Southwest Florida
Water Management District

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SPLASH! into Water Resources Education
Southwest Florida Water Management District

WATERSHED EXCURSION

Take a Virtual Watershed Excursion
at *WaterMatters.org/watershed*

Student Booklet
for grades 4–7

Dear Parents and Teachers:

As executive director of the Southwest Florida Water Management District (SWFWMD), I believe that it is imperative that we always have a safe and adequate supply of fresh water in Florida. To do this, our children must know how to be actively involved in the protection of water.

This publication is dedicated to the theme of watersheds. To ensure that Florida's watersheds will be valued and protected, we must learn how to balance the demands of humans while protecting the environment. For additional information about water resources protection, please contact the SWFWMD's Communications Department at 1-800-423-1476, ext. 4757.

David L. Moore
Executive Director
Southwest Florida Water Management District

Dear Watershed Students:

Are you ready to take a watershed excursion? We hope so! On your journey, you will stop at several stations along the way. At each station we have included a variety of information and activities about watersheds. Be sure to pass the Excursion Checkpoints so you can continue on your journey to the next station. Don't forget to complete the Watershed Investigations for further study. We hope this *Watershed Excursion* booklet will help you appreciate where you live and encourage you to help protect our water resources.

To help you learn more about watersheds, we have included many fun activities. There is also a poster about watersheds in our area and a contest for you to enter. Let's begin your watershed excursion now!

Youth Education
Communications Department
Southwest Florida Water Management District
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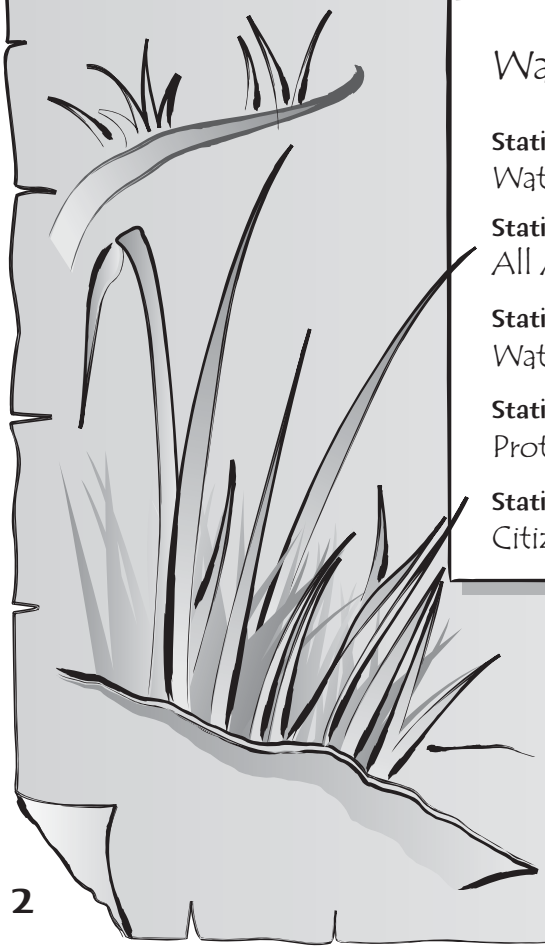


Watershed Excursion Guide:

This *Watershed Excursion* booklet is a special educational publication from the Southwest Florida Water Management District. The purpose of this publication is to educate students, residents and visitors about water resources issues and encourage protection of our water resources. A supplementary teacher's guide is available on request and can be ordered online at *WaterMatters.org/publications/*. If you need more information or have questions, please contact the Communications Department of the Southwest Florida Water Management District at (352) 796-7211 or 1-800-423-1476 (FL), ext. 4757.

Station 1

Watershed Basics

Have you ever studied a watershed? Are you familiar with the watershed in which you live? Recently, we asked a few students to tell us what they knew about watersheds. Here is what they said:

"A watershed is an area of land that water flows across as it moves toward a larger body of water."

"A watershed is a geographical area that includes all the humans, plants and animals that live in it. It's like a community. But, it also includes nonliving things such as rocks and soil."

"No matter where we live, we live in a watershed. Everyone lives in a watershed."

"Watersheds can be many different shapes and sizes. A large watershed may contain many smaller watersheds."

"Watersheds can have hills or mountains or be nearly flat. Florida is a fairly flat state, but it contains a lot of watersheds."

Do you agree with these students' comments about watersheds? Actually, everything they said is true. Regardless of where you live, you live in a watershed. A *watershed* can be defined as 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. It can also be described as a land area from which water drains or "sheds" to a particular water body. Watersheds are separated from each other by areas of higher elevation called ridge lines or divides. Because Florida has a relatively flat land surface, the watersheds may be separated by slight variations in elevation.

A watershed is usually described as either an open or closed system. In an open system, the water collects in an area until it overflows into a larger body of water such as a stream or river. These watersheds can be small or large, and most are interconnected. The process continues until the water finally moves out to sea. In a closed system, the water collects at a low point and leaves only through evaporation or by seeping into the ground beneath it. Most watersheds are open systems in which the water eventually moves out to sea.

We must all remember that a healthy watershed is vital for a healthy environment and economy. You can affect what happens in your watershed. Use the map in the center of this publication to locate the watershed in which you live. Remember that we depend on our watersheds to provide us with water for drinking, irrigation and industry, as well as for recreation and wildlife. Let's all work to protect the health and well-being of our watersheds!

Excursion Checkpoint

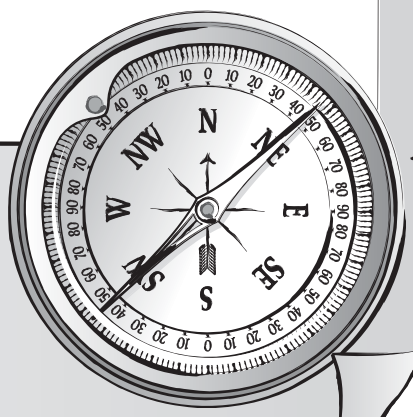
Watershed Quiz

Check all the phrases that are true about your watershed.

