

Water Quality

WETLANDS

Photo Courtesy of Lynda Saul

WETLANDS FILTER OUT POLLUTANTS AND TRAP SEDIMENTS

- ▶ Wetlands act as filters by slowing water flow, allowing sediments to settle, and absorbing and breaking down polluting nutrients.
- ▶ Wetlands can eliminate 15 to over 50% of the nitrogen, up to 60% of some metals, and 30 and 70% of phosphorus from entering streams and other water bodies.
- ▶ Wetlands can filter up to 90% of sediments from runoff, helping to purify water and slow down erosion.
- ▶ Treatment of wastewater by constructed wetlands could cost 60% less than conventional treatment methods.

BUFFERS PRESERVE WETLAND WATER QUALITY

The upland area surrounding a wetland—or the wetland buffer—is essential for maintaining wetland water quality and wildlife habitat. When surrounded by parking lots and buildings, a wetland's functions may be significantly weakened. But, healthy wetland buffers can protect and maintain wetland functions by removing sediments and pollutants from surface water runoff, removing nutrients and contaminants from upland sources, and maintaining habitats for wetland species.

In general, wide, densely vegetated buffers are better than narrow, sparsely vegetated buffers. The most effective buffer size depends on the wetland type, intensity of surrounding land use, watershed characteristics, and desired buffer function. For example, wetland buffers of 30 to greater than 100 feet may be most effective for removing sediment and phosphorous, while 100- to greater than 160-foot buffers may be most effective for removing nitrogen, and 100- to greater than 300-foot buffers may be most effective for wildlife protection.

Local governments are best positioned to regulate activities and development in wetland buffer areas. A well designed local buffer ordinance clearly defines its objectives, the wetlands to be protected, buffer dimensions, allowable activities, review procedures, and enforcement procedures. Visit www.eli.org for more information on wetland buffers.

WETLANDS IN A CHANGING CLIMATE

A changing climate will bring unpredictable rainfall, earlier snow melt, and more frequent and intense storms. Greater precipitation in some regions may increase surface runoff and soil erosion. In rural areas, that could result in more chemicals, fertilizers, and sediments reaching rivers and lakes from farms. In urban areas, high percentages of impervious surfaces could exacerbate this problem. This increase in polluted runoff may overwhelm the capacity of wetlands to filter harmful pollutants.

National Wetlands Awards

For the past 20 years, the National Wetlands Awards program has honored leaders in wetland conservation, research, and education. These wetland champions personify the concept of “think globally, act locally,” dedicating countless hours and resources to our nation’s wetlands.

MAKING AN IMPACT



Photo Courtesy of Sky Jones-Lewey

2004 Education and Outreach recipient Sky Jones-Lewey (behind the workshop sign) is the Resource Protection and Education Director for the Nueces River Authority. The organization works across 23 watersheds that spread over 17,000 square miles in Texas. The water quality functions of the wetlands in the Nueces Basin are threatened by erosion, invasion of non-native species, trash and illegal dumping, and the alteration of streambeds. Given that most of the Basin’s riparian lands are privately owned, the goal of the network is to educate local landowners about riparian function. “The biggest obstacle to riparian preservation is a lack of understanding and awareness about how riparian areas, creeks, and rivers work,” says Ms. Jones-Lewey. “The best opportunity for riparian preservation lies in education.”

While the project is voluntary, approximately 190 landowners have attended training sessions to learn about the economic benefits of protecting riparian functions on their properties. The Nueces River Authority hopes to protect the headwater streams that lead into the Nueces River by giving landowners the knowledge and tools to make the right choices. This project is the first of its kind in Texas, and as a result of its success there are hopes to create a similar program for the entire state. Learn more, visit www.nueces-ra.org/CP/LS/index.php.

YOU CAN MAKE A DIFFERENCE

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The National Wetlands Awards are administered by the Environmental Law Institute and supported by the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, USDA Natural Resources Conservation Service, USDA Forest Service, Federal Highway Administration, and NOAA Fisheries.



Photos Courtesy of Agriculture and Agri-Food Canada and Leo Michels

Invasive Species

WETLANDS

WETLANDS ARE VULNERABLE TO INVASIVE SPECIES

- ▶ Wetlands naturally accumulate debris, sediments, water, and nutrients and create canopy gaps, making them especially vulnerable to invasive species.
- ▶ Although wetlands account for less than 6% of the earth's surface, 24% of the world's most invasive plant species are found in wetlands.
- ▶ The highly invasive purple loosestrife is found in wetlands of all lower 48 states. Human and natural disturbances to wetland soils provide space and opportunity for purple loosestrife seeds to spread and quickly take over the land. Forty-five million dollars are spent annually to control the plant and to compensate for its damages.
- ▶ Nutria are beaver-like rodents, introduced for commercial fur production, that have endangered the remaining coastal marshes in Louisiana. Prolific breeders, nutria can destroy as much as 10,000 acres of coastal wetlands in Louisiana in one year alone.

