



Illustration by Libby Walker Davidson

# WETLANDS FACT SHEET

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3

## **Topic: Wetland Functions and Values**

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### **WHAT IS A WETLAND?**

Wetlands are defined as those areas of the state that are inundated by surface or ground water with a frequency sufficient to support plants and animals that depend on saturated or seasonally saturated soil conditions for growth and reproduction. These areas are commonly known as ponds, bogs, fens, marshes, wet meadows, shrub swamps, and wooded swamps. In the Vermont landscape, wetlands often occur in association with lakes, ponds, rivers, and streams. They may also, however, be isolated from any obvious connection to surface water. In all wetlands, the presence of water creates conditions that favor the growth of specially adapted plants (such as cattails, water lilies, alders, dogwood, red maple and swamp oak) and promote the development of wetland, or hydric, soils.

### **WHY PROTECT WETLANDS?**

Wetlands serve a wide variety of functions and values beneficial to the health, safety, and welfare of the general public. It is estimated that less than 5% of Vermont is wetland and that nearly 50% of Vermont's original wetland area has been lost or severely impaired due to draining, dredging, filling, or excavation activities associated with industrial and residential development and agriculture.

Some of the functions and values that wetlands provide include: flood control, water quality protection, wildlife habitat, recreation and economic benefits, and erosion control. While the degree to which a wetland serves these functions and values varies from wetland to wetland, each wetland works in combination with other wetlands as part of a complex, integrated system. These and other functions and values are described in more detail below.

### **FLOOD CONTROL**

During rain storms and snow melt events, the amount of water running over the surface of the land increases, and in severe storms, flooding may result. Many wetlands, particularly floodplain wetlands, have the capacity to temporarily store flood waters, during high runoff events. Although wetlands have often been referred to as natural sponges that soak up water, they actually function more like natural tubs, storing either flood waters that overflow riverbanks or surface water that collects in isolated depressions. As flood waters recede, the water is released slowly from the wetland soils. By holding back some of the flood waters and slowing the rate that water re-enters the stream channel, wetlands can reduce the severity of downstream flooding and erosion.

In watersheds where wetlands have been lost, flood peaks may increase by as much as 80 percent. On the Charles River in Massachusetts, the floodplain wetlands were deemed so effective for flood control by the U.S. Army Corps of Engineers that they purchased them rather than build expensive flood control structures to protect Boston.

## **WATER QUALITY PROTECTION**

Many pollutants are washed by rainfall from urban and agricultural lands and are carried overland to water bodies. Pollutants include soil particles, fertilizers, pesticides, grease and oil from cars and trucks, and road salts. Wetlands can improve water quality by removing pollutants from surface waters. Three pollutant removal processes provided by wetlands are particularly important: sediment trapping, nutrient removal and chemical detoxification.

As water from a stream channel enters a wetland, the water expands and flows through dense vegetation. The velocity of the flow is reduced, allowing suspended material in the water to settle to the wetland surface. The roots of wetland plants can then bind the accumulated sediments. As much as 90 percent of the sediments that are present in runoff or in streamflow may be removed if the water passes through wetlands. Also, because pollutants, such as heavy metals, are attached to soil particles, the settling of sediments in wetlands further improves water quality.

Certain chemical forms of nitrogen and phosphorus stimulate plant growth. An overabundance of these nutrients in surface waters can promote excessive plant and algal growth. Such nutrients may enter wetlands from surrounding areas and accumulate within less harmful chemical forms. Other nutrients may be taken up by wetland plants and converted to plant materials. When wetland plants die and decay, nutrients are recycled within the wetland. Wetlands are so effective at removing excess nutrients from water that many municipalities have built wetlands specifically for treating effluent from secondary sewage treatment plants. Natural wetlands are not suited for this purpose and for each wetland there is a limit to how much can be added before the natural plant and chemical processes are overloaded and break down.

Some of the toxic chemicals carried into a wetland in runoff are trapped along with settled soil particles. Some of these pollutants may be buried in the sediments, while others may be converted into less harmful chemical forms by biological processes or by exposure to sunlight for extended periods. Still other pollutants may be taken up by the plants.

Some freshwater wetlands are located at points where surface water enters an underground aquifer, thereby recharging groundwater supplies. Wetlands are more often points of groundwater discharge to the surface of the land, such as springs. The groundwater discharge may be important as a local drinking water source or important for providing stream flows for fish, animals, plants, and other organisms that live on or near the stream during dry summer months.

