

# Teacher's Guide

## *Hillsborough River Watershed Excursion*

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

High School

View excursions at: [WaterMatters.org/Watersheds](http://WaterMatters.org/Watersheds)

**Lesson Time:** One block or class period (approximately 50 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:

- 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
- 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

## SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

<b>Vocabulary:</b>	<b>Watershed:</b>	an area of land that water flows across as it moves toward a common body of water, such as a stream, river, or coast
	<b>Wetlands:</b>	land that is wet all, or part, of the year and supports plants adapted to wet soil and water level changes
	<b>Uplands:</b>	an area of high or elevated land
	<b>Brackish:</b>	fresh water that is mixed with salt water
	<b>Estuary:</b>	a semi-enclosed body of water where fresh water mixes with salt water
	<b>Reservoir:</b>	a natural or constructed area where surface water is collected and stored for later use
	<b>Spring:</b>	places where groundwater flows out of a natural opening in the earth's surface
	<b>Ecosystem:</b>	a biological community of interacting organisms and their physical environment
	<b>Bay:</b>	a shallow body of water between a larger barrier island and the mainland
	<b>Stormwater runoff:</b>	rainwater that picks up pollution as it washes over roads, parking lots, driveways, rooftops and other hard surfaces and washes into water bodies

**Engage:** (10 minutes) Students will take the pretest included before beginning this lesson. Review the vocabulary terms and ask aloud the following questions to activate prior knowledge:

- What do you know about natural springs?
- What kinds of pollution would you be likely to find in a populated city?
- What effects would stormwater runoff have on the Hillsborough River?
- 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/Watersheds](http://WaterMatters.org/Watersheds), scroll to the bottom of the webpage and click on the Hillsborough River Watershed Excursion. Instruct students to read the home page. From this page, students will click the locations numbered 1–7 while completing the worksheet.

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# Lesson Plan and Activities *continued from page 2*

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**Extend:** (10 minutes) Bring the class together after 20–25 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.

**Evaluate:** (5 minutes) Students will take the posttest (same as pretest) after viewing the excursion and completing the worksheet and lesson.

- Additional links:**
- Visit [WaterMatters.org/education/resources](http://WaterMatters.org/education/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/watersheds/](http://WaterMatters.org/education/watersheds/).

# Teacher Answer Key

## *Hillsborough River Watershed Excursion*

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### Pre-/posttest Answer Key

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

### Student Worksheet Answer Key

- (1) wetlands
- (2) pollution
- (3) flood damage
- (4) headwaters
- (5) Southwest Florida Water Management District
- (6) world
- (7) natural opening
- (8) nitrates
- (9) flood-tolerant
- (10) provide and protect
- (11) surface water
- (12) 1.2 billion
- (13) brackish
- (14) flood-control structures
- (15) water resources
- (16) urban watershed
- (17) natural landscape
- (18) number one
- (19) wetland habitats
- (20) protect and restore
- (21) estuary
- (22) nurseries
- (23) fresh water
- (24) pollution
- (25) feeding areas

# Pre-and Posttest

## *Hillsborough River Watershed Excursion*

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- 1) The following are true of the Green Swamp except:
  - a. It contains only wetland areas.
  - b. It is the beginning point of four major rivers.
  - c. Rain easily percolates into the aquifer in the Green Swamp.
  
- 2) Which of the following is true of Tampa Bay:
  - a. It's not affected by pollution because it's tidally influenced.
  - b. Cypress trees help protect sand from being washed into the water from the bay's shore.
  - c. It serves as a nursery for fish and other animals.
  
- 3) Which of the following statements about the Hillsborough River watershed is true?
  - a. The Hillsborough River watershed begins at Crystal Springs.
  - b. Measures have not been taken to prevent flooding in the Hillsborough River watershed.
  - c. The Hillsborough River watershed drains to the largest open-water estuary in Florida.
  
- 4) Which of these factors has primarily caused a decline in water quality from water exiting Crystal Springs?
  - a. Bacteria
  - b. Damage to wetland habitats
  - c. Nitrates
  
- 5) What strategy is used to prevent flooding in the Hillsborough River watershed?
  - a. The Tampa Bypass Canal redirects rising water into McKay Bay.
  - b. The Green Swamp collects most excess rainfall in the watershed.
  - c. Excess rainwater is diverted into the Hillsborough River Reservoir.

