Microscope to wetland?

Wading into Wetlands

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The water's up to your ankles and a pungent smell reaches your nose. You move along slowly, watching a great blue heron search for its lunch. When you round a bend, you're startled by a flock of ducks as they take off from the water. A dragonfly zips past your head as you watch the ducks fly off over trees.

You could be in a swamp. Or a salt marsh. Or one of many different types of wetlands. In this teacher's guide you'll learn what we mean by the word "wetland"—and why wetlands are so special.

There are many kinds of bogs, marshes, swamps and other wetlands. But all wetlands share some characteristics that set them apart from other kinds of habitats.

Most ecologists define wetlands as areas that, at least periodically, have waterlogged soils or are covered by shallow surface water, which supports plants and animals that are adapted to living in a watery environment.

Various factors can create wetlands. Since most wetlands are located in low-lying areas, rain and runoff help to keep them saturated. Some wetlands lie where groundwater is at or very near the surface of the Earth and feeds the wetlands from below. Other wetlands stand next to rivers or other bodies of water that regularly overflow. In coastal areas, tides keep many wetlands saturated.

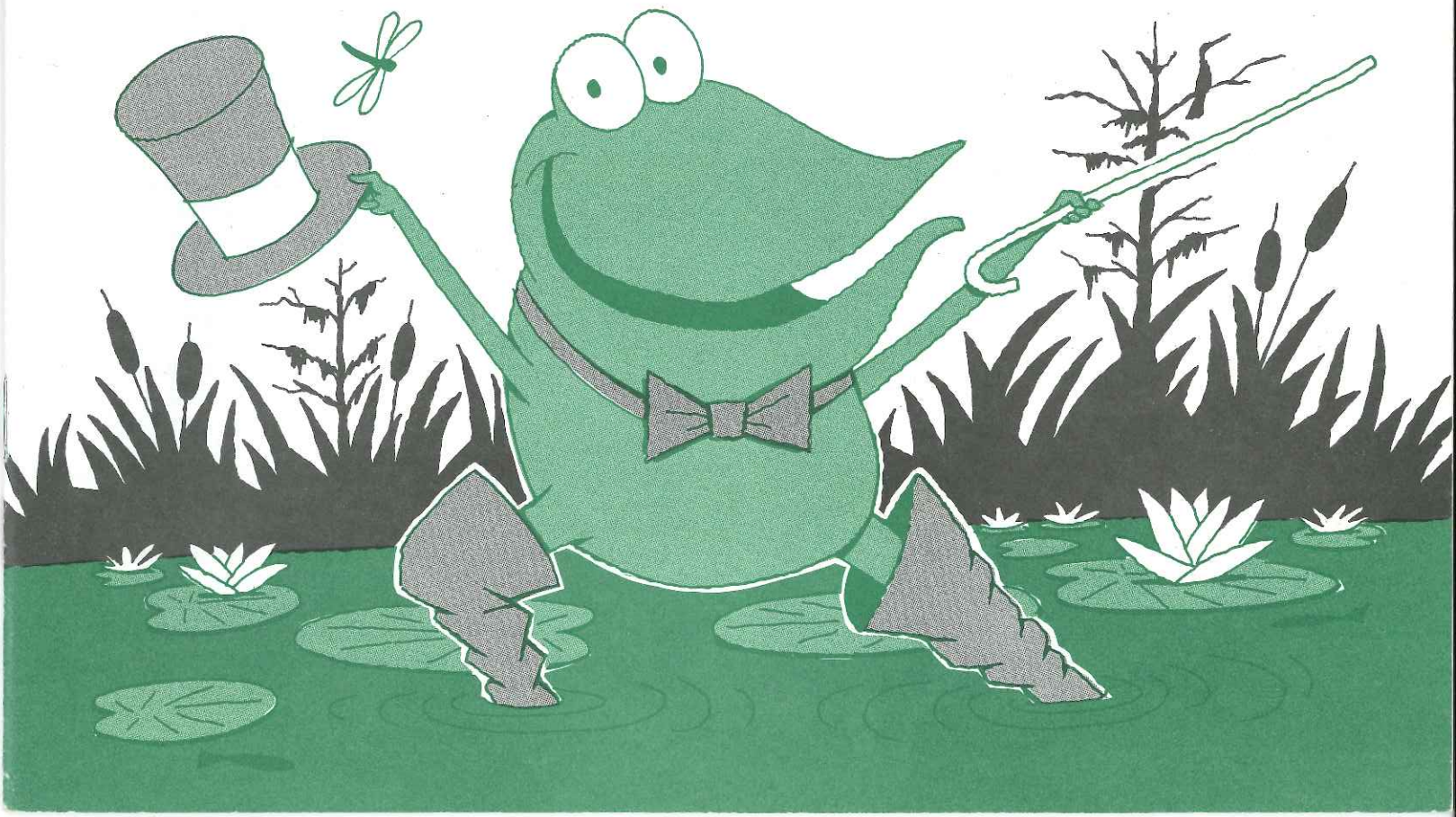
Some wetlands start with a little outside help. Beavers, for example, turn meadows into marshes or parts of forests into swamps by damming streams. People create wetlands, too. For example, a state wildlife agency might flood an area to create fish and wildlife habitat.

