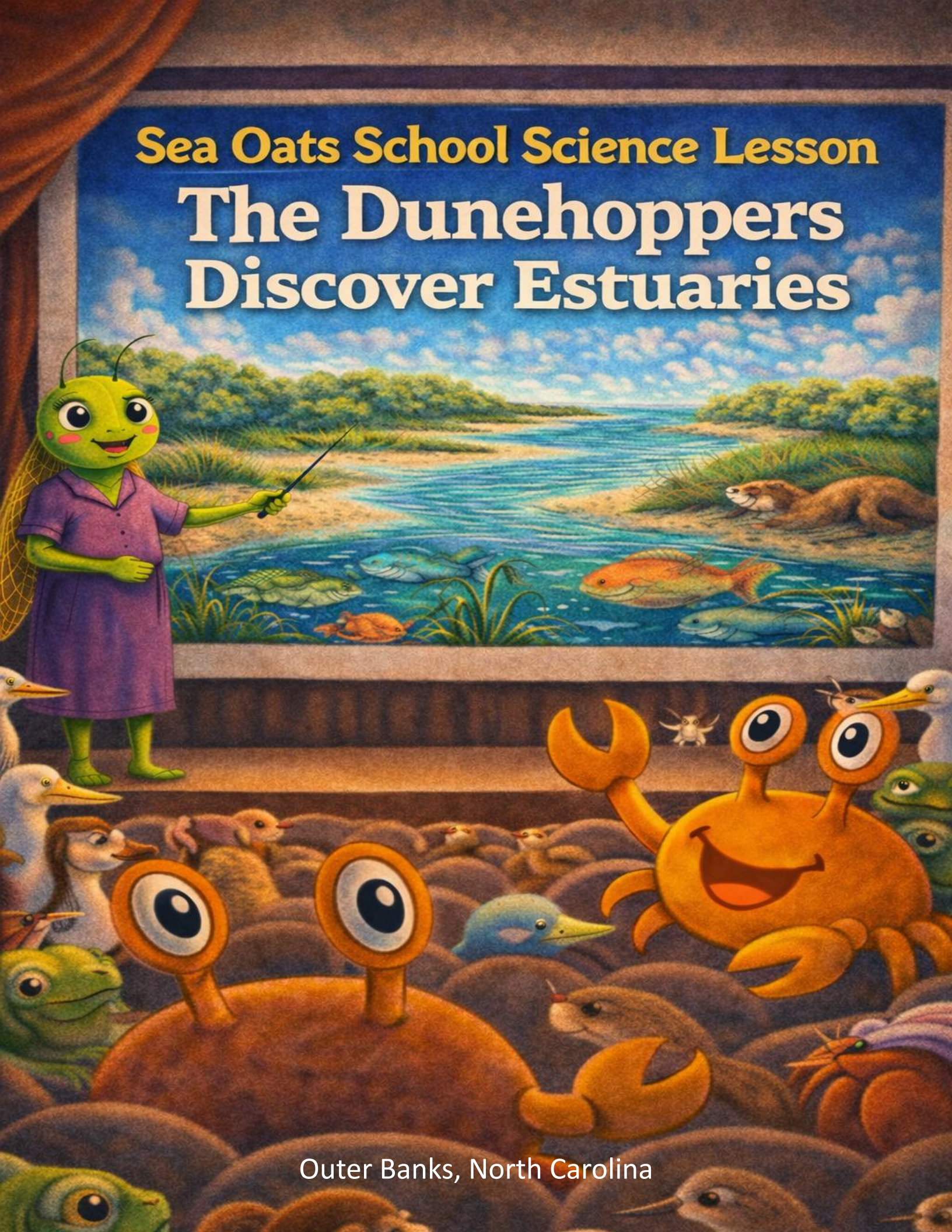

Sea Oats School Science Lesson
The Dunehoppers Discover Estuaries
Outer Banks, North Carolina

Forward

This storybook was created by the Outer Banks Coastal Conservation (OBCC), a nonprofit organization whose mission is to foster environmental stewardship and a deeper connection to the Outer Banks of North Carolina through outreach, education, and conservation efforts.

We believe that small stories can spark big change. That is why we have made this book available as a free resource for parents, teachers, and community members.

