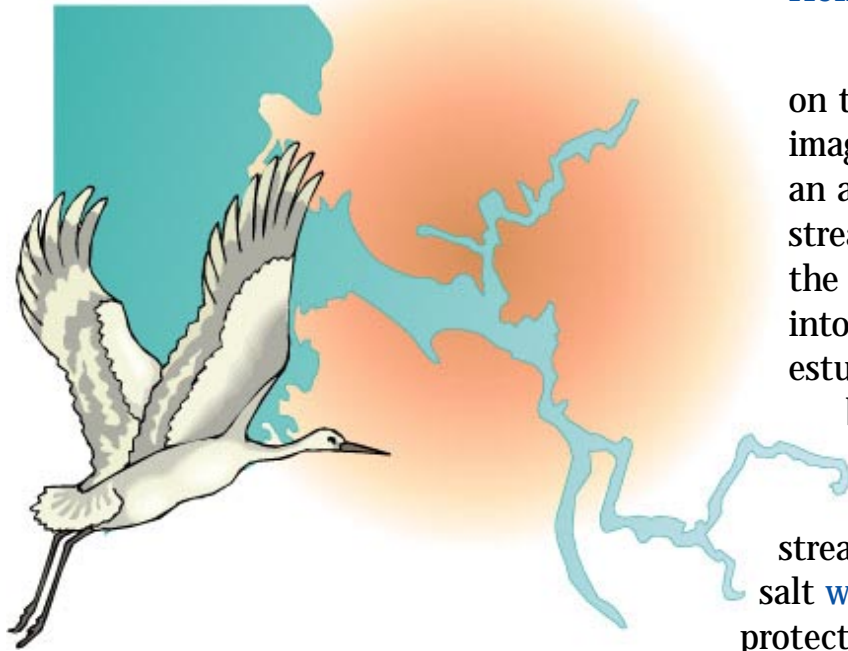


WATERDROPS

Estuaries Issue

A Southwest Florida Water Management District Water Resources Newsletter



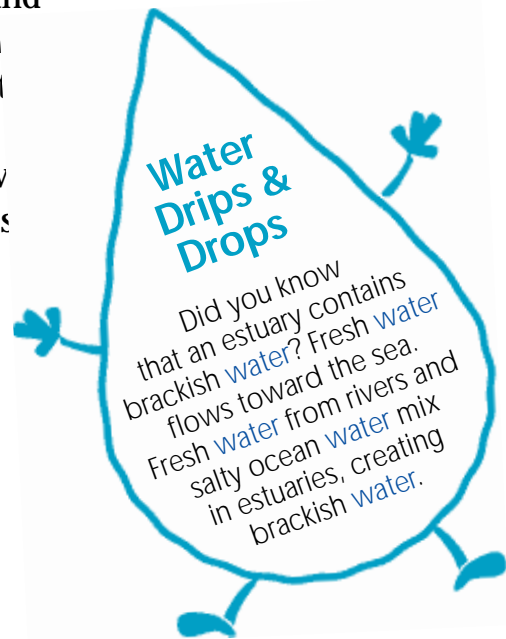
Hello Readers!

This issue of **WaterDrops** is on the subject of estuaries. Try to imagine you are looking down from an airplane and see rivers and streams as they flow to the sea. At the point where a river opens up into the salty **waters** of a bay, an estuary is formed. An *estuary* is a body of **water** partly surrounded by land where fresh **water** from rivers and streams runs into and mixes with salt **water** from the ocean. Estuaries protect **water** quality by filtering out

dirt and pollution. Because an estuary is part fresh and part salty, the sheltered **waters** of an estuary are home to a variety of plants, trees, birds, fish, mammals and other wildlife.

To help you learn more about estuaries, we have included a feature story, articles, activities and games. When you finish this issue, we hope that you will understand the importance of estuaries and their need for protection. In other issues of **WaterDrops**, you can learn more about how important **water** is to us. Don't forget to send in the activity on the back page for a free "Protect Our Estuary" sticker.

Happy Splashing!



Water Drips & Drops

Did you know that an estuary contains brackish **water**? Fresh **water** flows toward the sea. Fresh **water** from rivers and salty ocean **water** mix in estuaries, creating brackish **water**.