SALTWATER WETLANDS

Because they exist along coastlines, the major kinds of saltwater wetlands—salt marshes and mangrove swamps—support rich networks of life adapted to dynamic environments. Twice each day along most of the world's coasts, the tide rises and falls, exposing coastal wetlands to a rapidly changing environment. The plants and animals that live in these wetlands must be able to adapt to shifting water levels, fluctuating temperatures, periodic exposure to air and increases and decreases in the salt content, or salinity, of the water.

Salt Marshes

Found primarily along the Atlantic and Gulf coasts, but also in scattered locations along the U.S. West Coast, salt marshes are open areas filled with a sea of grasses or grass-like plants. Often they're found in the inner reaches of coves, inlets and bays since this protects them from the full force of the pounding surf. Sediment brought in on the tides and nutrient-rich silt carried by rivers can settle in these calmer areas, giving marsh plants an ideal place to



sprout, grow and spread.

Because of all the food salt marshes have to offer, they support a considerable amount of wildlife. But many salt marsh organisms are small or even microscopic. Few larger animals make the salt marsh their permanent home, and many migrating birds make only brief stopovers.

Mangrove Swamps

Mangrove swamps are the tropical counterparts to the salt marshes of cooler climates. They reach their most lush growth in the United States along the coasts of southern Florida. With their jungle of roots and dense leaves and branches, mangrove trees are the dominant plants in these swamps. They are great storm breakers, in addition to being popular places for wildlife.

Certain animals, like some oysters, cling to mangrove roots. Others, such as shrimp, fish and crabs, hide and feed among the roots submerged by high tide. And in the mangrove branches, storks, herons, egrets and a dozen other birds nest or roost. The swamps are also the last stopover for birds migrating across the Gulf of Mexico in the fall and the first stop for those returning in the spring.

FRESHWATER WETLANDS

Many ducks and geese, with numbers in the tens of millions, along with numerous shorebirds and other types of wildlife, start their lives in a marshy wetland area, better known as prairie pothole country. It covers more than 300,000 square miles throughout parts of the Dakotas, Minnesota, Montana, Iowa and Canada. Prairie potholes, which are numerous small ponds created by glaciers long ago, and other types of freshwater marshes along with swamps and bogs make up freshwater wetlands.

Marshes

From small cattail marshes along major highways in California to huge expanses of sawgrass in Florida to prairie potholes, freshwater marshes are a common sight throughout much of North America. Thick clumps of soft-stemmed plants such as grasses, sedges and rushes are abundant, along with cattails and water lilies. According to some biologists, freshwater marshes make up about 90 percent of our wetlands.

The water in a marsh fluctuates from season to season, rising during heavy rainfalls and often disappearing during dry periods. Seasonal or ephemeral wetlands are overlooked by people as vital areas because they may only be saturated with water for short periods during the year. The importance of these areas for migratory birds and flood control is often discounted simply because they don't look like typical wetlands.

Bogs

Bogs are freshwater wetlands that usually contain a huge build-up of peat—rich organic material that is made up of partially decayed plant material. Peat forms as plants die and their parts fall into the water.

Bogs are usually found in wet areas of the colder regions of the world where there is very little water flowing in or out. The high acidity of the peat, the cold year-round temperatures and the limited oxygen supply due to poor water circulation discourage bacteria and other decomposers from breaking down plant material, so peat layers grow year after year, becoming up to 40 feet thick.

Some bog plants, such as black spruce, have root systems adapted to low-oxygen supplies and waterlogged conditions. Others, such as some orchids and heath plants, have symbiotic relationships with fungi that help them get nutrients they need, which are in short supply in most bogs. Many bog plants, such as bladderworts, pitcher plants and sundews, trap and digest insects and other tiny animals as a source of nutrients.

Swamps

Swamps are wetlands dominated by shrubs or trees. They are usually saturated with water during the growing season but may dry out later in the summer. Swamps can have anywhere from a few inches to a few feet of water.

Two groups of freshwater swamps predominate. Forested swamps are often associated with major river systems, such as the Mississippi, and they often occur on river floodplains. These swamps are famous for their huge trees and contain stands of enormous bald cypress, overcup oak and water tupelo. On the other hand, shrub swamps are characterized by scrubby, low-growing vegetation. These swamps often form in poorly drained areas on the edges of lakes, forested swamps, marshes and streams.

WETLANDS AND WILDLIFE

Wildlife benefits from wetlands in many ways. Some examples follow:

Migration

While traveling between winter and summer homes, geese, herons, egrets, sandpipers, plovers and other birds converge on wetlands to "refuel" on rich food supplies before resuming their journeys. Many birds nest and winter in wetlands, too.

