

Whose Home?

Lesson by Phyllis Schmitt, Santa Rosa, CA
Adapted from the "The Saltmarsh Players"
in *WOW! The Wonders of Wetlands*

Key Concepts

1. Salt marshes are coastal wetlands.
2. A salt marsh provides a suitable habitat for a variety of plants and animals.
3. Plants and animals of the salt marsh live in different zones depending on their adaptations.
4. The factors that influence when and where an animal is found in the marsh are related to the rise and fall of tides.

A hand-drawn illustration of the word "Snail" in a cursive, handwritten style. The letter 'S' is large and features a spiral shell design on its left side. The word "Snail" is written in a simple, rounded font.

Background

Estuaries are the special places where the flowing waters of rivers meet the moving waters of the tides. A variety of estuary habitats may exist where the sea meets the mouth of a river including: wetlands, mudflats, and channels. Each habitat has a distinctive community of plants and animals. Wetlands are the vegetated areas of highest elevation in the estuary. These lands may periodically be covered by high tides. They are covered with dense plant growth that tolerates contact with seawater.

Mudflats are lower in elevation than the wetlands. They are alternately submerged then exposed by the tides. The soft mud deposits serve as the principal structural foundation of soft bottom communities that thrive in the estuary. Mudflats are characterized by burrowing animals and by plants tolerant of daily exposure to drying and flooding. Many animals of the mudflats burrow to be protected from predators and sheltered from the drying effects of the sun at low tide. The salinity in the mud is also more constant than that of the water.

Sea grasses, found at the lower levels of the intertidal region, often grow on mudflats (and sometimes clean sand). Eelgrass is one of the few flowering plants or sea grasses that can survive complete submersion in seawater. The lesson, "Extraordinary Eelgrass Beds" examines this unique community in depth.

One of the obvious features of the mudflats is the smell! This is because of the anaerobic (absence of oxygen) condition that exists just below the surface. These oxygen-depleted muds serve as an important habitat for many species of

anaerobic bacteria. Some of these bacteria produce hydrogen sulfide, the gas responsible for the characteristic rotten egg smell.

Channels are always underwater, even at the lowest tides. The scouring action of the tides or flow of a river keeps the channels from filling up with sediment. Channels in marshes may be dry at low tide. Channels support limited plant growth and provide homes for free-swimming organisms. Channels in the estuary vary in width from as wide as the whole estuary to small, narrow, creek-like flows. Most of the organisms that inhabit the channel are plankton. During some parts of the year, the channels are abundant with the larval stages of fish and invertebrates. Channels may also serve as spawning and feeding grounds. Herring and sole move into these areas to spawn and the juveniles of these and other species feed on the large amounts of available food.

Salt marshes, often associated with estuaries, are coastal wetlands. The salinity of the soil in these marshes is often much higher than the salinity of the water. Soil salinity increases as water evaporates from the soil, leaving the dissolved salts behind. Halophytes, plants that are tolerant to saline waters, are the dominant organisms of the marshes. The lowest parts of a marsh, submerged for longer periods of time, may be dominated by pickleweed, which stores salt in its fleshy leaves, or salt grass, which has special glands that enable it to rid itself of excess salt. In higher zones of the marsh, grasses and sedges that do not tolerate prolonged periods of submersion by the tides are prevalent. Sedges are grass-like plants with solid, angular stems (“sedges have edges”).

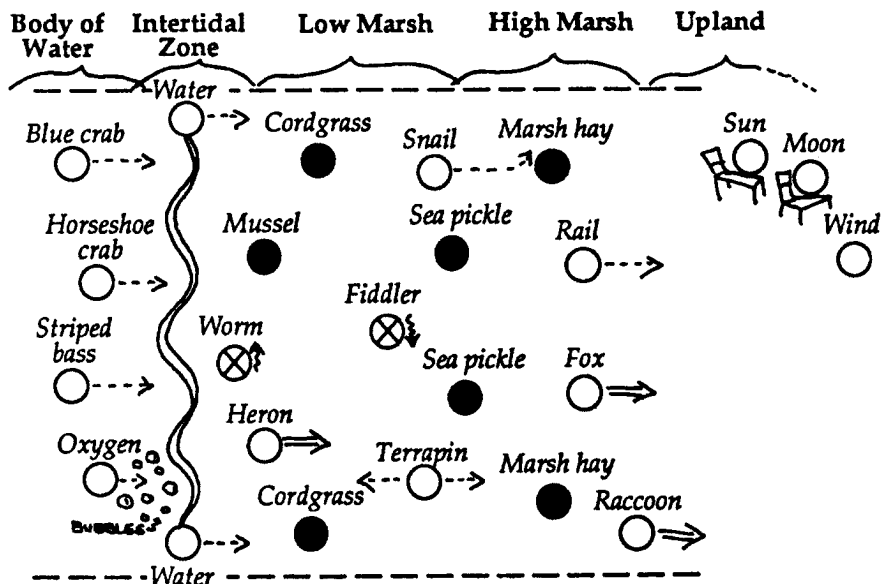
Salt marshes provide a variety of animals with a suitable habitat. Like the plants, animals live in different areas (zones), depending on their adaptations. Salinity, temperature, length of time an area is covered with water and position in the food chain are all factors that influence when and where a plant or animal will be found in the marsh. For example, plants and animals that can tolerate being alternately flooded for long periods of time and then exposed to the air live in the deeper zones. On the other hand, plants and animals that only like to “get their feet wet” live farther away from the tidal influence.