- ❑ I live in a watershed.
- ❑ A watershed is like a community.
- ❑ What I do can affect the quality of my watershed.
- ❑ A watershed can be a closed or an open system.
- ❑ It's up to all of us to protect our watershed.

Watershed Investigations

1. Take a few photos or sketch a few scenes of your neighborhood. Describe the scene in each photo or sketch and explain how it is part of your watershed.
2. Search newspapers, magazines or the Internet for an interesting picture or article about your area. Describe how it relates to your watershed.

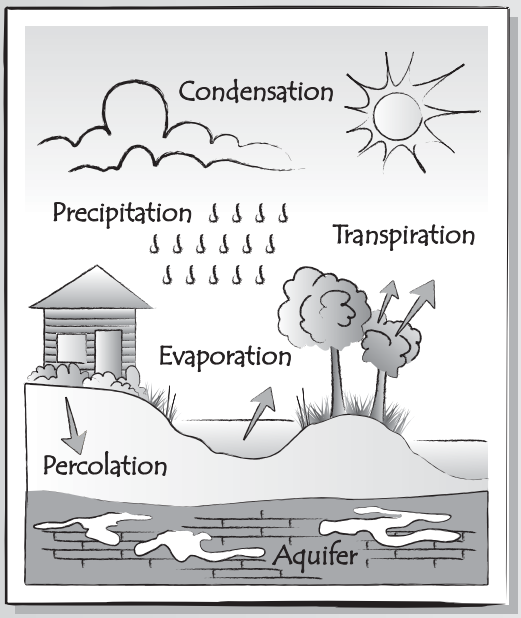


Station 2

All About Water

The Hydrologic Cycle

Do you realize that the water on earth today is the same water that has been here since the beginning of time? In fact, the water you drank yesterday may have been used centuries ago by Native Americans and explorers. All the water in our environment recycles itself over and over again with no beginning and no end. This process is called the *hydrologic cycle* or *water cycle*. The sun serves as the energy source that causes water to move continuously through several different phases within the cycle. Important phases in the cycle include the following: evaporation, transpiration, condensation, precipitation and percolation. Study the illustration and terminology to understand exactly how this wondrous cycle works.



The Hydrologic Cycle

evaporation	vapor created when the sun heats water in lakes, streams, rivers, oceans, puddles, etc.
transpiration	vapor created when plants and trees give off moisture
condensation	tiny droplets of water formed when water vapor rises into the air and cools
precipitation	moisture released from clouds in the form of rain, snow, hail, etc.
percolation	downward movement of water through the ground

Water On the Surface

If you have ever visited a river or lake, then you are already familiar with a few types of surface water. Surface water can exist in many different shapes and forms. An easy way to describe surface water is to think of it as any water that has not seeped into the ground and is exposed to the air. Most of the earth's *surface water* is salt water in our oceans. Salt water contains several times the amount of dissolved salt solids as fresh water. Less than 1 percent of surface water is fresh, but this water is essential for our life. In addition to rivers and lakes, other forms of fresh surface water include streams, creeks, ponds, sloughs and wetlands. All these bodies of fresh water affect the overall quality of the watershed. It is important that we keep them clean and healthy.

Water Under the Surface

Water that is found under the earth's surface is called *groundwater*. As part of the water cycle, various forms of precipitation gradually soak into the ground beneath the earth's surface in a process called *percolation*. (See illustration.) This groundwater is then stored in underground areas called *aquifers*. Aquifers are made up of loosely packed sediments and layers of calcium-rich limestone and dolomite. Most of Florida's population depends on groundwater for their drinking water. The Floridan aquifer system, which is the largest and deepest in the state, holds groundwater like a sponge, and its holes allow the water to move freely through it. The Floridan aquifer system stretches for 100,000 square miles beneath Florida and parts of Alabama, Georgia and South Carolina.

Wells are used to remove groundwater from aquifers. Wells may exist in all shapes and sizes, but basically they are holes that are drilled into the aquifer. A pipe and pump are used to draw the groundwater to the surface so that water may be supplied to cities, homes and farms.

The Remarkable Features of Florida's Karst Terrain

Did you know that much of Florida's landscape is made up of karst terrain? *Karst* is the name for any type of terrain where the bedrock dissolves easily. Karst is full of holes, cracks and crevices. It soaks up water like a sponge and its rock is always dissolving. Because of the nature of this landscape, Florida has many sinkholes, springs and caves. Let's take a closer look at each of these remarkable formations.

Sinkholes

A *sinkhole* may occur when rainfall percolating, or seeping, through the soil absorbs carbon dioxide and reacts with rotting vegetation, creating slightly acidic water. That water moves through spaces and cracks underground, slowly dissolving limestone and creating a network of spaces and caverns. As the limestone dissolves, pores and cracks become bigger and carry even more acidic water. When these underground spaces get too big, the land surface above collapses or sinks into the cavities. The result – a sinkhole. This process could take thousands of years.

Springs

Florida contains one of the largest concentrations of freshwater springs in the world – more than 700! Perhaps you have had the opportunity to visit one or more of the springs that have become popular tourist attractions. If so, then you probably already know that a *spring* is a place where groundwater that is under pressure discharges through a natural opening in the earth's surface. Many Florida springs are so small they cause only a trickle, while others are some of the deepest and largest known springs in the world.

Caves

An amazing underground world of caves and tunnels is often found beneath the surface of sunlit springs. These underwater cave systems within the aquifer take on many shapes and forms that may include twisting, narrow corridors and cave rooms. The unusually deep and dark environment can provide challenging adventures for experienced cave explorers.

