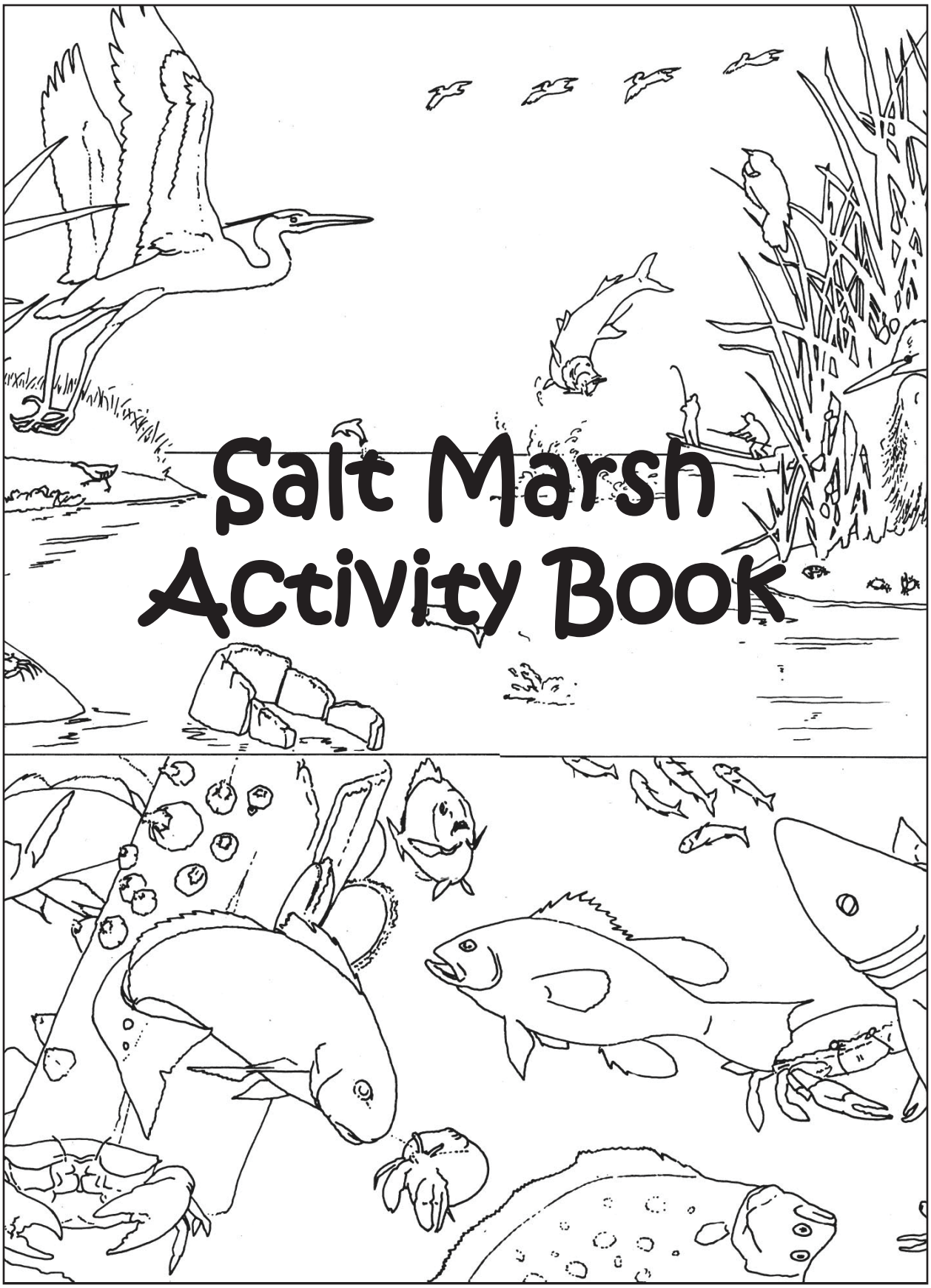
Salt Marsh Activity Book



This activity book supplements the *Guide to the Salt Marshes and Tidal Creeks of the Southeastern United States* publication that was created for the From Seeds to Shoreline$_{sm}$ education program. For online access to the *Guide*, and for more information about the From Seeds to Shoreline$_{sm}$ program, please visit the websites below.

***Guide*:** www.saltmarshguide.com

From Seeds to Shoreline$_{sm}$: www.scseagrant.org/education

Salt Marsh Activity Book

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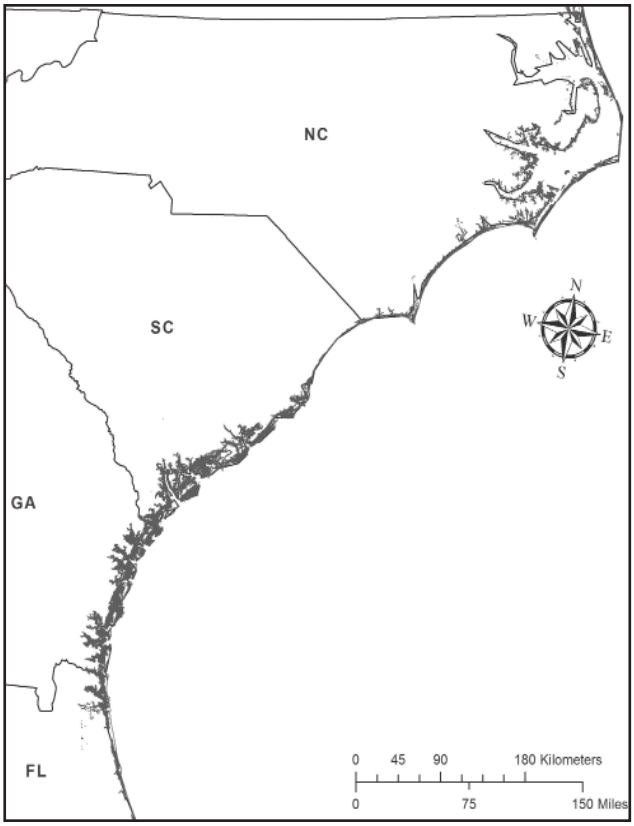
What is a salt marsh?

The salt marsh is an ecosystem that is found along the coast near the waters of the estuary. An estuary is where rivers (freshwater) meet the sea (salt water). Daily tides move water in and out of the salt marsh ecosystem, causing the area to be flooded during certain parts of the day.

Salt marshes can be found all the way from Maine to Florida along the east coast of the United States. Most of the salt marsh habitat is in the Southeast. South Carolina and Georgia each have about 350,000 acres of salt marshes; North Carolina has about 225,000 acres; the northeast Florida coast has about 83,000 acres.



Map of Southeastern salt marsh abundance

Fun Fact: Together, North Carolina, South Carolina, Georgia, and northeast Florida have almost two-thirds of the salt marsh habitat found along the east coast!

Benefits of the salt marsh

Salt marshes are helpful in many ways including keeping our water clean, protecting us from flooding, providing habitat for animals and plants, and supporting fun activities. Some of the main benefits the salt marsh provides to people are:

- **Clean Water** - A healthy salt marsh removes pollution from the water. This makes it safe for us to swim and fish.

- **Flood Protection** - Salt marsh plants and oyster reefs help stop strong waves that happen during strong storms, such as hurricanes. This helps protect our land and houses from flooding.

- **Seafood** - The salt marsh provides a habitat for many of the animals humans eat for food including oysters, crabs, and fish. Some people have jobs catching these animals to sell to other people.

- **Recreation** - People spend hours enjoying the salt marsh ecosystem. Some people fish while others spend their time kayaking or bird watching.

How does a salt marsh help you?

Threats to the salt marsh

Over half of the people in the United States live along the coast. Because of the natural beauty of the salt marsh, many people want to live near it. It is important to protect this ecosystem so that others can enjoy the marsh now and in the future. Some of the main threats to the salt marsh are:

- **Development** - Roads, parking lots, and rooftops do not let rainfall drain into the soil. Instead, the rainfall runs off into nearby marshes, carrying pollution with it. Some examples of pollution include litter, oil/gas, and pet waste.

- **Litter** - Trash that gets washed into the salt marsh can trap animals and crush plants. It can also break into small pieces that animals eat, making them sick.

- **Invasive species** - Some plants and animals we see in the salt marsh are not supposed to live there. These are called invasive species and they compete with other plants and animals for food and habitat.

- **Sea level rise** - As our planet warms up, glaciers melt and flow into our ocean. This causes our seas to rise, which could lead to our salt marshes drowning.

Can you think of other threats to the salt marsh?

Salt marsh word search

Can you find all the salt marsh words in the puzzle below?
Words will go from left to right and from top to bottom.

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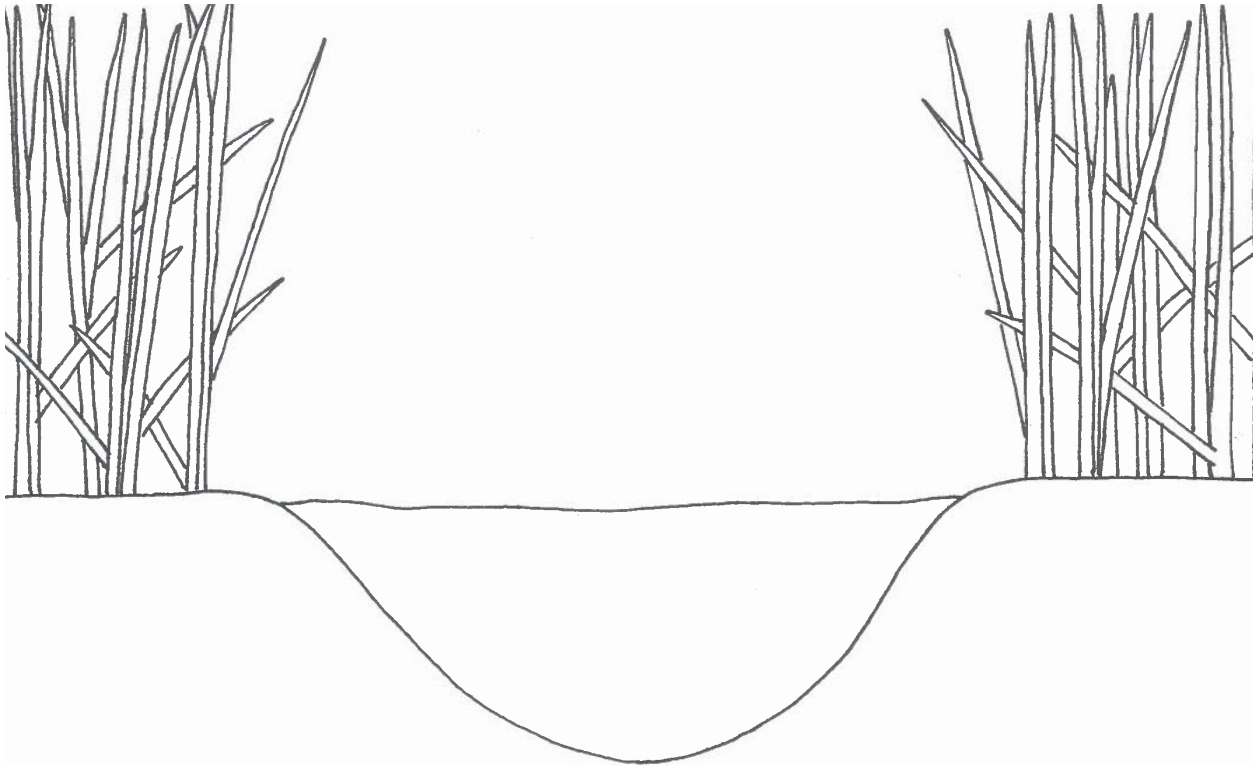
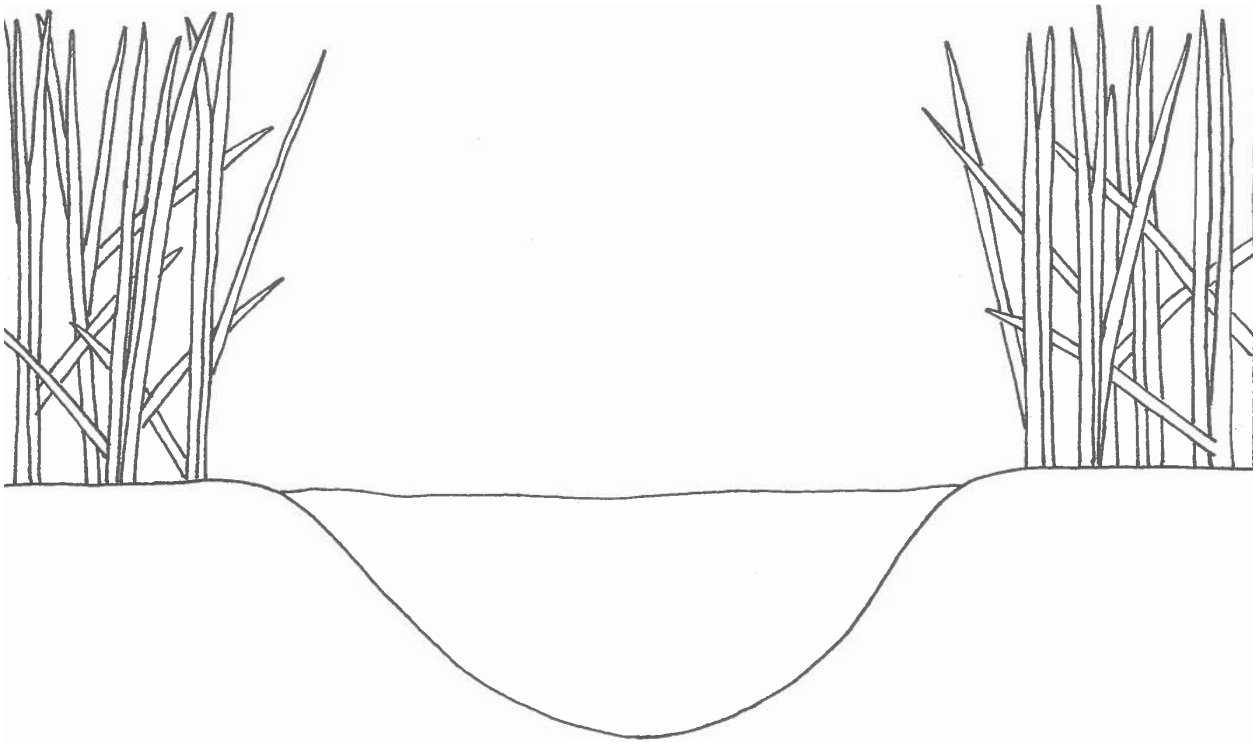
S	U	E	W	O	Q	Z	T	I	D	E	S	I	U	K
T	Z	E	L	Y	B	H	K	O	Q	A	V	M	Y	Z
U	C	K	D	S	G	U	F	F	W	H	T	F	N	P
A	L	O	I	T	W	Y	J	T	N	G	Q	I	R	Z
R	I	V	Q	E	B	D	S	H	C	X	K	S	G	J
Y	B	H	L	R	O	P	V	D	O	L	P	H	I	N

BIRD
CORDGRASS
DOLPHIN
ESTUARY
FISH
OYSTER
PLUFF MUD
SALT MARSH
SHARK
SNAIL
TIDAL CREEK
TIDES

Can you draw animals in the salt marsh?

