Section 2: Wetland Ecosystems- Freshwater Marshes & Swamps Study Guide

The following is an excerpt from the Aquatic & Marine Ecosystems Leaders Guide, Introduction of Lesson 2: Wetland Ecosystems- Freshwater Marshes & Swamps (2013). The activity lesson plans associated with this section are not currently available (i.e., the "DO" section below). The following is intended to guide 4-H leaders and youth in specific areas to gain knowledge in leading up to the 4-H State Aquatic & Marine Ecosystems Contest.

"OBJECTIVES

For youth to:

- Distinguish different types of freshwater wetlands from other aquatic/marine ecosystems.
- Identify the characteristics and functions of freshwater wetland ecosystems.
- Name common and endangered plants and animals found in freshwater wetland ecosystem.
- Identify the effects and impacts of the water cycle on freshwater wetlands.
- Identify the role of freshwater wetlands in aquifer recharge.
- Explain the function of freshwater wetlands as water purifiers
- Demonstrate knowledge of food chains and energy flow in wetlands.
- Identify impacts of human activities on wetlands.
- Define ways in which people can maintain, restore and preserve wetlands.
- Describe ways wetlands are important to people and wildlife.

PURPOSE:

To become familiar with freshwater wetland ecosystems.

DO

Here are some learning activities and suggested ways to implement the activities in Lesson 2.

- Discover the characteristics of a freshwater wetland with WHAT'S A WETLAND?
- Learn the names of common plants and animals found in the freshwater wetland ecosystems of Florida with WETLAND BINGO.
- Discover some of the functions of freshwater wetland areas in WETLANDS CAN STORE AND FILTER!
- Identify the effects and impacts of the water cycle on wetlands using WETLAND RECHARGE.
- Understand food chains and energy flow it wetlands with FOOD CONNECTIONS.
- Discover that wetlands are not all the same with WETLAND TYPES.
- Identify important functions of wetlands through WET AND WILD TRIVIA.

REFLECT:

After completing the activities in this lesson, help youth reflect on what they learned with these questions.

• Is water always present in a freshwater wetland?

No, wetland areas experience wet and dry cycles on a periodic basis. In some wetland types, water may never be visible at the surface, but saturates the soil and influences the types of plants found there.

- Describe how our freshwater wetlands affect the movement of water into the aquifer.

In addition to trapping soil and debris, freshwater wetlands also function as temporary water storage areas, slowly releasing the water into rivers, streams and aquifers.

- How do freshwater wetland plants help purify pollutants from the water?

Plants can absorb various nutrients and other pollutants through their roots.

- Compare the differences and similarities between various wetland types: swamps and marshes, bayheads and hydric hammocks, etc.

APPLY

- Identify a freshwater wetland in your area. Call the Natural Resource Conservation Service, Forest Service, Florida Department of Environmental Protection and/or other agencies for more information.
- Have youth draw a picture of the freshwater wetland they visited, including any plants and animals they observed. Ask each person to diagram a possible food chain that could be found in the freshwater wetland.
- Learn more about some of the common and endangered species found in freshwater wetlands in your vicinity.
- Draw a map of the freshwater wetland and its surrounding area. Identify possible sources of contaminants (pollution). Discuss how the wetlands function as a filter.
- Discuss where this wetland is located. Is it near development? What are possible threats to this area?
- Help youth to conduct a role-playing study of the ways classification of freshwater wetlands can affect their use and the limitations imposed by federal, state and local regulations.

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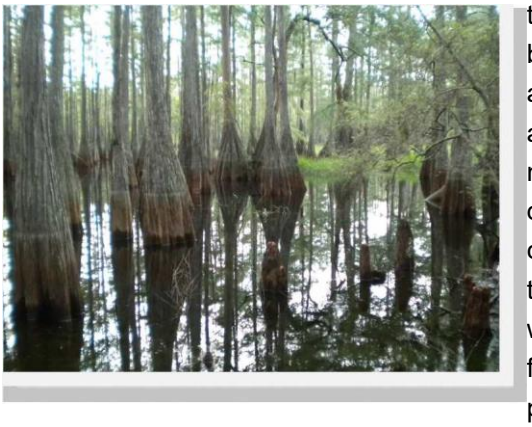
BACKGROUND BASICS ... FRESHWATER WETLAND ECOSYSTEMS

A wetland can be compared to a nursery, kitchen and bedroom for numerous species of plants and animals. Birds depend on our marshes, bayous and flooded bottomlands for nesting sites, roosts, food, and shelter during all or part of the year. Raccoon, opossum, mink, muskrat, beaver, red fox, gray fox, and otter live in and around wetlands feeding on small mammals, aquatic life, birds and their eggs. The white-tailed deer is found in the bottom lands, and when necessary it will depend on swamps and marshes to escape predators.

Wetland plants create habitats for many of the animals mentioned above. Plants have developed in these special water saturated environments forming complex interrelated communities. Many individual species of plants have adapted in special ways to live in wetland areas. Cypress knees help support the tree in water saturated soils. Carnivorous plants such as sundew and pitcher plants capture insects to supplement their nutrient requirements. **Wetlands** include freshwater marshes, swamps, bottomland hardwood forests, bogs, and wet meadows. These areas are covered by water for all or at least part of the year. In some cases, water may never be visible at the surface but saturates the soil beneath. They can be formed in low lying areas subject to flooding, in depressions where water collects, along springs and rivers, or in areas where soil types delay the movement of water. The word wetlands means many things to different people, and the variety of wetland types have been classified in different ways. According to the definition developed at the 1975 National Wetland Classification and Inventory Workshop; a wetland is a land area where an excess of water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. It spans a continuum of environments where terrestrial and aquatic systems integrate. The U.S. Fish and Wildlife service has listed twenty different types of wetlands, eight freshwater and twelve salt water. (See Lesson 4 for descriptions of coastal wetlands.) Basically, two major categories of freshwater wetlands exist: swamps and marshes. By definition, a **swamp** is a forested wetland containing woody plants (trees and shrubs) such as cypress, tupelo, buttonbush and red maple. **Marshes** are described as wetland areas dominated by grasses, sedges, and other non-woody species.