Land in the Watershed

A watershed doesn't include just water. It also includes the land upon which precipitation falls. The way in which land is used plays a very important role in the quality of a watershed. The land in a particular watershed may be used in many ways, such as agriculture, community developments, towns and cities, industry, recreation, conservation areas, etc. Often, when the land in a watershed is altered by people for development, water is unable to soak into the ground as easily. Instead, it flows directly into surface waters, carrying a variety of pollutants with it. We must remember that anything we do on the land within a watershed affects the water resources within that watershed.

People Can Prevent Pollution

Most water *pollution* is caused by the activities of humans. All pollutants are harmful, but some can actually be life-threatening. A few common pollutants include trash, chemicals, pesticides, fertilizers, wastewater, sewage, litter, soil particles, oil, acid rain, etc.

Water pollution is often described according to its source. Pollution that flows from pipes or comes from specific points is called *point-source pollution*. Pollution that does not come from a discharge at a specific point but is caused from land runoff, drainage or seepage after a rainfall, is called *nonpoint-source pollution* because it is difficult to locate its exact source. Let's never forget that we are all affected by pollution in our watershed, regardless of its source.

Watershed Investigations

1. Visit a body of water near your home. Look very closely at the water and the surrounding land. Describe what you see in terms of point-source and nonpoint-source pollution.
2. Search newspapers, magazines or the Internet for examples that illustrate point-source and nonpoint-source pollution. Describe how these pollutants affect the health and well-being of the watershed.

Excursion Checkpoint

Matching Activity

Now that you know more about water on and below the surface, match each term with its description. Write the correct letter next to each term.

___ 1. point-source pollution
___ 2. percolation
___ 3. spring
___ 4. salt water

a. a place where groundwater that is under pressure discharges through a natural opening in the earth's surface

b. a source of pollution that flows from pipes or comes from a specific source

c. most of the earth's surface water

d. downward movement of water through the ground

Station 3

Watersheds in Our Area

As you have already learned, no matter where you live, you are in a watershed. You will also recall that a watershed includes both water and land formations. As water flows down from the original source to its final destination, it marks an interesting trail through different features within the watershed. Each watershed has its own unique combination of water and land features that may include wetlands, rivers, springs, streams, lakes, ponds, bays, estuaries and land formations. Cities, towns, farms and plant and animal habitats are also important pieces that can be part of a particular watershed.

Let's take a closer look at a few of the water and land features that may exist in your watershed. Additional information about the watersheds that lie within the boundaries of the Southwest Florida Water Management District (SWFWMD) is presented on our center-spread poster. Be sure to check it out while you are on your watershed excursion!

Wetlands

Wetlands play a very important role in the health of a watershed. They provide habitat for a variety of plants and wildlife. Wetlands also act as powerful sponges that can soak up huge amounts of excess water from rainfalls, which helps to prevent flooding. Known as "nature's kidneys," wetlands purify and filter water that passes through them. Although there are many different types of wetlands, there is one characteristic that they all have in common: for at least part of the year, they are saturated or flooded with water. Marshes, bogs, wet prairies and swamps are examples of wetlands.

Rivers and Streams

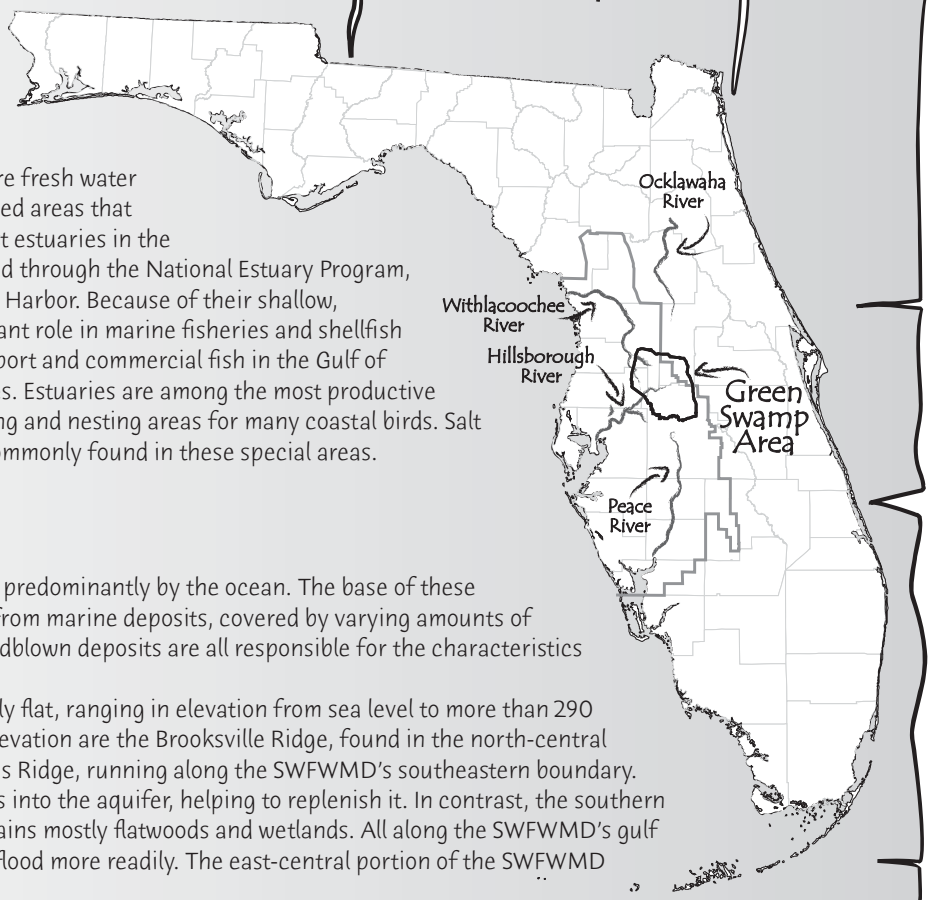
The water in rivers, streams, tributaries and brooks is water on the move. The flowing water can vary in temperature and clarity during its course. Also, the water can alternate between fast and slow speeds as it follows many twists and turns on its journey through the watershed. The kinds of plant and animal habitats will vary according to the different characteristics of the banks and bottoms of these water bodies. Within the SWFWMD, several rivers and creeks are currently used for municipal or industrial water supplies.

