

Phinizy Swamp Nature Park Teacher Field Trip Preparation Guide

Program: Swamp Stomp

Objectives: To learn how to delineate a wetland, to investigate wetland soils and organisms, and to learn why wetlands are valuable to all life.

The following academic standards are covered on this field trip:

GPS6: CS1, CS2, CS4b, CS5, S6E3a, S6E3b, S6E5h, S6E5i, S6E5j, S6E6

GPS7: CS1, CS2, CS4b, CS5, S7L1a, S7L1b, S7L4c, S7L4d, S7L4e

GPS8: CS1, CS2, CS4b, CS5, S8P1c, S8P1e, S8P1f, S8P1g

S.C. Science Standards: 6-2.1, 2.3, 2.4, 2.5, 2.7, 2.8, 4.2; 7-2.4, 4.3, 4.4, 4.5, 4.6; 8-2.1, 2.7, 3.9

Vocabulary:

Aquatic: Living or growing in water.

Delineate: To decide where something begins and ends

Diversity: a variety of different types of organisms

Ecology: The study of the relationships between organisms and their environment.

A scientist who studies ecology is called an ecologist.

Habitat: An area that provides all of the food, water and shelter in the proper arrangement that an organism needs to survive.

Hydric Soil: Soil showing the effects of the presence of water

Hydrophilic: water-loving; an organism adapted to living in water; these plants are also called hydrophytes.

Indicator Species: An organism whose prominent presence in an environment serves as a marker for that ecosystem

Marsh: A wetland characterized by grasses.

Mitigation: The policy of creating or replacing wetlands that have been lost to development

Pollution: a contaminant of the environment

Permeability: the rate that a liquid can flow through a substance

Restoration: The process of reestablishing the original condition of a degraded environment

Soil Texture: The way a soil feels as a result of the percentage of clay, sand, and silt (three components of soil).

Swamp: A wetland characterized by trees.

Terrestrial: Living or growing on land.

Watershed: The land area from which all water drains into a particular water body.

Water Table: The upper limit of water saturation in the ground

Wetland: An area characterized by water at or below the surface, low-oxygen soils, and special wetland plant species.

Teacher Background Information:

On Wetlands

What is a wetland?

A wetland is just that, wet land. A wetland is an area that has all three of the following characteristics:

- Low-oxygen (anaerobic), hydric (water-saturated) soil
- Special hydrophytic (water tolerant) plants that can survive in low-oxygen conditions
- A hydrologic regime where water is frequently at, just below, or just above the ground's surface, creating saturated conditions that lead to the development of hydric soils and the presence of hydrophytic plants (the level of water often fluctuates and is far from constant)

What is wetland delineation?

Wet land delineation is the method of determining whether or not an area is a wetland. Delineators test soil, examine the water table, and look for indicator plant species.

Where are wetlands located?

- All over the world and in every state in the U.S
- They can be freshwater or saltwater
- They can be along a body of water or independent from another water source
- They are often transitional areas located between dry land and deeper aquatic systems such as rivers and lakes
- They can be forested or not forested
- 5% of U.S. wetlands are coastal wetlands, while 95% are inland wetlands

What are some examples of wetlands?

- Marshes: dominated by herbaceous vegetation, with water levels from 3 feet to 6 inches or less. Includes salt marshes, fresh water marshes, and brackish marshes
- Swamps: dominated by woody trees or shrubs
- Wet meadows: a type of marsh dominated by grasses or sedges, with water levels at 6 inches or less
- Prairie Potholes: water-filled glacial depressions located primarily in the mid-west. An important site for waterfowl
- Bogs and Fens: wetlands with peat for soil due to low decomposition rates
- Vernal Pools: Temporary pockets of water that fill depressions in wooded areas, meadows, and river floodplains
- Carolina Bays: Unique wetlands found primarily in the coastal plain of North Carolina, South Carolina, and Georgia which are typically shallow, oval depressions

What wetlands exist at Pinizy Swamp Nature Park?

- Floodplain swamp (a swamp that exists near a stream or river)
- Constructed wetland marshes (human-made grassy wetlands)
- Oxbow Lakes and River Scars (remnants of where a river used to flow)

Why is it important to protect wetlands (values of wetlands)?

- They improve water quality by intercepting surface runoff and removing nutrients, waste and sediment from water
- They slow water down and prevent erosion
- They soak up floodwaters thus preventing downstream floods

- They provide areas of recreation and beauty
- They provide essential habitat for many diverse and often endangered species. Up to 45% of threatened or endangered species rely on wetlands for their survival
- They furnish natural products such as food, timber, fur to humans
- Some help to recharge groundwater supplies
- They provide areas for education and research
- Some wetlands support downstream aquatic systems
- The U.S. has lost over 50% of our wetlands to agricultural conversion, mining, and urban development

Why do we need to worry about loss of wetlands?

