Herring River Estuary Restoration Project
Wellfleet, MA

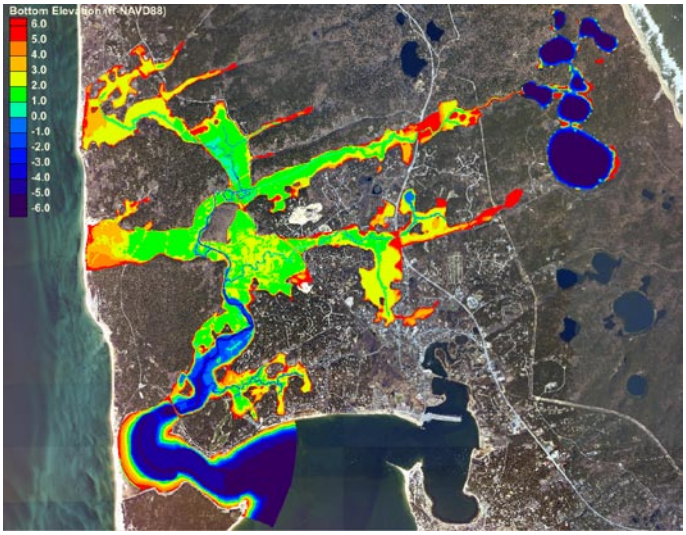
Project Characteristics:

- *Hydrodynamic Numerical Modeling*
- *Salinity Modeling*
- *Modeling of Hydraulic Structures*
- *Salt Marsh Restoration*
- *Restoration Alternatives Analysis*
- *Detailed Model Output and Visualizations*

This project involves restoring the Herring River Estuary System, which represents a significant floodplain (the largest estuary on outer Cape Cod). The restoration is geared towards developing a plan to restore up to 1,000 acres of wetland area. The overall goal of the Herring River Restoration Project is to create a productive environment that will sustain itself with improved water quality and a strengthened ecosystem by restoring tidal flow to the estuary. The success of the project largely depends on a comprehensive restoration plan.

Woods Hole Group was contracted to develop a comprehensive hydrodynamic and salinity model that is central in development of the restoration plan. This high resolution (2 meter scale) and complex model allows for evaluation of specific questions about the potential changes to surface water flow, velocity, and salinity levels within the estuary. The model is also applied to numerous alternative restoration scenarios to assess potential restoration gains, upland flooding concerns, improved salinity distribution, etc.

The Chequesset Neck Road Dike located at the entrance to Herring River.



Numerical modeling grid with associated elevations.

The model incorporates complex hydraulic structures to simulate and design an appropriate system of dikes, culverts, and road crossings. The restoration approach included evaluation and selection of the best model for application to the Herring River Estuary, code development, model set-up, calibration, and verification, and simulation of a range of physical conditions (e.g., sea level rise, storm conditions). The complex numerical modeling simulates both the hydraulics of the system and the salinity distribution throughout the estuary. The model results are used to assess restoration alternatives as well as design new engineering openings and water control structures. Following completion of the model, 3-D interactive animations and visualization tools were developed within Google earth showing the response of the system to various alternatives.

The project also involved significant coordination with the Herring River Technical Committee, the Town of Wellfleet, a Model Advisory Committee, and local stakeholders.

WOODS HOLE GROUP