INVASIVES THREATEN BIODIVERSITY

The spread of invasive species is a major threat to wetland biodiversity. Invasive plant species can grow rapidly into dense stands that choke waterways, lower water tables, and alter the natural vegetation community, eliminating habitats necessary for native wetland species.

In the Northeastern United States, invasive species are destroying the remaining wetland habitats of the bog turtle, a species listed as threatened at the federal level and endangered by several states. Invasive grasses and reeds are replacing the short grass and wet meadow habitats necessary for the turtle to survive. Throughout the region, federal and state agencies are collaborating with non-profit organizations and private landowners to save the turtles. In fact, prescribed grazing by cows, sheep, and goats has proven to be a particularly effective means of clearing the invasive vegetation and restoring turtle habitat.

Across the country, the application of targeted herbicides, controlled burning, mowing, prescribed grazing, and physical barriers offer means of fighting established wetland invaders. Once established, invasive species can be incredibly difficult to control. After prevention, early detection and rapid response (EDRR) may be the most important line of defense against future invasions. The earlier new invasive species are detected and contained, the more likely they can be controlled in the long-term.

WETLANDS IN A CHANGING CLIMATE

Wetlands are already more susceptible to invasive species than other ecosystems, and increases in rainfall and drought from climate change may exacerbate this problem. Warming temperatures and changing precipitation patterns may cause shifts in the areas where invasive species can thrive and allow for increased growth of existing populations of invasive species. For example, inland populations of the highly invasive common reed (*Phragmites*) may increase with higher temperatures, making it more difficult to control. This may be particularly problematic for sensitive wetland plants already stressed by climate change.

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Photo Courtesy of Diane Nygaard

2008 Wetland Community Leader recipient Diane Nygaard founded the non-profit group Preserve Calavera, a community conservation organization based in San Diego County, California. Preserve Calavera organized public education programs about invasive weeds and hosted an annual “Eat the Invasives” picnic, drawing the attention of both the California State Senate, which gave her organization a Certification of Recognition, and the Carlsbad Watershed Network, which gave Preserve Calavera their “Weed Warrior” award.

Her organization successfully helped the City of Oceanside’s fire department convince the city to amend its nuisance ordinance to prohibit tamarisk, arundo, and pampass grass—all non-native invasive species that have spread quickly through various parts of the United States. The fire department began this effort after a series of arson fires in areas with arundo grass raised concerns about fire safety. Preserve Calavera helped refine the ordinance and lobbied and testified to get it passed. In the Agua Hedionda watershed, Preserve Calavera and the Carlsbad Watershed Network have removed both arundo and pampass grass. For more information, visit their website, www.preservecalavera.org.

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Flood protection

WETLANDS

Photo Courtesy of NOAA

WETLANDS STORE FLOODWATER AND PROTECT COASTS

▶ Wetlands act as natural buffers or sponges that reduce storm surges and store flood waters. In fact, one acre of wetlands can store 1 to 1.5 million gallons of floodwater—roughly $\frac{3}{4}$ of a football field waist-deep in water.

▶ Wisconsin river basins with at least 40% wetlands and lakes experience streamflow that is as much as 140% lower than basins without wetland storage.

▶ On average, the loss of 2.5 acres of coastal wetlands increases the cost of coastal storm damage by \$33,000.

▶ The protection of 1,500 acres of wetlands along the Charles River in Massachusetts saves the region approximately \$17 million dollars in flood damage costs annually.

FLOOD DAMAGES COST BILLIONS

“Floods have caused the greatest loss of life and property and have disrupted more families than all other natural hazards combined.”
Federal Emergency Management Agency Director James Witt, 1995.

Two major floods in the Midwest caused an estimated \$30 billion in damages in 1993 and \$15 billion in 2008. In addition to a 20% increase in the frequency of intense rainfall events in the Midwest over the past 40 years, changes in land use, including the conversion of wetlands to subdivisions and of prairies to farm fields, have left the region less able to absorb the precipitation that can fall during these intense storms. In fact, the Mississippi and Missouri River Basins have lost over 26 million acres of their historic wetlands. Historically, bottomland hardwood-riparian wetlands along the Mississippi River stored at least 60 days of floodwater. Now, the remaining wetlands store only 12 days.

