

NATIONAL ESTUARY PROGRAM



EFFECTIVE • EFFICIENT • COLLABORATIVE • ADAPTABLE

THE NEP IS EFFECTIVE

For two decades, National Estuary Programs (NEPs) across the United States have worked to revive and restore our nation's estuaries—where the rivers meet the seas. The continued success of the NEP hinges in part on an unwavering commitment to a core principle: effectiveness.

In efforts to help towns and cities implement the Clean Water Act (CWA), NEPs have launched and assisted in wide-ranging actions designed to improve water quality and address habitat loss and degradation. CWA programs are at work to address water quality improvements, and public outreach programs are on course to help people learn about estuaries and understand the importance of these efforts. NEPs are also addressing the pollutants that degrade habitat and adversely impact the living resources that inhabit those areas.

Here are some examples of how NEP programs nationwide have championed the cause to protect, rebuild and restore our nation's estuaries.

HABITAT RESTORATION

The Barataria-Terrebonne National Estuary in Louisiana—the 4.2 million acre region between the Atchafalaya and Mississippi Rivers—is the fastest disappearing landmass on Earth.

As estuaries and wetlands in the region rapidly turn to open water, destroying interior vegetative marsh and ridge habitats, coastal communities are increasingly vulnerable to storm surge, deprived of potable drinking water, and face the inevitable exhaustion of resources that supply the nation with shrimp, oysters, fish, oil, and gas, as well as recreational opportunities.

NEP IN ACTION

To recover this prized coastal habitat, the Barataria-Terrebonne National Estuary Program (BTNEP) and the Greater Lafourche Port Commission are working cooperatively with other partners on a three-phase effort designed to restore a natural ridge that will provide needed protection to fish, wildlife, and plants. The main component of the Maritime Forest Ridge and Marsh Restoration Project at Port Fourchon is the harvesting of river bed sediment, directing it through pipelines to build new land, and planting new vegetation—specially selected grass plugs, seeds, and woody plants that will offer critical protection to habitat in the region.

“The Ridge Project” is supported by grants and generous donations of time, expertise, and money from birding

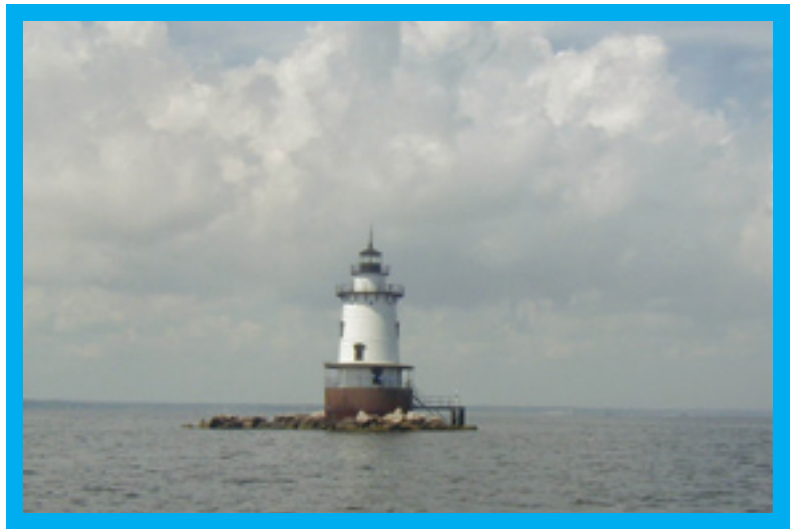
EFFECTIVE • EFFICIENT • COLLABORATIVE • ADAPTABLE

clubs, oil companies, the Federal Natural Resources Conservation Service, and other interest groups. When the project is completed, the region will see 2.25 miles of restored ridge and marsh habitat—more than 120 across maritime forest ridge, marsh, and tidal creeks.

Although the effects of Hurricanes Katrina and Rita have slowed progress, the 60-plus acres of new surface area created during the first phase of the project—before the hurricanes hit—prevented damage to the Port and surrounding land that would have otherwise occurred without the ridge, according to the Greater Lafourche Port Commission—an outcome that verifies the effectiveness of BTNEP's Comprehensive Conservation Management Plan and the value it brings to the country.

The next 40 acres of the project will be shaped with tidal channels constructed every 1,000 feet along the project site to provide for water exchange between the mitigated marshes to the south and the shallow open water areas to the north. Long-term plans include construction of new foot paths and board walks, and observation platforms and bridges along the ridge and out onto the marsh platform. Kiosks, interpretive signage and a nature center will complete the effort.

Their experience will be applied to future restoration projects in Louisiana and across the country. The BTNEP is quickly becoming a major resource for habitat restoration information as they field daily inquiries from NEPs across the country, other watershed management groups, and environmentalists worldwide.