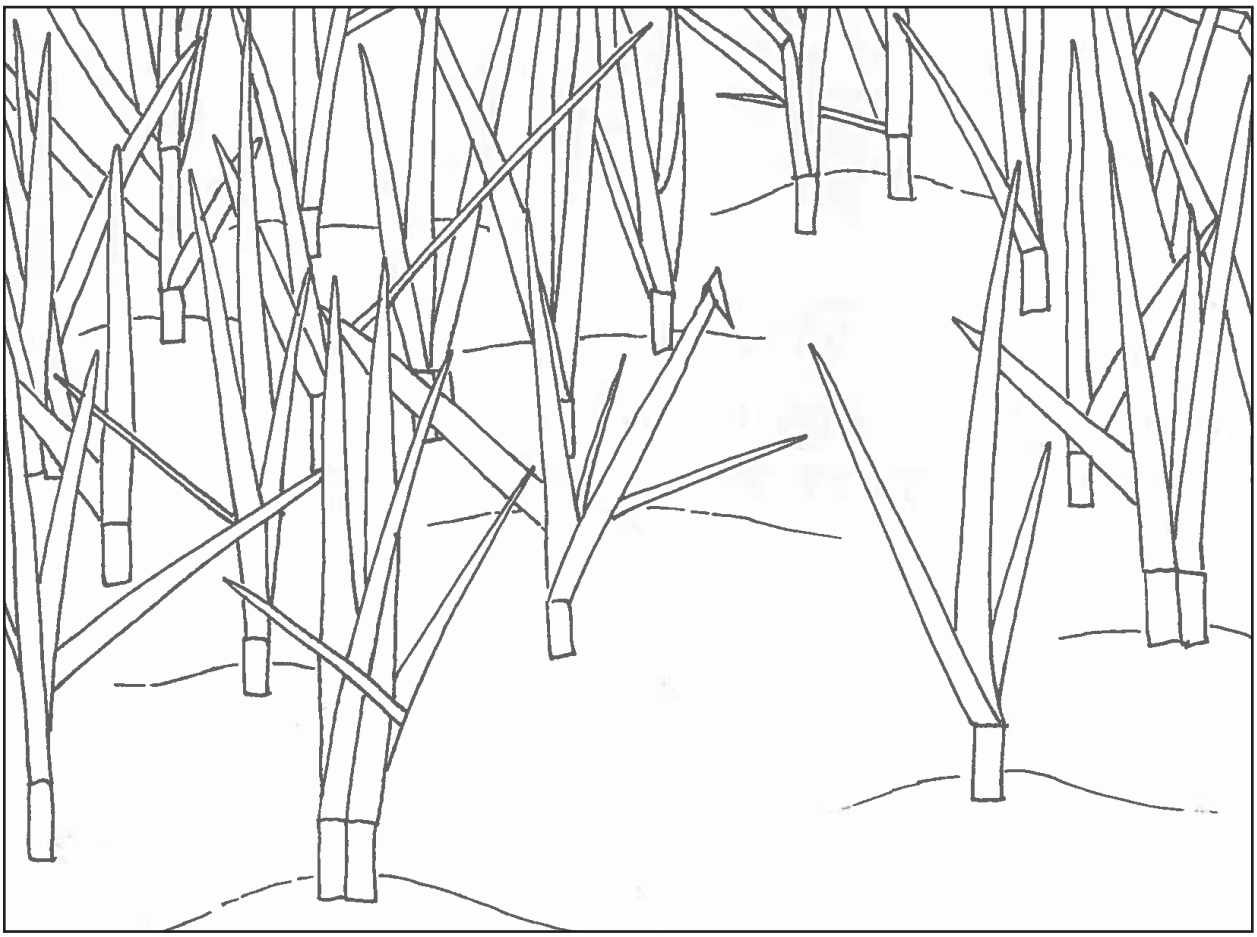


Can you draw things that do not belong?



Smooth cordgrass

Spartina alterniflora



Spartina is a grass found throughout the salt marsh, and changes colors depending on the season.

Spartina can survive in salt water and live along tidal creeks because of special adaptations.

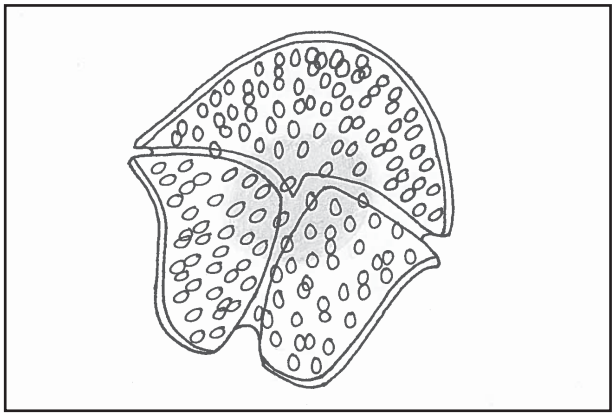
Fun fact: *Spartina* can grow nearly 8 feet tall!

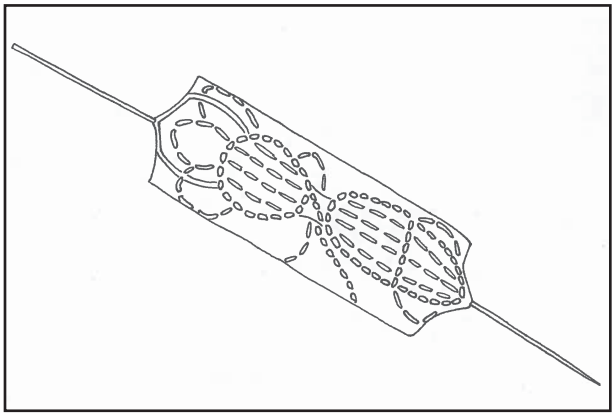
Which seasons do you think *Spartina* is bright green?

Answer: *Spring and Summer*

Phytoplankton

Phytoplankton are free-floating plants or algae at the bottom of the food chain. They drift with the currents in both fresh and salt water, and can cling to *Spartina* blades where they are eaten by grazing periwinkle snails.

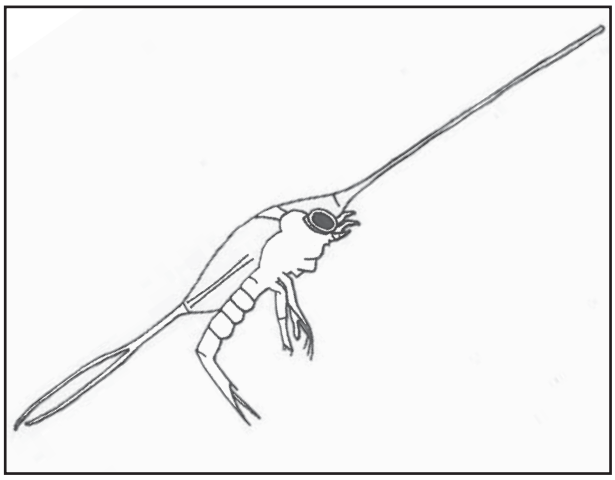


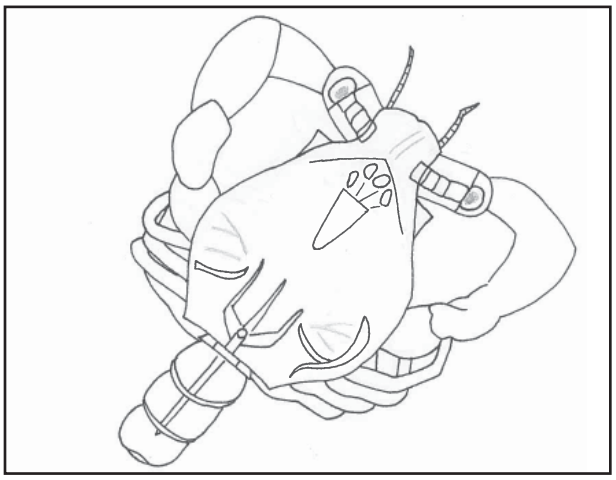


Fun fact: Phytoplankton produce most of the oxygen that we breathe!

Zooplankton

Zooplankton are tiny animals that drift with the currents. Together, zooplankton and phytoplankton form the base of the food chain.



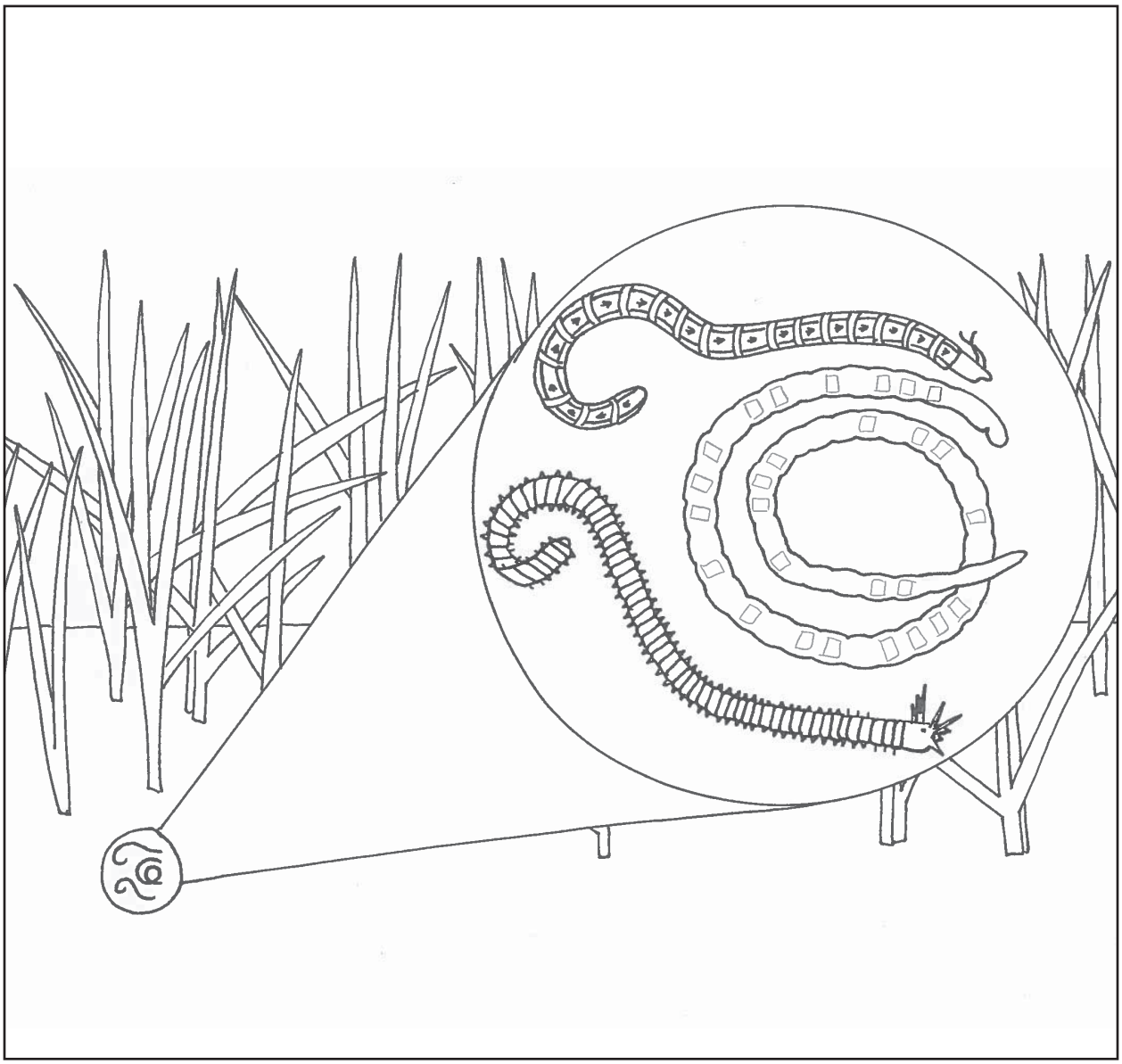


Fun fact: Some zooplankton grow into larger animals, such as fish and crabs!

