



RIVER KIDZ

MARTY

RIVER KIDZ PRESENT  
MILLY, MARTY and MANNY

JULIA KELLY  
©

5TH EDITION WORKBOOK

This Fifth Edition is dedicated to...  
**Mark D. Perry**, Executive Director,  
Florida Oceanographic Society



You are a true River Warrior and our favorite water hero! Thank you for working so tirelessly for our St. Lucie River and the Everglades.  
Love, The River Kidz



**naia & evie**

We are Evie Flaugh and Naia Mader, and we are the founders of the River Kidz! Our journey began in 2011 with just one lemonade stand raising money for the Rivers Coalition. Soon after that day, our nonprofit organization "River Kidz" was created. We are so proud of what River Kidz has accomplished and how much it's grown.

Thanks to all the committed members who have devoted their time and efforts, we have managed to create positive change in our community. We hope that we have inspired our future generations to continue the fight for clean water. This 5th edition workbook is here to show you how important it is to send the water south as nature intended.

We are now college students at Rollins College (Evie) and University of California Berkeley (Naia) and are excited to expand our knowledge of ways we can help our planet and especially our waterways. Every time we visit home we reflect on what change River Kidz has created in our community and it inspires us to keep fighting for the river. Over the years we've learned that one should never give up on their goals and that kids should always have a voice.

The change starts with you. Get out and raise awareness and stop the discharges! Save our Rivers!

With love, Naia and Evie



Dear Mrs. Gaylord,  
We would like to thank you so much for all your support over the years! Without your approval, we would have never gotten our workbooks integrated into the Martin County school system. We are forever grateful.

Love, The River Kidz



My name is Jack and I'm a River Kid. I moved to Florida when I was four. My mom grew up here. I love to swim, surf, and be outside. When my mom and I heard about the new group The River Kidz, I was the very first person to sign up! I knew the river was dirty because my grandparents live on the St. Lucie River. I thought if I could help clean it up, I should.

I have now been a River Kid for 10 years. I have learned so much about our river and the politics that keep it from

getting cleaned up. I have been to many river rallies screaming, "Save Our River" at the top of my lungs. I have made signs and t-shirts to spread the word around town. I have travelled to Washington D.C. and spoken in front of Congress with several other kids. None of these opportunities would have been possible without the River Kidz. Kids shouldn't have to fight for clean water, but showing the adults that kids care makes a difference. Get involved now.

Jack Benson-Maldonado

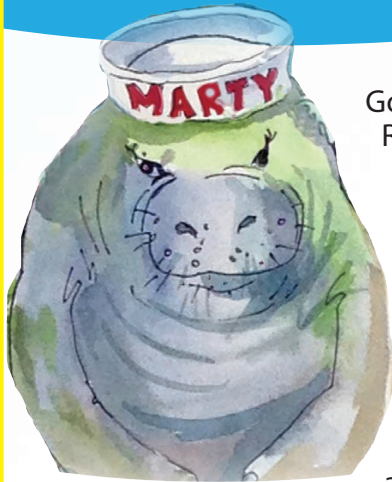
LAKE OKEECHOBEE

# River Kidz' Mission Statement

Our mission is to speak out, get involved, and raise awareness because we believe kids should have a voice in the future of our rivers.



# welcome!



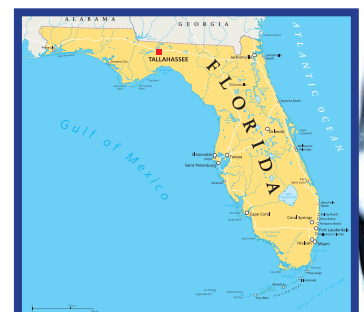
Good watery day fellow River Kidz! My name is Marty the Manatee. I am a marine mammal who lives in the St. Lucie River and the Indian River Lagoon. I have two other manatee friends who are joining me in this book today. Their names are Milly and Manny. Milly is a manatee that calls the Caloosahatchee River home.

The Caloosahatchee River is on the west side of Florida and connects to the Gulf of Mexico. My other friend is Manny and he calls Florida Bay home. Florida Bay is in the southern end of Florida just south of Miami and north of the Florida Keys. Both of these friends have problems with their home waters and we all need your help to fix them. These problems are caused by freshwater, either too much freshwater or not enough freshwater. With all this water you would never imagine water to be such an issue. It sure is, though! My manatee friends live in a unique area of Florida, but together we all live in the Everglades Eco-System. The Everglades starts at the head waters of Shingle Creek in Central Florida and goes south to Florida Bay. We are here to teach you about our watery homes and we hope you will use your powerful voice and capable hands

to make a difference in keeping our waterways clean. When I was a little manatee, I swam with my mom through the clear waters of the Indian River Lagoon. We would swim on sunny days just munching on seagrass and enjoying the critters that call it home also. Those days are hard to find now. The seagrass is missing in most of my favorite spots and the water is often murky, or even covered with gross green algae. I miss those good days and want to see them again. I have a great bunch of friends all over the state who are supporting clean water and we hope you will join us too!

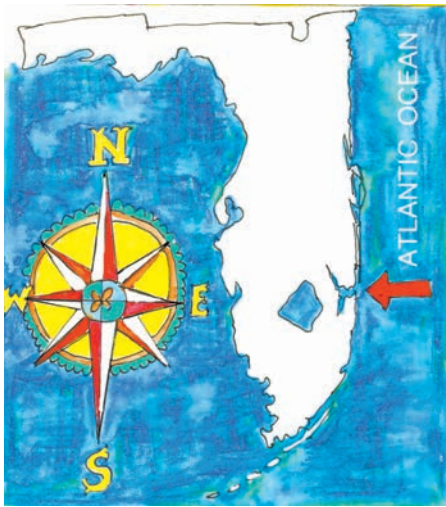
Who are my friends, you may ask... The River Kidz! The River Kidz speak out and raise awareness about the state's waterways. They believe kids have a voice and they should use that voice to speak up for the water they love to enjoy. The River Kidz started with a lemonade stand and from there it has grown. They have gathered together to do projects in the community. The kids have gone to Tallahassee, Florida (our state capital) and Washington D.C. (our nation's capital) and some of them were even able to meet our president. They have created art, presented at conferences, and held rallies full of adults who appreciate the River Kidz' voice and message. We came together to create this book so you could learn about the issues facing us in Florida and join with your voice, too. The more friends we have with an educated voice the louder we will become.

Inside this book you will learn about the Indian River Lagoon and St. Lucie River. We will explore Florida Bay and the Caloosahatchee River. You will learn about the Florida eco-system, unique weather patterns and the intricate food chain. When you are completed with the workbook, you will be able to teach your friends and family about protecting our precious home.



A peninsula is land that has water on three sides of it.

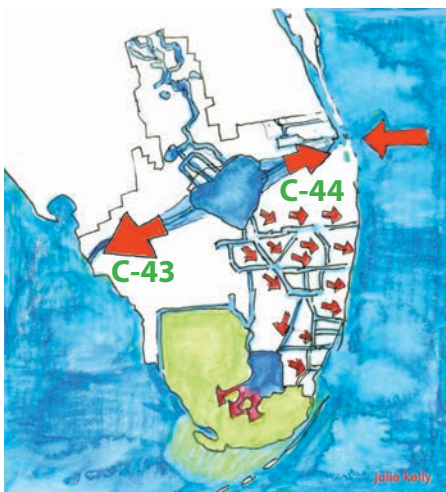
# history



Where I am



Historic flow



Current flow

As you can see, Central and South Florida looked very different than today. For instance, the Kissimmee River that originated in the swamplands of Orlando's Shingle Creek at the heart of Disney World, once winded south through floodplains for 134 miles, emptying into Lake Okeechobee. The lake, in turn, would fill up 21 feet before its waters tipped over the southern rim into a 32,000 square mile custard apple swamp located along the southern edge of Lake Okeechobee. Then, ever so slowly, this water would flow for months through miles of sawgrass, sloughs, and tree islands, being purified until reaching Florida Bay. This area is very important and is known as the Everglades system.

Although draining the land seemed helpful at first, people went too far. This over drainage is now causing problems with the health of the state's waterways, water supply for people, and destroying wildlife habitat for the animals.

Here to talk more about this are some of our animal friends, Marty, Milly, Manny, Cathy, and Kit. Each animal will tell you the story of water and their home, hoping you can help by becoming a River Kidz member. River Kidz' mission is **"to speak out, get involved and raise awareness because we believe kids should have a voice in the future of our rivers."**



### Channelized Kissimmee River:

- Controlled flooding well
- Drained 60% of wetlands
- Disturbed hydrologic cycle
- Lowered plant diversity
- Lowered fish and waterfowl diversity



# new friends



**Marty the Manatee**

Hi again it's me Marty the Manatee again. Remember when the dark, clear waters of the St. Lucie River were fresh and the river was filled with grasses? When my Great Grand-manatee lived in 1892, the local pioneers wanted to make the St. Lucie Inlet permanent, so they opened it with shovels. The salt water poured in, killing the fresh water grasses. As the fresh and salt waters mixed, it created the most bio-diverse estuary in North America. My family could still live in the river as we can be in both fresh and salt water. Our river became the fishing grounds of presidents because fish like tarpon thrived there, but in 1923 the Army Corp of Engineers dug a canal from Lake Okeechobee to the St Lucie River to create the Okeechobee Waterway, allowing boats to cross the state and to drain Lake Okeechobee through the St. Lucie. Immediately mud poured in and killed many of the fish. The county commission asked the Army Corp to stop the releases, but the federal government refused. In the 1950s and 60s, after a big flood in 1947, the state and federal government connected three more canals to the river to drain northern lands for orange groves and development as part of the Central and Southern Project. These canals known as C-23, C-24 and C-25 pollute our river too. In recent years, the river was very sick and filled with toxic algae.



**Milly**

**Marty**

**Manny**

# new friends

Now, I want to introduce you to my manatee friends, Milly and Manny, who are in the same boat. Milly is from the Caloosahatchee, on the west side of the state. Her river also had toxic algae blooms coming in from Lake Okeechobee. You see, as the lake dumps into the brackish rivers, the water becomes more fresh. In fresh water, also salt, rarely the algae blooms. The Caloosahatchee is a lot like the St. Lucie but much larger. It was one of the very first rivers dredged in the late 1800s in order to lower the lake for agriculture and development. Like the St. Lucie, the Caloosahatchee was not originally connected to Lake Okeechobee. What is different about the Caloosahatchee is that in times of drought it needs some fresh water so the **salinity** doesn't get too high, which means too salty. When the salinity rises the seagrass dies and there's no food for manatees to eat and nowhere for fish to hide. When it is dry and not raining, farmers in the Caloosahatchee are fighting over water. Then authorities need to make some decisions. The South Florida Water Management District (SFWMD) is a board of educated members of the community that gets to decide where the water goes. There's also the problem of **red tide** in this region, where large concentrations of toxic red dinoflagellate upwell from the sea floor and bloom, harming marine animals and humans. A dinoflagellate is a single-celled organism with two flagella, occurring in large numbers in marine plankton and also found in fresh water. Some produce toxins that can accumulate in shellfish, resulting in poisoning other organisms when eaten.