- More than half of all wetlands in the continental U.S. have been lost since the early 1700s (with 9 million acres lost between the mid-1950s and mid-1970s alone).
- 290,000 acres of wetlands are lost each year in the U.S.
- 84% of the wetlands lost during the last two decades have been from the Southeastern U.S.

What can we do to help preserve our wetland habitat?

- Federal laws can **protect** undeveloped wetlands
- Wetlands loss to development can be **mitigated** by creating another wetland to replace the one that was lost
- Wetlands can be **restored** by removing barriers to proper water flow

On Wetland Soils and Vegetation

What is soil?

- A soil is made up of broken pieces of rocks and minerals of the Earth, and the broken parts of the organisms that live on it (organic materials).
- Soil is classified based on the relative proportions of the following three particles:
 - ◆ Sand: largest particle
 - ◆ Silt
 - ◆ Clay: smallest particle
- The combinations of these three particles in different soils creates different soil textures.
- Soil texture can be one of the things that determines what type of vegetation will grow in a given area.

What are Hydric Soils?

Hydric soils develop under low oxygen conditions because of water saturation.

- Organisms living in this soil do not carry out normal respiration, but often resort to a type of respiration called anaerobic.
- Anaerobic respiring organisms often utilize sulfur or nitrates for their oxygen requirements, and thus release gases such as nitrogen gas and hydrogen sulfide that give the characteristic "swamp smells" that people associate with wetlands.

Hydric soils are classified as either organic or mineral

- Organic soils contain partially decayed plant and animal material that create a thick black or brown layer at the soil surface. These soils are further sub-divided into classification as either peat or muck.
 - ◆ Muck has very few plant fibers and is mostly decomposed.

- ◆ Peat still contains plant fibers that can be felt when the soil is rubbed between the fingers (1/3 of the soil is decomposed).
- ◆ Organic soils absorb water very well and play an important role in prevention of erosion.
- Mineral soils have more sand, silt, and clay and are typically light-colored. They can also show gleying & mottling.
 - ◆ Gleying occurs when iron in the soil is reduced from an oxidized state, creating gray or bluish gray coloring to the soil.
 - ◆ Mottling occurs when soils are saturated and then exposed to air in cycles, and creates orange, yellow, and reddish-brown splotches in the soil.

What is so special about Hydrophytic Plants?

Hydrophytes are specially adapted to living with the stress of fluctuating water levels and low oxygen availability. These adaptations include:

- Special air spaces in their stems and roots (called aerenchyma) that allow oxygen to diffuse from regions of high oxygen availability to regions of low oxygen availability
- Shallow root systems, swollen tree trunks and special aerial roots are used by many trees in wetlands to allow oxygen to reach the roots

Common wetlands plants include cattails, bulrushes, cordgrass, sphagnum moss, sedges, rushes, arrowheads, and willows. These plants can be classified as:

- Herbaceous plants (non-woody, soft-stemmed), of which there are three types:
 - ◆ Emergent plants are rooted in the soil but have most of their other parts above the water surface (arrowheads, rushes, cattails)
 - ◆ Floating plants are free-floating or rooted in the soil with the rest of their body floating on or just under or above the water's surface (water lily and duckweed).
 - ◆ Submergent plants are completely beneath the surface of the water (coontail)
- Shrubs (low, woody plants often with several stems instead of one main trunk)
- Trees (woody and perennial with one main stem or trunk; typically greater than 10 feet tall when mature)

About Watersheds

What is a watershed?

- The land area from which all water drains into a particular body of water
- It includes the body of water and the land that is "uphill" from it
- The water draining into the body of water is called "runoff" from the surface

How big are watersheds?

- Watersheds can be as small as your backyard and as large as the drainage basin for the Mississippi River
- Large watersheds can contain many smaller watersheds within them

What affects do humans have on watersheds?

- Humans often alter the flow of water bodies such as when they create a dam, or when they build a channel to connect two water bodies
- Humans add many types of pollution (chemicals, excess nutrients, sediment) to the land, which then gets washed into the water.
- Humans remove vegetation from the landscape and add cement and asphalt, which cause water to flow more quickly into water bodies and have less opportunity to infiltrate into

the soil. This also causes more flooding of streams and rivers and sedimentation of our water bodies.

How can wetlands clean polluted watersheds?

- Wetlands slow water down and help sediment to drop back into the soil
- Wetland plants can use excess nutrients or convert them to less harmful forms of the nutrient