Annelid worms

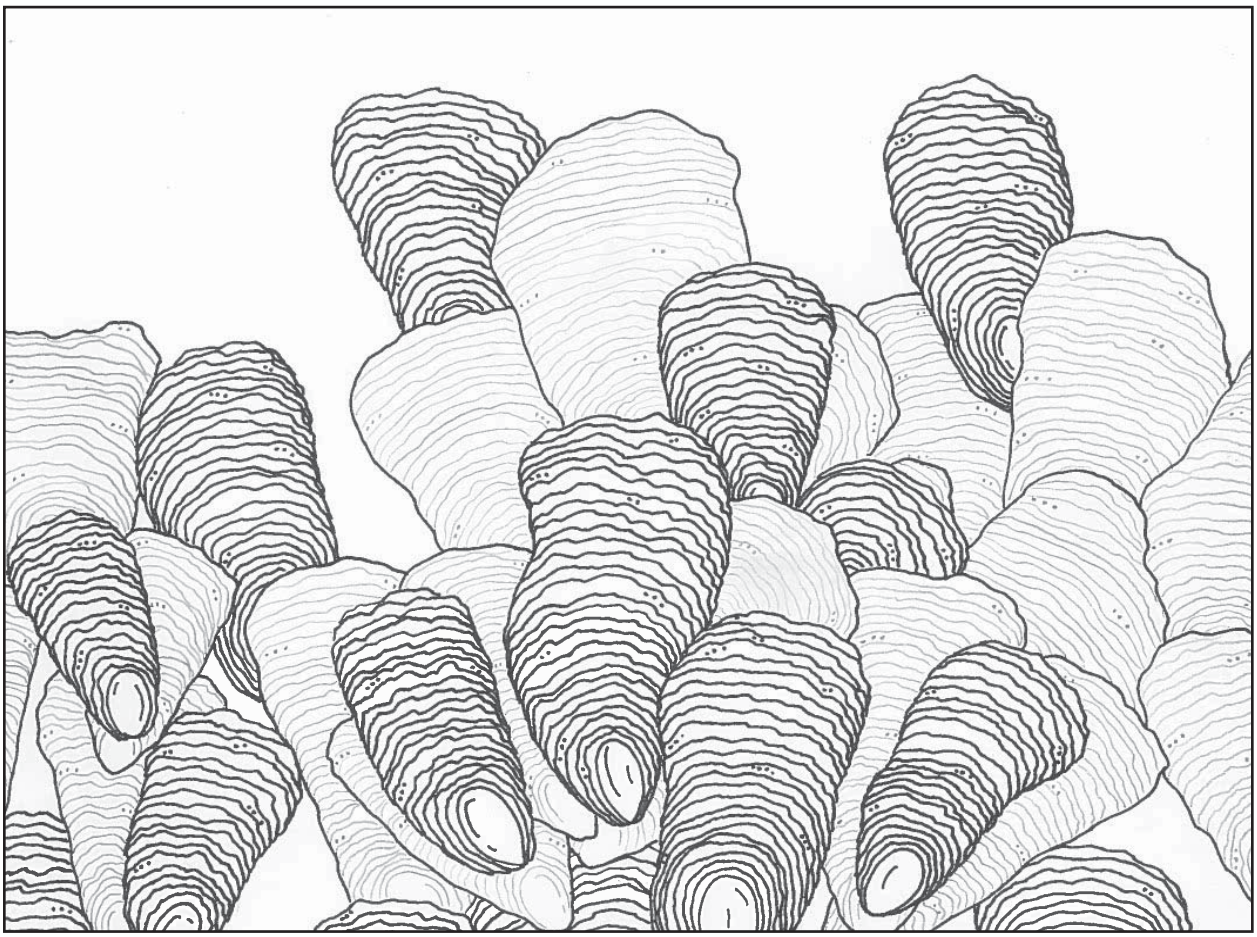
Annelids are any worms with sections on their body. Some of the worms you may see in the salt marsh are like the earthworms you dig up in your yard.

Fun fact: Some salt marsh worms move through the mud to feed while others create tubes to live in and wait for food to pass by their mouths!



Eastern oyster

Crassostrea virginica



Oysters have two shells that open to feed and close to protect themselves from drying out at low tide.

Oysters grow together to form a reef, which provides habitat for many fish, worms, and crabs!

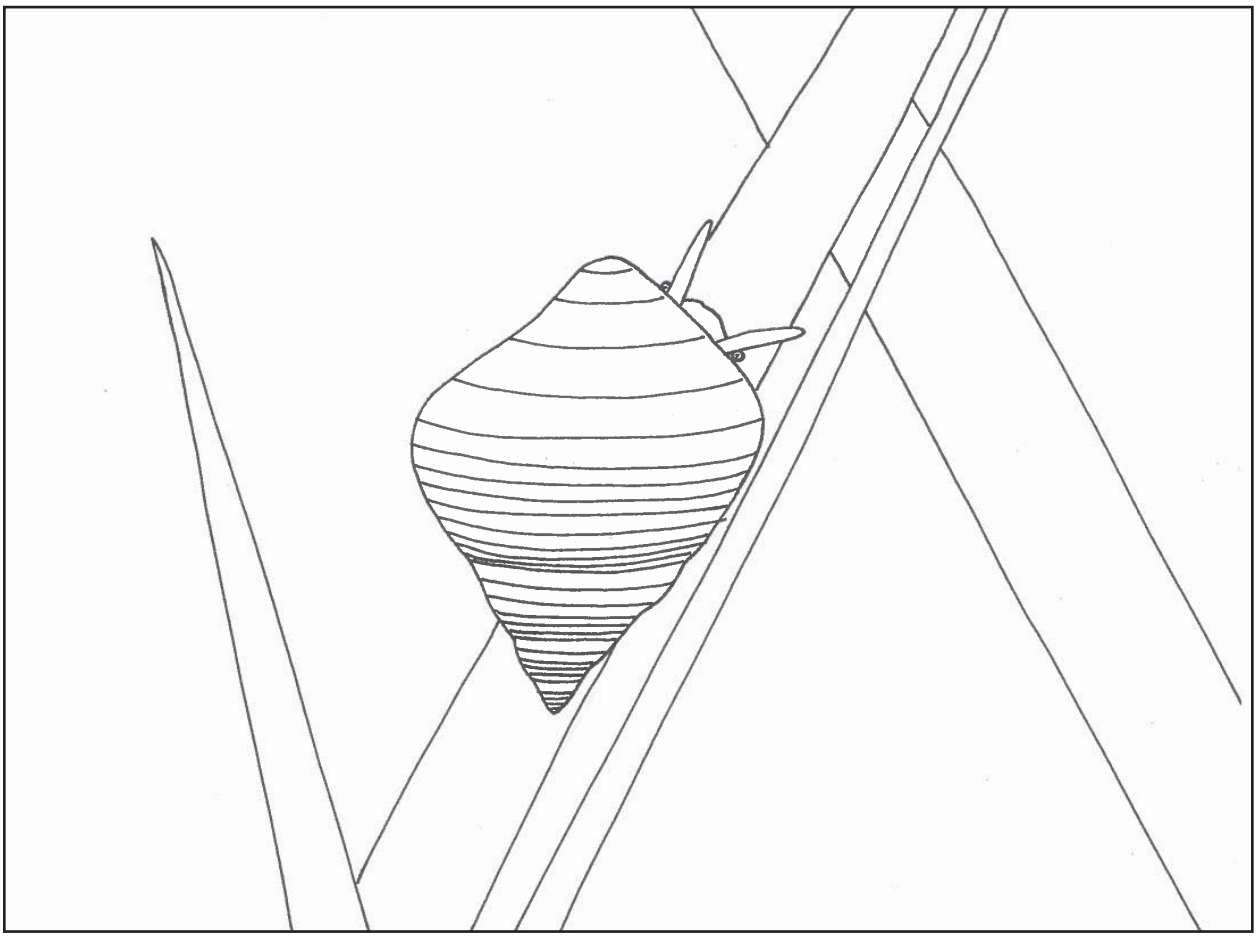
Fun fact: Adult oysters can filter up to four gallons of water an hour which helps keep our water clean!

Where do you find oysters in the salt marsh?

Answer: ***In tidal creeks***

Marsh periwinkle

Littoraria irrorata



The marsh periwinkle is a snail that has a dark brown to white shell.

Periwinkle snails climb up *Spartina* grass at high tide to escape being eaten and to feed.

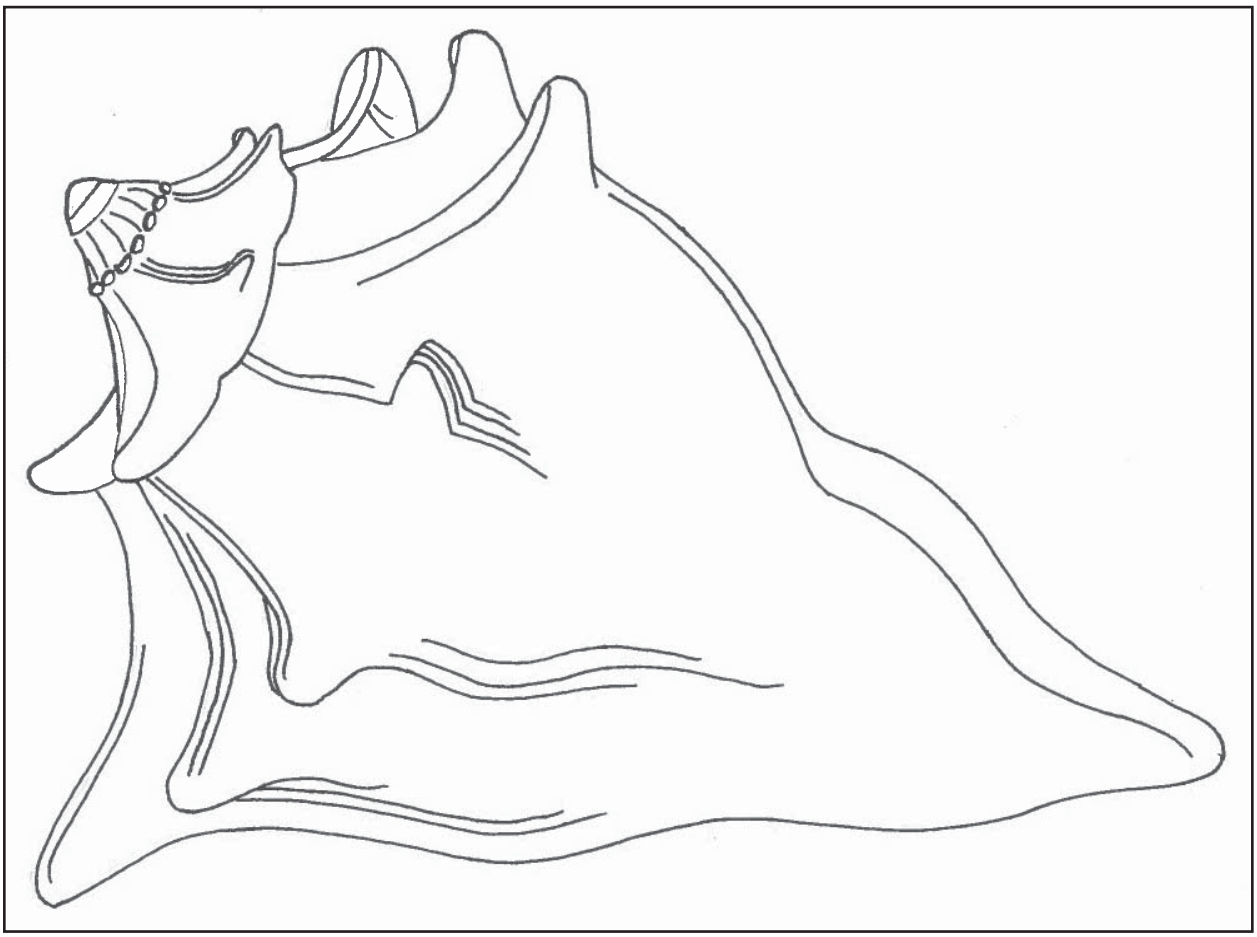
Fun fact: Some periwinkle snails spend their entire life on one blade of *Spartina*!

What do you think eats periwinkle snails?

Answer: ***Blue crabs and diamondback terrapins***

Knobbed whelk

Busycon carica



Knobbed whelks can be found in tidal creeks, often near oyster reefs.

Knobbed whelks lay a string of eggs, which often get washed up on the beach.