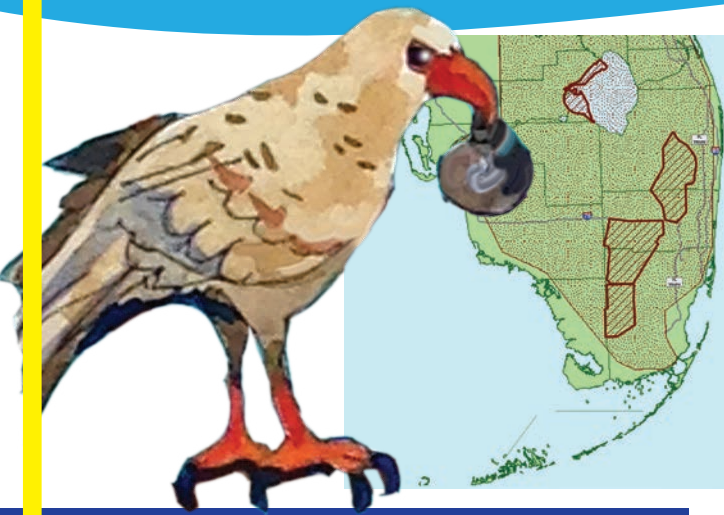
**Milly the Manatee**

**Manny the Manatee**



Manny is our other friend and he is from Florida Bay. Florida Bay is a giant estuary where the Everglades, a river of grass, meets the Gulf of Mexico and the Atlantic Ocean. This famous, gigantic estuary used to get most of its fresh water from Shark and Taylor Sloughs, giant rivers that merged with the sawgrass area south of Lake Okeechobee. Because of all the changes upstream, Florida Bay gets less than half the freshwater compared to pre-drainage times. As you can see on a map, people have also moved into the Everglades along Florida's southeast coast and built right into what was once the Everglades. Florida Bay is home to tremendous fisheries that begin their lives hiding in the seagrasses. When the salinity is too high, like it has been for many years, seagrass beds die and the fish have no place to grow up. Until more water flows south from Lake Okeechobee and the sloughs are restored, Florida Bay will suffer seagrass die offs where tens of thousands of acres of seagrass is reported to have died. Seems kind of weird, doesn't it? The St. Lucie is sick because it gets too much water, the Caloosahatchee gets either too much or not enough, and Florida Bay is starving for more fresh water.

# new friends



**Kit**  
The Snail Kite



Good day, my fellow students! My name is **Kit** the **Snail Kite**. I, too, am an endangered species like my little friend Cathy, the Cape Sable Seaside Sparrow. My home, the wetlands, has been drained for agriculture and urban development. Only one-fifth of my ancestors' original home remains. The present day system of canals, levees, and water-control structures has disrupted the volume, timing, direction, and velocity of freshwater flow. The natural sheet-flow pattern, under which the Everglades evolved over the last 5,000 years, no longer exists. Because my diet is composed almost entirely of apple snails who live in this habitat too, my life depends entirely on hydrology as I capture the snails with my sharp talons in the shallow waters.

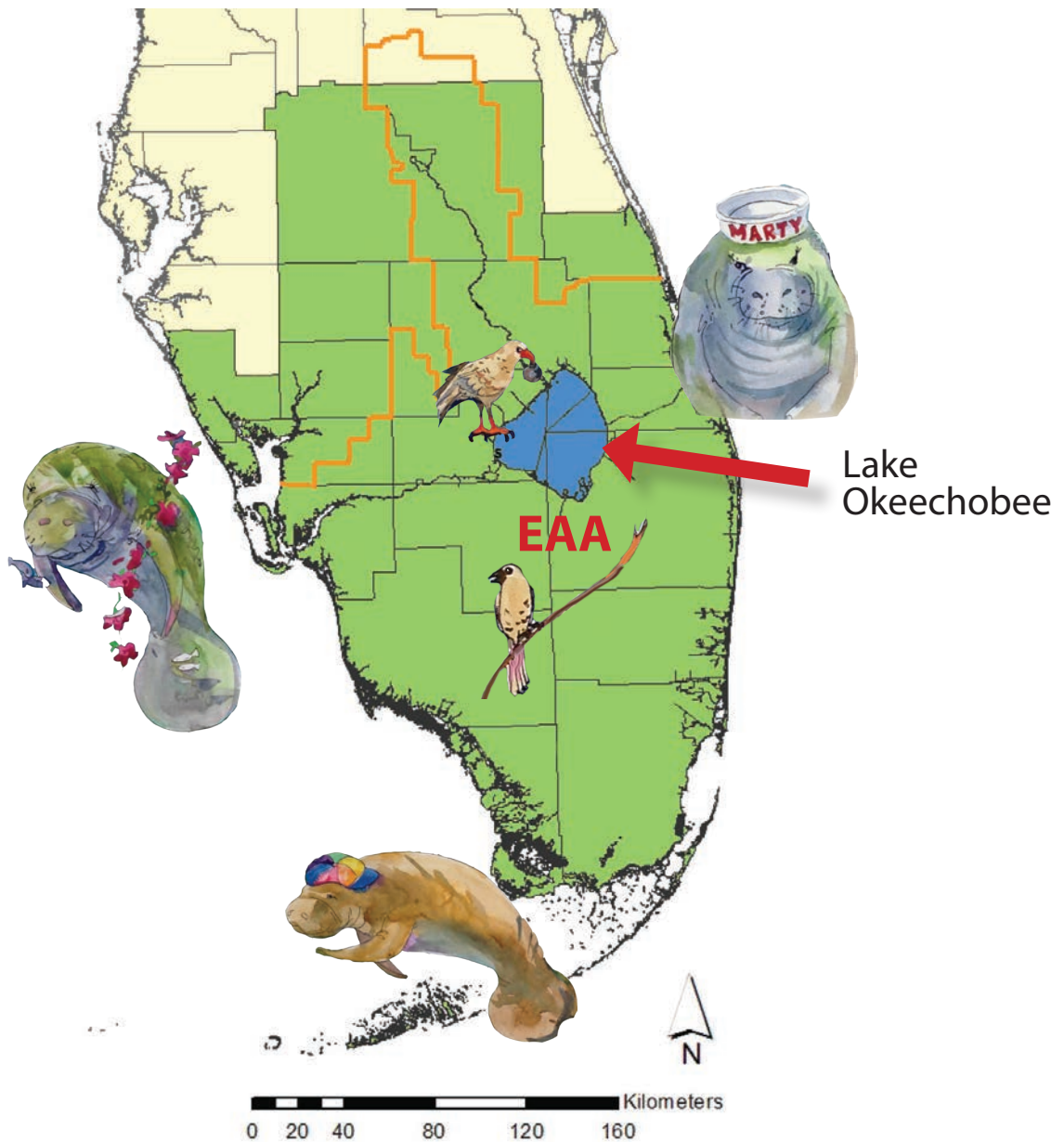


**Catherine**  
The Cape Sable Seaside Sparrow

Hi, my name is **Catherine**, the **Cape Sable Seaside Sparrow** and I am named for the southernmost point of land in the continental United States at the very tip of Southwest Florida. My real name is *Ammodramus Maritimus Mirabilis* but that's way too hard to say, so just call me Cathy! My Great-Great Grandsparrrows used to live in Cape Sable, a land of fresh and brackish water marsh habitats, but changes in water distribution due to repeated attempts to drain South Florida, water management practices since 1930, and two big hurricanes caused a shift in flora and fauna so we have to live mostly further north now. Most of my homeland was destroyed and have changed so much my friends and I are considered "endangered species." Sometimes we get blamed for not allowing water to move south because we have to build our homes in lands further north and east. People forget that they changed my ancestors' house in the first place! We would love to have our Cape Sable back, but now we can't live there. We do the best we can.



# Marty & friends



Lake Okeechobee was a secret and unknown place except to the native peoples until about in the late 1800's when pioneers began to move to the area south of Lake Okeechobee to start farming in year-round sunshine. Problems arose for farmers growing crops in the fertile lake watershed just south of the lake. In 1928 a strong hurricane killed many migrant workers and farmers, so the residents of the state asked Congress to help them control this natural but dangerous situation. A reinforced dike was built around the lake by the **Army Corp of Engineers (ACOE)** to help keep the lake from overflowing. Over the years, the area below the lake became known as the **Everglades Agricultural Area (EAA)** and expanded to 700,000 square miles. This was good for the farmers growing sugarcane and other crops, but no longer could the "water move south" and part of my homeland was destroyed.

# Florida's Past in-depth

Almost 100 years ago, South Florida looked very different than it does today. Lake Okeechobee did not have a dike around it, nor was the Caloosahatchee River or the St. Lucie River connected to the lake. The Kissimmee River in the north flowed in a winding path to Lake Okeechobee, and overflowed into the great custard apple forest and sawgrass prairie that extended to Florida Bay. This became known as "The Everglades," and the flow south from the lake, the "River of Grass".

People began to move to Florida and wanted to settle in the Everglades and start farming in the year-round sunshine and very good soils. Most years, Lake Okeechobee overflowed. This posed a problem for people living and farming near the fertile lake watershed who had turned much of the custard apple forest and the sawgrass prairies into farmlands. In 1928, a very strong hurricane killed thousands of people and destroyed farmland. It was devastating; they were living in a dangerous place. Residents and the state of Florida asked Congress to help them control this situation. A reinforced dike was built around the lake by the Army Corps of Engineers (ACOE) to stop the lake from overflowing and flooding the area where people were living and growing crops.

This dike is still there today but is even stronger. It is named after a past president, Herbert Hoover. After the dike was built, citizens and the government began draining even more of the Everglades area for farming and development. A few Florida cities are actually located in the Everglades.



Image: Todd Thurlow

Over the years, many canals have been built to drain the Everglades, but two of these are the biggest. These two major canals are the C-44 and the C-43. The C-43 canal runs from Lake Okeechobee westward to the Caloosahatchee River. The other canal, the C-44, runs from Lake Okeechobee eastward to the St. Lucie River and the Indian River Lagoon. (SLR/IRL) These two estuaries were originally **not** connected to the lake.

