



Habitat

Activity 1-7

# Estuary Ecosystems

Adapted from *Wild Louisiana*

## Focus/Overview

Students use research and map skills to gain a better understanding of what an estuary is by comparing the BTES with other estuaries around the United States. *NOTE: Many classrooms have only 1 computer with Internet access. This lesson consists of two activities and is organized with the intent that groups of 3 or 4 students can use the computer while the rest of the class continues working on the other activity. After each group finds the watershed they are researching, they may print it out and return to their seats to copy the information.*

## Learning Objectives

The learner will...

- describe the characteristics of an estuary ecosystem.
- identify ways in which human activities have altered estuary ecosystems.
- identify estuarine bodies of water from a U.S. map.
- use maps to identify the location and physical characteristics of the BTES.

## Louisiana Grade Level Expectations (Science)

7: GLE-26	Describe and compare the levels of organization of living things within an ecosystem (LS-M-C3).
7: GLE-39	Analyze the consequences of human activities on ecosystems (SE-M-A4).
8: GLE-20	Describe how humans' actions and natural processes have modified coastal regions in Louisiana and other locations (ESS-M-A8).

## Louisiana Grade Level Expectation: Social Studies

6, 7, 8: G-1A-M1	Identifying and describing the characteristics, functions, and applications of various types of maps and other geographic representations, tools, and technologies (G-1A-M1).
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## Materials List

- U.S Map handout or wall map
- BTNEP Thematic Mapper poster
- *Portrait of an Estuary* Publication – classroom set or enough for groups to share
- Computer with internet access
- Class sets of crayons
- Copies of Blackline Masters 1 and 2

## Background

An **estuary** is a place where freshwater and saltwater mix. Bodies of water that may be estuaries are: sloughs, bays, harbors, sounds, inlets and bayous. An alphabetical list of the 28 estuaries of nationally recognized significance registered with the National Estuary Program is listed at the website included in the student resources below.

## BTNEP Connection

Habitat

## Grade Level

7, 8

## Duration

90 minutes

## Subject Area

science

## Setting

classroom

## Vocabulary

estuary, watershed, ecosystem, habitat

## Original Source

Adapted from *Wild Louisiana*.



[www.btnep.org](http://www.btnep.org)



The land area that drains excess water caused by heavy rains or snow melt into channels is called a **watershed**. Gravity and geographical features cause the run-off water to make its way to the ocean through streams and rivers where it will combine with saltwater creating an estuary. The BTES watershed covers 15,769 square kilometers and drains 40% of the contiguous United States. The BTES serves as a drainage basin to 28 states and a small part of Canada. When seen on a map it resembles a huge tree with Louisiana's BTES as the main root.

An **ecosystem** is a specific area where living and non-living things are continuously interacting. A **habitat** is part of an ecosystem, but is specific to one population of animals. For example, the BTES ecosystem includes perfect habitats for alligators.

## Advance Preparation

### Activity 1

1. Obtain a classroom set of the *Portrait of an Estuary* publication from BTNEP.
2. Copy a classroom set of U.S. Maps or provide a wall map.
3. Obtain the BTNEP Thematic Mapper Satellite poster from BTNEP.

### Activity 2

1. You may want to go through the list of estuary links and choose the ones that have a complete chart filled out. Some of the estuary sites have much more information than others.
2. Either assign groups a specific estuary to research or post a list of the estuaries and have students scratch a line through each as they are selected.
3. Have the EPA website listed below already pulled up for the students.
4. Many classrooms have only 1 computer with internet access. These activities are written with the intent that groups of 3 or 4 students can use the computer while the rest of the class continues working on the other activity. After each group finds the watershed they are researching, they may print it out and return to their seats to copy the information.
5. You may want to go through the list of estuary links and choose the ones that have a complete chart filled out. Some of the estuary sites have much more information than others.
6. Either assign groups a specific estuary to research or post a list of the estuaries and have students scratch a line through each as they are used.
7. Have the EPA website listed below already pulled up for the students.

