

CHAPTER 4: ESTUARIES FROM DONA AND ROBERTS BAYS TO ESTERO BAY

MULLET

by Lisa Figueroa, Taylor Ranch School, Sarasota County

The adult striped mullet is bluish-gray or greenish on top, becoming silver with long stripes on the sides and white on the belly. Adult mullet spawn offshore in the winter, producing 1 to 7 million eggs. Many eggs are eaten before they hatch. Many hatchlings are also eaten. When young mullet reach the size of about one inch, they swim inshore to very shallow water where they find hiding places and food. After reaching two inches in length, these young mullet move into deeper water. Most mullet live 7 to 8 years, but the oldest one on record is 13 years.

Section 1: Lemon Bay

A baby mullet swims from the Gulf of Mexico through Stump Pass. In Lemon Bay, he keeps to the shallows where the mangroves grow. Their prop roots crisscross in the water. Big fish cannot move through the tangle of roots, so the little fish are safe.

The mullet eats tiny animals and plants. Where the water is still, he finds mosquito larvae to eat. He grows bigger.

One day, he is feeding in the seagrass near Cedar Point. A teacher from Cedar Point Environmental Center leads a wading trip. A girl scoops the mullet in a dip net and dumps him into a bucket.

The girl says, "Look! A little fish!"

The mullet sees only the white plastic sides of the bucket.

The teacher looks at the fish. "That's a finger mullet, also called a fingerling."

"I grew up eating mullet," the girl's mother says.

The girl grabs her mother's arm. "Don't eat this one!"

"Don't worry. It's too small to eat," the mother says.

"Let's give it a name," the girl says.

"It already has a name," the teacher says. "*Mugil cephalus*."

"That's a funny name — and hard to say too."

The girl bends over the bucket and whispers to the fish, "Hello, Muggy."

"It's the scientific name for the fish. It means bullet-head or helmet-head," the teacher explains.

The mother looks closely at the fish. "Its head is shaped like a bullet."

The teacher says to the girl and her mother, "Look for a few more minutes and then let it go."

The mother and the girl watch the fish. It doesn't seem to move at all. The girl says, "Okay, Mama, I'm ready to let it go."

The mother pours out the bucket, and Muggy darts away.

"Bye, bye, Muggy," the girl says.

Section 2: Stump Pass Beach State Park

Most visitors drive on Manasota Key Road to Stump Pass Beach State Park to enjoy the Gulf beach. But Muggy swims with many other small mullet between the two islands east of Manasota Key that are also part of the park. The group of mullet is called a school, and it protects the mullet from predators because there is safety in numbers.

Muggy hears a loud noise. Then he sees a boat pass over the seagrass. The motor has a propeller that looks like the blade of a fan. It moves water instead of air. In places, the propeller cuts the seagrass. Sometimes, grass tangles

around the prop and is pulled up by its roots. This kills the grass and leaves a scar, or sandy place, in the meadow of seagrass. Standing in the shallows, a little blue heron watches the school of mullet.

When one mullet strays over the bare sand, the heron eats it. Muggy and the school scoot into the seagrass to hide.

The boat's motor stops, and Muggy hears voices coming from the boat.

"We can't get to Sarasota Bay from here," a woman says.

"Sure we can. But not today," a man says.

"How?" the woman asks. The man points.

"See those red and green signs in the water? They mark the Intracoastal Waterway, a deep channel made for boaters. We can follow it north to Sarasota."

"How long will it take?" the woman asks.

The man says, "I'd say about an hour. First we'll go under the bridge to Englewood Beach, then through Lemon Bay and all along Manasota Key."

"That sounds like fun!" she says.

The man baits the hook on his fishing pole. "It's really fun going through Venice because the waterway is a narrow canal. On the north side of Venice, the channel

goes into Roberts Bay and into Dona Bay and on up to Sarasota."

"That means the city of Venice is an island," she says.

"That's right, thanks to the Intracoastal. But most people don't think of it that way because the waterway is so narrow, and three bridges connect it to the mainland. Most islands have wider stretches of water around them."

"I can't wait to see it," she says.

"Today, I just want to fish," he says. When he casts his line, the boat rocks. A shrimp on a hook plops into the water. The school of fish zips away.

SEAGRASS

by Barbara Davis, Port Charlotte Middle School, Charlotte County

Seagrasses are flowering plants that grow underwater. Like all plants, they need light, so they grow best in clear water. Most grow in the shallows; but if light can reach them, they can thrive in deeper water. There are four common seagrasses: widgeon grass, manatee grass, shoal grass and turtle grass. A rare seagrass is star grass. They all

make oxygen and are food and shelter for many animals. Seagrasses also help keep the water clean by trapping soil particles with their leaves. Dredging kills seagrasses, but even a boat's propellers can cause damage. So in seagrass beds, the boat's motor should be raised or shut off.