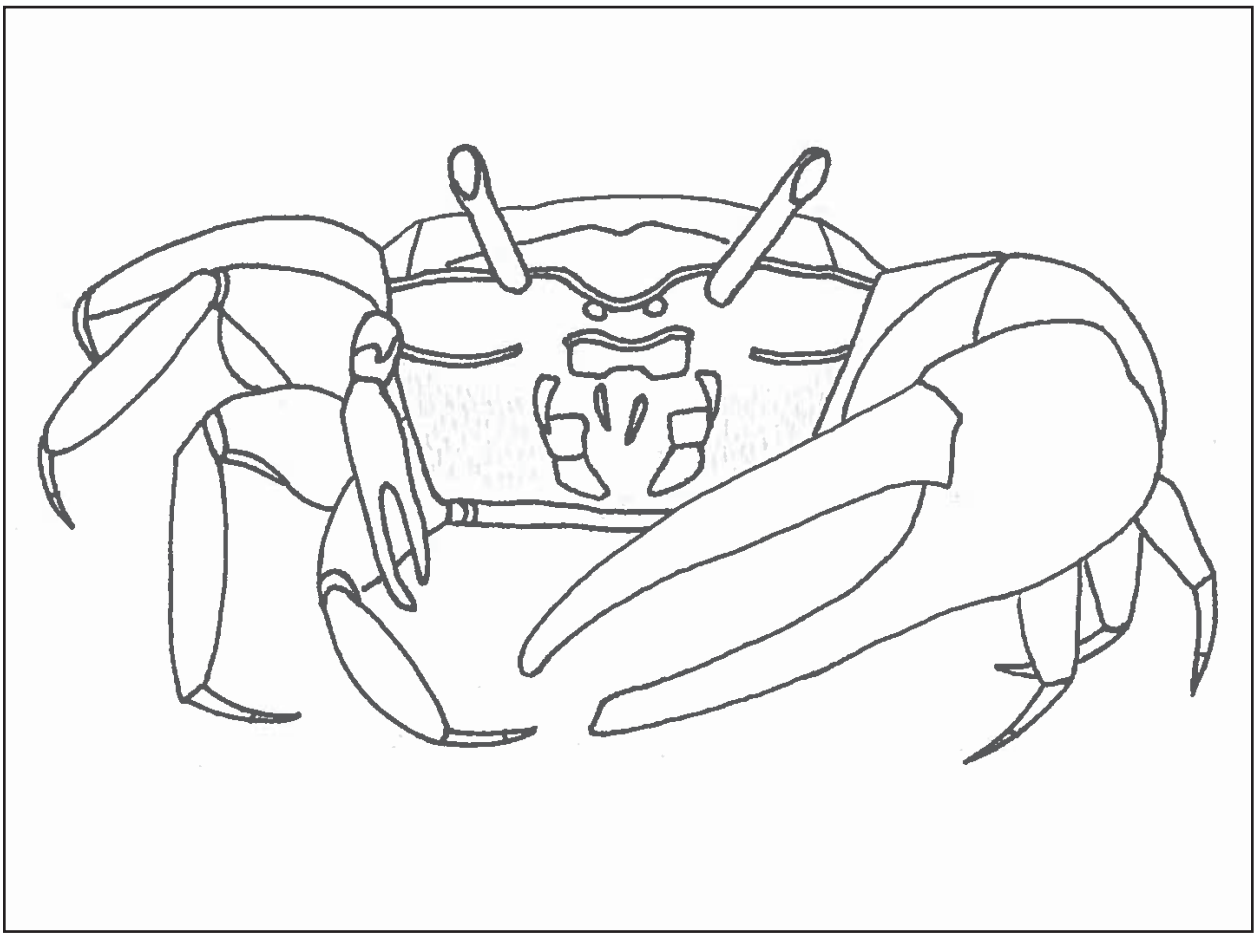
Fun fact: Knobbed whelks are born with a shell, and as the body grows, the shell grows with it in a spiral!

What do you think knobbed whelks eat?

Answer: *Clams, mussels, and oysters*

Mud fiddler crab

Uca pugnax



Mud fiddler crabs have eyes at the end of long stalks and a light "H" shape on their back.

Mud fiddler crabs dig small holes in the mud, and you can often see small balls of mud near the opening.

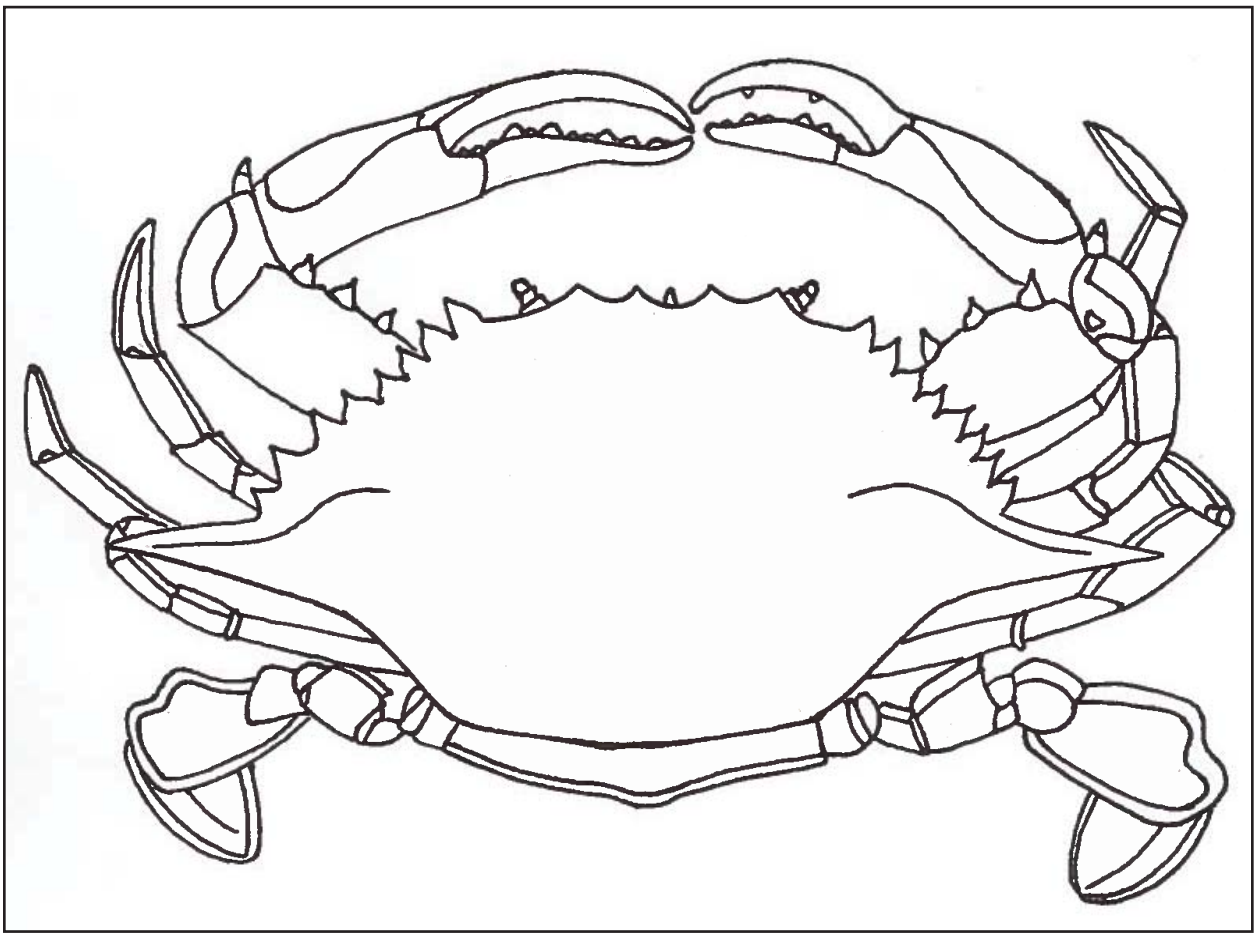
Fun fact: Males have one large and one small claw and females have two small claws!

Is the mud fiddler crab above a male or female?

Answer: Male

Blue crab

Callinectes sapidus



Blue crabs have a pair of paddle-like legs used for swimming, and three pairs of legs used for walking.

Blue crabs are found in many habitats and are scavengers, meaning they eat whatever they can find.

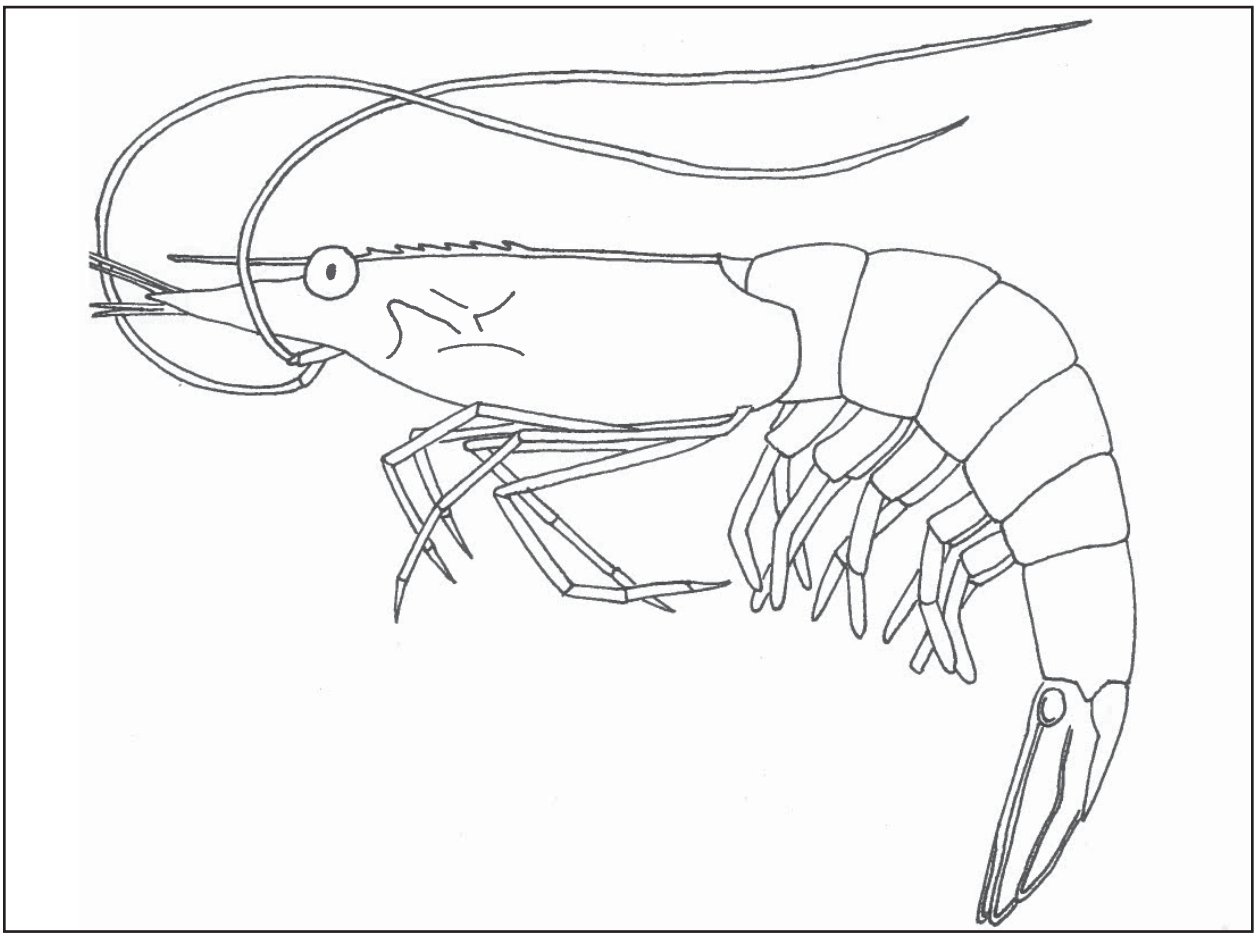
Fun fact: The tips of male claws are blue and the tips of female claws are red!

Can you circle the legs used to swim?

Answer: The two legs on the bottom

White shrimp

Penaeus setiferus



Shrimp have long white bodies with black speckles and dark eyes in the shape of kidney beans.

Shrimp move around, young shrimp can be found way up the tidal creeks, then move into the ocean as they grow.