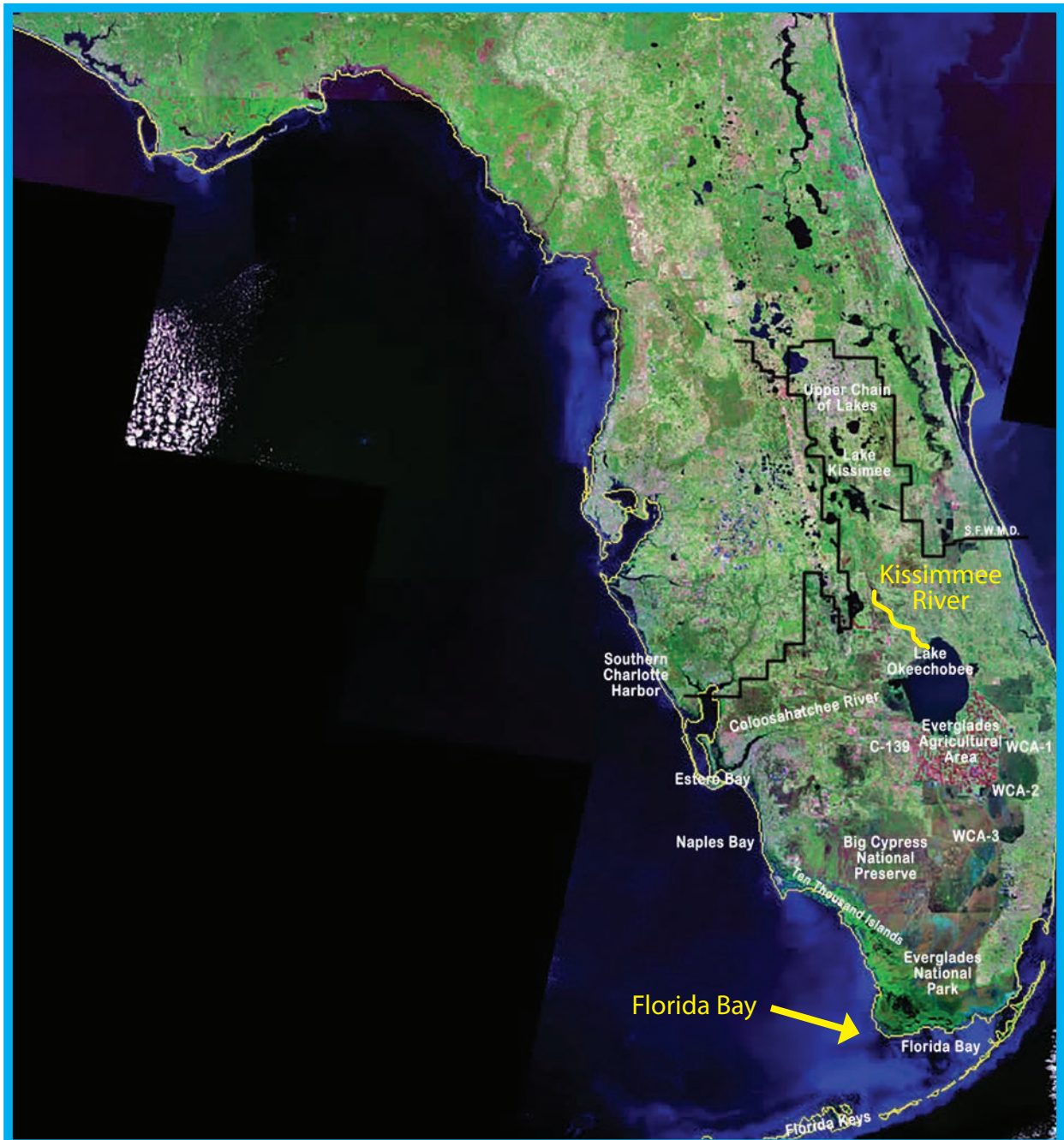
The man-made canals from Lake Okeechobee that connect the St. Lucie River and Indian River Lagoon on the east coast and the Caloosahatchee River on the west coast disrupt and lessen the salinity levels in both waterways. The sheet-flow that went south naturally to the Everglades and on to Florida Bay has been cut off, and therefore, drastically increased salinity levels.

We cannot forget the mightiest river of all, where all this water starts flowing into Lake Okeechobee in the first place, starting in a place near Disney World called Shingle Creek. The Kissimmee River has also been altered, and because this river flows downhill, these changes affect Lake Okeechobee, the estuaries of the St. Lucie/Indian River Lagoon, the Caloosahatchee River, and Florida Bay.

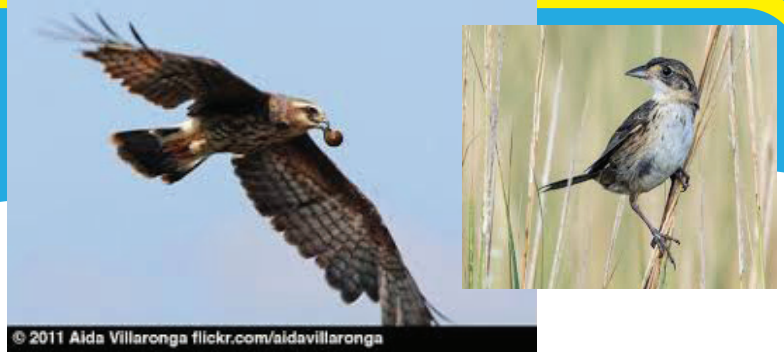
The story goes like this: Originally, water flowed southward through natural oxbows that slowed the water down, cleaning it and removing sediment. But here too, in Central Florida, people wanted to settle, ranch, and grow crops. To do this, it was necessary to quickly move the water off the land.

# Florida's Past in-depth

The ACOE once again heard the people and the State of Florida's call and straightened the once winding Kissimmee River, making a giant canal right up the middle of the natural oxbow river. As a result, the river was shortened and straightened to a length of 56 miles, much shorter than its original 105 miles. The straightening of the river caused the flow of the water to speed up. Dirty water polluted Lake Okeechobee, causing disastrous effects including harmful algae blooms, raised water levels, and increased nitrogen and phosphorus levels within Lake Okeechobee. What is interesting is the estuaries are sick because they get too much water from Lake Okeechobee and Florida Bay is sick because it doesn't get enough. Luckily, they are actively restoring the oxbows in the Kissimmee River. As a River Kid, it's our job to help fix this!



# move it south



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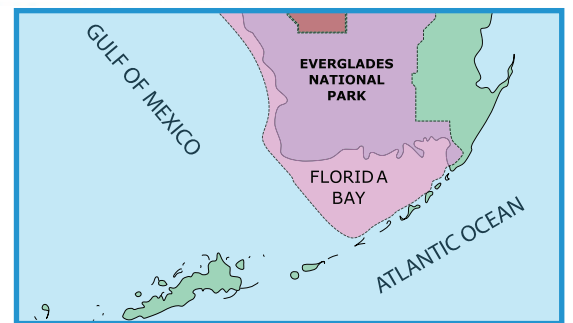
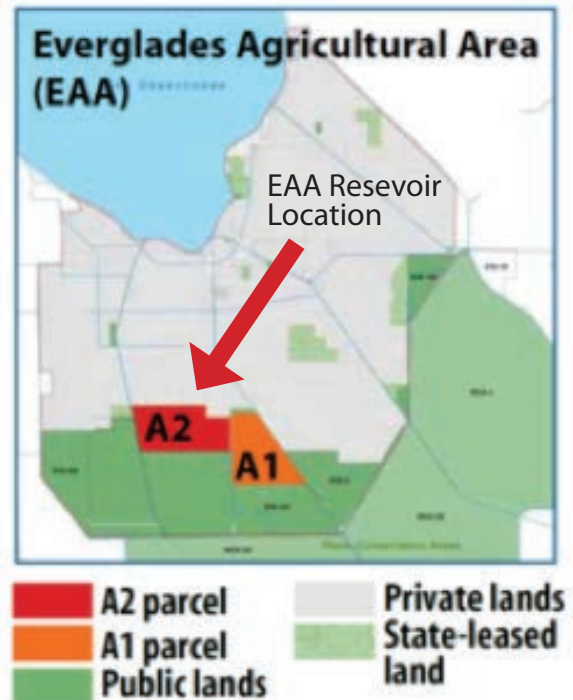
Stakeholders and scientists have been working many years on plans to move more water south

to help the estuaries and Florida Bay. Finally, the Florida Legislature put aside money to build a reservoir south of the lake, known as the Everglades Agricultural Area (EAA) Reservoir. A reservoir is like a big bucket of water that can hold the water in years when there is too much water. In years when there was not much rain, the farmers in the EAA can use it too. Getting this plan passed was lots of hard work, but in the end farmers, environmentalists, giant sugar corporations, and even a majority of our elected officials agreed it was time to help send some water south.

The South Florida Water Management District created a timeline on their website to follow along with the building progress as many things have to happen for it to work. This project requires the cooperation of both the Water Management District (state) and the Army Corp of Engineers (federal). This is a partnership, and like any good friendship, group project or relationship, it takes both sides working together to make the project great!

On Earth Day, April 22, 2021, a milestone was reached in Everglades restoration. On this day, a Project Partnership Agreement for the long fought EAA Reservoir was signed by the South Florida Water Management District and the U.S. Army Corps of Engineers. This long negotiated, important agreement, is the last major step the state must take before the U.S. Army Corps of Engineers can begin construction on the reservoir that will ensure clean water from Lake Okeechobee is sent to the Everglades reducing damaging discharges to the northern estuaries. The cost of the reservoir and storm water treatment area, slated to be completed by 2027/2028, is 3.4 billion dollars. At the signing, which was led by Governor Ron DeSantis, the River Kidz were credited by sponsor of the EAA Reservoir, former Florida Senate President, Joe Negron. Negron recognized the River Kidz "with a Z" and residents of the Treasure Coast for "not being stopped and leading the way!"

As a River Kid, part of your job is to contact people and inspire them to work together with the people involved. You speak for the river and its animals because they don't have a voice! Kidz are powerful, and the future of our world. Our lagoon and estuaries are your playground and together we can all work to make sure the reservoir is built and clean water can flow south into the Everglades and Florida Bay.



**BACK ROW:** Jay Steinle, SFWMDGB, Pedro Ramos, Superintendent ENP, Todd Polk, LTC ACOE, Noah Valenstein, Sec. DEP, Joe Negron, Former Senate Pres. **MIDDLE ROW:** Scott Wagner, VC SFWMD, Jacqui Thurlow-Lippisch, SFWMDGB **FRONT ROW:** Gov. Ron DeSantis, Chauncey Goss, Chair SFWMD

# harmful algae bloom

Under normal conditions, blue green algae (specifically cyanobacteria) can be a productive component of the estuary ecosystem. They contribute to the food chain and to the oxygen that keeps water bodies healthy. But sometimes, when conditions are right, excessive nutrients inflow to the estuary along with warm water, or if high discharges from Lake Okeechobee occur, certain algae can quickly grow and overpopulate. These foam or scum-like masses are called blooms. Some blooms release toxins that make ecosystems, animals and people sick, scientists call these harmful algae blooms.

In recent years, harmful algae blooms occurred throughout the St. Lucie Estuary as a result of high discharges from Lake Okeechobee, which itself was experiencing a bloom of cyanobacteria. The blooms were frightening to look at, had an awful smell, killing numerous marine animals and one family's pet dog. Blooms have also made other people, dogs, manatees and other life in the river extremely ill. Many human health problems are also associated with those types of blooms because they contained toxic chemical compounds (cyanotoxins). In water bodies with blue-green algae, if people or animals splash or if boats create wakes, the cyanotoxins in the algae can release into the air. The toxins mix with water droplets and spray—that's how people and animals can inhale the toxin. These toxins can't pass through your skin easily, so swallowing large amounts of contaminated water is what causes illness.

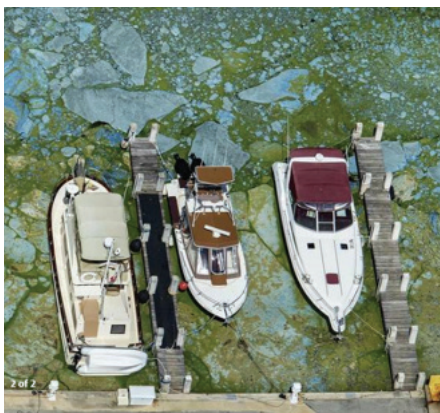
**Stay away from blue-green algae.** Water from areas with blue-green algae can make animals and people sick—**stay away from these areas and keep**

**your pets away too! Don't swim in or around blue-green algae.** For some people, blue-

green algae can cause rashes, stomach cramps, nausea, diarrhea and vomiting. People who are very sensitive to smells can have respiratory irritation. Sometimes, high exposures of toxin can affect the liver and nervous system. If you come into contact with blue-green algae, get out of the area and wash off with soap and water. See your doctor if you think blue-green algae has made you sick.