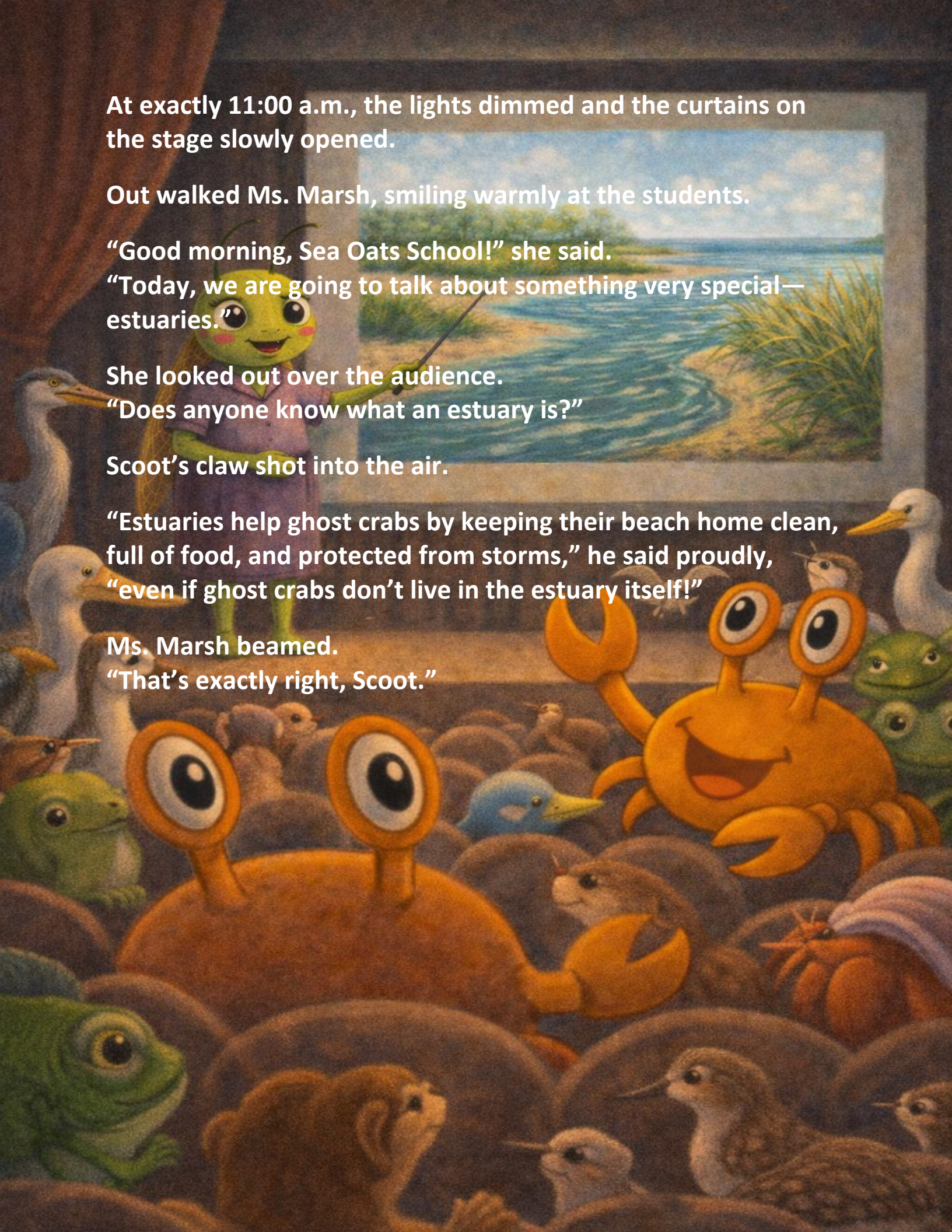
To learn more, access additional resources at: www.theobcc.org.

It was Wednesday morning, and that meant Science Lesson Day at Sea Oats School.

The sun sparkled over the dunes, sea oats whispered in the breeze, and Sandy, Scoot, and Shellby Dunehopper scurried into the school auditorium right on time. Papa and Mama Dunehopper always said that Wednesdays were special—especially when the lesson was about the ocean.

“This week’s lesson is about estuaries,” Sandy had told them at breakfast.

“And they’re very important to ocean life,” Papa and Mama added, “especially ghost crabs like us.”



At exactly 11:00 a.m., the lights dimmed and the curtains on the stage slowly opened.

Out walked Ms. Marsh, smiling warmly at the students.

“Good morning, Sea Oats School!” she said.
“Today, we are going to talk about something very special—estuaries.”

She looked out over the audience.
“Does anyone know what an estuary is?”

Scoot’s claw shot into the air.

“Estuaries help ghost crabs by keeping their beach home clean, full of food, and protected from storms,” he said proudly, “even if ghost crabs don’t live in the estuary itself!”

Ms. Marsh beamed.
“That’s exactly right, Scoot.”

What Is an Estuary?

Ms. Marsh clicked to her first slide.

