



Sweetwater Marsh National Wildlife Refuge

Written by Nancy Day

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Chapter 1: Meet the Marsh



This is Sweetwater Marsh. This marsh is an important habitat for more than 200 migrating bird species.

It is the largest salt marsh left on San Diego Bay.

At high tide, salty water flows into winding channels and fills the marsh.



At low tide, the salty water flows back to the bay.

Much of the marsh is muddy.

To survive here, plants and animals have to deal with water rising and falling twice a day.

They have to deal with salt, too.



Pickleweed grows along the edge of the marsh.

Sometimes, it is covered by salty water.

Pickleweed pushes salt from the water to the tips of its leaves.

The leaves turn red as they hold more and more salt.

Late in fall, the leaves drop off.

In this way, pickleweed can rid its body of a lot of salt.



Eelgrass grows in saltwater. It needs sunlight.

Because sunlight does not reach deep water, eelgrass grows in shallow water.

If the marsh water becomes muddy, the eelgrass grows in shallower water. This way it will get the sunlight.

You can sometimes see it at very low tide.



The salt marsh bird's beak is another plant. Its flowers are shaped like birds' beaks. It is a rare plant.

It grows on other marsh plants, called hosts.

It gets water and nutrients through its host's roots.

Pickleweed is one of its hosts.

Its purple stems and white flowers add color to the marsh.

It lives above the high-tide line.



This endangered plant needs bees that live next to marshes to pollinate it.

If the marsh is too salty in spring, the bird's beak's seeds may not sprout.



Animals in the marsh also have adaptations that help them survive the salt and tides.

Round stingrays are plentiful here.

They like warm water.

The water in their bodies changes to stay just as salty as the marsh water.

If the marsh water gets saltier—or less salty—the stingray flushes out much of its body water and takes in the water around it.



In shallow water, round stingrays sink to the muddy bottom to hide.

They wave their fins to stir up shrimp and crabs to eat.

They can sting predators—and people—with a spine on their tail.



Green sea turtles are endangered around the world.

Many have been killed for food or have become tangled in nets.

Pacific green sea turtles do not nest in the United States.

They like warmer water.

However, some turtles from Mexico have moved here to feed.



These turtles eat mostly eelgrass, but some eat jellyfish, too.

Green sea turtles shed tears to remove salt from their bodies.

Many have been killed for food or have become tangled in nets.



Belding's savannah sparrows are endangered in California.

They use pickleweed and other plants to make their nests.

Putting their nests in tall, thick pickleweed, keeps the eggs safe from water, even at high tide.



The sparrows eat insects and snails in the mud near the plants' roots.

Sometimes, they eat the pickleweed, too.

These shy birds live in the salt marsh all year.

Belding's savannah sparrows are endangered in California.

Chapter 2: Changes in the Marsh



Since California became a state in 1850, people have caused many changes here.

Big cities, such as San Diego, grew up around the bay.

Sweetwater Marsh is in the smaller city of Chula Vista, near San Diego.



People dredged mud out of the bay so big ships could pass.

They filled the wetlands with the mud to make more land to build on.

This made the marsh smaller and its water muddier.

They put dams on the Sweetwater River, so less fresh water flows into the marsh.

With less fresh water, the marsh became saltier.



People built a power plant on the bay.

Its pipes drain warm, cloudy water from the plant into the bay.

So the water in the bay—and the marsh it flows into—has become warmer and cloudier.



Now there are little bits of marsh here and there.

Buildings, roads, and levees break it up.

Life has become harder for some marsh plants and animals.



Pickleweed is very well-adapted to salt water and tides.

It can grow with different levels of salt and tidal flow.

Plenty of pickleweed still grows in the Sweetwater Marsh.

It does not grow where roads, dams, and levees are now, though.



Because muddier, cloudier water blocks light, eelgrass is dying out in many places.

No eelgrass grows around the power plant.

However, each year it spreads to other parts of San Diego Bay.

Some eelgrass seeds float here from other places along the coast.



Salt marsh bird's beak died out at Sweetwater Marsh by 1990.

Scientists are not sure why. They do know it does not do well where the marsh habitat has been damaged.

People planted more salt marsh bird's beak here.

The plants came from marshes in Mexico. The plants grew but did not form enough seeds.

Perhaps they needed bees nearer to the marsh to pollinate them.



How have surrounding cities affected wetland animals?

Round stingrays are still plentiful.

They stay in the marsh until they are big enough to move into deeper water.

They may even be drawn to the warmer water near the power plant.



Green sea turtles have been swimming in the shallow water near the bay's edge since the 1980s.

Before that time, they had not been spotted so far north.

The power plant—and sometimes ocean currents—has made the water warmer.

Warmer water may be the reason that the green sea turtles come here to eat eelgrass.

They are more active throughout the year in warmer water.



Belding's savannah sparrows depend on the salt marsh as their habitat.

Where buildings, roads, or levees have replaced pickleweed, these sparrows have fewer places to nest.

The more people and pets that disturb their habitat, the fewer pairs will build nests.

Chapter 3: Restoring the Marsh



In 1988, Sweetwater Marsh was made a National Wildlife Refuge.

Its goal is to save the native plants and animals there and to restore their habitat.

New marsh habitat has been created to replace some that was lost.

Scientists keep studying the best ways to restore the marsh.



The salt marsh bird's beak plants are being protected and studied here.

Also, Sweetwater Marsh is the only place in the United States where Palmer's sea heath grows wild.

The special plant is being protected and studied here, as well.



Plants from other places were crowding out these rare plants.

Volunteers pulled out plants that did not belong here and planted native plants instead.

People have planted eelgrass and cordgrass, too.



Scientists planted salt marsh bird's beak closer to coastal scrubland.

The bees that pollinate the plant live there.



Chula Vista is going to tear down the power plant.
Soon, the bay water that flows into the marsh will
be clearer and cooler.



Eelgrass will grow there again.

Some scientists think green sea turtles will still come to eat it.

In cooler water, the turtles might spend some of the winter hibernating in the mud.



Light-footed clapper rail



California least tern



Western snowy plover



Along with the Belding's savannah sparrow, endangered birds, such as the light-footed clapper rail, California least tern, and western snowy plover are protected here.

The light-footed clapper rail nests in thick, tall cordgrass.

It weaves the nest into surrounding cordgrass stems, so the nest floats up but not away when the tide rises.



People planted cordgrass in new marsh areas, but it did not grow tall enough.

When the water rose, some nests were destroyed.

People built nesting rafts that saved the few nests clapper rails built on them.

Meanwhile, people are helping hatch and raise the chicks of this rare bird.

The chicks are later released into the marsh.



Studies found that more Belding's savannah sparrows can live in the largest part of Sweetwater Marsh.

Smaller patches of marsh—cut off from the rest—have smaller populations.



Next, people plan to buy more land around the marsh.

They will also remove some roads and levees that block the flow of salt water.

Those actions will improve the water quality in the Sweetwater Marsh.

Native plants will grow over unneeded trails.

Other trails will be placed away from nesting birds.

That way, people and pets will not disturb the birds.

In the future, more birds may nest there!

Unit Title: **Living Things in Changing Environments**

Grade: **3**

Science Standards 3.3.c. and 3.3.d.

Supports ELA Standard: Writing 3.1.1.

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