**BLUE-GREEN ALGAE AND FISH** The Florida Dept. of Health says that fish tested from water with blue-green algae show that cyanotoxins don't accumulate much in the edible parts—muscle or fillet—of fish, but can in other organs. Rinse fish fillets with tap or bottled water. Throw out guts. Cook fish well.

- Dr. Gary Goforth



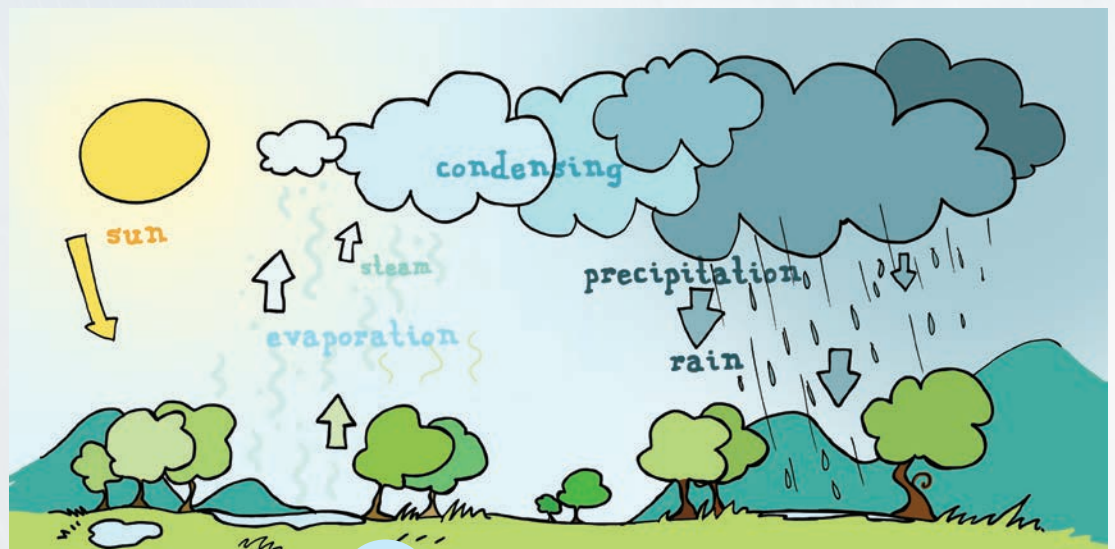
# weather and water cycle

Weather is a big part of life in Florida and plays an important role in the Everglades ecosystem. People moved to Florida long ago because of the temperate and tropical climate. This means our winters are warmer compared to other places in the United States. In South Florida it never snows although occasionally North Florida does get cold enough to have flurries! In Florida we have two distinct rain seasons. We have a “rainy season” which is the spring and summer when we get lots of rain and thunderstorms. This is also when we are more likely to have tropical cyclones such as a tropical depression, tropical storms or even hurricanes.

Hurricane season starts June 1st and goes until November 30th. This is the time of year when the Atlantic Ocean waters are the hottest. These storms usually form off the coast of Africa on the other side of the Atlantic Ocean and follow the winds and the Gulf Stream towards Florida or the eastern coast of the United States.

Our summer rains are a result of the water cycle! The ground heats up during our hot summers and this causes evaporation off the many lakes, the Atlantic Ocean and the Gulf of Mexico. This **evaporation** makes water vapor and this is water in the gas form. This vapor then rises into the clouds. When these clouds are too full of water vapor it causes **condensation** in the cold atmosphere air and changes into the liquid state which we call RAIN, a type of **precipitation**! The rain falls onto the land, the Gulf of Mexico and the Atlantic Ocean and fills up our lakes and rivers. When we have a lot of rain, the Kissimmee River and Lake Okeechobee fill up and that water is released through the canal system and is sent to the coasts both on the east and west sides of Florida. These discharges damage the estuaries, and by not sending water south into the Everglades where it is needed, that ecosystem is unnaturally dry and faces fires and drought.

Precipitation can come in many forms. If it is warm outside (above 32 degrees Fahrenheit) it will be in the form of rain. If it is cold outside it might come in the form of sleet or snow. If the conditions are just right we might see fog outside.



# weather and water cycle

There are two weather patterns that impact weather all over the world. These patterns are called *El Niño* and *La Niña*. These translate to “little boy” and “little girl” in Spanish. El Niño makes the Pacific Ocean warm up to higher than normal temperatures. In Florida this can mean more rain and hurricanes. For the Caloosahatchee River and the Indian River Lagoon, this can mean a greater amount of discharges during the fall and spring. During El Niño years we see discharges that started earlier than usual and continued through the spring, summer and even into fall. We also saw toxic algae blanket the St. Lucie River/Indian River Lagoon because of this increased rain and water coming from Lake Okeechobee. During La Niña years we often have dry conditions in Florida. This weather pattern brings winters that tend to be colder than normal in the Western United States and warmer than normal in the Southeastern United States.

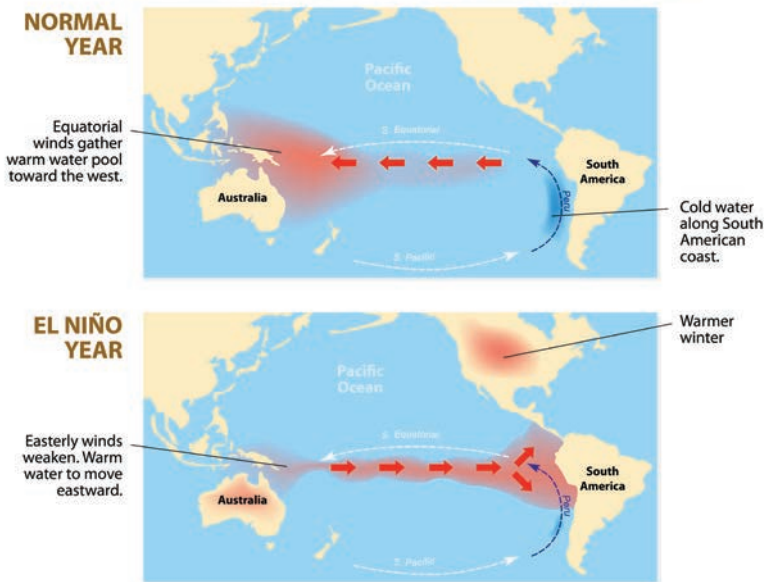


*Rains from hurricanes drain, forcing Lake Okeechobee to be discharged carrying pollution into the St. Lucie and Caloosahatchee Rivers.*



*Shown here are three major hurricanes during the summer of 2017. These storms included Irma which impacted the entire state of Florida.*

## THE EL NIÑO PHENOMENON



*Satellite image of a hurricane.*

What's all this green stuff everywhere?

I'm afraid it's toxic algae, Manny

Water from areas with blue-green algae can make animals and people sick!

CONDENSATION

PRECIPITATION

SNOW

RAIN

EVAPORATION

POLLUTED SURFACE RUNOFF

TOXIC BLUE-GREEN ALGAE

CONTAMINATED GROUNDWATER

I just ate some and my belly hurts....

It's making it hard for me to find fish to eat.

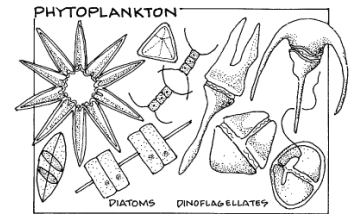


# Survive & Thrive

Everything eats! All living things require energy to live and survive on a daily basis. You may have eaten cereal at breakfast to give yourself energy for school. Well, a dolphin who lives in the Indian River Lagoon does not eat cereal, but it may have enjoyed a tasty morning meal of mullet or pinfish! Many animals in the Indian River Lagoon, Florida Bay and the Caloosahatchee River rely on each other for their meals. The roseate spoonbill likes to eat plankton out of the lagoon and so do the oysters and the mullet. The green sea turtle gets its energy from the seagrass and so does the manatee. The seagrass gets its energy from the sun that shines down into the water.

The amazing thing about food chains is that each piece of the chain helps the next piece survive and thrive. If you take away one of these animals in the chain, the chain will weaken or might fall apart altogether. This is why each animal is important and has its own ecological niche. An ecological niche is a special "job." Seagrass has a special job, too. It helps hold down sand, gives lots of animals homes and also is an important food source for the animals who eat it. Food chains are full of animals that each have their own ecological niche and all have unique jobs in the environment they inhabit.

Every living thing has needs to stay alive. Plants need soil, water, nutrients and light to stay alive. Animals (including humans) need food, air, water and space to live to stay alive. The food part for things to survive is the part that makes up a food chain. For animals, that is eating something and for plants that is the light of the sun shining down on them. In a food chain all things start with the sun. The sun shines down on plants (like seagrass and phytoplankton) and gives these critters the energy they need (through photosynthesis) to survive. The next step in the food chain would be the animals that rely on these plants for their food (these are often called herbivores). There is likely something that eats that animal that ate the seagrass and that animal is then getting energy from the animal it ate that got its energy from the seagrass that got its energy from the sun! It is a chain of living things getting energy from the living thing before it! That cereal you may have eaten this morning? It was made from grains that were getting their energy from the sun before they were harvested. You are part of a food chain. Maybe at lunch you will have a tasty fish sandwich? Well, you would be eating fish that might have eaten other smaller fish. Again, you are part of a food chain.



