

A Day *in the* *Salt Marsh*



by Kevin Kurtz
illustrated by Consie Powell

A Day in the Salt Marsh

Enjoy a day in one of the most dynamic habitats on earth: the salt marsh. Fun-to-read, rhyming verse introduces readers to hourly changes in the marsh as the tide comes and goes. Watch the animals that have adapted to this ever-changing environment as they hunt for food or play in the sun, and learn how the marsh grass survives even when it is covered by salt water twice a day.

It's so much more than a picture book . . . this book is specifically designed to be both a fun-to-read story and a launch pad for discussions and learning. Whether read at home or in a classroom, we encourage adults to do the activities with the young children in their lives. Free online resources and support at www.ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Salt Marsh Animals Matching Activity with information on their habitat and diet:
 - Blue crabs
 - Periwinkle Snails
 - Great Blue Herons
 - Bottlenose dolphins
 - Fiddler Crabs
 - Juvenile Fish
 - River Otters
 - Oysters
 - Diamondback terrapins
 - Horseshoe Crabs
 - Tidal Animals Activity
 - What Causes Tides?
 - Why are salt marshes important?
 - Spartina Grass and its adaptations
- Teaching Activities:
 - Reading Questions
 - Language Arts
 - Science
 - Mathematics
 - Geography
 - Coloring Pages
- Interactive Quizzes: Reading Comprehension, For Creative Minds, and Math Word Problems
- English and Spanish Audiobooks
- Related Websites
- Aligned to State Standards (searchable database)
- Accelerated Reader and Reading Counts! Quizzes
- Lexile and Fountas & Pinnell Reading Levels

eBooks with Auto-Flip, Auto-Read, and selectable English and Spanish text and audio available for purchase online.

Thanks to Susan-Marie Stedman, Wetland Team Leader at NOAA Fisheries Office of Habitat Conservation for verifying the accuracy of the book, including the "For Creative Minds" educational section.

Kevin Kurtz has loved books and nature since he was a child. In college and graduate school he received degrees in English literature and elementary education. Despite his unrelated degrees, one of his first jobs was as a research assistant in a marine biology laboratory. Working on a project to study some of the denizens of the salt marsh, he quickly became fascinated with this ever-changing, ever-beautiful habitat. He has combined all of these experiences to write and edit the South Carolina Aquarium's award-winning K-8 curriculum, as well as curriculum activities for the World Wildlife Fund, NOAA, and the College of Charleston's COASTeam project. He is currently the newsletter editor for SeaScripts, the newsletter of the South Carolina Marine Educators Association. *A Day in the Salt Marsh* is his first published children's book. Kevin currently resides in the South Carolina Lowcountry where he spends a lot of time reading and exploring the natural world.

