



HABITAT COMPARISON WALK (K-2)

Overview: In this activity, students will hike through and compare five different refuge habitats, looking for plants and animals in each habitat, and working on a Habitat Hunt Sheet.

Content Standards Correlations: Science, p. 293 (2016)

Grades: K-2

Key Concepts: A habitat provides a home for a plant or animal, with suitable food, water, shelter, and space. There are five habitats along the trail: the upland, salt marsh, slough, mudflats, and salt pond. Each habitat supports plants and animals that are adapted to living in it.

Objectives:

Students will be able to:

- identify and compare the five habitats on the refuge
- identify one plant or animal in each habitat

Materials:

Provided by the Refuge:

- 1 bird identification guide
- 1 plant ID book
- 1 habitat components poster
- 1 set of mud creature, shorebird and rail pictures
- 1 picture of salt marsh harvest mouse
- 1 brine shrimp & brine fly poster
- 12 clipboards

Provided by the Educator:

- pencils & copies of Habitat Hunt (*one per student, optional*)



Barn Swallow

TIME FRAME FOR CONDUCTING THIS ACTIVITY

Recommended Time: 30 minutes

Introduction (5 minutes)

- discuss the five habitats from the Eucalyptus Grove Overlook
- hand out binoculars, clipboards, pencils, and Habitat Hunt (*if provided*)

Habitat Walk (22 minutes)

- hike the trail from the Eucalyptus Grove Overlook to the Hunter's Cabin, walking through the upland, the salt marsh, over the slough and mudflats, and ending at the salt pond
- stop at the numbered stops on the map and lead discussions about the habitats and the plants and animals in each habitat

Discussion (3 minutes)

- answer any questions about the Habitat Hunt, using the answer sheet
- collect the equipment and Habitat Hunt Sheets

HOW THIS ACTIVITY RELATES TO THE REFUGE'S RESOURCES

What are the Refuge's resources?

- significant wildlife habitat
- endangered species
- migratory birds

What makes it necessary to manage the resources?

- The introduction of nonnative plants and animals that compete with or prey upon native plants and animals.

What can students do to help?

Refuge staff control introduced plants and animals, but we need your help.

- Plant native plants
- Keep your cat inside your house; they catch migratory birds
- Only take your dog to places that permit dogs and keep it on a leash
- Teach others what you have learned about refuge habitats

SUPPORTING INFORMATION ABOUT THIS ACTIVITY

Habitats

- A habitat is a home for a plant or animal. It provides food, water, shelter, and space suitable to the plant or animal's needs.
- Each habitat has its own unique characteristics.
- On the refuge, there are a variety of habitats, each of which supports different plants and animals.
- Each habitat that you will explore in the Habitat Comparison Walk is described below.

Upland

- The upland is the raised portion of land located above the marsh, out of reach of the tides. It is a higher and drier habitat than the marsh.
- There are a variety of native and nonnative (introduced by people) plants in the upland.
 - Native upland plants include California poppies and coyote brush.
 - Introduced upland plants include sweet fennel, eucalyptus, wild oat, and acacia.
- Animals in the upland include rabbits, ground squirrels, gopher snakes, lizards, hummingbirds, and other small, upland birds.
 - Animals may not be seen but evidence of them may be found (e.g. nests, webs, tracks, holes, scat, etc.).

Salt Marsh

- The salt marsh is a transition zone between the bay or slough and dry land.
- The salt marsh is a wetland habitat that is flooded by the tides twice daily.
- Plants in the marsh are shorter and less diverse than in the upland.
 - Plants include pickleweed, alkali heath, gumplant, salt grass, and sea lavender.
- Animals may not be seen but evidence of them may be found.
 - Animals in the salt marsh include voles, shrews, spiders, crabs, clams, ducks, shorebirds, hawks, and egrets.
 - The salt marsh is home to two endangered species that are found no where else - the salt marsh harvest mouse and the California Ridgway's rail.
- Approximately 80% of the salt marsh surrounding San Francisco Bay has been altered or destroyed.
 - Salt marshes were dredged, diked, and filled.
 - Landfills, salt ponds, buildings, and roads were built on top of the salt marshes.

