

2003 National Teacher Training Institute

Cypress/Tupelo Swamps or Why Henry Ford Bought Spanish Moss for His Model T's

Grades 9–10

Master Teacher

Charlie Campbell

Time Allotment

One 90-minute class period

Overview

The Lowcountry harbors an astonishing variety of natural diversity. The estuarine ecosystem of rivers, swamps and hot climate generate massive quantities of biodiversity. Francis Beidler Forest in Four Holes Swamp is the last remaining stand of virgin tupelo and bald cypress in the world. Economic and development pressure is depleting swamp habitats at the rate of 200 acres per day statewide (60,000 acres of wetland areas are lost each year in the U.S.). Human population is rapidly increasing, with Beaufort County alone adding 34,000 residents in the 1990s. Other pressures on wetlands areas include invasion from exotic plant and animal species and habitat destruction

Note to Teachers: Swamps are the focus of this lesson, however, the term “wetlands” is applied in many cases. The following definitions may be helpful.

Wetlands: areas that are saturated by surface or ground water that support a vegetation typically adapted for life in saturated soil conditions.

Swamp: a forested wetland area.

Marsh: a non-forested wetland area.

Estuary: a partially enclosed body of water formed where freshwater from rivers and

streams flows into the ocean, mixing with the salty seawater.

Subject Matter

Biology

Learning Objectives

Students will be able to:

- ✍ Learn the geologic history of the terrain, soils, and drainage patterns;
- ✍ Understand unique biological species that use this habitat;
- ✍ Recognize ecological processes that determine the dynamic nature of habitats;
- ✍ Understand the influence of human activity on the landscape;
- ✍ Understand the influence of large-scale events on local ecological systems.

South Carolina Standards

(These Standards can be found at http://www.sde.state.sc.us/offices/cso/Standards_Page.htm.)

Organisms both cooperate and compete in ecosystems. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years.

- a. Relate the concepts of cooperation and competition to organisms within an ecosystem.
- b. Evaluate how interrelationships and interdependencies of living things contribute to the homeostasis of ecosystems.
- c. Demonstrate an understanding of how living things maintain their high level of

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order at the expense of increasing the disorder of their physical surroundings.



Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected.




- a. Identify events that lead to awareness of environmental concerns such as fish kills, destruction of ozone layer, global warming, and the decline of the bald eagle. (H)
- b. Discuss the conflicts that could occur between land developers and conservationists. (P)
- c. Describe the effects of human overpopulation and activities on the survival of other species.
- d. Debate the consequences of extinction and the introduction of species within ecosystems.
- e. Assess the consequences of acid rain on ecosystems. (P)
- f. Give examples of how technology has advanced the study of environmental science. (T, P)

Media Components

Power Point Presentation

Tells the story of the cypress-tupelo swamps. Presents a review of the cypress-tupelo swamps in the region with regard to the following topics:

-  Description and characteristics of wetlands and swamps.
-  Description of bald cypress trees.

-  Description of Water tupelo trees.
-  Products derived from swamps.
-  Factors influencing the health and pressures that are endangering the survival of cypress-tupelo swamp ecosystems.

PP Presentation Title: Bald Cypress and Water Tupelo Swamps in the Lowcountry or Why Henry Ford bought Spanish Moss for his Model T's.

1. Definition of wetlands and swamps
 - a. Characteristics of swamps, emphasis on soil, water conditions
 - b. Swamps in the S.C. Lowcountry area (Four Hole Swamp)
2. Description of bald cypress trees
 - a. Gymnosperm (only deciduous conifer in South)
 - b. Unique adaptations for swamp life
 - c. Knees
 - d. Height
 - e. Growth/reproduction rates
3. Description of water tupelo trees
 - a. Unique adaptations for swamp life
 - b. Characteristics of tupelo trees
4. Economic impact of swamps
 - a. Timber industry
5. Natural value of swamps in Lowcountry
 - a. Home for unique wildlife
6. Negative pressures on swamp habitat
 - a. Exotic species of plants and animals
 - b. Excessive Subsidence (land settling)
 - c. Logging

Video

NatureScene: Congaree Swamp, S.C.

(<http://cfmedia.scetv.org/naturescene/Southcarolina/congaree/index.html?wholives/>)

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trees/bald-cypress) This site provides information on the bald cypress in this swamp. A video clip from the *NatureScene* series can be viewed on the site.

NatureScene: Reelfoot Lake, TN
(<http://cfmedia.scetv.org/naturescene/Tennessee/reelfootlake/index.html?wholives/trees/bald-cypress>) This site also provides information on the bald cypress through a *NatureScene* video clip.