- Water Drips & Drops
- Feature Story
- Take It Home
- Water Cycle Wanda
- Water in Our World
- Games & Puzzles
- What's Wet on the Web!



WaterDrops is written and developed by Susan Awbrey and illustrated by Pati Twardosky. Published by the Southwest Florida Water Management District as a part of the Splash! program.

Feature Story

A PADDLING ADVENTURE



On the first ring of the alarm, Kelly jumped out of bed. I don't think I've ever been up this early, she thought to herself as she hurried to get ready for the big day. Kelly's older brother, Raymond, who works at a nature center on the seacoast, promised to take her on a paddling trip if she got a good report card. To his surprise, she received all A's and B's! Kelly's reward was to spend the day canoeing with him through the estuary at the nature center.

In less than an hour, Raymond and Kelly arrived at the nature center and collected their gear. Then they walked down the winding path, which was still covered with early morning dew.

"I hope you remembered to bring your camera, Kelly," said Raymond. "There will be a lot of sights you won't want to forget."

"I sure did," said Kelly. "I want to make an album and take it to school."

Soon they arrived at the beautiful estuary where the fresh **water** from the land met and mixed with the salty **water** from the sea. Raymond helped Kelly into the canoe and gave her one of the paddles. The sun glistened on the **water** as they gently paddled through the black needlerush and cord grass of the salt**water** marsh. "These grasses help keep the soil anchored when the tides move in and out," said Raymond.



"Oh, look over there," said Raymond as he pointed at a brown pelican and a roseate spoonbill. "They're nesting among those mangroves."

Kelly aimed her camera, took a picture and then asked, "What are mangroves?"

"They are very unusual trees that grow well in salty **water**," said Raymond. "They can actually separate and take in fresh **water** from the salt **water**. It's pretty cool!" Then he added, "People call them walking trees because the roots sticking out above the surface of the **water** make them look

like they are standing or walking." Another "click" sound could be heard from Kelly's camera.

"There's a saltmarsh snake on that branch," said Raymond as they drifted toward the bank. Raymond explained to Kelly that Florida has more species of snakes than any other state, but that only one species can survive well in salty **water**. It is the saltmarsh snake. The camera made another "click."



“What else lives in an estuary?” asked Kelly.

“Oh, there are all kinds of things beneath the surface,” responded Raymond. “Estuaries are important nursery areas for a variety of fish, shrimp, crabs and shellfish, which provide food for bigger fish and animals.”

They observed several herons, egrets and other wading birds as Raymond and Kelly paddled and “clicked” their way along the coast.

“What’s that big shadow floating near the surface?” asked Kelly.

“It could be a Florida manatee,” said Raymond. Within a few moments, the manatee approached them. “There are only about 3,276 of these gentle marine mammals left in Florida,” said Raymond. “They are often called sea cows because they eat grasses and other plants in the brackish, shallow waters.”

“What is brackish water?” asked Kelly as she took another picture.

“It’s water that is a mixture of fresh water and salty water, like the water in an estuary. Everything that lives here must be able to survive in this unusual kind of environment.”

Just then Raymond looked at his watch. “We better head back to the nature center now. We can have our picnic lunch there.”

“OK, Raymond,” said Kelly. “Thanks for the trip. Maybe we can do this again sometime?”

“If you can keep your grades up, I will bring you back here at the end of next semester,” said Raymond.

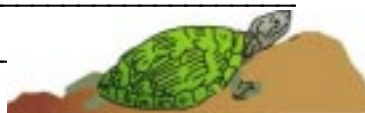
“That’s a deal,” said Kelly. “I plan to study extra hard!”



Kelly took several pictures on her canoeing adventure. Describe two of them. Be sure to give each picture a title.