**Brine Shrimp**



**Perch**



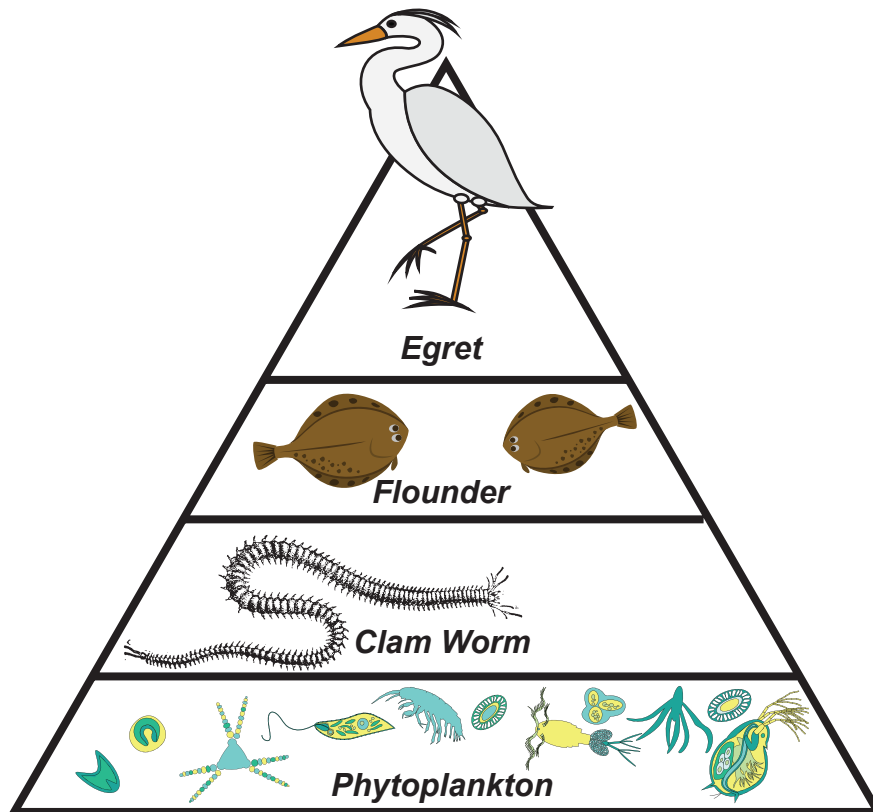
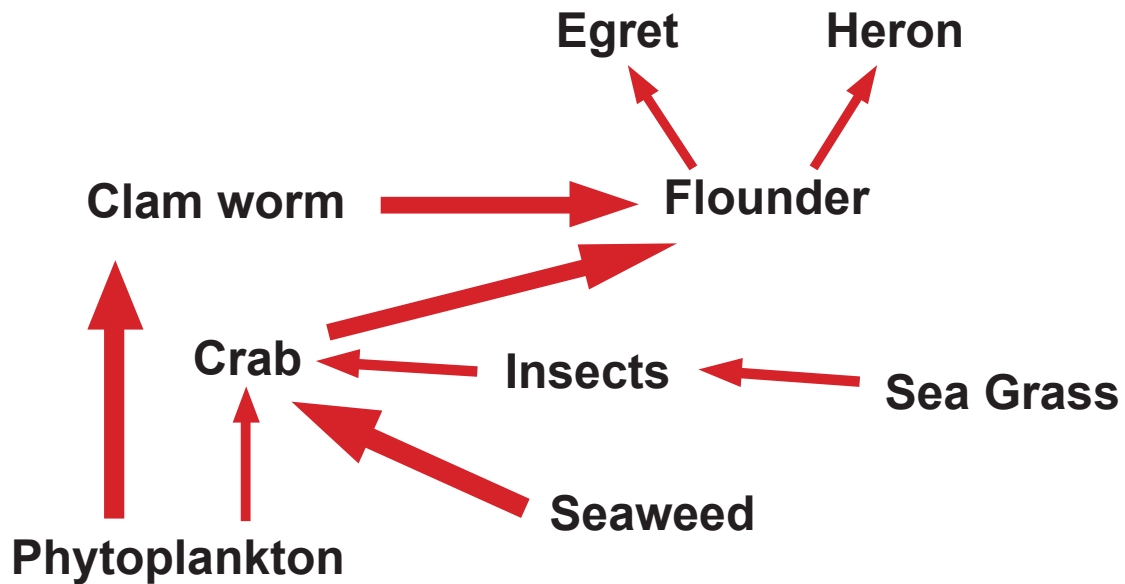
**Kingfisher**

SC.4.L.17.3

# Survive & Thrive

## The Indian River Lagoon

An estuary is a body of water in which fresh water draining from the land mixes with salt water from the ocean. The result of this mixture is an environment with abundant plant and animal life. The Indian River Lagoon is a 156-mile-long estuary on Florida's East Coast. It is a diverse estuary, supporting thousands of species of plants and animals. The food web and food pyramid shown below are examples of the relationships that exist in the Indian River Lagoon ecosystem.



# Survive & Thrive



Remember that all living things have basic needs like air, food, shelter, and water in order to reproduce and survive.

They also need a source of energy. The sun's energy enters the ecosystem and flows through all living things in the ecosystem.

Plants use sunlight to make their own food. Animals cannot make their own food.

An organism that can make its own nutrients, usually with energy from the sun is called a **producer**. Plants are called producers because they produce, or make, their own food.

An organism that needs to eat another organism to survive is called a **consumer**. There are different types of consumers, such as herbivores, carnivores, and omnivores.

- Animals that eat only plants to get energy are called **herbivores**.
- Animals that eat only other animals to get energy are called **carnivores**.
- Animals that eat both plants and animals for energy are called **omnivores**.

## CONSUMERS



**Herbivore**



**Carnivore**



**Omnivore**



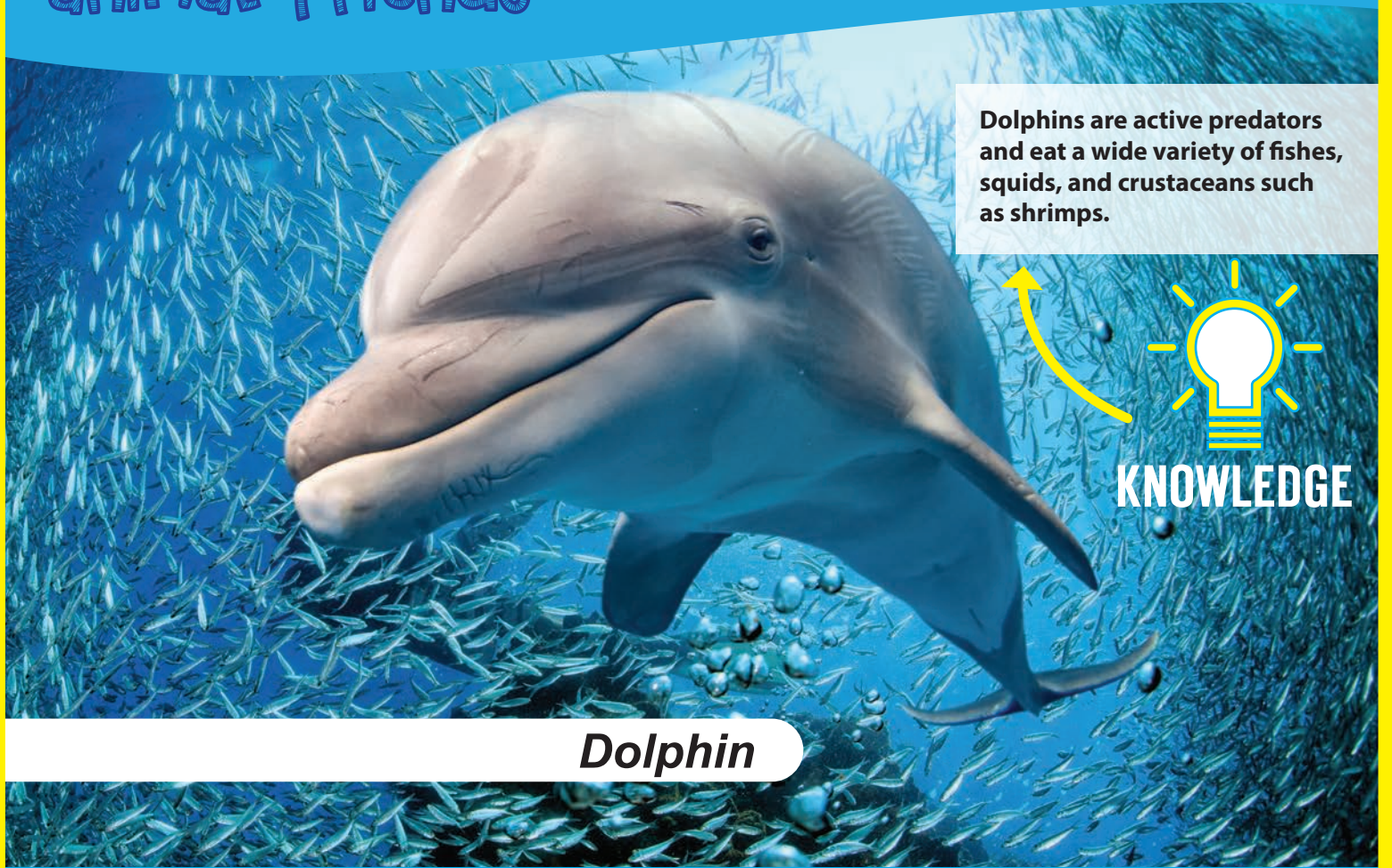
KNOWLEDGE

Manatees eat water  
grasses, weeds, and  
algae.

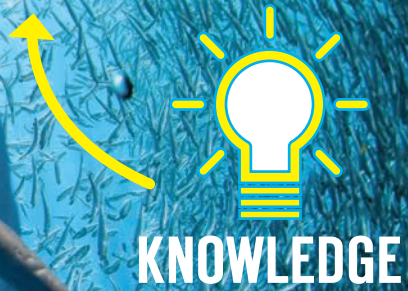


**Manatee**

# animal friends



Dolphins are active predators and eat a wide variety of fishes, squids, and crustaceans such as shrimps.



KNOWLEDGE

**Dolphin**



KNOWLEDGE

Using its spoon-like bill to scoop prey up from shallow water, the roseate spoonbill's diet typically includes minnows, small crustaceans, insects and bits of plants.

**Roseatte Spoonbill**

# animal friends



The diet of pelicans usually consists of fish, but occasionally amphibians, turtles, crustaceans, insects, birds, and mammals are also eaten.



KNOWLEDGE

**Pelican**



KNOWLEDGE

Snook feed on small fish, shrimp and an occasional crab.



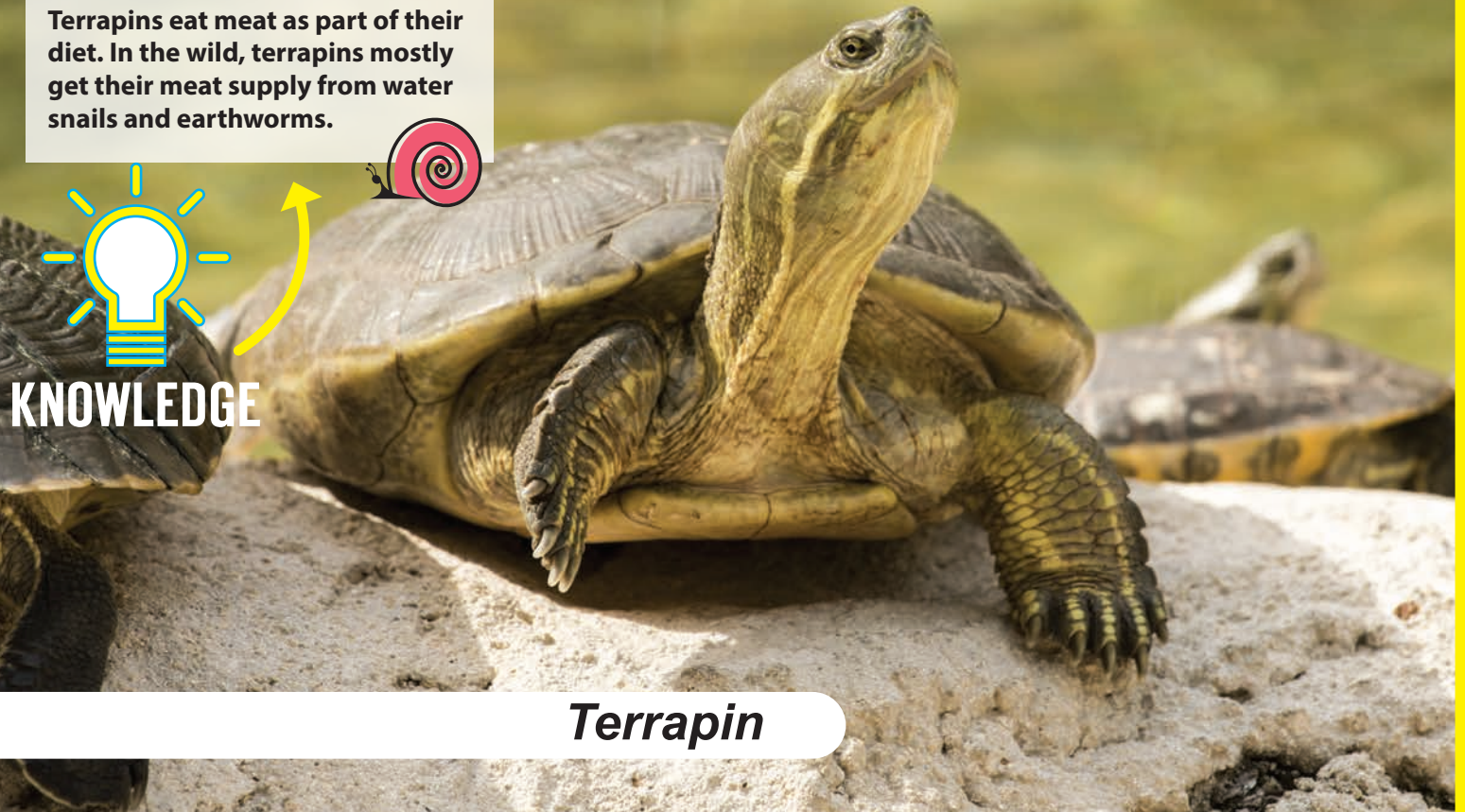
**Snook**

# animal friends

Terrapins eat meat as part of their diet. In the wild, terrapins mostly get their meat supply from water snails and earthworms.



