet is estimated at 24,000 cubic yards per year albeit no wave and sediment transport measurements have been conducted. Flood shoal deposits spill over into the Federally-maintained Intracoastal Waterway (ICW), which requires frequent maintenance dredging in order to maintain navigability. Lengthening of the north jetty will serve as a fishing “pier” and impound the southward-flowing transport of sand for more efficient bypassing to downdrift beaches.

Revision of Bakers Haulover Inlet Management Plan requires field studies to better understand the wave and beach dynamics. Estimates of longshore sediment transport are based on deterministic models because actual measurements of nearshore wave characteristics have not yet been undertaken.

Proposal

The Lidar bathymetric image of the ebb tidal delta/shoal at Bakers Haulover Inlet (Figure 1) shows an intricate pattern of sedimentation and little control of sand movement by the short north jetty. The downdrift beaches of Bal Harbor and Surfside are critically erosional areas because of inlet dynamics. It has been proposed to use this large sand shoal to nourish these beaches, but there is a concern about causing erosion on the public beach north of the inlet—Haulover Park. In order to determine the wave and tidal conditions that drive the sediment transport system, it is necessary to make nearshore wave and current measurements—which have not previously been undertaken. This information is also critical for establishing baseline conditions prior to any construction (e.g., lengthening of the north jetty) or removal of the ebb tidal delta/shoal.

Ten pressure-transducer wave gauges, five GPS-controlled drifters and two video-cameras will be used to monitor the wave/current and beach conditions.

Budget

The cost of wave/current and beach measurements will be \$150,000 per year for three years.

