



RESTORING COASTAL & MARINE HABITATS

**The NOAA Restoration Center
NOAA Fisheries**



RESTORING COASTAL & MARINE HABITATS



Above, *Spartina alterniflora* planting, Prall's Island, New York



Volunteers unload trash and discarded monofilament fishing line collected on mangrove islands in Tampa Bay to prevent bird deaths and entanglement.

Restoration

Improves and maintains habitats degraded by decades of abuse

Rebuilds fishery habitat lost to coastal development and neglect

Restores habitats that provide jobs and contribute to a healthy economy

Preserves traditional coastal cultures

Expands enjoyment of outdoor areas and provides natural settings to teach our children

Enhances habitats that improve our quality of life

Why Restore Coastal & Marine Habitats?

Coastal and marine habitats include tidal marshes, wetlands, coral reefs, mangroves, seagrass beds, kelp forests, tidal flats and rivers, to name just a few. These habitats provide homes for marine animals, foraging and nursery grounds for fish and shellfish, nesting and stop over areas for birds, and opportunities for people to learn about and enjoy nature. They also provide a buffer against the forces of nature, dampening the destructive effects of wind, waves and flood. Commercial and recreational fishing industries and a burgeoning tourism industry depend on healthy, functioning coastal and marine habitats. But, these habitats are under siege. The nation's coastal and marine habitats have fallen victim to their own desirability and usefulness.

Each year thousands of people move to the coast to enjoy coastal areas and marine habitats. The number of people living in coastal areas in the United States is now over 50% of the population. This number is expected to increase dramatically in the future. For this reason, coastal areas face extraordinary pressures related to population growth and associated development, resource harvesting and recreation. Numerous oil spills, ship groundings, toxic chemical releases and other disasters befall marine habitats each year. These risks facing our nation's marine habitats are expected to increase. Developing and using technically sound habitat restoration measures will ensure that these areas of exceptional diversity survive the challenges of the 21st century. Habitat restoration and conservation are essential for sustaining and rebuilding our ailing resources.

Ocean 255 burns in Tampa Bay, Florida



THE NOAA RESTORATION CENTER



Taking Responsibility for Marine Habitat Restoration

NOAA-Sponsored Community-Based Restoration Project

Eelgrass (*Zostera marina*) provides protective cover and breeding habitat for numerous marine organisms. "Seagrasses in Classes" is a Save the Bay, science-based "theory-to-practice" program that brings restoration fieldwork directly into the classroom. Students set up aquaria in their school classrooms, plant and grow eelgrass from seed, monitor water quality, germination, and growth rates and report the monthly data to the Narragansett Bay's, Save the Bay program.



The NOAA Restoration Center is the only office within the National Oceanic and Atmospheric Administration solely devoted to restoring the coastal and marine habitats that support the nation's fisheries and other trust resources. Created in the early 1990s as an outgrowth of the *Exxon Valdez* oil spill, the Restoration Center, located in NOAA Fisheries, provides restoration expertise and comprehensive restoration planning and implementation for coastal and marine habitats facing chronic problems like subsidence, erosion and disruption of natural processes.

Habitat restoration and conservation are essential to the future health and sustainability of our nation's coastal resources and fisheries. For this reason, the Restoration Center is committed to implementing quality restoration projects, advancing the science of habitat restoration and monitoring the success of efforts to ensure healthy and sustainable fishery resources. Key to this commitment is the Restoration Center's mission to expand local habitat restoration techniques into broad-scale, ecosystem restoration approaches in all coastal, estuarine and anadromous fish habitats within the United States and its territories. To provide solutions to restoration challenges in all of these habitats, the Restoration Center implements several major programs: the Damage Assessment and Restoration Program (DARP); the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA); the Community-Based Restoration Program (CRP) and the Restoration Research Program.

Strong support from Congress has greatly contributed to past successes and enables the Restoration Center to continue to expand its programs and reach greater goals.

THE NOAA RESTORATION CENTER PROGRAMS

Overview of Programs

Under the **Damage Assessment and Restoration Program**, restoration scientists and managers ensure that injured marine resources are restored after oil spills, toxic releases or ship groundings. The **Community-Based Restoration Program** applies a novel, grass-roots approach to restoration and is designed to actively engage communities in on-the-ground restoration of local habitats. Restoration conducted under the **Coastal Wetlands Planning, Protection and Restoration Act** reduces coastal erosion and reverses wetlands loss in Louisiana, where tens of thousands of acres of wetlands are lost through subsidence, erosion and die-offs each year. To complement these programs, the Restoration Center advances emerging restoration technology, science and cost-effective practices through its **Restoration Research Program**. Taken together, these programs benefit countless acres of fragile and threatened coastal and marine habitats around the country.