The following activity deals primarily with the salt marsh habitat.

Materials

For the class:

- a character card for each student
- habitat zone markers
- 12 feet of rope to represent the water line
- habitat zone markers: cards on traffic cones labeled: Body of Water, Intertidal Zone, Low Marsh, High Marsh, Upland
- bubble soap
- 2 chairs or stools
- items to construct masks or costumes (optional)
- open area laid out as shown below:



Code:

- = student playing role
- = stationary character
- ⊗ = moves above and below ground
- > = moves toward high marsh
- ⇒ = may leave marsh altogether

Teaching Hints

Note: The character cards represent species of the Mid-Atlantic coast of the U.S. You may wish to substitute species found in other coastal regions.

Preparation

1. Distribute one character card to each student. Optional: Have the students make masks or simple costumes. Briefly review or introduce how saltwater will move through the various zones of the marsh, as the tide comes in.
2. Have the students who are “WATER” read their cards and take their places at low tide. Have them practice moving to the high tide level (“Intertidal Zone” to the edge of the “High Marsh”) and then back to the low tide level.
3. Explain that the gravitational pull of the moon is the major force that makes the tide move in and out. Have the “MOON” read his/her card and take a position at the highest end of the marsh.
4. The sun also pulls on the water of the earth causing the tide to move in and out. The “SUN” takes a position next to the “MOON”. At high tide the “MOON” and “SUN” will raise their cards high in the air to reinforce the fact that they pull the water.
5. Next ask the “plants”, in turn, to read their cards and take their appropriate places in the marsh. Remind the “plants” that they are rooted to the ground.
6. Do the same for each of the “animals”. Ask each to state what he or she will do during high and low tide.
7. Ask: **What is in the water that helps the animals survive?** (oxygen)
“OXYGEN” moves behind the water line.
What helps mix new oxygen into the water? (wind moving the water) As the “WIND” blows, making waves that help mix in oxygen, “OXYGEN” will blow bubbles using bubble soap.
8. All characters are now ready to perform together.

Discussion

Throughout the activity ask the students questions like:

How can you tell when it is low tide in the marsh? (exposed mudflats)

Which plants can stay underwater the longest? (cord grass; up to 22 hours)

Why do the animals move with the tides? (to find food, to breathe, to protect themselves)

Which plants stay dry most of the time? (salt marsh hay)

The Salt marsh Comes Alive!

Announce: **“It is low tide! The “SUN” and “MOON” are high in the sky. The “WIND” begins to blow, the “waves” move gently and the “plants” sway in the breeze.”** (“Animals” behave as directed for low tide.)

Continue: **“The tide begins to rise!”** (The water line should walk slowly toward the high marsh, with “fish” following behind. As the water passes over each character, he/she should change to high tide activities. Talk students through it, reminding them what they should be doing, which also helps everyone to notice what the others are doing.)

When the tide line reaches its peak, announce: “It is high tide.” (Have the group stop in place briefly and quickly have each player tell what he/she is doing.)

Now ask the “tide” to turn and go back again; as the tide passes over each character, the activities of the animals should change again. Repeat the performance until the students understand how the tides affect the plants and animals in the marsh.

Key Words

alternately - in turns; one and then the other

channel - an area of the mudflat, always under water

community - an assemblage of interacting populations living in a particular locale

habitat - a place or “home” in the environment where an organism lives or is expected to live

halophytes - flowering plants that are tolerant to complete submergence in seawater

mud burrow - a hole or tunnel in mud

mudflat - low muddy land that is flooded at high tide and left uncovered at low tide characterized by very fine sediments

tide - rise and fall of the sea level along the shore

tolerate - ability to survive despite some difficulty; to put up with

wetland - a lowland area, such as a marsh or swamp, that is saturated with moisture and characterized by specialized soil and plants

Extensions

1. Have students share their performance with an audience.
2. Add music to the performance.
3. Have individuals or small groups of students write a story of “their” character, as it faces its challenges in the salt marsh.
4. Some students might enjoy writing pattern poems: haiku, diamond, cinquain, limerick, anagram poem . . .

a. cinquain

noun		
_____	_____	_____
adjective		adjective
_____	_____	_____
verb	verb	verb

phrase about the topic in line one		

noun/ same as line one or a synonym		

b. diamond poem

noun			
_____	_____	_____	_____
adjective		adjective	

three verbs ending in -ed or -ing			
_____	_____	_____	_____
noun	noun	noun	noun

three verbs ending in -ed or -ing			
_____	_____	_____	_____
adjective		adjective	

noun			



Plant: Cordgrass

I grow in the low marsh. I'm underwater for long periods each day. I can't move to stay dry.



