

# Hydrological Feasibility study and Post Construction Assessment of Tidal Restoration Stony Brook, Brewster, MA

## Project Characteristics:

- *Wetland Restoration*
- *Field Data Collection Program*
- *Development and Calibration of a Two-dimensional Numerical Circulation Model*
- *Evaluation of Restoration Alternatives*
- *Post construction monitoring and characterization for estuary.*

The Stony Brook estuary is an historic herring run that also leads to a 32-acre salt marsh on the south side of Rte. 6A in Brewster, MA. The marsh has deteriorated over the years due to inadequate tidal circulation, impedance by the Route 6A causeway and the defunct and undersized culverts

Initially the project consisted of a field data collection program, development and calibration of a two-dimensional numerical circulation model using the Environmental Fluid Dynamics Code (EFDC), and the application of the calibrated model to conduct an alternatives analysis aimed at restoring tidal flow to the Stony Brook estuarine system.

The hydrodynamics and salinity model was utilized to simulate existing conditions, as well as alternatives involving the replacement of two culvert structures which convey tidal flow under the Route 6A roadway to the upstream/landward portion of the marsh.

The potential benefit and impacts of the each proposed restoration alternative were evaluated including upland flooding, sediment transport/scour of the channel bed or adjacent roadway, effects on drainage/infrastructure, and any effects on migratory anadromous fish. The alternatives were simulated under typical tidal, low-flow, and storm conditions to fully assess their performance and to make a recommendation on how to best achieve restoration with minimal impacts. The recommended alternative was chosen based on its likelihood to restore approximately 15 acres of wetland habitat, and maintain the herring run.



Since 2005, the Stony Brook Restoration Project Team has been guiding this complex restoration project, which was one of 50 projects selected nationwide for funding from NOAA's Habitat Restoration Center and the American Recovery and Reinvestment Act of 2009.

In late 2010, using the guidance and conceptual design of alternatives provided by the Woods Hole Group, the project was designed and constructed successfully, and subsequently won a national award, the Coastal America Partnership Award, presented by President Obama's Administration for its teamwork and effectiveness at restoring ecological function while remaining protective of surrounding infrastructure. The Woods Hole Group was contracted by the Project Team to perform a post-construction hydrologic assessment of the estuary in December of 2011. The assessment, which included a second data collection program and calibrated numerical model evaluation, was completed in July 2012, and reported an improved (restored) tidal regime throughout the estuarine system and was on target with the expectations presented by the pre-construction model simulations.