Cross Bayou, Florida



Before, a site prepared for planting of *Spartina alterniflora* to help establish mangroves.



After, the *Spartina alterniflora* plants established a stable environment for settlement of native mangrove species.

THE DAMAGE ASSESSMENT & RESTORATION PROGRAM (DARP)



Restoring Habitats After Marine & Environmental Disasters



Restoration specialists set hand-carved wooden decoys to attract common murrelets to their former nesting site after an oil spill killed approximately 6,300 birds. By the year 2000, 98 breeding pairs were once again nesting on Devil's Slide Rock, Pacifica, California.



Shellfishermen participate in a restoration project by transplanting quahogs to a shellfish spawner sanctuary in Rhode Island.

When disasters strike the marine environment, immediate expertise is needed to cleanup, assess damage, ensure that responsible parties are held accountable, and see that settlement funds are used wisely to restore injured resources. Under DARP, NOAA serves as a trustee on behalf of the public to restore natural resources injured from oil spills, hazardous-substance releases and physical impacts such as ship groundings. DARP is a multi-office program with three main offices that provide an integrated approach to assessment and restoration. NOAA Fisheries is responsible for restoration planning and implementation, the National Ocean Service is responsible for assessing injury and damage and the Office of General Counsel oversees legal services for all aspects of the program. By working in partnership with other federal, state and tribal trustees, NOAA collects data, conducts assessments and implements restoration actions quickly and effectively. Through DARP, a legal and procedural framework exists to ensure that the public's voice is heard and thoroughly taken into account when determining the use of settlement funds for restoration.

Since DARP was established, settlements with polluters have provided hundreds of millions of dollars to restore injured habitats, from estuaries and coral reefs along the East and Gulf coasts, to salmon streams and coastal habitats along the Pacific West Coast. The Restoration Center ensures that these funds are used to implement a wide range of projects. These include rescuing and reattaching injured coral colonies, recreating historical, intertidal marshes from previously-filled wetlands and creating shellfish spawner sanctuaries that replenish declining shellfish populations. Over the years, restoration projects have benefited a rich and varied number of habitats and biological resources including fish, shellfish, sea turtles, marine mammals, corals, seagrasses, kelp beds, marshes and estuaries.

***Fortuna Reefer* aground on Mona Island coral reef, Puerto Rico**



In Key Largo, Florida, a NOAA scientist repairs the surface of an injured coral head.

Hundreds of ships ground in sensitive marine environments each year. Ships that ground on coral reefs crush corals and disrupt delicate ecosystems. DARP settlement funds allow Restoration Center scientists to study and employ new methods to restore injured corals at ship-grounding sites.

COASTAL WETLANDS PLANNING PROTECTION & RESTORATION ACT

(CWPPRA)



A Regional Approach to Restoration in Louisiana

Louisiana is beset by the highest rate of coastal wetland loss in the nation. The annual loss of wetlands is so severe, up to 35 square miles by some estimates, that it threatens the safety of Louisiana's citizens, local traditions and cultures, the state's economy, and the environment. In response to this threat, Congress enacted the Coastal Wetlands Planning, Protection and Restoration Act. In the first ten years of the program, the NOAA Restoration Center has administered approximately ten million CWPPRA dollars annually for on-the-ground restoration that has benefited thousands of acres of threatened wetlands and marine habitats.

CWPPRA is unique because it provides a structure for comprehensive regional restoration in Louisiana. The program specializes in designing large-scale projects that reverse coastal wetland loss and provide future protection for Louisiana's threatened coastline. Under CWPPRA, federal agencies in collaboration with the State of Louisiana, design, develop and implement diverse habitat projects to protect, create and restore wetlands threatened by erosion, subsidence and hydrological alterations. Only the most feasible, technologically sound projects that provide the greatest ecological benefits are funded. An integral part of CWPPRA is setting restoration priorities based on comprehensive regional restoration planning. While the CWPPRA focus is in Louisiana, the Restoration Center is committed to expanding this regional watershed approach to restoration across the nation.



Dredged sand is pumped onto East Timbalier Island to stabilize, support and restore dune and marsh habitats after hurricanes created a breach in the island and compromised island habitats.



An aerial image of the footprint of East Timbalier island shows the breach created by hurricanes.

Big Island, Atchafalaya River Delta, Louisiana



Above, a bucket dredge excavates containment dikes in the Atchafalaya Delta during initial stages of construction. The Atchafalaya Delta projects created twelve-hundred acres of marsh and are projected to establish an additional three thousand acres over a twenty-year period.

