LSU Coastal Roots™ Program

Compendium of Coastal, Wetland, and Restoration Information for Louisiana Educators

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Purpose of this Compendium

Preservation and restoration of Louisiana's coastal habitats and land are two of the most pressing issues facing our state. Educators have a vital role in bringing to the awareness of young people the urgency of caring for their natural surroundings. By teaching our students using activities that build knowledge and encourage action, educators will increase the environmental literacy of our young citizens and inspire them to become active stewards of our coastal habitats. I am committed to supporting educators interested in teaching about Louisiana's coastal issues by providing them as many high-quality resources as possible. This compendium is an initial effort to offer educators a guide to the best available resources to enhance and support their educational activities.

While I started compiling these materials years ago, many people have had a hand in identifying and annotating the resources in this compendium:

- Janina Fuller, graduate student, LSU School of Human Resource Education and Workforce Development
- Cally Chauvin, middle school teacher
- Justin Bruno, graduate student, LSU Educational Theory, Policy and Practice
- Ashley Castello, LSU graduate student, LSU Educational Theory, Policy and Practice
- Dr. Margaret-Mary Sulentic-Dowell's EDCI 3200 students, who provided the initial list of children's books as part of a service-learning project for their course

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I intend to periodically update and expand this compendium. I welcome educators to send me information and/or links to resources that should be included in future editions.

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# Table of Contents

1. LA GLEs for Coastal and Wetland Education .................................................. 4
2. General Resources about the Coast, Wetlands and Restoration Efforts .......... 7
   - Coastal Erosion ................................................................................. 15
   - Subsidence ................................................................................. 18
   - Barrier Islands ........................................................................... 19
   - Soil ............................................................................................ 20
   - Water Quality ............................................................................ 22
   - Point and Non-Point Source Pollution ............................................. 26
   - Hurricanes .................................................................................. 28
   - Human Impacts .......................................................................... 31
   - Animals of the Coastal Zone .......................................................... 34
   - Plants of the Coastal Zone .............................................................. 38
   - Threatened and Endangered Species ............................................. 40
   - Identification and Classification of Plants and Animals .................... 42
   - Food Chains and Webs ................................................................ 43
   - Non-indigenous (Invasive) Species ............................................... 45
   - Curriculum Resources ................................................................ 47
   - Maps ........................................................................................... 52
   - Video Resources ......................................................................... 54
   - LSU Coastal Roots Program Information ...................................... 56
   - Grant Resources ......................................................................... 58
   - Books about Wetland and Coastal Resources ................................... 59
   - Guide to Abbreviations ................................................................ 65
Louisiana GLEs for Coastal and Wetland Education

The following Grade Level Expectations (2003) have been selected for their relevance to teaching coastal and wetland related concepts in grades PreK – 12. Other GLEs not listed may also be appropriate, but the GLEs listed below reflect those most closely related to coastal and wetland education topics. Notations in parenthesis refer to the LA Benchmarks for Science (1997).

PreK

Physical Science Properties of Matter
9. Sort objects using one characteristic (PK-CS-P2; PS-E-A1)

Life Science - Characteristics of Organisms
20. Give examples of different kinds of plants and different kinds of animals (PK-CS-L1)

Life Science - Life Cycles of Organisms-
22. Learn about animals and plants through nonfiction literature (PK-CS-L1; LS-E-B1)

Life Science - Organisms and Their Environments-
24. Describe plants and animals in the schoolyard or home environment (PK-CS-L1; LS-E-C1)

Life Science - Characteristics of Organisms
25. Identify easily observable variations within types of plants and animals (e.g. features of classmates, varieties of trees, breeds of dogs) (LS-E-A4)

Life Science - Life Cycles of Organisms -
28. Observe life cycles and describe changes (e.g. humans, dogs, insects) (LS-E-B1)

Earth and Space Science
30. Distinguish between areas of Earth covered by land and water (ESS-E-A2)

Grade 1

Science as Inquiry – Understanding Scientific Inquiry
12. Explain and give examples of how scientific discoveries have affected society (SI-E-B6)

Life Science - Characteristics of Organisms-
26. Describe the differences between plants & animals (LS-E-A1)
27. Identify what animals and plants need to grow and develop (LS-E-A1)
28. Describe the characteristics of living (biotic) and nonliving (abiotic) things (LS-E-A2)

Life Science - Life Cycles of Organisms-
30. Record and share observations of changes in developing plants (LS-E-B1)
31. Describe how animals and their offspring are similar and how they are different (LS-E-B3)

Life Science - Organisms and Their Environments-
32. Describe features of some animals that benefit them in their environments (LS-E-C1)
34. Record evidence of plants and animals in the schoolyard or other environments (LS-E-C2)

Earth and Space Science - Properties of Earth Material
35. Examine soils to determine that they are often found in layers (ESS-E-A1)
37. Illustrate how water changes from one form to another (e.g. freezing, melting, evaporating) (ESS-E-A-3)

Grade 2

Science as Inquiry – Understanding Scientific Inquiry
13. Explain and give examples of how scientific discoveries have affected society (SI-E-B6)

Life Science - Characteristics of Organisms-
27. Match the appropriate food source & habitat for a variety of animals (e.g., cows/grass/field, fish/tadpole/water) (LS-E-A1)
28. Describe structures of plants (e.g. roots, leaves, stems, flowers, seeds) (LS-E-A3)

Grade 3

Science as Inquiry – Understanding Scientific Inquiry
17. Explain and give examples of how scientific discoveries have affected society (SI-E-B6)

Life Science – Characteristics of Organisms
35. Compare structures (parts of the body) in a variety of animals (e.g. fish, mammals, reptiles, amphibians, birds, and insects) (LS-E-A3)
36. Compare structures (e.g. roots, leaves, stems, flowers, seeds) and their functions in a variety of plants (LS-E-A3)
37. Describe how plant structures enable the plant to meet basic needs (LS-E-A4)
38. Classify groups of organisms based on common characteristics (LS-E-A4)
39. Compare organisms from different groups (e.g. birds with mammals, terrestrial plants with aquatic plants) (LS-E-A4)

Earth and Space Science – Properties of Earth Materials
46. Describe earth processes that affected selected features in students’ neighborhoods (e.g. rusting, weathering, erosion) (ESS-E-A1)
48. Identify examples of the processes of a water cycle (e.g. evaporation, condensation, precipitation, collection of runoff) (ESS-E-A3)

Science and the Environment
57. Describe the interrelationships of living (biotic) and nonliving (abiotic) components within various ecosystems (e.g. terrarium, swamp, back yard) (SE-E-A1)
58. Describe how humans have had negative and positive effects on organisms and their environments (SE-E-A3) (SE-E-A5)
61. Explain how selected animals once classified as endangered have recovered (SE-E-A5)
62. Identify animals in Louisiana that have recovered and that are no longer considered endangered (SE-E-A5)
Grade 7 (Life Science)

Structure and Function in Living Systems
6. Compare the life cycles of a variety of organisms, including non-flowering and flowering plants, reptiles, birds, amphibians, and mammals (LS-M-A3)

Reproduction and Heredity
22. Give examples of the importance of selective breeding (e.g., domestic animals, livestock, horticulture) (LS-M-B3)

Populations and Ecosystems
23. Classify organisms based on structural characteristics, using a dichotomous key (LS-M-C1)
24. Analyze food webs to determine energy transfer among organisms (LS-M-C2)
25. Describe and compare the levels of organization of living things within an ecosystem (LS-M-C3)
26. Identify the various relationships among plants and animals (e.g., mutualistic, parasitic, producer/consumer) (LS-M-C4)
27. Differentiate between ecosystem components of habitat and niche (LS-M-C4)

Adaptations of Organisms
29. Predict the impact that changes in a species’ population have on an ecosystem (LS-M-C4)

Science and the Environment
30. Differentiate between structural and behavioral adaptations in a variety of organisms (LS-M-D1)
31. Describe and evaluate the impact of introducing nonnative species into an ecosystem (LS-M-D1)
32. Describe changes that can occur in various ecosystems and relate the changes to the ability of an organism to survive (LS-M-D2)
33. Illustrate how variations in individual organisms within a population determine the success of the population (LS-M-D2)
34. Explain how environmental factors impact survival of a population (LS-M-D2)

Grade 8 (Earth and Space Science)

Structure of Earth
15. Illustrate the role of organic processes in soil formation (ESS-M-A4)
19. Determine the results of constructive and destructive forces upon landform development with the aid of geologic maps of Louisiana (ESS-M-A7)
20. Describe how humans’ actions and natural processes have modified coastal regions in Louisiana and other locations (ESS-M-A8)
21. Read and interpret topographic maps (ESS-M-A9)
22. Compare ocean floor topography to continental topography by using topographic maps (ESS-M-A9)
23. Explain the processes of evaporation, condensation, precipitation, infiltration, transpiration, and sublimation as they relate to the water cycle (ESS-M-A10)
24. Investigate and explain how given factors (e.g., climate, type of rock, ground cover) affect the rate of water movement in the water cycle (ESS-M-A10)
28. Use historical data to plot the movement of hurricanes and explain events or conditions that affected their paths (ESS-M-A12)

Earth in the Solar System
48. Communicate ways that information from space exploration and technological research have advanced understanding about Earth, the solar system, and the universe (ESS-M-C8)
49. Identify practical applications of technological advances resulting from space exploration and scientific and technological research (ESS-M-C8)

Science and the Environment
50. Illustrate possible point and non-point source contributions to pollution and natural or human-induced pathways of a pollutant in an ecosystem (SE-M-A3)
51. Analyze the consequences of human activities on global Earth systems (SE-M-A4)
52. Describe the relationship between plant type and soil compatibility (SE-M-A9)
53. Distinguish among several examples of erosion (e.g., stream bank, topsoil, coastal) and describe common preventive measures (SE-M-A10)

Environmental Science (USUALLY AN ELECTIVE)

Biological Evolution
18. Classify organisms from different kingdoms at several taxonomic levels, using a dichotomous key (LS-H-C4)
20. Analyze differences in life cycles of selected organisms in each of the kingdoms (LS-H-C6)

Interdependence of Organisms
24. Analyze food webs by predicting the impact of the loss or gain of an organism (LS-H-D2)
26. Analyze the dynamics of a population with and without limiting factors (LS-H-D3)
27. Analyze positive and negative effects of human actions on ecosystems (LS-H-D4) (SE-H-A7)

Environmental Systems and Interactions
1. Describe the abiotic and biotic factors that distinguish Earth’s major ecological systems (SE-H-A1)
4. Determine the effects of limiting factors on a population and describe the concept of carrying capacity (SE-H-A3)
5. Examine and discuss the major stages of succession, describing the generalized sequential order of the types of plant species (SE-H-A4)
8. Explain how species in an ecosystem interact and link in a complex web (SE-H-A7; SE-H-A10)
10. Analyze the effect of an invasive species on the biodiversity within ecosystems (SE-H-A9)
12. Give examples and describe the effect of pollutants on selected populations (SE-H-A11)

Resources and Resource Management
18. Identify the factors that affect sustainable development (SE-H-B6)

Personal Choices and Responsible Actions
21. Analyze the effect of common social, economic, technological, and political considerations on environmental policy (SE-H-C3)
22. Analyze the risk-benefit ratio for selected environmental situations (SE-H-C4)
23. Describe the relationship between public support and the enforcement of environmental policies (SE-H-C5)

Environmental Awareness and Protection
27. Describe how accountability toward the environment affects sustainability (SE-H-D5)

For the complete LA GLE listing and the 2008 LA Comprehensive Curriculum, visit http://www.doe.state.la.us/lde/saa/2257.html
General Resources about the Louisiana Coast, Wetlands, and Restoration Efforts

**Louisiana Wetlands: Functions and Values – CD-ROM (CWPPRA/USGS)**
Presentations on wetlands functions and values, coastal wetlands land loss and restoration, the Wetlands Reserve Program (WRP) and wetlands conservation opportunities statewide. Contact: DNR, 800-267-4019 or click on “Email LaCoast” on [http://www.lacoast.gov](http://www.lacoast.gov). Grades 6-12.

**Louisiana Coastal Facts (DNR)**
Summary of important facts about population, marsh acreage, commerce, fishing, eco-tourism and other pertinent topics.

**Restoration Program Background (DNR)**
Introduces major causes of wetland loss, valuable resources provided by the wetlands, current coastal restoration programs, coastal restoration project implementation, and project types.

**Coastal Louisiana – Coloring Book (CWPPRA/USGS)**
Four pictures of coastal Louisiana that can be printed out to color or colored online (requires Flash).

**Louisiana Wetlands: An American Resource – Activities (CWPPRA/USGS)**
[http://lacoast.gov/education/classroom/webquest.htm](http://lacoast.gov/education/classroom/webquest.htm)
Uses the WaterMarks publication as a source for WebQuest questions.

**Teacher Workshop Presentation on the LA Coast (CWPPRA/USGS)**
[http://lacoast.gov/education/classroom/webquest.htm](http://lacoast.gov/education/classroom/webquest.htm)
PowerPoint presentation with notes, put together by staff from the Coastal Wetlands Planning, Protection and Restoration Act. Slightly out-dated (pre-Katrina). Good graphics and explanations. **NOTE:** The two contact people noted at the end of the presentation no longer work for CWPPRA.

**Salt Marsh Habitat of the Barataria-Terrebonne Estuary – Activity Book (BTNEP)**
Written from Clawdette the Crab’s perspective. Follow Clawdette through the estuary. To obtain a copy call 800-259-0869. Grades 1-4. **Free upon request.**

**Caring for Coastal Wetlands (CWPPRA/USGS)**
[http://lacoast.gov/reports/program/CaringBrochure/index.htm](http://lacoast.gov/reports/program/CaringBrochure/index.htm)

**EstuaryLive! – Activities (BTNEP)**
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.
- **The Watersheds of the National Estuary Program** - Map depicts watersheds of the continental U.S. and their respective estuaries, Grades 3-12.
- **The BTNEP Location Map for EstuaryLive!** - Map of the Barataria-Terrebonne Estuary System.
- **Travels of Jean Lafitte** - World map showing all the locations visited by Jean Lafitte. Grades 6-12.
- **Salt Marsh Activity Book: Where is the BTNEP Estuary?** - A map students can color-by-number showing where the Barataria-Terrebonne Estuary is relative to the state of Louisiana.
- **Salt Marsh Activity Book: What is an Estuary?** - Color-by-number map shows different types of water found in an estuary.
- **Salt Marsh Activity Book: The Spongy Marsh** - Line drawings with measurements help students imagine the impact of a storm surge with / without wetland protection.
EstuaryLive! – Video Clips (BTNEP)  
http://educators.btnep.org/default.asp?id=69

Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.

- **Elmer’s Island and Community Involvement** (Clip 9) - Shows students participating in the Coastal Roots Program. David Bourgeois demonstrates how students grow seeds and then plant what they grow.
- **Jean Lafitte** (Clip 10) - Kerry St. Pé explains how valuable the coastal areas were to Jean Lafitte. “Wetlands are the treasures,” says St. Pé.

Haunted Waters – Video Clips (BTNEP)  
http://educators.btnep.org/default.asp?id=61

An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.

- **People and the Environment** (Clip 2) - Introduces the estuary, the environment of the Mississippi Delta and the people who live there.
- **Growing Economy** (Clip 5) - Depicts the planting, harvesting and processing of sugar cane in the early days of the local economy.
- **Ethnic Influences** (Clip 16) - Shows aspects of life on Grand Isle in the late 1800’s and some of the cultural influences from around the world.

Bayou Lafourche: The Longest Street in the World – Video Clips (BTNEP)  
http://educators.btnep.org/default.asp?id=48

This documentary captures the history, culture, lifestyle, environmental troubles and emerging ecological solutions of the 100-mile ribbon of bayou that weaves through the Barataria-Terrebonne Estuary.

- **Bayou History-Head of the Bayou** (Clip 2) - Describes the early days of steamboat traffic connecting Bayou Lafourche to the rest of the world.

Vanishing Wetlands, Vanishing Future – Video Clips (BTNEP)  
http://educators.btnep.org/default.asp?id=62

This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.

- **Mississippi Delta** (Clip 2) - Explains the formation of the Mississippi Delta and the principles of hydrologic modification.
- **Government Involvement** (Clip 9) - Outlines some of the political considerations of water management in south Louisiana. NOTE: Some of the material in this clip has changed, and new technology has been developed since this film was made. Mike Robichaux is no longer our State Senator.
- **Student's Views on Wetlands** (Clip 10) - Students express their feelings about losing our wetlands. The teacher explains her use of three processes to teach her Wetlands Unit: hands-on inquiry based lessons, technology, and culminating activities in visual and performing arts.

The JASON Project: Disappearing Wetlands – Curriculum  

Explains what wetlands are, why they are disappearing, and how best to manage these ecosystems in your neighborhood, in Louisiana, and around the world. **Cost and ordering information are provided.** Grades 4-8.

Wetlands Education – Activities (EPA)  
http://www.epa.gov/owow/wetlands/education/

A wide variety of resources for wetlands education. Grades K-12.
Spirit of the Estuary: Using Art to Understand Ecology – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=76
A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies. Grades 6-12.

- **I Am an Estuarian** (Activity 1-1) - Poetry is used to describe the biotic factors and organisms of the Barataria-Terrebonne Estuary, as well as its people and culture.

- **Rhythm of the Tides** (Activity 1-5) - Basic music rhythms help illustrate the concepts of tidal movement and how the tides are related to movements of the earth, moon, and sun.

- **The Landscape of the Estuary** (Activity 1-6) - Focus is on the natural and human-made landscape features of the estuary, particularly the ridges, bayous and associated settlements. Students explore their own built environment through field trips and art, creating maps and artwork to compile tourism brochures that highlight natural and human-made features of interest.

- **Jambalaya, Crawfish Pie, File' Gumbo** (Activity 1-12) - Students create an authentic Southern Louisiana-style cookbook, with recipes, cultural stories and illustrations, and identify the impact the estuary has on local culture and cooking.

- **The World's Greatest Sculptor** (Activity 2-7) - Sculpture enables students to design a river system, learning in the process about riparian life, erosion and its effects on the landscape.