Section 3: Don Pedro Island

In Little Gasparilla Sound, Muggy and the school of mullet feed. Today they are in the prop roots near a fishing area of Don Pedro Island State Park.

Muggy and the other mullet hear some splashing in the water. They see the feet and legs of a man and a boy as they wade into the water. Not far from them is a school of big mullet. Some of the fish jump from the water. When they fall back into the water, they make a slapping sound.

The two people stand still for a few minutes. Then the man twists as he throws a cast net. The net spreads over the water and makes an eight-foot circle. As it hits the water, the lead weights around the edges splash. Some mullet are trapped inside. Others get away before the net sinks to the bottom.

The man yanks the draw line of the net. Then he pulls the mullet through the mesh of the net and breaks the neck of each fish.

He tells the boy, "This is called 'choking' the mullet. It kills them so they can't escape. It also bleeds them, so the fillet will be white when we clean them."

Muggy watches.

"How come you don't catch mullet with a hook?" the boy asks.

The man works the net. "You can. But it takes a long time to catch as many as you can with a net. Besides, sometimes a mullet won't bite on a hook."

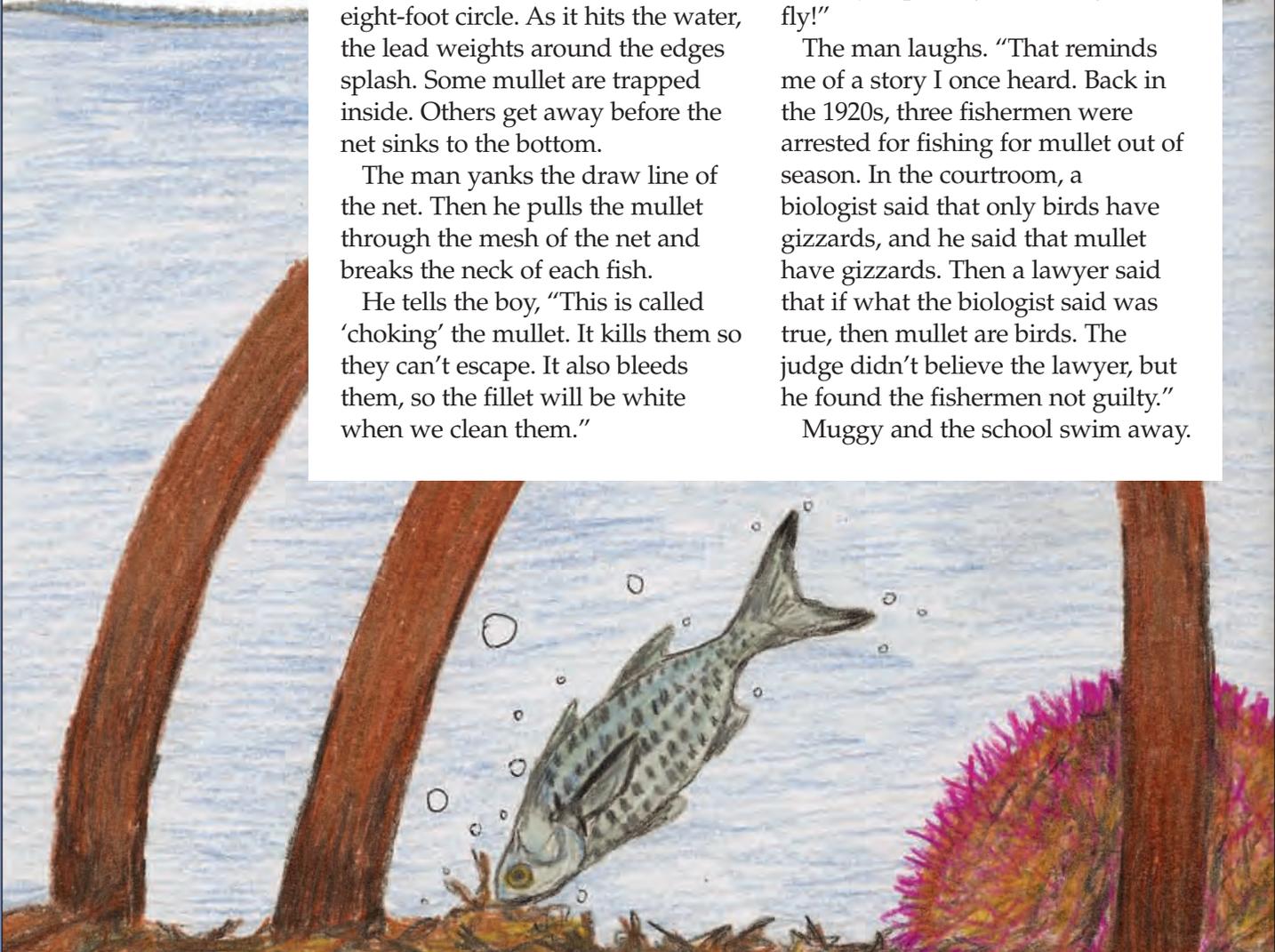
"Why not?" the boy asks.