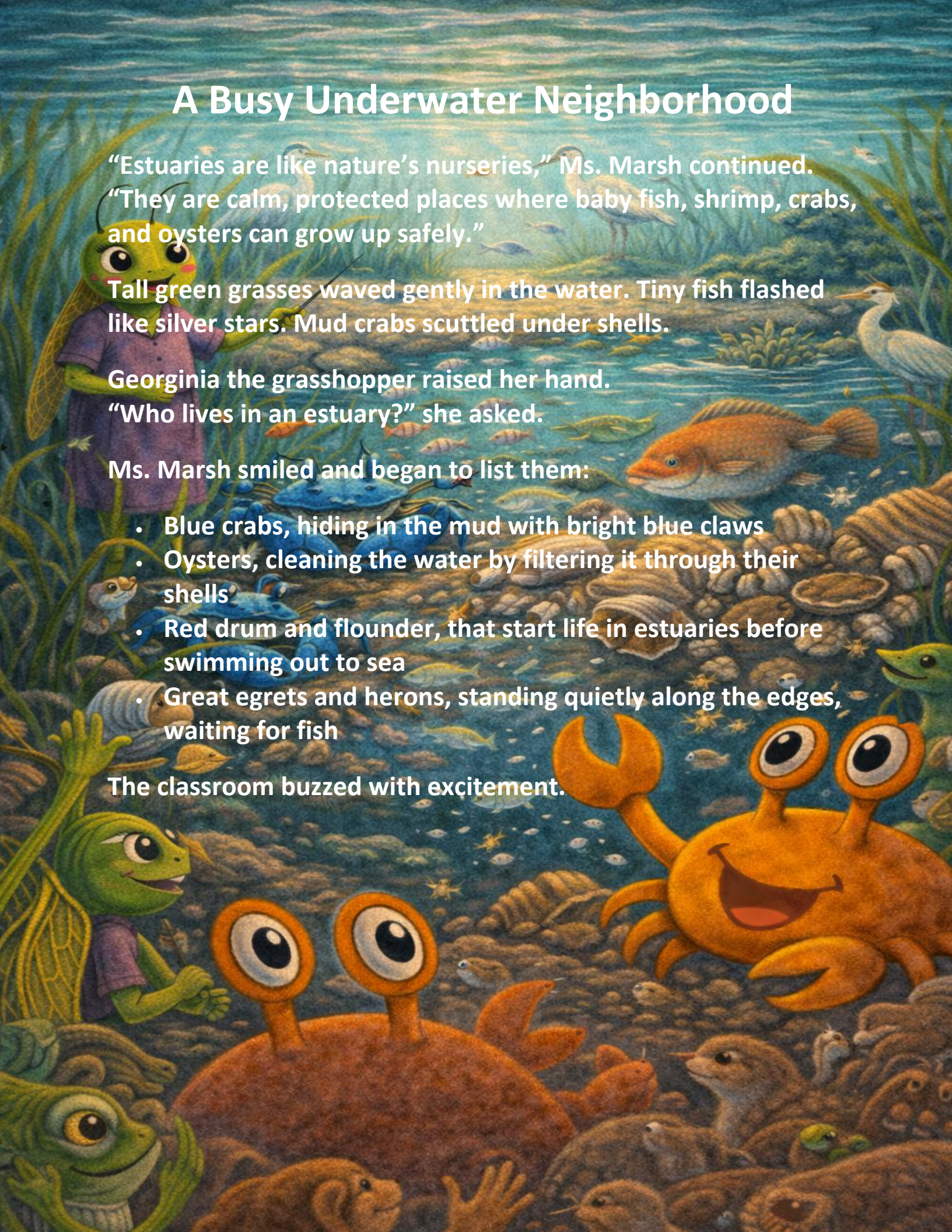
"Have you ever seen the place where a river meets the ocean?" she asked.
"That magical place is called an estuary."

She explained that in an estuary, freshwater from rivers and saltwater from the sea mix together.
"This makes something called brackish water—not too salty and not too fresh. It's just right for many living things."

Along the Outer Banks of North Carolina, Ms. Marsh told them, there are huge estuaries called sounds, like Pamlico Sound, Albemarle Sound, and Currituck Sound.
"They stretch behind the barrier islands," she said, "and they are full of hidden life and changing tides."

The Dunehoppers imagined winding waterways sparkling behind the dunes.

A Busy Underwater Neighborhood



“Estuaries are like nature’s nurseries,” Ms. Marsh continued. “They are calm, protected places where baby fish, shrimp, crabs, and oysters can grow up safely.”