- **Doin' What Comes Naturally: Naturalist? Artist? Or Both?** (Activity 2-8) - In observing, drawing and journaling about nature, students learn a variety of drawing and sketching techniques and discuss the importance of careful, accurate drawings of the natural world. Works of naturalists are studied and students use journal entries to reflect on field experiences.

- **Nature's Art** (Activity 2-9) - Students discern how art materials are derived from natural sources and how feelings can be communicated through artwork. Artwork is analyzed and the impact artwork has on people's perception of the estuary is discussed.

- **Mamas, Your Babies Grow Up to Be ____** (Activity 2-10) - Cultural heritage is examined through art and history. Students design a class mural depicting scenes from estuary life and ask viewers how they are affected by the mural.

- **Cajun Music: Traduire** (“to translate”) (Activity 2-11) - Cajun French words are translated into English. Students describe how Cajun musicians relate with the wetland environment and interpret Cajun lyrics into their own words.

- **Bals De Maison** ("house dances") (Activity 2-12) - Students observe Cajun dance styles and learn how Cajuns have used dance and music as sources of entertainment and socializing, even as the wetlands isolated Cajun culture.

- **From the Cane Field to the Easel: The Mystery of the Blue Dog** (Activity 2-14) - Using the work of Cajun artist George Rodrigue as inspiration, students study works by Pollock, Warhol and Munch. They create their own pop art image to include elements of the estuarine environment.

- **Music Makers** (Activity 3-1) - Students research Cajun and Zydeco music, and interview local musicians to get their perspectives on Louisiana's wetlands.

- **Commercials for the Coast** (Activity 3-2) - Wetlands vocabulary is used to write a “jingle” that teaches about wetlands.

- **Who Knows? The Shadow Puppets Do!** (Activity 3-3) - Priority problems in the Barataria-Terrebonne Estuary System are identified and students research them in depth. Focus questions are brought to life using puppetry, including all aspects of staging.

- **Honk If You Love the Wetlands** (Activity 3-4) - Functions and values of wetlands are outlined, and students design and share a communication strategy to make others aware of the importance of wetlands.

- **Pass the Word - Creating an Environmental Action Brochure** (Activity 3-5) - Computer technology is employed to produce an action brochure informing citizens of the seven priority wetland issues and encouraging them to take action.

- **Estuary Extra! Your Own Environmental Newspaper** (Activity 3-6) - Students brainstorm ideas for newspaper topics, select departments of the newspaper in which to work, and plan, design, edit and publish a student newspaper.

- **Musical Meaning** (Activity 3-7) - Students research songs about the wetlands and interpret lyrics.

- **And Then a Hero Comes Along** (Activity 3-8) - Students identify and research people recognized for contributions to preservation of the environment, specifically of the estuary.
Wetland Issues – CDs (BTNEP)
http://educators.btnep.org/default.asp?id=49

- **Exploring Coastal Louisiana with Boudreaux and Marie**
  Interactive CD-ROM addressing coastal wetland issues in Louisiana. A component of the CD-ROM focuses on Barataria-Terrebonne and showcases its ecological, economic, and cultural importance. Bird and animal identification and wetland quizzes promote interaction and learning. Boudreaux's camp has a map room, a kids' room, and many other surprises. Developed jointly by BTNEP, CWPPRA, and the USGS National Wetlands Research Center. Lesson plans available on the root directory of the CD. To request your CD, contact <sandra@btnep.org>.

- **Thibodeaux's Treasure**
  Interactive CD invites elementary school children to learn about our wetlands as they join Jeanne Thibodeaux and Tee Boudreaux on a treasure hunt journey. This CD will teach basic skills and inspire coastal stewardship through a cartoon learning environment. To request your CD, contact <sandra@btnep.org>. Grades K-4.

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64

The BTNEP Educator's Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **Habitat Lap SIt** (Activity 1-3) - Highlights the importance of a habitat. This lesson requires cooperation from all class members. Grade 4.
- **Wetlands in a Pan** (Activity 1-4) - Demonstrates the functions of a wetland. Students create models, test them, and evaluate their effectiveness. Grades 3-4.
- **We are Losing Our Wetlands** (Activity 1-5) - Students visualize how much of our wetlands are being lost. The use of measurement and calculations are incorporated in this lesson. Grades 3-4.
- **Wetland Metaphors** (Activity 1-6) - Uses metaphors to simulate the functions of the wetlands. Common household objects are used to create wetland metaphors. Grade 7.
- **Estuary Ecosystems** (Activity 1-7) - Comparison activity where students research other estuaries and compare them to BTNE. Informational research skills are incorporated in this activity. Grades 7-8.
- **Wetland Eco-Bingo** (Activity 1-8) - Game that covers all areas of the BTNE habitat and ecosystem, this is a great review activity. Grade 5.
- **A Bayou Journey in 1880** (Activity 1-16) - Guided imagery helps students relax and listen as the teacher reads the story, “A Bayou Journey to Last Island in 1880.” Grade 5.
- **The Great Marsh Dilemma** (Activity 1-17) - Helps students understand the many aspects of the problems of wetland loss in Louisiana. Students role-play members of the community. Grades 7, HS Biol, HS Env Sci.
- **Where is the Barataria-Terrebonne Estuary?** (Activity 1-2) - Students identify major waterway areas in the BTNEP area using a beach ball and a large table cloth to create a map of the region. Grades K-2.
- **Ask an Expert** (Activity 4-2) - Incorporates oral history to show changes that have occurred to our coastal areas. Students conduct oral history interviews about how the Louisiana coast has changed during their lifetimes. Grades 4, 5, 7, 8, HS Biol.
- **Weaving Our Wetland Economic Web** (Activity 5-1) - Focuses on our coastal economy, both renewable and nonrenewable. Students list local economic activities, conduct a survey, and develop a concept map. Grades 5 & 7.

Lessons on the Lake – Curriculum (LPBF/SLU/NOAA)
http://www3.selu.edu/turtlecove/lessonsonthelake

Interactive tool to learn more about watersheds, in particular the Lake Pontchartrain Basin. The Lake Pontchartrain Basin, in Louisiana, is part of the much larger Mississippi River watershed which covers more than half of the United States. Grades 5-12.
360 Degree Views of Bayou Sauvage Project Sites (CWPPRA/USGS)
http://lacoast.gov/media/QTVR/index.htm
Two views of Bayou Sauvage project sites. You can see in 360 degrees by moving the mouse.

Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and completely downloadable from this site. Grades 6-12.

- **What is Happening to Our Coast** - Describes the coastal environment and how it changes under natural and human influences.
- **Creating a Wetscape Activity** - Students make their own watershed to see how their water systems can be affected by what others do. Grades 5-8.
- **Coastal Morphology** - Describes distinct habitats within the coastal ecosystem.
- **History of the Mississippi River** - Presents deltaic processes and their consequences.
- **Healthy Estuary** - Ten focus questions and 34 indicators are used to present an overview of the environmental health of the Barataria-Terrebonne Estuary System. Grades 7-8.
- **Healthy Estuary Activity** - Students use an estuary guide booklet to answer a series of questions on estuary health.
- **Louisiana Seafood** - History of and distinctions among fishing practices, harvesting methods, catch types and production values.
- **Shrimp and Shellfish** - Worksheet on commercial fishing practices.
- **Function of the Wetlands** - Flow chart graphically depicts aspects of wetland function.
- **When You Were My Age** - Oral history reflects the true experience of a people and affords an opportunity for students to communicate with those who have witnessed the current history of an area.
- **A Bit of History** - History of the Cut Off Canal and its importance to Bayou Lafourche.

Freshwater Ecoregions of the World (WWF/TNC)
http://www.feow.org/index.php
Covering virtually all freshwater habitats on Earth, this first-ever ecoregion map, together with associated species data, is a useful tool. It can be used to build a foundation for global and regional conservation planning efforts, to identify outstanding and imperiled freshwater systems, to create a logical framework for large-scale conservation strategies, and to provide a global-scale knowledge base for increasing freshwater biogeographic literacy.

Coastal Louisiana – Activities (NOAA)
http://www.coastalscience.noaa.gov/education/labook.pdf
Information on coastal Louisiana provides the opportunity to color, connect the dots, solve mazes, try word searches and more. Grades K-4.

Estuary Characteristics (USN)
http://www.onr.navy.mil/focus/ocean/habitats/estuaries1.htm
Illustrated diagrams of estuaries and descriptions of their characteristics.

Exploring Estuaries (EPA)
http://www.epa.gov/owow/estuaries/kids/
An interactive website where students can learn factual information about estuaries, take a virtual tour of an estuary, and solve an estuary mystery.

NowCOAST (NOAA)
http://nowcoast.noaa.gov
Web mapping portal provides access to real-time meteorological, oceanographic, and river observations from a variety of federal, state, and university observing networks. Users may access immediate information to complement lessons on a specific estuary or coastal region, or to support general lessons on weather forecasting, watersheds, water quality, and physical oceanography.
Estuaries: Where Rivers Meet the Sea – Activities (NOAA)
http://www.estuaries.gov

This site has two purposes: 1) Provide information on National Estuaries Day activities, such as EstuaryLive! and local National Estuarine Research Reserve and National Estuary Program events; 2) Serve as a long-term resource on the importance of estuaries and the need to protect them.

Estuaries – Tutorial (NOAA)
http://oceanservice.noaa.gov/education/kits/estuaries

An overview of estuarine habitats, the threats facing them, and efforts to monitor and protect estuaries nationwide.

Seagrass Scientists (NOAA)
http://nerrs.noaa.gov/Education/pdf/5thGradeSeagrassScientists.pdf

Learn about the jobs that estuarine scientists and wildlife biologists perform by simulating a sampling method that measures the health of a seagrass community over time.

What is a Watershed? – Videos
http://www.conservationinformation.com/?action=learningcenter_kyw_whatisawatershed

Three educational videos about watersheds: “What is a Watershed?”, “Everyone Impacts a Watershed”, and “Potential Sources of Pollution”.

Locate Your Watershed (EPA)
http://cfpub.epa.gov/surf/locate/index.cfm

Locate your watershed by entering your ZIP code or the name of a stream, city, tribe, lake, school, or airport. Find out what citizen groups are actively trying to protect your watershed, what role your watershed plays in the national watershed network, current water use data, and more.

Wetlands Reading List (EPA)
http://www.epa.gov/owow/wetlands/science/readlist.html

Annotated list of reading materials for grades PreK-12.

Tides Tutorial (NOAA)
http://oceanservice.noaa.gov/education/kits/tides

Overview of the complex systems that govern the movement of tides and water levels. The Roadmap to Resources complements the information in the tutorial by directing you to additional information and data from NOAA and other reliable sources.

Wetlands Affect You and Me – Activities (EPA)
http://epa.gov/gmpo/education/pdfs/WetlandsAffect.pdf
http://epa.gov/gmpo/education/pdfs/WetlandsAffectTeachers.pdf

Extensive curriculum guide includes information addressing the designing of a wetland, generation of organic matter, observation and inventory of wetland soils and organisms, the construction of an aquarium, the process of wetland destruction, and the preparation and consumption of a cattail. Grades 4-6.

The Young Scientist’s Introduction to the Wetlands (EPA)
http://epa.gov/gmpo/education/pdfs/YoungScientistsIntro.pdf

General information, illustration, and diagrams on the wetland ecosystem, including different terms for different wetland habitats, the array of plant and animal life found in wetland habitats, and the range of professions involved in wetlands work and research. Grades 4-6.

Estuary Activity Kit (EPA)
http://epa.gov/gmpo/education/pdfs/EstuaryActivityKit.pdf

Information on common toxic chemicals found in households, the problem of hypoxia, research on average water use, the process of erosion and sedimentation, and the importance of wetland wildlife, such as waterfowl. Many activities include the construction of models of certain structures, such as estuaries and wetland habitats. Grades 5-7.
Wetlands: Nature’s Water Wonders – Curriculum (EPA)
Comprehensive information on wetland habitats. These materials stress the importance of human interaction with wetlands, illustrate the web of living and nonliving inhabitants of wetlands through role-play, and offer various forms of assessment for wetland activities. Grades 5-7.

Let the Cattail out of the Bag – Activity (EPA)
http://epa.gov/gmpo/education/pdfs/Activity-Cattail.pdf
Students encounter a “touchy-feely” bag full of wetland objects while blindfolded, in order to gain a better understanding of the sensory experiences associated with wetland habitats. Students must then hypothesize on what they felt and smelled. Grades K-6.

Wetland in a Pan – Activity (EPA)
http://epa.gov/gmpo/education/pdfs/Activity-WetlandPan.pdf
Using clay, carpet scraps, soil, and muddy water, students make a model wetland that demonstrates the flood-buffering and filtering effects which take place in wetland areas. Grades 3-12.

Wetland Metaphors – Activity (EPA)
http://epa.gov/gmpo/education/pdfs/Activity-WetlandMetaphors.pdf
In identifying the ecological functions of wetlands, students use common household items, such as sponges, antacid tablets, soap, small pillows, etc. to represent objects in the wetlands and their functions. Grades K-12.

Coastal Louisiana – Activity Book (NOAA)
http://coastalscience.noaa.gov/education/labook.pdf
Provides information on Coastal Louisiana and the opportunity to color, connect the dots, solve mazes, try word searches and more. Grades K-4.

Catch A Wave – Activity
http://k12science.org/curriculum/ldeproj/teacherlessons.shtml
Students use online real-time data to guide their discovery of the causes and effects of ocean waves and tides. Grades 6-12.

More Than Just A Swamp – Puzzle (EPA)
http://www.epa.gov/owow/wetlands/education/puzzle.html
Wetland terminology is provided with an interactive crossword puzzle.

Wetlands Transects (SEA)
http://www.sea.edu/academics/k12.asp?plan=wetlandstransects
Students place transect lines beside a local stream or river, then record species of plants and insects living around the waterway. Students learn transect techniques and other sampling methods, and compare species diversity and density among transects.

Currents Tutorial (NOAA)
http://oceanservice.noaa.gov/education/kits/currents
Overview of the types of ocean currents, what causes them, how they are measured, and how they affect our lives, including animations.

Functions and Values of Wetlands in Louisiana – Bulletin (LSUAC)
Overview of wetlands in Louisiana.

Portrait of an Estuary – Bulletin (LSUAC)
Description of Louisiana estuaries.

Eco Pros Wetlands – Activities
http://www.eco-pros.com/wetlands.htm
Interactive website provides basic information about wetlands along with lesson plans and activities.
Ready, Set, Get Wet – Activities (EPA)
http://epa.gov/gmpo/education/pdfs/ReadySetGetWet.pdf
Various activities include a picture search, preparation tips for visiting a wetland area, experiments involving growing wetland algae and designing wetland models, and constructing a food web. Grades 3-5.

Web Quest (CWPPRA/USGS)
http://www.lacoast.gov/education/classroom/webquest.htm
Secondary-level WebQuest teaches more about Louisiana wetlands.

America’s Wetland Education Page (AWF)
http://www.americaswetland.com/custompage.cfm?pageid=28
Student-friendly website includes teacher resources.
Coastal Erosion

Educator's Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **We are Losing Our Wetlands** (Activity 1-5) - Students visualize how much of our wetlands is being lost with the aid of measurement and calculations. Grades 3-4.
- **Coastal Erosion: Making Sense of it All** (Activity 1-10) - Students create concept maps explaining the effects of coastal erosion on Louisiana. Students research information and orally present their findings. Grades 3-5, 8.
- **Demonstration Destruction** (Activity 1-11) - Students create a model of a coastal area and demonstrate a negative effect on the environment. The students are divided into groups, each group taking a factor that causes coastal erosion. Grades 3-5, 8.
- **Investigating Habitat Change** (Activity 1-12) - Mapping skills are developed as students collect data and determine the percentage of land loss over several periods of time. Grades 5 & 8.

Claude & Clawdette’s Estuary Adventure – Activities (BTNEP)

Students finish a story about boats and coastal erosion using this activity page.

Haunted Waters – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=61

An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.

- **Settling of the Land** (Clip 4) - Describes the building of Indian mounds in the time of Jean Lafitte, the presence of native wildlife, and the settling of German immigrants and West African slaves with help of the Native Americans.
- **Levees** (Clip 7) - Explains why levees were built and how they prevented further flooding like the Flood of 1927. Wendell Curole, Dr. Davis, and Mark Schexnayder show physical evidence of what levees did for the sugar cane farmers in lower Louisiana.
- **Flooding and Sugarcane** (Clip 8) - Clip 8 begins where Clip 7 ended, adding information about the hydrologic system of lower Louisiana and the problems of living in low lying areas. Students are encouraged to think critically about how levees changed the landscape and how fertilizer affects our waterways.
- **Oil Business** (Clip 13) - Details the detrimental impacts of oil industry activities on the health of coastal wetlands.
- **Death by Sea** (Clip 17) - Examples of the effects hurricanes can have on the Barataria-Terrebone ecosystem.
- **Erosion Rates** (Clip 18) - Describes what is happening to our Barrier Islands and shows how quickly the land forms that protect us from hurricanes are disappearing. A map is shown of how Louisiana will look in the year 2040.

EstuaryLive! – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=69

Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.

- **Levees** (Clip 11) - Mr. Wendell Curole explains the importance of the levees and why they were built.
- **Oil** (Clip 12) - Kerry St. Pé briefly introduces the importance of the local offshore oil industry.
- **Salt Water Intrusion** (Clip 15) – Why are stable salinity levels important in different parts of the estuary?
Rescuing the Treasure – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=63
A sequel to "Haunted Waters, Fragile Lands," this video describes the importance of estuaries and restoration techniques.
- **Land Loss - 2040 Map** (Clip 2) - Explains the wetlands as our living resource, what an estuary is and what BTNEP is. Also shows a map of Louisiana’s land loss from 1950 until 2040.

EstuaryLive! – Activities (BTNEP)
http://estuarylive.btnep.org/default.asp?id=26
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.
- **Louisiana's Coastal Plain: A Look at Land Loss** - PowerPoint slides show progressive land loss from 1839-2020. Grades 4-12.
- **BTNEP: Changes Over Time** - Students answer questions about changes in the Golden Meadow wetlands based on their analyses of comparative land use maps. Grades 6-12.
- **Salt Marsh Activity Book: Why Are We Losing Salt Marsh?** - Color the picture and answer questions about progressive land loss. Grades 2-6.
- **BTNEP Coastal Land Loss** - Colored map printout shows land loss from 1839-2020. Grades 4-12.

