

# Hydrodynamic Characterization and Sediment Transport Potential at the Former Callahan Mine Property, Brooksville, ME

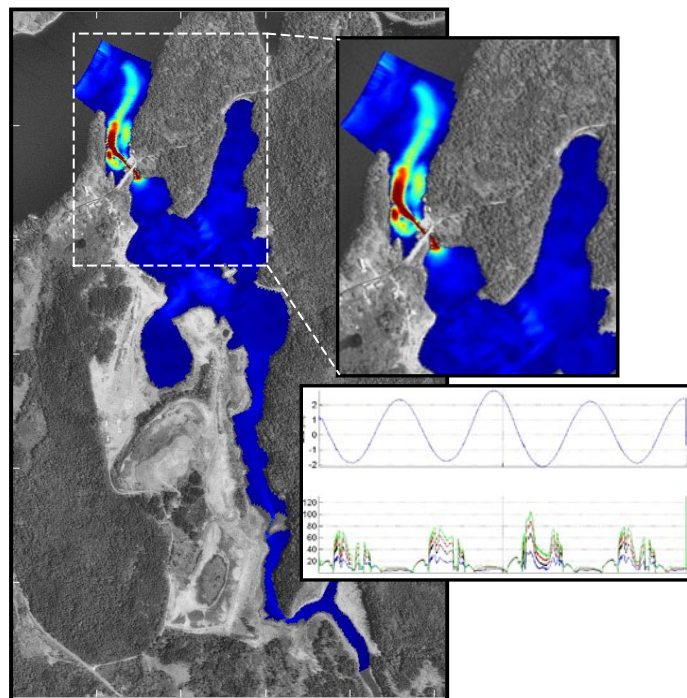
## Project Characteristics

- *Superfund Site RI/FS Support*
- *Current Data Collection Using ADCPs*
- *Freshwater Inflow and Bathymetry Measurements*
- *3-D Hydrodynamic and Sediment Transport Modeling (EFDC)*

The Goose Pond estuary is a site of environmental concern and is classified as a Superfund site on the National Priorities List by the Environmental Protection Agency (EPA). The site is the former location of a zinc/copper open-pit mine where mining operations were conducted adjacent to and beneath the tidal estuary. Woods Hole Group and MACTEC are supporting the Maine Department of Transportation (DOT) for an evaluation of contaminant transport and fate at the former Callahan Mine site connected to the Penobscot River in Brooksville, ME.

MACTEC is preparing a Remedial Investigation/ Feasibility Study to evaluate impacts to sediments and aquatic receptors in the Goose Pond estuary and Penobscot Bay and impacts to soil and groundwater from the former mine site. MACTEC contracted Woods Hole Group to characterize the hydrodynamics and transport processes within the flooded former mine property influenced by the tides of Penobscot Bay. The project consists of a field data collection program, and the development of a three-dimensional hydrodynamic and sediment transport model to evaluate overall circulation patterns and transport within Goose Pond.

Water level, salinity, and current speed/direction data were collected and used to characterize baseline conditions at the site. A three-dimensional (3-D) numerical model (EFDC) was then applied to simulate current velocities and the potential for sediment transport within the estuary, as well as between the estuary and the Penobscot River.



Unique aspects of the site to be incorporated into the model included the former mine, a now-flooded pit in the estuarine system with depths up to 300 feet, a former earthen dam upstream of the mine, a large tidal range coupled with low-lying areas and adjacent wetlands requiring wetting and drying capabilities, as well as Goose Falls, a tidally influenced reversing waterfall that connects Goose Pond with Penobscot Bay.

The model was calibrated and verified using collected field data. The model was then applied to simulate return period storms to assess the potential for sediment mobility under extreme conditions. The model results are being factored in to an evaluation of remediation activities.