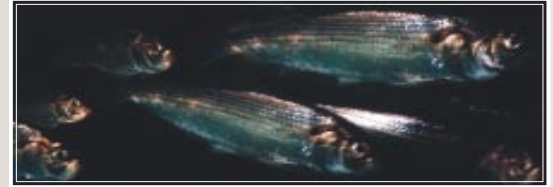


Mid-stage construction creates a suitable platform for new delta habitat, Big Island, Louisiana.



Two years post-construction shows accretion and well-developed marsh, Big Island, Louisiana.

COMMUNITY-BASED RESTORATION PROGRAM (CRP)



People Working Together for Habitat Restoration



Spartina alterniflora is a salt tolerant plant that helps prevent erosion in coastal areas and provides habitat and cover for marine organisms. Ft. McDill Airforce Base, Florida, volunteers work with NOAA and Tampa BayWatch to restore salt marsh grass.



At Ft. McHenry, Maryland, volunteers plant *Spartina alterniflora* in a community-based restoration project.

The concept behind the NOAA Community-Based Restoration Program is simple: develop strong partnerships to accomplish meaningful, grassroots, habitat restoration activities that simultaneously promote an abiding conservation ethic and the wise stewardship of living marine resources. Partnerships occur at the national, regional, and local level and bring together groups such as community organizations, government, recreational and commercial fishing organizations, students and educational institutions, youth conservation corps, and private land owners to implement sound restorations.

The Restoration Center's role is to help identify potential projects, strengthen the development and implementation of habitat restoration activities within communities, and generate long-term national and regional partnerships to support community-based restoration efforts across a wide geographic area. Several times each year proposals are requested for individual projects, either directly by the Restoration Center or through its numerous partners. NOAA field staff make site visits and meet with potential grantees to answer questions and guide the restoration process. Proposals undergo a competitive review, and projects are selected based on their technical merit, level of community involvement, ecological benefits to marine and anadromous fish habitat, and partnership opportunities.

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed it is the only thing that ever has.”

Margaret Mead, anthropologist



Local, Regional and National Partnership Contributions

When Restoration Center staff started the Community-Based Restoration Program in the mid-1990's, they recognized the significant role that partnerships could play in making broad-scale contributions to restoring habitats around the country.



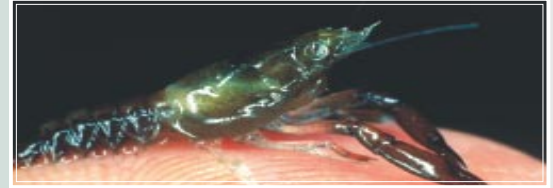
The United Anglers of Casa Grande, California, a local high school group, worked for over 11 years to restore Adobe Creek, a tributary of the Petaluma River. The Community-Based Restoration Program supported construction of a step-pool fish ladder that allowed steelhead trout to return to their native spawning grounds.

At the national and regional levels, partnerships expand the funds available for local habitat restoration projects. At the local level, these funds are typically leveraged between 3-5 dollars for every NOAA dollar invested. In addition to funding, partners contribute land, technical assistance, work-force support, or other in-kind services that benefit restoration activities for living marine resources. Partnerships allow communities to reach significant milestones faster, and the cooperative nature of the community-based restoration process helps to instill a sense of collective stewardship and respect for the environment. Since the CRP was founded, the program has successfully established a diverse network of national and local restoration partners.



In the last two centuries, many East Coast rivers were dammed. As a result, native species like blueback herring, alewife, Atlantic salmon, and shad have difficulty reaching their spawning habitats. The Community-Based Restoration Program is sponsoring a series of projects to address this problem. They include selective dam removals and installation of fish passages in Northeastern rivers. Above, in Massachusetts, workers notch a dam before installing an Alaskan SteepPass fish ladder that will improve the ability of anadromous fish to reach the upper regions of the Parker River.

RESTORATION RESEARCH PROGRAM



New Frontiers

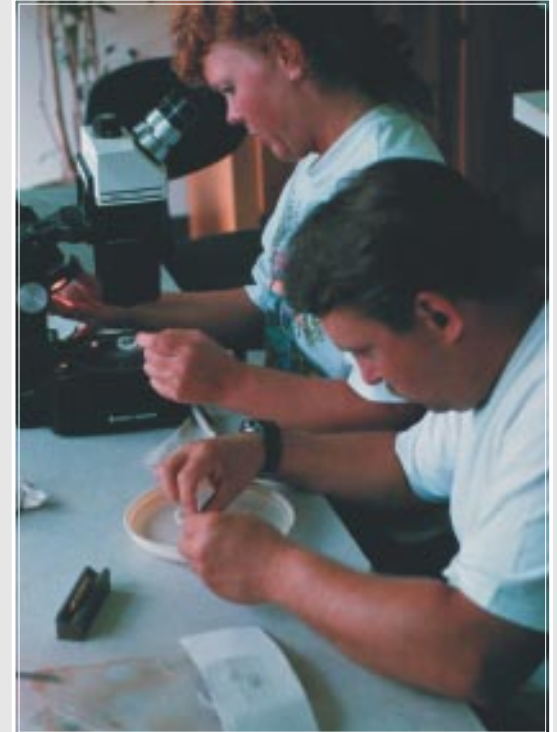
The Restoration Center Research Program advances the science of restoration by developing stronger, more efficient, less costly restoration technologies. The program benefits from the collective experience of NOAA staff located at five regional Fisheries Science Centers around the country. Under the research program, these scientists work to understand how coastal and marine habitats recover after restoration and what requirements must be met to ensure successful restoration. Research is conducted on all types of coastal, estuarine and marine habitats, such as salt marshes, coral reefs, and seagrass beds.



