

# Understanding Wetlands And Endangered Species: Definitions And Relationships

Imagine you are walking through the woods. Up ahead, you see a small opening surrounded by trees, shrubs, wildflowers, and grasses. The opening has standing water with small clumps of leafy vegetation scattered throughout and isolated trees standing in the water. Around this opening the ground is soggy and dark. You see a snake move silently by while a salamander watches you before darting away.

You find a stump and sit to rest. As you settle back, you begin to notice many birds flying from one tree to the next, their calls ringing in the air. You hear tree frogs and the buzz of mosquitoes at your ear. You notice crawfish mounds near the water and droppings from a raccoon and a fox. You see the footprints of several deer, and you can see minnows in the shallow water. Water lilies float on the water surface. Butterflies visit the swamp lilies and dragonflies dart through the air.

What is this place and why are there so many different plants and animals here? This place is a wetland. Wetlands provide food, cover, and nesting sites (habitat) for many different animals—many of which are becoming increasingly rare.

We all know that the whys and hows of wetlands and endangered species protection are among the more controversial and actively debated natural resource issues of our day. Many people, even those who have a great love for wildlife, have been taught that wetlands are “wastelands” which serve no purpose unless they are drained and “put to use.” My purpose here is to explain, in general terms, what wetlands and endangered species are and to discuss the relationships which often exist between the two. This explanation will emphasize the role wetlands play in providing habitat for many plants and animals and the consequences loss of wetland habitat has had on many species.



## What Are Wetlands?

While the warm, fuzzy description given at the beginning of this publication helps develop a mental picture of a wetland, it leaves out the mosquito bites and humidity for which these areas are famous. In fact, wetlands have had a bad reputation, especially with early settlers who thought that “swamp vapors” caused fevers. This bad reputation and the realization that wetlands, when drained, often converted to very productive and valuable farm land were the root causes of wetland acreage losses which began in earnest in the mid-1800s.

Wetlands share some of the characteristics of both uplands and open water. Because wetlands are often located in an intermediate position between uplands and open water, many people call them transitional areas. Despite the early belief that wetlands were more valuable if converted to another use, time has proven that wetlands serve many functions which make them valuable in their natural state. Some of the valuable functions performed by wetlands are: protection of water quality, flood prevention, water storage, and wildlife habitat.

A few common types of wetlands include: fringe wetlands located along the shoreline of lakes; salt and freshwater marshes located in coastal areas; deepwater swamps and bottomland hardwood forests along rivers; and prairie potholes located in Canada and the upper midwestern states.

## Three Components Of A Wetland

To be considered a jurisdictional or legal wetland, all three of the following components must be present: wetland hydrology; hydric soils; and hydrophytic vegetation.

The hydrology (the presence, abundance, and source of water) determines and maintains the structure and function of a wetland. The hydrology of a wetland also drives the formation of hydric soils.

Hydric soils are soils that are “saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part.” Anaerobic conditions develop when water displaces oxygen present within the pore spaces of a soil. Hydric soils are often gray in color and may smell like rotten

eggs. Orange-colored deposits often occur around roots growing within hydric soils. Such things as how often and how long the soils are saturated or flooded; the depth of flooding; the time of year during which the soils are saturated or flooded, and whether the water is fresh or saline determine the type of vegetation found in a wetland.

Hydrophytic vegetation literally means “water-loving” vegetation. Plants that are able to grow and reproduce in wetlands do so because of special adaptations which allow them to survive in a waterlogged environment. Many wetland plants have very spongy roots. These roots have air spaces, which are believed to allow the movement of oxygen from the leaves to the roots, thereby allowing the plant to thrive despite the anaerobic conditions present in the soil. Wetland plants may have adventitious roots (roots growing out of the trunk above the soil surface), surface roots (roots growing at or just above the soil surface), or lenticels (openings on roots and stems for oxygen exchange). The type and abundance of vegetation is an important factor in determining what types of animal species use the wetland.

## Wetland Productivity

Many wetlands have very high primary productivity rates. This means that the plants growing in the wetland are very efficient at converting sunlight, water, and soil nutrients into plant tissue. Typically, the most productive wetlands are coastal wetlands and wetlands located adjacent to rivers or streams. The reason that many of these areas are so productive is related to the hydrology or movement of water which occurs within many wetlands.