Wetlands functions

Wetlands perform a number of important functions. Some can purify polluted water. Others can reduce the impact of floods by temporarily storing flood waters. Some wetlands provide critical habitat for endangered species. Still others help refill groundwater supplies.

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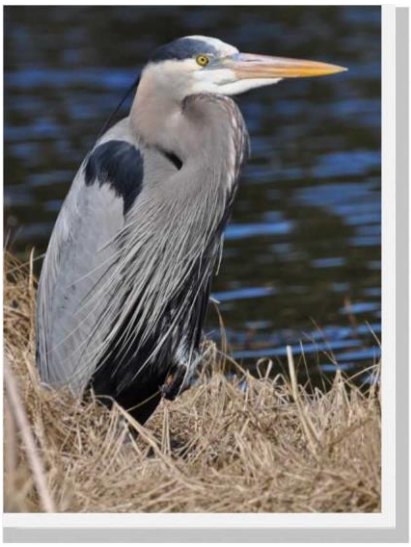
Wildlife and Fisheries



Wetlands are among the world's most biologically productive ecosystems and are very important as habitats for fish and wildlife. Wetlands provide essential breeding, spawning, nursery, nesting, migratory and/or winter habitats for a major portion of the nation's migratory and resident fish and wildlife. Many of the nation's threatened and endangered plant and animal species depend on wetlands for their survival. Millions of birds including Florida mottled ducks, sandhill cranes, wood storks, great egrets, American coots and wood ducks depend on marshes, wet meadows, swamps, mudflats and other wetland types.

Surface and Groundwater Supply

The **groundwater recharge** function of wetlands (i.e., movement of surface water to groundwater/aquifer areas) is an important wetland function. Some wetlands are areas of groundwater recharge that may be linked to human uses. For example, recharge is essential to the refilling of aquifers for water supply. Wetlands are also interconnected with our lakes and rivers. Wetlands help maintain lake levels and river flows by storing floodwater, then gradually discharging water into these surface features.

Water Quality

Wetlands slow the flow of runoff from uplands before it reaches a river, lake, or other body of water. They trap and filter sediments from flood water. Wetlands play an important role in maintaining and improving water quality by retaining or removing nutrients, and processing chemical and organic wastes and pollutants.

It is critical to recognize that wetlands have a limited capacity to perform this water quality function. When sediments, nutrients, pesticides, heavy metals and other substances collect in wetlands soils, plants, and animals may absorb these substances. High levels of certain toxins can impact the food chain through effects on growth and reproduction. This can result in serious problems for fish, wildlife, and human populations.

Flood, Erosion and Shoreline Damage

Wetlands slow water movement, temporarily store flood water, reduce bank and shoreline erosion, and slowly release stored water downstream, thereby saving lives and property. This function is especially important in areas with human development on flood plains, such as the St. Johns River basin, where the possibility of flood damage is high. Inland wetlands located along major streams and around lakes help protect shorelines and channel banks from storm, wave, or erosion damage.

Important factors influencing the flood reduction role of wetlands include size (larger wetlands provide more flood storage and flow reduction) and location within the basin (wetlands in the upper watershed often are more effective for flood water retention). Other factors such as texture of the subsoil, vegetative cover and connections with other wetlands (isolated wetlands are generally less helpful in flood control) can help reduce high water levels during critical flood stages.

The direct economic significance of the flood and shoreline erosion control function of wetlands can be measured by the millions of dollars spent annually for construction of jetties, bulkheads and other structures intended to inhibit water damage. Flood waters and shoreline erosion destroy homes, eliminate harvestable timber, remove fertile soil, and alter land uses. Eroded sediments are often redeposited in navigable channels, increasing the need for costly dredging. As a natural ecosystem, wetlands provide many of these services at no cost.

Other values and uses of wetlands

Other important wetland values include aesthetic qualities, educational uses, archeological/ historical sites, research, and recreation areas. Undisturbed natural wetlands have high value as examples of their biotic community type for study and comparison, and for protection of unique resources. Also, with proper management, consumptive uses of wetlands such as commercial fishing and forestry may be compatible with ideas for wetland protection. Sustainable management of consumptive use of wetlands is important for the health of these ecosystems.

Conclusion

Both saltwater and freshwater wetlands are important as natural areas because they hold a great diversity of plant and animal life. Wetlands are considered nursery areas for many species of fish. The special importance of wetlands as a result of their rarity and diversity is Wetlands in Florida are not only valued for their wildlife diversity but for flood control and as water recharge zones. Wetlands have also played a major role in the state's history and development, shaping settlement patterns and agricultural areas.

Since wetlands make up only an estimated 5.5% of the land area in the United States (excluding Hawaii and Alaska) these areas might be considered rare. With proper management and protection Florida's wetlands will continue to be productive ecosystems that support a variety of uses for the human community and natural community alike.”