Above, NOAA Fishery scientists compare fish utilization in both natural marshes and those restored using innovative techniques. This allows scientists to measure the effectiveness and benefits of new restoration techniques.



Left, the design and construction of innovative earthen terraces dissipate waves and currents and trap sediments to contribute to new wetland growth. Marsh terracing affords maximum restoration benefits by creating highly productive marsh edges that provide nursery habitat and feeding areas for numerous fishery resources.



Scientists tag and study recruitment of juvenile lobsters on man-made reefs created to provide habitat after an oil spill in Rhode Island killed thousands of lobsters and other shellfish.



The research program is critical. The results obtained through the research program improve the basic tools used to undertake sound habitat restoration. The data collected in this process support habitat restoration planning and implementation of projects, and provides information that may be needed to make corrective actions to ensure that habitat restoration provides the benefits for which it was designed. When restoration is completed, the Restoration Center promotes science-quality monitoring of its projects to meet future restoration challenges and expand the knowledge of restoration ecology.

After restoring natural hydrology to a Rhode Island marsh, scientists study recruitment of fish populations.

REGIONAL RESTORATION



Chesapeake Bay



GIS image representing NOAA Chesapeake Bay restoration activities

Taking an Ecosystem Approach

Restoration is one of the most important tools we have to promote the recovery of disturbed and damaged ecosystems because it allows us to accelerate natural recovery processes by years and, in some cases, decades. As restoration becomes an increasingly significant tool to alleviate environmental problems, it is important to ensure that restoration occurs on a regional or ecosystem basis and that it addresses human interactions with nature. Regional restoration planning complements other tools like conservation, habitat enhancement and protection and, taken together, provide a comprehensive solution that will allow us to tackle watershed-wide habitat problems. Under a regional restoration planning process, state and federal agencies and non-governmental organizations work with the public to identify, select and implement the most appropriate restoration techniques that achieve the greatest benefits for entire regions and watersheds.

The Restoration Center is active in regional and watershed restoration planning and implementation in Louisiana through its work under CWPPRA, and in various coastal watersheds under its other programs. As the Restoration Center expands its programs and its role in regional and ecosystem restoration, its goal is to be in a position to conduct broad-scale ecosystem restoration planning and implementation with its national, regional and local partners in all important coastal, estuarine and anadromous fish habitats throughout the United States and its territories. Using geographic information systems (GIS) and initiatives like the development of a National Restoration Strategy with national restoration partners, helps us to realize these goals.



A marsh grass planting, Louisiana

HOW TO BECOME INVOLVED



Get Involved

Contact the NOAA Restoration Center or one of the five NOAA Fisheries regional offices.

Check the NOAA Restoration Center Website for funding opportunities

Attend public meetings, become involved with local planning boards, state and coastal resource centers, advisory committees, or other planning entities

Respond to requests for project solicitations and ideas

Comment on draft and final restoration plans

Volunteer to assist in restoration projects

Share your experiences and information, and network

NOAA Restoration Center

NOAA Fisheries F/HC3
1315 East West Highway
Silver Spring, MD 20910
(301) 713-0174
Fax: (301) 713-0184
www.nmfs.noaa.gov/habitat/restoration

NOAA Fisheries Regional Offices

For information on how to contact a restoration specialist in your region, call the NOAA Restoration Center or visit the websites below.

Alaska Region
www.fakr.noaa.gov

Northeast Region
www.nero.nmfs.gov

Northwest Region
www.nwr.noaa.gov

Southeast Region
<http://caldera.sero.nmfs.gov>

Southwest Region
<http://swr.nmfs.noaa.gov>

“Restoring Habitat For Future Generations”



How To Contact The NOAA Restoration Center

NOAA RESTORATION CENTER

NOAA Fisheries, F/HC-3

1315 East-West Highway

Silver Spring, MD 20910

(301) 713-0174

(301) 713-0184 - fax

www.nmfs.noaa.gov/habitat/restoration



Printed on recycled paper.