**KNOWLEDGE**

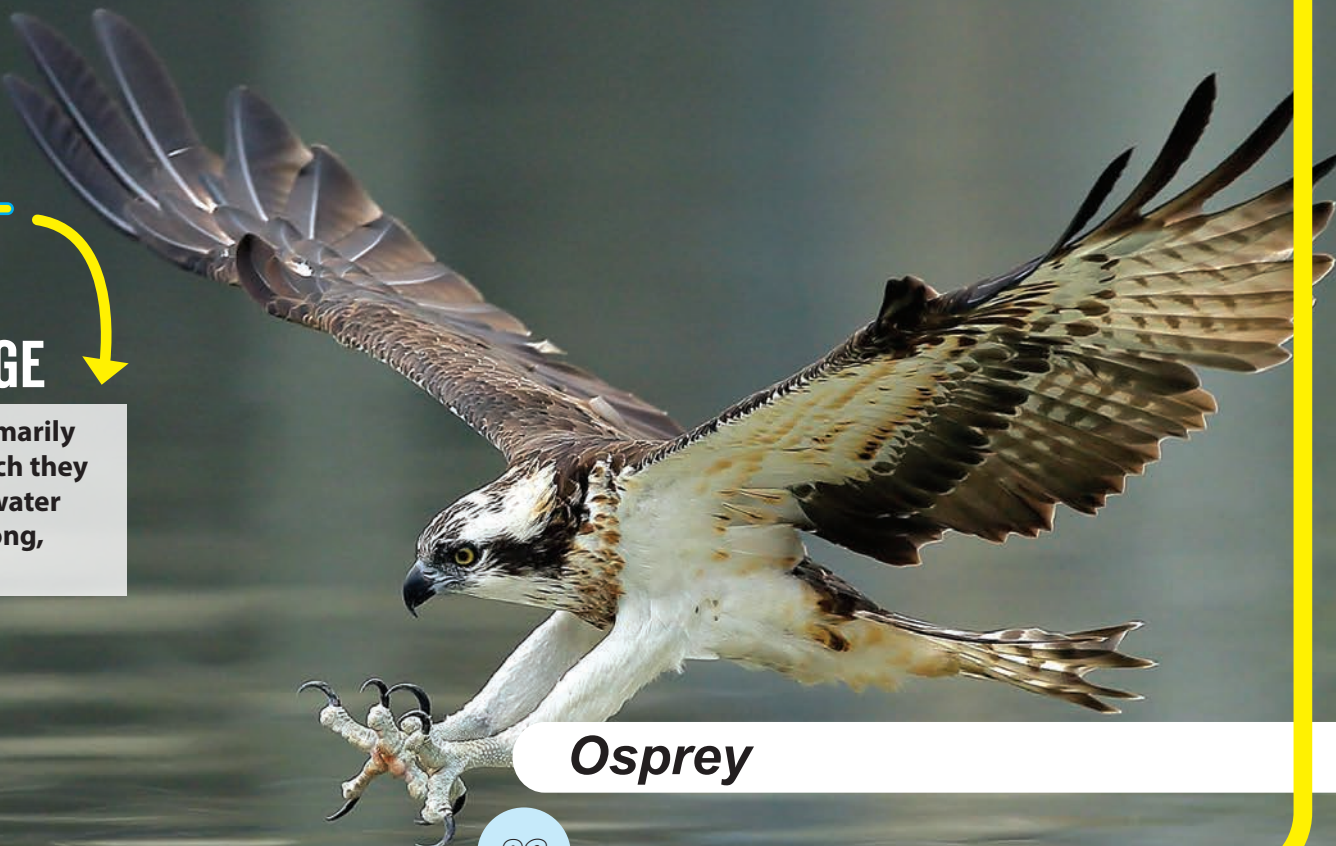


**Terrapin**



**KNOWLEDGE**

Osprey feed primarily on live fish, which they catch from the water by using their long, hooked talons.



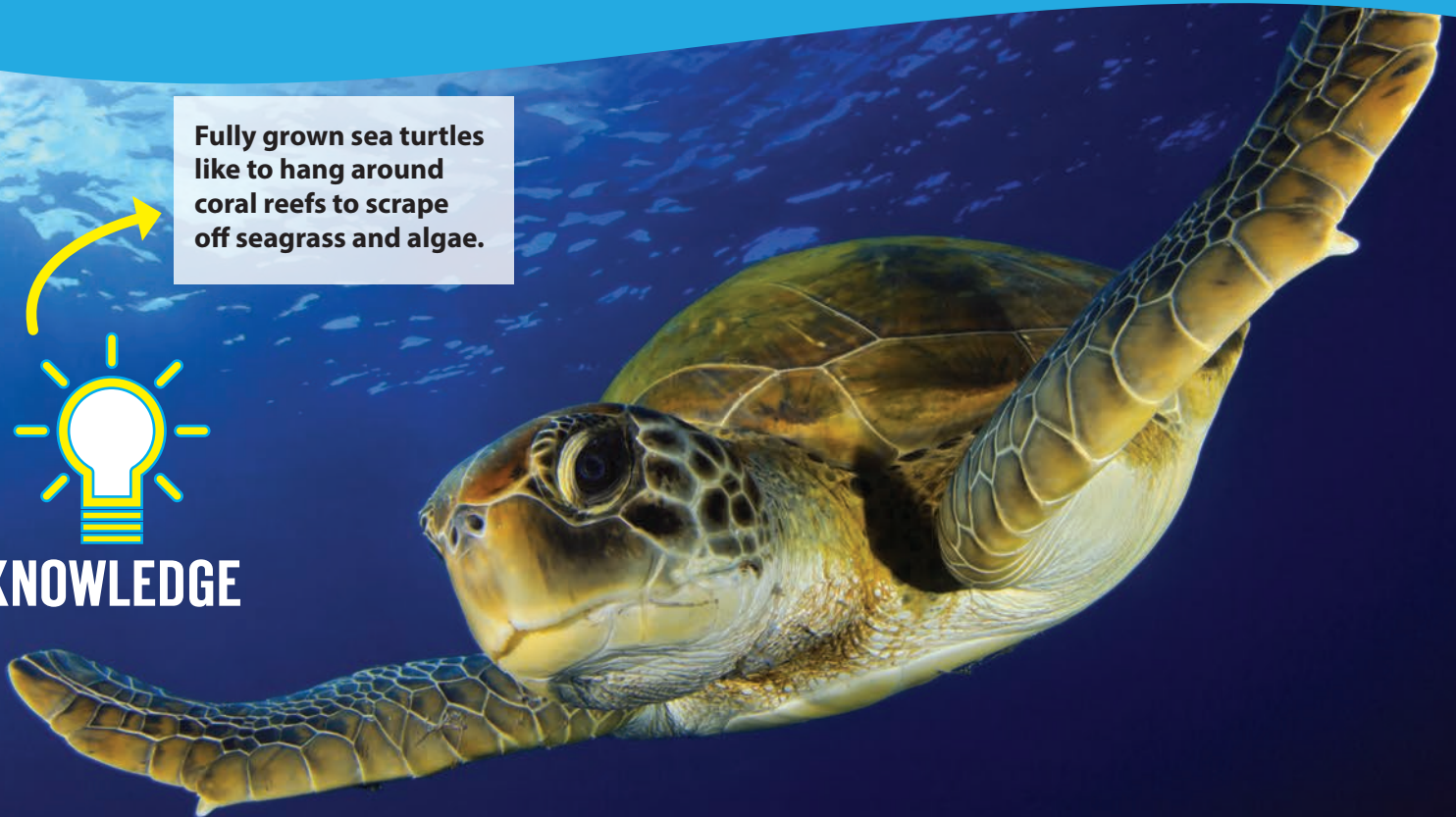
**Osprey**

# animal friends

Fully grown sea turtles like to hang around coral reefs to scrape off seagrass and algae.



**KNOWLEDGE**



**Sea Turtle**

Seahorses eat small crustaceans such as shrimp.



**KNOWLEDGE**



**Sea Horse**



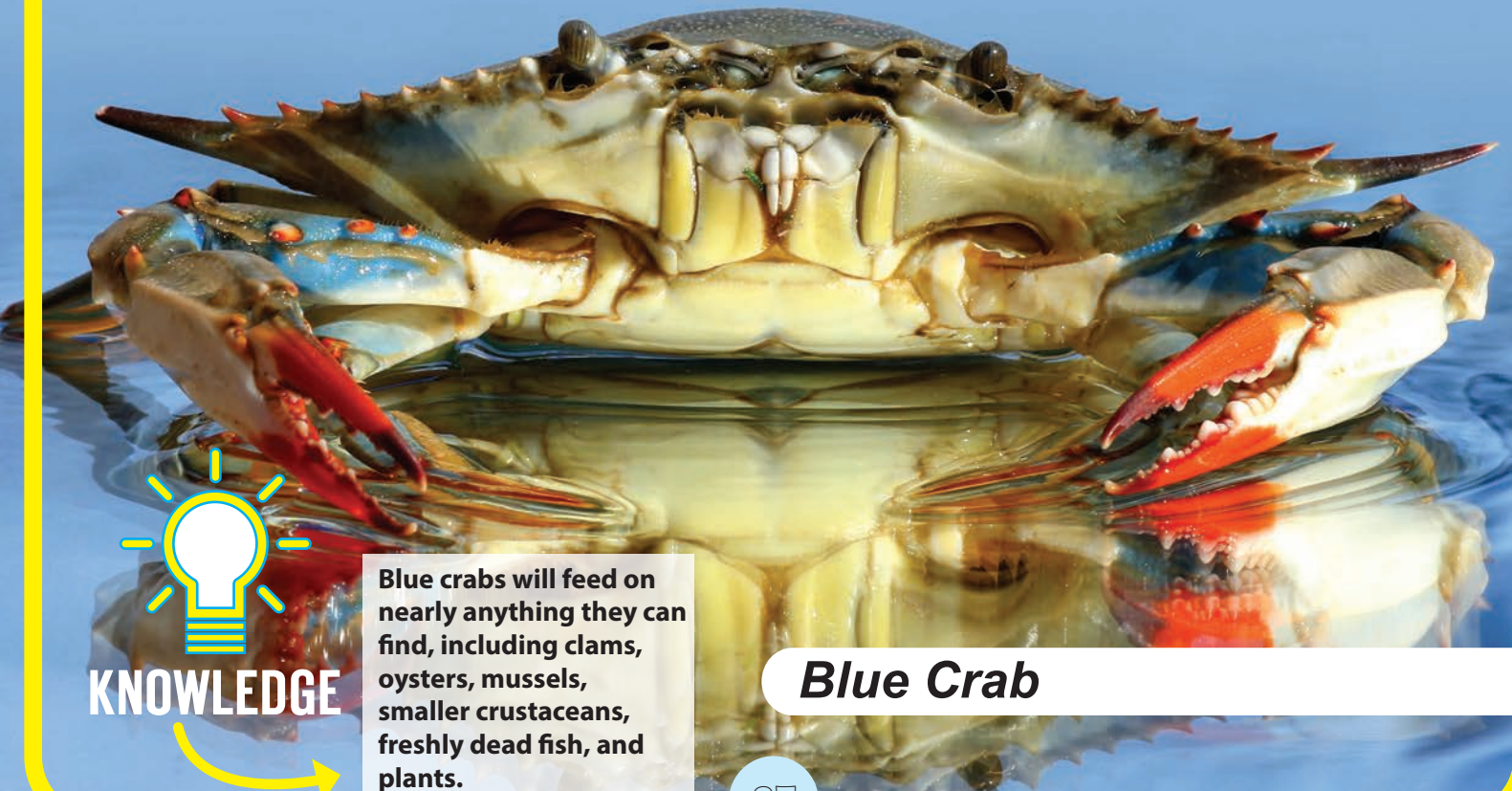
# animal friends



## KNOWLEDGE

Snail Kites live almost entirely on large apple snails. They may also eat many small turtles and rarely eat small snails, rodents, crabs.