The man says, "Mullet are different than most fish. They use some of the sand grains that they eat to help them grind their food. It works inside a special part of their body called a gizzard. Chickens and other birds have gizzards too."

The boy says, "Maybe that's why mullet jump! They think they can fly!"

The man laughs. "That reminds me of a story I once heard. Back in the 1920s, three fishermen were arrested for fishing for mullet out of season. In the courtroom, a biologist said that only birds have gizzards, and he said that mullet have gizzards. Then a lawyer said that if what the biologist said was true, then mullet are birds. The judge didn't believe the lawyer, but he found the fishermen not guilty."

Muggy and the school swim away.



Section 4: Cape Haze and Island Bay National Wildlife Refuge

Muggy and the school glide through mangrove roots that grow along one of the islands in Turtle Bay. Twenty acres of the mangrove shore plus some other land form the Island Bay National Wildlife Refuge.

Nearby is a fish shack built on pilings with water all around. It is a historic building because it shows a way of life from the past. Some fish shacks have rotted away, and others have burned, but a few exist.

Muggy and the school of fish glide beneath one. Barnacles and sea squirts grow on the pilings. Muggy hears someone playing a guitar and then footsteps. Muggy sees legs splashing into the water as a man and a boy sit on the deck. Then Muggy hears their voices.

“Tell me the story, Daddy, about the fish shack.”

“You’ve heard it before, son.”

“I know. I want to hear it again.”

The man says, “Fishermen netted so many fish that their boat couldn’t hold them all. They unloaded the fish here and kept on fishing. Another boat, called a ‘run boat,’ picked up the fish and took them to the fish companies in Punta Gorda.”

Muggy swims near their feet. Air bubbles cling to the man’s leg hairs.

The boy asks, “Why didn’t the fishermen just come back and get them at the end of the day?”

Muggy circles the feet of the boy.

His father says, “If it was a good day of fishing, there would be too many. And even if it wasn’t a good day, they would go bad waiting all day. You know how hot it is today? Imagine if the shack were full of dead fish.”

“It would stink!” the boy says. Muggy watches the boy’s toes wiggle.

“That’s right. So the run boat would get the fish to the fish company while it was still fresh. That’s important for any fish, but especially for mullet.”

“Why?”

“No one knows why, but mullet don’t keep. Mulletheads, the people who really love mullet, say you should eat them as soon as you catch them.”

Muggy sees a grouper near one of the pilings. He and the other little fish hurry away.



MULLET LIFE

by Lisa Figueroa, Taylor Ranch School, Sarasota

Striped mullet like warm coastal water that varies from salty to fresh. They live near streams and rivers or in brackish bays, inlets and lagoons with sand or mud bottoms. They school — swim together — for protection. Larger

fish, turtles, water snakes and wading birds prey on them. Mullet often leap from the water, and some scientists think they are escaping predators. Others think they are clearing their gills and collecting oxygen since they

live in oxygen-poor water. They are always eating tiny animals (zooplankton), bottom-dwelling (benthic) organisms, bits of dead plants and animals (detritus) and small animals with no bones (invertebrates).

Section 5: Gasparilla Island State Park and Cayo Costa State Park

Muggy sees the large silvery flashes of a silver king tarpon. Most fish get oxygen from the water through their gills, but tarpon also have a

swim bladder that works like a lung. Like a roller coaster, they move up and down, in and out of the water. When they are out of the water, they can breathe air.

Sometimes water in Charlotte Harbor can be very low in oxygen. Schools of mullet must swim away to survive, but tarpon can stay because they breathe oxygen from the air.

A channel marker guides boats bringing people to Cayo Costa State Park. An anhinga sits on the marker and holds its wings open to dry. It watches Muggy and the school of fish twist in and out of the maze of mangrove roots.

Three brown pelicans skim low across the water. The channel is called Pelican Pass. Boats go through the pass into Pelican Bay, stopping at the docks.

Muggy hears splashing. He watches the feet of a girl and boy wading into the water. He hears the girl say, "Do you see the little fish?" She points to Muggy and the other mullet.

The boy says, "Yeah, but this is nothing like Gasparilla

Island State Park where we were yesterday."