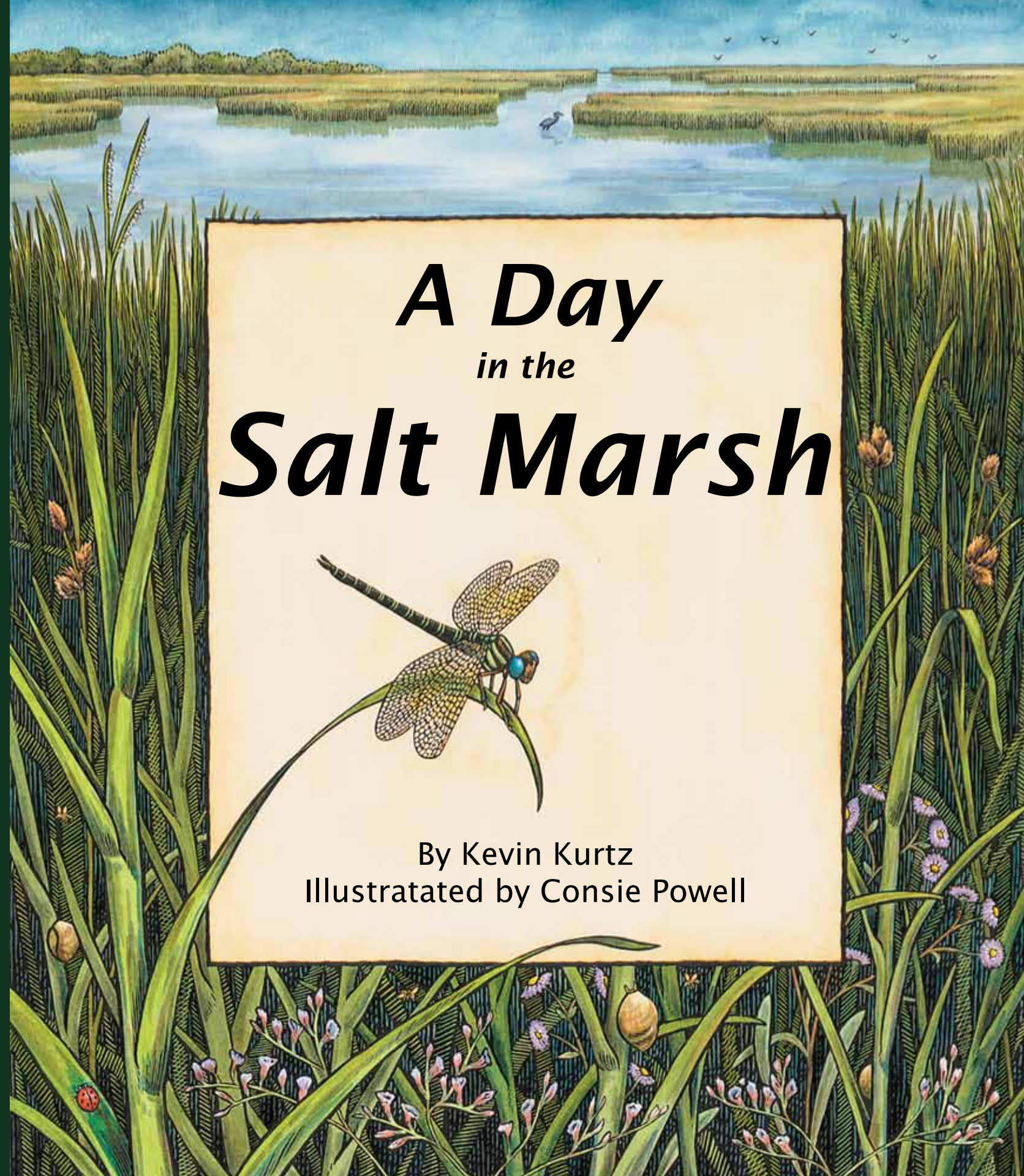
Consie Powell is an author, illustrator, and a visual storyteller. Because she loves the outdoors, much of her work centers on nature and the environment. In addition to illustrating *A Day in the Salt Marsh*, Consie has also written and illustrated the Sigurd Olson Nature Writing award-winning *Leave Only Ripples: A Canoe Country Sketchbook*, *The First Day of Winter*, *Amazing Apples*, *Old Dog Cora and the Christmas Tree*, *A Bold Carnivore: An Alphabet of Predators* and has illustrated *Baby Bear Isn't Hungry* and *Who Lives in the Snow?* She also edits, designs, illustrates, and occasionally writes for the North Carolina WILD Notebook (the young readers' feature in the monthly *Wildlife in North Carolina* magazine), and has created artwork for the North Carolina Museum of Natural Sciences and the North Carolina Zoo. Consie and her husband spend the academic year in North Carolina and the summer in the isolated lake country of northern Minnesota where she loves to paddle her wooden canoe and explore marshes and bogs. Of course, she always has her sketchbook handy.