Natural Nurseries

The young of certain fish, crustaceans and other creatures spend their earliest days in wetlands, taking advantage of the rich food supply before moving to open waters. Thick wetland vegetation also provides a good place to hide.

Habitat and Breeding Grounds

Wetlands provide hundreds of kinds of plants and animals vital habitat in which to live. In particular, the health of our nation's waterfowl population is directly tied to these areas. Seventy-five percent of all waterfowl breed only in wetlands.

Havens for Rare Species

Wood storks, snail kites, whooping cranes and American crocodiles are all endangered species—and they all live in wetlands. In fact, about 43 percent of U.S. threatened and endangered species either live in wetlands or depend on them in some way for their survival. This means that almost half of the nation's rare animals and plants are inseparably linked to areas that, altogether, make up only about five percent of the total land area in the lower 48 states.

WETLANDS AND PEOPLE

Wetlands provide people with countless benefits. Here are a few:

Flood Busters

Sponging up excess water, wetlands offer an easy and cheap way to control floods. Because they lie in low spots or depressions, wetlands function like giant, shallow bowls. Water flowing into the bowls spreads out and slows down, which helps to reduce flood damage to the natural and human environment.

Natural Pollution Filters

As Mother Nature's maid, wetlands and the aquatic plants that grow there provide free cleaning services by removing excess nutrients, heavy metals and other toxic chemicals from polluted runoff water. Contaminants adhere to vegetation and sediment that settle on the wetland floor. In this way, wetlands help protect the nation's drinking water.

Silt Trappers

When wetlands slow flood waters, the silt and other sediments in the water settle out among the roots and stems of wetland plants. This helps to protect streams, lakes and other bodies of water downstream from a build-up of sediment that could stifle aquatic plants and animals.

Storm Breakers

Coastal wetlands buffer the effects of the ocean's strong winds and waves on shoreline communities of people and wildlife.

Groundwater Rechargers

The nation's groundwater can be replenished and recharged by wetlands. Surface waters that feed into groundwater systems recharge or refill these systems. Water migrates downward through wetlands to maintain groundwater levels.

Stock for Fisheries

Wetlands support the commercial fishing industry because they provide fish and shellfish with food and a place for breeding and raising young.

Recreation Hot Spots

Hunters and anglers of wetland-dependent species rely on intact wetland ecosystems to support and nurture their recreation. Many more Americans seek wetlands as retreats to birdwatch, photograph and otherwise appreciate wetland species and habitat.

WATCHING OUT FOR WETLANDS

Wetlands are highly sensitive to disruption caused by human activities. Since the first European settlers colonized North America, we have lost well over 50 percent of our wetlands. And the latest reports put the losses at up to 290,000 acres of wetlands every year.

As wetland areas have become more populated, development has crept farther and farther into these critical areas. More channels, dikes and diversions have been installed. Much of the rich peatland that had taken hundreds of years to form has been drained and turned into farmland. Other former wetland areas have become pastures for livestock. Fertilizers from farms and lawns seep into our water, reducing its quality.

Wetland areas are in trouble all over the country. Here are some examples:

Everglades

One of the largest marshes in the world, the Everglades once covered most of South Florida. Disrupting the balance of alternating wet and dry seasons, urban and agricultural development since 1900 have put the entire Everglades ecosystem in jeopardy, including the 1.2 million acres that lie in Everglades National Park.

Prairie Potholes

Only 5.3 million acres remain of the 17 million acres of prairie wetlands that once dotted North Dakota, South Dakota and Minnesota. About 33,000 acres of prairie potholes continue to disappear each year.

Great Lakes

Marshes along the Great Lakes have decreased 90 percent. These marshes not only provide habitat for fish and wildlife, but also help to prevent shoreline erosion and minimize the destructive effects of storms.

California

Less than 450,000 acres of California's original 5 million acres of wetlands remain.

Lower Mississippi Valley

Only about 15 percent of the bottomland hardwood wetlands that once covered the lower Mississippi Valley still exist.

TAKING CARE OF WETLANDS

From local zoning laws to state wetland acquisition to provisions in the national Clean Water Act, wetlands have some protection at all levels of government. But because of lack of support and money, much of the legislation for wetlands protection is poorly enforced, and some of it has been offset by conflicting legislation that encourages wetland destruction.

Two of the most effective wetland-protection programs are the Federal Migratory Bird Stamp Program (known as the Duck Stamp program) and Section 404 of the Clean Water Act. The Duck Stamp program, administered by the U.S. Fish and Wildlife Service, requires waterfowl hunters over 16 years of age to purchase a duck stamp annually. The funds raised help buy valuable wetland habitat. Section 404 of the Clean Water Act helps prevent wetland destruction while still allowing certain development under a permit program.

Although these and other programs have given wetlands a helping hand, many conservation groups feel that much more wetland protection is needed. The National Wildlife Federation and other groups are working to establish a national wetland policy that would: prevent any additional loss of wetlands; restore wetlands that have been dredged, drained and overdeveloped; construct artificial wetlands as needed; support wetland research; and strengthen existing wetlands legislation.