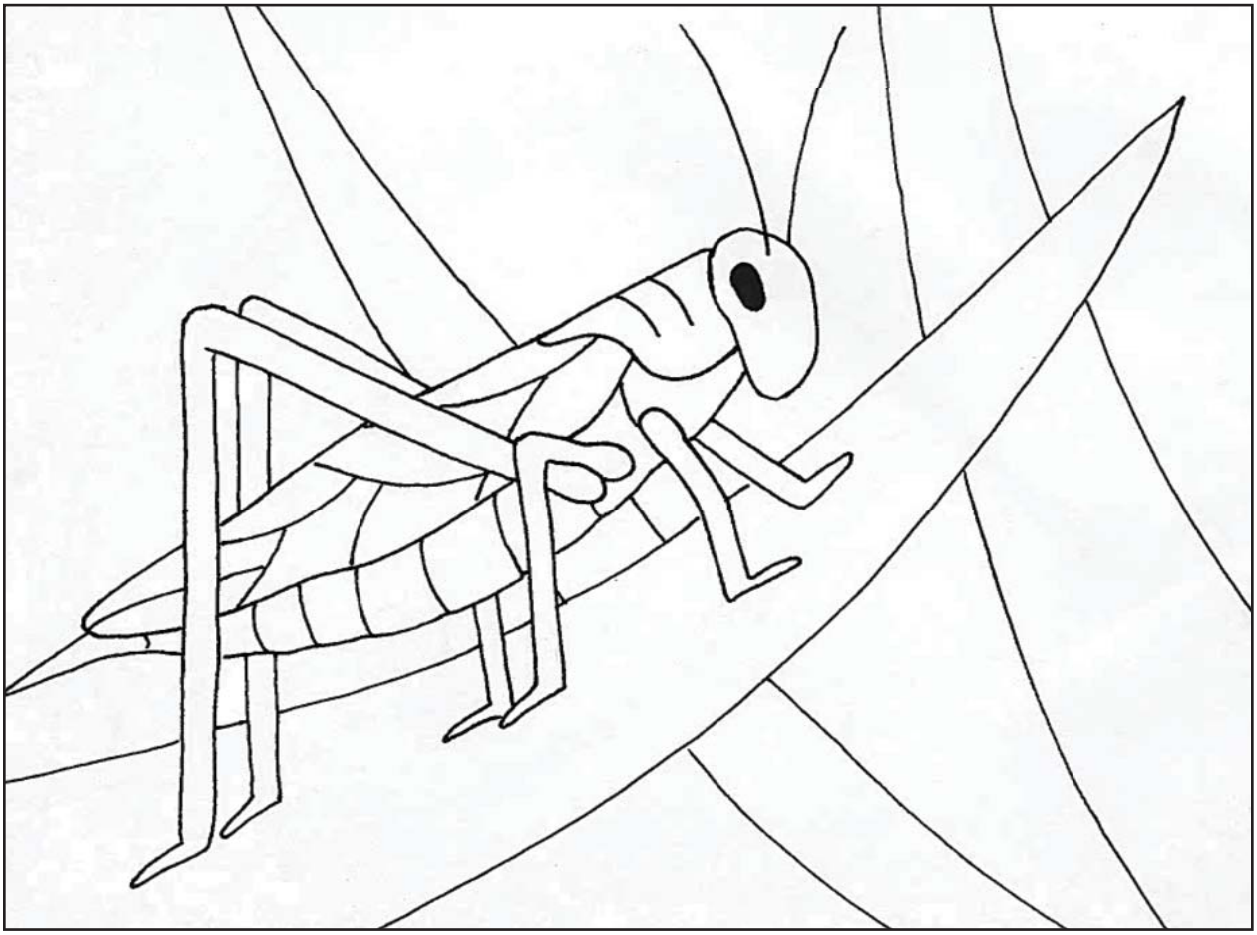
Fun fact: Shrimp have two types of legs - some legs are used for walking and some legs are used for swimming!

Can you circle the legs that are used for walking?

Answer: *The thin legs closest to the head*

Salt marsh grasshopper

Orchelimum fidicinium



The salt marsh grasshopper is similar to the grasshoppers you may see in your yard.

Salt marsh grasshoppers have two long antennae and are bright green all over their body and legs.

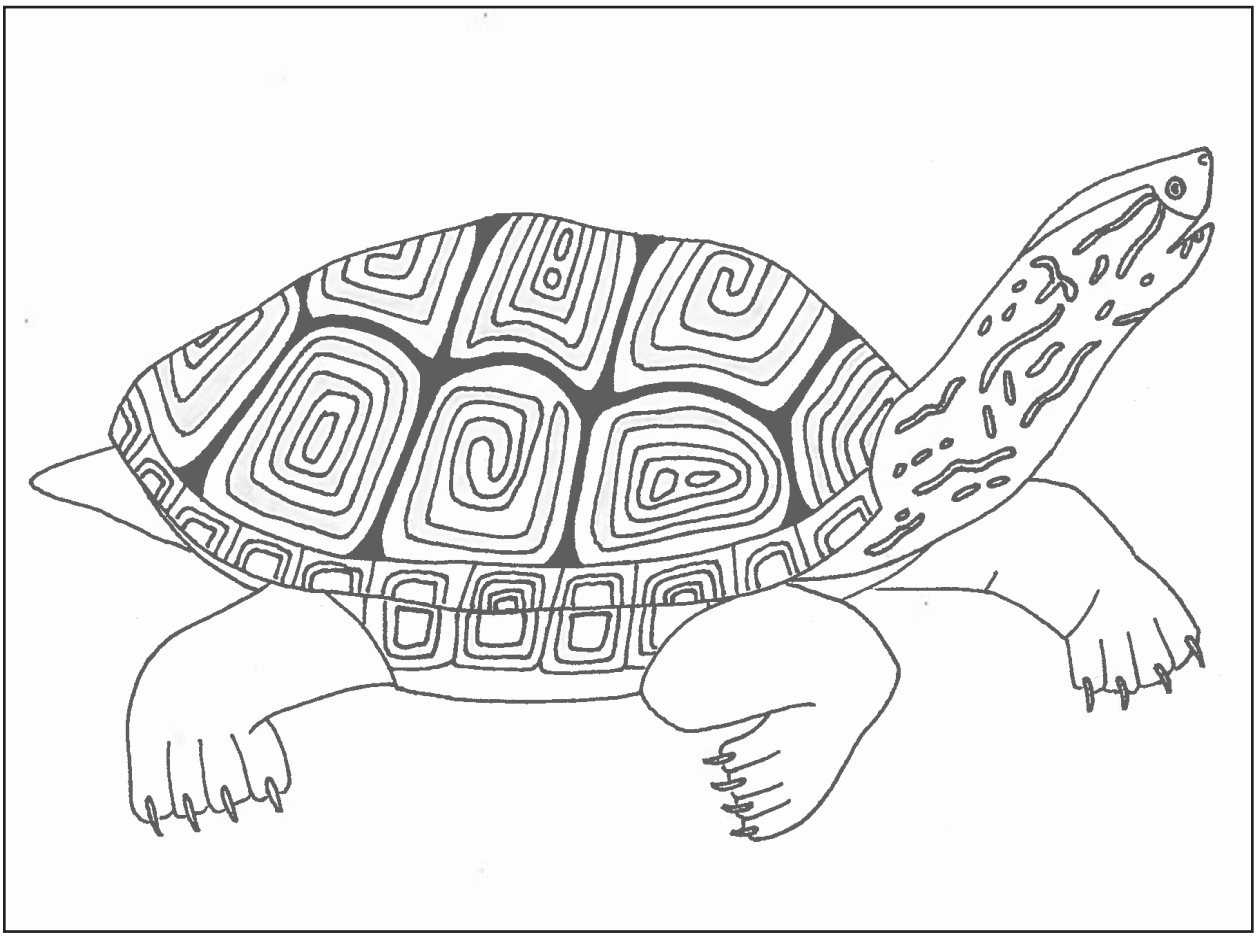
Fun fact: Salt marsh grasshoppers are one of the only animals that eat live *Spartina*!

Why are salt marsh grasshoppers bright green?

Answer: *To camouflage with Spartina*

Diamondback terrapin

Malaclemys terrapin



Diamondback terrapins have a diamond shaped pattern on their shell.

A diamondback terrapin female will only crawl out of the water when it is time to lay her eggs.

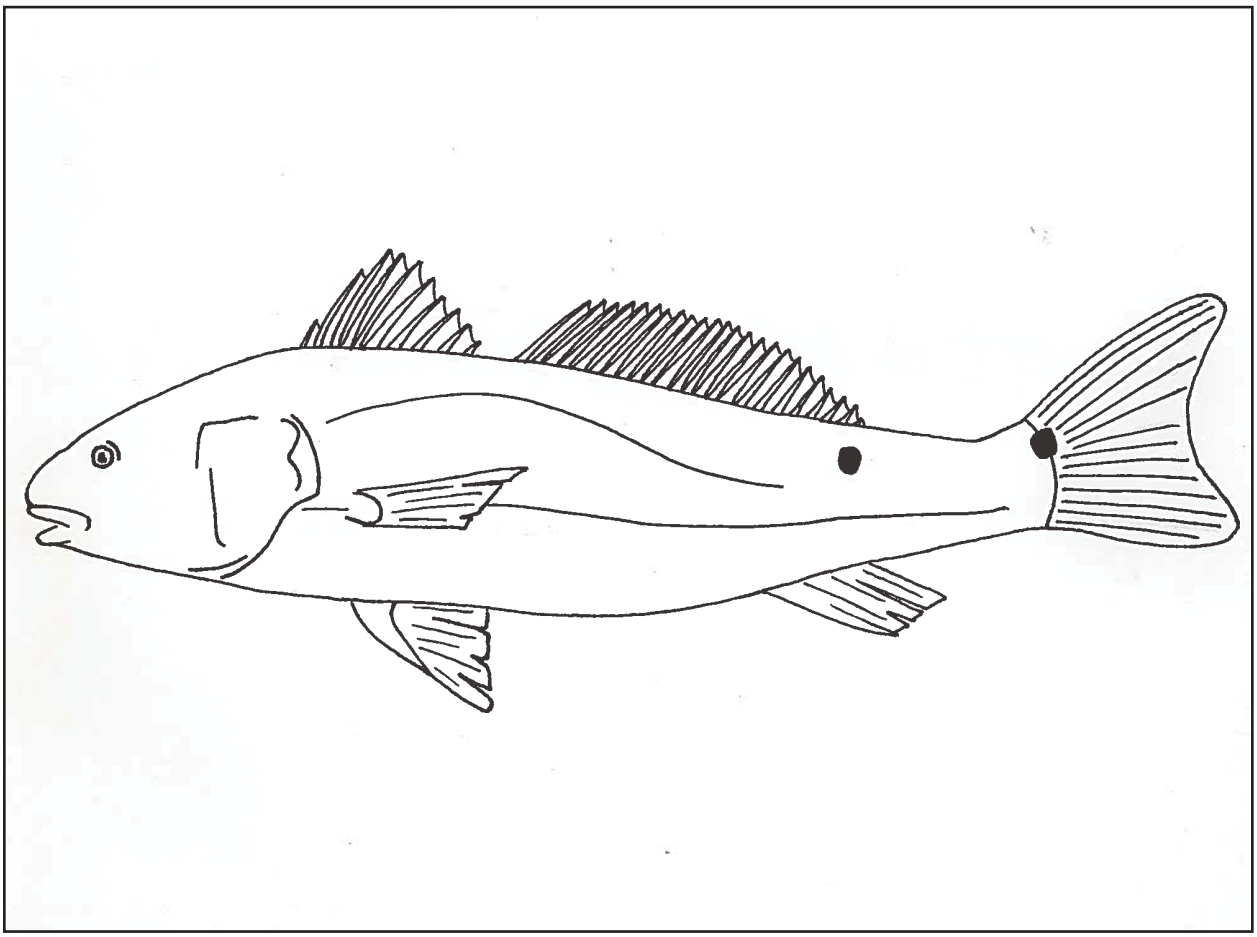
Fun fact: Every diamondback terrapin is different, their bodies can be black, gray, green, brown, or spotted!

Is the terrapin a type of turtle, fish, or bird?

Answer: Turtle

Red drum

Sciaenops ocellatus



Red drum are a long, light red fish and have one or more dark spots near the tail.

Many fishermen hope to catch red drum when they visit the salt marsh to fish.

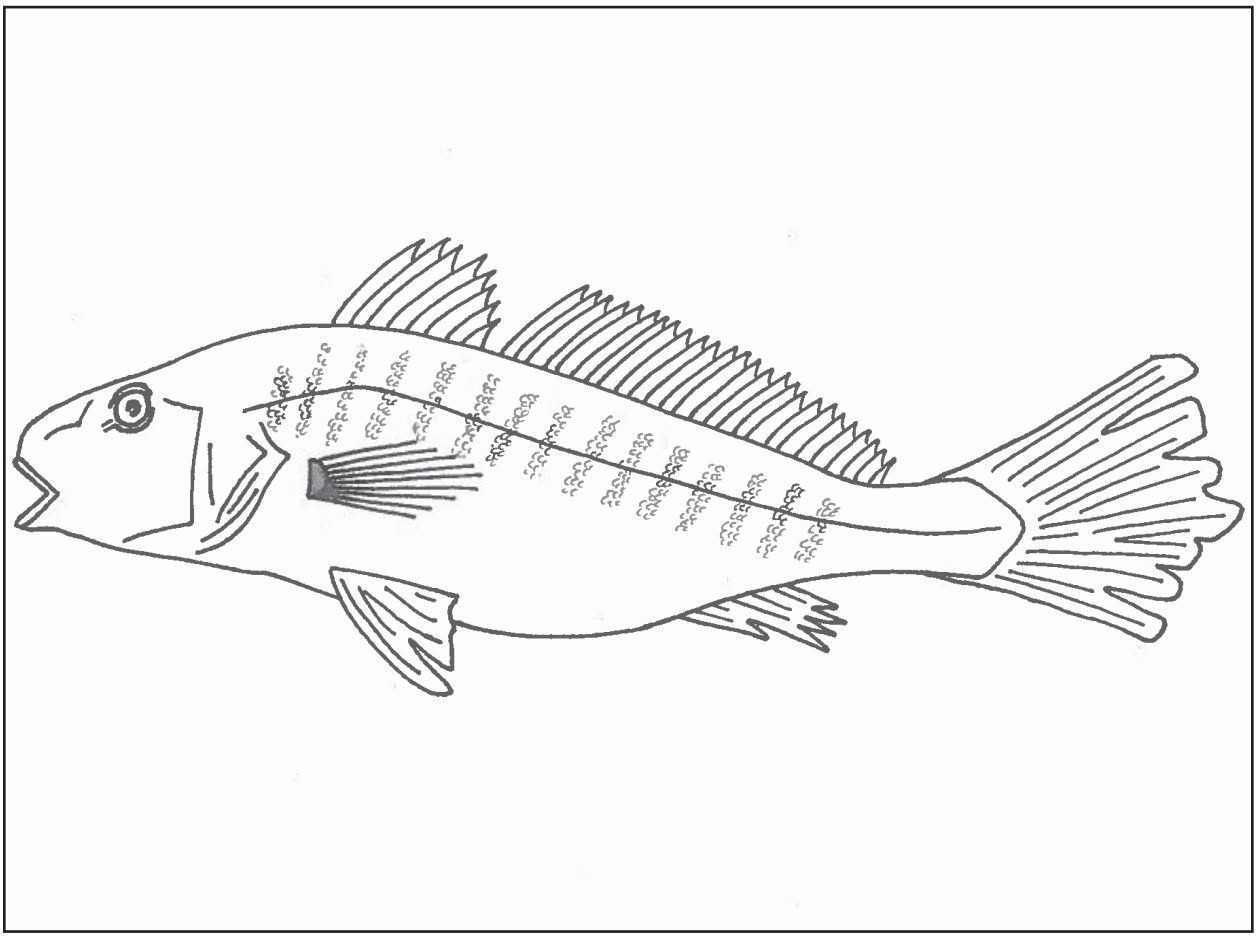
Fun fact: The spot on the tail looks like an eye, so other fish will attack the tail thinking it is the head!

