



# Managing Wetlands to Control Nonpoint Source Pollution

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States, territories, and tribes identify nonpoint source (NPS) pollution as the Nation's leading source of surface water and ground water quality impairments. When properly managed, wetlands can help prevent NPS pollution from degrading water quality. Wetlands include swamps, marshes, fens, and bogs.

Properly managed wetlands can intercept runoff and transform and store NPS pollutants like sediment, nutrients, and certain heavy metals without being degraded. In addition, wetlands vegetation can keep stream channels intact by slowing runoff and by evenly distributing the energy in runoff. Wetlands vegetation also regulates stream temperature by providing streamside shading. Some cities have started to experiment with wetlands as an effective tool to control runoff and protect urban streams.

Improper development or excessive pollutant loads can damage wetlands. The degraded wetlands can no longer provide water quality benefits and become significant sources of NPS pollution. Excessive amounts of decaying wetlands vegetation, for example, can increase biochemical oxygen demand, making habitat unsuitable for fish and other aquatic life. Degraded wetlands also release stored nutrients and other chemicals into surface water and ground water.

The U.S. Environmental Protection Agency (EPA) recommends three management strategies to maintain the water quality benefits provided by wetlands: preservation, restoration, and construction of engineered systems that pretreat runoff before it reaches receiving waters and wetlands.

## **Wetlands Preservation**

The first strategy protects the full range of wetlands functions by discouraging development activity. At the same time, this strategy encourages proper management of upstream watershed activities, such as agriculture, forestry, and urban development. Several programs administered by EPA, the U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, and the U.S. Department of the Interior, as well as other government agencies, protect wetlands by either controlling development activities that would affect wetlands or providing financial assistance to people who wish to protect them. In addition, nongovernmental groups that purchase wetlands for conservation purposes, such as The Nature Conservancy, The Trust for Public Land, and local land trusts, are playing an increasingly important role in protecting water quality.

## **Wetlands/Riparian Restoration**

The second strategy promotes the restoration of degraded wetlands and riparian zones with NPS pollution control potential. Riparian zones are the vegetated ecosystems along a water body

A series of fact sheets on nonpoint source (NPS) pollution

*Did you know that wetlands receive significant amounts of NPS pollution because they are typically the lowest point on the landscape?*

NPS pollution occurs when water runs over land or through the ground, picks up pollutants, and deposits them in surface waters or introduces them into groundwater.

through which energy, materials, and water pass. Riparian areas characteristically have high water-tables and are subject to periodic flooding and influence from the adjacent water body. They encompass wetlands and uplands, or some combination of these two landforms.

Restoration activities should recreate the full range of preexisting wetlands functions. That means replanting degraded wetlands with native plant species and, depending on the location and the degree of degradation, using structural devices to control water flows. Restoration projects factor in ecological principles, such as habitat diversity and the connections between different aquatic and riparian habitat types, which distinguish these kinds of projects from wetlands that are constructed for runoff pretreatment.

### **Engineered Systems**

The third strategy promotes the use of engineered vegetated treatment systems (VTS). VTS are especially effective at removing suspended solids and sediment from NPS pollution before the runoff reaches natural wetlands.

One type of VTS, the vegetated filter strip (VFS), is a swath of land planted with grasses and trees that intercepts uniform sheet flows of runoff, before the runoff reaches wetlands. VFSs are most effective at sediment removal, with removal rates usually greater than 70%. Constructed wetlands, another type of VTS, are typically engineered complexes of water, plants, and animal life that simulate naturally occurring wetlands. Studies indicate that constructed wetlands can achieve sediment removal rates greater than 90 percent. Like VFS, constructed wetlands offer an alternative to other systems that are more structural in design.

### **Saving a Precious Resource**

Healthy wetlands benefit fish, wildlife, and humans because they protect many natural resources, only one of which is clean water. Unfortunately, over half of the wetlands in the lower-48 states were lost between the late 1700s and the mid-1980s, and undisturbed wetlands still face threats from development. To help prevent NPS pollution from further degrading the Nation's waters and to protect many other natural resources, wetlands protection must remain a focal point for national education campaigns, watershed protection plans, and local conservation efforts.