Lakes and Ponds

A lake or pond can be simply defined as a big hole in the ground filled with standing water. Did you know the difference between a lake and a pond is determined by the depth and not the length or width? It is also a fact that some very deep lakes were formed by sinkholes. The following lakes have been identified as Surface Water Improvement and Management (also known as SWIM) priority water bodies that need special protection: Panasoffkee, Tarpon, Banana and Thonotosassa lakes and the Winter Haven Chain of Lakes. Cleanup and restoration projects help improve important water bodies like these. To make sure these lakes remain healthy, special programs have been developed for their protection.

Estuaries

Estuaries are special water bodies where fresh water mixes with salt water. They are semi-enclosed areas that open up to the sea or gulf. The three largest estuaries in the SWFWMD, which have also been recognized through the National Estuary Program, are Tampa Bay, Sarasota Bay and Charlotte Harbor. Because of their shallow, protected waters, estuaries play an important role in marine fisheries and shellfish production. Approximately 75 percent of sport and commercial fish in the Gulf of Mexico spend part of their lives in estuaries. Estuaries are among the most productive ecosystems in nature. They provide breeding and nesting areas for many coastal birds. Salt marshes, mangroves and seagrasses are commonly found in these special areas.



Land Formations

Florida's land forms have been shaped predominantly by the ocean. The base of these formations is primarily limestone, formed from marine deposits, covered by varying amounts of sand and clay. Ancient seas, rivers and windblown deposits are all responsible for the characteristics of these land forms.

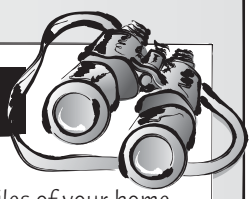
The land in most of our area is relatively flat, ranging in elevation from sea level to more than 290 feet above sea level. Two areas of higher elevation are the Brooksville Ridge, found in the north-central section of the SWFWMD, and the Highlands Ridge, running along the SWFWMD's southeastern boundary. Both ridges are places where rainfall drains into the aquifer, helping to replenish it. In contrast, the southern portion of the SWFWMD is lower and contains mostly flatwoods and wetlands. All along the SWFWMD's gulf coast, the land is lower and often tends to flood more readily. The east-central portion of the SWFWMD tends to be hilly and gently rolling.

Land use and classifications for land cover include: agriculture; residential, commercial and industrial development; upland forests; wetlands; open range; beaches; and transportation. Agriculture is the largest user of land.

The Green Swamp

The Green Swamp is a large geographic area of nearly 870 square miles of wetlands and uplands located in the center of Florida. Yearly rainfall collects across this extensive flat landscape forming the headwaters for the Peace, Hillsborough, Withlacoochee and Ocklawaha rivers. This collection and storage of rainfall helps provide flood protection and natural treatment of runoff water. Because the underground aquifers are so close to the surface of the land, portions of the Green Swamp are very important for groundwater recharge. The various native habitats in the Green Swamp (uplands and wetlands) are home to a wide variety of plants and animals. Because of its regional importance, approximately one-fourth of the area is under the protection of the SWFWMD. This unique nature area is called the Green Swamp Wilderness Preserve and is open to the public.

Watershed Investigations



1. Using the land and water features discussed at this station, describe the features that are within a few miles of your home. Explain how these features are connected to each other. Draw a map to illustrate these connections.
2. Search newspapers, magazines or the Internet for an article about a water body or land area. Describe the main idea and list three important points included in the article.

Excursion Checkpoint

True or False?
Circle one.

TRUE FALSE 1. A watershed includes only areas of water.

TRUE FALSE 2. The aquifer is close to the earth's surface in the Green Swamp.

TRUE FALSE 3. The difference between a lake and a pond is in its depth.

TRUE FALSE 4. Wetlands act as a filter to remove pollutants from water.

TRUE FALSE 5. A lake can be formed from a sinkhole.

Watersheds Within the SWFWMD

Within the boundaries of the Southwest Florida Water Management District (SWFWMD), there are 11 major watersheds. We have numbered the descriptions of the watersheds so that you can easily locate them on the map. As you read about our watersheds, you will see that they have many differences, as well as a lot in common. For each watershed, we have included a few of its features and challenges. Remember, these highlights provide only a preview of these geographic areas. It is up to you to take additional steps and gather more information about these watersheds as you continue on your excursion!


RANDY EMBERG

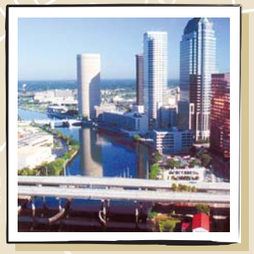
1. Withlacoochee River Watershed

The Withlacoochee River begins in the Green Swamp and flows northward, discharging into the Gulf of Mexico near Yankeetown. It is one of only two rivers in Florida that flows north. Four springs – Rainbow, Blue, Gum and Fenney – discharge water into the river. Other water features include Lake Panasoffkee, Rainbow River, Lake Rousseau and the Tsala Apopka Chain of Lakes. Land use consists of wetlands, upland forest, rangeland, agriculture, mining and urban development.


RANDY EMBERG

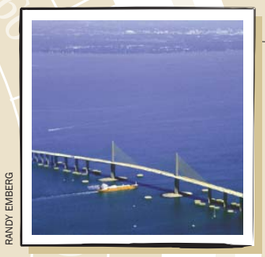
2. Springs Coast Watershed

The watershed includes the Crystal, Homosassa, Chassahowitzka, Weeki Wachee and Pithlachascotee rivers and their many springs. In this area you will also find an extensive coastal swamp area, rolling hills and dunes, and part of the Brooksville Ridge. The cities of Port Richey, New Port Richey, Weeki Wachee, Brooksville and Crystal River are located within the watershed.