Picture 1

Picture 2



Take It Home

MAKING WATER EVAPORATE

Evaporation happens when **water** turns into vapor in the air. In an estuary, **water** evaporates into the air and moves through a cycle that finally returns in the form of moisture from the clouds. During this process, what do you think happens to the salt that is in the salty **water**? To find out, try this easy experiment

Materials:

- 2 cake pans
- 2 sheets colored construction paper
- 1 cup **water**
- 1 cup **water** with 1 tablespoon salt
- pencil
- labels

Directions:

1. Cut the pieces of construction paper to fit in the pan
2. Lay one piece of construction paper in each pan.
3. Pour 1 cup of **water** in the first pan and label the pan “plain **water**.”
4. Pour 1 cup of the salty **water** in the second pan and label the pan “salty **water**.”
5. Place both pans near a sunny window.
6. Answer the questions below.
 1. How many days did it take for the **water** to evaporate?
 2. Where did the **water** go?
 3. What was left in the pan that contained plain **water**?
 4. What was left in the pan that contained salt **water**?
 5. Does salt evaporate? Why or why not?
 6. Did the fresh **water** and salt **water** evaporate at the same rate?



Ask Water Cycle Wanda

Carlos asks: I know that there are a lot of estuaries in Florida. Which one is the largest?

Water Cycle Wanda: Tampa Bay is the largest open-**water** estuary in the state. The estuary covers almost 400 square miles. The depth of the **water** within the estuary is approximately 12 feet. The major rivers that empty into the estuary are the Alafia, Hillsborough, Manatee and Little Manatee rivers.