Web sites

Natural Heritage Resources Fact Sheet: Bald Cypress.
(<http://www.dcr.state.va.us/dnh/wcypress.htm>)

Bald Cypress and Water Tupelo Swamps
(http://www.hatchie.com/cypress_tupelo.htm)

Francis Beidler Forest in Four Holes Swamp (<http://www.pridenet.com/1997/july/environment/forest.htm>)

Salt Tolerance of Southern Bald Cypress
(http://www.nwrc.usgs.gov/climate/fs92_97.pdf)

On Ocean's Edge
(<http://www.gddf.org/interest/lowcountry.asp>)

Four Hole Swamp
(http://cfpub.epa.gov/surf/huc.cfm?huc_code=03050206)

EnviroMapper for Water (South Carolina)
(<http://map8.epa.gov/scripts/.esrimap?name=NHDMapper&Cmd=ZoomInByState&CmdOld=ZoomInByScalar&th=35&zf=2&lc=000010001&qc=2&Nq=&Vw=&Nc=0&Pi=0&Pw=0&fipsCode=45&click.x=5&click.y=4&im=on&L=90.1424560328664&B=25.7054681776295&R=80.02771761>)

[2787&T=33.2915219926891&am=&re=0&acl=&AL=0\)](http://www.geography.about.com/library/blank/blxussc.htm)

For a printable blank map of South Carolina, visit the following Web site:

<http://geography.about.com/library/blank/blxussc.htm>.

For a map of South Carolina with river systems identified, visit the following site:
ftp://ftp.rootsweb.com/pub/usgenweb/sc/maps/sc_rv.gif.

Materials

Per student:

pencil and paper
blank map of South Carolina
map of river systems (wetlands) in South Carolina

Prep for Teachers

- ✍ Prior to teaching this lesson, bookmark the Web sites used in this lesson on the computer in the classroom.
- ✍ Copy enough blank maps of the state of South Carolina for each student in the class. Then design another map, however, in this map identify the wetland areas. This will be used as the **Introductory Activity**.
- ✍ When using media, provide students with a **Focus for Media Interaction**, a specific task to complete and/or information to identify during or after viewing of video segments, Web sites, or other multimedia elements.

Introductory Activity

Step 1: To begin the lesson, ask students to list as many characteristics of wetlands and swamps that they can think of. Write these on the board, facilitating the discussion. Make a list of the natural benefits of wetlands. It should include cypress timber,

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shrimp, crawfish, furs, flood control and wind control, water filter, habitat for many animals and aesthetic value. Discuss the impact on the rest of the environment if the swamps were removed from the ecosystem.

Step 2: Hand out the blank map to the students. Ask the students to indicate by drawing a tree where they think the wetland areas are located. Review the students' responses and end the **Introductory Activity** by showing them the map of South Carolina with the wetland areas highlighted.

Learning Activities

Step 1: OPEN the Power Point (PP) presentation.

(**Note to Teacher:** This Power Point presentation is on SCETV's NTTI Web site at <http://www.scetv.org/ntti/lessons/9-12lessons.html>. Scroll down to **Science, Grades 9-12**. This lesson with the Power Point presentation will be listed in that group of lesson plans. Just click on the Power Point presentation.)

Step 2: SHOW slide 1 and slide 2. Tell the class that wetland areas occur in many places in the U.S. Bald cypress and water tupelo swamp areas occur in the Southeast indicated by the highlighted areas on the map in Slide 2. LINK to the Web site that shows the map of S.C. water systems from slide 3: *EnviroMapper for Water (South Carolina)*

<http://map8.epa.gov/scripts/.esrimap?name=NHDMapper&Cmd=ZoomInByState&CmdOld=ZoomInByScalar&th=35&zf=2&lc=000010001&qc=2&Nq=&Vw=&Nc=0&Pi=0&Pw=0&fipsCode=45&click.x=5&click.y=4&im=on&L=90.1424560328664&B=25.7054681776295&R=80.027717612787&T=33.2915219926891&am=&re=0&acl=&AL=0>

Slide 4 lists additional Web sites with information on wetlands.

(**Note to Teacher:** When finished viewing the Web site, always HIT the BACK button at the top left hand of the screen to return to the PP program).

Step 3: SHOW slide 5. Explain that about ½ of Beaufort County land area is wetlands area, primarily marshes and estuarine communities. LINK to the *Four Hole Swamp* Web site from slide 6. (http://cfpub.epa.gov/surf/huc.cfm?huc_code=03050206)

Step 4: Discuss the following facts about Four Hole Swamp:

- ✍ It is a riverine swamp (it is part of the Edisto river system).
- ✍ It is called a blackwater swamp (the water is very dark colored due to tannins from the leaves that fall into the water).
- ✍ It contains the last remaining stands of virgin bald cypress and tupelo timber in the world.