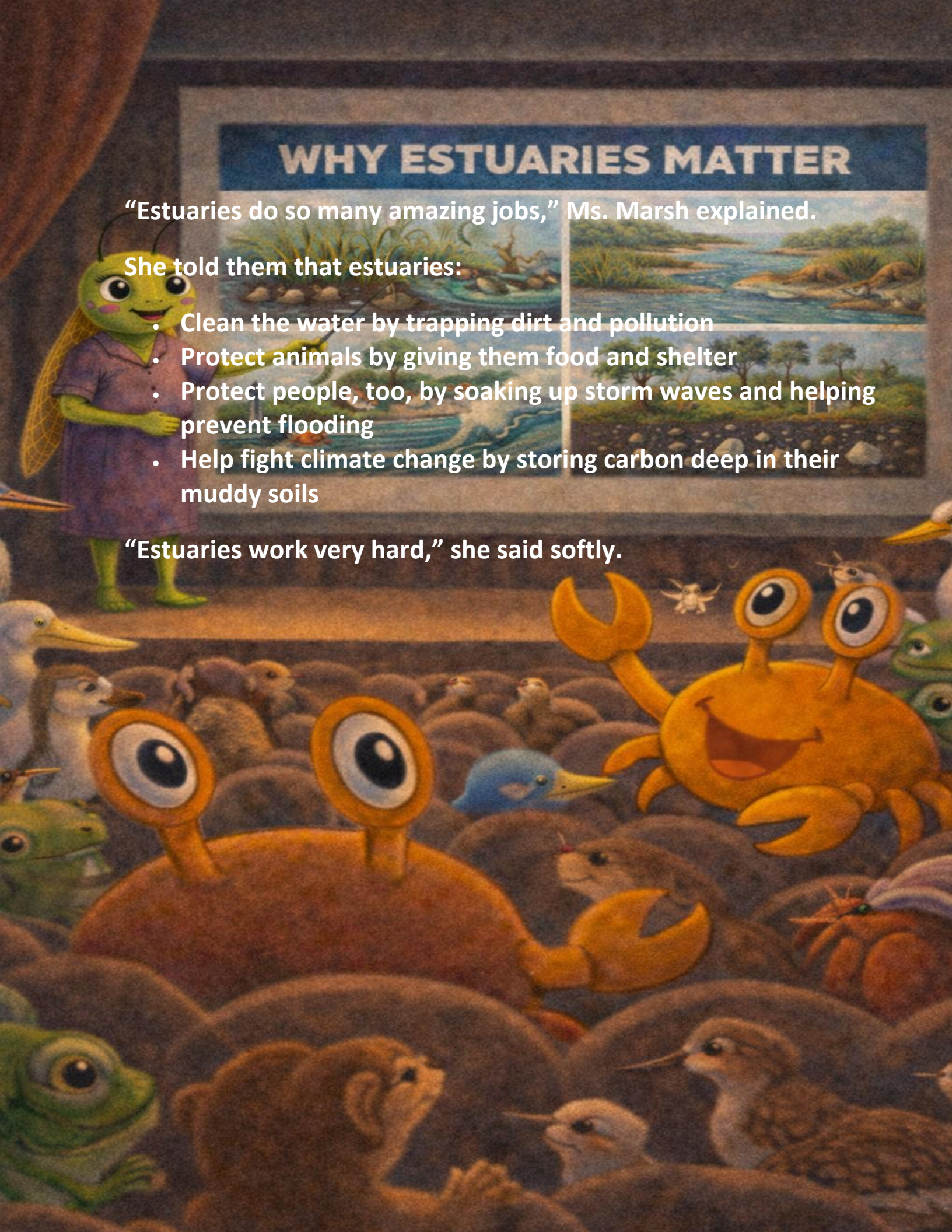
Tall green grasses waved gently in the water. Tiny fish flashed like silver stars. Mud crabs scuttled under shells.

Georginia the grasshopper raised her hand.
“Who lives in an estuary?” she asked.

Ms. Marsh smiled and began to list them:

- Blue crabs, hiding in the mud with bright blue claws
- Oysters, cleaning the water by filtering it through their shells
- Red drum and flounder, that start life in estuaries before swimming out to sea
- Great egrets and herons, standing quietly along the edges, waiting for fish

The classroom buzzed with excitement.



“Estuaries do so many amazing jobs,” Ms. Marsh explained.

She told them that estuaries:

- Clean the water by trapping dirt and pollution
- Protect animals by giving them food and shelter
- Protect people, too, by soaking up storm waves and helping prevent flooding
- Help fight climate change by storing carbon deep in their muddy soils

“Estuaries work very hard,” she said softly.

What's Hurting Our Estuaries?