Washing Away – DVD (LPB/PBS)
http://www.lpb.org/programs/washingaway/
A documentary about the loss of Louisiana's coastal wetlands produced in August of 2007. "Washing Away” tells the stories of six Louisianans and how the storms affected the coastline, their land and their livelihoods. These people share their stories and their knowledge of the larger impacts of coastal land loss on the environment, wildlife, the economy, industry, culture and communities. Lesson plans supplement the documentary. For a copy of this program visit us at the above URL, send email to orders@lpb.org, or call the LPB at 800-973-7246. **Cost is $25.**

MarshMission – CD
Two narrated PowerPoint presentations and a Flash movie about Louisiana’s vanishing wetlands. To request your copy of the CD, send an email to <jsche15@lsu.edu>.
- **Vanishing Wetlands** by C.C. Lockwood (approx. 27 min.)
- **Changing Landscape** by Rhea Gary (approx. 27 min.)
- **The Rise and Disappearance of Southeast Louisiana** by Dan Swenson (7 min.)

Bayou Lafourche: The Longest Street in the World – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=48
This documentary captures the history, culture, lifestyle, environmental troubles and emerging ecological solutions of the 100-mile bayou that weaves through the Barataria-Terrebonne Estuary.
- **Saltwater Intrusion on the Bayou** (Clip 3) - Effects of intrusion on freshwater supplies.
- **Losing the Wetlands** (Clip 1) - How changes in coastal wetlands directly affect the lives and livelihood of the people who live there.

Spirit of the Estuary: Using Art to Understand Ecology – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=76
A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies. Grades 6-12.
- **Dialogue: Disappearing Wetlands** (Activity 2-13) - Students analyze David Bates’ painting, *Grassy Lake*, generating and interpreting a list of what they observe in the painting; improvise a dialogue between two people in a canoe in a swamp; write a dialogue about the disappearing wetlands in Louisiana; research the wetlands of the BTNE for the purpose of creating a script that will be shared with an audience; critique, edit and revise each others’ work; learn techniques needed to create a tape of their dialogues; use the Internet to find an appropriate audience with whom to share their taped dialogues; make a fact page or brochure to provide additional wetlands information to their audience; and record daily reflections about the process in their journals.
Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and are downloadable from this site. Grades 6-12.
- **What is Happening to Our Coast** - Describes the coastal environment and how it changes under natural and human influences.
- **Components of Coastal Land Loss** - States broad environmental and economic consequences when land turns to water or land is covered with water due to subsidence, sea level rise, flood control structures, canals and navigation channels, storms and wave action, herbivory, and development.
- **Oh Where Have All the Animals Gone?** - Students choose a wetland animal about which to create an information brochure.
- **Restoration History** - History is outlined in order to understand how Bayou Lafourche received funds for restoration projects.
- **A Quote From Mark Twain** - A gem of wisdom from the great author.
- **Interpreting Twain’s Quote Activity** - Students express their responses to what is happening today in south Louisiana.

Wetlands & Wonder: Reconnecting Children with Nearby Nature – Video (EPA)
http://www.epa.gov/owow/wetlands/education/wetlandsvideo/
This 14-minute video from the U.S. Environmental Protection Agency discusses loss of wetlands and its effect on our connection to the natural world. The video includes streaming text for the hearing impaired.

The Dead Zone – Lesson Plan (EPA)
An inquiry-based lesson on what causes hypoxic conditions that produce the “Dead Zone” in the Gulf of Mexico. The maps from this pdf are an excellent resource for studying the watershed issues. Grades 9-12 but may be adapted for a younger audience.
Subsidence

Subsidence and Sea Level Rise in Louisiana: A Study in Disappearing Land (NOAA)
http://www.magazine.noaa.gov/stories/mag101.htm
An article showing examples of subsidence. The photography gives a true picture of what is happening to Louisiana’s coastal areas.

Subsidence and Sea-Level Rise in Southeastern Louisiana: Implications for Coastal Management and Restoration (USGS)
http://coastal.er.usgs.gov/LA-subsidence/
Data on subsidence in southeastern Louisiana. A colored map accompanies the text.

Louisiana’s Wetlands Are Sinking Under Pressure (CWPPRA/USGS)
Causes and effects of subsidence in south Louisiana.

Loss of Wetlands: Subsidence – Activities (CWPPRA/USGS)
http://www.lacoast.gov/education/FragileFringe/subsiden.htm
Activity-based lesson on defining and demonstrating the results of subsidence.

Vanishing Wetlands, Vanishing Future – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=62
This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.

- **Subsidence** (Clip 4) - Describes the mechanisms and effects of salt water intrusion due to subsidence. Habitat loss is shown in several ways: canals, sediment loss, salt water intrusion. It also simply states how each effects our wetland areas.

Rescuing the Treasure – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=63
A sequel to “Haunted Waters, Fragile Lands,” this video describes the importance of estuaries and restoration techniques.

- **Subsidence** (Clip 6) - Describes the effects of subsidence on local habitat and culture.

Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and are downloadable from this site. Grades 6-12.

- **Subsidence-An Important Factor** - Definitions and descriptions of tectonic and compaction subsidence.
- **Subsidence Made Simple Activity** - Concepts of subsidence are demonstrated using a jigsaw puzzle.

Louisiana Wetlands Disappearing (AAPG)
http://www.aapg.org/explorer/2007/01jan/subsidence_map.cfm
Map showing subsidence in different areas of Louisiana at an inch/year ratio (Visual Simulation).

Subsidence – Activities
http://www.mysciencebox.org/files/3katrina_case.doc
Case study lesson on Katrina includes activities dealing with subsidence.

Probable Production-Induced Subsidence, Fault Reactivation, and Wetland Loss in the Gulf Coast Region – Slide Show (USGS)
http://coastal.er.usgs.gov/gc-subsidence/slide-show/
Secondary-level or teacher resource slide show about subsidence and how it ties to wetland loss.
Barrier Islands

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)

http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **Barrier Islands** (Activity 1-01) - Shows how barrier islands protect coastal Louisiana from the winds and waves of storms. Students construct models and simulate the wave movements of a storm.
- **The Tragedy of Isles Dernieres** (Activity 1-15) - Investigates history and science while unraveling the tragic story of the Isles Dernieres, and offers an excellent opportunity to use modern technology. Grades 8 & HS Env Sci.

Barrier Islands as Part of and Protection for the Wetlands (CWPPRA/USGS)

http://www.lacoast.gov/education/FragileFringe/barriers.htm

Identifies the value of the barrier islands to the wetlands.

Barrier Island Fact Sheets (USGS)

http://marine.usgs.gov/fact-sheets/Barrier/barrier.html

Data and GIF images support the need to save our eroding barrier islands.

Barrier Islands: Last Island and Trinity Island

http://www.ccllockwood.com/stockimages/barrierislandslastisland.htm

Awesome photography by C.C. Lockwood of the barrier islands of Louisiana. (Photos may not be used without express written permission.)

Northern Gulf of Mexico Ecosystem Change and Hazard Susceptibility Project (USGS)


Explores the Louisiana wetland and estuary system. Good resource for sharing an active science investigation with secondary students. Grades 8-12.

Coastal Barriers

http://www.eoearth.org/article/Coastal_barriers_in_the_United_States

Information about coastal barriers and islands.

Barrier Islands: To Build or Not to Build?

http://www.glencoe.com/sec/science/webquest/content/barrierisland.shtml

Various uses of barrier islands result in disagreements about how they are to be managed. Should barrier islands be protected and left undeveloped? Should people be allowed to build homes and hotels on barrier islands?

Haunted Waters – Video Clips (BTNEP)

http://educators.btnep.org/default.asp?id=61

An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.

- **History of Barrier Islands** (Clip 3) - Cajuns, Creoles and others of many nationalities settled in the barrier islands long ago.
Soil

The Great Plant Escape: Case 2 “Soiled Again” – Activity
http://www.urbanext.uiuc.edu/gpe/case2/index.html
Detective Le Plant needs you to get your hands dirty by helping him dig for clues in the soil. To solve this case, you must find out what soil is, why it is important, and in what kinds of soil plants grow. Grades 4-5.

BrainPop: The pH of Soils – Video
http://www.brainpop.com/science/seeall/
Short video takes the students through the pH scale and why it is so important to the soil. Look under “Science” and click on “pH scale” and soil clips. Requires subscription.

GLOBE Project: Soil Chapter – Activity
http://archive.globe.gov/tclg/tgchapter.jsp?sectionId=86
PDF chapter on soil includes protocols, field guides, learning activities, appendix and data sheets.

CyberBee: Probing Questions – Activities
http://www.infotoday.com/MMSCHOOLS/mar02/cybe0302.htm
Which type of soil supports more plant life? Why do you think the habitats have different pH levels in the soil? Includes sample worksheet, lesson plans, where to buy science probes for testing and links to related sites.

pH Agriculture – Lesson Plan
http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/13/3f/ad.pdf
Includes information on major components of soils, factors affecting soil pH, effect of pH on plant growth, the relationship between soil pH and nutrient availability, and more.

The Biotic and Abiotic Factors: The Relationship Between pH and the Sprouting of Corn Seeds – Lesson Plan
http://www.rci.rutgers.edu/~dougproj/programs/outreach/Life/AbioticpH.pdf
Enables students to identify solutions of varying pH, observe the relationship between biotic and abiotic factors affecting pH levels, and to determine optimal pH for seed growth. Grades 7 and above.

Salt Marshes – Video (NOAA)
http://oceanservice.noaa.gov/education/kits/estuaries/media/supp_estuar06a_saltmarsh.html
Shows how plants and the soil are tolerant to high and low tides; defines what a levee is and lists plants that are compatible in the salt water marshes of our coastal areas.

Soil Analysis – Activity
http://www.mysciencebox.org/soilanalysis
Soil analysis activity with links to specific grade levels, scientific concepts, lesson types and related topics.

Soil Net – Activities
http://www.soil-net.com
Ample soil information and activities for Grades 1-4.

Soil Soakers – Activities (EPA)
http://www.epa.gov/oerpage/superfund/students/clas_act/fall/soakers.htm
Students learn to test soils’ ability to absorb and retain water and how these qualities pertain to wetlands. Grades 2-6.

Buried Treasure – Activities (EPA)
http://www.epa.gov/oerpage/superfund/students/clas_act/fall/buried.htm
Teaches students about soil decomposition and how this process relates to wetlands. Grades 3-6.
Underground Adventure – Activities
http://www.fieldmuseum.org/undergroundadventure/

Students decide on a research question, propose a hypothesis, establish a study site at their school, conduct field research, take notes on their findings in a scientific journal, and modify their hypothesis based on what they find. Grades 3-8.

Delineating a Wetland Using Soils – Lesson Plan
http://www.classroomearth.org/node/183

Students identify wetlands using soil samples in this AP Environmental Science Class lab.
Water Quality

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **What is Freshwater and What is Saltwater?** (Activity 3-1) - Students locate Louisiana waterways and compare the Gulf of Mexico (salt water) to the Barataria Bay (freshwater).

- **The Ideal Filter** (Activity 3-2) - Focuses on the wetlands filtering system. Students design an ideal filter to simulate the job done by a wetland in purifying dirty water.

- **The Hurricane’s Coming!** (Activity 3-3) - Stresses the importance of wetlands being nature’s best filters and protectors. Students build models that show the function and value of wetlands as storm protectors.

- **Keep It Above Board** (Activity 3-4) - Focuses on trash decomposition in the environment. Students compare the decomposition rates of several items and create a collage.

- **Exploring the Barataria-Terrebonne Watershed** (Activity 3-5) - Contrasts the relatively flat landscape of coastal Louisiana with hillier terrain in the Tunica Hills region. Students discuss how water moves through watersheds.

- **Watershed Drainage and Sources of Pollution?** (Activity 3-6) - Involves the importance of keeping our watershed healthy. Students make a model watershed and investigate runoff, point source and non-point source pollution.

- **Understanding Nutrients: Nitrogen Cycle** (Activity 3-7) - Emphasizes the roles of phosphorus and nitrogen in aquatic plant growth. Students participate in a skit to understand the Nitrogen cycle.

- **Understanding Nutrients: Phosphorus Cycle** (Activity 3-8) - Emphasizes the role of phosphorus in aquatic plant growth on our ecosystems. Students participate in a game.

- **The Effect of NO₃ on Plant Growth** (Activity 3-9) - Investigates the effects of various concentrations of fertilizer on plant growth. Students design an experiment on fertilizer, record results after one week and draw conclusions from their data.

- **Measuring the Bayou’s Vital Signs** (Activity 3-10) - Investigates the water quality of Bayou Lafourche. Students test Bayou Lafourche water for effects of various concentrations of fertilizer on plant growth and other water quality issues.

Healthy Water, Healthy People – Activities
http://www.projectwet.org

Innovative water quality education program sponsored by Project WET and the Hach Scientific Foundation, offering hands-on activity guides, testing kits, training, and more. This unit is for anyone interested in learning and teaching about contemporary water quality education topics.

- **Mapping It Out** (Pp. 6-8) - Uses two excellent teaching techniques: the KWL process and Concept Mapping. Students express prior knowledge of water quality.

- **From H to OH!** (Pp. 15-20) - Allows students to simulate the creation of acids and bases.

- **Grab a Gram** (Pp. 29-34) - Introduces basic water quality measurements like parts per million (ppm) and milligrams per liter (mg/L).

- **Multiple Perspectives** (Pp. 55-59) - Entails completing a set of activities showing different points of view about water quality.

Monitoring Estuarine Water Quality – Activities (NOAA)
http://apps.dataintheclassroom.org/water-quality/

Features five activities at different levels to teach about monitoring water quality using real data. Grades 6-8.
Vanishing Wetlands, Vanishing Future – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=62
This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.
- **Fish Kills** (Clip 5) - Measurements can detect minerals and chemicals that can be harmful to fish. Crop fertilization is performed in ways that cause minimal damage to wetlands.
- **Pathogen Contamination** (Clip 6) - Proper detection and sewage treatment procedures keep pathogens from reaching open wetlands.
- **Oyster Industry** (Clip 7) - Discusses commercial impact of oyster industry on Barataria-Terrebone area.
- **Toxic Substances** (Clip 8) - Presents sources of toxins in the wetlands and describes how toxins can harm the environment.

Give Water a Hand – Action Guide (EPA)
An extensive program on the importance of the protection of water, including activities and research projects on how to ensure the water quality of a certain area. Grades 4-8.

Can Sea Water Freeze? – Activity (NASA)
http://aquarius.nasa.gov/pdfs/sea_water_freeze.pdf
Freeze liquids of varying salinity; learn how salinity relates to the buoyancy of sea ice and icebergs.

Properties of Fresh & Sea Water – Activity (NASA)
http://aquarius.nasa.gov/prop_fresh_sea.php
Conduct experiments on the boiling point, freezing point, and heat capacity of fresh water and sea water.

Stacking Water – Lesson Plan (SEA)
http://www.sea.edu/academics/k12.asp?plan=stackingwater
Students use clear straws to stack colored water of different salinities. Grades 6-12.

Tides Tutorial – Activities (NOAA)
http://oceanservice.noaa.gov/education/kits/tides
Overview of the complex systems that govern the movement of tides and water levels. The Roadmap to Resources complements the information in the tutorial with additional information and data from NOAA and other reliable resources.

Waters of the Earth – Lesson Plan (SEA)
http://www.sea.edu/academics/k12.asp?plan=watersoftheearth
Students create a visual display showing the distribution of water on earth. Grades K-10.

Evaporation Investigation – Activity (NASA)
http://aquarius.nasa.gov/evap_invest.php
Observe and understand the process of evaporation. Grades 1-6.

Magnificent Ground Water Connection – Activities (EPA)
http://www.epa.gov/region01/students/teacher/groundw.html
Printable lessons and worksheets on ground water, the water cycle, water conservation, water contamination, and water protection. Grades K-12.

Morphie’s Great Water Ride Adventure – Activities
http://www.on.ec.gc.ca/greatlakeskids/morphie-home-e.html
Learn about the water cycle by riding through it with Morphie Raindrop. Grade 2.

Thirstin’s Water Cycle (EPA)
http://www.epa.gov/safewater/kids/flash/flash_watercycle.html
Students control the water cycle as they learn in this interactive, animated activity. Grades 1-5.
Water Cycle: Now You See It, Now You Don’t – Activities (NASA)
http://aquarius.nasa.gov/water_cycle.php
Learn about the relationship between temperature and condensation. Grades 2-5.

Water Cycle Game – Activity (NOAA)
http://response.restoration.noaa.gov/watercyclegame
Explains the complexity of the water cycle through role-playing as a molecule of water.

Fragile Fringe – Activities (USGS)
Guide for teaching about coastal wetlands.

What is a Watershed? – Videos
http://www.conservationinformation.com/?action=learningcenter_kyw_whatisawatershed
Three educational videos about watersheds: “What is a Watershed”, “Everyone Impacts a Watershed,” and “Potential Sources of Pollution.”

Water Sourcebooks (EPA)
http://www.epa.gov/safewater/kids/wsb/
Environmental education program explains the water management cycle, showing how it affects all aspects of the environment. All 324 activities include hands-on investigations, fact sheets, reference materials, and a glossary of terms. Grades K-12.

Density: Sea Water Mixing & Sinking – Activity (NASA)
http://aquarius.nasa.gov/seawater_mix_sink.php
Uses temperature-salinity (T-S) diagrams to understand seawater density. Grades 6-12.

Dive In! – Lesson Plan (NOAA)
http://www.uncw.edu/aquarius/education/lessons/Aq%20Dive%20In.pdf
How do buoyancy, pressure, and light affect the work of underwater scientists? Archimedes’ Principle and how light is affected as it passes through water are investigated; students compare and contrast atmospheric and underwater pressure. Grades 9-12.

Electrolysis of Salt Water – Activities (NASA)
http://aquarius.nasa.gov/electrolysis.php
Conduct an experiment to see that water can be split into its constituent ions through the process of electrolysis. Grades 9-12.