Coastal wetlands flood regularly due to tidal water movement. Tidal flooding flushes the soils of coastal wetlands, removing toxins and wastes which may make the soils inhospitable to plants or burrowing animals. In addition, the regular movement of water into and out of coastal wetlands helps to re-aerate soils. This re-aeration results in more vigorous growth of wetland plants.

Wetlands adjacent to rivers flood on a fairly regular basis. This movement of water delivers nutrients, sediment, and organic matter from upland areas, creating the rich soils for which these systems are so valued.

## Which Animals Inhabit Wetlands?

Not surprisingly, the fact that many wetlands are highly productive means that they are also rich in animal species. Animals are attracted to wetlands because they provide food, water, cover, and nesting sites. In short, wetlands provide many animals with homes. Many species live their entire lives in wetlands and are completely dependent on them for survival. Other species are dependent on wetlands only during a portion of their life cycle. For these species wetlands serve either as a summer home, a winter home, or an occasional feeding or resting spot.

Wetlands provide critical habitat for wildlife, and, in fact, wetlands exceed all other land types in wildlife productivity. It has been estimated that in the United States roughly 150 species of birds and more than 200 species of fish depend on wetlands for their survival.

Many birds such as the great blue heron, great egret, bald eagle, osprey, red-shouldered hawk, owls, wild turkey, belted kingfisher, red-bellied woodpecker, pileated woodpecker, and several species of swallows, sparrows, and warblers use wetlands. Ducks occupy wetlands in great numbers. Duck species include the wood duck, mallards, black ducks, blue-winged teal, gadwall, widgeon, and the northern pintail.

Mammals such as the muskrat, beaver, raccoon, and white-tailed deer also use wetlands. In addition, a wide variety of reptiles, turtles, and freshwater fish depend on wetlands for survival.

One group of animals often overlooked when the inhabitants of wetlands are considered is the invertebrate species. These small animals, which include flatworms, aquatic earthworms, leeches, crawfish, and fairy shrimp, are vital links between plants and the animal food chains. Many invertebrates graze on living plants while others consume dead organic material. The invertebrates are in turn eaten by fish, birds, frogs, toads, and turtles. So, in fact, invertebrates make energy available to animals which may consume little or no plant material.

While much remains to be learned about the many different species of invertebrates that inhabit wetlands of various types, research has shown that these species have very specific habitat requirements. What happens to these vital links when wetlands are altered or destroyed? What happens to the animals that depend on these species for some or all of their nutritional requirements? Obviously, if the flow of energy, in the form of food, from one species to another is interrupted, there will be a negative impact on both species diversity and on population size.

## What Are Endangered And Threatened Species?

The Earth is rich in both animal and plant species. However, a number of species are experiencing trouble meeting their needs. Some of these species are considered “endangered” while others are considered “threatened.” Endangered species are species that, if not protected, are in imminent danger of permanently disappearing from Earth. Threatened species are species that, if not protected, are likely to become endangered in the foreseeable future. In 1973, Congress passed the Endangered Species Act with the express purpose of protecting species that were in danger of extinction.

There are many reasons why a species may face extinction, including such natural events as long-term changes in climate and worldwide sea level fluctuations. Some species are found only in small numbers in few locations which means that any change (whether natural or induced) could negatively impact them. Today, people have the ability to alter land, water, air, and climate to a degree never before seen. As a consequence, the majority of species facing extinction today do so as a result of habitat degradation or destruction caused by people. Worldwide, roughly 1,100 species have been designated as either threatened or endangered. In addition, another 3,600 have been identified as candidates for threatened or endangered status although official action has not been taken.

## Why Is Wetland Habitat Threatened?

Wetland habitat degradation can result from either increased or decreased flow of water into or out of an area; decreased water quality, resulting from excess nutrients and toxic chemicals originating from faulty septic tanks; overflowing sewers; or runoff from agricultural lands or urban areas. Wetland habitat destruction results from the transformation from natural areas to agricultural fields, urban development, or plant monocultures.

Another danger facing wetland-dependent species is the fragmenting of wetlands into smaller and smaller unconnected areas. When this happens, species requiring large areas of land to survive will begin to disappear. This has been observed with the black bear in Louisiana and the Florida panther in Florida. Other animals, which might not need large ranges, may still face the problem of inbreeding or isolation from suitable reproductive partners simply because they can no longer move from one nearby wetland site to another.