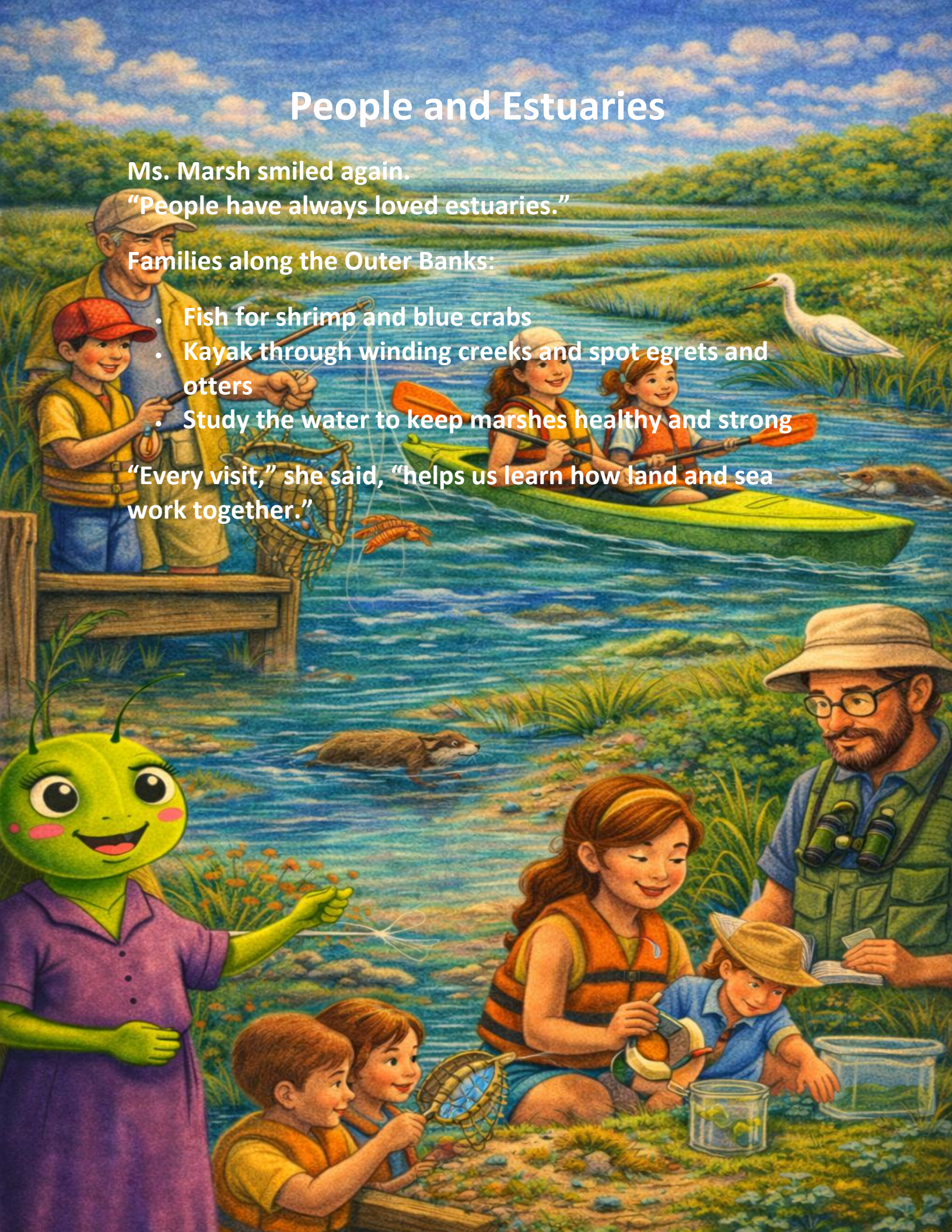
"Even though estuaries are strong," Ms. Marsh said, "they still need our help."

She explained that:

- Pollution from roads and lawns can cause algae to grow too much and steal oxygen from fish
- Building too close to the water can damage marsh plants and animal homes
- Storms and rising sea levels can wash away shorelines and make the water too salty

The Dunehoppers listened closely.

People and Estuaries



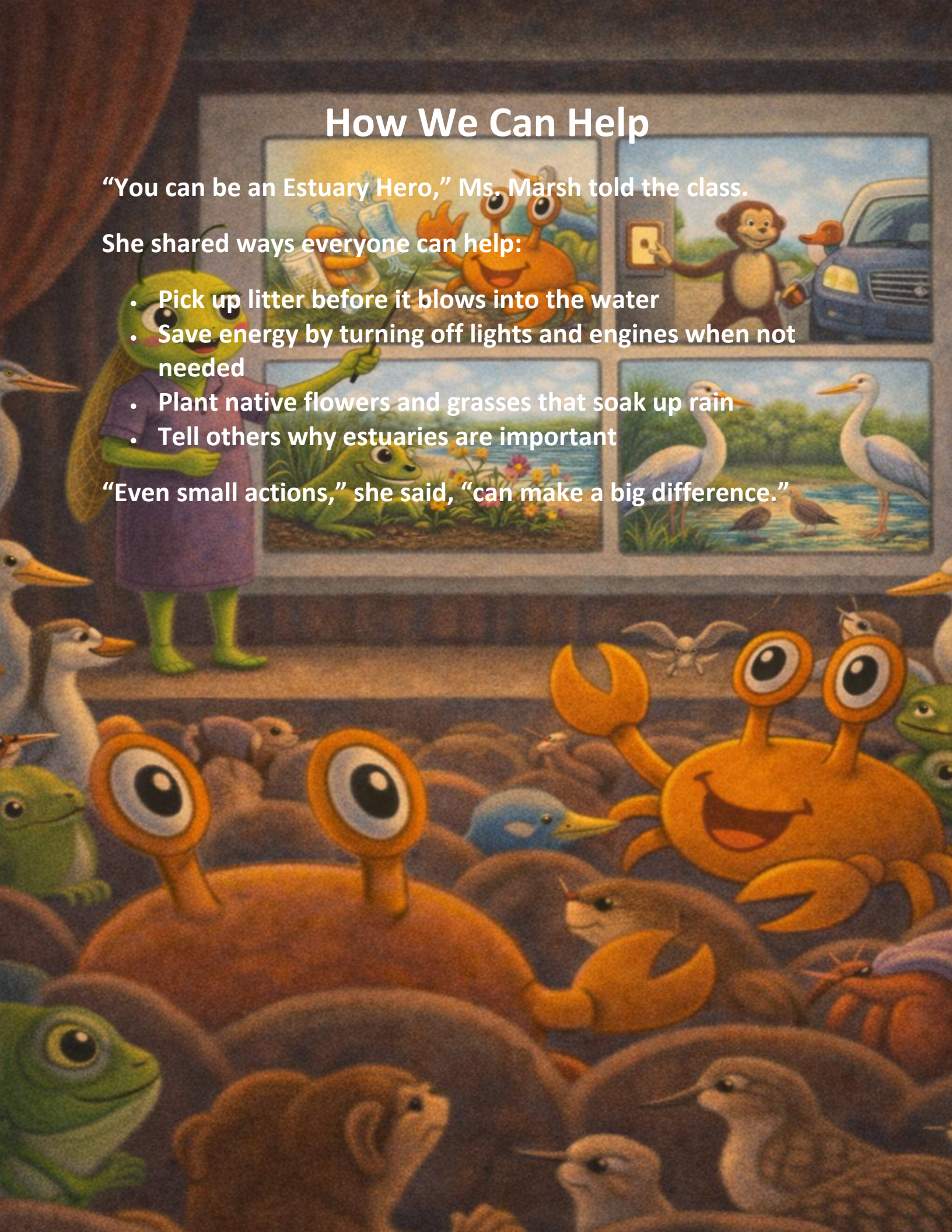
Ms. Marsh smiled again.
"People have always loved estuaries."