"That seemed like a desert to me — all hot sand," says the girl.

"But what about those cool iguanas!" The boy reaches into the water to pick up a shell. Muggy and the other fish dart away.

The girl says, "I didn't like the iguanas. They look scary. And they don't belong there. They chase away the animals that are supposed to live there."

"I liked chasing them." The boy tosses his shell. Muggy hears the "kerplop" when it hits the water and watches the shell sink to the bottom.

The girl says, "I liked that old lighthouse. A family lived there, and I thought about how it would feel to live there."

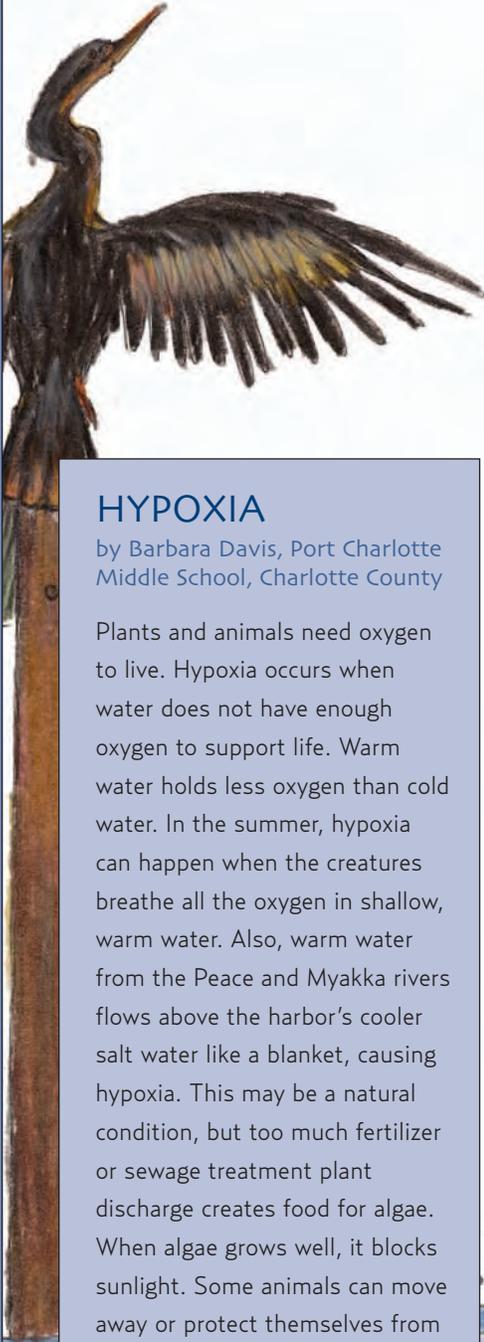
"Oh, who cares about some old building. Let's go," the boy says.

They turn and run back to the shore. Muggy and the mullet scoot away.

HYPOXIA

by Barbara Davis, Port Charlotte Middle School, Charlotte County

Plants and animals need oxygen to live. Hypoxia occurs when water does not have enough oxygen to support life. Warm water holds less oxygen than cold water. In the summer, hypoxia can happen when the creatures breathe all the oxygen in shallow, warm water. Also, warm water from the Peace and Myakka rivers flows above the harbor's cooler salt water like a blanket, causing hypoxia. This may be a natural condition, but too much fertilizer or sewage treatment plant discharge creates food for algae. When algae grows well, it blocks sunlight. Some animals can move away or protect themselves from hypoxia; but others, like plants, cannot.





Section 6: Pine Island Sound and National Wildlife Refuge

Muggy and the school of mullet swim through Pine Island Sound. There are 17 islands in the Pine Island National Wildlife Refuge. Some of these mangrove islands are closed to the public and are home to herons, egrets and pelicans. These birds like to eat mullet, so the school stays away.

Pine Island Sound is home to many kinds of shellfish, including clams. Just west of Cork Island, the school of mullet swims over clams growing under mesh. They have been “planted” by clam farmers. The mesh protects the clams from being eaten by stingrays, sheepshead, blue crabs,

tulip shells or king’s crowns. The farmers have to remove sponges, sea squirts and barnacles that grow on the mesh so the clams will live.

A boat drifts above and Muggy hears the first man say, “Fishing for a living was easier before the net ban.”

“You bet,” the second man says.

The first man says, “Remember when we were mullet wrappers? We knew we had a school when a bunch of mullet started jumping.”

“Or when the pelicans started circling and diving. Don’t forget them.” The second man laughs.

The first man says, “I hated it when they tried to steal the

mullet as we wrapped the nets around the school.”

Muggy noses the hull of the boat.

“That was the fun part. The real work was hauling that net in, pulling the mullet through the mesh and icing them down,” the second man says.

