

# Teacher's Guide

## *Peace River Watershed Excursion*

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

High School

View excursions at: [WaterMatters.org/Education/Teacher-Resources](http://WaterMatters.org/Education/Teacher-Resources)

**Lesson Time:** One block or class period (approximately 55 minutes)

**Grades:** 9–12

**Objective:** Using context clues and relevant facts in the excursion, students will build an understanding of what a watershed is, the characteristics of local watersheds and how human actions affect the health of a watershed.

### Next Generation Sunshine State Standards:

- SC.912.L.17.1:** Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
- SC.912.L.17.7:** Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
- SC.912.L.17.8:** Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
- SC.912.L.17.10:** Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
- SC.912.L.17.12:** Discuss the political, social, and environmental consequences of sustainable use of land.
- SC.912.L.17.16:** Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
- SC.912.L.17.18:** Describe how human population size and resource use relate to environmental quality.
- SC.912.L.17.20:** Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

### Common Core Curriculum Standards:

#### Grades 9–10

- LACC.910.WHST.1.1e** Text Types and Purposes
- LACC.910.RST.1.1** Key Ideas and Details
- LACC.910.RST.1.2** Key Ideas and Details
- LACC.910.RST.2.4** Craft and Structure

#### Grades 11–12

- LACC.1112.WHST.1.1e** Text Types and Purposes
- LACC.1112.RST.1.2** Key Ideas and Details
- LACC.1112.RST.2.4** Craft and Structure
- LACC.1112.RST.2.6** Craft and Structure

# Lesson Plan and Activities

<b>Vocabulary:</b>	Watershed:	an area of land that water flows across as it moves toward a common body of water, such as a stream, river, or coast
	Ecosystem:	a biological community of interacting organisms and their physical environment
	Tributary:	a small stream or river that flows into a larger one
	Estuary:	a semi-enclosed body of water where fresh water mixes with salt water
	Brackish:	fresh water that is mixed with salt water
	Climate:	weather conditions existing in a region or over a long period of time

**Engage:** (15 minutes) Students will take the pretest provided prior to beginning the lesson. Review the vocabulary terms and ask aloud the following questions to activate prior knowledge:

- Describe what would happen to humans and animals living nearby if a river dried up.
- What types of animals and trees would you find around a river in Florida?
- What are some recreational activities people can do along the river?

**Explore/Explain:** (20–25 minutes) Pass the student worksheet out and ask students to go to [WaterMatters.org/Education/Teacher-Resources](http://WaterMatters.org/Education/Teacher-Resources), scroll to the bottom of the webpage and click on The Peace River. Instruct students to click on the “Begin” tab to move to the introduction. Then ask students to complete the student worksheet while moving through the sections.

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# Lesson Plan and Activities *continued from page 2*

**Extend:** (10 minutes) Bring the class together after 20 minutes to discuss some of the questions on the student worksheet. If time allows, consider using “Think-Pair-Share” and pair students with one another to share their answers. Then ask each pair to share one of their answers with the class.

OR

To learn more, have students view the video titled “Restoring the Pieces of the Peace River” found under Contents on the watershed excursion’s index.

**Evaluate:** (10 minutes) Students will take a pretest prior to beginning the virtual watershed excursion and a posttest (same as pretest) after viewing the excursion and completing the worksheet.

- Additional links:**
- Visit [WaterMatters.org/Education/Teacher-Resources](http://WaterMatters.org/Education/Teacher-Resources) to view all six virtual watershed excursions and the coordinating teacher’s guides. At this site, you can also view the Florida Watersheds video (11 minutes) and download the coordinating middle or high school teacher’s guides.
  - Take the Watershed Pledge with your class at [WaterMatters.org/Education/Teacher-Resources](http://WaterMatters.org/Education/Teacher-Resources).

# Teacher Answer Key

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### Pre-/posttest Answer Key

1. b.
2. c.
3. a.
4. c.
5. b.

### Student Worksheet Answer Key

- (1) Polk County
- (2) Charlotte Harbor estuary
- (3) sediment load
- (4) decomposing plant material
- (5) blackwater
- (6) subtropical
- (7) phosphate
- (8) estuary system
- (9) possible answers: palmettos, cypress, water locust, sweet gum, cabbage palm, live oak and mangroves
- (10) salty
- (11) possible answers: black bears, raccoons, opossums, armadillos, white-tailed deer, panthers, gray foxes, gopher tortoises, sandhill cranes and limpkins
- (12) Manatees
- (13) Feast of Flowers
- (14) Bone meal
- (15) phosphorus?
- (16) "Bone Valley"
- (17) possible answers: clearing, draining and re-contouring of lands for residential and commercial purposes, transportation, agriculture, recreation, timbering, power generation, and ore and mineral extraction
- (18) minimum flows and levels
- (19) fossils
- (20) brackish and tidally influenced
- (21) Arcadia
- (22) ecological integrity
- (23) mangrove forests
- (24) nutrients
- (25) Charley

# Pre-and Posttest

## *Peace River Watershed Excursion*

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- 1) Which of the following statements about the Peace River is **false**?
  - a. It begins in Polk County.
  - b. It is an alluvial river.
  - c. It gets its fresh water from rainfall.
  