NUTRIENT REDUCTION

The Long Island Sound Study (LISS) is achieving measurable results from their efforts to reduce nitrogen discharges to the Long Island Sound—where sewage treatment plants discharge more than a billion gallons of treated effluent, which contains oxygen-demanding material and nitrogen.

Large inputs of nutrients such as nitrogen have over-fertilized significant areas of the Sound, fueling the excessive growth of marine plants that deplete the water's oxygen. These low dissolved oxygen levels—a condition called hypoxia—degrade the habitat for fish and shellfish.

NEP IN ACTION

To address the problem, the LISS provides progressive leadership on several efforts, including a push to upgrade wastewater treatment plants, and to implement watershed protection measures aimed at reducing polluted runoff. The LISS also supports emission reduction programs designed to lessen nitrogen deposits from the air.

To gain a better understanding of the relationship between nitrogen discharges to the Sound and dissolved oxygen levels, they used scientific information based on a three-dimensional water quality model that helped them establish a nitrogen reduction target of 58.5 percent.

Connecticut and New York incorporated the target into a Total Maximum Daily Load (TMDL) for nitrogen to help meet Water Quality Standards. The States have also revised their water quality standards for dissolved oxygen in marine waters to reflect EPA criteria for protection of living resources in marine waters and created new provisions for pollutant trading for cost-effective attainment of Water Quality Standards. Implementation of the TMDL is moving forward, with upgrades at wastewater treatment plants decreasing the amount of nitrogen to Long Island Sound in 2006 by 52,000 lbs. per day compared to baseline levels.

These reductions are partly due to innovative strategies. Connecticut's Nitrogen Credit Exchange program, which won a 2007 EPA Blue Ribbon Water Quality Trading Award, sold 8.5 million worth of credits in four years. By 2006, 35 percent of the 79 participating sewage treatment plants had reduced nitrogen output below assigned permit limits, making them eligible to sell a total of \$1.32 million in nitrogen credits. This innovative program is expected to save the State between \$200 million and \$400 million in wastewater treatment construction costs over the next decade.

In New York, "bubble permits" now provide flexibility to dischargers on how to attain permit limits—an approach expected to save New York City up to \$660 million in sewage treatment plant upgrade costs. And the States of Massachusetts, Vermont, and New Hampshire worked with the Connecticut River Nitrogen Work Group to discuss reducing nitrogen loading from the Connecticut River watershed to the Long Island Sound—a collaboration that led to four years of nitrogen monitoring and new water quality models to identify sources and quantify loads of nitrogen from the upland States.



CLEAN WATER ACT – TOTAL MAXIMUM DAILY LOAD (TMDL)

The goal of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of our nation's waters. Under Section 303(d) of the CWA, States, territories and authorized tribes are required to develop lists of waterbody segments impaired by a pollutant and needing a Total Maximum Daily Load (TMDL).

A TMDL specifies the maximum amount of a pollutant a waterbody can receive and still meet water quality standards. A TMDL is made up of the sum of all point source loads ("wasteload allocation") and load associated with nonpoint sources ("load allocation").

National Estuary Programs develop strategies to help attain or maintain water quality standards through mechanisms such as TMDLs.

TOTAL MAXIMUM DAILY LOAD

The Hillsborough River, a highly urbanized waterbody located within the City of Tampa, is a significant tributary to Tampa Bay. Bacterial contamination (fecal coliform) from human impacts such as sanitary sewer overflows, malfunctioning septic systems, the homeless population, pet waste and agricultural drainage has impaired the river and threatened coastal swimming, fishing and shellfish harvesting.

As required by Section 303(d) of the Clean Water Act, the Tampa Bay Estuary Program (TBEP) and many partners are working to address the water quality of the Hillsborough River by developing an implementation plan to address State and Federal Total Maximum Daily Load (TMDL) requirements. TMDLs are measures that specify the maximum amount of pollutant a waterbody can receive and still meet water quality standards.



THE NEP IN ACTION

To implement the TMDL, the TBEP collaborated with stakeholders to develop a Basin Management Action Plan (BMAP)—a watershed-based approach to identify and address water quality impairments in a major drainage basin in Hillsborough County.

The team reviewed existing water quality information; developed an inventory of existing or planned pollution reduction projects, identified new issues and information gaps, and developed comprehensive plans to address sources of pollution. A microbial source tracking program was also developed to help assess the cause of bacterial contamination in different portions of the river.

The BMAP draft identified three key solutions for their potential to remove Hillsborough River from the 303(d) list of impaired waters for bacterial contamination. In addition BMAP is a viable model for addressing water quality impairments in other waterbodies of the Tampa Bay watershed.

