



Functions and Values of Wetlands



Dave Davis

Long regarded as wastelands, wetlands are now recognized as important features in the landscape that provide numerous beneficial services for people and for fish and wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods. These beneficial services, considered valuable to societies worldwide, are the result of the inherent and unique natural characteristics of wetlands.



Wetlands are considered valuable because they clean the water, recharge water supplies, reduce flood risks, and provide fish and wildlife habitat. In addition, wetlands provide recreational opportunities, aesthetic benefits, sites for research and education, and commercial fishery benefits.

Functions Versus Values

Wetland functions include water quality improvement, floodwater storage, fish and wildlife habitat, aesthetics, and biological productivity. The value of a wetland is an estimate of the importance or worth of one or more of its functions to society. For example, a value can be determined by the revenue generated from the sale of fish that depend on the wetland, by the tourist dollars associated with the wetland, or by public support for protecting fish and wildlife.

Although large-scale benefits of functions can be valued, determining the value of individual wetlands is difficult because they differ widely and do not all perform the same functions or perform functions equally well. Decision-makers must understand that impacts on wetland functions can eliminate or diminish the values of wetlands.

property damage and loss of life—benefits that have economic value to us. For example, the U.S. Army Corps of Engineers found that protecting wetlands along the Charles River in Boston, Massachusetts, saved \$17 million in potential flood damage.

Water filtration. After being slowed by a wetland, water moves around plants, allowing the suspended sediment to drop out and settle to the wetland floor. Nutrients from fertilizer application, manure, leaking septic tanks, and municipal sewage that are dissolved in the water are often absorbed by plant roots and microorganisms in the soil. Other pollutants stick to soil particles. In many cases, this filtration process removes much of the water's nutrient and pollutant load by the time it leaves a wetland. Some types of wetlands are so good at this filtration function that environmental managers construct similar artificial wetlands to treat storm water and wastewater.



Water storage. Wetlands function like natural tubs or sponges, storing water and slowly releasing it. This process slows the water's momentum and erosive potential, reduces flood heights, and allows for ground water recharge, which contributes to base flow to surface water systems during dry periods.

Although a small wetland might not store much water, a network of many small wetlands can store an enormous amount of water. The ability of wetlands to store floodwaters reduces the risk of costly



Red-osier dogwood

Biological productivity. Wetlands are some of the most biologically productive natural ecosystems in the world, comparable to tropical rain forests and coral reefs in their productivity and the diversity of species they support. Abundant vegetation and shallow water provide diverse habitats for fish and wildlife. Aquatic plant life flourishes in the nutrient-rich environment, and energy converted by the plants is passed up the food chain to fish, waterfowl, and other wildlife and to us as well. This function supports valuable commercial fish and shellfish industries.



The Great Flood of 1993 in the upper Mississippi River Basin caused billions of dollars in property damage and resulted in 38 deaths. Historically, 20 million acres of wetlands in this area had been drained or filled, mostly for agricultural purposes. If the wetlands had been preserved rather than drained, much property damage and crop loss could have been avoided.

DID YOU KNOW?

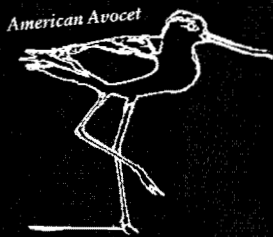
- In 1991 wetland-related ecotourism activities such as hunting, fishing, bird-watching, and photography added approximately \$59 billion to the national economy.
- According to the Pacific Coast Federation of Fishermen's Associations, almost \$79 billion per year is generated from wetland-dependent species, or about 71 percent of the nation's entire \$111 billion commercial and recreational fishing industry in 1997.
- An acre of wetland can store 1–1.5 million gallons of floodwater.
- Up to one-half of North American bird species nest or feed in wetlands.
- Although wetlands keep only about 5 percent of the land surface in the conterminous United States, they are home to 31 percent of our plant species.



Steve Delaney

Seventy-five percent of commercially harvested fish are wetland-dependent. Add shellfish species and that number jumps to 95 percent.

The Wetland Fact Sheet Series



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Threats to Wetlands

Wetland Restoration

Funding Wetland Projects

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Volunteering for Wetlands

Teaching about Wetlands

For more information, visit www.epa.gov/owow/wetlands.

Wetland Resources

On the Internet

Ecosystem Valuation www.ecosystemvaluation.org

Economic Valuation of Wetlands www.ramsar.org/lib_val_e_index.htm

In Print

Restoration, Creation, and Recovery of Wetlands: Wetland Functions, Values, and Assessment, R.P. Novitzki, R.D. Smith, and J.D. Fretwell. United States Geological Survey Water Supply Paper 2425. Available on-line at <http://water.usgs.gov/nwsum/WSP2425/functions.html>.

Technical Aspects of Wetlands: Wetland Hydrology, Water Quality, and Associated Functions, Virginia Carter. United States Geological Survey Water Supply Paper 2425. Available on-line at <http://water.usgs.gov/nwsum/WSP2425/hydrology.html>.

Wetlands Functions and Values. Visit the North Carolina State University Water Quality Group's on-line informational database, WATERSHEDSS, at <http://h2osparc.wq.ncsu.edu/info/wetlands/funval.html>.