

SEDIMENTATION STUDY OF THE LOXAHATCHEE RIVER ESTUARY

Summary

In 2000, the Jupiter Inlet District (JID) contracted with the University of Florida to conduct a Sedimentation Study of the Loxahatchee River Estuary. The study was completed in 2003 and presented to the District Board of Commissioners in February, 2004.

The construction of the FEC Railroad Bridge has effectively divided the estuary into two zones. The eastern zone consists of sandy littoral sediment, whose accumulation has been contained by the District's ongoing plan involving periodic dredging and transfer. The central embayment is the principal feature of the western zone, within which sediment consists mainly of fine sand.

At the same time, there has been concern for slow accumulation of organic-rich muck derived from local sources and supplied mainly by two tributaries, the Northwest Fork and the Southwest Fork. Accordingly, the study analyzed the effectiveness of sediment control with specific attention given to dredged traps and channels. This approach was based on the finding that tributary freshwater discharges are too low, even at their peak values, to prevent designed channels from accumulating sediment.

Channel and Trap Alternatives

1. C-18 Trap

This trap was proposed to be placed approximately one mile downstream from the S-46 Structure, at a depth equal to the Canal's original dredged depth. It was rejected based on analysis showing a sediment capture rate of less than 50%.

2. FECRR Trap

The purpose of this trap was to examine its efficiency in capturing sand arriving from the Eastern zone of the estuary through the channel underneath the FECRR Bridge. It was rejected based on how relatively little sediment actually appears to be entering the estuary from the Intracoastal Waterway. This is attributed to the District's decision to enlarge its inlet sand trap in 1993.

3. C-18 Channel North

This alternative consists of dredging the entire canal close to its original depth. Calculations indicated that the resulting channel would have a trapping efficiency of 77%, meaning it would capture 460 tons per year of the 600 tons entering the estuary.

4. C-18 Channel South

This approach represents an attempt to preempt the arrival of sediment downstream of the S-46 Structure. The SFWMD included the maintenance dredging of this stretch of the C-18 Canal as part of its Comprehensive Everglades Restoration Program (CERP).

5. Bay Channel South

This channel would take advantage of the prevailing flood and ebb flow pathways close to the southern rim of the embayment, and thereby provide an efficient means of flushing embayed waters. More can be learned about this option: [C-18 AND SOUTH SHORELINE NAVIGATION CHANNEL EXECUTIVE SUMMARY](#)

6. Northwest Fork Channel

The basis for dredging in this channel would be to draw fine sediment that appears to deposit in this area and thereby prevent its eventual transport into the embayment. However, because the incoming sediment load is low, the shoaling rate would be low as well; thus there seems to be insufficient cause to construct this channel unless and until a time the sediment load increases considerably.

The overall effectiveness of channel alternatives was examined on a qualitative basis by weighing: (1) sediment control, and (2) improvement in navigation for small vessels afforded by these channels. It was concluded that only two alternatives would merit future consideration towards implementation, these being the maintenance of a second navigation channel close to the southern rim of the Central Embayment and the dredging of C-18 Canal. Periodic removal of sediment from either channel should help maintain depths and possibly also the clarity of water in the Central Embayment.

Concluding Comments

According to the study, future decisions concerning sediment management in the estuary would be improved by a program of additional data collection. The study recommends a more detailed survey of the entire estuary within the boundaries of the Jupiter Inlet District every four years, and concurrent pushcore-based data from pre-specified sites.