# Student Worksheet

## *Hillsborough River Watershed Excursion*

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Go to the Hillsborough River Watershed Excursion at: [WaterMatters.org/Watersheds](http://WaterMatters.org/Watersheds)

**Directions:** Click on the image of the Hillsborough River to enter the interactive tour. Read the introduction then click “Get started and visit the map,” and then select **1 Green Swamp**. Fill in the blanks on this worksheet as you read through and complete the tour. Click the hyperlink at the bottom of each location to proceed to the following location.

### Section 1: Green Swamp

(1) \_\_\_\_\_ are a type of wildlife habitat in the Green Swamp and are an important natural resource. Click on the “wildlife habitats” hyperlink to find the next answers. Wetlands are beneficial to the environment and people because they serve as a sanctuary for rare and endangered species, they clean (2) \_\_\_\_\_ from surface water and they help prevent (3) \_\_\_\_\_. Close the window. The Green Swamp is the (4) \_\_\_\_\_ of four major rivers. To keep the Green Swamp and its rivers protected, the (5) \_\_\_\_\_ purchased a portion of the land.

### Section 2: Crystal Springs

Florida contains the most freshwater springs in the (6) \_\_\_\_\_. Click on the “springs” hyperlink. A spring is a place where groundwater discharges through a (7) \_\_\_\_\_ in the earth’s surface. Close the window. The Hillsborough River Watershed has two named springs — Crystal Springs and Sulphur Springs. Crystal Springs has seen a decline in water quality that experts believe is caused by (8) \_\_\_\_\_, found in fertilizer.

### Section 3: Hillsborough River State Park

This state park is home to many native Florida tree communities including river swamps, cabbage palms, oak hammocks and cypress trees. Click on the “cypress trees” hyperlink. Cypress trees are the most common and most (9) \_\_\_\_\_ of all wetland trees in Florida. Click on the “Back: Hillsborough River State Park” hyperlink. State parks are managed to (10) \_\_\_\_\_ the “real” Florida.

## Section 4: Hillsborough River Reservoir

Click on the “Reservoir” hyperlink. A reservoir is an area where (11)\_\_\_\_\_ is collected and stored. Close window. The Hillsborough River Reservoir has served as the main water source since the 1920s. It can hold up to (12)\_\_\_\_\_ gallons of water! Depending on the tides and the amount of rainfall, the river is sometimes fresh and sometimes (13)\_\_\_\_\_.

## 5: Tampa Bypass Canal

This 14-mile long waterway includes a constructed canal and several concrete (14)\_\_\_\_\_. When a large amount of rainfall is expected, the structure redirects the rising waters keeping homes and business from flooding. Overflow water is stored in the Lower Hillsborough Flood Detention Area, owned by the Southwest Florida Water Management District (SWFWMD). This area has several natural habitats and is one of the largest undeveloped areas in Hillsborough County. It’s managed for its (15)\_\_\_\_\_ and flood management functions.

## Section 6: Downtown Tampa

The lower part of the Hillsborough River Watershed is a(n) (16)\_\_\_\_\_, created when the human population in an area grows as a city or town develops. Click on the “urban watershed” link. This results in the clearing and development of the (17)\_\_\_\_\_ along the river. Close window. Click on the “Stormwater runoff” link. The Environmental Protection Agency identified stormwater runoff as the (18)\_\_\_\_\_ pollutant to our nation’s waters. Click “Back: Downtown Tampa.” The Hillsborough River Watershed faces problems from pollution damaged (19)\_\_\_\_\_ and increased stormwater runoff. Therefore, the SWFWMD works, and other organizations are working to (20)\_\_\_\_\_ and \_\_\_\_\_ wetlands and surface water bodies.

## Section 6: Tampa Bay

Tampa Bay is the largest open-water (21)\_\_\_\_\_ in Florida. This is where fresh water and salt water meet. The quiet, shallow waters serve as (22)\_\_\_\_\_ for fish and other animals. The flow of (23)\_\_\_\_\_ here is essential, and it begins in the Green Swamp. Estuaries provide homes to a number of plants, trees and seagrasses. These are important because they filter (24)\_\_\_\_\_ from water before it reaches the ocean and they provide homes and (25)\_\_\_\_\_ to animals that live in an estuary.