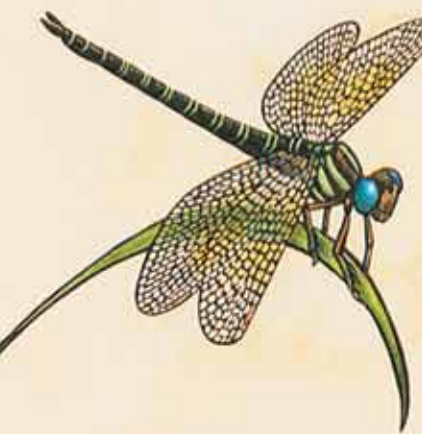
Kevin Kurtz



Consie Powell



A Day in the Salt Marsh



By Kevin Kurtz
Illustrated by Consie Powell

To my parents-Thanks for eighteen years of free food and shelter—KK

For Annie, whose friendship makes me rich—CP

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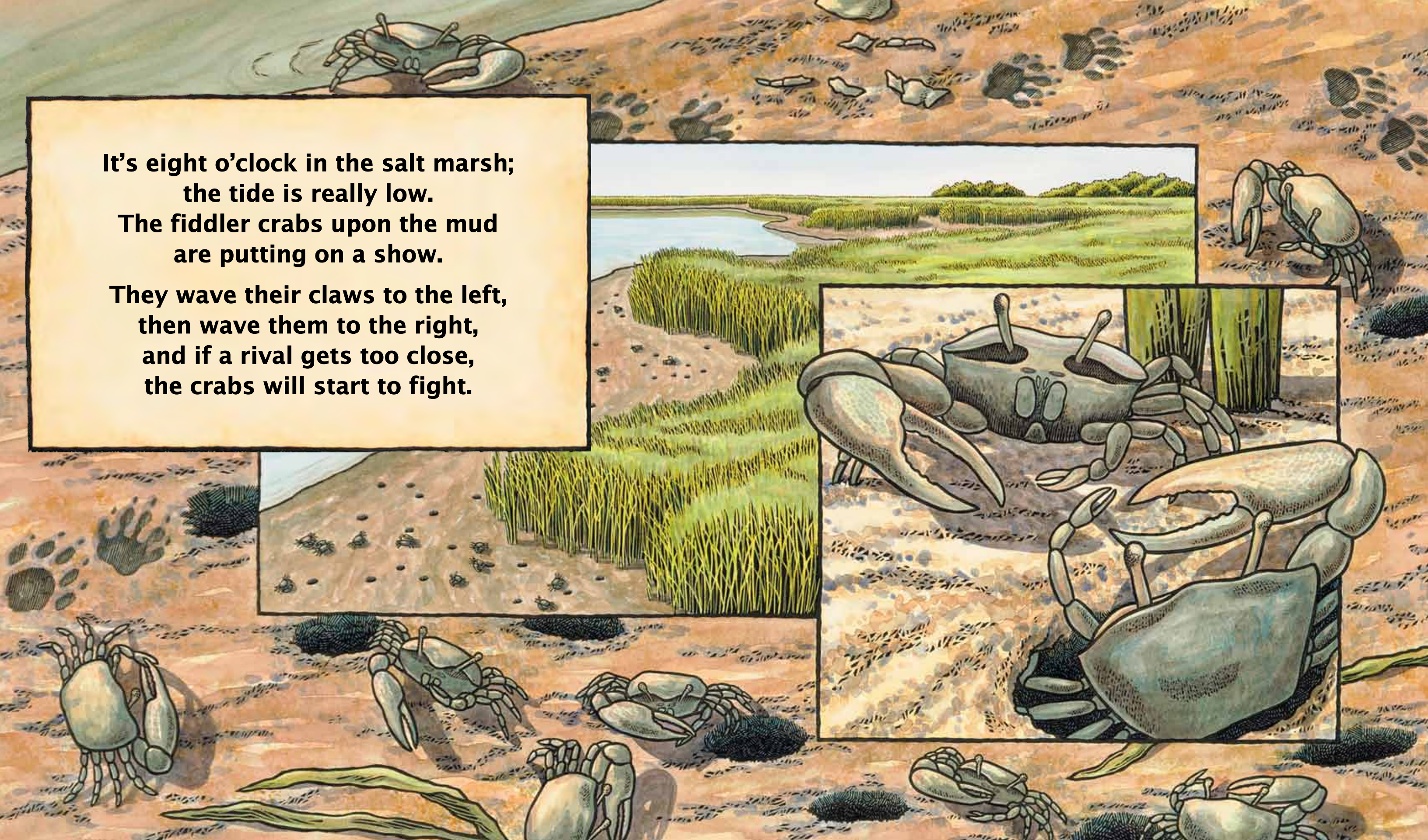
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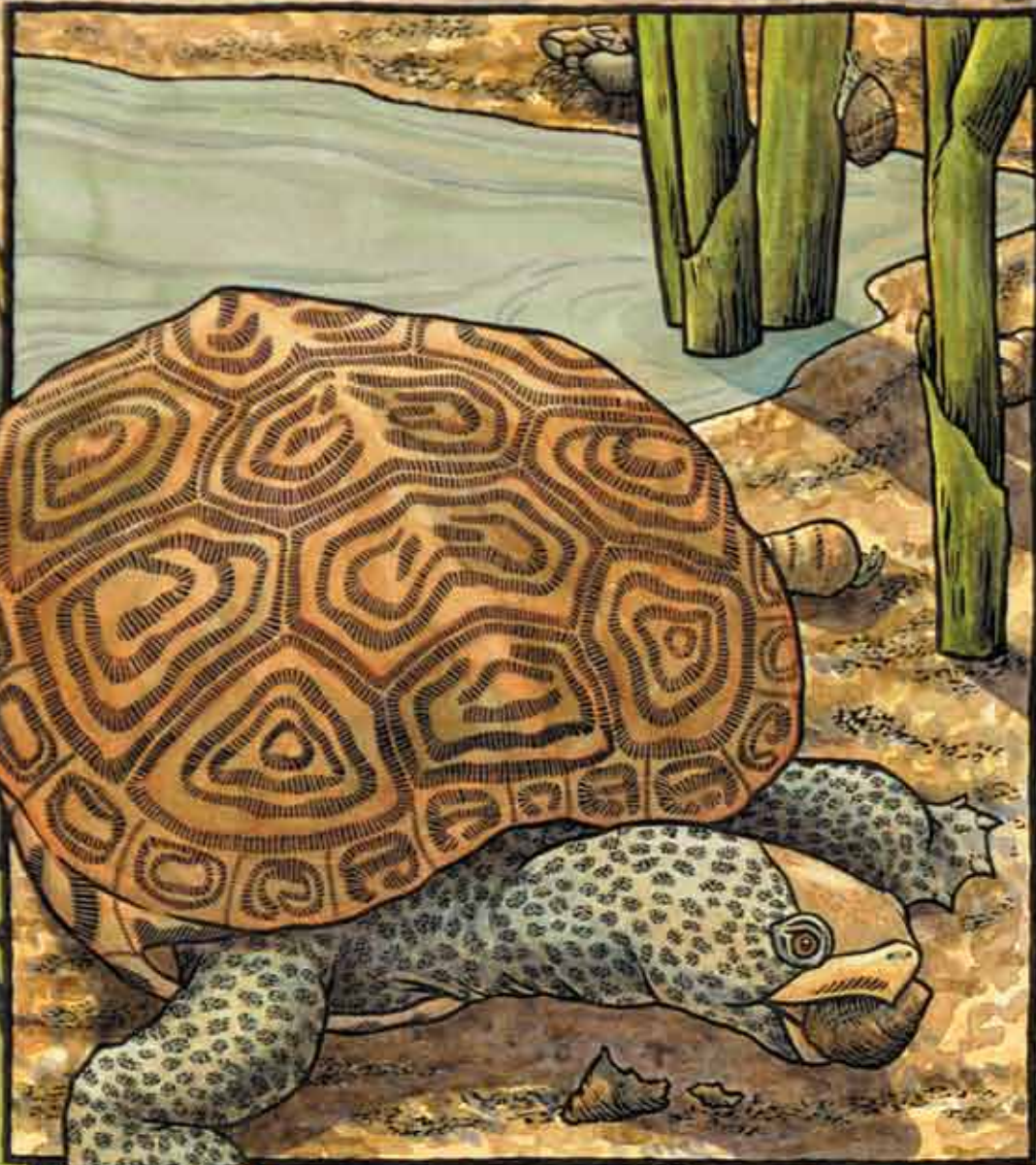
