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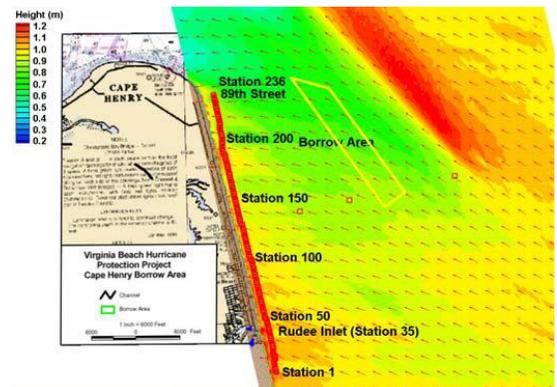
Modeling of Wave Climate and Littoral Transport

Description

Wave modeling investigation was conducted to study the impact of a proposed borrow area on the wave climate and sediment transport potential at Virginia Beach, VA.

Issue

The U.S. Army Corps of Engineers District, Norfolk (CENAO), is preparing an Environmental Assessment for the use of sand sources off the coast of Cape Henry for future maintenance of the Virginia Beach, VA, shoreline. The primary purpose of the project is to maintain a buffer for hurricane protection for structures landward of the existing beach. The Cape Henry Borrow Area is located adjacent to Virginia Beach, and the Atlantic Ocean Navigation Channel. The borrow scenario involved removing approximately 26.1 M³ of material from the borrow area over a period of 50 years. Plan borrow



STWAVE numerical model wave transformation information for Virginia Beach, VA

activities will deepen the existing bottom in the seaward portion of the Cape Henry Borrow Area by 4.3 m over an area of approximately 6.1 sq km.

Products

Offshore wind-wave and swell climate was represented by Wave Information Studies (WIS) hindcast information covering the 10-yr time period 1990-99. Wave transformation from deep to intermediate water depths was performed with the finite difference STWAVE (Spectral Wave) model. A total of 495 wave conditions (5 heights × 9 periods × 11 directions) were modeled as directional wave spectra at the offshore boundary.

Supporting Technology

STWAVE numerical model provides wave transformation information over complex bathymetry, wave-current interaction, local wave growth, and depth- and steepness-induced wave breaking.

Benefits

The study objective was to provide wave climate and potential longshore transport information and analysis for two bathymetric cases: existing bathymetry and Plan 1 that included planned excavation from the Cape Henry Borrow Area. These two cases bracketed the range of expected conditions over the next 50 years and enable assessment of potential project impacts on littoral transport patterns along adjacent beaches.

Sponsors

U.S. Army Corps of Engineers District, Norfolk (CENAO).

Point of Contact

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