Liquid Rainbow – Activities (NASA)
http://aquarius.nasa.gov/liquid_rainbow.php
Use analytical thinking by devising schemes to stack solutions of different densities. Grades 1-5.

Potato Float – Activities (NASA)
http://aquarius.nasa.gov/potato_float.php
Understand how the same object can both sink and float, depending on its density relative to a fluid. Grades 4-8.

Locate Your Watershed (EPA)
http://cfpub.epa.gov/surf/locate/index.cfm
Locate your watershed by entering your ZIP code or the name of a stream, city, tribe, lake, school, or airport. Find out what citizen groups are actively trying to protect your watershed, what role your watershed plays in the national watershed network, current water use data, and more.

Off Base – Lesson Plan (NOAA)
http://oceanexplorer.noaa.gov/explorations/08lophelia/background/edu/media/offbase.pdf
Students learn to: define pH and buffer; explain in general terms the carbonate buffer system of seawater; explain Le Chatelier’s Principle; predict how the carbonate buffer system of seawater will respond to a change in concentration of hydrogen ions; identify how an increase in atmospheric carbon dioxide might affect the pH of the ocean; and discuss how this alteration in pH might affect biological organisms. Grades 9-12.
Water Analysis Lesson – Activity
http://www.mysciencebox.org/wateranalysis
Basic water analysis lesson.

Lessons on the Lake: Rollin' Down the River: Riverine Systems – Activities (USGS)
Teaches about river systems and watersheds.

The Global Water Sampling Project – Activities
http://www.k12science.org/curriculum/waterproj/environmentalscienceactivities.shtml
International cooperative project includes resources and lessons about water quality.

Louisiana 2006 Water Quality Assessment Report (EPA)
http://iaspub.epa.gov/waters10/attains_index/control/?p_area=LA
Report on water quality levels for Louisiana.

Mississippi River Water Quality: Implications for Coastal Restoration (CWPPRA/USGS)
http://www.lacoast.gov/reports/its/MRWQ.pdf
Secondary-level or teacher resource bulletin tying water quality to coastal restoration efforts.

Louisiana Hydrowatch (USGS)
http://la.water.usgs.gov/default.html
Hydrologic data for Louisiana, including data collection sites and maps, best for secondary classrooms.
**Point and Non-Point Source Pollution**

**Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)**
[http://educators.btnep.org/default.asp?id=64](http://educators.btnep.org/default.asp?id=64)

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **Swamp Sweep** (Activity 3-11) - Students conduct a scientific investigation to determine amounts, types, and sources of debris found along a selected waterway within their community. Results are used to make a positive change towards the problem. Grade 7.

**Project WET – Activities**

- **Just Passing Through** (pp. 166-170) - Learn how vegetation affects the movement of water over land surfaces and helps prevent erosion.
- **A-maze-ing Water** (pp. 219-222) - Learn how runoff water can pick up pollutants and carry them through storm water systems.
- **Sum of the Parts** (pp. 267-270) - Distinguish between point and non-point sources of pollution, and understand how everyone contributes to water pollution in a river system.

**Healthy Water, Healthy People – Activity**

- **Footprints On The Sand** (pp. 90-97) - Students simulate development of a beachfront community to explore the possible effects of development on water quality.

**Non-point Source Kids Page – Activities (EPA)**

Topics dealing with non-point source pollution at different levels, with activity sheets and articles. Grades 2-6.

**Splash**

A sailboat tours different areas selected by students and helps students find sources of non-point and point pollution. This interactive game is available on CD for a minimal fee (around $9.00).

**Ohio State University Extension Fact Sheet**
[http://ohioline.osu.edu/aex-fact/0465.html](http://ohioline.osu.edu/aex-fact/0465.html)

Extensive chart listing non-point source pollutants and their sources. It also shows graphics of point source pollution examples and summarizes the Clean Water Act of 1972.

**What’s the Point? Point vs. Non-point – Lesson Plan**
[http://www.saws.org/education/H2o_university/Elementary/ClassModules/docs/What’s_the_Point.pdf](http://www.saws.org/education/H2o_university/Elementary/ClassModules/docs/What’s_the_Point.pdf)

Activity-based lesson with graphic organizer that can be used as a Pre- and Post-test.

**Rainwater Blues DVD (DNR)**

Today non-point source (NPS) pollution remains the nation’s largest source of water quality problems. It is the reason that approximately 40% of our rivers, lakes and estuaries are not clean enough to meet basic uses such as fishing or swimming. To order a free "Rainwater Blues" educational video contact Linda Pace, Louisiana Department of Natural Resources, Coastal Resources Scientist Supervisor, (800) 267-4019, <linda.pace@la.gov>. Please indicate whether you would like the 15- or 30-minute version. Free upon request.

**Pollution – Tutorial (NOAA)**
[http://oceanservice.noaa.gov/education/kits/pollution](http://oceanservice.noaa.gov/education/kits/pollution)

 Presents the history and types of non-point source pollution, methods used to detect pollutants, and assess and reduce their damaging effects on the environment. The Roadmap to Resources complements the information in the tutorial by directing you to additional information and data resources from NOAA and other reliable sources.
Vanishing Wetlands, Vanishing Future – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=62
This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.
- **Fish Kills** (Clip 5) - Measurements can detect minerals and chemicals that can be harmful to fish. Crop fertilization is performed in ways that cause minimal damage to wetlands.
- **Pathogen Contamination** (Clip 6) - Proper detection and sewage treatment procedures keep pathogens from reaching open wetlands.
- **Oyster Industry** (Clip 7) - Discusses commercial impact of oyster industry on Barataria-Terrebone area.
- **Toxic Substances** (Clip 8) - Presents sources of toxins in the wetlands and describes how toxins can harm the environment.

Marine Debris – Coloring Book (NOAA)
http://www.education.noaa.gov/books/debris/debris1.htm
Helps kids understand how to recognize the hazards of throwing junk into the ocean and overboard from boats.

It All Runs Down Hill – Activity (NOAA)
http://oceanservice.noaa.gov/education/for_fun/ItAllRunsDownhill.pdf
Simple student activity in which a model of a watershed is created to show how rainfall carries pollution into the ocean and other bodies of water.

Turning the Tide on Trash: Marine Debris – Curriculum (EPA)
http://www.epa.gov/owow/OCPD/Marine/contents.html
An extensive learning guide on how water pollution threatens the vitality of the world’s ocean systems. Activities include ways to see how marine debris, such as human trash, can cause discomfort and harm to marine wildlife.

Mercury is Rising – Activity
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive1203.html
Calculate the amount of fish a person can eat per month in order to stay within acceptable limits of the EPA’s mercury guidelines.

You Can Protect Our Waters – Bulletin (LSUAC)
Basic bulletin from LSU Ag Center introducing water pollution.

Watersheds and Wetlands – Activity
http://www.mysciencebox.org/wetlands
Basic lesson series teaching about watershed pollution and how it ties to the wetlands.

Lessons on the Lake: Pontchartrain Basin: A Watershed – Lesson Plan (USGS)
Created by the Lake Pontchartrain Basin foundation. Teaches about watersheds and wetland pollution.

Lessons on the Lake: Liquid Assets: Our Water Resources – Lesson Plan (USGS)
Created by the Lake Pontchartrain Basin foundation. Teaches about protecting our water resources.
Hurricanes

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **The Hurricane’s Coming!** (Activity 3-3) - Stresses the importance of wetlands being nature’s best filters and protectors. Students build models that show the function and value of wetlands as storm protectors.

Preparing Your House for a Hurricane (CWPPRA/USGS)
http://lacoast.gov/education/kids/hurricane/hurricane_house.htm

Basic information about hurricanes, including definitions of watch and warning. The last slide has the viewer pick up outdoor items and store them in the proper location, as well as boarding up windows and shutting doors.

Getting Hurricane Supplies (CWPPRA/USGS)
http://lacoast.gov/education/kids/hurricane/hurricane_supplies.htm

Basic information about hurricanes, including definitions of eye and cloud wall. Viewer clicks on portions of the slide to answer questions. The last slide has viewer placing the most important items needed for hurricane preparedness into a supply box.

Willful Winds: Hurricane Andrew and Louisiana’s Coast – Booklet (CWPPRA/USGS)
http://lacoast.gov/education/willfulwinds/index.htm

Details the impact of Hurricane Andrew on Louisiana’s coast.

EstuaryLive! – Activities (BTNEP)
http://estuarylive.btnep.org/default.asp?id=26

Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.

- **Packing it on! The Width of Levees** - Students respond to questions about the Golden Meadow Hurricane Protection Levee.
- **Keeping up with the Surge!** - Students analyze effects produced by the Golden Meadow pump station under various conditions.
- **Standing Up to the Surge!** - Students perform calculations and volumetric measurements pertinent to design and building of the Golden Meadow Hurricane Protection Levee.
- **Hurricanes Isidore and Lili: A View from Space** - Satellite images are analyzed to answer questions about the forms of hurricanes.
- **Hurricanes Isidore and Lili: Another Look** - Students analyze storm track diagrams.
- **Hurricanes Isidore and Lili: East Timbalier Island** - Students analyze storm effects on East Timbalier Island.
- **Hurricanes Isidore and Lili: Trinity Island** - Students compare photos to look for differences in land area and other qualities after hurricanes.

Weather Information – Booklet (NOAA)

Provides research and investigation experiences using online resources on El Niño, hurricanes, and weather.

Forces of Nature

Created to accompany a National Geographic film, this site offers explorations of the biggest forces our earth can bring us: tornadoes, earthquakes, volcanoes and hurricanes. Virtual labs let you design your own disaster, and National Geo-quality photos fill in the gaps of your visual imagination.
Hurricane Basics (NOAA)
Offers resources and information about hurricanes, including how they form and grow. It also includes the cycle of Atlantic storm names for the years 2005 through 2010 and a tracking chart for the Atlantic/Caribbean Sea site.

Hurricane Names (NOAA)
http://www.nhc.noaa.gov/aboutnames.shtml
Hurricanes have names that are taken from a central list. Is your name there? Take a look at the names for the Worldwide Tropical Cyclone Names that are to be used for storms in the Atlantic and the Pacific as well as the waters around Australia, the Fiji Islands and India.

Hurricane Education Materials – Activities (NOAA)
http://www.climate.noaa.gov/index.jsp?pg=./education/hurricanes/materials.jsp
Hurricane related activities, including a storm surge lesson, a family disaster plan, hurricane awareness, basics, and a fact sheet, posters, booklets and links to further activities. Grades 9-12.

Hurricanes (NOAA)
http://www.oar.noaa.gov/k12/html/hurricanes2.html
Basic hurricane information and a web-based activity on graphing hurricane related data.

Hurricane Tracking Chart (NOAA)
http://www.nhc.noaa.gov/gifs/track_chart.gif
Track Atlantic hurricanes using this gif image of the Atlantic Ocean from Nova Scotia to northern South America and the Gulf of Mexico.

National Hurricane Center Home Page (NOAA)
http://www.nhc.noaa.gov/
Learn about the history of noteworthy storms, hurricane direct hits on the mainland U.S. coastline and for individual states from 1900-1996.

Saffir-Simpson Hurricane Scale (NOAA)
http://www.nhc.noaa.gov/aboutsshs.shtml
A 1-5 rating based on the hurricane's intensity, this scale is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region.

Sea State – Activities
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0906.html
Being able to accurately forecast the conditions at sea has been the goal of explorers, sailors, and fishermen for thousands of years. Now, through the use of ocean observing systems, we can not only predict, but pinpoint, exactly what the sea will be like before leaving the dock.

Masters of Disaster – Curriculum
http://www.redcross.org/disaster/masters
Helps teachers integrate disaster safety concepts into lesson plans.

National Severe Storm Laboratory’s Weather Room – Activities (NOAA)
http://www.nssl.noaa.gov/edu/
General information about tornadoes, hurricanes, lightning and thunderstorms. Includes weather lessons, a basic introduction to map analysis and interpretation, and information about weather careers. Elementary school coloring books are available for printing and use for weather education.

NCDC S.C.H.O.L.A.R.S. – Activities (NOAA)
http://www.ncdc.noaa.gov/oa/edu/html#scholars
Provides a wide range of printable materials for use in teaching about climate changes and various weather phenomena, such as hurricanes and tornadoes.
Forecast Watch – Activities (NOAA)
http://www.noaawatch.gov/
A roundup of NOAA weather Web sites, including links to the latest weather forecasts around the USA and around the world. Track storms through NOAA weather satellites, get the latest weather maps and learn how to protect yourself and your community from severe weather.

Past Weather – Activities (NOAA)
http://www.ncdc.noaa.gov/oa/ncdc.html
A roundup of NOAA Web sites that contain archived weather information. Official weather records date back to 1895. Obtain certified weather information for a court case, building project or other purpose.

Play Time for Kids – Activities (NOAA)
http://www.nws.noaa.gov/om/reachout/kidspage.shtml
Designed to help kids learn about hurricanes, winter storms, thunderstorms, and other hazardous weather.

NOVA ScienceNOW: Hurricanes – Lesson Plan (PBS)
http://www.pbs.org/wgbh/nova/teachers/activities/3204_02_nsn.html
Models how wetlands reduce the intensity of a hurricane.

Kid's Hazards Quiz – Activities (NOAA)
http://www.ngdc.noaa.gov/hazard/kqStart.shtml
Natural hazards such as earthquakes, tsunamis, and volcanoes affect both coastal and inland areas. Select your quiz subject from thunderstorms, tornadoes, hurricanes, floods, winter storms, tsunamis, volcanoes, landslides, and wildfires. You can also set up a family disaster plan from this web site.

Hurricane on the Bayou – Video
http://www.hurricaneonthebayou.com
Dynamic IMAX movie created during Hurricane Katrina teaching about the impact of hurricanes on the Louisiana coast. Includes resources for teaching lessons about the movie. Movie can be ordered via a link on the site.

Hurricane Force: A Coastal Perspective – Videos
http://www.open-video.org/featured_video.php?type=Related&videoid=4560&PHPSESSID=5cb816611751559645c8026db3c85bcd
Series of video clips describing the impact of hurricanes on the Gulf Coast.
**Human Impacts**

**Project WILD – Lessons**

Only available to teachers by attending a workshop. For information on [how to sign up for a workshop](mailto:info@projectwild.org).

- **Ethi-Thinking** (Pp. 303-304) – Students list activities that might be harmful to wild plants and animals.
- **Changing the Land** (Pp. 345-352) – Humans affect biological communities in many ways. (This activity can also be used with the BTNEP Map.)

**Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)**

http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **Coastal Wetlands Needs You!** (Activity 1-14) - Encourages the students to brainstorm ways they can contribute to solving and abating the problems associated with coastal land loss and habitat destruction. Students create a Citizen Action Brochure. Grades 2, 3, 5, 7, HS Biol.
- **Issue Analysis and Decision Making** (Activity 1-13) - Students conduct research on potential restoration options, then discuss risks and benefits of a freshwater diversion project. Grades 7, 8, HS Env Sci.
- **Swamp Sweep** Activity (3-11) - Focuses on debris found along a selected waterway within their community. Students conduct a scientific investigation and use the results to make a positive change toward solving the problem. Grade 7.

**Spirit of the Estuary: Using Art to Understand Ecology – Activities (BTNEP)**

http://educators.btnep.org/default.asp?id=76

A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies. Grades 6-12.

- **The Material of Culture** (Activity 1-2) - Students research cultural artifacts; study the process of creating material culture; create an exhibit of Native American, African, and/or Cajun/Creole cultural artifacts.
- **To Build or Not to Build** (Activity 1-3) - Students learn that Louisiana’s coast is disappearing at a catastrophic rate; compare and evaluate a variety of actual coastal restoration techniques; use accurate scientific terminology to discuss basic facts of coastal zone management; describe examples of current problems associated with land loss; develop a PSA to create an awareness of coastal land loss issues; analyze restoration projects that identify and remediate coastal and loss problems; prepare an evaluative presentation that critiques current practices.
- **Where Has All the Green Space Gone** (Activity 1-4) - Students identify greenspace, natural areas and/or other important sites in the BTNE; research history of development in the BTNE; reflect on the ecological impact of urbanization; construct a green map; and communicate student findings to the community.
- **Architecture of the B-T Basin** (Activity 1-7) - Students gather information on the characteristic features of the traditional architectural styles found in the Barataria-Terrebonne Estuary; organize the features in a graphic organizer; visit at least one historic building in their community; choose and draw a building that displays features of one of the traditional styles; contrast the traditional styles with modern architectural styles and discuss the importance of preserving historic buildings.
- **Form & Function of Boat Designs** (Activity 1-8) - Students study, compare and contrast the design features of four boat types described in the handout *The Form and Function of Louisiana Fishing Boats* and on the Louisiana FolkLife website; create a Venn diagram to highlight the similarities and differences between two fishing boat designs; draw their favorite fishing boat designs either from life (preferred if possible) or from a photograph; describe and explain in both oral and written form the design features they consider most important to the specific job their chosen boat does and how form follows function.
Wetland Loss: Digging of Canals – Activities (CWPPRA/USGS)
http://www.lacoast.gov/education/FragileFringe/canals.htm
Illustrates the destruction of wetlands that resulted from the digging of canals for oil and gas exploration in the coastal wetlands and cypress logging in the swamps. Grades 4-8.

Salt Marsh Habitat of the Barataria-Terrebonne Estuary – Activity Book (BTNEP)
BTNEP Activity Book. To obtain a copy call 800-259-0869. Free upon request.
• From Marsh to Marina (Pp. 21-23) - Shows the changes that can occur in a marsh and how humans have impacted the area to meet their needs.
• Why Are We Losing Salt Marsh? (Pg. 24) - Shows how land loss occurs through natural causes and man’s activities.

Rescuing the Treasure – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=63
A sequel to “Haunted Waters, Fragile Lands,” this video describes the importance of estuaries and restoration techniques.
• Tourism (Clip 4) - Presents aspects of the ecosystem that attract visitors who can’t see these attractions anywhere else in the world.
• Problems of the Future (Clip 7) - Shows consequences of wetland loss. Students are asked to think about what they can do to help with this situation.
• Solutions and the Future (Clip 8) - Gives possible future solutions to help prevent the loss of our wetlands. BTNEP brings citizens, public officials and scientists together to come up with solutions. Citizen involvement is one of the most effective ways to save our wetlands.
• This is Our Future (Clip 9) - Shows how Louisiana’s wetlands help the whole United States, not just Louisiana (seafood industry, oil and gas industry, recreational activities, wildlife, etc.).