The three key actions in the draft BMAP are:

- Installation of auxiliary battery-powered generators at sanitary sewer pump stations throughout the City of Tampa to prevent sewer overflows during power outages;
- Comprehensive, integrated stormwater treatment planning and implementation; and
- Enhanced educational programming to increase public awareness of the proper disposal of pet waste.

TBEP has already made significant gains in awareness efforts to educate the community about improperly disposed of pet waste and its effect on water quality. During a single pilot project, they were able to effect a 46 percent decrease in waste piles—and the effort is now under consideration in neighboring counties and cities.

The team—including the Environmental Protection Commission of Hillsborough County; city and county public works, planning and water departments, health departments, the Southwest Florida Water Management District, private industries, scientists, and citizens—recently submitted its draft BMAP to the Florida Department of Environmental Protection.

CREATING AN ARTIFICIAL REEF

Since the 1950s, the Sarasota Bay system has lost about 4,500 acres of hard bottom habitat due to dredge and fill activities, adversely impacting the productivity and biodiversity of Sarasota Bay's coastal lagoon system. Hard bottom habitat provides a substrate for soft corals, filtering bivalves and crustaceans, which in turn support a variety of life stages of game and non-game fin fish as well as shellfish. Historically these hard bottom habitats supported a thriving fishing industry along Florida's Gulf Coast and bay inlets.

NEP IN ACTION

The Sarasota Bay Estuary Program (SBEP) helped to establish an Artificial Reef Program in 1996 to replenish this vital habitat type. Since its inception, the SBEP and its partners have deployed approximately 5,000 artificial reef modules and other materials of opportunity (such as concrete culverts) in the waters in and near Sarasota Bay, targeting deeper areas and channel markers.



The \$674,000-project is a joint effort funded by several groups, including Manatee and Sarasota Counties, Sarasota Sportsmen's Association, Mote Marine Laboratory, Florida Fish and Wildlife Commission, and Reef Innovations, which manufactures the reef balls and offers monitoring assistance. It also features a public outreach component, with children, parents and teachers from SBEP-supported groups such as Bay Buddies and Reef Rakers, assisting in reef clean-up events and artificial reef surveys. This important project is providing critical habitat for a variety of marine organisms while giving scientists an opportunity to do valuable research on bay bottom restoration. The reefs also provide more opportunities to fish in small vessels.

During 2002, the SBEP conducted two seasons of sampling on several established artificial reefs within Sarasota Bay, identifying more than 25 species, including gray snapper, gag grouper, sheepshead and stone crab. The research indicated that a variety of reef types would be required to increase species diversity. The

SBEP and its partners placed many of the reef modules in clusters of various sizes to see what size grouping of modules produces the optimum habitat for the reef organisms.

In 2006, Mote Marine Laboratory began a two-year project monitoring five of the Sarasota Bay artificial reef sites for the SBEP. Preliminary results indicate that different numbers of reef modules support different life stages of marine organisms and a variety of species. By implementing an innovative artificial reef strategy—young fish are now living near the new reefs—SBEP is creating a new kind of habitat, and is increasing the biodiversity of Sarasota Bay.

STORMWATER TREATMENT

The Indian River Lagoon National Estuary Program (IRL NEP) has ambitious goals to improve water and sediment quality and restore and rehabilitate damaged coastal habitat.

Excessive freshwater discharges into the central and southern lagoon due to diversion of floodwaters from the St. Johns River and Lake Okeechobee and pollutant-laden stormwater into the lagoon have caused fish kills in some areas of the lagoon along with the loss and/or degradation of thousands of acres of seagrass, salt marsh and mangrove wetlands.

NEP IN ACTION

To reverse the damage and save the lagoon, the IRL NEP, along with numerous local, State and Federal government agencies including county mosquito control districts, the U.S. Fish and Wildlife Service, St. Johns and South Florida Water Management Districts (SFWMD), Canaveral National Seashore National Park Service and the National Aeronautic and Space Administration (NASA) have joined forces and funding efforts. As a result, more than 100 stormwater reduction and treatment projects now exist throughout the watershed. Stormwater retrofit projects and large stormwater abatement and detention projects have been implemented or are in the planning stages, including a State-funded \$10-\$20 million project to redirect 100 miles of expanded watershed back to the St. Johns River.

Signs of recovery are already present with respect to coastal wetland habitat, water clarity, seagrass habitat and fisheries. The reconnection and rehabilitation of more than 27,000 acres of coastal wetlands and reductions in pollutant loads from constructed storm water treatment projects, coupled with substantially less rainfall in the last decade, have helped reduce runoff. This also helps lower inputs of nitrogen, phosphorus, soils and turbidity.