“It was work, but not like farming clams,” the first man says. “At least when we were out in the boat, I felt free.”

“You’re out in the boat now, free as can be!” the second man says.

“It’s not the same,” the first man says.

Muggy and the school of mullet scoot away.

SHELLFISH AND AQUACULTURE

by Carol Mahler

More than 275 kinds of shellfish live in the estuary. In the past, people harvested clams, oysters and scallops to eat. Shellfish feed on things floating in the water, so they work as filters. If the water is clean, the shellfish are healthy. But when red tide, bacteria or chemicals are in the water, the shellfish keep those harmful things. They can cause the

shellfish to die, or the shellfish may make the people who eat them sick. Pollution has closed many parts of the estuary to shellfishing, but not Gasparilla Sound and Pine Island Sound. Clam farmers there lease bottomlands to raise clams for people to eat. This is a type of farming called aquaculture.

Section 7: Sanibel Island and San Carlos Bay

A frigate bird soars above the J. N. "Ding" Darling National Wildlife Refuge on Sanibel Island. San Carlos Bay washes the shores of the refuge. Muggy and the school of mullet explore the shallow water where roseate spoonbills feed. Great blue herons wade in the water. Ibis sit on the prop roots of the mangroves.

Beneath another mangrove, Muggy looks up. He thinks he sees a cloud, but it's not a cloud. It's a snowy egret stabbing the water with its sharp bill. It grabs a fish near Muggy, and Muggy zips away.

The school of mullet passes the edge of Sanibel Island. A road, called a causeway, links Sanibel to the mainland. The causeway

includes three bridges and two islands. The islands were made by spoil from dredging. Before it was built, the water flowed easily through San Carlos Bay. Now the islands of the causeway block the flow and push a strong current under each of the bridges.

That strong current pulls the mullet toward the channel. A loud roar scares Muggy and the other mullet. Dredges are working along the causeway. Like vacuum cleaners, they suck up the sand from the boat channel. The sand, or spoil, is pumped out. The sand is sometimes used to build the islands between the bridges.

The school of mullet tries to circle around the dredge. But one mullet is too close, and the pipe swallows it. When it is dumped out with the sand, it is already dead. Many other animals and fish are also killed. The spoil smells like rotting fish for many days.

Some of the dead fish float out into the water. A blacktip shark is eating them. The school of mullet turns away, and the shark chases them. The school zigzags in the water. Because it is so big, the shark can't turn as quickly, and Muggy and the school escape.

An osprey soars above the school and dives toward the water. It grabs a mullet and flaps its wings. It flies to its nest carrying the heavy mullet. Muggy and the other mullet zip into the seagrass. They see several manatees. The manatees graze on the seagrass, and the mullet eat the tiny plants and small animals that live on or in the seagrass. The mullet and the manatees feed together.