EstuaryLive! – Activities (BTNEP)
http://estuarylive.btnep.org/default.asp?id=26
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.
• Hypoxia: Root of the Dead Zone - A bar graph helps students understand effects of hypoxia on the wetlands.

Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and are downloadable from this site. Grades 6-12.
• A Quote From Mark Twain - A gem of wisdom from the great author.
• Interpreting Twain’s Quote Activity - Students express their responses to what is happening today in south Louisiana.
• Early Man in Louisiana - Information and maps describing prehistoric settlers of the bayou.
• Bayou Indians Activity - Students research crafts, lifestyles, and customs of the bayou’s original inhabitants, and create an object that reflects a part of their heritage.
• Researching the Bayou Indians - Students select a tribe to research and answer questions about tribal relationships with the Federal Government.
• European Man in Louisiana - History of the settling of Louisiana by explorers and people of various nationalities.
• Investigating European Man in Louisiana Activity - A worksheet helps students recall key events and people in local history.
• Sugar Time Activity - Students create a timeline of the growth and development of the sugar industry.
• Louisiana Oil Industry - Describes both the importance of the local oil industry and how it threatens the ecosystem.
Empty Oceans – Lesson Plan (NOAA)
http://www.sanctuaries.noaa.gov/education/teachers/pdfs/sustain_seafood_lesson2.pdf
How does the human population affect the population of marine species? What can citizens do to sustain seafood populations? Grades 6-8.

National Marine Sanctuaries – Activities (NOAA)
http://www.sanctuaries.noaa.gov/education/teachers/features/lpexplore.html
Explore our national marine sanctuaries and learn about habitats and human impacts.

Oceans Connecting a Nation – Activities
http://k12science.org/curriculum/oceansproj_new/index.html
Urges students to consider the impact humans are having on the oceans. Grades 8-12.

Blue Frontier Oceans for Life – Lesson Plans
http://www.nationalgeographic.com/secs/
Multimedia approach promotes ocean exploration and conservation. Underwater expeditions to National Marine Sanctuaries provide case studies and data for lesson plans. Topics include: biological oceanography; ocean regions and habitats; physical ocean process; human links to and impacts on the ocean; applications of oceanography. Virtual expeditions link the classroom experience with the individual National Marine Sanctuaries, research methods and technology, and researchers’ experiences. Free, on-line teacher workshops feature top ocean researchers and policy makers.

Keep Away – Lesson Plan (NOAA)
http://oceanexplorer.noaa.gov/explorations/06mexico/background/edu/GOM%2006%20KeepAway.pdf
Students discuss the meaning of biological diversity and compare and contrast the concepts of variety and relative abundance as they relate to biological diversity. Given information on the number of individuals, number of species, and biological diversity at a series of sites, students make inferences about the possible effects of oil drilling operations on benthic communities.

The Dead Zone – Lesson Plan (NOAA)
Inquiry-based lesson on what causes hypoxic conditions that produce the “dead zone” in the Gulf of Mexico. The maps from this pdf are an excellent resource for studying watershed issues. Grades 9-12 but may be adapted for a younger audience.

Human Disturbances of the Estuaries (NOAA)
http://oceanservice.noaa.gov/education/kits/estuaries/media/supp_estuar09a_toxic.html
Data on fertilizers and toxic substances that damage coastal areas.

Waterlife: Where Rivers Meet the Sea – Activities (NOAA)
http://oceanservice.noaa.gov/education/waterlife/welcome.html#top
Interactive story based on estuarine environment introduces the estuary, its diverse ecosystems, tidal influences, restoration efforts, and marine debris. Emphasizes personal responsibility and care for environment. (NOTE: This product is still in the development stages, keep visiting the website for more details.)

Who Moved the Beach? – Lesson Plan (NOAA)
Identify the primary causes and impacts of coastal erosion, and how human communities should respond to this process. For advanced 8th (Honors), and 9-12th graders.
Animals of the Coastal Zone

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64

The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **A Song on the Bayou** (Activity 4-1) - Focuses on a song about Cocodrie (alligators), by a Cajun music artist, Papillon. Students compare a nutria to an alligator and discuss how these animals function and survive in their habitat. Grades 3-4.

- **The Story of a Blue Crab** (Activity 2-1) - Focuses on the life cycle of the blue crab. Students discuss each stage of the life cycle and how the habitat plays a role in this process. Grade 2.

- **Understanding Animal Adaptations** (Activity 2-2) - Emphasizes the ways in which humans and beavers have developed body structures that adapt to their habitats. Students dress up a volunteer using props. Grade 1.

- **Louisiana Meal** (Activity 2-3) - Focuses on common foods in Louisiana. Students choose a native animal or plant and create a meal using the USDA Food Pyramid as a guide.

- **Wetlands Loss = Fisheries Loss** (Activity 2-6) - Explores the land-water interface relationship. Students simulate the marsh breakup and create their own productivity curve. Grades 5-8.

Education on the Halfshell: Oysters and Biology – Activities (LASGCP)
http://lamer.lsu.edu/classroom/halfshell/index.htm

- **Understanding a Dichotomous Key** - Students learn to use a dichotomous key by identifying various sea shells.

- **Creating a Dichotomous Key** - Students explore the benefits of creating dichotomous keys as a means of identifying an organism or object.

- **Writing a Descriptive Essay** - Students learn how to write a descriptive essay as a means of identifying an organism or object.

- **Oyster Culture Cycle** - Students understand the fragile balance of providing food for our growing population and learn how the oyster hatchery can help with this balance.

SeaScope (Scope-On-A-Rope) – Activities (LASGCP)
http://lamer.lsu.edu/classroom/seascope/

SeaScope activity folios are written by teachers for teachers. They use the video microscope nicknamed "Scope-On-A-Rope" (SOAR) in science lessons on aquatic organisms.

- **Looking for Ol’ Crustfy** - Students create a slide show using technology, gather data, write stories and poems, and choreograph an original dance to depict the crawfish.

- **Trailing the Snail Addendum: When Ordering Snails for the Classroom** - Snail behavior and characteristics are observed.

- **Secrets of Sand** - Students are introduced to the physical properties of sand.

- **Mosquitoes: Their Place on the Planet** - Stages of mosquito metamorphosis are observed and recorded.

- **Squidology** - Students learn how squid have evolved for survival in the sea by observing, measuring, making hypotheses, and recording data.


Plants and Animals of the Louisiana Wetlands
http://www.wild-lab.com/courses/wetlands/research/animals.htm

This site offers several links that provide lists, location, habitats, size, life span, pictures, etc. of a multitude of wetland plant and animal species. Links include information on:

- **Food Chains / Webs**
- **Hydrophytic Plants**
- **Habitats and Diets**
- **Insects**

- **Amphibians**
- **Turtles**
- **Snakes**
- **American Alligator**

- **Lizards**
- **Mammals**
- **Birds**
- **Fish**
Wetlands Animals – Quiz (CWPPRA/USGS)
http://lacoast.gov/education/kids/AnimalQuiz/
Clues are given about an animal that can be found in the wetland area.

Louisiana State Plants – Lists (DOT)
http://www.fhwa.dot.gov/environment/rdsduse/la.htm
A comprehensive list of all the plants found in Louisiana with their scientific names.

Bird Identification – Quiz (CWPPRA/USGS)
http://lacoast.gov/education/kids/birdquiz/index.htm
Identify common birds of Louisiana. A multiple choice format using pictures.

Wings over the Wetlands – Video (BTNEP)
Examines the importance of South Louisiana’s wetland habitats to the many birds that either call this region home or who depend on it as they pass through during migration. Runtime: 27 minutes. Worksheet online. Order from BTNEP: http://btnep.org. Grades 5-12. Free upon request.

EstuaryLive! – Activities (BTNEP)
http://estuarylive.btnep.org/default.asp?id=26
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.
- Consider the Crab – A graph is analyzed to discover important facts about the blue crab industry.
- Birds: Beautiful Migrants – Maps and text explain the importance of the estuary to seasonal migrants.
- Coast Birds PowerPoint Presentation – Images of estuary migrant birds.
- Brown Pelican – A Recovery Success Story – A graph and thought questions about Louisiana’s state bird.
- Fiddler Crabs of the Joyner Nature Preserve at Pelotes Island – Describes the life habits of the Fiddler crab and shows a video of how the animal moves.

Haunted Waters – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=61
An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System. These clips describe the history of hunting in the bayou and the importance of careful management of these natural resources.
- Hunting (Clip 10)
- Muskrats (Clip 11)
- Harvesting Alligators (Clip 14)
- Life from the Water (Clip 15)

Vanishing Wetlands, Vanishing Future – Video Clip (BTNEP)
http://educators.btnep.org/default.asp?id=62
This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.
- Oyster Industry (Clip 7) - Discusses commercial impact of oyster industry to the Barataria-Terrebonne region.

Rescuing the Treasure – Video Clip (BTNEP)
http://educators.btnep.org/default.asp?id=63
A sequel to “Haunted Waters, Fragile Lands,” this video describes the importance of estuaries and restoration techniques.
- Wildlife (Clip 3) – The lives of the estuary residents are intimately tied to the creatures that live there.

Counting FishStix – Lesson Plan (NOAA)
http://www.uncw.edu/aquarius/education/lessons/Aq%20FishStix.pdf
Students learn how scientists estimate the population size of different fish groups by collecting and analyzing data from surveys they conduct in the classroom.
Spirit of the Estuary: Using Art to Understand Ecology – Curriculum (BTNEP)

http://educators.btnep.org/default.asp?id=76

Addresses wetland environmental issues through the integration of fine art, language arts, science, and social studies. Grades 6-12.

- **Be Instrumental** (Activity 1-9) - Students learn about the natural products of wetlands that humans used to create instruments; create their own instruments from the wetlands; create their own chant to tell the story and importance of wetlands.

- **Birds of Paradise: Protect My Home** (Activity 1-10) - Students list threatened/endangered birds; examine and describe the role of humans in threatening, endangering and protecting the birds; and create a postcard urging people to protect the birds of the Barataria-Terrebonne estuary.

- **A Handful of Estuary Critters** (Activity 2-1) - Students list a minimum of 10 critters of the Barataria-Terrebonne Estuary; select one critter and research, observe and describe it; paint as realistically as possible one critter on their partner's hand using craft paint or tempera paint; and photograph and display their work.

- **Natural Notes** (Activity 2-2) - Students understand the importance of sound in the natural world and wetlands in particular; mimic the sound made by their chosen animal; and understand its habitat.

- **This is Driving Me Buggy ... So Let's Wrap it Up!** (Activity 2-3) - Students research common insects of the BTNE; sketch outlines of insects or find patterns of insect shapes; make potato prints or Styrofoam stamps; and design and print wrapping paper with an insect pattern.

ACES – Curriculum (NOAA)

http://www.signalsofspring.net/aces/about.cfm

An expansion of "Signals of Spring," an award-winning, classroom-based curriculum program in its 10th year, where in addition to learning formal science concepts, students use Earth imagery to explain the movement of animals that are tracked by satellites. The ACES curriculum also introduces environmental issues the animals face, and the environments of the NOAA National Marine Sanctuaries. Students learn science within the context of the ocean, with high-quality curriculum-based activities, as they use NOAA remote sensing data to develop authentic inquiry skills. **Must register for full access.**

How to Hide in the Ocean – Lesson Plan (SEA)

http://www.sea.edu/academics/k12.asp?plan=hideinocean

Observe and discuss the advantages of camouflage, then try designing a well-camouflaged fish. Grades K-8.

Sinking Races – Lesson Plan (SEA)

http://www.sea.edu/academics/k12.asp?plan=sinkingraces

Build plankton models and compete to see which sinks most slowly. Grades 2-8.

Wetland Inhabitant Word Search – Activity (EPA)


Search for the types of animals found in wetlands.

Fisheries – Activities (NOAA)

http://www.oar.noaa.gov/k12/html/fisheries2.html

Explains what fisheries management is, why fisheries management is important, and how fish populations are managed.

Fisheries Learning on the Web – Activities (NOAA)

http://www.miseagrant.umich.edu/flow/index.html

Comprehensive curriculum about the Great Lakes ecosystem. Each lesson is aligned with national and state curriculum standards for science and social studies and features a hands-on classroom activity. FLOW was selected "Teachers' Top Web Picks" (BRIDGE Web site) for Sea Grant Ocean Science Center Education. Grades 4-8.
Weather Information – Booklet (NOAA)
Provides students research and investigation experiences using on-line resources on El Niño, hurricanes, and weather.

Turtle Trouble – Lesson Plan (NOAA)
http://nerrs.noaa.gov/Education/pdf/6thGradeTurtleTrouble.pdf
Understand the job of aquatic scientists and the roles they play in influencing public policy. Participation in a mock community environmental forum teaches the importance of community involvement and working within the law to have a positive impact for the community and for wildlife. Grade 6.

Marine Activities, Resources & Education – Activity
Drawing of several coastal plants and wetlands provides examples of coexistence between plants and animals of the wetlands.

Climate Change, Wildlife and Wetlands – Activity (EPA)
Printable cards of plants, animals, and ecosystems that may be affected by climate change.

Fisheries at the Galveston Laboratory – Activities (NOAA)
View, copy, or download 3 different educational activity books developed by the lab's education staff. How do biologists research and keep track of sea turtle populations in order to save them? Learn about wildlife and why caring for their wetland habitat is not just about them. Think like a shrimp fisherman in the Gulf of Mexico.

Local Fisheries Knowledge Project – Activities (NOAA)
http://www.st.nmfs.gov/lfkproject
Through interviews with local fishermen, and others in fishing-related industries, explore the connection between fisheries, their communities, and our lives. Students document and preserve the rich knowledge and experiences of these individuals for future generations. Grades 9-12.

Louisiana Animals – Activities
http://www.vickiblackwell.com/laanimals.html
Web resources on animals of Louisiana. Grades 1-5.
Plants of the Coastal Zone

Making Tracks – Videos
Introduce science concepts found in the outdoors. Worksheets included. Length: 3-4 minutes each.

- History of Forest Succession (Quick Time video)
- Fall Colors - How the Forest Makes Energy (northern deciduous forests; Quick Time video)
- The Rotten Truth About Forest Decomposition (Quick Time video)

EstuaryLive! – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=69
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.

- Black mangrove (Clip 5) - The roots of the black mangrove nourish the tree, help prevent erosion of wetland soils, and provide cover for small animals.

EstuaryLive! – Activities (BTNEP)
http://estuarylive.btnep.org/default.asp?id=26
Investigates the rich bounty of organisms in the Barataria-Terrebonne ecosystem, the delicate balance between the natural environment and human impacts, and the estuary’s importance to the nation.

- Where Do Black Mangroves Grow Best? - Students use their knowledge of ecology to propose the best sites to plant black mangrove trees.

Haunted Waters – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=61
An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.

- Cypress Boom (Clip 6) - Explains how the bayou culture was shaped by the cypress industry.
- Trembling Prairies (Clip 9) - Shows the production techniques for harvesting and the uses of Spanish moss.

Spirit of the Estuary: Using Art to Understand Ecology – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=76
A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies. Grades 6-12.

- Painting in Style: Flowers of the Estuary (Activity 2-4) - Students describe the following styles of art: Egyptian Hieroglyphics, Classical Realism, Impressionism and Pointillism, Surrealism, and Abstract and Cubism; identify paintings from each of the above styles; identify the following flowers of the estuary: Water Hyacinth, Louisiana Iris, Cardinal Flower, White Water Lily, and the Spider Lily; research and identify at least ten flowers of the estuary and their habitats; create artwork using one of the above styles; identify and discuss the elements and principles of design in their paintings.
- We Walk in Beauty (Activity 2-5) - Students identify a minimum of fifteen plants that live in the Barataria-Terrebonne Estuary; research the life cycle and the special characteristics of a plant from the estuary; describe the skills necessary to keep a field journal; use observation, reflection, drawing, and writing during a field trip to; create a field journal.
- Cherokee Leaf Painting (Activity 2-6) - Students describe how plants can be used as dyes; transfer a leaf’s natural dye to a piece of fabric; practice the craft of leaf painting.

Bridge Ocean Education: Spartina Salt Marshes
http://life.bio.sunysb.edu/marinebio/spartina.html
Excellent images that can be placed on PowerPoint slides.
Wild Plants of Our Wetlands – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=78
Introduction to wetland environment with pre-visit, on-site, post-visit and assessment activities that can be coordinated with field trips to the Jean Lafitte National Park Historical Park and Preserve (http://www.nps.gov/jela/). Grades 6-12.

Trees Make a Difference – Activities (BTNEP)

N. Carolina Estuary Reserve Foundation: The Salt Marsh Players – Lesson Plan
Students are assigned roles in a skit designed to illustrate how a salt marsh works and how the organisms in it interact with each other. Grades 1-8.

Seagrass Scientists – Lesson Plan (NOAA)
http://nerrs.noaa.gov/Education/pdf/5thGradeSeagrassScientists.pdf
Learn about the jobs that estuarine scientists and wildlife biologists perform by simulating a sampling method that measures the health of a seagrass community over time. Grade 5.

International Paper: Life of the Forest – Booklet
http://internationalpaper.com/Our%20Company/Learning%20Center/Life%20Of%20Forest/index.html
Timber company booklet introducing forest life cycles and common trees.

The Brown Marsh Project Responds to Louisiana's Smooth Cordgrass Dieback (CWPPRA/USGS)
http://www.lacoast.gov/articles/bms/index.htm
Describes a time span during which native plants were observed to be dying in massive numbers and the response to help the habitat recover.

Gulf Coast Prairies and Marshes – Activities
http://www.nature.org/wherewework/northamerica/states/louisiana/preserves/art6866.html
Information about plants in the Gulf Coast prairies and marshes, including notes regarding conservation efforts and impacts on wildlife and links to activities and further participation.