Step 5: LINK to the following Web site for more information on Four Hole Swamp. (<http://www.pridenet.com/1997/july/environment/forest.htm>)

Step 6: SHOW slide 7. Explain that swamp conditions differ from normal soil due to the influence of constant water saturation. Anaerobic is a term that means that oxygen is not necessary in the environment. Explain that swamp gas has a rotten egg smell due to anaerobic bacteria that release gaseous byproducts as a result of their metabolism.

Step 7: SHOW slide 8. Point out the fluted base of the cypress tree and the non-fluted base of the tupelo tree. LINK to the video clip about the bald cypress trees on slide 9: *NatureScene: Reelfoot Lake, TN*

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(<http://cfmedia.scetv.org/naturescene/Tennessee/reelfootlake/index.html?wholives/trees/bald-cypress>).

Step 8: Focus for Media Interaction: Ask the students to review and write down the points about bald cypress trees that were discussed in the Web site clip.

Step 9: SHOW slides 10, 11, 12, and 13 for additional points about bald cypress trees. Be sure to mention that the name “bald cypress” comes from the fact that the leaves of the cypress drop off in winter, giving the tree a “bald” look. LINK to another clip about bald cypress trees from Slide 14. *NatureScene: Congaree Swamp, S.C.* (<http://cfmedia.scetv.org/naturescene/Southcarolina/congaree/index.html?wholives/trees/bald-cypress>).

Step 10: SHOW slide 15 as an example of wildlife that lives in the swamps. The Prothonotary warbler often nests in bald cypress trees, especially in hollowed-out areas in knees. PLAY the sound clip of the Prothonotary from slide 15 by double clicking on the speaker.

Step 11: Show slides 16, 17 and 18 for more information about the water tupelo’s leaves and fruit.

Step 12: SHOW slides 19, 20, 21, 22, 23 and 24. Explain the commercial value of swamps for the products that are exclusive to the swamp habitat as well as other products that are not exclusive but are valuable to local economies. Explain the term “ecotourism.”

Step 13: SHOW slide 25. Read out loud the threats to conservation of natural wetlands and swamp habitats. Describe the danger to preserving swamp habitat connected with each pressure.

Step 14: SHOW Slide 26. ACCESS the Web site on Chinese Tallow trees on slide 27. SHOW slides 28 and 29.

Step 15: SHOW slide 30 and access the Web site on saltwater intrusion and tolerance of bald cypress trees. (http://www.nwrc.usgs.gov/climate/fs92_97.pdf.)



Step 16: SHOW slide 31 and access the Web site by clicking on “click here” on the PP presentation. *Slideshow: The Lowcountry at Risk* (<http://www.gddf.org/interest/lowcountry.asp?objectID=387>). Explain that this is a forecasted scenario based on current development and population trends.

Step 17: Focus for Media Interaction: Ask the students to review the points about pressures on swamp areas. Ask them to make a list of ways that the pressures can be reduced or eliminated to insure that swamp habitat is protected and survives for future generations. Facilitate the list by writing it so all the class can see it.

Step 18: SHOW slides 32-35 and explain the use of the bald cypress wood in the application that Henry Ford used.

Step 19: END PP presentation.

Culminating Activity/ Community Connections

-  Visit a wetland area, preferably an area that is swamp with bald cypress and tupelo trees.
-  Have a park ranger or naturalist visit the classroom and show slides and speak to the students on the subject of wetlands and swamps.

Assessment

At the end of the class period:

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- ✎ Require the students to make a list of beneficial aspects of swamps.
- ✎ Require the students to compile a list of species that may not exist if the swamps were eliminated.
- ✎ Have the students describe the characteristics of swamps that make them unique from other types of ecosystems.

Cross-Curricular Extensions

Earth Science: Hydrologic, soil and environmental conditions of swamps. For example, review the anaerobic nature of the soil in swamps compared to the aerobic soil of non-swamp areas.

Geography: Study swamps throughout other geographical areas of the U.S. and the

rest of the world. Compare and contrast the major, unique features of swamps in other parts of the U.S. and the world.

For example, compare the types of woody plants that are in swamps in the north-western part of the U.S. compared to the bald cypress and tupelo swamps of the southeastern U.S.

History: Study the ways that people have influenced swamps and wetlands in the past, both economically and environmentally. For example, the effect logging and agriculture industries have had on the swamp habitat.

Student Materials

maps
pencil
paper