BARRIER ISLANDS

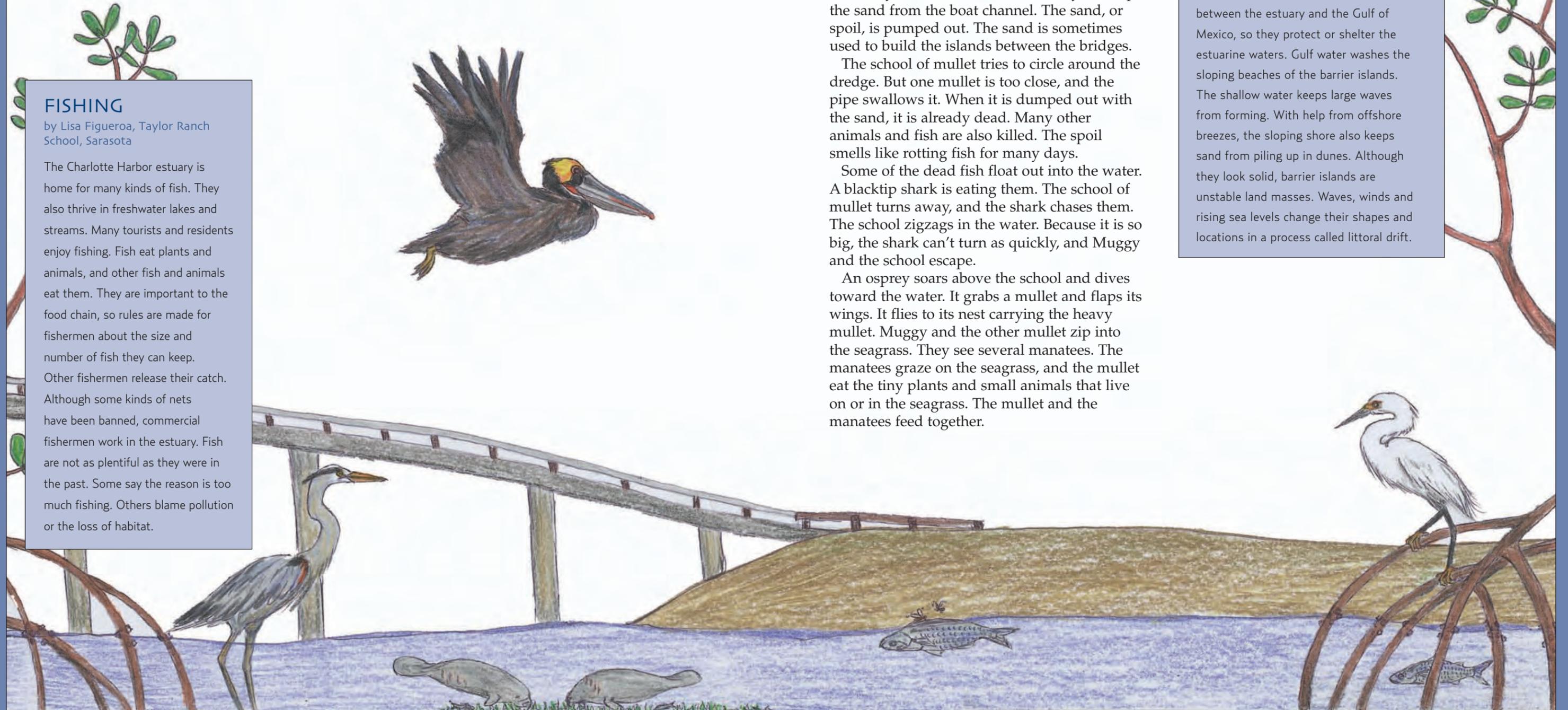
by Carol Mahler

Hickory Island, Lovers Key-Black Island, Estero Island, Sanibel Island, Captiva Island, North Captiva Island, Cayo Costa, Gasparilla Island, Little Gasparilla Island, Don Pedro Island and Manasota Key are all barrier islands. They are located between the estuary and the Gulf of Mexico, so they protect or shelter the estuarine waters. Gulf water washes the sloping beaches of the barrier islands. The shallow water keeps large waves from forming. With help from offshore breezes, the sloping shore also keeps sand from piling up in dunes. Although they look solid, barrier islands are unstable land masses. Waves, winds and rising sea levels change their shapes and locations in a process called littoral drift.

FISHING

by Lisa Figueroa, Taylor Ranch School, Sarasota

The Charlotte Harbor estuary is home for many kinds of fish. They also thrive in freshwater lakes and streams. Many tourists and residents enjoy fishing. Fish eat plants and animals, and other fish and animals eat them. They are important to the food chain, so rules are made for fishermen about the size and number of fish they can keep. Other fishermen release their catch. Although some kinds of nets have been banned, commercial fishermen work in the estuary. Fish are not as plentiful as they were in the past. Some say the reason is too much fishing. Others blame pollution or the loss of habitat.