MANNY LOPEZ

3. Hillsborough River Watershed

The Hillsborough River begins in the Green Swamp area and flows southwest, discharging into Hillsborough Bay. Lakeland, Plant City, Land O'Lakes, Zephyrhills, Temple Terrace and part of Tampa lie within the watershed. The Tampa Bypass Canal was built to protect areas from flooding, and the Hillsborough River Reservoir provides most of the drinking water for residents of Tampa. The watershed reflects a wide variety of land uses from rural to urban.


RANDY EMBERG

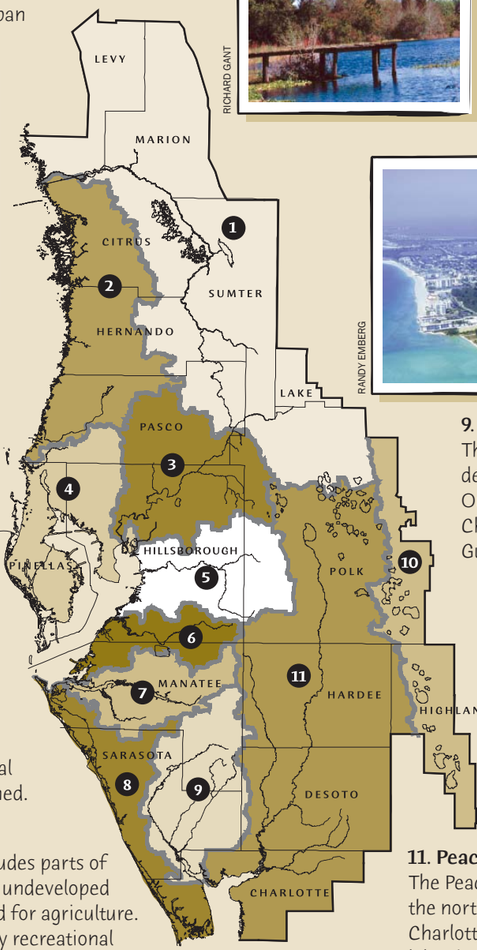
4. Tampa Bay/Anclote River Watershed

This watershed consists of several major cities, densely populated urban areas and sprawling inland suburbs. It also includes a diversity of natural systems such as Tampa Bay, which is the largest open-water estuary in the state, pristine coastal beaches, and many lakes, streams and wetlands. Within the watershed, there is a thriving business community, major industrial interests and recreational opportunities. Balancing the needs of a large and growing population while protecting water supply sources, natural systems and water quality will continue to be a major challenge for this watershed.


RANDY EMBERG

5. Alafia River Watershed

Extending over sections of Hillsborough and Polk counties, the watershed includes parts of Lakeland, Plant City, Mulberry and Brandon, as well as large areas of rural and undeveloped land and phosphate mining areas. Approximately 33 percent of the land is used for agriculture. The Alafia River, Medard Reservoir and other water bodies provide high-quality recreational activities for residents and visitors.




RICHARD GANT

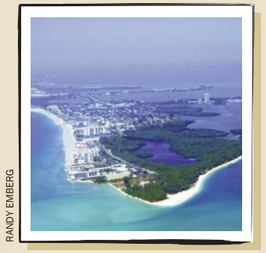
6. Little Manatee River Watershed

Beginning in eastern Manatee and southeastern Hillsborough counties, the Little Manatee River originates in a swampy area east of Fort Lonesome in southeastern Hillsborough County and flows west, eventually entering into Tampa Bay. Lake Wimauma is the watershed's only natural lake. Land is used mainly for agriculture. The communities of Sun City, Wimauma and Ruskin are the major urban areas within the watershed.

7. Manatee River Watershed

The Manatee River begins near Four Corners and flows west to empty into Tampa Bay and the Gulf of Mexico. Lake Manatee Reservoir and Bill Evers Reservoir were created to provide drinking water for residents in the area. The watershed includes the cities of Bradenton and Palmetto.


RANDY EMBERG


RANDY EMBERG

8. Southern Coastal Watershed

More than 60 miles of barrier islands and estuaries exist within this watershed. Extending along the southwestern shore of Florida, features include Sarasota Bay, Dona and Roberts bays, Lemon Bay and a portion of Gasparilla Sound. Some of Florida's most beautiful beaches and productive estuaries can be found here. The cities of Sarasota and Venice and the Town of Longboat Key are located in the watershed.


FILE PHOTO

9. Myakka River Watershed

The portion of the Myakka River located within Sarasota County has been designated a State of Florida "Wild and Scenic River" and as such is an Outstanding Florida Water. The Myakka River flows south, emptying its waters at Charlotte Harbor (the state's second largest open-water estuary) and into the Gulf of Mexico. The land in the watershed is used mainly for agriculture, recreation and conservation. The City of North Port is located within the Myakka River watershed.


MANNY LOPEZ

10. Lake Wales Ridge Watershed

This watershed contains a series of sand ridges and ancient dune fields that form the ridge, which supports a unique ecosystem of scrub plants and wildlife. Approximately 40 to 60 percent of scrub and wildlife species live nowhere else on earth. The ridge has numerous deep sinkhole lakes with extremely clear water and many citrus groves.


RICHARD GANT

11. Peace River Watershed

The Peace River watershed encompasses over 2,300 square miles. Beginning in the northern part of Polk County, the Peace River flows south, discharging through Charlotte Harbor into the Gulf of Mexico. Lake Hancock, one of the most polluted lakes in the state, is a headwater lake of the Peace River. Due to the large amount of agriculture and phosphate mining within the watershed, people rely heavily on groundwater resources.

