



Hydrodynamic Evaluation of Tidal Flushing and Design of Replacement Channel Opening

Massachusetts Coastal Zone Management (CZM) Wetlands Restoration Program and the Nantucket Conservation Foundation

Medouie Creek is a coastal salt marsh system that connects to Polpis Harbor on Nantucket and, eventually, to Nantucket Sound. Many years ago, dike roads were constructed to connect formally isolated upland areas, but these roads dramatically reduced the connecting area between the marsh and the harbor. Currently the interior of the marsh receives limited salt water input only during the higher tides of the lunar cycle. The Common Reed (*Phragmites australis*) dominates large areas of the marsh and anecdotal evidence suggests that the reeds have been expanding their influence over the last 30 years. Improving the tidal connection would improve tidal circulation, improve water quality, and help to decrease *Phragmites* presence.

The Horsley Witten Group, Inc. (HW) assisted the Massachusetts CZM Wetlands Restoration Program and the Nantucket Conservation Foundation by evaluating the tidal restriction and providing recommendations for increasing tidal flow to the salt marsh. Field work included the analysis of water levels throughout the marsh area and surveying of topographic features that may limit tidal flow. It was determined that salinity in the marsh is relative low and incoming groundwater flow to the marsh is retained, supporting higher fresh surface water elevations than may have previously occurred.

Next, HW evaluated the feasibility of several options to open a new breach in one of the dike roads, allowing a second tidal connection between the harbor and the marsh. The most cost-effective method selected to increase flushing to the marsh at this location was to excavate the dike road to create a swale that is inundated at high tides with a low flow box culvert installed to convey lower tide level flows. HW successfully reviewed all appropriate permits for the selected alternative including; Massachusetts Department of Environmental Protection Chapter 91 and Water Quality Certification, Army Corps of Engineers, Nantucket Conservation Commission, and the Massachusetts Environmental Policy Act. Finally, HW completed construction plans, bid the project, and oversaw construction which has been successfully completed.

Funding partners include; CZM, the Nantucket Conservation Foundation, the National Oceanic and Atmospheric Administration, the United States Fish and Wildlife Service, and the Natural Resources Conservation Service. Completion certifications were obtained from appropriate funding and permitting agencies.

Client Contact: Tim Smith, Restoration Ecologist
Cape Cod National Seashore (formerly of CZM WRP)
508-487-3262 x107

HW Contact:
Neal Price

www.horsleywitten.com

- Civil & Environmental Engineering
- Wetlands Management
- Coastal Management
- Hydrogeology & Water Supply
- Stormwater Management
- Wastewater Management
- Site Assessment & Remediation
- Land Use Planning
- Education & Outreach



Sandwich, MA

90 Route 6A
Sandwich, MA 02563
tel: 508-833-6600

Newburyport, MA

30 Green Street
Newburyport, MA 01950
tel: 978-499-0601

Providence, RI

370 Ives Street
Providence, RI 02906
tel: 401-272-1717