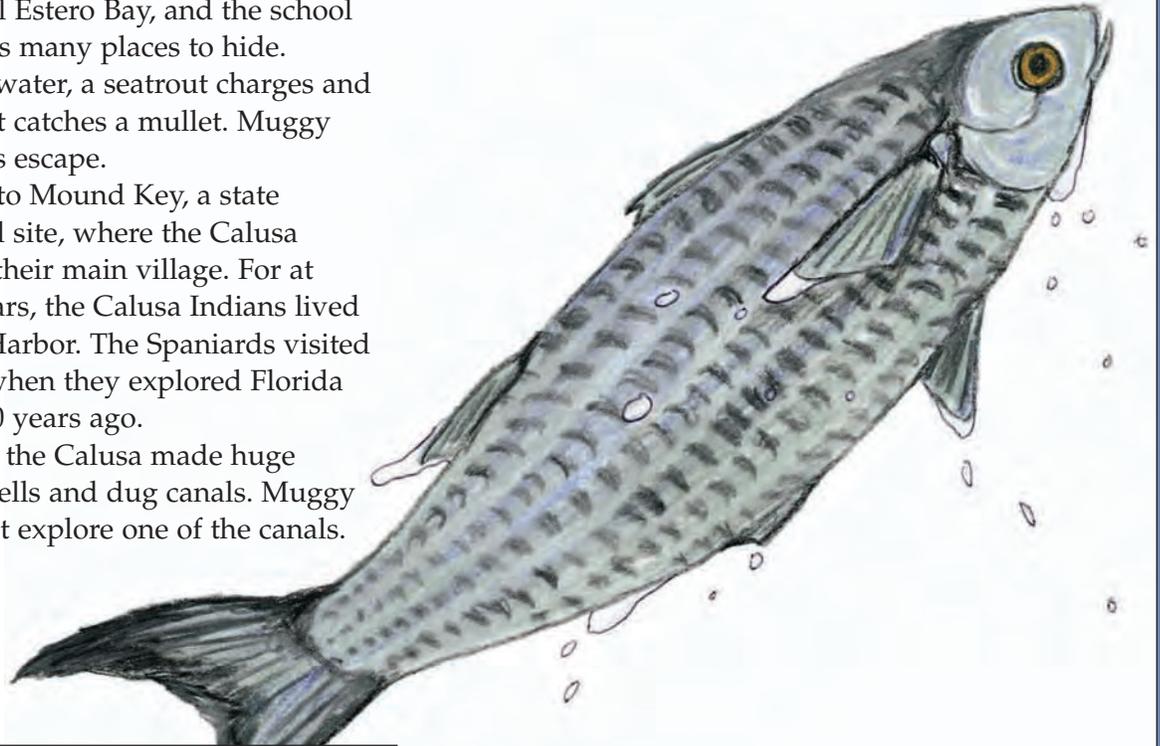


Section 8: Mound Key Archaeological State Park

Large seagrass meadows and many mangroves fill Estero Bay, and the school of mullet finds many places to hide. From deeper water, a seatrout charges and chases, until it catches a mullet. Muggy and the others escape.

They swim to Mound Key, a state archaeological site, where the Calusa Indians built their main village. For at least 2,000 years, the Calusa Indians lived in Charlotte Harbor. The Spaniards visited Mound Key when they explored Florida more than 500 years ago.

On this key, the Calusa made huge mounds of shells and dug canals. Muggy and the mullet explore one of the canals.



INTRACOASTAL WATERWAY

by Lisa Figueroa, Taylor Ranch School, Sarasota

Florida has lost about 60,000 acres, or 8 percent, of its estuaries to dredge-and-fill activities. Like digging in the sand, dredging displaces large amounts of sand to create channels for boats. Dredged in the 1960s, the Intracoastal Waterway is a channel 9 to 12 feet deep that allows boats to travel fast without going into the open water of the Gulf of Mexico. If you don't spend a lot of time boating, you may not realize that boats can hurt manatee. Manatee cannot hear low-frequency noises, such as boat motors, and they cannot move quickly out of a boat's path. Many die from propeller injuries, while others survive with huge gashes on their bodies. Pollution from boating and trash from careless people can also hurt plants and animals in the estuary.

Mangroves grow in it. Fiddler crabs crawl along the roots, and spiders spin webs through the branches. Muggy can hear a prairie warbler trilling its notes. Then a snook charges up the canal. The school of mullet scatter. Some wiggle between the mangrove roots. Muggy and the other mullet turn back to the bay. They race through the canal, and the snook chases them.

Muggy and two other mullet zip into the bay. A bald eagle swoops toward them and snatches one mullet in its talons. The snook grabs the other. The third is Muggy. He searches through the seagrass for the rest of the school, but he can't find them. After a while, he jumps into the air. He does not jump like a dolphin, which dives head first and curves its body. Muggy holds his body stiff. Instead of his nose, his belly hits the water first, and he looks like someone making a belly flop.

Mullet in the mangroves and in the seagrass hear Muggy jump. They glide toward the sound. Now Muggy is in a school of fish again.

Section 9: Estero Bay Preserve State Park

Muggy sees two kayaks and hears the dipping of the paddles. The paddles stop, and the kayaks drift near the mangroves. Muggy hears the girl say, "I've never seen a river like Estero."

Her uncle says, "And it's been used by people for a long time."

She says, "It sure doesn't look like it."

"What did you think about that Koreshan community?" her uncle asks.

She says, "They had some funny ideas! I can't believe they planted melaleuca trees because they wanted to dry up the Everglades!"

"I know." The man drinks from a water bottle. "Melaleuca also keeps any other plants from growing, and animals and birds need those plants to live."

From underwater, Muggy watches a crab crawling on the prop roots.

The girl says, "I saw a bunch of dead melaleuca trees along Interstate 75."

He says, "It's a lot of work to kill them. Workers have to inject them with a chemical,

a little at a time, so the trees die slowly. If the tree thinks it's dying, it releases a million seeds, and each one will grow a new tree."

"What a mess!" she says. Her kayak rocks as she shifts her weight. In the shade of the kayaks, Muggy sees comb jellies and sea horses in the seagrass.

The girl says, "I'm a mess too. My arms hurt already, and we haven't gone very far on the blueway."