## **EROSION CONTROL**

Vegetated wetlands along the shores of lakes or rivers can protect against erosion caused by waves along the shorelines during floods and storms. Wetland plants are important because they can absorb much of the energy of the surface waters and bind soil and deposited sediments in their dense root systems.

## **FISHERIES HABITAT**

Certain freshwater fish species require wetlands as spawning grounds and as nursery areas for their young. Spring spawning by northern pike in Lake Champlain is a particularly good example. Others, like black bullhead, yellow perch, pumpkin seed and bluegills, leave open water to spawn in shallow-water wetlands. The failure of many aspects of commercial and recreational freshwater fishing in the Great Lakes has been linked to wetland destruction.

Wetlands can be thought of as the farmlands of the aquatic environment since they produce great volumes of food (plant material). The major food value of wetland plants comes when the plants' dead leaves and stems break down in the water to form small particles of organic material called "detritus". This enriched material is their principal food for many small aquatic invertebrates, various shellfish, and forage fish that are food for larger predatory fish. These larger fish are, in turn, consumed by people.

## **WILDLIFE HABITAT**

Wetlands exhibit very high rates of plant productivity - the conversion of energy from the sun into plant materials. Recent studies suggest that some wetland types such as coastal marshes and inland freshwater marshes, are among the most productive ecosystems in the world. This high productivity often supports a varied and complex food web both within and outside of the wetland.

Wetlands provide essential habitat and food for numerous wildlife species. In addition to serving as a food source, the dense vegetation found in most wetlands provides places for wildlife to build homes and hide from predators. For many species, like the Canada goose, wood duck, great blue heron, muskrat, beaver, snapping turtle, and bullfrog, wetlands are primary habitats - the only places they can live. For others, such as black bear, moose, deer, wood frogs, and marsh hawks, wetlands are not primary habitat but are important for a part of their life cycle or during certain times of the year.

Wetland habitats are necessary for the survival of a disproportionately high percentage of endangered and threatened species. About 40 percent of the plant and animal species listed by the federal government as threatened or endangered depend heavily on wetlands, including species such as the osprey, the common loon and the whooping crane.

## **RECREATION AND ECONOMIC BENEFITS**

Wetlands provide endless opportunities for popular recreational activities, such as hiking, boating, hunting, fishing, trapping and birdwatching. Almost everyone likes being on or near the water, and the presence of so many fascinating lifeforms makes our wetlands especially enjoyable treasures. The observation and photography of wetland dependent birds, alone, entice an estimated 50 million people to spend nearly \$10 billion each year. The nation's harvest of muskrat pelts is worth over \$70 million annually. Waterfowl hunters in the United States spend over \$600 million annually to harvest wetland-dependent birds.

A wealth of natural products are produced in wetlands. Those available for human use include timber, fish and shellfish, wildlife, blueberries, cranberries, and wild rice. Approximately 82 million acres of forested wetlands are harvested nationally for commercial timber operations.

## **EDUCATION AND RESEARCH**

Wetlands can provide tremendous opportunities for education and research. They are good systems to study for several reasons because they are discrete ecosystems with easily defined boundaries. They also can exhibit a high diversity of habitats and species. By examining the types of pollen in layers of peat moss taken from bogs, we can learn about historical changes in climate and vegetation over thousands of years. Wetlands also have unique life forms, such as insectivorous plants, that are not found in the adjacent uplands.

## **OPEN SPACE AND AESTHETICS**

Many wetlands are visually rich environments because of their ecological interest and diversity. Historically, writers, artists, and photographers have been drawn to wetlands trying to capture the beauty on canvas and paper. Open wetlands, such as marshes, are often considered to be more attractive than shrub or forested wetlands. Wetlands that provide high wildlife habitat are perceived as more aesthetically pleasing because people go to wetlands to see wildlife. In areas where most of the uplands have been developed, the remaining wetlands are increasingly valuable for open space. Wetlands along streams provide natural green belts and corridors for wildlife.

## **HYDROPHYTIC VEGETATION AND THREATENED AND ENDANGERED SPECIES**

Wetlands that have uncommon plant community types, such as bogs, fens, alpine peatlands, and black gum swamps, provide habitat for rare, threatened, or endangered species, or represent the best known local example of common plant community types, such as marshes, shrub swamps, and wooded swamps, make an important contribution to Vermont's natural heritage and genetic diversity.

## **SUMMARY**

Wetlands are an important part of our national heritage. Our economic well-being and our quality of life have been largely dependent on our nation's wetlands since America was first settled. We must now take positive steps to protect wetlands to ensure that the values they provide will be preserved for future generations.