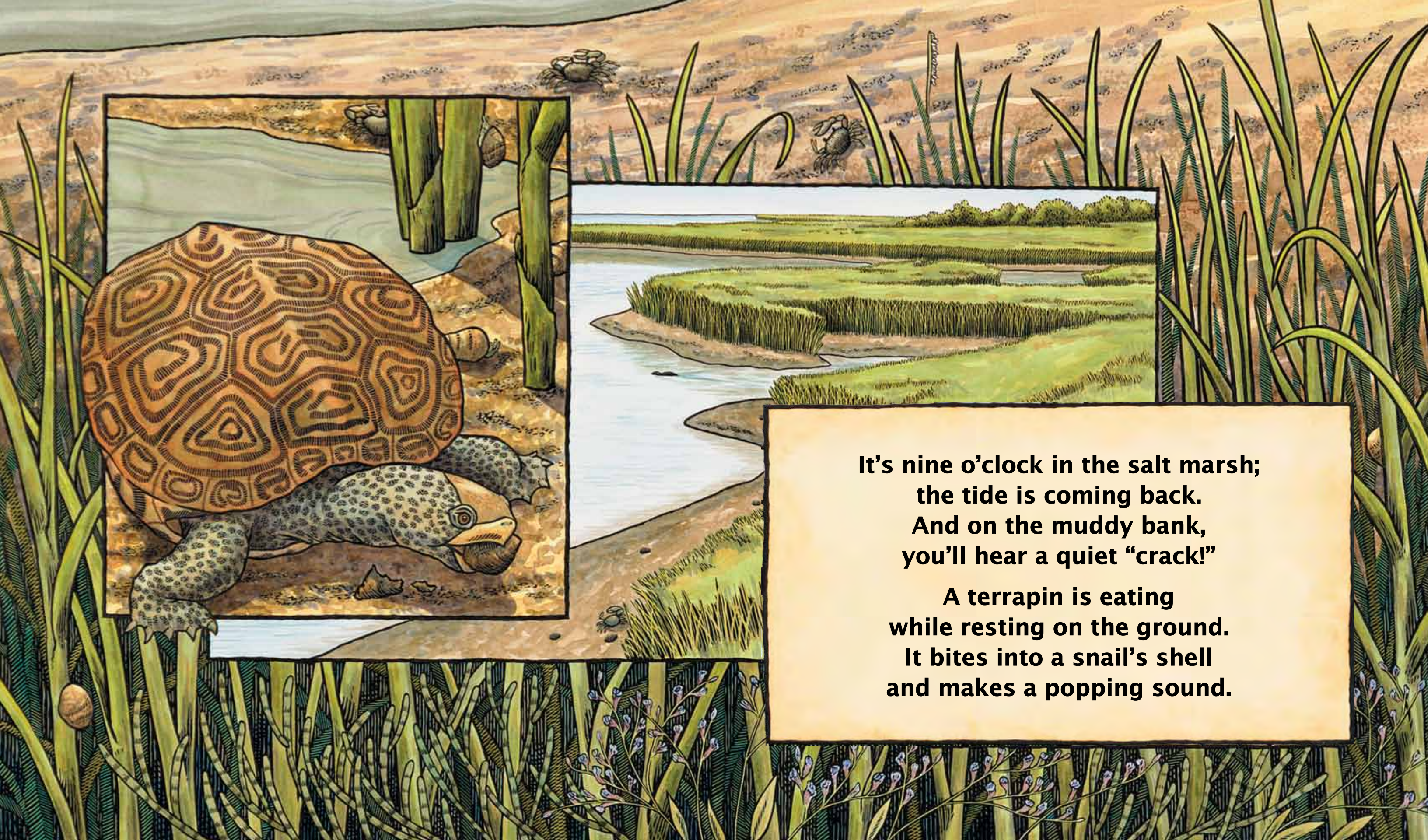
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**The sun’s coming up in the salt marsh,
and the birds respond with song.
If you decide to stay awhile,
you’ll see changes all day long.**