Can you find the eye spots?

Answer: *The dark spots on the tail*

Atlantic croaker

Micropogonias undulatus



The Atlantic croaker is a silver fish with light black stripes on the sides of its body.

The Atlantic croaker has a black spot located at the base of the pectoral fins (side fins).

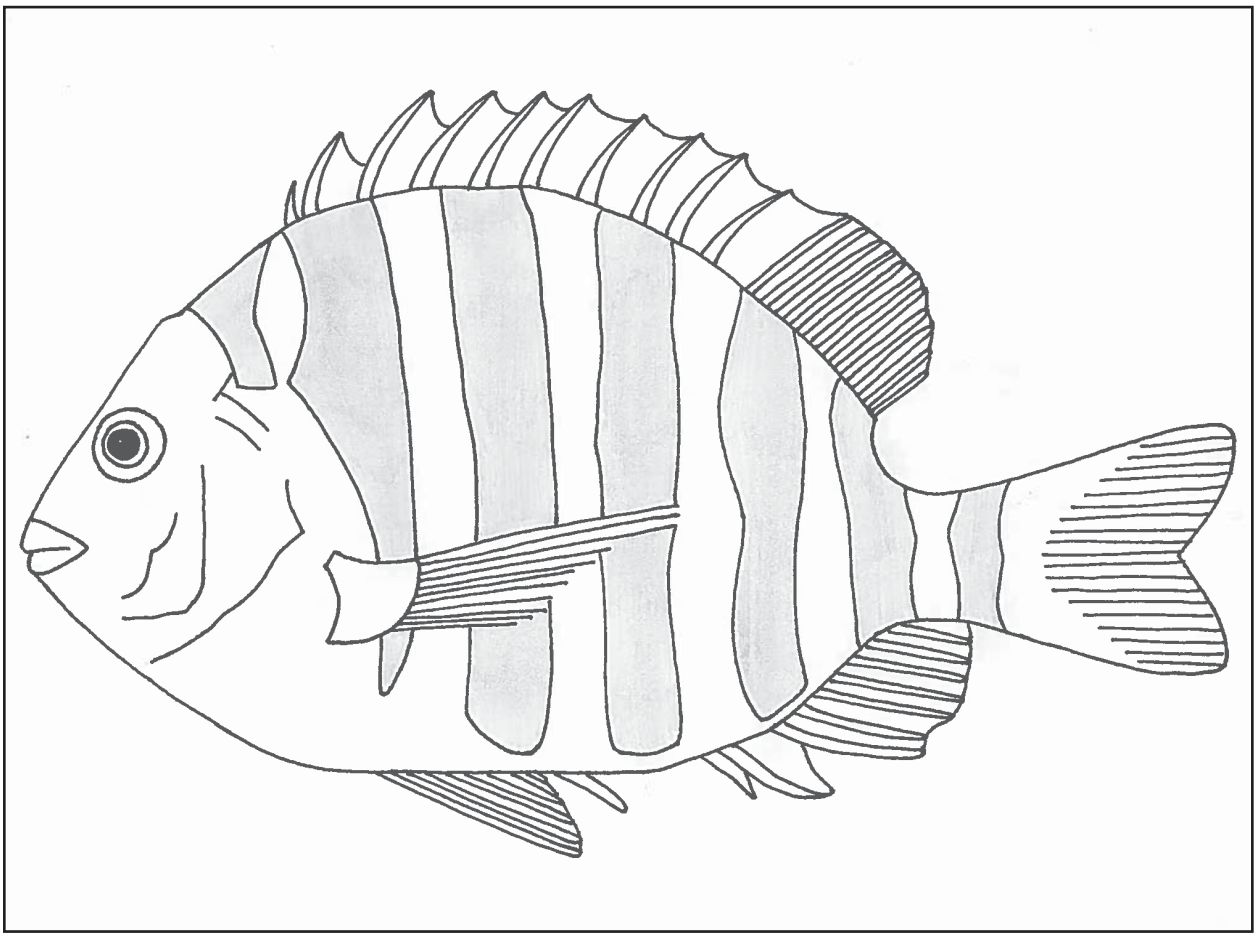
Fun fact: The Atlantic croaker makes a loud croaking sound which can be heard if it is caught while fishing!

Why do you think it croaks when it is caught?

Answer: *Because it is stressed*

Sheepshead

Archosargus probatocephalus



Sheepshead are thin fish, which swim around docks and oyster reefs in the water.

Sheepshead have dark thick stripes running down both sides of their body.

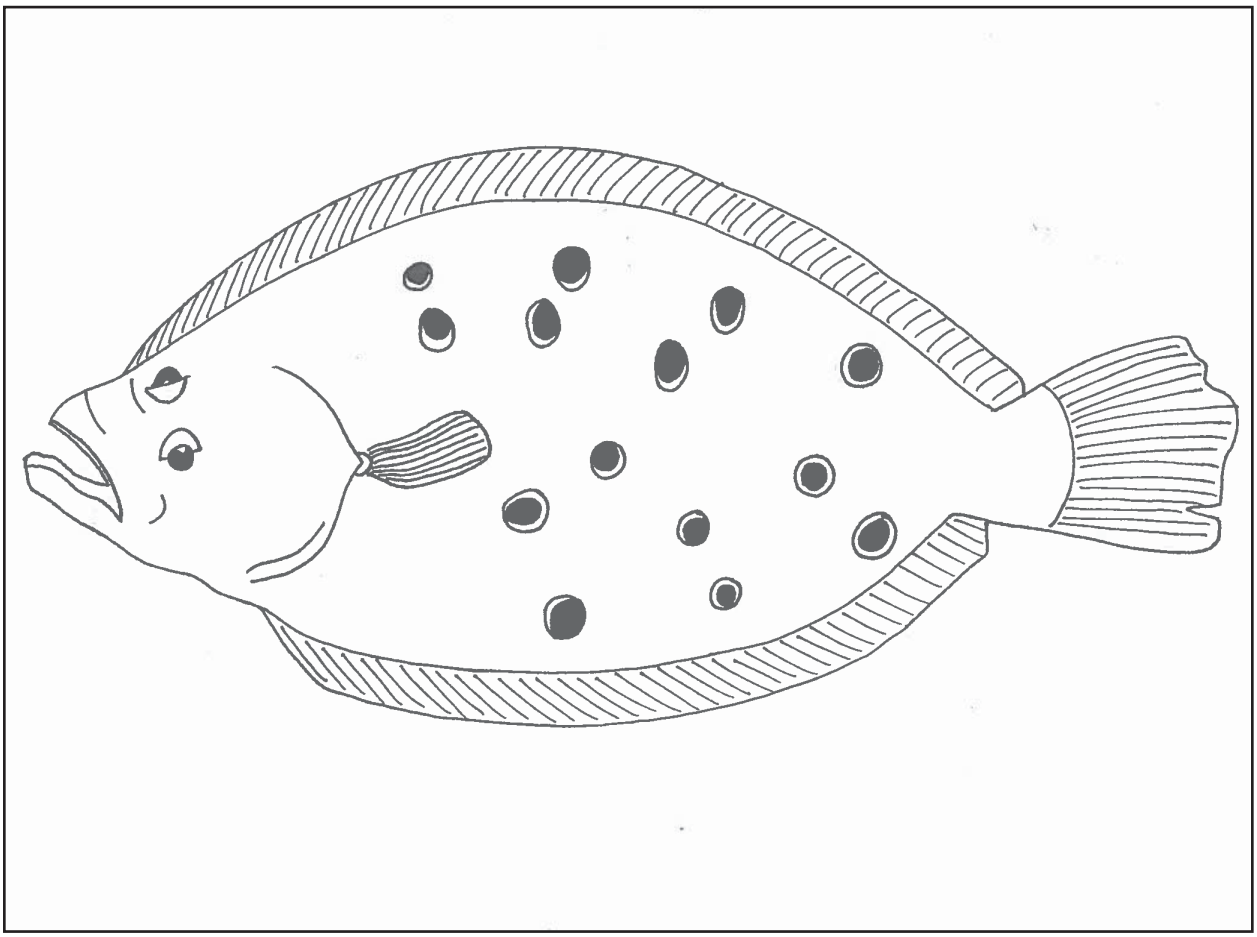
Fun fact: Sheepshead have large teeth like human teeth which crush shells and scrape food off of docks!

What do you think the darker stripes are for?

Answer: Camouflage

Summer flounder

Paralichthys dentatus



The summer flounder is a flat fish with both eyes on the same side of its body.

Flounders can camouflage with the sand or mud on the bottom of the creek.

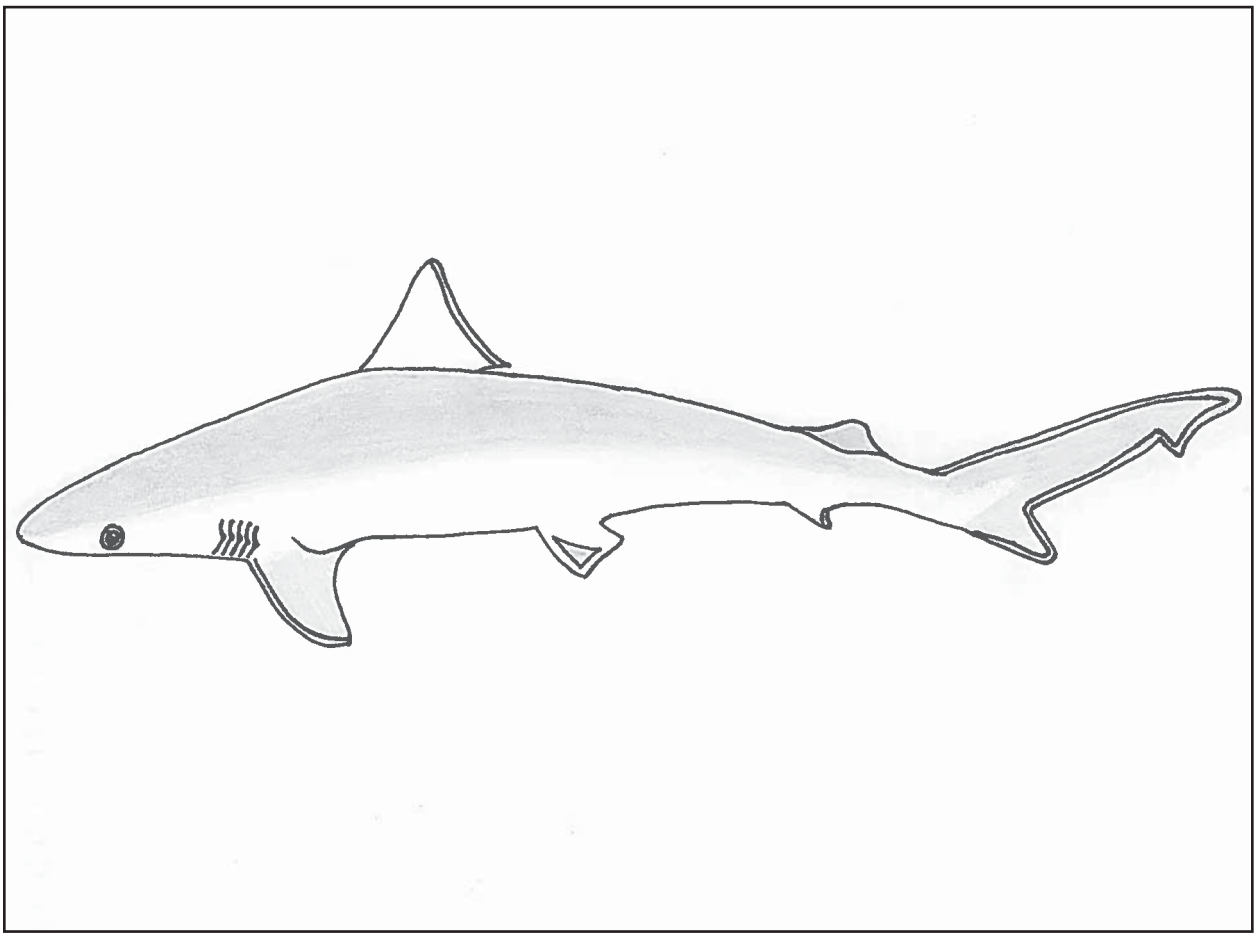
Fun fact: A flounder is born with eyes on both sides of its head. As it grows, one eye moves to the other side!