He says, "I love these blueway trails because it's a nature trail for canoes and kayaks. It's the best way to enjoy Estero Bay and the other estuaries."

She asks, "Didn't you say Estero Bay was the only aquatic preserve in Florida?"

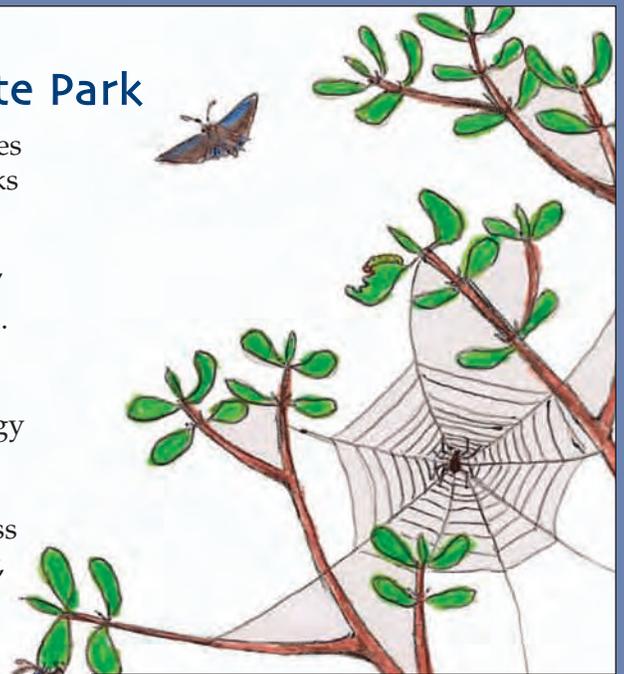
He says, "It isn't the only one, but it was the first."

Muggy sees a needlefish. The school dives deeper into the mangrove roots.

The girl asks, "Can we paddle all of the blueway trails?"

Her uncle says, "We will, but not today. Let's go."

Their paddles dip into the water, and Muggy shifts with the movement.



FLORIDA AQUATIC PRESERVES AND STATE BUFFER PRESERVES

by Carol Mahler

In 1966, residents and legislators worked to mark special natural areas of fresh water, salt water and a mix of the two. The six areas around Charlotte Harbor are Lemon Bay Aquatic Preserve, Cape Haze Aquatic Preserve, Gasparilla Sound/Charlotte Harbor Aquatic Preserve, Pine Island Sound Aquatic Preserve, Matlacha Pass Aquatic Preserve and Estero Bay Aquatic Preserve. The boundaries are the high tide lines of the named bodies of water and their tributaries upstream as far as the tide reaches. Most of the open water in Charlotte Harbor estuary is included in the six preserves. Also, since the 1970s, more wetlands and uplands near the shores have been protected and are now part of the Charlotte Harbor and Estero Bay buffer preserve state parks.





Section 10: Lovers Key State Park

Estero Boulevard bridges Big Carlos Pass and New Pass and goes through Lovers Key State Park. Muggy hears the noise of cars and trucks.

The school of mullet feeds with sea horses and pipefish in the seagrass that grows between Lovers Key and Long Key. Suddenly, Muggy sees a large shape, but he is not afraid. It is a sea turtle.

The mullet swim into the shade of an observation platform. Four legs and feet dangle in the water, two large and two small. Muggy hears the talking of the people on the platform.

"I can't believe how many turtle nests we saw on the beach," a girl says.

"Sea turtles like this beach," her mother says.

"This place is so beautiful," the girl says.

"And if it hadn't been saved from development, it would look just like Fort Myers Beach," her mother explains.

"It seems built up enough, with the parking lot, roads, picnic tables, shelter and restrooms," the girl says. She moves her legs back and forth in the water, and Muggy plays in the currents that she makes.

Her mother says, "I wish it had become a park before the developer dug those canals in Black Island, where we hiked."

The girl asks, "What's wrong with canals?"

Her mother replies, "Black Island was mangrove wetlands. As workers dredged the canals, they piled the spoil beside them. It made the land higher, and now it is uplands where mangroves can't grow. That higher land is home to plants and animals that never lived there. The ones that used to live there, like the mangroves, had to find other places."

"Does that include people?" The girl rests, and Muggy circles her legs.

Her mother says, "There are artesian wells where fresh water flows from the ground without being pumped. People used to live here in fish camps."

"I wish I could have seen it before the changes!" The girl kicks both feet up. Water flies across the surface and falls like raindrops. She plunges her feet back into the water with a splash. Muggy and the mullet scatter for a moment, but they gather again. Maybe Muggy has found a home with them.

Her mother says, "The story's the same throughout the Charlotte Harbor estuary. Somehow we have to find a place for everyone — even the plants and animals — to live."