Station 4

Protecting Our Watersheds

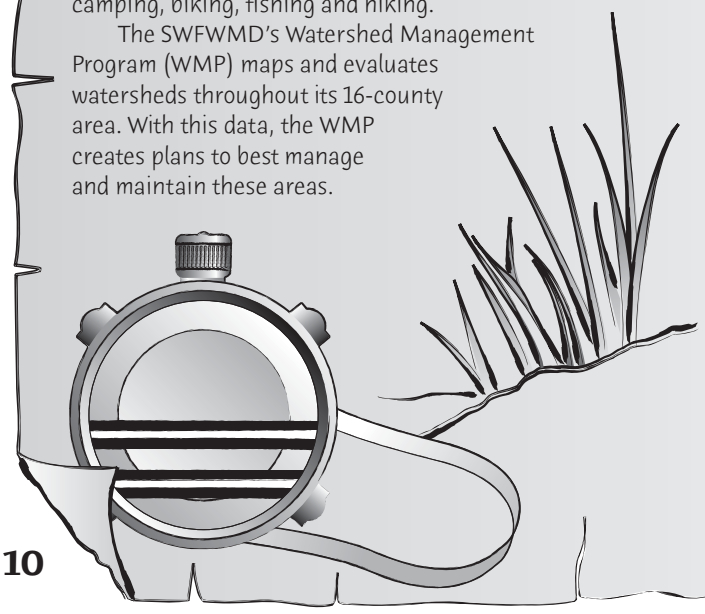
Many agencies and organizations are working hard to maintain the health of our watersheds now and protect them for the future. Concerned citizens can also get involved.

The Southwest Florida Water Management District

The Southwest Florida Water Management District (SWFWMD) is the regional agency responsible for managing water resources. Its job is to maintain a balance between the water needs of current and future water users without damaging the environment. The SWFWMD's Governing Board directs a wide range of programs, initiatives and actions. These programs include flood protection, regulatory programs, water supply planning, data collection and evaluation, water conservation, land acquisition, habitat restoration, cooperative water resources projects and education.

The SWFWMD works in these four major areas: water supply, water quality, flood protection and the protection of natural systems. Regulatory programs help prevent overuse or contamination of water supplies. Historically, water managers used structures to divert water during floods, maintain lake levels during droughts and prevent salt water from entering fresh surface water bodies. Such structures are still in operation within the SWFWMD's boundaries. Additionally, hundreds of thousands of land acres have been purchased by the SWFWMD to protect the natural systems that provide our water supply. Much of this land is available to the public for recreational activities such as camping, biking, fishing and hiking.

The SWFWMD's Watershed Management Program (WMP) maps and evaluates watersheds throughout its 16-county area. With this data, the WMP creates plans to best manage and maintain these areas.



Other Agencies and Programs

The Florida Department of Environmental Protection (FDEP) is a state agency that focuses on the protection of air quality, water quality and waste management. It is also responsible for more than 160 state parks and other recreational trails and areas for outdoor activities.

The National Estuary Program was established in 1987 to identify, restore and protect nationally significant estuaries in the United States. The program focuses not just on improving the water quality in an estuary, but on maintaining the health of the whole system. Tampa Bay, Sarasota Bay and Charlotte Harbor have been recognized as significant estuaries.

Help Protect Our Watersheds

There are many ways people can protect their watersheds:

- *Use fertilizers and pesticides sparingly*
  Extra nutrients in the water supply disrupts the natural harmony between animals and plants of an ecosystem.
- *Have septic systems inspected for leaks and capacity*
  Contamination of the water supply is harmful to plants, animals and people.
- *Conserve water*
  Overwatering can damage lawns and plants and places extra stress on our water supply.
- *Never dump anything down a storm drain*
  Storm drains are channels for rainwater to help reduce flooding. Dumped chemicals can find their way deep underground, polluting the aquifer and other water supplies we all rely on.
- *Pick up after your pets*
  Bacteria from pet waste can be carried into nearby water bodies and are harmful to fish.

Challenges Facing Our Watersheds

As the population in Florida continues to grow, it becomes even more important that we are able to live in healthy watersheds. The future of our watersheds depends on all of us working together to identify problems that may exist and being involved to help solve them. Following is a list of several challenges water managers have identified that may exist in your watershed. Water managers continue to work on plans for improving these situations. However, never forget that it is up to all of us to help contribute to the solutions and not the problems.

- An increase of nutrients from over-fertilization found in groundwater and major springs can cause problems in water quality and increase algae, making swimming and fishing less fun.
- Natural land that has been converted for urban, suburban, commercial, industrial and agricultural development can reduce habitat for wildlife.
- Past development, not subject to today's water management regulations, may have impacted water quality and caused flooding problems.
- Increased urban development is a primary source of water pollution through untreated stormwater runoff.
- The many seasonal visitors and dense population of the Tampa Bay area and the gulf coast raise issues about water quality and water conservation.
- Urbanization in coastal areas affects the large open-water estuaries that serve as a mixing area between fresh and salt water.
- Increased mining in an area can threaten wildlife habitat and impact water resources.
- Because groundwater and surface water are interconnected, pumpage from groundwater can affect lakes, wetlands, rivers and streams.
- Urban development occurring within flood zones requires proper planning to protect businesses, residents and their property from flooding.
- Increased demand for water, especially when rainfall is scarce, can cause water levels in rivers and lakes to drop so low they can cause problems for aquatic life and other species that depend on these water resources.
- Residential and industrial developments, as well as farms and orchards, can threaten existing scrub habitat.

Watershed Investigations

1. Select one of the challenges listed above and suggest ways to improve the situation.
2. Search newspapers, magazines or the Internet for articles that discuss any of the challenges facing a watershed. Write a summary of the article.

Excursion Checkpoint

Yes or No?

YES NO 1. Is it important that while meeting the water needs of users, the environment not be damaged?

YES NO 2. Does stormwater runoff improve the quality of the environment?