Families along the Outer Banks:

- Fish for shrimp and blue crabs
- Kayak through winding creeks and spot egrets and otters
- Study the water to keep marshes healthy and strong

"Every visit," she said, "helps us learn how land and sea work together."

How We Can Help



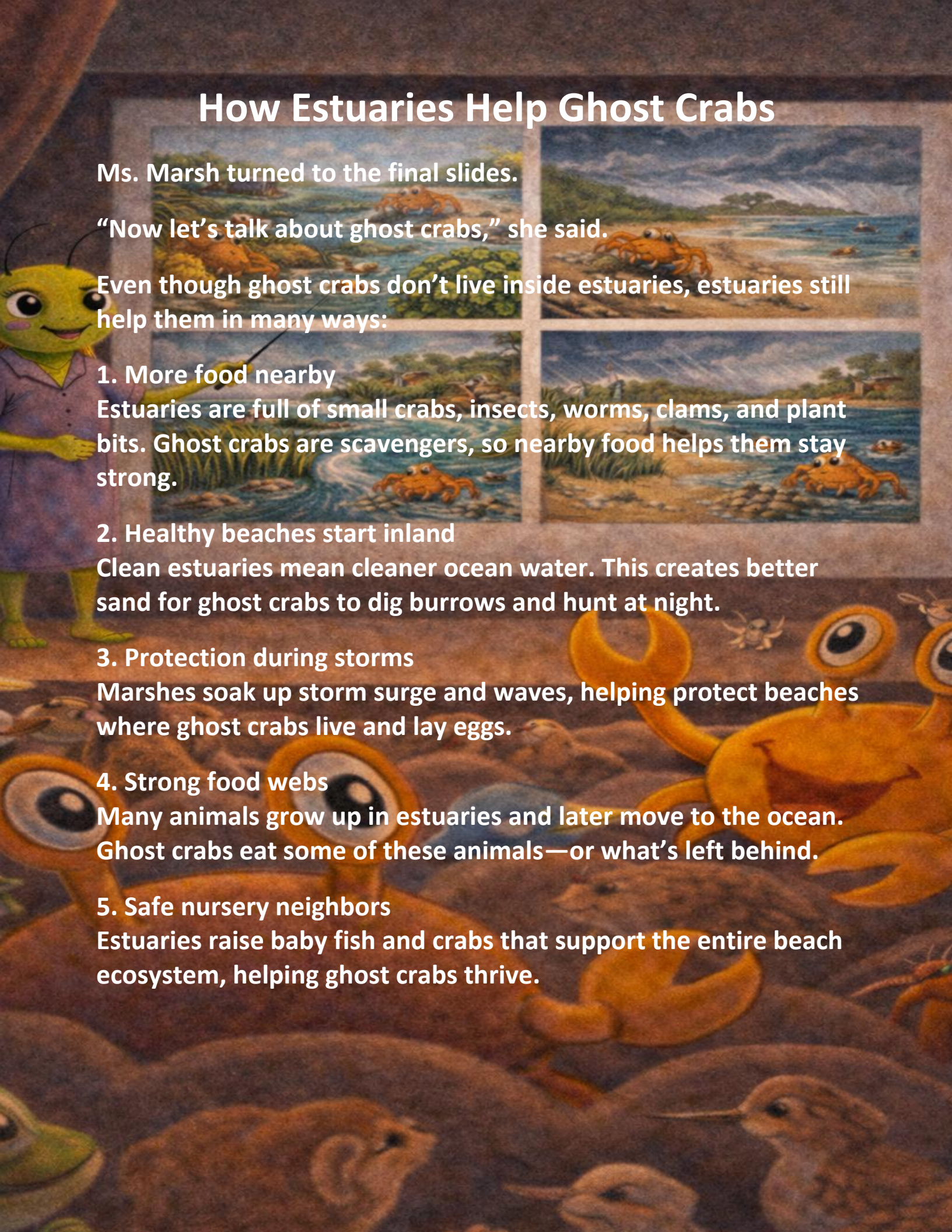
“You can be an Estuary Hero,” Ms. Marsh told the class.

