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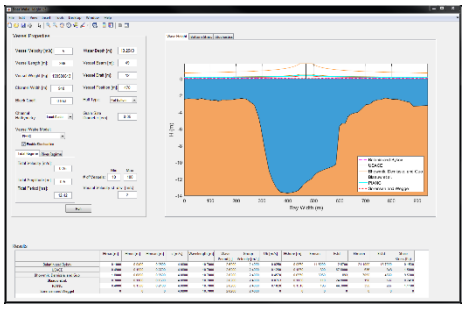
Vessel Wake Prediction Tools (FY20)



Background: District sponsors, stakeholders, and cooperating resource agencies frequently request estimates of navigation channel vessel wake impacts to adjacent resources (e.g., estuarine shorelines, structures). Higher order numerical methods yield detailed information on vessel wake parameters but lower order approaches can provide rapid, initial assessments of the potential impacts and help determine the requirements and needs for a more comprehensive study. 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 are modulated through time. Predicting the cumulative effect of vessel generated waves on shoreline stability and water quality is complex and requires algorithms that can isolate vessel wake signatures and classify the associated vessel activity.

Approach: The purpose of this work unit is to produce simple tools that provide low-level screening alternatives to determine the relative effect of vessels in comparison to other environmental forcing (e.g. wind waves, tides, and river flow).

Technical Advancements:

- A low level desktop screening tool to estimate the cumulative effect of multiple vessels operating in a waterway as well as the average wave, tide or river energy.
- 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.

Payoff: The research will provide new, rapid methodologies to evaluate navigation impacts to at risk shorelines and vulnerable environmental habitats that can aid decision makers in project planning and execution. Tools and techniques developed through this work unit have recently been applied to several projects including a marsh edge erosion study along an ecosystem restoration project in New Jersey, a shoreline change analysis for the Post-45 study in Charleston Harbor, South Carolina, and, a study of sacrificial berm degradation near dredged material management areas along the Houston Ship Channel, Texas.

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