YES NO 3. Can poorly planned development have damaging effects on a watershed?

YES NO 4. Is the majority of the land acquired by the SWFWMD open to the public for recreational activities?

Station 5

Citizens Get Involved

Parents, teachers, students and other citizens throughout the SWFWMD are becoming actively involved in their watersheds. People volunteer their time on projects that may range from just a few neighbors cleaning a small vacant lot to thousands of people working together on a large restoration area. Because we all live in a watershed, it is important that we keep it clean and healthy. Remember — a watershed is like a neighborhood, which means it is up to all of us to be good neighbors. Make plans to get involved now!

Adopt-A-Pond Program

Have you ever wondered why there are so many ponds in our area? Ponds play a very important role in trapping and filtering pollutants caused from stormwater runoff. But over time, these ponds can become unhealthy. Restoring and maintaining stormwater ponds is essential to the health of our lakes, creeks, rivers and bays.

Next time you pass by a pond, take a closer look at it. Does it look like a healthy pond? A healthy pond contains beneficial plants that help clean the water. The pond should be clear of litter and grass clippings and be surrounded by a fertilizer-free zone. A healthy pond usually shows that neighbors really care about their community. The quality of wildlife habitat depends on a healthy pond environment.

FILE PHOTO

Adopt-A-Pond is a neighborhood program that is dedicated to better pond environments and cleaner water.

The program is active in Hillsborough and Pasco counties. Neighborhood citizens can participate in a wide variety of activities that include pond walks with a biologist, seminars, publishing a newsletter, neighborhood education meetings, water testing and pond planting. By understanding stormwater pond management and the use of beneficial plants, citizens can help improve our surface water quality.

If you are interested in finding out more about this program, please contact the Southwest Florida Water Management District at 1-800-423-1476, ext. 4757.

Having Fun in Their Watershed

Middle school students participating in the Starkey Environmental Education Center's Wetland Ambassadors program learn about their local watershed and the water resources within it. Students study plants and animals found in their watershed, water quality and human impacts to the groundwater supply by following the peaceful waters of the Pithlachascotee River to the clear, warm waters of the Gulf of Mexico. But students aren't the only ones learning. Prior to taking their classes out to the Center, teachers receive watershed education training and classroom resource materials with pre- and post-field trip activities.

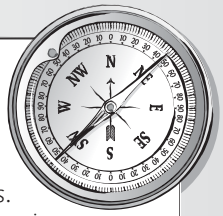
SUSAN AWBREY

Planet Bloomingdale

Since 1987, Planet Bloomingdale has been an exciting environmental education program at Bloomingdale High School. The area around the school includes 13 acres of wetlands with half a mile of trails, open-air classrooms and an environmental center. Planet Bloomingdale's overall goal is to have students not only become more aware of the environment but also become supporters of Florida's environmental protection, conservation and restoration efforts. Students learn the importance of water quality to Tampa Bay's estuaries. By raising seagrasses and red mangrove trees from seeds they gather themselves, students contribute to the health of their watershed. More than 15 organizations have contributed funds or services to this unique environmental project. Students who participate in the project are given opportunities to share their knowledge about the environment with the community, especially elementary schools.

RANDY EMBERG

Watershed Investigations



1. Think about a project that your class could do to help the environment. Describe the plan to your classmates. Also determine a way to know whether or not the project is successful.
2. Search newspapers, magazines or the Internet for examples of environmental projects that are taking place now. Describe one of these projects and explain the positive effect it may have on the watershed.

Excursion Checkpoint

Be a Good Neighbor

Take the following quiz to find out if you are a good neighbor in your watershed.

1. It is up to all the neighbors in the watershed to keep it _____.
   a. salty b. healthy
   c. polluted
2. Schools can provide many opportunities to learn about your _____.
   a. environment b. watershed
   c. both a and b
3. The health and quality of your watershed depends on _____ for its future.
   a. everyone b. no one
   c. alligators

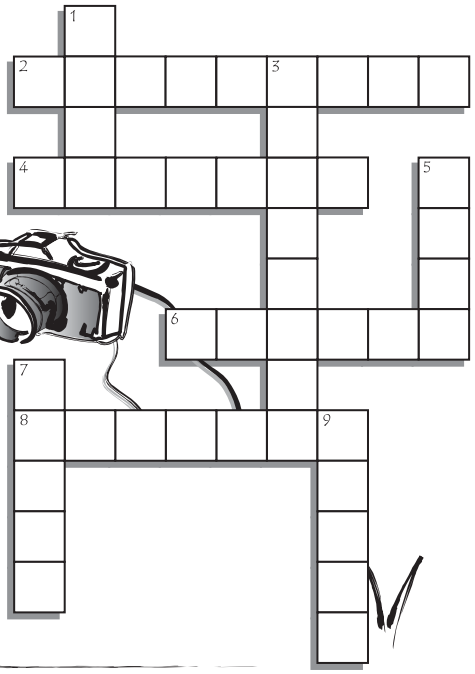
Crossword

Across

2. A _____ can be either a closed or an open system.
4. A _____ is a natural reservoir system that stores water and lessens the risk of flooding.
6. Water found beneath the surface of the earth is called _____water.
8. An _____ is a spongelike underground layer of rocks that can hold and release water.

Down

1. A large, deep body of standing water is called a _____ .
3. A _____ is an underground space caused when bedrock erodes and dissolves from acidic water.
5. A _____ is a small shallow body of standing water.
7. A land surface produced by dissolving bedrock is called _____ terrain.
9. A _____ is water that is on the move.