Plant: Salt marsh hay

I grow in the high marsh. I'm underwater for a few hours each day. At low tide I lie on the mud.



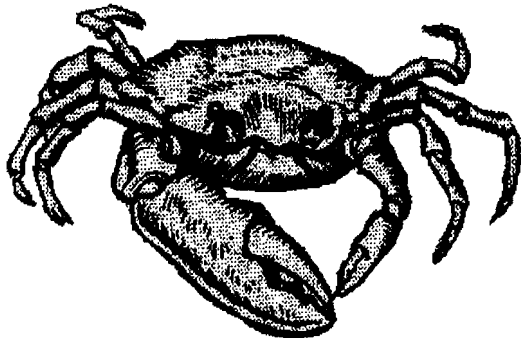
Non-living: Wind

Sometimes I sweep across the marsh. I help the sun and moon move the tide. I also add oxygen to the water.



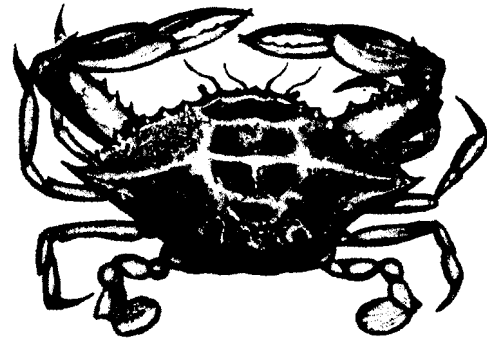
Plant: Sea pickle

I live in the high marsh. The tides cover me with water, then uncover me. I look like groups of little pickles because I soak up salt water.



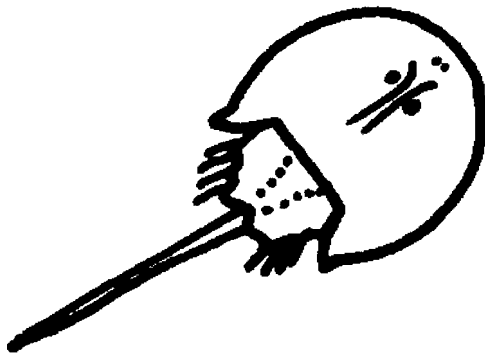
Animal: Fiddler crab

I run around the marsh at low tide. I use my claws to eat dead plants and animals. At high tide, I hide in my mud burrow.



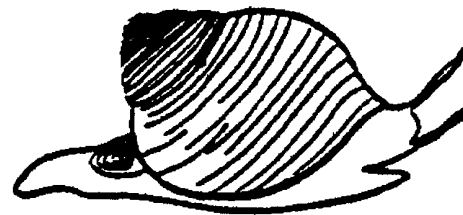
Animal: Blue crab

I come to the marsh with the water of the high tide. I find lots to eat. I swim out of the marsh as high tide moves out.



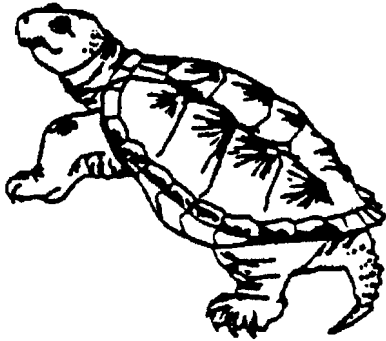
Animal: Horseshoe crab

I stay at sea until a full moon in May. Then I swim ashore with the high tide. I lay my eggs in the sand. A few days later I move out with the high tide.



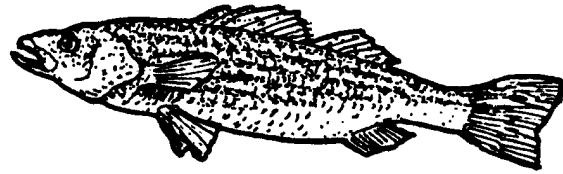
Animal: Saltmarsh snail

I live in the high marsh. At low tide, I glide around the mud looking for algae and dead plants to eat. At high tide, I crawl up the stems of grasses.