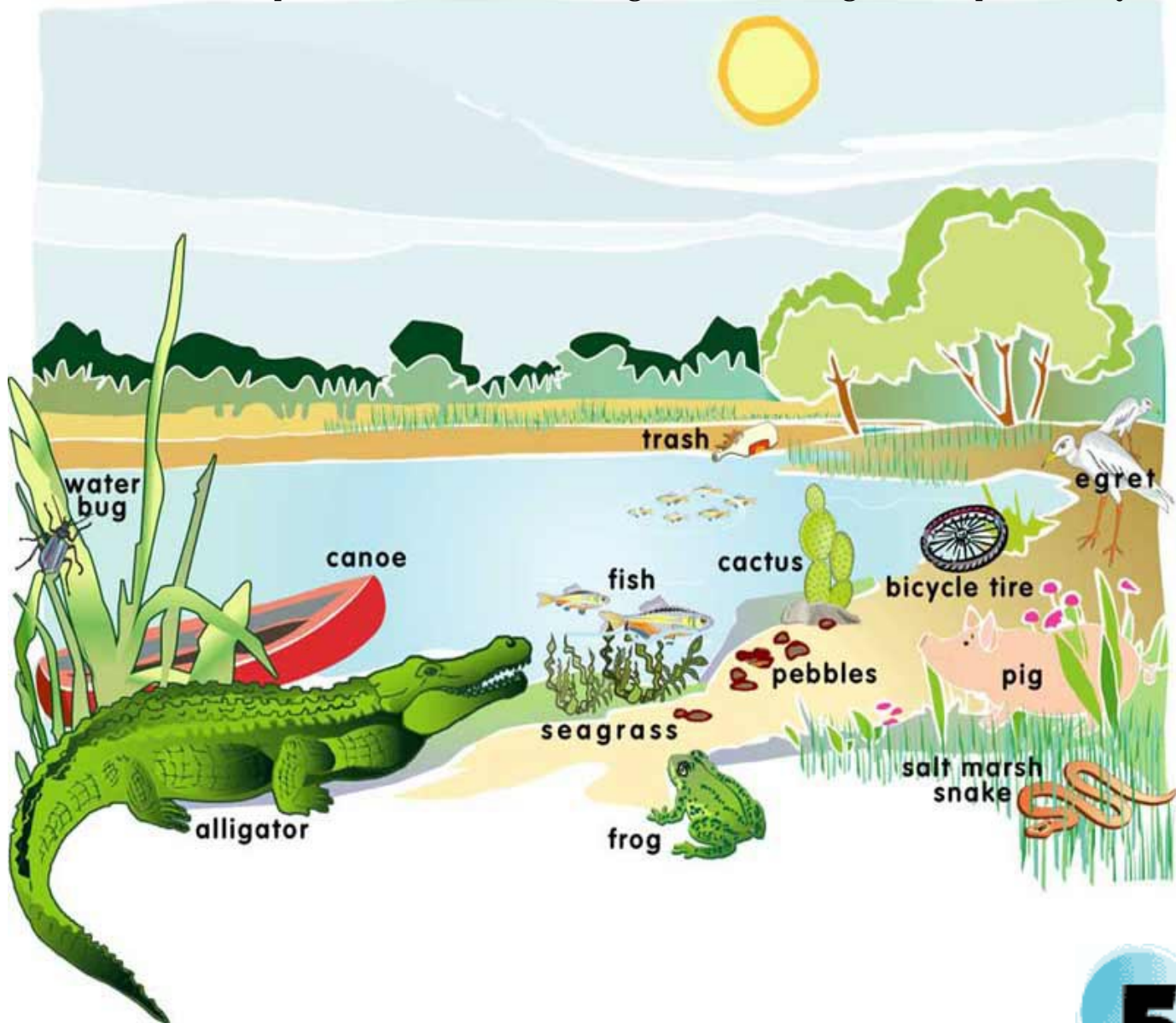
Water in Our World

ESTUARY ENVIRONMENT

What Doesn't Belong Here?

Florida estuaries provide homes for a variety of living and nonliving things. The mixture of salty **water** and fresh **water** create a special environment for everything that belongs here.

Let's see if you can decide which things do NOT belong in an estuary. Study the pictures below and draw an X over each thing that should not be in an estuary. When you finish, the unmarked pictures will show the things that do belong in this special ecosystem.



Water in Our World



TROPICAL WALKING TREES

If you have visited Florida's central and southern coastal banks, then you may have been lucky enough to see a mangrove swamp. Mangroves are very unusual trees, and some of them even have tangles of roots

appearing above the surface of the **water**. This type of mangrove, known as the red mangrove, often looks like it's "walking" on the **water**, which is why they have the nickname "walking trees." Mangroves trap materials brought in by the tides and help prevent coastal erosion. Mangroves can survive in their salty **water** environment because they are able to screen out the salt as they breathe in oxygen from the **water**. Mangrove trees need warm weather and warm **water** to stay healthy. In addition to the red mangrove, Florida is also home to two other species of mangroves: white and black. A variety of birds use the mangroves for roosting and nesting. Many other forms of wildlife may also be found near mangroves.

Fill-in-the-blank

Complete each sentence by writing the correct word.

A popular name for the red mangrove tree is a _____.

The red, white and black mangrove trees are the three _____ of mangroves that exist in our state.

Mangrove trees are able to remove the _____ as they breathe in oxygen from the **water**.



WORD SEARCH

Can you find these words?

Word Bank

estuary ✓
 pollutant
 manatee
 mangrove
 brackish
 species
 nursery
 wildlife
 salty
 fresh



WATER WORDS

Unscramble the following groups of letters to form words related to **water**. Then make up a **water** sentence using each of the words.

ishbcrak _____

lasty _____

syeaurt _____

sherf _____

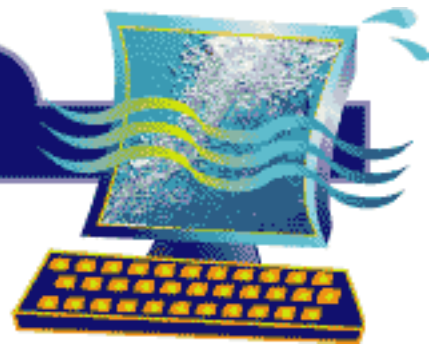
osioner _____

evgroman _____

Answers to **WaterDrops** activities are printed in the Teacher's Guide. View the Teacher's Guide and other **WaterDrops** issues at the Information & Education section on the World Wide Web at: WaterMatters.org, or request a copy by calling 1-800-423-1476, ext. 4757 (Florida only).



What's Wet on the Web!



Are you ready to learn more about estuaries and our environment? Take one of the virtual tours that are presented at the Information & Education section on the Web at: **WaterMatters.org**. After you complete each tour, list several facts you learned about estuaries.



ESTUARY PLEDGE

I promise to do my best to help keep southwest Florida's estuaries clean and healthy. I also promise to tell others about how important estuaries are to our natural environment. I will do my best to be an environmental citizen.



Signed _____

Mail a copy of your pledge to us and we will send you a free "Protect Our Estuary" sticker!

Name _____

Address _____

City _____ State _____ ZIP _____

Phone _____ County _____

School _____ Teacher _____ Grade _____

Send to: **WaterDrops Estuary Pledge**
In-School Education
Communications Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