- 2) Which of the following is true about a mangrove ecosystem?
  - a. Mangroves stabilize shorelines and prevent erosion.
  - b. Mangroves can only grow in salt or brackish water.
  - c. Falling mangrove leaves crowd out young aquatic species.
  
- 3) Which of the following statements about the Peace River watershed is **true**?
  - a. Phosphate changed agriculture and brought value to the land along the Peace River.
  - b. Minimal land use changes over the past 150 years have prevented extensive groundwater withdrawals in the watershed.
  - c. One tributary feeds the Peace River.
  
- 4) What is the climate along the Peace River Valley?
  - a. Dry
  - b. Rainy
  - c. Humid and subtropical
  
- 5) Charlotte Harbor...
  - a. includes only the Peace River watershed
  - b. is protected by the Charlotte Harbor National Estuary Program
  - c. is one of the smallest estuaries in Florida

# Student Worksheet

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Go to the Peace River Watershed Excursion at: [WaterMatters.org/Education/Teacher-Resources](http://WaterMatters.org/Education/Teacher-Resources)

**Directions:** Instruct students to click on the “Begin” tab to enter the first site. Then click on the links under “Contents” to complete the worksheet. Click the next section to proceed to the following page.

### Read the Introduction

#### Section 1: Where the River Begins

The Peace River begins in northern (1) \_\_\_\_\_ and runs 106 miles to the (2) \_\_\_\_\_.

#### Section 2: Natural History

An alluvial river is a river with a large, well-defined drainage basin that carries a high

(3) \_\_\_\_\_. A blackwater river has dark, stained waters from

(4) \_\_\_\_\_. A spring-fed river has cool, clear water.

The Peace River is nourished by springs, but it is primarily a (5) \_\_\_\_\_ river. The Peace River watershed has a humid and (6) \_\_\_\_\_ climate. The river peaks in late summer and early fall. Fossil layers in the riverbed contain (7) \_\_\_\_\_. In the Charlotte Harbor, phosphorous interacts with mangrove detritus and other nutrients to fuel the most productive (8) \_\_\_\_\_ in Florida.

#### Section 3: Ecological Diversity

List three types of trees that can be found along the Peace River. (9) \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_, \_\_\_\_\_ Mangroves increase in abundance as the water

becomes more (10) \_\_\_\_\_. List three types of animals that you would find along the Peace

River. (11) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

(12) \_\_\_\_\_ are common in the Charlotte Harbor estuary even though they are critically endangered.

## Section 4: Human History

Ponce de Leon discovered our state and called it Pascua de Florida, which means

(13)\_\_\_\_\_. In the 1500s, a Spanish cartographer was drawing a meandering river and called it the Rio de la Paz, which means the “Peace River.” During the wars in the 1800s, every Indian settlement in the Peace River Valley had been destroyed.

## Section 5: The Discovery of Phosphate

(14)\_\_\_\_\_ was the original source of fertilizer along the Peace River Valley. Agriculture was forever changed by the discovery of (15)\_\_\_\_\_ role in promoting plant growth. This nonrenewable resource was formed millions of years ago and ultimately became sedimentary layers of rock. During the nineteenth century, the Florida phosphate boom was sparked and the region was nicknamed (16)\_\_\_\_\_.

## Section 6: Southern Water Use Caution Area (SWUCA)

A *water use caution* area is an area where water resources are or will become critical in the next twenty years. The Peace River and its watershed are included in the SWUCA, established in 1992. List three land uses in the area that required extensive withdrawals of groundwater resulting in lowered aquifer and lake levels, saltwater intrusion and loss of flow in the Peace River: (17)\_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_. To prevent damage to habitats and water resources, safe thresholds, called (18)\_\_\_\_\_, were developed by District scientists.

## Section 7: Tributaries

The Peace River is fed by these five tributaries:

Horse Creek — the largest tributary along the Peace River.

Paynes Creek — close to this tributary is a small waterfall, one of only a few in Florida.

Charlie Creek — amateur paleontologists search the creek bed for (19)\_\_\_\_\_.

Joshua Creek — early projectile points and other stone tools were recovered here.

Shell Creek — its outflow is controlled by a dam; above the dam is fresh water, while below it's (20)\_\_\_\_\_ and \_\_\_\_\_.

## Section 8: Canoe Trail

The Peace River Canoe Trail begins at Fort Meade and continues for 67 miles, just west of

(21)\_\_\_\_\_.

## **Section 9: Charlotte Harbor**

The Charlotte Harbor National Estuary Program was created to protect the estuary's water quality and (22)\_\_\_\_\_. The estuary is a mosaic of habitats, including the (23)\_\_\_\_\_, which are home to at least 2,300 animal species.

## **Section 10: Florida's Mysterious Mangroves**

Mangroves stabilize shorelines, prevent erosion and provide a location for nesting seabirds. The mangrove leaves fall into the water, supplying (24)\_\_\_\_\_ to the multitude of food chains.

## **Section 11: The Hurricanes of 2004**

Mangrove forests in Charlotte Harbor suffered the worst devastation from Hurricane (25)\_\_\_\_\_. This set the stage for long-term decline in the black mangrove population in the area.