

# Where Rivers Meet the Sea



## Estuary Concept

Estuaries are interconnected with the world Ocean and with major systems and cycles on Earth.

## Learning Objectives

- An estuary is a body of water, partially enclosed by land, where salt water from the ocean and fresh water from the land can mix.
- Estuaries can be found in coastal areas of the ocean worldwide.
- The National Estuarine Research Reserves (NERRS) are sites located around the coasts of the United States, including the Great Lakes and Puerto Rico that research and monitor estuaries.

## Teacher Background

Estuaries and their surrounding wetlands are bodies of water usually found where rivers meet the sea. Estuaries are home to unique plant and animal communities that have adapted to brackish water – a mixture of fresh water draining from the land and salty seawater.

Estuaries are places where the planet's major environments of land, ocean, rivers, and the atmosphere come together. Estuaries

## Activity Information

### Grade Level

5, 6-8, 9-12

### Time Required

2 (1 hour) class sessions and homework time

### Topic

Ecosystem Interactions and Dependencies, Water and Landforms

## Overview

In this exercise, students will take an online quiz to check their initial estuary knowledge and watch an introduction video. They will explore why estuaries are studied and protected by the National Estuarine Research Reserve System (NERRS). Students will then research and adopt a reserve site and present their findings to the class.

are found all over the planet, mostly in the form of saltwater marshes and mangrove swamps. Estuaries, no matter where they are located on Earth, have shared characteristics.

They all have a semi-enclosed body of water that has a free connection to the open sea, and fresh water derived from land drainage. The North American shoreline is ringed with estuaries.

There are reserve sites in the United States that make up a system of estuaries stewarded by NOAA's National Estuarine Research Reserve System (NERRS). These reserves are located in U.S. coastal states from Alaska to Puerto Rico, including the Great Lakes Basin, and protect over 1.3 million acres of coastal land and waters. You are invited to visit these estuarine reserves and their Education Coordinators to explore and study our nation's estuaries — where the rivers meet the sea.



You can find additional background information about estuaries on the [NOAA Ocean Service Education Estuaries](#) page.

## Teacher Preparation

1. Review the quiz, [Test Your Estuarine Wisdom](#). This quiz is a pre-test for an inquiry into estuaries. It can be found on the [Estuary Education Resources](#) page.
2. Preview the video, [What is an Estuary?](#) You will want to show this video to your students after they take the quiz. The video discusses what an estuary is, the types of estuaries, and why students should care about estuaries. This resource can be found in the video gallery.
3. Become familiar with the [NERRS Interactive Map](#). Click on the green pins for different Reserve sites to see the type of data students will be seeing when they use the Interactive Map in this and later activities.
4. Please direct students to the [Glossary](#) if they encounter words they do not know. The glossary can be found on the [Estuary Education Resources](#) page.

## Procedure or Activity Steps

1. Have your students take the [Test Your Estuary Wisdom](#) either individually or as a group to test their prior knowledge. Recommend bookmarking the link to the quiz for students.
2. Then have them watch the [What's an Estuary?](#) Video. If not viewing as an entire class, then recommend bookmarking the link to the video for the students.
3. Use Student Handout: *Explore a Reserve* to have students work individually or in groups to investigate one of the National Estuarine Research Reserves (NERRS) and make a brochure or presentation about that estuary to share with the rest of the class.

## Materials Needed

- Computer with internet access
- Quiz: Test Your Estuarine Wisdom
- Video: What is an Estuary?
- Student Handout: *Explore a Reserve*

# Explore a Reserve

It's your job in this exercise to "adopt" one of the National Estuarine Research Reserve System (NERRS) estuaries. Learn as much as you can about your Reserve and then make a poster or presentation to share with the class about what makes your Reserve unique and why students might want to travel there.

## Procedure

1. Choose a reserve using this [NERRS Interactive Map](#) by clicking on one of the green pins to virtually visit your estuary site in the NERR System. Use the information from the reserve website to create your poster or presentation. Use the ideas below to guide you to identify interesting information to put in your presentation.
  - What is your Reserve's name?
  - When did your Reserve become part of NERR system?
  - Where is your Reserve located? You may want to include a copy of your Reserve's location map from the website.
  - Describe your Reserve's estuary. How does it fit the definition of an estuary? What type of estuary is it (i.e., coastal plain, fjord, bar-built, or tectonic)? In which bio-geographic region is your estuary located? For definitions refer to the [Glossary](#).
  - Your teacher will give you further instructions on the use of additional online or outside resources. If time allows, you may want to include information about plants and animals in the Reserve's estuary, how people use the estuary, features that make that estuary unique, and so on.
2. Be prepared to present to your class. Make your presentation lively and engaging. Let your classmates know why you think they would enjoy visiting your Reserve estuary.

## Conclusion

Based on the other Reserves presented in class, how does your Reserve estuary compare to others in the NERR system?