Project Learning Tree – Curriculum
http://www.plt.org
Curriculum resources focusing on forestry, tree life, and forest wildlife. Includes teacher workshop details and comprehensive lesson and activity book correlated by subject, standard, grades, and activity. Teachers must participate in daylong workshop to receive materials, but the website includes some lessons and activities.
Threatened and Endangered Species

**Endangered Species – Coloring Book (CWPPRA/USGS)**

Interesting facts are presented along with drawings to be colored of each organism in its native habitat: Bald Eagle, Black Bear, Butterfly, Longhorn Beetle, Woodpecker, Crayfish, Gecko, Pitcher Plant, Crane, Prairie Chicken, Sturgeon, and Mussel.

**Endangered Species – Activity (FWS)**

PowerPoint by the U.S. Fish & Wildlife Service defines the term “endangered species” and gives picture examples. A quiz accompanies the PowerPoint.

**Kids Corner – Activities (FWS)**

Activities and information on endangered species and conservation.

**Manual of Rare Plants, Animals, and Natural Communities of LA’s Coast Zone – Activities (BTNEP)**
http://educators.btnep.org/default.asp?id=84

Fact sheets on rare animal and plant species and natural communities of special concern for all of the river basins contained within Louisiana’s coastal zone. The fact sheets in the book will provide specific information about each species of community found within the coastal zone, including descriptions, distribution map, conservation status, and photos or illustrations as available. Created by the Louisiana Department of Wildlife & Fisheries Natural Heritage Program with funding from the BTNEP 2007 Mini-Grants Program.

**Spirit of the Estuary: Using Art to Understand Ecology – Activities (BTNEP)**
http://educators.btnep.org/default.asp?id=76

A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies. Grades 6-12.

- “A Time to Be Born; A Time to Die” (Activity 1-11) - Students identify threatened/endangered species of the Barataria-Terrebonne Estuary; identify comeback species of the BTNE; understand the causes of the threatened or endangered status of those animals or plants.

**Manatee – Activities (LASGCP)**
http://lamer.lsu.edu/classroom/manatee/

Did you know that manatees have been spotted in Louisiana? The following activities provide an understanding of manatee habits and a deeper appreciation for this unique animal.

**Manatee Activities for your classroom:**

- How to Make a Manatee Model (216KB PDF)
- Louisiana Manatee Sightings List from 1929 through 2001 (65KB PDF)
- Worksheet for LA Manatee Sightings (808 KB PDF)
- Answers Worksheet for LA Manatee Sightings (823 KB PDF)
- Manatees in Louisiana (7.93MB PDF), a Louisiana Conservationist magazine article by Jill Wilson from the July/August 2003 issue
- Manatee & Marine Mammal Web Resources a list of manatee information websites
- Manatee Fact Sheet (252KB PDF)

**National Marine Fisheries Service – Lesson Plans (NOAA)**
http://www.nmfs.noaa.gov/pr/education/lessons.htm

Explains how the NMFS office protects endangered species, helps conserve marine mammals and works with the Marine Mammal Stranding Network.

**Countering Contamination: Data and DDE – Lesson Plans (USGS)**

Series of lessons focusing on ecotoxicology, DDE and bioaccumulation in bald eagles. Grades 8-12.
Lessons on the Lake: Ecosystems in Delicate Balance: Threatened, Endangered, and Introduced Species of the Lake Pontchartrain Basin – Lesson Plan (USGS)
Discusses endangered species in the basin area.

Brown Pelicans Return to Louisiana Coast (CWPPRA/USGS)
http://lacoast.gov/articles/bps/index.htm
Describes loss and return of the Brown Pelican to the Louisiana coast.

US Fish and Wildlife Southeast Louisiana National Wildlife Refuges Endangered Species (FWS)
http://www.fws.gov/southeastlouisiana/species.html
Describes some endangered species in Louisiana and programs enacted to protect them.

Endangered Species of Louisiana
http://www.endangeredspecie.com/states/la.htm
Concise list of plant and animal endangered species in Louisiana including scientific names.

Recapture Lab – Activity
Math lesson describing how wildlife biologists typically estimate the number of animals in a given area. Uses students’ proportion skills.
Identification and Classification of Plants and Animals

Wildlife Index
http://www.exploringnature.org/database/wildlife_index.php
A wildlife index that provides information on range, habitat, physical traits, diet, habits, predators, reproductive traits, lifespan, illustrations and physical diagrams. Animals are classified by classification system, habitat, specific traits and locations.

uBio
http://www.ubio.org/
The Universal Biological Indexer and Organizer (uBio) is a comprehensive database of known scientific and common names of living (and once-living) organisms. The Taxonomic Name Server catalogs names and classifications to enable tools that can help users find information on living things using any of the names that may be related to an organism.

Leaf Key to Common Trees in Louisiana – Bulletin (LSUAC)
http://www.lsuagcenter.com/en/communications/publications/Publications+Catalog/Environment/Forestry/Leaf+Key+to+Common+Trees+in+Louisiana.htm
How to identify common trees and plants in Louisiana.

Native Tree Growing Guide for Louisiana – Bulletin (LSUAC)
Description of native trees in Louisiana.

Changing Attitudes about Nature Through Bird Identification – Activity
Lesson series on bird identification appropriate for a variety of grade levels.

Louisiana State Arthropod Museum (LSUAC)
http://www2.lsuagcenter.com/Inst/Research/Departments/arthropodmuseum/index.htm
Includes a photo index of insects. Information about free insect identification or having a researcher come visit your class is also available.

Herbarium Collection – Activity
Details a secondary level project to create a field guide of local plants.

Pond Life Identification
http://www.microscopy-uk.org.uk/pond/x_index.html
UK site including pictures for identifying common microscopic pond life.

Dress Up a Twig – Lesson Plan (EPA)
http://www.epa.gov/oerrpage/superfund/students/clas_act/winter/dressup.htm
Introduces how to identify a tree by its twigs rather than its leaves. Grades 3-6.

Twig Match Lesson – Lesson Plan (EPA)
http://www.epa.gov/oerrpage/superfund/students/clas_act/winter/twigmtch.htm
Lesson expanding how to identify trees by twigs rather than leaves.

Random Sampling – Activity
http://www.biologycorner.com/worksheets/randomsampling.htm
Lesson on random sampling tied to estimating the number of a given plant species.
Food Chains and Webs

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64
The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.

- **Wetland Webs** (Activity 2-4) - Introduces the concept of food webs. Students form a huge food web of producers, herbivores, omnivores, carnivores, detritivores and scavengers. Grades 2, 4, 5.
- **Marsh Food Web Rummy Card Game** (Activity 2-5) - Reinforces the theme of wetland food webs. Students are divided into small groups to play a rummy card game. Grades 2, 4, 5.
- **Trading Spaces** (Activity 2-8) - Uses of research skills to identify invasive species, both plant and animal, found in the BTNE area. Students create posters to make a collective mural to place for display. Grades 5, 7, HS Env Sci.

Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and completely downloadable from this site. Grades 6-12.

- **Biology** - Flow charts, text, tables and vocabulary lists expand the students’ understanding of wetland biology.
- **Soft Drink Energy Pyramid** - Students identify producers, consumers and decomposers and discuss the energy pyramid.
- **Identifying the Food Chains** - A questionnaire is used to help analyze the illustrated food web.
- **Food Pyramid of the Salt Marsh** - This graphic depicts familiar wetland organisms in a food pyramid.

Parenting the Next Generation Website – Activities

- **Food Chains and Webs** - A simple description of food chains and webs with graphics.
  http://www.vtaide.com/png/foodchains.htm
- **Food Chains MCQ** - A quick pre- or post-test that can be used to see understanding of chains.
  http://www.vtaide.com/png/foodchains.htm

Brain POP

- **Food Chain Movie** - A short clip showing the food chain process with a video quiz.

EcoKids Website
http://www.ecokidsonline.com/pub/eco_info/topics/frogs/chain_reaction/index.cfm

- **Chain Reaction** - An interactive game about creating a food web.

Ready, Set, Get Wet – Activities (EPA)
http://epa.gov/sempra/education/pdfs/ReadySetGetWet.pdf
Wetlands inquiry includes picture search, preparation tips for visiting a wetland area, experiments involving growing wetland algae and designing wetland models, and constructing a food web. Grades 3-5.

The Marine Food Chain
http://drake.marin.k12.ca.us/stuwork/rockwater/PLANKTON/Food%20Chain.htm
A chart depicting a marine food chain with key definitions and factual information.

Gone Fishing – Lesson Plans
http://www.coolclassroom.org/teachers_guide/teachersguide.html# (printable teacher’s guide)
http://www.coolclassroom.org/cool_projects/lessons/biology/biology.html (link to student activity)

Students explore the role of phytoplankton in a marine food web and how physical factors in the environment affect living communities (Approximately (4) 45-50 minute classroom periods).
Marine Activities, Resources & Education – Wetland Illustration
This ready-made drawing of several coastal plants and wetlands provides an illustration on which students can easily place arrows to show a food chain / food web.

Countering Contamination: Data and Dichlorodiphenyldichloroethylene (DDE) – Lesson Plans (USGS)
Series of lessons focusing on ecotoxicology, DDE and bioaccumulation in bald eagles. Grades 8-12.

A Wetlands Food Web Story – Activities
http://www.natureillinois.org/natwrks.htm
Food web story centering on wetlands wildlife. Grades 1-5.
Non-indigenous (Invasive) Species

Oh No! Hannah's Swamp is Changing – Activities (LASGCP)
http://lamer.lsu.edu/classroom/nis/
An illustrated children’s book about basic concepts of exotic species impacts. Concepts include what nonindigenous species are, the effects that they have on our environment, and what can be done to stem the tide. The book contains a poster and several activities. Grades K-4. Order form provided; cost is $10.

Project TELLUS: Exotic Species – Video and Activities (LASGCP)
http://lamer.lsu.edu/classroom/nis/pdfs/ExoticSpecies.pdf
Two activities and an evaluation designed to accompany the Project TELLUS Video on Exotic Species. For a copy of the video, contact the LA Sea Grant College Program at www.laseagrant.org.

NAB the Aquatic Invader – Activities (LASGCP)
http://www.sgnis.org/kids/
Students become private investigators on an aquatic invader case and help other detectives “book the bad guys.” They start by Meeting the Suspects and then read their profile sheets. Students uncover more clues by solving the case files on each Detective Page and collecting evidence and background information to help catch each suspect. When enough evidence has been gathered to “book a bad guy”, students click on the “Book’em” file and answer the questions. Current invasive species are from the Great Lakes area. The Gulf of Mexico region will be adding invasive species to the website in the near future. Grades 4-10.

Exotic Aquatics (LASGCP)
http://lamer.lsu.edu/exotics/exotics_list.htm
Information and links about four invasive species that cause big problems for Louisiana ecosystems: Nutria, Zebra Mussel, Water Hyacinth, and Hydrilla.

Clawdette’s Estuary Adventure – Activities (BTNEP)
Discusses exotic and invasive species and offers activities.

Educator’s Guide to the Barataria-Terrebonne National Estuary – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=64
The BTNEP Educator’s Guide to the Barataria-Terrebonne National Estuary is a comprehensive, downloadable source of information and activities for formal and nonformal educators. Grades K-12.
- Nutria: Nutrition and Nuisance (Activity 2-7) - Introduces an invasive species called a nutria. Students develop a persuasive argument for eating nutria. Grades 4-5.
- Trading Spaces: Invasive Species (Activity 2-8) - Uses research skills to identify invasive species, both plant and animal found in the BNES area. Students create posters to make a collective mural to place for display. Grades 5, 7, HS Env Sci.

Haunted Waters – Video Clips (BTNEP)
http://educators.btnep.org/default.asp?id=61
An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.
- Nutria and Marshes (Clip 12) - Describes how the nutria interact with the native ecosystem.

Estuary Survival – Activity
Investigate what invasive species are feeding on and how this may harm the native species.

About Nutria (CWPPRA/USGS)
http://www.lacoast.gov/search/start.pl?Terms=nutria&submit=Submit
Articles that can be downloaded and copied to distribute to students about Nutria. Nutria are responsible for major destruction of our wetlands.
Lafourche Parish: From the Beginning – Activities (BTNEP)
http://educators.btnep.org/default.asp?id=66
- A comprehensive guide to Lafourche Parish, its history, culture, and resources. Activities will help students better understand this important Louisiana parish. All files are in Adobe format and are downloadable from this site. Grades 6-12.
  - Louisiana Crops and Fur Resources - Traces growth and production in the wax and fur industries.
  - And Then Came the Nutria-Part One - Myths and facts of the nutria’s introduction in Louisiana.
  - Extra Extra Read All About It! - Students create a newspaper page on Louisiana’s fur, crop or nutria industry.
  - And Then Came the Nutria-Part Two - Management of nutria and how pelt values have changed over the years.

Seeing Purple: A Population Explosion – Activity
- Through a simulation, sampling, and estimation activity, students learn about the impact of purple loosestrife on a wetland due to its exponential growth. Learn about purple loosestrife’s life cycle and appreciate how scientists determine population size in an ecosystem.

Invasive Species (NOAA)
http://oceanservice.noaa.gov/education/kits/estuaries/media/supp_estuar09d_invasives.html
- Introduces invasive species and non-native species.

Habitat Survey – Activity
http://www.mysciencebox.org/survey
- Students identify invasive plants growing in a specified area.

Nutria Fact Sheet (USGS)
- Fact sheet on the nutria and detailing the impact that this non-indigenous animal has on Louisiana coastal native species.

Assessing an Ecosystem’s Plant Biodiversity – Activities
http://www.classroomearth.org/node/177
- Students explore an ecosystem’s plant diversity, mathematically determine the dominant vegetation, and estimate the relative presence of the invasive species in the study area.

Gypsy Moths
http://www.fs.fed.us/ne/morgantown/4557/gmoth/
- Resource on gypsy moths and their spread and destruction in North America.
Curriculum Resources

Barataria-Terrebonne National Estuary Program Website for Educators (BTNEP)
http://educators.btnep.org/
Main website for educators (All products are FREE to the public). Offers a host of comprehensive information and activities for educators. Videos, DVDs, Field Trip guide, Workbooks, Educational Resource Guides, Maps, Workshops, etc. To obtain materials, call 800-259-0869. Grades K-12. Free upon request.

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Spirit of the Estuary: Using Art to Understand Ecology (BTNEP)
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A multi-disciplinary curriculum that addresses wetland environmental issues through the integration of fine art, language art, science, and social studies.

Project WET
http://www.projectwet.org/
The Project WET Curriculum and Activity Guide is a collection of over 90 science-based, interdisciplinary activities and lesson plans. In the United States The Project WET Curriculum and Activity Guide is only available through workshops. Grades K-12.

Project WILD
http://www.projectwild.org/
Only available to teachers by attending a workshop. To sign up for a workshop send an email to info@projectwild.org.

Aquatic Project WILD
http://www.projectwild.org/
Activity Guides and workshops emphasize aquatic wildlife and aquatic ecosystems. Activity guides are free of charge to teachers who participate in three to six hour workshop. To sign up for a workshop contact Cheryl Fischer (<cfischer@wlf.louisiana.gov>, 985/ 882-9601).

Flying WILD
http://flyingwild.org
You can receive a copy of Flying WILD: An Educator’s Guide to Celebrating Birds by attending and successfully completing a Flying WILD Educator Training. For workshop information contact Ed McCrea, Flying WILD Outreach (<emccrea@eecg.org>, 814/ 260-9138).

WOW! The Wonders of Wetlands
https://sslserver.com/wetland.org/shop/mainpub.shtml?id=pub1
More than 50 fun and effective learning-activities for both indoor and outdoor use. These activities focus on the three definitive wetland parameters: water, soil, and plants; and there are animal-oriented exercises as well.

Healthy Water Healthy People: Water Quality Educators Guide
http://www.projectwet.org/
Available through the Project WET website. You can order the book without having to take a class. Cost is $24.95.
POW! The Planning of Wetlands, An Educator’s Guide
http://www.wetland.org/publications_home.htm
Based on over thirty years’ experience in wetlands construction, horticulture and education, “POW!: The Planning of Wetlands” is a curriculum and two-day workshop that guides educators through the creation, restoration and/or enhancement of a wetland on school grounds or within the community. Unlike other schoolyard habitat programs where the design is manufactured by experts and the students are brought in solely for labor, POW!’s 25 hands-on activities are designed to engage the class in all project phases. The class will survey their school grounds, calculate drainage area, create a water budget, design the wetland based on desired functions, choose appropriate native wetland vegetation, construct and plant the wetland, and monitor biological and chemical parameters of the finished habitat. The 300+ page guide also contains a wealth of wetlands information as well as a native wetland vegetation guide. Activities are correlated to National Science Standards and are presented in an educator friendly lesson plan format with Student Activity Pages ready for copying. **You must take the course to get a copy of this resource.**

Write On! Wetlands Challenge Books
http://www.wetland.org/education_writeon_challenge.htm
Build your wetland library and the next generation of wetland stewards at the same time. To celebrate American Wetlands Month each year in May, Environmental Concern sponsors the national Write On! Wetlands Challenge, a literary and arts competition that challenges youth to write and illustrate a children’s book about wetlands. The competition begins in February with a Call for Authors, followed by a Call for Artists in May. The winning words and art combine to create a book whose quality, emotion and enthusiasm is truly inspiring. So far three books have been published: **Sammy’s Wetland Adventure**, **Wetlands Make Sense**, and **Wetlands A to Z**. Each sells for **$7 plus shipping and handling**.

Wetlands 101
http://www.wetland.org/education_wetland101.htm
Designed to give a basic understanding of wetland ecology, types, functions and management, this is the perfect first step for anybody interested in learning more about wetlands. The course is divided into wetland characteristics, wetland functions, and wetland management. A quiz for the general public is **free upon request** at http://www.wetland.org/quiz/. The quiz covers material appropriate for advanced middle school and high school students.

National Marine Sanctuaries Education (NOAA)
http://sanctuaries.noaa.gov/education/teachers/
Standards-based lesson plans, professional development opportunities, field studies, multicultural programs, online resources and more. The National Marine Sanctuary Program provides teachers with resources and training to support ocean literacy.

