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Submission Title: Modeled and measured circulation in a complex tidal salt marsh

Reference ID: 0480-001153

Information

Abstract Title* Modeled and measured circulation in a complex tidal salt marsh

Preferred Presentation Type* Oral presentation

Abstract* The Bombay Hook National Wildlife Refuge occupies the largest contiguous tidal salt marsh complex on the western side of Delaware Bay. Over the past century, various alterations to the natural marsh system have been made, including removal of oxbows in rivers crossing the marsh system and the dredging of an artificial entrance channel connecting the bay to an interior creek. During this period, portions of the previously healthy marsh platform have collapsed or are in the process of doing so, leading to the development of extensive tidal mud flats in the interior of the marsh.

We hypothesize that the deterioration of the marsh is due in large part to these anthropogenic influences, which have apparently led to extensive deepening and widening of channels within the system. In order to investigate this problem, we have implemented an unstructured grid model of the entire marsh system using the FVCOM model. The model is driven by current and surface elevations derived from a larger scale model of Delaware Bay, along with local wind input. Data on freshwater input into the system is lacking due to the absence of gauging stations on the small rivers and creeks entering the system as well as the lack of an estimate of connection with groundwater system. In support of the modeling effort, we have deployed up to eight Aquadopp ADCP's in order to assess tidal, subtidal and residual circulation through the main connections to Delaware Bay as well as the within the multiply connected system of channels within the marsh interior. We have also deployed pressure gauges to examine flooding and draining processes over the marsh as well as the development of locally generated wind waves in the areas occupied by tidal flats. In this talk, we will present a synthesis of model and field results aimed at determining mechanisms that could be contributing to net sediment loss to the system.

Theme (1st Choice)* General Topics - Physical

Receipt #: 0480-001153-2000000200

Name: James Kirby

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