**It's eight o'clock in the salt marsh;
the tide is really low.
The fiddler crabs upon the mud
are putting on a show.
They wave their claws to the left,
then wave them to the right,
and if a rival gets too close,
the crabs will start to fight.**



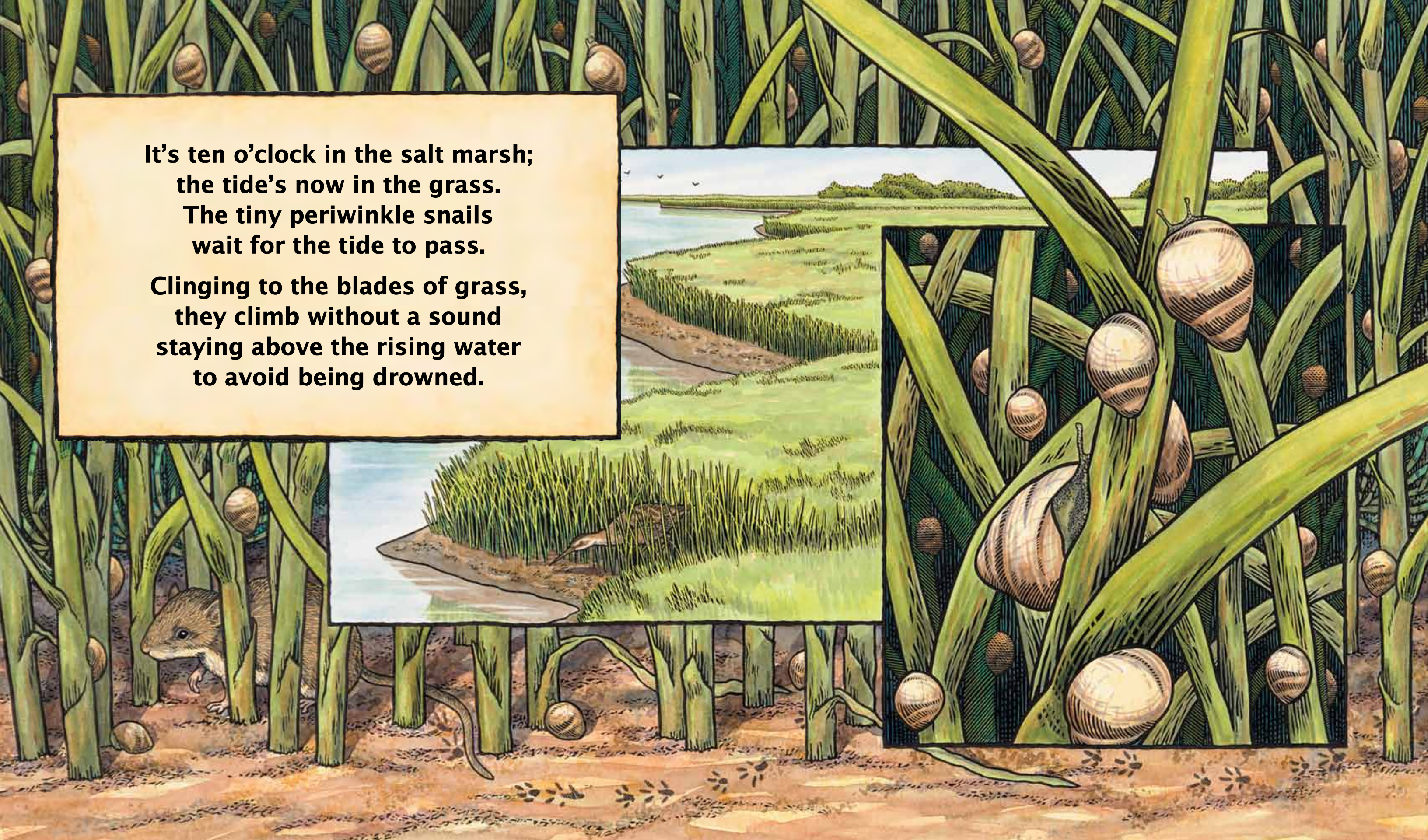


**It's nine o'clock in the salt marsh;
the tide is coming back.
And on the muddy bank,
you'll hear a quiet "crack!"**

**A terrapin is eating
while resting on the ground.
It bites into a snail's shell
and makes a popping sound.**

**It's ten o'clock in the salt marsh;
the tide's now in the grass.
The tiny periwinkle snails
wait for the tide to pass.**

**Clinging to the blades of grass,
they climb without a sound
staying above the rising water
to avoid being drowned.**



For Creative Minds

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Salt Marsh Plants and Animals

Read the descriptions of the Salt Marsh animals and match each to the appropriate picture.



1.

a. Juvenile Fish

The eggs and babies of many ocean fish are brought by the currents into salt marshes.

The young fish hide in the shallow water among the grass and feed off tiny plants and animals until they are big enough to swim back into the ocean.



2.

b. Periwinkle Snail

Periwinkle snails live in salt marshes, and some can spend their entire lives on one blade of grass!

Periwinkle snails eat the detritus (little bits of plants and dead animals) and algae left on the spartina grass by the high tide.



3.

c. River Otter

River otters are found in and near freshwater and brackish water habitats across North America. In the salt marshes they feed on fish and a variety of other animals and plants.



