

## **Mother Nature's Wastewater Treatment Plant**

Last week I talked about Mother Nature's watershed design and the importance of trees and wetland buffers in protecting lakes and streams. This week I'm going to expand a bit on the importance of wetlands, Mother Nature's Wastewater Treatment System.

Wetlands are typically transitional ecosystems- not quite dry enough to be upland, but not quite wet enough to be a river or pond. They are what ecologists call an "ecotone," where both terrestrial and aquatic organisms coexist, or perhaps take turns existing at different times of the year. Not long ago, wetlands were looked upon with scorn as unusable land that had little economic value and provided breeding grounds for mosquitoes and other pests. In the 19<sup>th</sup> Century the US had numerous laws and programs that actually encouraged the filling or draining of wetlands in order to "reclaim" land and over half the wetlands in the continental US were eventually destroyed.

In the 1930's duck hunters recognized that fewer wetlands meant fewer ducks, and ecologists began to recognize the critical importance of wetlands to water quality and breeding habitat for certain birds, fish, and amphibians. These diverse groups brought about changes in the laws and wetlands were given special protection by federal and state governments. A complex set of rules has evolved that defines wetlands legally based on the soils, plants, and hydrology and protects the areas in and around wetlands.

Wetlands purify water through the same processes that man-made wastewater treatment plants use- and then some. Photosynthesizing plants and algae take up nutrients and generate oxygen. The plant stems and planktonic (floating) algae cells take up metal contamination and sediment through adsorption and remove it from the water column. Wetland plants transport oxygen and other compounds to the root zone or "rhizosphere," providing sustenance to various bacteria that are the real workhorses of the system. These bacteria break down organic contaminants and take up additional nutrients. Through the process of "evapotranspiration" the plants take up water from their roots and release pure water to the atmosphere, where it recycles as rain. The water that is released is replaced by additional water flowing towards the roots, so the plant essentially acts as a pump to draw the dirty water through its zone of cleansing bacteria and sediments. Clean water leaving the wetland recharges groundwater aquifers or seeps slowly to nearby water bodies.

Wetlands also act as sponges to store floodwaters and release it slowly during drier periods. Small wetlands known as vernal pools provide critical habitat so frogs and salamanders can lay their eggs in fish-free waters. Shoreline wetlands provide erosion protection and shelter for juvenile fish. Accumulation of peat in bogs sequesters carbon, helping to reduce greenhouse gas accumulation. With all these critical functions, it is no wonder that a recent study concluded that wetlands are the most valuable ecosystems on the face of the planet, providing approximately \$15 trillion worth of value worldwide. Clearly a resource well worth protecting!

Want to know more about wetlands? Stop into the Maine Lakes Resource Center or visit EPA's web site at: [www.epa.gov/owow/wetlands](http://www.epa.gov/owow/wetlands).