Although often relied upon for flood control, levees and other structural approaches can make matters worse by encouraging development in high risk areas while not sufficiently protecting communities from flood damage (over 20 levees failed in the 2008 Midwest floods). Instead, the restoration of wetlands and natural floodplains may provide more effective protection against flood damage.

WETLANDS IN A CHANGING CLIMATE

Sea-level rise threatens to drown coastal wetlands by converting vegetated habitat into open water, destroying our natural defenses from hurricanes and storm surge. Some coastal wetlands adjacent to undeveloped lands may be able to naturally move inland, as uplands are converted to wetlands. However, 60% of Atlantic coastline below 1 meter is available for development, potentially blocking this migration. Less than 10% of the Atlantic coastline has been set aside for conservation. By 2080, the world could lose 5-20% of its coastal wetlands from rising seas.

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Photo Courtesy of Larry Smith

1997 Volunteer Leadership recipient Larry J. Smith has effectively fought for the protection of West Tennessee’s 70-mile-long Wolf River, its wetlands, and floodplain. Mr. Smith helped the Wolf River Conservancy purchase over 4,000 acres of wetlands and bottomland along this uniquely urban, suburban and rural river. He is a leader of the U.S. Army Corps of Engineers/Shelby County Wolf River restoration project, an historic effort to restore wetland draining caused by prior river channelization. The effort connects over 2,000 acres of floodplain lands to other public lands, restoring the flood-prevention function of thousands of acres of public and protected floodplain lands upstream. Downstream, several urban parks will be connected with a riverside nine-mile rails-to-trails project to restore riparian corridors and improve floodplain functions.

As an attorney, Mr. Smith provides landowners valuable expertise on the use of conservation easements. As an educator, he leads canoe trips and nature hikes into unique areas of river birch and sycamore bottomland hardwoods and cypress-gum swamp. He teaches about the importance of wetlands in elementary, high school, and university classrooms, transmits environmental news across the mid-South via a Memphis radio station, and appears on a regional public-access television program on the environment.

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Habitat Loss

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Photo Courtesy of U.S. EPA

ONLY HALF OF OUR ORIGINAL WETLANDS STILL EXIST

- ▶ Over half of all the wetlands that existed in the lower 48 states at the time of European settlement have been lost.
- ▶ In many states, wetland loss is severe. Both California and Ohio have lost at least 90% of the wetlands that were present 200 years ago.
- ▶ Louisiana loses up to 40 square miles of wetlands annually. By 2040, Louisiana could lose an additional 800,000 acres, moving the coast inland by as much as 33 miles in some areas.
- ▶ Although the U.S. Fish and Wildlife Service estimated a net gain in freshwater wetlands between 1998 and 2004, most of the gain was in acres of ponds. There continues to be significant losses of vegetated wetlands, such as emergent and shrub wetlands.

RESTORING LOST WETLANDS

Federal and state agencies and conservation organizations are continually engaging in efforts to restore degraded wetland habitats. For example, the USDA's Natural Resources Conservation Service's Wetlands Reserve Program offers conservation easements to landowners willing to protect and restore wetland habitat. Almost 2 million acres were enrolled in the Wetlands Reserve Program as of 2008, preserving or restoring vital wetland habitat across the country.

Non-profit conservation organizations are vital to wetland restoration projects, and they often partner with state and federal agencies to carry out restoration efforts. In Illinois, for example, local conservationists and scientists teamed with the state's Department of Energy and Natural Resources to form the Des Plaines River Wetlands Demonstration Project. The objective of the project was to study the effects of wetlands on water quality, wildlife conservation, and flood protection, particularly after the flood-prone county lost over \$40 million in damages as a result of a massive flood in 1986. The results of these restoration efforts have been monitored over the decades to demonstrate the ecological and economic benefits of wetlands. The demonstration, which totaled 50 acres, is now home to 21 endangered or threatened species that were not present before restoration, with notable increases in bird, beaver, muskrat, fish, and plant populations. In addition, the restored area was able to filter 80% of nutrients and sediments from flowing into Des Plaines River.

WETLANDS IN A CHANGING CLIMATE

On the American and Canadian plains, shallow, water-filled depressions known as prairie potholes host more than 50% of North America's migratory waterfowl. These wetlands also absorb excess rainfall and snow melt, reducing the threat of flooding downstream. Changes in precipitation due to climate change are already evident in the prairie pothole region, adding stress to a habitat already altered by drainage for agriculture. Decreased precipitation in the western prairie pothole areas may lead to drier soils, earlier spring drying, and fewer potholes. These changes may cause the prairie potholes to shrink by 38-54% by the end of the century.