4.

d. Great Blue Heron

Great blue herons are found in fresh and saltwater wetlands across North America.

They stand still in shallow water and feed on the fish and other small animals that swim by.



5.

e. Oysters

Oysters are found in coastal waters throughout the world.

When the tide covers them, they filter detritus and algae out of the water for food.

f. Blue Crab

In the United States blue crabs are found in the coastal waters of the Atlantic Ocean and Gulf of Mexico.

They are scavengers and eat dead animals.

g. Bottlenose Dolphin

With the exception of the Arctic and Antarctic, bottlenose dolphins are found in coastal and ocean waters all around the world.

They often work together to feed on small fish and squid. In the southeastern United States, they have even been seen in salt marshes knocking fish out of the water and eating them on the land!

h. Diamondback Terrapin

Diamondback terrapins are the only turtles that live in salt marshes.

They feed on crabs, snails, insects, fish and sometimes worms and aquatic plants.

i. Fiddler Crab

Fiddler crabs live in the mud in salt marshes and tidal flats. Fiddler crabs scoop up mouthfuls of dirt and separate the algae (their food) from the sand that they spit back out.

j. Horseshoe Crab

Horseshoe crabs are found in coastal waters of the Atlantic and Gulf of Mexico. They live on the tidal flats and at the bottom of tidal creeks.

They look through the sand and mud for shrimp, worms, and other small animals.



6.



7.



8.



9.

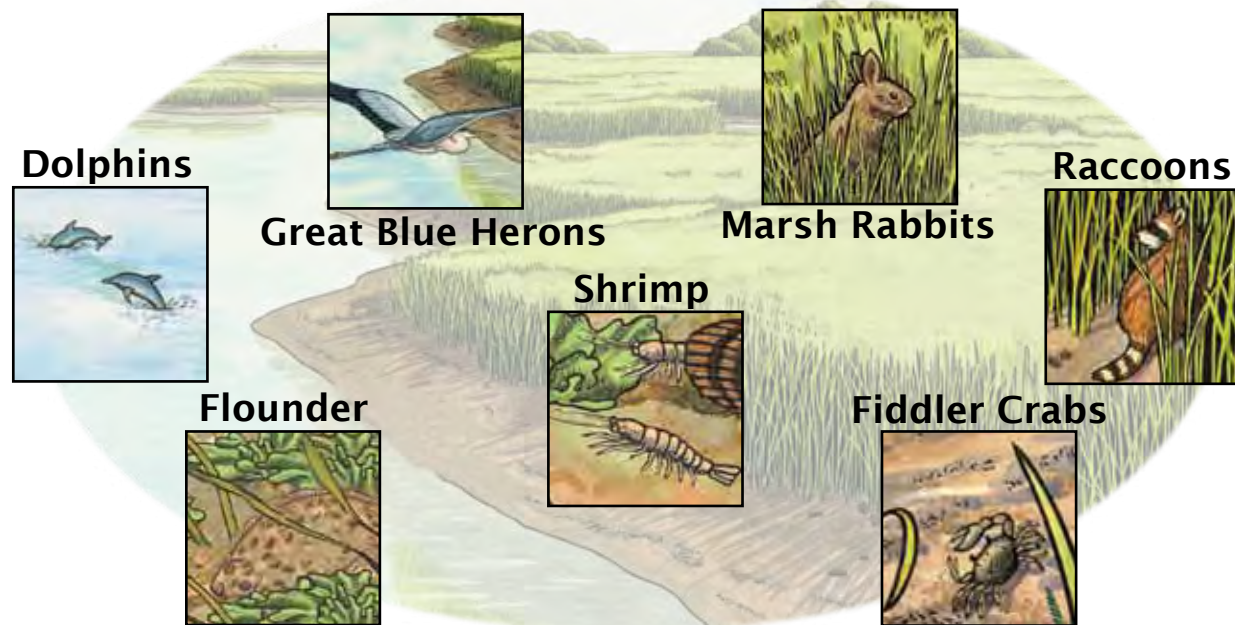


10.