Wetlands have been particularly hard-hit with both habitat degradation and destruction. In fact, roughly half of all wetlands that existed within the lower 48 states at the time of European settlement have disappeared. Some states, such as California have lost as much as 90 percent of the wetlands present 200 years ago. Alabama has lost approximately 50 percent of its original wetlands, Mississippi and Tennessee have lost roughly 59 percent, and North Carolina has lost 44 percent. Kentucky has lost 80 percent of the wetlands that were present 200 years ago. Historically, most of this loss was to agriculture. Present-day wetland loss is often associated with urban expansion, particularly in coastal areas. Conversion of bottomland hardwood forests to pine does still occur in parts of the Southeast.

## How Does Wetland Loss Affect Wetland-Dependent Species?

Not surprisingly, coupled with the dramatic destruction of wetlands and degradation of remaining wetlands, there has been a marked decrease in the populations of many animal and plant species that depend on these systems for survival. At least 95 plant, 5 mammal, 22 bird, 4 reptile, 3 amphibian, and 22 fish species listed as endangered or threatened depend on wetland habitats for survival. In 1986, there were 188 species of animals listed as threatened or endangered by the federal government. Of these, roughly 50 percent were wetland related. The animal groups with the largest numbers listed as threatened or endangered are the fish, mussels, and

**Federally Listed Endangered And Threatened Species Associated With Wetlands.\***

	Number Of Endangered Species Associated With Wetlands	Number Of Threatened Species Associated With Wetlands	Percent Of Total Species Listed In United States
Plants	17	12	28
Animals			
Mammals	7	—	20
Birds	16	1	68
Fishes	26	6	48
Reptiles	6	1	63
Amphibians	5	1	75
Insects	1	4	38
Mussels	20	—	66
Total	98	25	

Source: Niering 1988.

\*Only species listed within the United States are included here.

birds. In 1986, 103 plants were listed as threatened or endangered, and 28 percent were considered wetland dependent.

As of 1991, the U.S. Fish and Wildlife Service had listed 595 plant and animal species as threatened or endangered. Of this number, 256 (43 percent) are wetland dependent. In fact, wetlands provide fully 60 percent of all threatened species and 40 percent of all endangered species listed in 1991 with essential habitat. The table illustrates the breakdown of threatened and endangered species by taxonomic groups.

Information on many wetland-dependent plant and animal species is limited. However, data on waterfowl, which migrate from northern to southern wetlands every year, have been collected for many years. Although these species are not threatened or endangered, they have experienced significant decline in numbers. It was estimated that there were 145 million ducks migrating from Alaska, Canada, and the northern prairie states in the period just after World War II. By 1992, that number had dropped to 64 million—a 56 percent reduction. This decrease was attributed primarily to loss of habitat. Many people feel that the decrease observed in duck populations is an indication that many other wetland species are also experiencing declines.

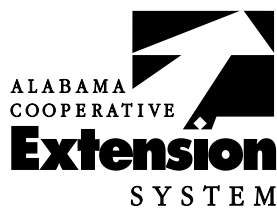
Migratory species, such as waterfowl, may require different types of wetlands at different times during the year. In 1982 it was estimated that 80 percent of the American breeding bird population and more than 50 percent of the 800 species of protected migratory birds relied on wetlands. This means that impacts on wetlands in one part of the United States, Canada, Mexico, or South America may adversely impact the numbers and species composition of migratory birds. This fact complicates attempts to protect wetland-dependent species because decisions affecting migratory birds must be made not only across state boundaries, but across countries and in some cases continents.

## Conclusion

As you can see, wetlands are valuable real estate to many plants and animals. The next time you discuss the issues of wetlands and endangered species I hope the information provided here will help you have a better understanding of how these two issues are related. Hopefully I've helped you to a better understanding of the value of wetlands and how many animal and plant species depend on them for survival. Unless we all begin to understand this relationship, you can expect to hear more and more about endangered species at the same time that you hear about wetland loss.

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**Kathryn Flynn**, *Extension Forester*, Assistant Professor, Forestry, Auburn University

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