Sediment Transport Modeling for Wind Farm Offshore Virginia (VOWTAP)

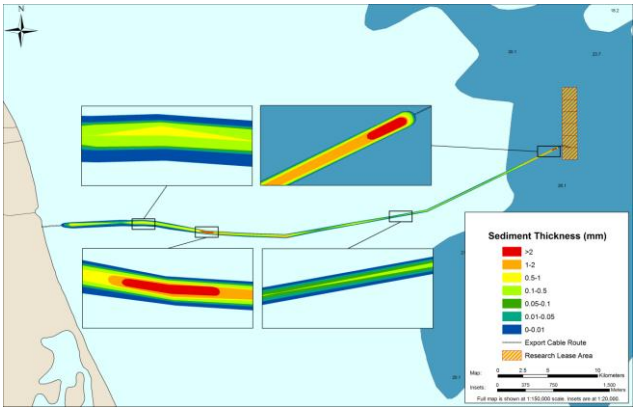
Project Characteristics:

- *Geophysical sampling and surveys, regional current measurements.*
- *Sediment transport analysis*
- *Assessment of the sediment transport potential associated with the installation of a submarine electric cable*

Woods Hole Group performed a sediment transport analysis for the proposed Virginia Offshore Wind Technology Advancement Project (VOWTAP) for Demonstration of an Innovative Offshore Wind System off the Coast of Virginia. The analysis was developed for a planning level assessment of the sediment transport potential associated with the installation of a proposed submarine electric cable via hydraulic jet plowing techniques between the shoreline and the primary site in water depths up to 27 meters approximately 43 km off the shore of Virginia. As the plow is towed by the vessel, the seafloor sediments are temporarily fluidized by high pressure water jets creating a narrow trench, as the cable is simultaneously guided by the plow into the trench.

As a result of the trenching activities, a sediment plume can be mobilized into the water column, potentially impacting benthic and pelagic organisms. The analytical modeling and analysis identified potential environmental impacts associated with the proposed submarine activities, specifically related to the concentration of fine sediments in the water column and the footprint and thickness of sediments deposited on the seafloor. While the majority of fluidized sediment was shown to settle back into the trench to provide cover for the cable, a portion of the fine sediments can remain in suspension under the influence of the ambient currents. The zone of influence was generated by incorporating project-specific parameters of the jetting apparatus/operation, ambient current data, and collected sediment grain size analysis data into the analytical model.

Input information included sediment characteristics from geophysical sampling and surveys, regional current measurements (e.g., CODAR), and output from regional circulation models (e.g., Rutgers/ROMS).



Map of modeled depositional plume along the proposed cable route.

Results indicated the concentration and settling thickness of the sediment plume is dependent on the strength of ambient tidal currents and the volume of fine material mobilized in the trench. The fine particles (<200 µm) can remain in suspension for approximately 6-7 minutes after initial release while coarser particles settle at a faster rate. The fine sediment suspended in this plume settles into a layer on the ocean floor generally less than 1 mm thin, and the maximum deposition is expected to occur roughly 10 to 25m from the trench. The maximum zone of influence on either side of trench varied between 50 meters and 200 meters, but was less than 250 meters.

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