Answers: 1h; 2c; 3e; 4j; 5a; 6b; 7f; 8d; 9g; 10i

Tidal Animals Activity

Salt marshes are wetlands found in areas where rivers meet the oceans (bays and estuaries). The daily rising (flood) and falling (ebb) saltwater tides make this one of the most difficult habitats for plants and animals to survive. *Look at the animals below. Which of the animals are most likely to be in the salt marsh at low tide (when there's not much salt water), and which animals are most likely to be in the marsh at high tide (when there's lots of salt water)?*

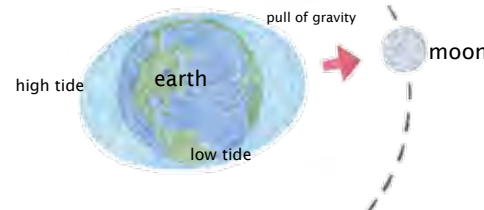


Answers: Low tide: raccoons, marsh rabbits, fiddler crabs, and great blue herons
High tide: dolphins, shrimp, and flounder

What Causes Tides?

As the moon revolves around the earth, gravity pulls the ocean water on the near side of the earth towards it, making a bulge. Because of centrifugal force (like water in a spinning bucket), the water on the opposite side of the earth makes another bulge. These bulges draw water from other parts of the oceans creating two dips. These bulges and dips eventually reach land as high and low tides.

Tides are not the same everywhere on the earth and they change daily. A high tide one day will arrive approximately 50 minutes after it did the day before. Most areas have two tide cycles a day, but there are some areas that only have one. The difference between high tide and low tide is usually a few feet, but it can vary from just a few inches to well over 40 feet in Canada's Bay of Fundy!



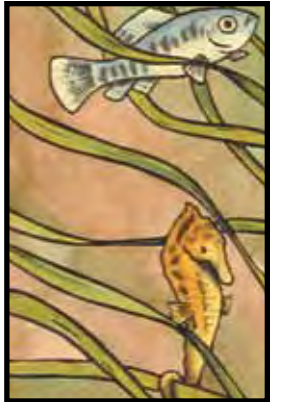
Why are Salt Marshes Important?



Marshes are one of the most important habitats on the planet! So much grass grows there that the only habitats on earth that produce more plant material per acre than marshes are rainforests!

This grass is very important for life in the ocean. When it dies, the tide carries it into the ocean where its nutrients support a variety of food chains. Many ocean animals would not be able to survive without the marsh grass food for them or the animals they eat.

Salt marshes are also safe nursery grounds for many young sea animals. The plants and grass provide food and a place to hide from predators (bigger animals that want to eat them). Almost all animals that we eat as seafood (shrimp, grouper, and flounder) depend on the salt marsh for their babies to grow. Without the salt marsh providing a safe nursery, we wouldn't have seafood to eat.



The salt marsh grasses slow down waves, which helps control floods during hurricanes and other storms. Salt marsh mud soaks up chemicals in the water and the marsh grass catches litter. This helps the ocean to be cleaner because not as much pollution reaches it. Salt marshes are not only important to fish and crabs; they are also important to birds. Many migrating birds depend on salt marshes as a resting area and a place to eat while on their long journey.



Spartina and its Adaptations

If you poured salt water on the plants in your yard, they would all die (so don't actually try it). Spartina grass is covered by salt water every day, but it has special glands to get rid of the salt while keeping in the water. *If you lick a spartina blade, you can taste the salt it has spit out!*

Spartina grass has strong, deep roots to hold it firmly in the ground during heavy winds and tide changes. The grass blades are also long and narrow to bend easily during high winds.

There are two types of spartina: the tall spartina is closest to the water and can be over nine feet tall and the short spartina grows to between two and three feet in the meadows or the flats.

Just like other plants, spartina turns green and grows tall in the spring and summer. When fall arrives, it turns brown and starts to break apart. Some of it stays in the marsh where it is eaten by the animals and it helps to fertilize the grass for the next year. Other broken pieces form "wrack," a floating pile of grass that can be carried out to sea or can wash ashore on a beach. Wrack is an important food source and a safe place for tiny little animals.

A type of Spartina called "alterniflora" is native to the East and Gulf Coasts of the United States where it is very important. However, it has somehow found its way to the West Coast of the United States where it has become a serious weed problem. It is growing too fast and taking away habitat from marsh plants (including Spartina foliosa) that are native to that area. *How or why can one plant be really good in one place and bad in another? How do you think plants and animals move from their native area to "invade" a foreign area?*



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