Resource Guide for Teachers of Marine Science (NOAA)
http://swfsc.noaa.gov/
This resource guide was prepared by staff of the National Marine Fisheries Service to provide information on Coastal Awareness in Science for elementary, junior high and high school science teachers. Its purpose is to promote the exploration of ecology and coastal awareness. The guide is divided into a reference to books at the elementary, middle, and high school levels; as well as a section on teacher resources with curriculum guides, lesson plans, bibliographic collections, etc. and audiovisual materials for all age levels, includes CD-ROM, Film and Video.

COAST Resource Guide
http://www.coast-nopp.org/toc.html
This guide is divided into elementary/middle school and high school activities. Lessons fall within the following topic areas: physical parameters, plate tectonics, marine and aquatic habitats, marine and aquatic pollution, marine and aquatic resources, and deep sea technology.
Lake Pontchartrain Basin’s Lessons on the Lake (LPBF/SLU/NOAA)
http://www3.selu.edu/turtlecove/lessonsonthelake
Activities that teach about watersheds, in particular the Lake Pontchartrain Basin, which is part of the much larger Mississippi River watershed that covers more than half of the United States.

Coastal Louisiana Activity Book (NOAA)
http://www.coastalscience.noaa.gov/education/labook.pdf
Provides information on Coastal Louisiana and gives young children the opportunity to color, connect the dots, solve mazes, try word searches and more.

A Beautiful World Starts With You
http://www.energystar.gov/ia/business/k12_schools/KidsBrochure.pdf
Five pages of coloring and energy conservation activities from Energy Star.

Case of the Broken Loop (EPA)
http://www.epa.gov/epawaste/education/pdfs/4-6.pdf
Follow the detective through each of these activities to learn more about reducing waste and conserving resources.

Earth Day Activity Book (EPA)
An 11-page coloring book full of tips for making the Earth a better place.

Follow That Trail! (EPA)
http://www.epa.gov/epawaste/education/pdfs/k-3.pdf
Students look for clues to solve puzzles related to pollution and conserving resources.

Keep Away (NOAA)
http://oceanexplorer.noaa.gov/explorations/06mexico/background/edu/GOM%2006%20KeepAway.pdf
Students discuss the meaning of biological diversity and compare and contrast the concepts of variety and relative abundance as they relate to biological diversity. Given information on the number of individuals, number of species, and biological diversity at a series of sites, students make inferences about the possible effects of oil drilling operations on benthic communities.

Marine Debris Coloring Book (NOAA)
http://www.education.noaa.gov/books/debris/debris1.htm
This coloring book helps kids understand how to recognize the hazards of throwing junk into the ocean and overboard from boats.

Ocean Pollution
This unit includes 15 lessons with hands-on activities to educate students about ocean pollution. Grades 5-6.

Emergency Response and Restoration (NOAA)
http://response.restoration.noaa.gov/kids/kids.html
Shows how NOAA and other agencies respond to oil spills and hazardous chemical accidents. It also contains some experiments to try.

EARTH Lesson Plans
http://www.mbari.org/earth/lesson_grid.htm
Lesson plans from the Monterrey Bay Aquarium Research Institute on ocean observations, ocean animals and predators, marine animal classification, and coastal processes.

Pollution (NOAA)
http://oceanservice.noaa.gov/education/kits/pollution
Teaches about non-point source pollution, the history and types of non-point source pollution, methods used to detect pollutants, and assess and reduce their damaging effects on the environment. The Roadmap to Resources complements the information in the tutorial by directing you to additional information and data resources from NOAA and other reliable sources.
Teens for Planet Earth
http://teens4planetearth.com/teenshome
Surf these pages for incredible facts about the natural world, for the latest conservation news, and to discover how teens can – and do – make a difference by carrying out environmental service-learning projects in their communities.

Sammy Soil Coloring Book (EPA)
http://www.epa.gov/gmpo/edresources/ssoil.html
The Sammy Soil Online Coloring Book was developed by the Mississippi Soil and Water Conservation Commission by means of a grant from the Gulf of Mexico Program to help children understand the importance of conserving natural resources -- our soil and water.

ACES Curriculum (NOAA)
http://www.signalsofspring.net/aces/about.cfm
An expansion of "Signals of Spring," an award-winning, classroom-based curriculum-program in its 10th year, where in addition to learning formal science concepts, students use Earth imagery to explain the movement of animals that are tracked by satellites. The ACES curriculum also introduces the environmental issues the animals face, and the environments of the NOAA National Marine Sanctuaries. Students learn science within the context of the ocean, with high-quality curriculum-based activities, as they use NOAA remote sensing data to develop authentic inquiry skills. Must register for full access.

COAST Resource Guide
http://www.coast-nopp.org/resource_guide/index.html
This guide, intended to be used by teachers to structure classroom activities, is divided into two sections to reflect the different emphases and requirements of elementary/middle school programs and high school programs. Click on either “elementary and middle school activities” or “high school activities” to access lesson plans on ocean related topics.

Cold One Day, Warm Another?
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive1105.html
Learn how upwelling influences beach water temperatures in this Data Tip, a collaboration with the U.S. Army Corps of Engineers Field Research Facility.

Lesson Plan Library (NOAA)
http://oceanservice.noaa.gov/education/classroom
Collection of 50 guided inquiry based activities based on the research, technology, and activities conducted by NOAA's Ocean Service in the areas of oceans, coasts, and charting and navigation. All of the lessons emphasize hands-on activities using on-line data resources, and are correlated to National Science Education Standards. Each lesson includes: Focus Questions, Learning Objectives, Teaching Times, Background Information, Learning Procedures, a “Me” Connection, Evaluations, Extensions, as well as Resources and Student Handouts. The lessons in the Discovery Classroom have been developed for students at the high school level, but are easily adapted for students at the middle school or undergraduate level.

Making Waves
http://waves.marine.usf.edu/mwhome.htm
University of South Florida scientists have teamed with teachers to design lesson plans based on current ocean research. Topics include: coral reefs, sea level rise and shoreline erosion, harmful algal blooms, El Niño, natural disasters, using real-time data to study ocean conditions, and studying the ocean from space. Each unit contains a student-friendly background article, one or more classroom activities, satellite images, web links, recommendations for grade level application and evaluation.

Project Learning Tree
http://www.plt.org
Curriculum resources focusing on forestry, tree life, and forest wildlife. Includes teacher workshop details and comprehensive lesson and activity book correlated by subject, standard, grades, and activity. Teachers must participate in daylong workshop to receive materials, but website includes some lessons and activities.
Climate and Marine Fisheries (NOAA)
http://www.pfel.noaa.gov/research/climatemarine
Examines how changes in the earth’s climate affect marine ecosystems and fisheries. Includes summary information on climate as it relates to fisheries and provides examples of the impact on fisheries from short-term changes (El Niño scale), from intermediate to decadal scale changes, and from long-term climate variability. It also provides examples of the potential impact of global change on marine fisheries, links to research on climate and fisheries, and data sources for analysis.

Properties of the Ocean
http://oceanworld.tamu.edu/educators/props_of_ocean/activities/index.html
Five ocean related activities on SONAR, waves, salinity, water density, and underwater topography.

Wyland Clean Water Challenge
http://www.wylandoceanchallenge.org/index.cfm?mid=2&sid=6
Teaches about the waters of the world and the life within them. Students create a representation of their newfound knowledge through the arts.

Louisiana Project Learning Tree
http://www.laplt.org/
Louisiana branch of Project Learning Tree including details on upcoming workshops.

Project Webfoot
http://www.ducks.org/projectwebfoot/
Curriculum resources focusing on marine and freshwater wildlife. Includes lessons and activities.

Audubon Nature Institute Education Outreach Program
http://www.auduboninstitute.org/education_outreach.html
Describes Audubon’s mobile education program, camps for Pre-K through 7th-graders, teacher workshops and outreach programs.

South Louisiana Wetlands Discovery Center
http://www.slwdc.org/
The South Louisiana Wetlands Discovery Center offers educational opportunities about this region’s very fragile unique wetland environment and offers ways locals and tourists can help to conserve and preserve the wetlands. The educational opportunities materialize in the unique pairing of two educational models, an interpretive program component for grades K-12 and a science-focused educational component or “research laboratory” for grades 4-16, each focusing on the South Louisiana coastal environment while serving different audiences.
Maps

LA Coast Maps (CWPPRA/USGS)
http://www.lacoast.gov/maps/
Maps of coastal Louisiana restoration projects, pre- and post- hurricane, land loss, aerial photographs and teaching aids.

Habitat Changes in the Lower Barataria-Terrebonne Estuarine Basins 1956-2000 (BTNEP)
http://www.btnep.org

100+ years of land change for coastal Louisiana and Southeast Coastal Louisiana.

Land Loss Animations of Coastal Louisiana (CWPPRA/USGS)
http://www.lacoast.gov/maps/animations/index.htm
Louisiana’s CWPPRA Basins, click on parish map.

Louisiana Wetlands Disappearing (AAPG)
http://www.aapg.org/explorer/2007/01jan/subsidence_map.cfm
Map showing subsidence in different areas of Louisiana at an inch/year ratio (Visual Simulation).

Satellite Imagery of Louisiana (CWPPRA/USGS)
http://www.lacoast.gov/maps/lastate.htm
Satellite imagery showing Louisiana.

WETMAAP
http://www.wetmaap.org/
Wetland Education Through Maps and Ariel Photography. Seven areas: Avery Island, Cocodrie, False River, Golden Meadow, Martello Castle, North Shore (Lake Pontchartrain) & the Red River have been completed and are ready for teacher use in the Louisiana area. An activity set has also been done for Mobile Bay, AL.

National Estuary Program Map (BTNEP)
Shows the watersheds of the National Estuaries including Barataria-Terrebonne Estuary.

Southeastern Louisiana: Lake Pontchartrain and Manchac area
http://www.selu.edu/acad_research/programs/turtle_cove/maps_data/index.html
- Black and white image of the western 1/2 of Lake Pontchartrain, including portions of Lake Maurepas, the cities of Mandeville, Ponchatoula, and the lakeshores of Metairie and Kenner. 27 mb tiff file (may require Quicktime plug-in). The same image in jpeg format 2.7 mb .jpg file
- Colorized thematic mapper image of the Manchac WMA 25 mb tiff file (requires Quicktime plug-in). The same image in jpeg format 1.4 mb .jpg file

Land Changes (USGS)
Land changes for coastal Louisiana and Pre-2005 Data, NWRC Wetland maps, info, animations of wetland loss projections, more

Louisiana Land Loss Facts
http://www.slld.net/csimage.html
Four maps on the same page that depict the land loss in Louisiana (1839, 1870, 1993, 2020).
Sea Floor Mapping (NOAA)
http://oceanservice.noaa.gov/education_new/seafloor-mapping
Join Cobalt, the Sea Floor Detective, and Safety Seagull as they explain how scientists map the ocean floor, what nautical charts are and how their used, and why this information is so important. Contains animations, movies, fun facts, and much, more. Grades 3-5.

Biodiversity 911
http://www.biodiversity911.org/
Why do we really need all those plant and animal species? Does it really make a difference if another is lost to extinction? Learn of the many factors that affect habitat and how individuals can make a positive impact. Games, activities and tips.

Freshwater Ecoregions of the World (WWF/TNC)
http://www.feow.org/index.php
Covering virtually all freshwater habitats on Earth, this first-ever ecoregion map, together with associated species data, is a useful tool for underpinning global and regional conservation planning efforts, particularly to identify outstanding and imperiled freshwater systems; for serving as a logical framework for large-scale conservation strategies; and for providing a global-scale knowledge base for increasing freshwater biogeographic literacy.

Map Puzzles (SEA)
http://www.sea.edu/academics/k12.asp?plan=mappuzzles
Students make puzzles from world maps, dramatizing how much of the globe is covered by ocean.

Lessons on the Lake Maps (USGS)
Compilation of maps by Lake Pontchartrain Basin foundation for use with their lessons or independently.

Gulf of Mexico Shoreline Change Map (USGS)
http://coastalmap.marine.usgs.gov/ArcIMS/Website/usa/GoMex/shoreline_change/viewer.htm
USGS Gulf of Mexico detailing the changes of the Louisiana and surrounding coastlines.

Subsidence and Sea-Level Rise in Southeastern Louisiana: Implications for Coastal Management and Restoration (USGS)
http://coastal.er.usgs.gov/LA-subsidence/
Data on subsidence in southeastern Louisiana. A colored map accompanies the text.
Video Resources

American Wetland Videos
Public Service Announcements (free downloads)
- America’s Energy Coast
- Don’t Be A Big Loser Campaign
- Losing America’s Coast
- American Wetlands (Famous Louisiana)

BTNEP Videos
http://educators.btnep.org/default.asp?id=48
To obtain these videos on DVD, contact BTNEP at 800-259-0869. Free upon request.
- Haunted Waters, Fragile Land (Video Clips Available online)
  An award winning documentary on the cultural, geologic, and environmental history of the Barataria-Terrebonne National Estuary System.
- Vanishing Wetlands, Vanishing Future (Video Clips Available online)
  This video on BTNEP’s seven priority problems is in the style of Bill Nye the Science Guy and is best suited for middle school, though the vocabulary is applicable to high school topics.
- Rescuing the Treasure (Video Clips Available online)
  A sequel to Haunted Waters, Fragile Lands, describing the importance of estuaries and restoration techniques. Activity sheet available. Grades 5-12.
- EstuaryLive! Video Clips (BTNEP) (Video Clips Available online)
- Wings Over Wetlands Video - Examines the importance of South Louisiana’s wetland habitats to the many birds that either call this region home or who depend on it as they pass through during migration. Activity sheet available. Grades 5-12.
- Bayou Lafourche: The Longest Street in the World - A documentary that captures the history, culture, lifestyle, environmental troubles and emerging ecological solutions of the 100-mile ribbon of bayou that weaves through the Barataria-Terrebonne Estuary. Through the lens of a camera and the voices of many stakeholders, videographer Jim Fields examines the bayou, its historical significance, the culture, and the problems that have been created since this once mighty waterway has been altered and controlled by humans. Grades 6-12.

LA Coast Videos and Public Service Announcements (CWPPRA/USGS)
http://lacoast.gov/media/videos/
These graphic presentations are available to be downloaded for free and shown as PSA’s or included in educational presentations.
- Delta Wide Crevasses (RealMedia 3.96 MB)
- Hopendale Hydrologic Restoration (RealMedia 6.02 MB)
- Mississippi Delta Land Loss 1932-2050 (RealMedia 2.44 MB)
- Land Loss Update: Louisiana Coastal Land Loss Computer Simulation 1932 through 2050
- Land Loss Update Video (RealMedia file 10.7 MB 2003-06-16)
- Land Loss Update Video (AVI file 53.2 MB 2003-06-16)
- Lower Bayou Lafourche / Port Fourchon, Southeastern, Southwestern Louisiana
- Brown Marsh Overflight (176x120 Resolution)
- “Save Louisiana Wetlands" Campaign - Public Service Announcements
  - Harry Connick, Jr. Video
  - Aaron Neville Video
  - Chef Paul Prudhomme Video
  - Kermit the Frog Video

Project TELLUS Exotic Species Video and Activities (LASGCP)
http://lamer.lsu.edu/classroom/nnis/pdfs/ExoticSpecies.pdf
Two activities and an evaluation designed to accompany the Project TELLUS Video on Exotic Species. For a copy of the video, contact the LA Sea Grant College Program at www.laseagrant.org.
Rainwater Blues (DNR, Coastal Management Division)
Non-point source pollution, unlike pollution from industry, comes from everyone and everywhere. Rainfall picks up and carries natural and man-made pollutants and deposits them into our lakes, rivers, bayous, wetlands, estuaries and even our drinking water supplies. This DVD contains both a 15 and a 30 minute version of the video. To order this DVD, contact Linda Pace at (800) 267.4019, Voice 225.342.7936, <linda.pace@la.gov>. Free upon request.

MarshMission CD-ROM
Two narrated PowerPoint presentations and a Flash movie about Louisiana’s vanishing wetlands. To request your copy of the CD, send an email to <jsche15@lsu.edu>.
- Vanishing Wetlands by C.C. Lockwood (approx. 27 min.)
- Changing Landscape by Rhea Gary (approx. 27 min.)
- The Rise and Disappearance of Southeast Louisiana by Dan Swenson (7 min.)

Black Bears and Songbirds of the Lower MS River Valley CD-ROM
(CWPPRA/USGS)
Inform students of the importance of forested wetlands and the animals that depend on them. This highly interactive CD-ROM features audio and video clips of wildlife and research biologists. Developed by the USGS and The US Fish and Wildlife Service. Request a copy through the LaCOAST webpage at http://lacoast.gov/freestuff/CD-ROMs/.

The Water Sourcebook Series CD-ROM
http://www.legacyenved.org/resource/resource_teacher.htm
The Water Sourcebook Series consists of a set of 4 volumes appropriate for Grades K-2, Grades 3-5, Grades 6-8, & Grades 9-12. Each volume is a flexible comprehensive environmental education program on water issues. The Water Sourcebook Series explains the water management cycle using a balanced approach and how it affects every aspect of the environment. The curriculum provides strong science and math content, but also links these subject areas to social studies and language arts. Each Water Sourcebook contains hands-on activities and investigations, fact sheets, reference materials, and a glossary of terms. There are 5 chapters contained in each book, Introduction to Water, Drinking Water and Wastewater Treatment, Surface Water Resources: Ground Water Resources, and Wetland and Coastal Waters. The Water Sourcebook helps kids learn about water, “use what you need and don’t pollute” is the message sent to children through the Water Sourcebook Series. Cost for the CD-ROM is $10. Order form is online (see the website).

Mercury Awareness: Prevention and Protection Video and DVD (DEQ)
This nine-minute video has been developed to inform people mercury pollution, exposure and fish advisories in Louisiana’s bodies of water. Available in CD, VHS and on the website.

Runoff Non-point Source Pollution Video (NOAA)
http://oceanservice.noaa.gov/education/kits/pollution/media/supp_pol01a.html
Very short “Quicktime” video on different runoff scenarios, this can be used as an attention getter or discussion point.

Hurricane on the Bayou Video
http://www.hurricaneonthebayou.com
Dynamic IMAX movie created during Hurricane Katrina teaching about the impact of hurricanes on the Louisiana coast. Includes resources for teaching lessons about the movie. Movie can be ordered via links on the site.