## Procedure

1. Introduce both activities before allowing the students to get started so that groups may rotate to use the computers.
2. Use a wall map to point out some lakes and some estuaries. Ask them to identify what differences they can see on the map between the two. (Estuaries occur along the coastline and open to the ocean. Lakes are totally enclosed as their own body of water.) Continue allowing the students to point out other possible estuaries.
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### Activity 1

1. Divide the class into groups of 3 or 4, making sure that each group has a U.S. Map handout and at least one *Portrait of an Estuary* booklet.
2. Provide each student with a **BTES Data Sheet (Blackline Master #1)** and a **National Estuary Ecosystem Research Sheet (Blackline Master #2)**.
3. Restate the definition of an estuary as a place where salt water and fresh water mix.
4. Use the U.S. map to highlight the portion of Louisiana makes-up the BTES.
5. Use the U.S. map to describe that nearly all of the run-off water from the central U.S. makes its way to the Mississippi River and flows down to the Gulf of Mexico.

6. Ask students to refer to their U.S. maps and infer why the water flows all the way down to the Gulf of Mexico instead of either staying in place or flowing out to the Atlantic or Pacific. (The Earth's gravity forces the water to flow towards the ocean. Geographical features such as mountains funnel the water down to the Gulf of Mexico.)
7. Review the **BTES Data Sheet (Blackline Master #1)** to make sure that students understand all the terminology.
8. Introduce the *Portrait of an Estuary* booklet to the students.
9. Have students complete their **BTES Data Sheets (Blackline Master #1)** using the *Portrait of an Estuary* as a reference.
10. While everyone is on task, allow small groups of students to analyze the BTNEP satellite image wall map. Have students use natural and man-made features (highways) to locate their neighborhoods or towns.
11. All students should be on task with these activities while waiting for their turn at the computer where they will find the information to complete their second activity.

#### **Assessment, Activity 1:**

- Correct the completed BTES data sheet
- Use land features on the U.S. map to identify and explain the watershed of the BTES.
- Explain why the BTES is considered an estuary
- Use physical features on a state map to identify the area that the BTES is located in Louisiana.

#### **Activity 2**

1. As students are working on their **BTES Data Sheet**, allow groups to rotate use of the computer to research information for Activity 2.
2. Explain to students that the EPA has 28 estuaries participating in the National Estuary Program. These are listed in alphabetical order on the website provided below with links to each.
3. Have students explore the list and choose one to fill out their **National Estuary Ecosystem Research Sheet (Blackline Master #2)**.
4. Some of the links offer more information than others. Encourage students to fill out as much information as possible. If time constraints on computer use are a factor, have students print out the one page of information on their estuary when it is located. They may take this information back to their desk to complete the data sheet.
5. Have students compare the information that they have found about other estuaries with the information they recorded about the BTES by answering the questions on their data sheet.

#### **Assessment, Activity 2:**

- Have each group share what they have discovered from this activity with the rest of the class, using a U.S. map to reference the location of their estuary.
- Collect the completed Estuary Research Data sheets

### **Blackline Masters**

1. **Estuary Ecosystem Data Sheet – Barataria-Terrebonne National Estuary**
2. **Estuary Ecosystem Data Sheet**

### **Extensions**

- **Language Arts:**  
Have students write letters to students in schools located near other estuaries. They may ask questions about programs they have locally to try and help their estuaries.
- **Social Studies:**  
Use road map that includes the BTES area. Have students analyze the map to see how people have chosen the land on which communities are built. Explain the significance of community names such as "Willowdale Ridge".
- **Math:**  
All of the watershed areas in this activity are expressed in square kilometer units. Have students convert kilometers to miles so they can have a clear understanding of the measurements involved and also be able to compare mileage to kilometers.

- **The Arts:**

Have students trace a map showing the full Mississippi watershed. When they have traced the watershed, it appears like long roots of a tree. Have students use this tracing to create other art or posters explaining the term *watershed*.

