Teacher's Guide
Springs Coast Watershed Excursion

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT — High School

View excursion at: *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, nonnative 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 State Standards:

LAFS.1112.WHST.1	Text Types and Purposes
LAFS.910.WHST.1	Text Types and Purposes
LAFS.1112.RI.1	Key Ideas and Details
LAFS.910.RI.1	Key Ideas and Details
LAFS.1112.RI.3	Integration of Knowledge and Ideas
LAFS.910.RI.3	Integration of Knowledge and Ideas

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Lesson Plan and Activities

Vocabulary:

watershed:	an area of land that water flows across as it moves toward a common body of water, such as a stream, river, lake or coast; also known as a drainage basin
spring:	a place where groundwater discharges from the underlying limestone bedrock to the Earth's surface through a natural opening in the ground
springshed:	the area of land that contributes groundwater to a spring
aquifer:	a spongelike layer of underground rock that can hold and release water
wetland:	land that is wet all, or part, of the year and supports plants adapted to wet soil and water level changes
point source:	contamination that can be traced to a single point or location
nonpoint source:	pollution that does not come from a single point or location
nitrates:	a form of nitrogen found in inorganic fertilizers that in excess amounts can cause significant water quality problems and algae blooms
runoff:	rainfall that is not absorbed by the soil but flows to a larger body of water

Engage: (15 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:

- Where does our drinking water come from?
- How does drinking water get to your home?
- What types of pollution affect a water body and how does the pollution get to the water body?

Explore/Explain: (25–30 minutes) Pass out the student worksheet and ask students to go to *WaterMatters.org/Watersheds*, scroll to the bottom of the webpage and click on the Springs Coast Watershed Excursion. Instruct students to read the welcome page and follow the links at the top of the excursion's welcome page while completing the worksheet.

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Lesson Plan and Activities *continued from page 2*

Extend: (5–10 minutes) Bring the class together after 25–30 minutes to discuss the "Reflecting" 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 a posttest (same as pretest) after viewing the excursion and completing the worksheet.

Additional links:

- Visit *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.

Teacher Answer Key
Springs Coast Watershed Excursion

Southwest Florida Water Management District

Pre-/posttest Answer Key

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

Student Worksheet Answer Key

(1) Floridan aquifer
(2) "karst" terrain
(3) springshed
(4) drinking water
(5) Rainbow and Withlacoochee
(6) nitrate levels
(7) water clarity
(8) dissolved oxygen
(9) second largest
(10) limestone aquifer
(11) Florida manatee
(12) estuary
(13) warm-water habitats
(14) Gulf of Mexico
(15) seagrass area
(16) nurseries
(17) habitats
(18) estuaries
(19) freshwater and saltwater
(20) Florida Park Service
(21) sea-level rise
(22) state-designated Threatened
(23) public ownership
(24) Southwest Florida Water Management District
(25) septic tanks and excessive fertilizer
(26) umbrella species
(27) freshwater cave system
(28) 112
(29) bird of prey
(30) land and water
(31) filter out pollution

Pre- and Posttest
Springs Coast Watershed Excursion
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

1. What is the cause of elevated nitrates in a watershed?
    a. Leaking septic tanks
    b. Excessive fertilizer
    c. Both a. and b. are correct

2. What type of water is found in an estuary?
    a. Fresh water
    b. Salt water
    c. Fresh and salt water

3. Which of the following statements about the Florida sandhill cranes is true?
    a. They are a state-designated Threatened species.
    b. They are a state-designated Endangered species.
    c. They are a well-established species in Florida.

4. Why are springs an important wintering site for threatened manatees?
    a. Manatees can only survive in the pristine water of springs year-round.
    b. Springs provide a warm-water habitat when water int he Gulf is too cold.
    c. Springs are the only place manatees can find food in the winter.

5. What are two main problems facing the Springs Coast Watershed?
    a. Increased levels of nitrogen in the water and sea-level rise.
    b. Increased levels of bacteria in the water and invasive wildlife.
    c. Increased population causing excessive pollution and flooding.

Student Worksheet
Springs Coast Watershed Excursion

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Go to the Springs Coast Watershed Excursion at: *WaterMatters.org/Watersheds*

Directions: Read the excursion's welcome webpage and follow the tabs at the top of the webpage. Fill in the blanks on this worksheet as you complete the tour.