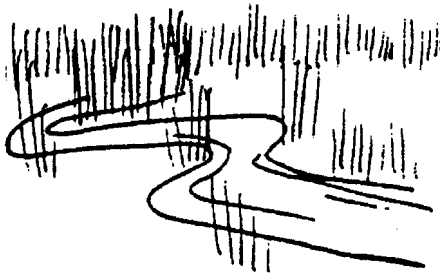
Animal: Diamondback terrapin

I am the only turtle of the salty wetlands. The tides don't bother me much. I eat snails, crabs, worms, and fish. I follow the food.



Animal: Striped bass

I raise my young in the marsh. They dart in and out of the marsh plants. They swim in and out with the tides. They find lots of food in the marsh.



Non-living: Water

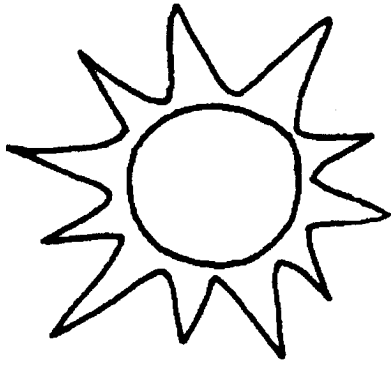
I am the tide. At high tide, I move slowly into the low marsh, then into the high marsh. I stop for a moment, then slowly move out to sea.

(You will need a partner to help you make and move the strip of "water".)



Non-living: Oxygen

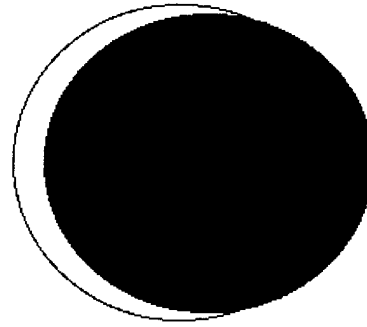
I am in the water. Animals and plants need me to live. I come from the wind and from plants. I move in and out with the water of the tides.



Non-living: Sun

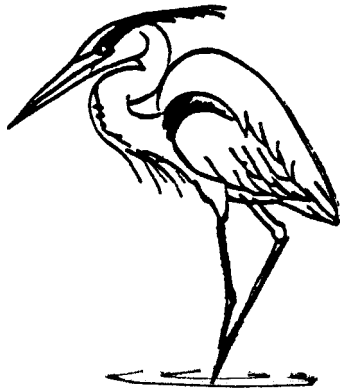
I help move the tide. I help pull water away from the shore making the low tides in one place. The water “piles up” making high tides in other places.

(“Shine” over the marsh by standing on a chair and making a big circle above your head with your arms.)



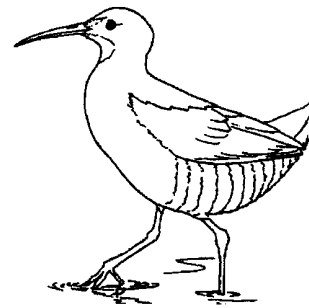
Non-living: Moon

I am the most important mover of the tide. I help pull water away from the shore making low tides in one place. The water “piles up” making high tides in other places.



Animal: Great blue heron

I am a large beautiful bird. I use my long neck and pointed bill to spear fish and crabs to eat. At high tide, I move to the high marsh or fly away.



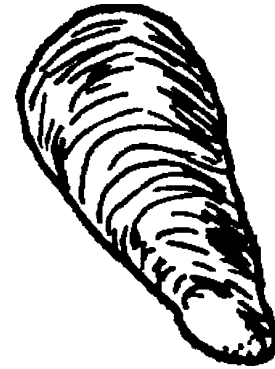
Animal: Clapper rail

I am the “marsh hen”. At low tide, I eat fiddler crabs and worms from the mud. I eat seeds, too. At high tide, I eat snails in the high marsh.



Animal: Clam worm

I live in a tube I make in the mud of the low marsh. At high tide, I swim out to eat clams and dead fish. At low tide, I stay inside my tube.



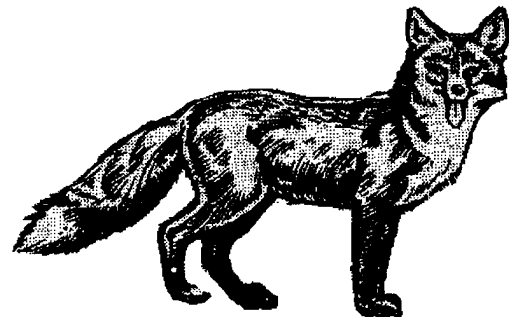
Animal: Ribbed mussel

I live on the mud in the low marsh. I can't move about. At high tide, I open my shells to take in water, oxygen, and food. At low tide, I close up tight.



Animal: Raccoon

I visit the saltmarsh to hunt for crabs, mussels, and fish. I am not fond of swimming. When the tide rises, I leave the marsh for higher ground.



Animal: Red fox

I visit the saltmarsh to hunt for rabbits, small marsh birds and eggs, crabs and berries. As the tide rises, I leave the marsh for higher ground.

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