**Snail Kite**



## KNOWLEDGE

Blue crabs will feed on nearly anything they can find, including clams, oysters, mussels, smaller crustaceans, freshly dead fish, and plants.

**Blue Crab**

# animal friend questions

## Producer or Consumer?

An organism that needs to eat another organism to survive is called a \_\_\_\_\_.

An organism that can make its own nutrients, usually with energy from the sun is called a \_\_\_\_\_.

## What kind of consumer am I?

By drawing a line, connect the correct type of consumer to the appropriate animal.

**Omnivore**

**Herbivore**

**Carnivore**



Fill out the table below for each animal friend labeling if they are a producer or consumer. If they are a consumer, what type are they?

Animal Friend	Producer or Consumer?	Type of Consumer
Dolphin		
Roseate Spoonbill		
Pelican		
Snook		
Terrapin		
Osprey		
Sea Horse		
Snail Kite		
Blue Crab		

# questions

## WELCOME

Describe the type of animals Marty and his friends are. Explain why you think this.

---

---

---

---

What makes Florida a peninsula?

---

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---

Manatee Name	Where do I live?	Description of location
Marty		
Milly		West side of Florida and connects to the Gulf of Mexico
Manny	Florida Bay	

What do Floridians do to prepare for a hurricane and why?

Investigate that air is all around us and that moving air is wind.

What are the effects of the southern Everglades being in an unusual drought condition?

# questions

Draw an arrow to where each manatee lives in Florida.



**Milly**



**Manny**



**Marty**



## Our Changing Florida

Historically, where did the Everglades start and end?

---



---

## Weather and Water Cycle

How do our winters compare to some other places in the United States?

---



---

	Winter/Fall	Spring/Summer
Also known as		
Description		

When is Florida's Hurricane Season? \_\_\_\_\_

# questions

Label and describe each part of the water cycle.

## Food Chains

List what living things need to survive.

Animals (including humans)	Plants

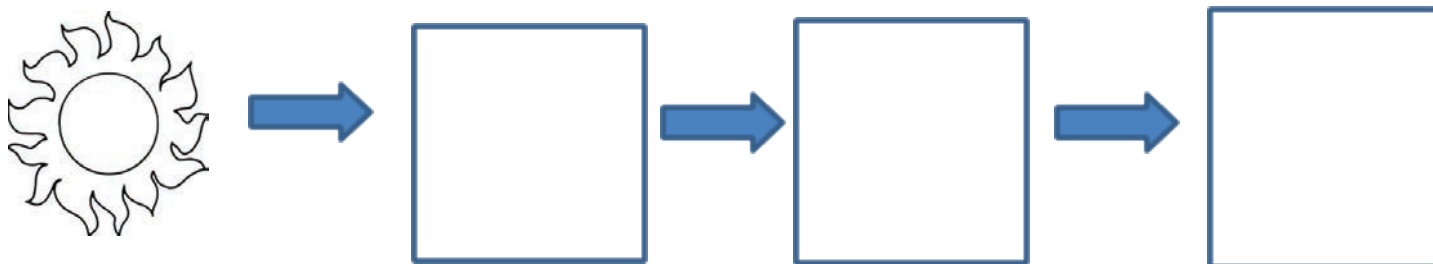
What niche or special job does seagrass have?

---

---

---

Design a food chain of your own starting with the sun.



# Sing-along



The River Kidz are here  
Our mission's quite clear  
We love our river and ALL its critters  
Let's hold it all dear

Please keep our river clean  
So we don't have to scream  
"Go shut the locks" and walk the talk  
and quit (pause) being so mean

To all the little fish  
It's our biggest wish  
To keep them healthy and swimming  
around  
And sometimes on our dish

North Fork, South Fork, Manatee Pocket!  
We gotta keep it pristine...  
Sand Bar, Pecks Lake, Indian River  
The color's blue not green!

What about the seagrass?  
It's disappearing so fast  
What will happen? No shrimp-a-snappin'?  
It's just not gonna last

The dolphins and the turtles  
We know they have some hurdles  
Nets and boats and hooks in throats  
Our blood begins to curdle

North Fork, South Fork, Manatee Pocket!  
We gotta keep it pristine...  
Sand Bar, Pecks Lake, Indian River  
The color's blue not green!

Florida's big mistake  
Is discharge from the Lake  
The runoff and the fer-ti-lizer  
Ruins us, FOR PETE'S SAKE!

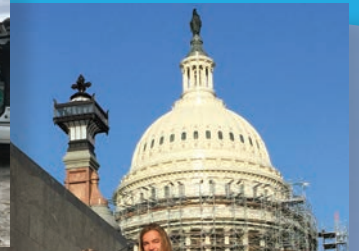
The River Kidz are here  
Let's not live with fear  
We'd lose our river and ALL its life  
We better keep it clear!



[www.riverscoalition.org](http://www.riverscoalition.org)



# kidz in action

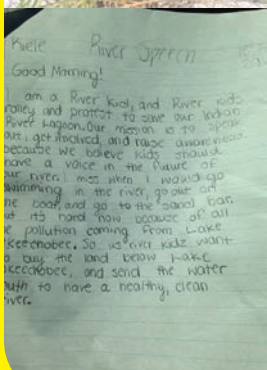


Speaking Out

Being a River Kid is a big part of solving the problems facing the lagoon and the Everglades. Learn about these crucial topics, and you can help my friends and me. There are lots of ways you can help; you have a voice people in charge want to hear. One thing is for sure, with your help and your voice we can clean up the water and send it south.



Advocacy Through Art



Write Letters

# kidz in action



Restoration Projects



## 10 Things Every Responsible River Kid Should Practice

1. Use **RE-USEABLE WATER BOTTLES** or buy drinks in **GLASS OR ALUMINUM** bottles.
2. Carry your own re-usable shopping/grocery bags and **SAY NO TO PLASTIC BAGS**.
3. Ask for your beverage without a **STRAW** (you can carry glass, paper or metal straws with you).
4. Carry your **OWN CUTLERY** and re-use!
5. Participate in a **RIVER OR BEACH CLEAN-UP** regularly.
6. **REDUCE** your waste by not buying products with a lot of plastic packaging.
7. **SAVE WATER** by turning off the faucet when you are brushing your teeth, washing dishes or taking a shower.
8. Make sure all **ALL LIGHTS ARE OFF** in your room or house when you leave.
9. **NO STYROFOAM** whatsoever.
10. **ALWAYS REDUCE, RE-USE AND RECYCLE!**





# HOW YOU HELP



replant oyster beds

live oak

replant mangrove trees

Inform the public

write to your elected officials

## Addresses

### **President of the United States**

#### **The White House**

1600 Pennsylvania Avenue NW  
Washington, D.C. 20500

### **Office of Governor State of Florida**

The Capitol  
400 S. Monroe St.  
Tallahassee, FL 32399-0001

### **US Senate**

284 Russell Senate Office Bldg  
Washington, D.C. 20510

### **U.S. Senate**

716 Hart Senate Office Bldg.  
Washington, D.C. 20510

### **US Congress Representative for Treasure Coast**

2182 Rayburn House Office Building  
Washington, D.C. 20515

### **President of the Florida Senate President**

The Capitol, 404 S. Monroe Street,  
Tallahassee, FL 32399-1100

### **Speaker of the Florida House of Representatives**

# 420 The Capitol  
402 South Monroe Street  
Tallahassee, FL 32399-1300

### **Florida House of Representatives**

11700 S.E. Dixie Highway  
Hobe Sound, FL 33455

### **Florida House of Representatives**

900 SE Federal Highway  
Stuart, FL 34994-3724

### **Martin County Commissioners**

Administrative Building  
Martin County Commissioners  
2401 SE Monterey Road  
Stuart, FL 34996

### **City of Stuart Commissioners**

Stuart City Hall  
121 SW Flagler Avenue  
Stuart, FL 34994

### **U.S Army Corps of Engineers**

#### **Jacksonville District**

701 San Marco Boulevard  
Jacksonville, FL 32207

### **South Florida Water Management District**

3301 Gun Club Road  
West Palm Beach, FL 33406

**Write your own letter on the next page and mail to the above addresses.**



A writing template consisting of a vertical red margin line on the left, a vertical dashed line to its right, and horizontal blue lines for writing. The page is otherwise blank.





RIVER KIDZ

MARTY

RIVER KIDZ PRESENT  
WILLY, MARTY and MANNY

JULIA KELLY ©

# get inspired...

## Local Zero Waste Entrepreneur

At a young age **Brandi Kneip** knew she wanted to help change the world. At the age of 18 she invested her college money into opening a business in Stuart, FL. Not just any business though. A business that would help people use less plastic. And that's exactly what JAR The Zero Waste Shop is! Reducing plastic is one of the best ways you can help the environment and it's something you can implement at any age!!



## Recycling Program Founder

**Adriana Mancini** has been passionate about the environment since she was a fourth-grade student when she founded Bessey Creek Elementary School's Team

our environment and becoming involved in the community through recycling efforts. As of 2015, Team Green Martin is implemented in several Martin County schools as part of a district-wide initiative. Adriana is equally passionate about clean water. Since 2009, she has fundraised over \$70,000 to help end the global water crisis. When Adriana was a junior in high school, she founded Students4H2O, which is now a non-profit organization in Martin County with the mission to enhance education, stewardship, and citizenship, beginning with elementary and middle school students.

Green. This recycling program empowers and provides leadership opportunities for all students together through a common goal of protecting

## International Climate Change Activist

In August 2018, at age 15, **Greta Thunberg** started a school strike for the climate in Sweden, becoming one of the youngest environmental activists on climate change whose campaigning has gained international recognition. She has delivered messages about climate change effects in countless cities worldwide, creating a movement that is now called Fridays For Future. Thunberg's activism started after convincing her parents to adopt several lifestyle choices to reduce their own carbon footprint. She started spending her school days protesting, holding a sign that said School Strike for Climate outside the Swedish Parliament calling for a stronger action on climate change and it caught the attention of the media. Thunberg tries to live a low-carbon life. Therefore she is vegan, and she doesn't fly. In 2019, TIME magazine named her Person of the Year, she was on Forbes list of The World's



100 Most Powerful Women, and has had two nominations for the Nobel Peace Prize. Her influence on the world stage has been described as the "Greta Effect". Her speech at the 2019 UN Climate Action Summit, in which she exclaimed, "How dare you!" was widely publicized by the press.