Hurricane Force: A Coastal Perspective Videos
http://www.open-video.org/featured_video.php?type=Related&videoid=4560&PHPSESSID=5cb816611751559645c8026db3c85bcd
Series of online videos describing the impact of hurricanes on the Gulf Coast.
LSU Coastal Roots Program
Compendium of Coastal, Wetland, and Restoration Information for Louisiana Educators

LSU Coastal Roots Resources

LSU Coastal Roots Program Information
http://coastalroots.lsu.edu
The Coastal Roots Program began in 2000 as an education outreach project for the Louisiana Sea Grant College Program. In 2006, the Coastal Roots Program was transitioned into the LSU Department of Educational Theory, Policy, & Practice and the LSU Center for Plant, Environmental, and Soil Sciences.
- Coastal Roots Summary (PDF file; 104 K)

Putting Down Roots (2002) by E. Coleman & E. Bush
http://nsgl.gso.uri.edu/lsu/lsuh02002.pdf
An overview of how to establish a native plant nursery at a school.

Nursery instructions
http://coastalroots.lsu.edu/toc-nursery.htm
- Stratification Instructions (cypress) (203KB, PDF)
- Reading a Salinity Refractometer (580KB, PDF)
- Planting Your Seeds (162KB, PDF)
- Nursery Production Checklist (124KB, PDF)
- Bumping Up Your Seedlings to Larger Pots (153KB, PDF)
- Division of Grasses (1124KB, PDF)

Coastal Roots Plants
http://coastalroots.lsu.edu/toc-nursery.htm
- Southern Baldcypress (191K, PDF)
- Bitter Panicum (354K, PDF)
- Black Mangrove (338K, PDF)
- Hackberry (222K, PDF) Live Oak (208K, PDF)
- Longleaf Pine (coming soon!)
- Louisiana Iris (193K, PDF)
- Loblolly Pine (coming soon!)
- Nuttall Oak (coming soon!)
- Red Mulberry (331K, PDF)
- Swamp Red Maple (coming soon!)
- Wax Myrtle (216K, PDF)

Can Yard and Cold Frame Information
http://coastalroots.lsu.edu/toc-nursery.htm
- Putting Down Roots (Coleman and Bush, 2002) (3025KB, PDF)
- Building a Cold Frame - Plans (213KB, PDF)
- Preparing to Construct Your CR Can Yard (162 K, PDF)
- Constructing Can Yards and Irrigation Systems (972KB, PDF)
  - Making a Can Yard (slideshow by Cody from Pierre Part Elementary, 900KB)
- Automatic Irrigation Timers
  - Pre-2006 timers: instructions for the "old" timers (203KB, PDF)
  - troubleshooting your "old" irrigation timer (592KB, PDF)
  - Post-2006 timers: instructions for the "new" timers (197KB, PDF)

Coastal Roots in the Classroom
http://coastalroots.lsu.edu/toc-teacherinfo.htm
- Coastal Roots Lessons - Visit the LA Sea Grant Education website to check out five lessons you might want to incorporate in your classes centered on your CR school nursery. There is also an information sheet about preparing for your restoration fieldtrip. Click on Coastal Roots!
- **Bloggin’ about Coastal Roots** - St. Martin Episcopal students are blogging about their experiences working on Coastal Roots. Teachers Kate Marchal and Warren Lind have set up a [St. Martin's Coastal Roots Blog](#) to help their students write about and reflect on what they are learning in the CR Program. They are posting pictures as well as comments about their school plant nursery. Contact [Dr. Pam Blanchard](mailto:pamb@lsu.edu), pamb@lsu.edu, if you would like to know more about this technology-rich classroom activity.

- **Coastal Roots Social Network on NING** - Visit the Coastal Roots Social Network on NING to communicate with others about what is happening in Coastal Roots schools. Go to [http://lsucoastalroots.ning.com](http://lsucoastalroots.ning.com) to learn more! Need help? Contact [Dr. Pam Blanchard](mailto:pamb@lsu.edu), pamb@lsu.edu, or Craig Howat (Luling Elementary). Thank you to Craig Howat for his initiative to get this working for our program!

**Teacher Learning Opportunities**
[http://coastalroots.lsu.edu/toc-teacherinfo.htm](http://coastalroots.lsu.edu/toc-teacherinfo.htm)

- **Louisiana Wetland Education Coalition** (LaWEC) - a group of educators interested in teaching about Louisiana wetland and coastal issues. Newsletters are sent out every three to four weeks informing listserve members of upcoming workshops and educational opportunities. *Free upon request.* Contact Dr. Pam Blanchard ([<pamb@lsu.edu>](mailto:pamb@lsu.edu)), if you would like to join.
Grant Resources

ING Unsung Heroes Awards

The ING Unsung Heroes program helps K-12 educators and their schools fund innovative classroom projects. At least one award will be granted in each of the fifty states, provided one or more qualified applications are received from each state. The deadline for applications is in late April.

Write On! Wetlands Challenge
http://www.gscb.org/forum/index.php?PHPSESSID=0cnncm2rtduju7flqo4sqch71m4&topic=150.msg152#msg152

This competition, celebrating American Wetlands Month in May, challenges students to create a book written and illustrated by kids for kids. Hosted by Environmental Concern Inc, the contest asks students in grades 6-8 to write a children’s book with a wetland theme. The winning entry will be illustrated by students in grades k-5 and published by Environmental Concern Inc. The theme in 2009 is The Case of the Wetland Mysteries! All entries must be in the form of a mystery story. The deadline for entry is in early March.

Earth Partnership for Schools
http://uwarboretum.org/eps/

The Earth Partnership Program, from the University of Wisconsin-Madison Arboretum, focuses on ecological restoration as a way of establishing a positive relationship between people and the land. The program assists teachers in establishing restoration projects on school sites and providing the tools for building a curriculum that incorporates restoration into almost any subject area. The program includes a two-week institute in the summer and ongoing support from UW-Madison Arboretum staff to help schools with restoration planning and curriculum development. Check out the resources under Tools for Teachers.

International Paper Foundation

The Foundation primarily supports environmental education, literacy and critical community needs. Most environmental education funds are offered to programs that address air and water quality, involve outdoor activities and forestry education, and are focused on young children.

Environmental Protection Agency
http://www.epa.gov/enviroed/grants.html

The EPA’s Environmental Education Division, Office of Children’s Health Protection and Environmental Education, offers funds to projects that build public awareness and the ability to make informed decisions affecting environmental quality. Applications are due in mid-December.

National Environmental Education Foundation
http://www.classroomearth.org/grants

The Student Conservation Association awards financial prizes to high schools where students have designed service projects that improve, restore, beautify or conserve their high school environment. The application deadline is in early October.
Books about Wetlands and Coastal Resources

This is an annotated list of books about the coast and wetlands habitats. It is organized into general categories (animals, coastal erosion, trees and plants, weather, and wetlands/swamps). It contains mostly children's trade books, but there are several books for adults scattered through the listing. Age levels and annotation sources are noted where appropriate. If you know of a good book that should be included in this listing, please send the author and title to Pam Blanchard.

<table>
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<tr>
<th>Animals</th>
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<td><strong>Galko, F. (2002). Wetland animals. Chicago, IL: Heinemann.</strong></td>
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### Coasts

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<th>Author</th>
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<td>Baines, J.</td>
<td>Coasts. London, United Kingdom: Hodder Wayland.</td>
<td>Describes different types of coasts, the animals and plants they support, the resources they provide for humans, how they are endangered, and how they can be protected. Includes case studies and activities.</td>
<td>9780817253707</td>
</tr>
<tr>
<td>Blaustein, D.</td>
<td>The Everglades and the Gulf Coast. Salt Lake City, UT: Benchmark Books.</td>
<td>Presents an overview of wetland ecology as seen in Florida's Everglades, the largest freshwater wetlands ecosystem in the continental United States.</td>
<td>9780761408963</td>
</tr>
<tr>
<td>College of William and Mary.</td>
<td>Where's the beach? Examining coastal erosion. Dubuque, IA: Kendall Hunt Publishing Company.</td>
<td>Plans for building a children's camp at the beach are on hold due to beach erosion. The camp received a donation to develop nature-themed experiences and protect the environment, and the camp manager must begin construction quickly to be ready for the summer season. As members of the town council, students develop scientifically-based regulations that will satisfy both the long-term needs of the town and plans for the new camp.</td>
<td>9780757523885</td>
</tr>
<tr>
<td>Colten, C.</td>
<td>Transforming New Orleans and its enviros: Centuries of change. Pittsburgh, PA: University of Pittsburgh Press.</td>
<td>From prehistoric midden building to late-twentieth century industrial pollution, this book traces through history the impact of human activity upon the environment of the Lower Mississippi River Valley.</td>
<td>9780822957409</td>
</tr>
<tr>
<td>Ganeri, A. (2006).</td>
<td>Cracking coasts. New York, NY: Scholastic Hippo.</td>
<td>Geography with the gritty bits left in! Wave goodbye to boring geography lessons as you clamber up some Cracking Coasts. Marvel at the ginormous Giant’s Causeway. Scream as you surf an awesome reef breaker. Shiver with fear as you take a trip to the spooky Skeleton Coast. Visit an eerie lighthouse and go sailing with a sailboat. Geography has never been so horrible!</td>
<td>9780439963978</td>
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</table>

Addresses the consequences of ignoring the warning signs that nature provides and the struggle to convince the rest of the country that South Louisiana lay in the path of destruction. Adult. 265 pp. bn.com ISBN-13: 9780061124242


Describes the various factors that change the shape of coastlines including storms, natural erosion, and rising sea levels. Young Adult. 160 pp. bn.com ISBN-13: 9780684190877


Although many of these celebrated artists lost their homes, jobs, music, artwork and supplies in Hurricane Katrina, they did not lose their need to create. The memories depicted here represent just a few of the people, places, and things that make the Mississippi Gulf Coast special to those lucky enough to call it home. 32 pp. amazon.com ISBN-13: 9781893651305


Discusses the characteristics, animal life, and importance of oceans and coastal areas and ways to protect these habitats. Ages 9-12. 72 pp. amazon.com ISBN-13: 9780385310772


Louisiana is in a desperate battle to save its coastal wetlands, which are disappearing at the rate of a football field–sized area every 38 minutes. Lockwood immersed himself in the wetlands for an entire year, living on a houseboat with his wife, a schoolteacher, who created an interactive classroom from the boat via the Internet. 106 pp. bn.com ISBN-13: 9781578063482


This book explains that if wetlands are not overburdened with effluence they can act as pollution filter systems for groundwater. Young Adult. 112 pp. amnh.org ISBN-13: 9781560061625


This collection explores what makes the Gulf Coast region culturally and environmentally distinct. Stories, poems, essays and journal entries provide information on the area’s natural features and reveal the region’s remarkable richness. Age 9. 252 pp. bn.com ISBN-13: 9781571316653


The fight over one man’s tract of sacred marsh fronts a deeper story of our place in the environment and our obligations to it. 384 pp. bn.com ISBN-13: 9780375508769

Trees and Plants


Weather


When Ms. Frizzle's class takes a field trip to the local weather station, they end up in a hurricane. Ages 4-8. 48 pp. bn.com ISBN-13: 9780590446877


Describes what a hurricane is, using the damage caused by Hurricane Andrew when it hit Florida in 1992 as an example. 32 pp. hungrybookworm.com ISBN-13: 9781584154167


Examines important events as defining moments in U.S. history. Each incident includes vital details without overwhelming younger readers. The aftermath is discussed last, telling how the event defined or changed history. Ages 12+. 48 pp. shop.scholastic.com ISBN-13: 9780516236285


Includes a great deal of scientific information, beginning with a basic explanation of the subject and what scientists are trying to discover, as well as information on educational backgrounds necessary to pursue these careers. Ages 12-15. 80 pp. bn.com ISBN-13: 9780761327035


A young boy describes the experiences of his family when a hurricane hits their home on the island of Puerto Rico. Ages 8-10. 32 pp. bn.com ISBN-13: 9780068812973


The experience of a hurricane as seen through the eyes of a child. Young readers will learn about big storms that come from the ocean, the effects of wind and rain, and some of the more lighthearted and practical alternatives to doing without electricity. Ages 5-8. 40 pp. bn.com ISBN-13: 9780975434253

The first half of this book gives hurricane science, history, and perspectives on how we deal with hurricanes. The second half is a personal guide to “Living Successfully in the Hurricane Zone.” 352 pp. bn.com ISBN-13: 9780312371524


In rhyming text, the Cat in the Hat teaches Sally and Dick about different weather conditions and how we learn about them. Ages 5-8. 45 pp. bn.com ISBN-13: 9780375922766


The people of Bayou Town are in a race against the rain as they try to repair the hole in the Boudreaux family's roof. Alfons even swims into action to save a family of beavers. 32 pp. bn.com ISBN-13: 9781565546468


Discusses where and how hurricanes are formed, the destruction caused by legendary storms, and the precautions to take when a hurricane strikes. Ages 5-9. 32 pp. bn.com ISBN-13: 9780061170713


Explains the importance of water to life on Earth, how flooding occurs, and some of its most devastating consequences. 48 pp. bn.com ISBN-13: 9780516263439


As a hurricane destroys the coast of South Louisiana in October 1893, Hattie and Eric learn that family and friendship are far more important than gold. Ages 9-12. 144 pp. bn.com ISBN-13: 9781565546752


In this retelling of a Native American tale, the Moon weaves a blanket of clouds around a mother and her children who are freezing atop a cypress tree, having sought shelter from a flood. Ages 5-8. 32 pp. bn.com ISBN-13: 9781565549227


Through collage art, a story is told that expresses profound emotions and describes the devastating effects of Hurricane Katrina. The story begins with preparation and evacuation, moves through the stresses of being displaced and not knowing the whereabouts of loved ones, and ends with a message of the persistence of hope. Ages 4-8. 32 pp. storyofastorm.com ISBN-13: 9781893062863


The morning after a hurricane, two brothers find an uprooted tree which becomes a magical place, transporting them on adventures limited only by their imaginations. Ages 5-8. 32 pp. bn.com ISBN-13: 9780395629741

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**Wetlands/Swamp**


Describes the characteristics of the Okefenokee Swamp and the animals and plants that live there. Ages 4-8. 32 pp. bn.com ISBN-13: 97805162037448


Written by scientists, science educators and writers, these action-packed books discuss the work of scientists and their research, and deal with environmental problems and some of their solutions. Ages 9-11. 40 pp. booksamillion.com ISBN-13: 9780941042185


Describes and portrays the birds, snakes, and other animals that can be seen in a swamp. Ages 6-10. 32 pp. bn.com ISBN-13: 9780688171193


Children will fall under the bayou’s spell as they learn about a new world in this lyrically charming book by one of our most respected naturalists. Ages 3-8. 32 pp. bn.com ISBN-13: 9780399226533


Kids and teachers wade into bogs, swamps, and marshes to show firsthand why wetlands are so important to wildlife and people. Ages 6-12. 87 pp. bn.com ISBN-13: 9780791048375


When his father takes him to visit the Louisiana bayou, Buster sends postcards to his friends back home telling them about the Cajun language, learning to catch crabs, and keeping watch for a swamp monster. Ages 6-9. 32 pp. bn.com ISBN-13: 9780316159128


Carroll takes us on a lively, unforgettable yearlong journey through the wetlands, illustrated with his own elegant drawings, and reveals why wetlands are so important to all life on Earth. Adult. 304 pp. bn.com ISBN-13: 9780618127375


In 1851 in Louisiana, Paul is abandoned in the bayou by his older brothers and it is up to his lame Cajun friend Lily to find him. Ages 9-12. 160 pp. bn.com ISBN-13: 97806889829291


Learn about types of wetlands and the importance of preserving them. Young Adult. 112 pp. bn.com ISBN-13: 9780531130346

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http://coastalroots.lsu.edu


Nichols, C. (2002). *Wetlands.* Oregon City OR: Marshall Cavendish. Presents the different kinds of wetlands, such as swamps, marshes, and bogs, and introduces some of the animals that live there. 32 pp. bn.com ISBN-13: 9780761414346


http://coastalroots.lsu.edu
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Publisher/Publication Details</th>
<th>Summary</th>
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This listing of coastal and wetland-related books was initially compiled by Dr. Margaret-Mary Sulentic-Dowell’s EDCI 3200 (Reading, Writing, and Oral Communication in the Elementary School) during the spring of 2008. These LSU preservice students compiled the list as a service-learning project for the course. The contributed list was subsequently annotated and expanded by Coastal Roots staff. We are grateful to these future teachers for their assistance.
### Guide to Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AAPG</td>
<td>American Association of Petroleum Geologists</td>
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<tr>
<td>AWF</td>
<td>America’s Wetland Foundation</td>
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<tr>
<td>BTNEP</td>
<td>Barataria-Terrebonne National Estuary Program</td>
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<tr>
<td>CWPPRA</td>
<td>Coastal Wetlands Planning, Protection and Restoration Act</td>
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<tr>
<td>DEQ</td>
<td>Department of Environmental Quality</td>
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<tr>
<td>DNR</td>
<td>Department of Natural Resources</td>
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<tr>
<td>DOT</td>
<td>Department of Transportation</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>FWS</td>
<td>U. S. Fish &amp; Wildlife Service</td>
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<tr>
<td>LASGCP</td>
<td>Louisiana Sea Grant College Program</td>
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<tr>
<td>LPB</td>
<td>Louisiana Public Broadcasting</td>
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<tr>
<td>LPBF</td>
<td>Lake Pontchartrain Basin Foundation</td>
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<tr>
<td>LSUAC</td>
<td>Louisiana State University Agriculture Center</td>
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<tr>
<td>NASA</td>
<td>National Aeronautic and Space Administration</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<tr>
<td>PBS</td>
<td>Public Broadcasting System</td>
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<tr>
<td>SEA</td>
<td>Sea Education Association</td>
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<tr>
<td>SLU</td>
<td>Southeastern Louisiana University</td>
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<tr>
<td>TNC</td>
<td>The Nature Conservancy</td>
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<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
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<td>USN</td>
<td>United States Navy</td>
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<tr>
<td>WWF</td>
<td>World Wildlife Fund</td>
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