Tab 1: What is a Spring?

In the Springs Coast Watershed, the **(1)**_____ is close to the land surface and discharges groundwater at springs.

Springs are common in Florida because of the state's **(2)**_____.

A **(3)**_____ is the area of land that contributes groundwater to a spring.

Click on the aquifer illustration.

In Florida, most of the population depends on the Floridan aquifer for their **(4)**_____.

Once you are finished reading, click "Return to What is a Spring."

Tab 2: Rainbow River

Rainbow Springs provides fresh water to the **(5)**_____ and _____ rivers.

Although the upper portion of the river has some of the clearest water and healthiest submerged aquatic vegetation, the river has one of the highest **(6)**_____ among the Springs Coast systems.

Excess algae growth can cause reduced **(7)**_____ and extreme fluctuations in **(8)**_____.

Student Worksheet
Springs Coast Watershed Excursion

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Tab 3: Crystal River/Kings Bay

Crystal River/Kings Bay is the **(9)**_____ springs group in Florida.

Coming from within the **(10)**_____, the spring water is 72 degrees year-round and a safe haven for manatees in the winter.

The Crystal River National Wildlife Refuge is the only federal refuge created specifically for the protection of the threatened **(11)**_____.

Crystal River/Kings Bay has characteristics of both freshwater springs and a(n) **(12)**_____ because of its intimate connection with the Gulf.

Click on the manatee link.

The two greatest threats to manatee survival include the availability of **(13)**_____ and injury or death resulting from collisions with boats.

Once you are finished reading, click "Return to Crystal River/Kings Bay."

Tab 4: Coastal Estuarine Habitats

Four of the five springs groups in the watershed discharge directly into the **(14)**_____ in a region that is home to the second largest **(15)**_____ in the continental United States.

Estuaries are productive and diverse ecosystems that serve as **(16)**_____ for fish, shellfish and other animals.

The tide ebbs and flows through a salt marsh. This flushing action helps nourish the plants, making salt marshes some of the richest and most productive **(17)**_____ on Earth.

Click on the photo of the Red Drum.

Red Drum spend most of their lives inshore in the fertile waters of **(18)**_____.

Once you are finished reading, click "Return to Coastal Estuarine Habitats."

Student Worksheet
Springs Coast Watershed Excursion

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Tab 5: Homosassa River

The springs of the Homosassa River are home to both **(19)**_____ and _____ fish.

Today, Homosassa Springs State Wildlife Park is owned by the state and managed by the **(20)**_____.

Changing salinity due to **(21)**_____ and fluctuations in river flow is an emerging issue in the lower portion of the Homosassa River.

Click on the photo of the Florida sandhill crane.

Florida's sandhill cranes are a **(22)**_____ species that are found in inland shallow freshwater marshes, prairies, pastures and farmlands.

Once you are finished reading, click "Return to Homosassa River."

Tab 6: Chassahowitzka River

Most of the lands adjacent to the Chassahowitzka River are in **(23)**_____, meaning they will retain much of their natural beauty for generations to come.

The **(24)**_____ acquires lands that are important to the protection of Florida's water resources.

Two ways nitrates can get into the groundwater supply and eventually appear in spring discharge are **(25)**_____ and _____.

Click on the photo of the Florida black bear.

The Florida black bear is considered a(n) **(26)**_____ because by protecting the Florida black bear and its habitat, we also protect other species' habitats.

Once you are finished reading, click "Return to Chassahowitzka River."

Student Worksheet
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Tab 7: Weeki Wachee River

The Weeki Wachee Springs complex is home to the deepest known **(27)**_____ in the country.

The Weeki Wachee Springs complex contributes more than **(28)**_____ million gallons of water per day to the flow of the Weeki Wachee River.

Click on the photo of the osprey.

The osprey is a large **(29)**_____ that is commonly seen circling above lakes, rivers, streams and ponds, or perched on dead trees or telephone poles.

Once you are finished reading, click "Return to Weeki Wachee River."

Tab 8: Weekiwachee Preserve

The District and other agencies and governments acquire conservation lands because **(30)**_____ and _____ are forever linked by Florida's natural water cycles.

Wetlands are important because they naturally transport spring water to the Gulf of Mexico and **(31)**_____ from runoff before it reaches surrounding water bodies.