She shared ways everyone can help:

- Pick up litter before it blows into the water
- Save energy by turning off lights and engines when not needed
- Plant native flowers and grasses that soak up rain
- Tell others why estuaries are important

“Even small actions,” she said, “can make a big difference.”

How Estuaries Help Ghost Crabs



Ms. Marsh turned to the final slides.

“Now let’s talk about ghost crabs,” she said.

Even though ghost crabs don’t live inside estuaries, estuaries still help them in many ways:

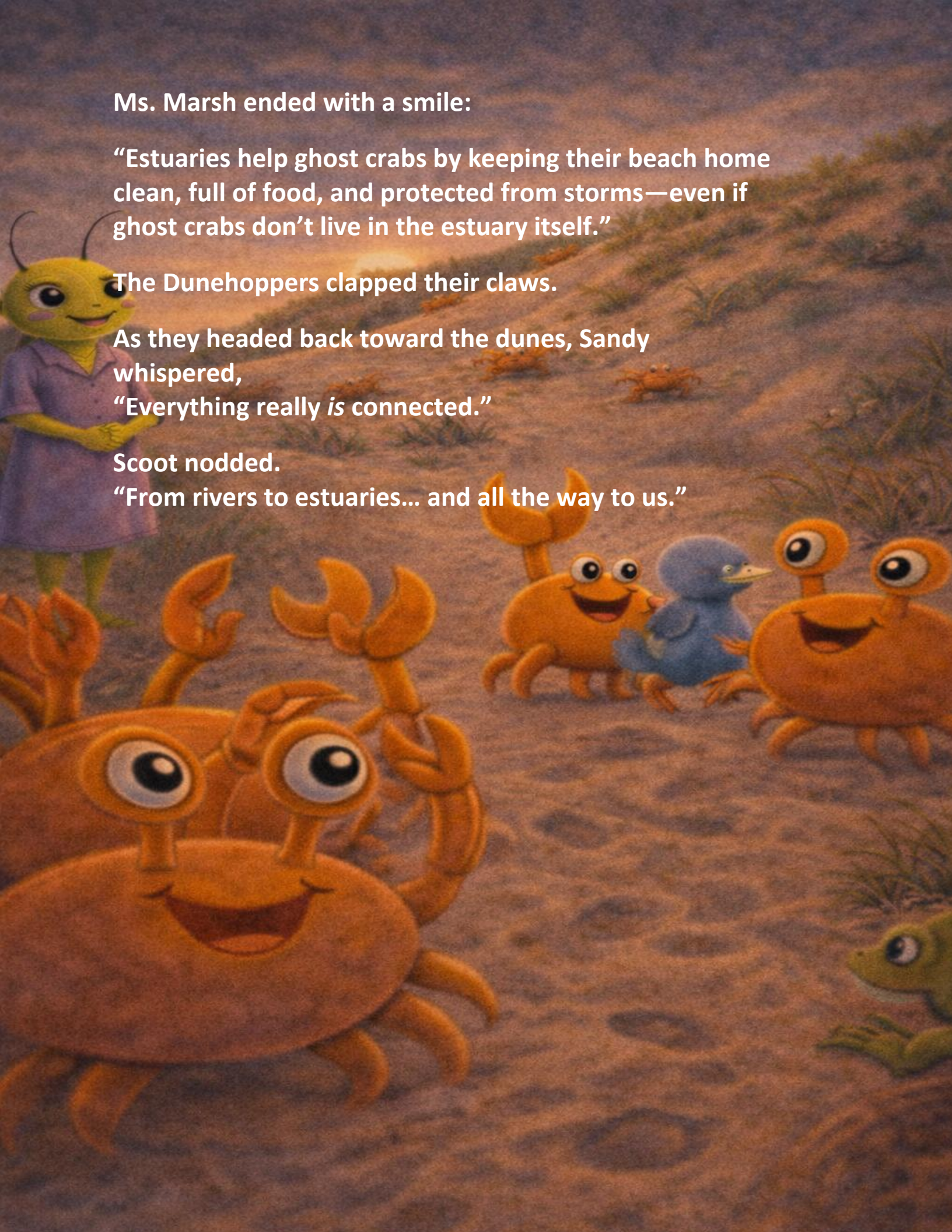
1. More food nearby
Estuaries are full of small crabs, insects, worms, clams, and plant bits. Ghost crabs are scavengers, so nearby food helps them stay strong.

2. Healthy beaches start inland
Clean estuaries mean cleaner ocean water. This creates better sand for ghost crabs to dig burrows and hunt at night.

