Coastal Inlets Research Program

Inlet Engineering Tools:

Engineering tools to examine vessel wake induced channel erosion

Need Determining vessel wake impacts are now a frequent request by District sponsors, stakeholders, and cooperating environmental agencies. The lack of a uniform method to predict vessel waves and wash on adjacent shorelines leads to the application of approximate methods which may prove inaccurate in the long-term. Federal navigation channels support a variety of traffic from large ocean going vessels to recreational craft with corresponding variations in speed, wave energy and vessel traffic density that modulate through time. Predicting the cumulative effect of vessel-generated waves on shoreline stability and water quality requires new algorithms that can isolate vessel wake signatures and classify the associated vessel activity.

Approach
- Numerical modeling – This will involve 2D numerical modeling that includes a vessel simulation. The results will provide statistical error bounds on wake height predictions that will be implemented in a desktop tool.
- Vessel wake analysis software – Acquire time series of water level data to develop an automated vessel wake detection algorithm.
- Tools to analyze AIS data – Develop software that extracts vessel information from the AISAP and Coast Guard databases that can be used to correlate ship operations with vessel wake measurements.

Technical Advancements The following tools are being developed to investigate vessel impacts to shoreline change and water quality.
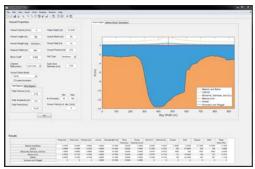
1) Matlab executable program to be used as a desktop tool to estimate vessel wake energy dissipation

2) A new suite of software tools to extract vessel wake power estimates from time series of water level data and cross-reference with AIS to understand the role of vessel operations on shoreline impacts
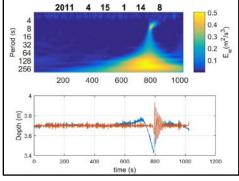
Leveraging Opportunities This work is leveraged against ongoing work in Charleston Harbor and Houston Ship Channel.

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