What color is a flounder when it blends in with mud?

Answer: Brown

Atlantic sharpnose shark

Rhizoprionodon terraenovae



The Atlantic sharpnose shark has a long thin body, that is dark on top and light on the bottom.

Like all sharks, the skeleton of the Atlantic sharpnose shark is made of cartilage (like your nose), not bone.

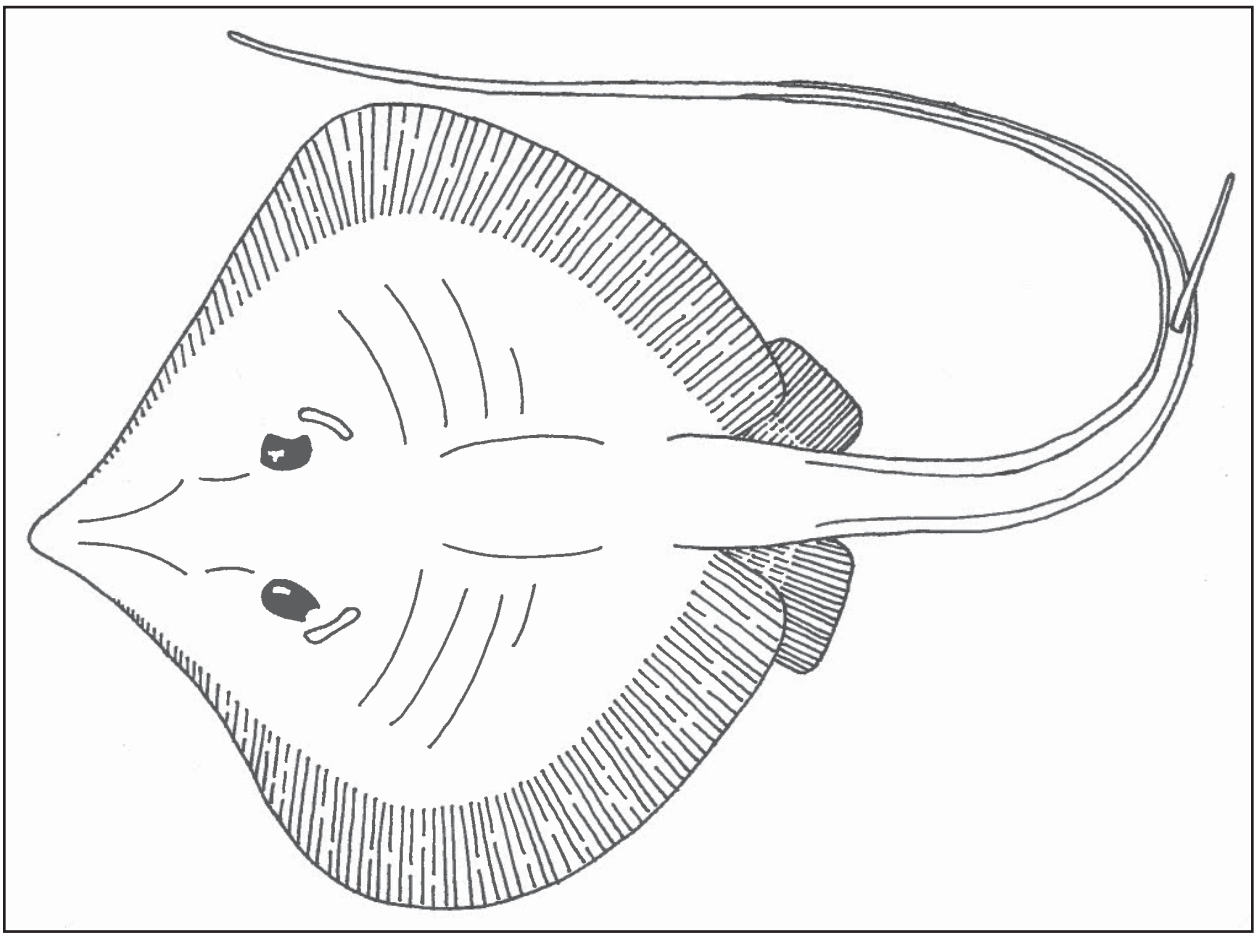
Fun fact: The Atlantic sharpnose shark is called "the deer of the marsh" because of how many there are!

Can you circle where the gills are located?

Answer: *The gills are the slits near the head*

Atlantic stingray

Dasyatis sabina



The Atlantic stingray is a flat, round fish that is dark on the top and light on the bottom.

The holes on top of the Atlantic stingray's head suck in water to breathe while it is buried on the bottom.

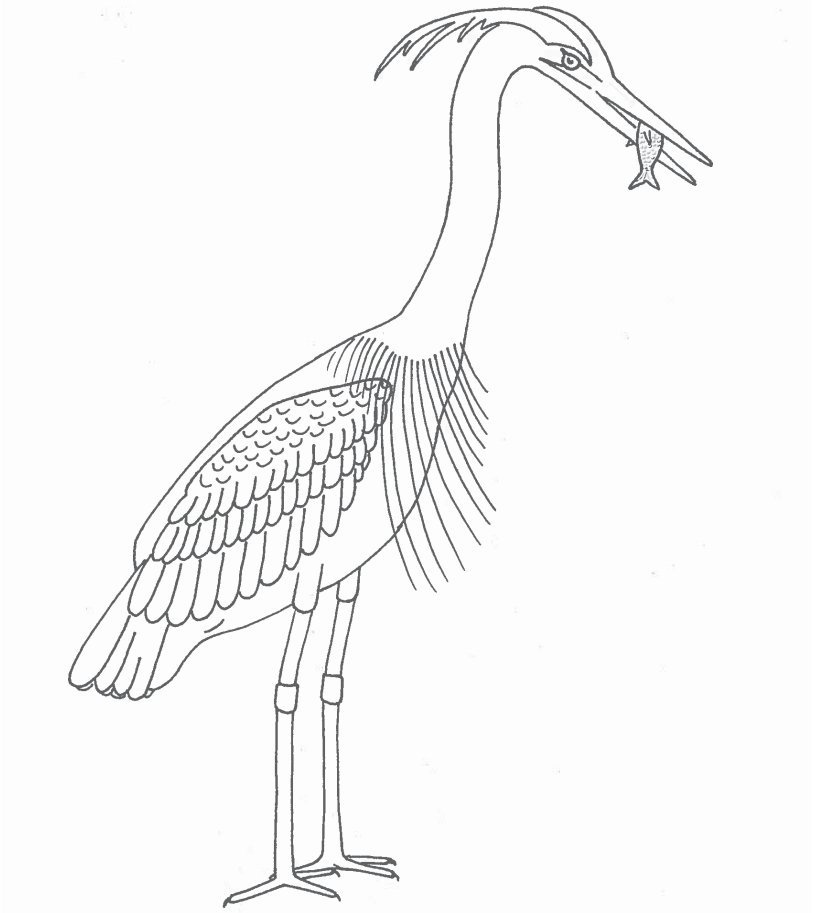
Fun fact: The Atlantic stingray does not use its spine to attack; it only uses it for defense when it is scared!

Where do you think an Atlantic stingray's mouth is?

Answer: *On the bottom of its body*

Great blue heron

Ardea herodias



The great blue heron is a very tall bird that can grow up to 4 feet tall.

Great blue herons are wading birds, meaning they walk through the water to feed.

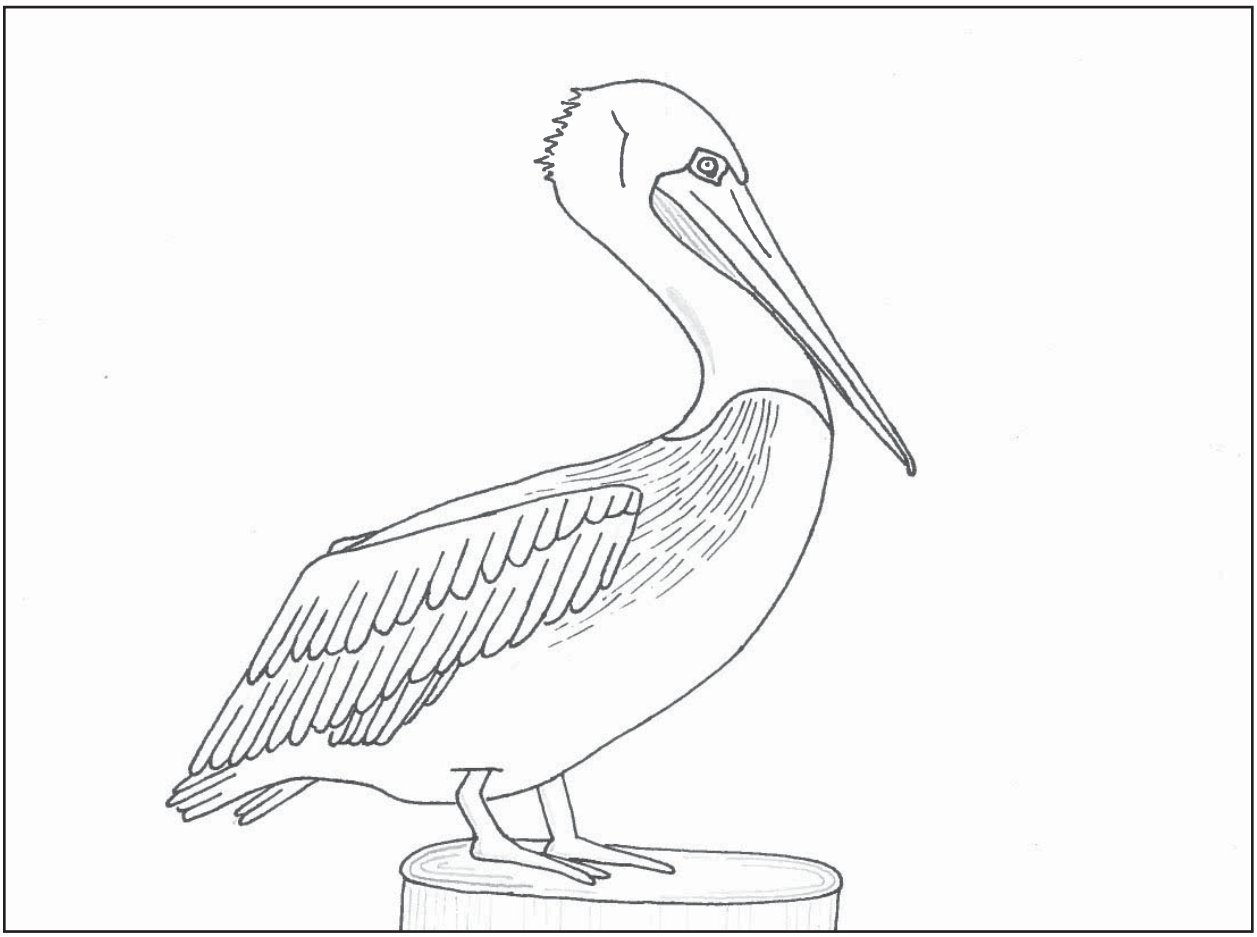
Fun fact: Although the great blue heron is large, it only weighs between 5-6 pounds!

What do you think the great blue heron eats?

Answer: *Fish and shrimp*

Brown pelican

Pelecanus occidentalis



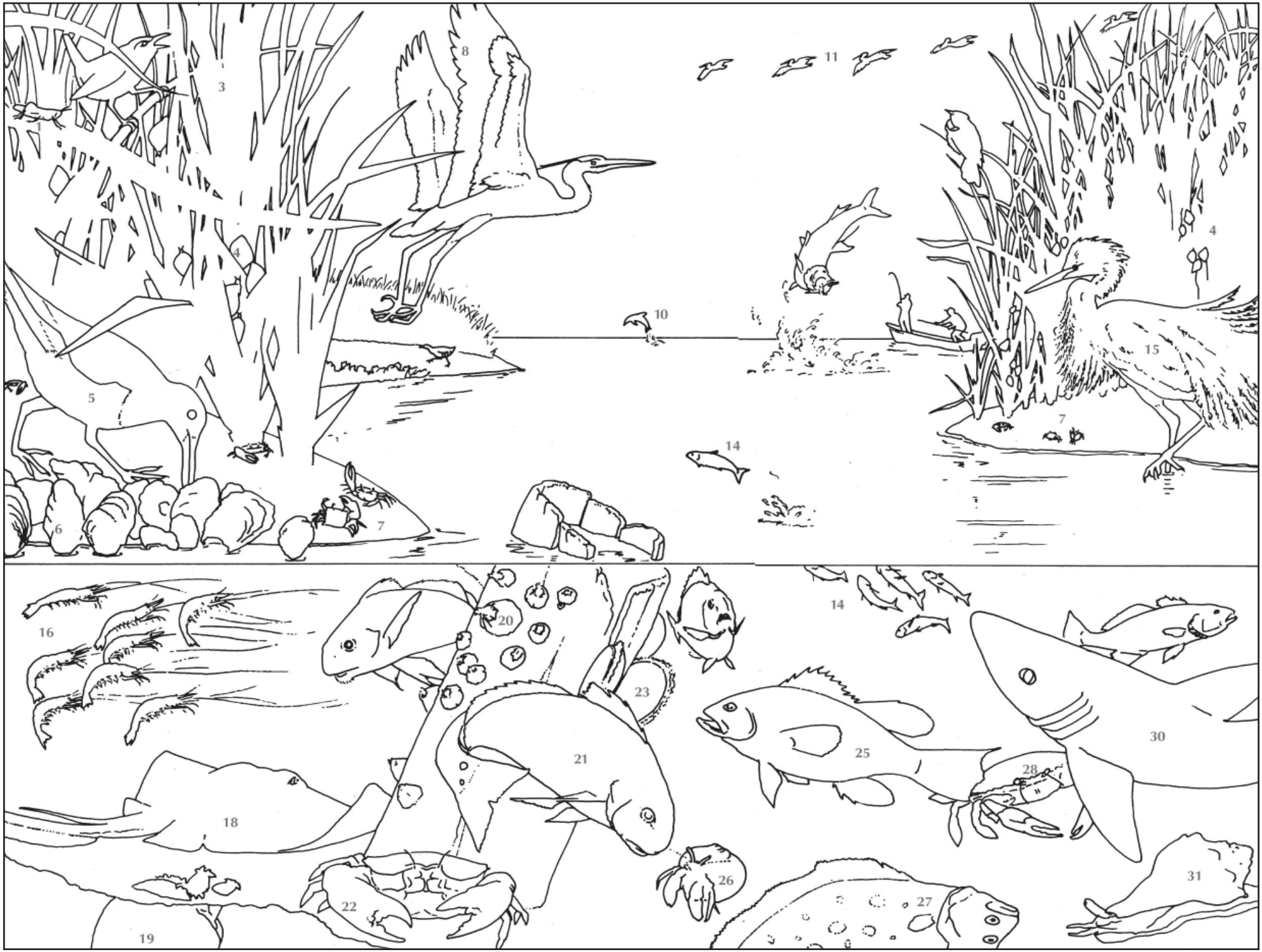
Brown pelicans are a large diving bird with a white head and brown body.