3. Protection during storms
Marshes soak up storm surge and waves, helping protect beaches where ghost crabs live and lay eggs.

4. Strong food webs
Many animals grow up in estuaries and later move to the ocean. Ghost crabs eat some of these animals—or what’s left behind.

5. Safe nursery neighbors
Estuaries raise baby fish and crabs that support the entire beach ecosystem, helping ghost crabs thrive.



Ms. Marsh ended with a smile:

“Estuaries help ghost crabs by keeping their beach home clean, full of food, and protected from storms—even if ghost crabs don’t live in the estuary itself.”

The Dunehoppers clapped their claws.

As they headed back toward the dunes, Sandy whispered,
“Everything really *is* connected.”

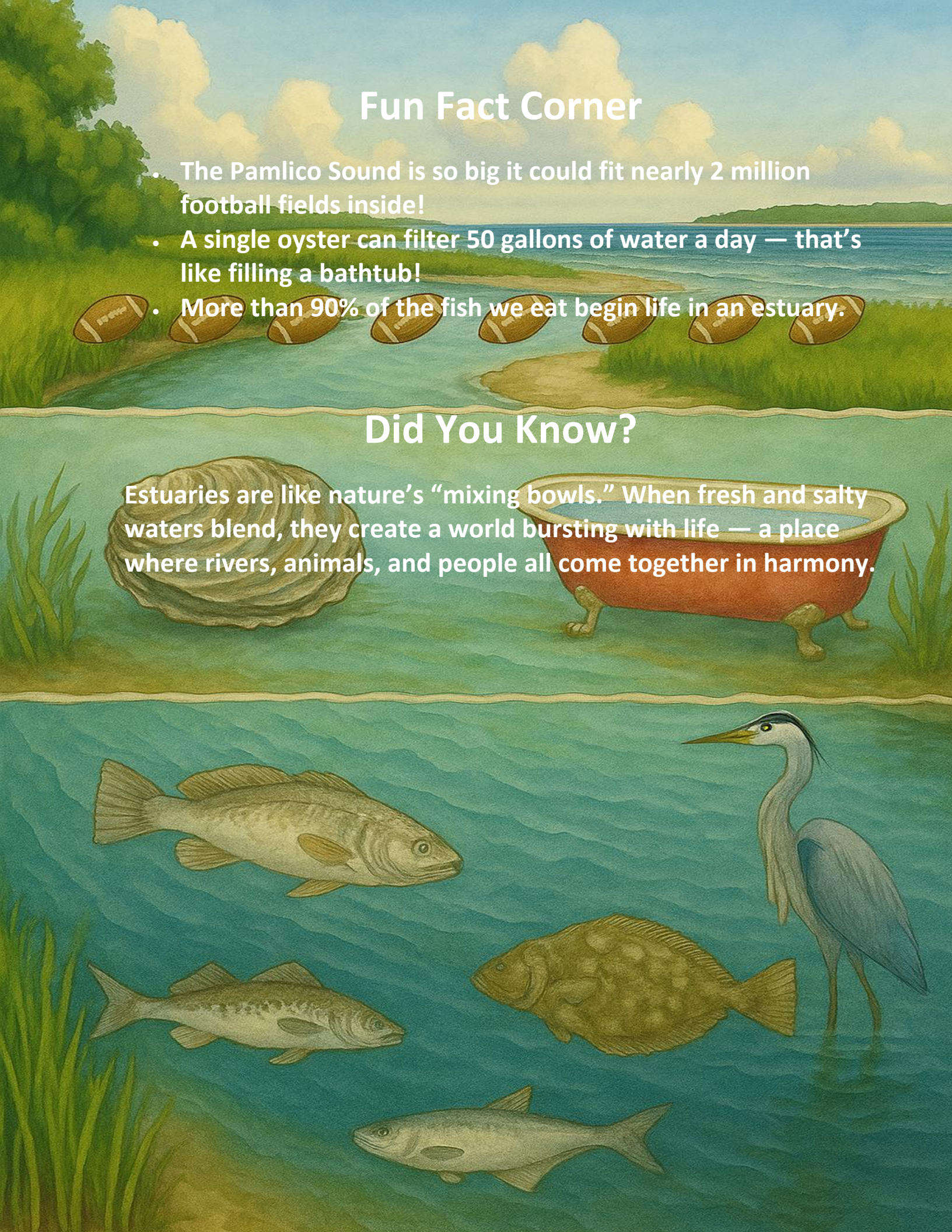
Scoot nodded.
“From rivers to estuaries… and all the way to us.”

Fun Fact Corner

- The Pamlico Sound is so big it could fit nearly 2 million football fields inside!
- A single oyster can filter 50 gallons of water a day — that's like filling a bathtub!
- More than 90% of the fish we eat begin life in an estuary.

Did You Know?

Estuaries are like nature's "mixing bowls." When fresh and salty waters blend, they create a world bursting with life — a place where rivers, animals, and people all come together in harmony.



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