## Resources

### BTNEP Resources:

*Portrait of an Estuary*, published by Louisiana State University AgCenter and BTNEP, request from BTNEP or print the file from [http://www.agctr.lsu.edu/Communications/pdfs\\_bak/pub2802estuary.pdf](http://www.agctr.lsu.edu/Communications/pdfs_bak/pub2802estuary.pdf)  
Thematic mapper/poster (satellite image of BTES), request from BTNEP

### Tradebooks:

Johnson, Rebecca L. 2004. **Journey into an Estuary**. Lerner Publishing Group. 48pp ISBN: 1575055929

*Takes readers on a walk at a sheltered bay, showing examples of how the animals and plants of estuaries are connected and dependent on each other and the estuary's mix of fresh and salt water. Age range: 8-12.*

Walker, Sally M. 2003. **Life in an Estuary**. Lerner Publishing Group. 72 pp.

*Examines the physical features, processes, and many different species of plants and animals that make up the ecosystem of the largest estuary in the United States, the Chesapeake Bay.*

### Websites:

National Ocean Service, National Oceanic and Atmospheric Administration. 3 July 2003. **Estuaries: Where Rivers Meet The Sea**. Accessed July 22, 2005 at <http://estuaries.gov/about.html>.

*General information website about estuaries. Gateway to EstuaryLIVE. Good information.*

U.S. Environmental Protection Agency. 2003. **Which Estuaries are in the NEP?** Accessed July 22, 2005 at <http://www.epa.gov/owow/estuaries/find.htm>.

*EPA National Estuary Program map and links to individual estuary programs.*

U.S. Environmental Protection Agency. 2003. **EPA National Estuary Program Map**. Accessed July 22, 2005, at <http://www.epa.gov/owow/estuaries/find.htm>

U.S. Environmental Protection Agency. 2003. **EPA National Estuary Program**. Accessed July 22, 2005, at <http://www.epa.gov/owow/estuaries/list.htm>.

*Links to all 28 participating estuary programs.*



Satellite view of the Barataria-Terrebonne National Estuary.

## ESTUARY ECOSYSTEM DATA SHEET

### Barataria-Terrebonne National Estuary

Parentheses refer to information in particular sections of *Portrait of an Estuary*.

State in which the estuary is located: Louisiana

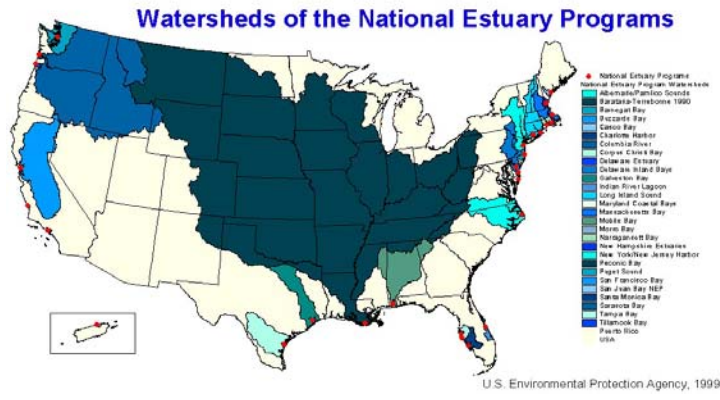
Area of watershed: 15,769 square kilometers

Priority management issues (Section: *Causes of Loss*):

Major habitat types within the estuary (Section: *The Barataria-Terrebonne Estuary System Description*):

Federally endangered or threatened species (Section: *Fish and Wildlife Habitat*):

List three things about the Barataria-Terrebonne Estuary System that you find interesting:



# ESTUARY ECOSYSTEM DATA SHEET

Name of the Estuary Program: \_\_\_\_\_

State in which the estuary is located: \_\_\_\_\_

Area of watershed: \_\_\_\_\_ square kilometers

Priority management issues:

Major habitat types within the estuary:

Federally endangered or threatened species:

List three things about this estuary system that you find interesting: