

White Sands Beach Salt Marsh

Connecticut Department of Environmental Protection
Nonpoint Source Management Program



Success Stories

July 2000



Connecticut Department of Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127 - Arthur J. Rocque, Jr., Commissioner

Functions and Value of Salt Marshes

Salt marshes are coastal wetlands that are subject to the twice-a-day ebb and flood of the tide, and are found along the shores of Long Island Sound and the Sound's many tributaries. Salt marshes are ecological systems with high biological productivity; nutrients stored and recycled within them provide the foundation of the estuarine food chain. The dead leaves and stems of marsh plants enter the water, are broken down by bacteria, and become food for fiddler crabs, worms, snails, finfish, and shellfish. The marshes provide nesting, feeding, and refuge areas for shorebirds and other wildlife, and they store floodwater, stabilize the shoreline, and act as buffers against wave energy. The marshes function as living filters where pollutants are contained, diluted, or stabilized as tidewater and stormwater flow through marsh grass and over mud flats. The vegetation in wetlands helps filter out excess nutrients, which contribute to water quality problems in many coastal areas, including Long Island Sound. The small fish and birds that thrive in healthy salt marshes keep nuisance mosquito populations under control. Salt marshes also provide scenery, and many recreational, scientific, and educational opportunities.



photo by Paul Capotosto

Tidal creek connecting marsh to Long Island Sound

The Resource

White Sands Beach is located in southeastern Connecticut in the town of Old Lyme on the Long Island Sound coastline. The five-acre marsh is separated from Long Island Sound by a 200-300 yard wide barrier beach, and was connected to the Sound's salt water by a tidal creek and an underground culvert. Like many Long Island Sound salt marshes, the White Sands Beach marsh is surrounded by year-round residences, most of which are converted summer cottages. These include several homes which were built on the landward side of the barrier beach, isolating the marsh from the Sound. Although small, the marsh still provides many of the beneficial functions associated with tidal wetlands (see **Functions and Values of Salt Marshes** sidebar).



Environmental Problems

Prior to residential development on White Sands Beach in the 1930s, the salt marsh was connected directly to Long Island Sound by a natural tidal creek, through which salt water entered and freshwater exited the marsh system. Like many other coastal areas in Connecticut, residential development on the barrier beach had effectively blocked most of the flow through the creek. Wetlands were filled, and the creek was altered to pass through a culvert and a tide gate. The tide gate was used to drain the marsh during the summer to prevent mosquito breeding. The reduced tidal flow during the summer months decreased the salt content of the soil and lowered the water table in the marsh. The lower water table caused accelerated soil decomposition and loss of elevation, a process called subsidence. Research has shown that draining salt marshes can cause the release of dilute sulfuric acid, which can make the marsh soils and water very acidic. The leaching of organic material from the marsh depresses oxygen levels in tidal creeks, making it difficult for fish and other aquatic organisms to survive. In effect, these hydromodifications can convert the marsh from a pollution filter to a nonpoint source of pollution (see **Nonpoint Source Pollution** sidebar). The reduced salinity also allowed the marsh vegetation to become dominated by common reed (*Phragmites australis*). *Phragmites* is a non-native, invasive plant that, unchecked, crowds out native plants and reduces wildlife diversity. It can grow to 10-15 feet in height, blocking scenic views and shading out native plants. In addition, the dead shoots of *Phragmites* can persist for several years, accumulating a large volume of combustible material and creating a fire hazard. Other problems associated with the restricted flow of freshwater out of the marsh system included reduced access to the marsh by fish that feed on mosquito larvae, and periodic back-water flooding of several neighboring properties.

Nonpoint Source Pollution

Nonpoint source (NPS) pollution is diffuse in nature, both in terms of its origin and in the manner in which it enters surface and ground waters. It results from a variety of human activities that take place over a wide geographic area. Pollutants usually find their way into waters in sudden surges, often in large quantities, and are associated with rainfall, thunderstorms, or snowmelt. NPS pollution generally results from land runoff, precipitation, atmospheric dry deposition, drainage, or seepage. Hydromodification — physical disturbance to a water resource caused by filling, draining, ditching, damming, or otherwise altering wetlands and stream courses — is also considered a nonpoint source problem.



photo by Paul Capotosto

Daniel Shaw, DEP Wetland Restoration Specialist, prepares the site for the removal of the 18 inch pipe

The Solution

The goal of the White Sands Beach Salt Marsh Restoration Project was to restore the natural functions and values of the five-acre “pocket” salt marsh by increasing the flow of salt water into the marsh from Long Island Sound and fresh water flow out of the wetland. The CT DEP Wildlife Division’s Wetland Habitat and Mosquito Management (WHAMM) Program had demonstrated in several other similar situations that, if salt water flow is restored to a degraded wetland, the *Phragmites* grasses cannot tolerate the increased salinity and will start to die off. The process will continue until the plants have completely died off or receded back to the upland areas, which allows native salt marsh plant and wildlife species to re-establish themselves.



Working with area residents, WHAMM Program staff investigated the site and developed a restoration plan. The plan involved replacing the altered tidal creek and the existing 18-inch diameter, 70-foot long culvert and broken tide gate that connected the marsh with Long Island Sound with a 24-inch diameter, 120-foot long culvert. In addition, the tidal creek channels were cleared of debris and excess sediment. A sign describing the project was erected at the site for educational purposes.



Results

The project was completed in May 1997. Post-construction monitoring by the WHAMM and White Sands Beach Association has determined that the project was successful in increasing the flow of salt water into the marsh and freshwater out of the marsh. They have observed a measurable reduction of *Phragmites* and an increase in native vegetation, fish, and wildlife. Although no water quality sampling has been conducted, it is assumed that the restoration of other natural functions is improving the pollutant-removal capacity of the marsh. Since completion of the project, none of the neighboring residences have been flooded, and the threat of fire has been greatly reduced. The restored salt marsh is also serving as a “living” classroom for local residents.



photo by Paul Capotosto

Replacement of an 18” pipe with a 24” pipe for allowing natural flow into the marsh

CT DEP Wetland Restoration Programs

Connecticut is nationally recognized for its leadership role in tidal wetland (including salt marsh) restoration. Since 1980, the CT DEP Office of Long Island Sound Programs (OLISP) and CT DEP Wildlife Division’s Wetlands Habitat and Mosquito Management (WHAMM) Program have restored or assisted in the restoration of nearly 1,700 acres of formerly degraded tidal wetland. The WHAMM Program was formally established in 1994 and is one of the first wetland habitat restoration programs in the country with dedicated staff and specialized low-ground pressure equipment.

Future Plans

The CT DEP and White Sands Beach Association will continue to monitor the White Sands Beach Salt Marsh to measure the environmental improvements resulting from the restoration project. Lessons learned from this project and others like it will be used to help meet the Long Island Sound Habitat Restoration Strategy goal of restoring at least 2,000 acres of habitat by 2010. These types of habitat restoration projects have been given high priority for funding.





Photo by Paul Capotosto

Educational sign describing project and cooperators

Project Partners and Funding

The White Sands Beach Salt Marsh Restoration Project was a joint effort by the White Sands Beach Association, the U. S. Environmental Protection Agency, and several offices of the CT DEP, including the Bureau of Water Management, the Wildlife Division, and the Office of Long Island Sound Programs (OLISP). The project cost \$15,000, including:

- \$9,000 from an EPA Clean Water Act Section 319 grant awarded by CT DEP; and
- \$6,000 from the CT DEP Coves and Embayments Programs.

Contacts

For more information regarding White Sands Beach Salt Marsh Restoration project and wetland restoration in general, contact:

Paul Capotosto, CT DEP WHAMM Program
(860) 642-7239 paul.capotosto@po.state.ct.us

Stan Zaremba, CT DEP NPS Coordinator
(860)424-3730 stanley.zaremba@po.state.ct.us

Deb Frey, CT DEP NPS Administrative Officer
(860) 424-3810 deborah.frey@po.state.ct.us

Ron Rozsa, CT DEP OLISP
(860)424-3034 ron.rozsa@po.state.ct.us

Mel Cote, US EPA CT NPS Coordinator
(617)918-1553 cote.mel@epa.gov

CT DEP and US EPA websites
<http://dep.state.ct.us>
<http://www.epa.gov/owow/nps/education.html>

This CT DEP NPS Success Story is funded by the CT DEP through a US EPA Clean Water Act Section 319 Nonpoint Source Grant.



Connecticut Department of Environmental Protection
Bureau of Water Management, Planning & Standards Division
Nonpoint Source Management
79 Elm Street, Hartford, CT 06106-5127
(860) 424-3020

CT DEP is an equal opportunity/affirmative action employer, offering its services without regard to race, color, religion, national origin, age, sex, or disability. In conformance with the Americans with Disabilities Act, the CT DEP makes every effort to provide equally effective services for persons with disabilities. Individuals with disabilities needing auxiliary aids or services should call - CT DEP Affirmative Action at (860) 424-3035.



Printed on Recycled Paper