PROJECT: Jupiter Inlet Management Plan - Downdrift Volumetric Change Analysis

PURPOSE/GOAL: Monitor effects of 1, 2, and 3 above.

PROJECT LOCATION: Inlet Mouth

PROJECT STATUS: Periodically.

DESCRIPTION:

As required by the Florida DEP, the Jupiter Inlet District has undertaken a comprehensive monitoring plan to determine whether the District's current sediment bypass protocol affords sufficient nourishment to the beaches downdrift of the inlet. Two such reports have been prepared, the first in 1998 to evaluate the short-term effects of the recently completed jetty improvements, and a second, in 2001. The 2001 report, prepared by Taylor Engineering, shows a slight volumetric accretion of sediment in the order of approximately 6,500 cubic yards per year.

Because improvements to the north and south jetties may ultimately result in the need to place less sand on the downdrift beaches, a re-evaluation of the JID sediment budget was undertaken, beginning in 2006 and culminating with a report prepared by the University of Florida Department of Civil and Coastal Engineering (2008).

Of particular concern have been times when beach nourishment is "due", but as a result of low rate of sand influx, the trap is not ready, i.e., not sufficiently filled, for dredging. Although the 60,000 cy per year sand placement requirement can be expected to be fulfilled over a five-year period, on a yearly basis this volumetric rate of placement requirement raises concern when that amount is not available. Accordingly, this issue was revisited. A secondary goal of the study was to examine beach profiles and assess the role of the south jetty as an agent of shore erosion.

To meet the above goals, four sets of tasks were carried out as follows: (1) a field investigation lasting several months to characterize the flow field and the sediment transport regime of the inlet channel leading to the central embayment, (2) acquisition of necessary available data on sediment accumulation/dredging volumes, sand placement (nourishment) volumes and beach profile surveys, (3) assessment of acquired data using two different approaches to determine beach sand gain and loss rates, and (4) estimation of sand transport rates in the inlet channel and the central embayment of the Loxahatchee River, using collected data and numerical modeling of flows and sediment movement.

Based on the above tasks and ensuing observations made in this report, it was recommended:

- The present sand bypassing protocol should be maintained, with minor readjustments, if necessary, in placement location. These adjustments should be based on an assessment of the pre-nourishment shoreline position. A rational approach to track the performance of the protocol would be by developing and examining a sand budget in February/March of each year, based on data reported in the previous (calendar) year. This approach should replace the presently adopted protocol based on a long-term mean sand budget for sand management.

- The south jetty extension should be considered as beneficial to JID's mission of sand management, until such a time that the extension is shown to be a net negative factor in sand management. Periodic evaluation of the role of the south jetty must be made in conjunction with the north jetty, and relative to known impacts of jetties elsewhere in the state.