The IRL NEP goal for wetland rehabilitation is 34,943 acres. To date, approximately 24,760 acres have been rehabilitated in the north central portion of the lagoon and 4,695 acres in the south. The rehabilitation of nearly 30,000 acres, along with a marked increase in seagrass coverage across these estuary segments and increased landings of sea trout, pinfish and mangrove snapper, indicate that this ambitious and fast-acting NEP is effecting change.



BACTERIAL MONITORING AND WATER-QUALITY STANDARDS

Tillamook Bay—Oregon's third largest estuary—supports a thriving commercial and recreational shellfishing industry. Unfortunately, bacteria concentrations found in all five of the Bay's major tributaries routinely violate State and Federal water quality standards, threatening human health and causing commercial harvest area closures.

As is often the case in estuaries across the country, Tillamook Estuaries Partnership (TEP) knew bacteria came from a combination of point and non-point sources including agricultural runoff, failing septic systems, overloaded municipal treatment plants, and urban stormwater. The tricky part was identifying exactly where these sources were delivering the largest loads and quantifying how much bacteria was threatening the Bay's health.



NEP IN ACTION

With its Comprehensive Conservation and Management Plan (CCMP) serving as a guide, the TEP launched an ambitious bacteria research and monitoring effort in the basin. Data produced from this effort has allowed TEP to apply mitigation efforts exactly where they are needed in order to efficiently and effectively achieve water quality goals. In addition, bacteria data collected through TEP's monitoring was also used by the

State of Oregon to create the Tillamook Bay Bacteria Total Maximum Daily Load (TMDL).

TEP began its monitoring program in 1996, launching an extensive Storm-Based Monitoring Program to identify and evaluate bacterial concentrations attributable to the watershed's different land uses. The effort also identified suitable long-term sampling sites for tracking the status and trends of bacteria throughout specific river reaches. A small team of dedicated volunteers joined the effort the following year, and 13,000 samples later, the TEP is reporting significant progress in 2007.

TEP's trend data has led to some important discoveries, including the determination that forested areas of the watershed generally meet water quality standards for bacteria, indicating that forest wildlife is not a key contributor of bacterial contamination as some thought. Working with Oregon State University researchers in 2001, the TEP began a three-year genetic marker study in the Tillamook Bay Watershed. The study enabled scientists to discriminate among bacteria from humans and ruminant sources (Ruminant forces includes cows, elk, and deer). They found widespread contamination from farm animal waste in specific segments of the river and high concentrations of human waste in other parts. Using the data, watershed managers can now build the best strategies for decreasing fecal pollution indicators in specific areas.

The TEP is working with agricultural landowners, including the local dairy cooperative, which made some important improvements to its discharge system so that its effluent no longer discharges directly into the Wilson River. With a credible, scientific framework the TEP has developed partnerships with local municipalities on habitat restoration and stormwater management projects. Additionally, a voluntary educational program targeted to small landowners offers assistance with septic system upgrades, riparian re-vegetation

projects, and workshops about the importance of fencing off riparian areas to prevent livestock from entering streams and rivers.

While the lower sections of four of the key rivers in the Tillamook Bay watershed still violate Oregon's water quality standards for recreational use, the fifth tributary, the Wilson River, has been in compliance since 2005, and statistically significant trends indicate that bacteria concentrations remain on a steady decline.

More than a decade's worth of status and trend information is paying off for the TEP with targeted approaches that support successful, efficient implementation of the Comprehensive Conservation and Management Plan. Investing in efforts that strategically target land uses that contribute to surface water bacteria is bringing the Tillamook Bay watershed closer to coming into compliance with State and Federal water quality standards.

REAL RESULTS IN REAL PLACES

The US EPA National Estuary Program (NEP), a unique and voluntary community-based program established in 1987 under the Clean Water Act (CWA) Amendments, works to restore and maintain the water quality and ecological integrity of estuaries of national significance.

Through strong commitment, trust, and significant time and resources spent by many State, local and Federal partners, the NEPs have made substantial progress in protecting and restoring habitat in their estuaries. NEPs have implemented wide ranging actions to rehabilitate wetlands, create artificial reefs, and plant riparian buffers among many other types of activities that address the loss and degradation of multiple habitats and estuarine watersheds. NEPs and their partners have produced real on-the-ground environmental results—improving

water quality, erosion, flood control, open space, and creating habitat.

There are 28 NEPs, located in 18 U.S. coastal States and Puerto Rico, which are designated estuaries of national significance for their distinct economic, ecological, recreational, and aesthetic values.

For more information contact:

US EPA
Office of Wetlands, Oceans and Watersheds (OWOW)
Coastal Management Branch
Mail Code 4504T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Tel: 202.566.1260

Fax: 202.566.1336

www.epa.gov/owow/estuaries

The NEP: Applying the Clean Water Act in ways that are Effective, Efficient, Adaptable, and Collaborative.