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Photos Courtesy of Molly Brown and Donna Dewhurst/FWS

1999 Volunteer Leadership recipient Molly P. Brown has worked tirelessly and successfully to protect and expand Virginia's Back Bay National Refuge. The Refuge is composed mostly of fresh and brackish marshlands and supports high levels of biodiversity. These marshes support perennial plants that provide habitat for invertebrates that fish, birds, and amphibians rely on for food. Animals like geese, muskrats, and red-bellied turtles rely on this protected area.

When housing developments and a new parkway threatened to destroy some of the forested wetlands within the Refuge, Ms. Brown contacted every member of the Virginia Beach City Council, involved a coalition of non-profit organizations, and garnered strong public support to oppose the project. Her efforts succeeded in finding alternative options.

Ms. Brown, as president of the Friends of Back Bay, has secured several million dollars-worth of land acquisition appropriations. The influx of federal support and increased community advocacy has helped to double the size of the Refuge from its creation in 1938, to 9,000 acres.

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Endangered Species

WETLANDS



Photos Courtesy of Puerto Rico DNER and U.S. EPA

MANY ENDANGERED SPECIES DEPEND ON WETLANDS

- ▶ Almost 40% of endangered and 60% of threatened plant and animal species rely on wetland habitats.
- ▶ The nation's coastal estuaries, wetlands, and waterways provide migratory stopover, feeding, and breeding habitat for 85% of waterfowl and migratory birds.
- ▶ There are 125 endangered or threatened wetland plants—17% of the total number of endangered plant species.
- ▶ In the continental United States, two-thirds of all waterfowl—or some 6.7 to 8 million birds—reproduce in prairie potholes of the Midwest.

RESTORED WETLANDS HELP CRANES REBOUND

The rarest of all 15 crane species, the whooping crane is a migratory bird on the federal endangered species list that resides exclusively in North America. Whooping cranes winter in the coastal marshes of Texas, and rely on the prairie wetlands of the Plains states during migration to Canada.

Preservation of wetland habitats along the whooping cranes' migratory path is critical to ensure their survival as the cranes require the shallow wetland waters to feed, nest, and roost. Pollution and habitat loss pose major threats to the cranes. In fact, the conversion of wetlands for agriculture and urban development helped cause the whooping crane population to drop to an all-time low of 15 individuals. Shoreline erosion and drought and other extreme weather conditions resulting from climate change continue to threaten whooping crane habitats today. Diverted water for agriculture and consumption reduces the amount of water in wetlands and continued construction and barge traffic along coastal waterways can bring in pollutants and chemicals that threaten wetland habitats.

Wetland management constitutes an important piece of whooping crane protection. In Wisconsin, where over 75% of the wetlands are privately owned, many federal and state financial incentive programs are available to help landowners to restore or maintain wetlands. Habitat restoration programs, such as those available in Wisconsin, in combination with captive breeding efforts, have allowed the whooping crane population to rebound to about 500 birds, of which 350 live in the wild.

WETLANDS IN A CHANGING CLIMATE

Species that live in ephemeral wetlands—such as vernal pools, playas, and prairie potholes—may be especially vulnerable to climate change. The fairy shrimp, an endangered species inhabiting vernal pools in the Southwest, requires both wet and dry environments during its lifecycle. As the vernal pool fills with water, fairy shrimp can have as little as two weeks to hatch, eat, grow, reproduce, and lay eggs before their ephemeral pool disappears. Drier conditions in the Southwest, expected with climate change, could affect this delicate timing by causing pools to disappear quicker, threatening the survival of many endangered species.

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Photos Courtesy of Joe Colon

2008 Conservation and Restoration recipient Mildred Ramos Majoros, a resident of Miami, Florida and native of Puerto Rico, demonstrated the importance of wetland restoration in preserving endangered species. When plans for a large luxury resort were announced for the northeastern shore of Puerto Rico, a public outcry—including demonstrations with school children waving signs reading, “Save the Turtles” and “Welcome Leatherbacks”—led by Ms. Majoros’ group, forced the government to reconsider and establish the San Miguel Natural Reserve, which serves as an important nesting ground for endangered leatherback turtles.

Ms. Majoros, a project manager with the Trust for Public Land, worked with the Puerto Rico Department of Natural Resources to obtain appraisals, surveys, environmental assessments, title work, and secure substantial grant funding. She promoted public awareness for the Reserve and received praise for her innovative strategies, determination, and engagement of landowners to voluntarily sell property for the Reserve. Said one official, “Mildred Majoros’ dedication and commitment seeing the San Miguel acquisition through...are nothing short of heroic.” Ms. Majoros noted, “It has been a particular honor for me to preserve in my homeland of Puerto Rico, a special piece of paradise.”

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