The pelican's long bill has a large pouch named a "gular," which is used to scoop up fish.

Fun fact: Like some humans, as pelicans age, the color of their head turns to white!

Where do you think the pelican's pouch is?

Answer: *Hidden beneath its beak*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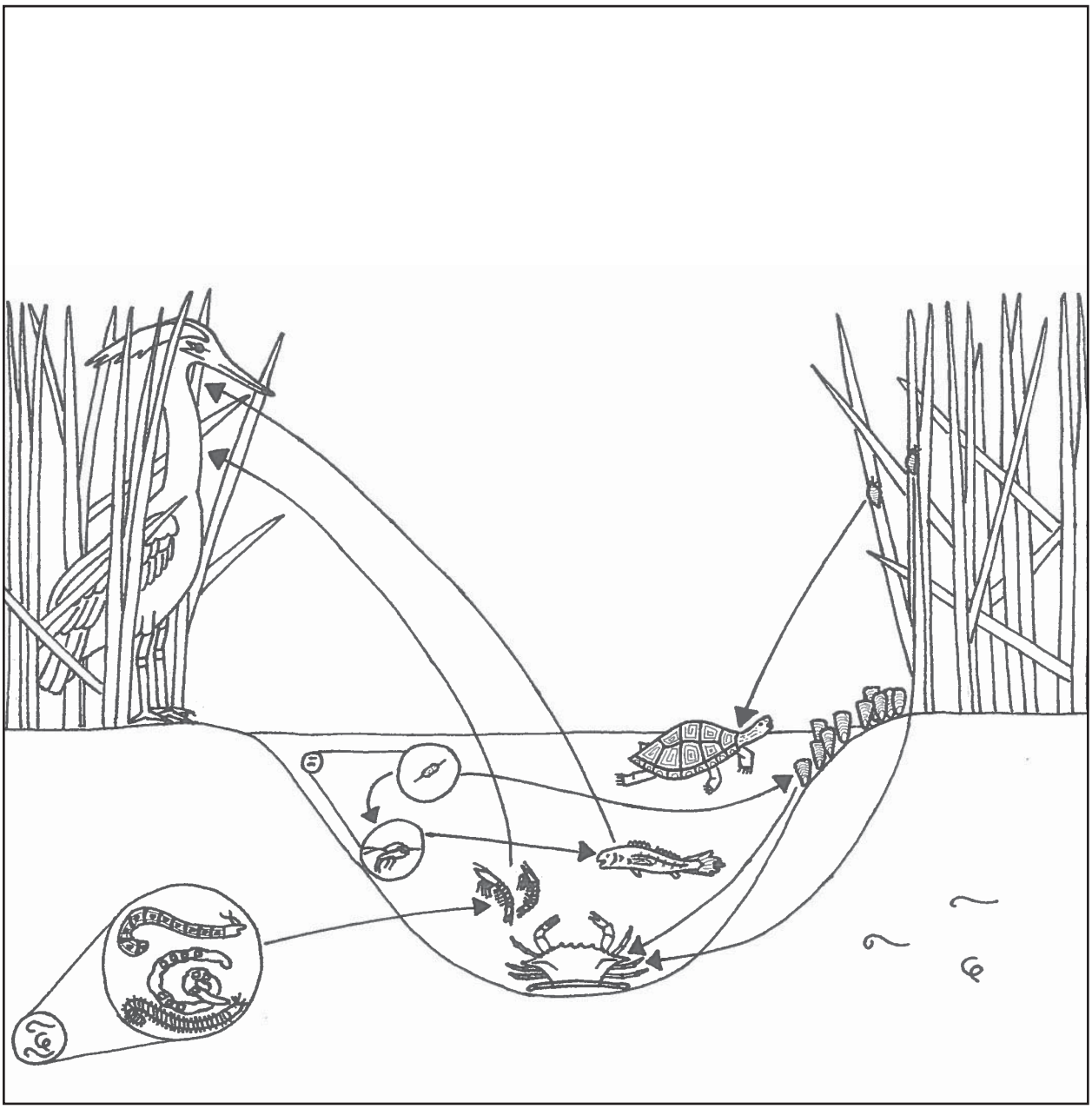
Can you find the animal above and put the number next to its name below?

___ Salt marsh grasshopper	___ Striped hermit crab	___ Hard clam
___ Striped mullet	___ Brown pelican	___ Bottlenose dolphin
___ Fiddler crab	___ Atlantic stingray	___ Summer flounder
___ Snowy egret	___ Stone crab	___ Red drum
___ Ribbed mussel	___ Black sea bass	___ American oystercatcher
___ Eastern oyster	___ White shrimp	___ Barnacle
___ Blue crab	___ Atlantic sharpnose shark	___ Great blue heron
___ Marsh periwinkle	___ Smooth cordgrass	___ Knobbed whelk

Answers: column one (1, 14, 7, 15, 23, 6, 28, 4); column two (26, 11, 18, 22, 25, 16, 30, 3); column three (19, 10, 27, 21, 5, 20, 8, 31)

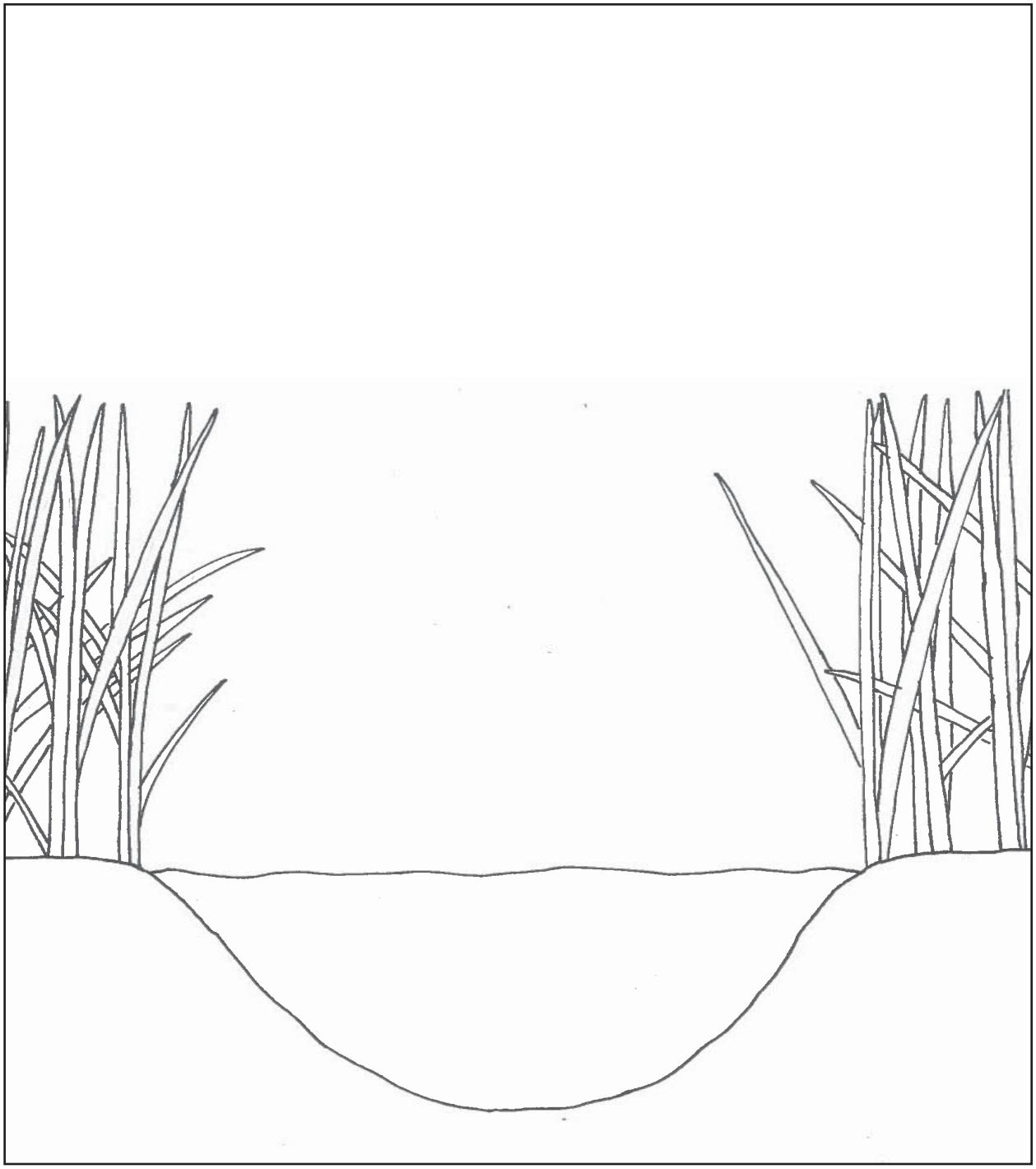
Salt marsh food web

A food web is a never ending cycle of "what eats what." Predators hunt other animals for food, and prey are animals that are hunted. Below, an arrow drawn from a prey to a predator means that the predator eats that prey. For example, an arrow from the periwinkle snail to the terrapin means the terrapin eats periwinkle snails!



Make your own food web

Use the animals found in this book to make your own food web. Try to include a mix of predators and prey! Remember to draw your arrows from prey to predator.



Salt marsh cryptogram

Below you see all the letters of the alphabet with a box below it. Each letter has a number that goes with it. Use the information given to fill in the letters on the lines below to solve the phrase!

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

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Have you seen a salt marsh? Where?

How can you help protect the salt marsh?

What is your favorite animal in the salt marsh?

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Websites

From Seeds to Shoreline (S2S)$_{SM}$ Program: www.scseagrant.org/education
US Environmental Protection Agency: www.epa.gov
NC Sea Grant: www.ncseagrant.org
SC Sea Grant Consortium: www.scseagrant.org
GA Sea Grant: www.georgiaseagrant.uga.edu
Marine Education Extension Program: www.marex.uga.edu
FL Sea Grant: www.flseagrant.org
NC Department of Environmental Quality: www.ncdenr.gov
SC Department of Natural Resources: www.dnr.sc.gov
SCDNR Southeastern Regional Taxonomic Center:
www.dnr.sc.gov/marine/sertc
SC Department of Health & Environmental Control: www.scdhec.gov
GA Department of Natural Resources: www.gadnr.org
FL Department of Environmental Protection: www.dep.state.fl.us
National Estuarine Research Reserve (NERR) System: www.nerrs.noaa.gov
NC Coastal Reserve and NERR: www.nccoastalreserve.net/web/crp
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ACE Basin NERR: www.dnr.sc.gov/marine/NERR/index.html
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Guana Tolomato Matanzas NERR: www.gtmnerr.org
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SC Aquarium: www.scaquarium.org
NC Aquariums: www.ncaquariums.com
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Brevard County Environmentally Endangered Lands Program:
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SCDNR Mission Statement

The South Carolina Department of Natural Resources is the advocate for and steward of the state's natural resources. The South Carolina Department of Natural Resources develops and implements policies and programs for the conservation, management, utilization and protection of the state's natural resources based upon scientifically sound resource assessment and monitoring, applied research, technology transfer, comprehensive planning, public education, technical assistance and constituent involvement. The South Carolina Department of Natural Resources is pro-active in protecting the state's natural resources for use and enjoyment by future generations of South Carolinians.

SCDNR Pledge

Members of the public are of utmost importance to us, whether in the office or the field. We must listen to their concerns and balance their needs with those of the state's natural resources, for which we are accountable. In essence, they are our employers, and we should treat them with the dignity that such a position affords.

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EPA United States Environmental Protection Agency

Sea Grant S.C. Sea Grant Consortium

SERTC Southeastern Regional Taxonomic Center

ACE Basin National Estuarine Research Reserve

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