Unscramble

Unscramble the Letters to Form Real Words

DONP

LUTLPOONI

STARK

RYSTEAU

DESHRAWTE

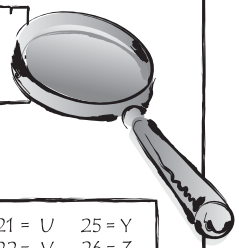
Word Search

WETLANDS
POLLUTION
AQUIFER
CAVE
WATER
RUNOFF

WATERSHED
KARST
SINKHOLE
ESTUARY
POND
RIVER

K	S	P	W	A	T	E	R	S	H	E	D	Q	A	P
T	A	Z	I	O	R	E	R	E	R	C	I	U	O	W
C	B	R	N	D	F	V	J	E	E	M	F	L	R	A
A	G	J	H	I	A	G	A	V	T	L	L	E	T	S
V	H	M	U	E	X	M	T	S	R	A	K	H	F	R
E	S	Q	B	S	I	N	K	I	E	M	W	S	M	O
W	A	N	R	W	E	T	V	N	R	E	S	T	X	Y
E	T	T	W	N	L	A	O	K	N	U	A	R	L	R
L	Q	U	V	E	D	I	C	H	B	Y	O	M	B	A
A	R	I	V	N	T	S	A	O	R	I	B	E	W	U
P	T	X	D	U	S	L	Q	L	Y	E	C	C	X	T
D	K	E	L	C	J	D	A	E	R	X	V	L	R	S
N	P	L	W	H	K	K	A	N	Z	F	W	I	Q	E
O	O	R	T	E	A	R	H	Y	D	R	D	S	R	M
P	G	O	R	U	N	O	F	F	Y	S	W	A	T	E

Hidden Message



Break the Code and Learn an Important Message

1 = A	5 = E	9 = I	13 = M	17 = Q	21 = U	25 = Y
2 = B	6 = F	10 = J	14 = N	18 = R	22 = V	26 = Z
3 = C	7 = G	11 = K	15 = O	19 = S	23 = W	
4 = D	8 = H	12 = L	16 = P	20 = T	24 = X	

20 8 5 6 21 20 21 18 5 15 6 25 15 21 18 23 1 20 5 18 19 8 5 4

4 5 16 5 14 4 19 15 14 25 15 21 .

Vocabulary

Aquifer: a spongelike underground layer of rocks that can hold and release water

Estuary: a body of water where fresh water mixes with salt water

Groundwater: water beneath the earth's surface

Hydrologic cycle: the endless cycle of water moving through the environment

Karst terrain: land surface that is produced by dissolving bedrock

Nonpoint-source pollution: type of pollution that is difficult to trace to an exact source

Percolation: downward movement of water through the ground

Point-source pollution: type of pollution that can be traced to a particular point

Pollution: any change in water that causes it to become unclean or impure

Sinkhole: a collapsed underground space caused when bedrock erodes and dissolves from acidic water

Spring: a place where groundwater that is under pressure discharges through a natural opening in the earth's surface

Surface water: water that stays on top of the earth's surface

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

Wetland: an area of land that is wet at least part of the year

Web Sites

You can surf the Internet to learn even more about watersheds. Below is a list of interesting web sites that give information about water resources, present educational activities that focus on water and provide links to other web sites.

Southwest Florida Water Management District
WaterMatters.org

Surf Your Watershed
cfpub.epa.gov/surf/locate/map2.cfm

Water Environment Federation
wef.org/AboutWater/ForStudents/WastewaterTimeline

Give Water a Hand
uwex.edu/erc/gwah

Tampa Bay Estuary Program
tbep.org

Tampa Bay Beach Buddies
marine.usf.edu/beachbuddies

Create a Watershed Excursion Sign!

Now that you have completed your excursion through the watersheds, use your knowledge to design a watershed sign.

Directions:

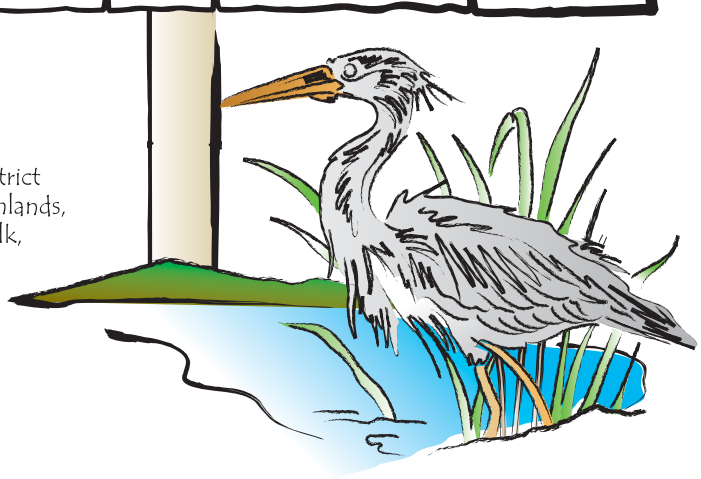
Write an important message on the sign to the right that would help others understand the importance of keeping your watershed clean and healthy. You may also want to include a drawing and color it. Pretend that the sign could be displayed somewhere in your watershed for everyone to see. Don't forget to be creative!

Rules:

- The entry must be submitted on this page or a copy of it. The entire message and design must be on the sign.
- Remember to keep a copy of your entry. Only one entry per student will be accepted. This activity is open to students in grades 4-7 in the following counties within the District boundaries: Charlotte, Citrus, DeSoto, Hardee, Hernando, Highlands, Hillsborough, Lake, Levy, Manatee, Marion, Pasco, Pinellas, Polk, Sarasota and Sumter.

Prizes:

Prizes will be awarded to entries based on creativity and an understanding and respect for your watershed.



ENTRY FORM

Student's name: _____

Title of entry: _____

Home address: _____

City: _____ ZIP code: _____

County: _____

School name: _____ Grade level: _____

Please return your entry and this form to:

Create a Watershed Excursion Sign!
Communications Dept., Youth Ed. Section
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

Southwest Florida Water Management District
WATERMATTERS.ORG • 1-800-423-1476

SWFWMD SPLASH! Water Resources Education