# vocabulary

**ACOE** - Army Corp of Engineers- The federal branch of government controlled by the Army and under the department of defense.

**Appreciate** - To value something highly.

**Aquatic** - Living in a water environment.

**Awareness** - Knowing or learning about something.

**Biodiversity** - Having many different species in one area.

**Brackish** - A mixture of freshwater and saltwater.

**Canals** - Man-made waterways intended to move water from one area to another, usually straight and narrow.

**Condensation** - Is the process by which water vapor in the air is changed into liquid water.

**Congress** - Branch of Federal Government that makes laws.

**Consumer** - An organism that feeds on other organisms for food.

**C-43** - Canal that runs from Lake Okeechobee to the West Coast of Florida, specifically the Caloosahatchee River.

**C-44** - Canal that runs from Lake Okeechobee to the East Coast of Florida, specifically the St. Lucie River.

**Dike** - A man-made barrier that surrounds a body of water. (Lake Okeechobee has the Herbert Hoover dike).

**Discharge** - To release water.

**Disrupt** - To interrupt the way things normally are.

**EAA** - Everglades Agriculture Area- An area south of Lake Okeechobee where farming takes place. This area is home to rich, fertile soils created from millions of years of detritus and swampland.

**El Niño** - The cycle of warm and cold temperatures that are measured on the sea surface temperature of the tropical, central and Eastern Pacific.

**Energy** - The capacity to do work.

**Environment**- The sum of conditions affecting an organism, including all living and nonliving things in an area such as plants, animals, water, soil, weather, landforms and air.

**Estuary** - A brackish body of water influenced by tides.

**Evaporation** - The process of turning from liquid into vapor.

# vocabulary

**Fertile** - Rich in plant nutrients.

**Food Chain** - Transfer of energy through various stages as a result of feeding patterns of organisms.

**Habitat** - A place in an ecosystem where an organism normally lives.

**Harmful Algae Bloom** - The result of algae growing at high rates and causing damage to the surrounding water environment.

**Indian River Lagoon (IRL)** - 156 mile waterbody with brackish water on the east coast of Florida.

**Inference** - The act of reasoning from factual knowledge or evidence

**Intervention** - Action and regrouping intended to help improve a current situation.

**La Niña** - a cooling of the water in the equatorial Pacific which occurs at irregular intervals and is associated with widespread changes in weather patterns complementary to those of El Niño, but less extensive and damaging in their effects.

**Life Cycle** - The entire sequence of events in an organism's growth, development and reproduction.

**Mammal** - Any various warm-blooded vertebrate animal of the class mammalian including humans, characterized by a covering of hair on the skin, and in the female, milk producing mammary glands for nourishing their young.

**Nitrogen** - Naturally occurring element that improves plant growth and is needed by all living things. Excess nitrogen can pollute waterways.

**Oxbows** - A bend in a river shaped like a "U."

**Organism** - An individual form of life of one or more cells that maintains various vital processes necessary for life.

**Phosphorus** - Naturally occurring element that improves plant growth and is needed by all living things. Excess phosphorus can pollute waterways.

**Photosynthesis** - A process performed by plants and algae using light to produce energy.

**Pollutants** - Harmful substance found in an area.

**Precipitation** - Rain, snow, sleet, or hail — any kind of weather condition where something's falling from the sky

**Salinity** - Measure of the salt in a water sample.

**Sediment** - Material from the land that reaches the water.

**Sun** - Star closest to the Earth and the center of our solar system.

**Watershed** - Land or area that drains into a waterway, river or stream.

**Waterways** - A navigable channel of water.

# get social...



@riverkidzmc



river.kidz



River Kidz  
@riverkidzmc



**NO PLASTIC IN THE PARK**

March 7th, 12:00 - 2:00pm  
Sewall's Point Park

12:00 Lemonade & Cookies  
12:30 Presentation  
1:00 Letter writing  
1:30 Scavenger hunt

**FUN FOR THE WHOLE FAMILY**

- Presentation
- Write or color letters to our Congressmen, Senators, and Local Legislators
- TC Trash Art
- Trash hunt
- T-shirts
- Lemonade & cookies

Enjoy SurfRider Foundation member Dylan Hanson's debut film "Rockless Recycling" on single-use plastics and how we as a community can take action to join the fight to reduce, refuse, and reuse!

**SURFRIDER FOUNDATION**  
TREASURE COAST



River Kidz  
December 25, 2019

Happy Holidays from the Rivers Coalition and River Kidz! Help support the effort to Stop the Discharges and keep Clean Water in our Estuary.

Rivers Coalition  
December 25, 2019

Happy Holidays from the Rivers Coalition and River Kidz! Help support the effort to Stop the Discharges and keep Clean Water in our Estuary.



**RALLY FOR THE MANATEES**



LM.COM  
Days of Christmas: River Kidz need help printing environmental workbook for schools



River Kidz  
January 29

Thank you to Valerie Gaynor, Christina Vignone Radcliffe, the Martin County School System and all the MC Science Lab teachers of 4th grade! We can't wait for you to use the new 4th edition River Kidz workbooks in your curriculum!



**Finn died after contacting toxic algae**

Several other dogs have recently become ill after coming in contact with the St. Lucie River

**Keep pets away from the river**

For more information visit: [www.riverkidz.com/WaterQuality](http://www.riverkidz.com/WaterQuality)



# thank you

This workbook is made possible by the generous efforts of hundreds of children, parents, companies and talented individuals.

## Special thanks to:

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Mary White  
Tracey Miller

Woman's Club of Stuart  
Illustrated Properties  
Blessing of the Fleet  
Richard Geisinger  
Nancy Scott  
Rip Fisher  
Becky Harris  
Kevin Harris  
Carole Brown  
John Kiker  
Eve Samples  
Betty Doty  
John Walter

Barbara Volin  
Joseph DeMarco  
John Eubank  
Robert Potter  
Greg & Alice Luckhardt  
David Christensen  
Maureen Kenyon  
Lowell Sasser  
Max Chesnes  
Dr. John Millay  
Jennifer Borges  
Jim and Kim Moir  
Merritt Matheson  
The Town of Sewall's Point

Art by  
Julia Kelly



Hi! I'm Blanco the white pelican.  
Sorry I'm late!  
I just migrated in as I only  
spend part of the year in Florida.  
Thank you for helping to protect  
our environment!

You can learn more about River Kidz at [www.riverscoalition.org](http://www.riverscoalition.org)

River Kidz is personal to me because I live on the river and the condition of the river affects my everyday life, so I want to fight with the River Kidz and make a change!  
- Olivia Siegel

The River is important to both me and our ecosystem. It is imperative that the water is kept clean and free from sewage and pollution. I believe being a part of the River Kidz will have the power to keep it this way.  
- Eryn Kelly

Being part of River Kidz to save animals and help raise water awareness so animals have better quality of life.  
- Matilda Small

Being part of River Kidz means being part of a community of people and friends to help better our water!!  
- Tate Small

To me the river is my home, and as a River Kid I will do everything in my power to protect it. River Kidz show that kids have a voice in what happens in the world they will one day inherit.  
- Veronica Dalton

I'm lucky to have the IRL as my backyard. It is my favorite place to go to relax and paddleboard or hang out at the sandbar. Now because of the blue green algae there are times I can't go in or near the water. Not a lot of people care about the IRL or even the pollution in our ocean which stinks because it's my favorite place to be.  
- Noa Vignone

I just want to swim. I don't want the manatees to have X eyes.  
- Irie Kernan

# What the River Kidz

To me the river means life, and as a River Kid I will do everything I can to keep it that way. The River Kidz are supposed to teach people about it, and the ways that they can keep our waters clean. That kids have a voice in what happens in the world they will one day inherit.  
- Daphne Dalton



The river is special to me because I love all the animals in the river, I want them to be safe because they are sweet to me when I swim with them in the river.  
- Dela Kernan

As a child, I spent countless hours playing on the river, fishing and boating. The river is a big part of me and to see it so polluted breaks my heart. The best way to treat our rivers is how you would treat your home. Keep Our Rivers Clean!!!  
- Brandon Collins

The river is very important to me, I grew up by it. I watched it become so polluted over the years. It's really important to keep our rivers clean so that kids will be able to go out in the water and play. Also, to save our dolphins, turtles, manatees and fish that live there.  
Save Our Rivers!!!!  
- Carly Collins

The river is our home, our life, and our future. It help makes us who we are. I love River Kidz because it lets people know how much we care about our river. Oh, and it is also a lot of fun!!!  
- Laila and Eloise Mayfield



River Kids has given me so many opportunities to share my voice about our river. It has showed me the importance for standing up for what I believe in and the power that one small voice can have. It has also allowed me to be a part of a family and allowed me to grow.  
- Anna Mcgovern

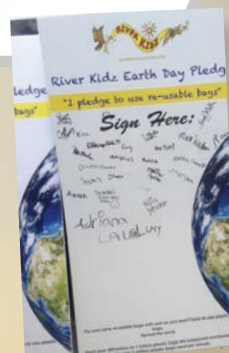
It means the future to me because it's about the animals and the importance of having them in our future. We need clean water to save them, as humans it's our job to help keep them safe, not hurt them or destroy their home.  
- Zoë Glover

I feel like the river is my best friend, and you have to protect it from a bully.  
- Heath Samples

Animals and birds need clean water and birds need fish to eat. Dirty water means no birds and no fish. We can't live without fish, animals and clean water. The river needs our help. We are little but we all need clean water.  
- Asher Glover

I joined RiverKids while still in elementary school and next year I will be graduating from high school. River Kids not only taught me about my local waterways and environment, I also learned that becoming an active participant and making my voice heard can make a difference in our community. From participating in fundraising activities to attending local protests about clean waterways, River Kids really made me aware of the problems facing our environment and possible solutions to improve it.  
- Chloe Janson

# means to me



River Kids means bringing the community together to raise awareness about the value of our river and what each of us can do to keep it clean!  
- Rachel Goldman

In 2011, the River Kidz was founded and I was lucky enough to be one of its earliest members. I'm proud to stand up for our river with all the animals and life in it! Let's make a change and help send the water south to the Everglades so our St. Lucie River becomes clean again!  
- Kiele Mader

I love being a part of River Kidz and am able to help support and protect and support our River"  
- Pippa Hilton-Green

The River Kids means a lot to me, it is a place where we can fight for our river. When I was new to River Kids five years ago, they were always very welcoming and still are. It is a place to learn and teach others why saving our river is so important. I hope you will join!  
- Hannah Lucas

Being a Riverkid to me means protecting the environment that we are in and around every day. A clean river means a happier, healthier environment and happier healthier people!  
- Avery Aydelotte

The river is fun and it keeps a lot of animals alive!  
- Celia Traylor

The River Kidz means a lot to me because it allows me as a kid to voice my thoughts about the way the "adults" are treating the river. The River Kidz also allows me to meet other kids with likeminded thoughts about the river.  
- Coltin Moir



# RIVERS COALITION

## You are our Rivers' Future!



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RIVER KIDZ



ST. LUCIE RIVER



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