Tidal Slough and Mudflats

- A slough is a natural waterway. Newark slough is a finger of the bay which carries bay water into the salt marsh with each high tide.
- At low tide, when the slough water is carried out to the bay, the mudflats below the slough are revealed.
 - Small, drifting plants and animals (plankton) live in the slough water, along with a variety of fish.
 - In the mudflats are a wide variety of mud creatures, including snails, crabs, mussels, crabs, worms, and amphipods.
- Many birds feed in and near the slough.
 - Dabbling ducks, such as mallards and northern shovelers, and shorebirds feed on mud creatures and plankton on the mudflats.
 - Diving ducks, such as canvasback, feed on plankton and clams in the slough water.
 - Egrets and herons, fish in the slough water, stabbing at fish and crabs.

Salt Pond

- The salt pond is a human-made habitat. Cargill Salt Company uses the ponds to harvest salt through the process of solar evaporation.
- Bay water is pumped through a series of ponds and after five years the salinity is high enough for salt crystals to form. The salt is harvested, processed, and sold.
- Salt ponds of varying salinities encompass the South San Francisco Bay. The water of the salt pond is very salty, and few organisms are adapted to live in the salt pond.
 - In lower salinity ponds, there are fish, water boatmen, brine shrimp, brine flies, and algae; in middle salinity ponds, it is just brine shrimp, brine flies, and algae; in the highest salinity ponds, only bacteria can live.



Northern Pintails

HOW TO LEAD THIS ACTIVITY BY FOLLOWING THE "DO, READ, ASK" TEACHING FORMAT

Introduction (5 minutes)

Do

Begin the walk at the Eucalyptus Grove overlook with the following discussion about habitats.

Read

- "We are going to take a walk to look at the 5 different habitats on the Refuge.
- From where we are standing we have a good view of the refuge. We can see 5 distinct habitats: (point to the habitats as you name them) the upland, the salt marsh, the slough, the mudflats (if it is low tide), and the salt ponds.
- A habitat is a home for a plant or an animal. Within their home, plants and animals can find food, water, shelter, and space they need to live."

Ask

- ? **Are all habitats the same?** (No)
- ? **What can you see in the habitats?** (Grasses, shrubs, trees, birds, slough, trails, bridges, people, ground squirrels, etc.)
- ? **What do animals and plants need to live?** (Food, water, shelter, and space)

Do

Show the habitat components poster.

Read

- "We are going to go on a hike to look for different animals and plants and the habitats where they can find food, water, shelter, and space.
- During the hike, you will be working on a Habitat Hunt sheet. Cross off the things you see during our hike."

Note: The Habitat Hunt is optional the teacher must provide these sheets.

Do

If appropriate, hand out to each student: a clipboard, a pencil, and a Habitat Hunt sheet (pencils and Habitat Hunt sheets are provided by the teacher)

Habitat Walk (22 minutes)

UPLAND

Do

Use the activity map and walk to Stop #1. Use the plant identification guide to identify the Acacia trees.

STOP #1

Ask

- ? **What type of animals do you think live in these Acacia trees?** (Birds, insects.)
- ? **What do these animals use these trees for?** (Food, shelter.)



Acacia

Read

"Birds and insects use these trees to raise their young, find food, and for shelter from the weather. This tree is part of their habitat."

Ask

- ? **What types of animals do you think live on the ground?** (Ground squirrels, rabbits, lizards, snakes.)
- ? **Where do these animals make their home?** (In the ground in burrows. Burrows are a hole that ground squirrels and rabbits dig into the ground. Snakes and lizards can use these burrows too.)
- ? **What do these animals eat?** (Plants, insects, and other small animals.)

Read

"We are going to continue down the trail and look at a couple of other plants that live in the upland."

Do

Continue walking down the trail. Look for native plants between Stop #1 & #2. Use the plant ID guide to help identify these. Scratch and sniff a few leaves to release the aromatic oils. At the bend in the trail, turn left. Continue on the path to Stop #2.

STOP #2

Ask? This is coyote bush. How do you think this plant got its name? (No one really knows for sure, but some possible answers are that the flowers are fluffy like a coyote's fur, or that coyotes like to hide in it.)



Coyote Bush

Do

Across from Stop #2 is Stop #3. Along the right side of the trail, you will see a large bush that spreads out towards the marsh. This is California blackberry. Use the [plant identification guide](#) to help identify the California blackberry.

STOP #3

Ask

? This is California blackberry. In the summer this bush grows fruit which is called the blackberry fruit? What types of animals might eat the fruit? (Birds, ground squirrels, red fox, and gray fox.)

Read

“The California blackberry provides food and shelter for different types of birds and mammals. The habitat we just walked through with the Acacia trees, the coyote bush, and the California blackberry has a name.”



California blackberry

Ask

? Do you remember what it is called? (Upland.)
? Do you think the animals that live on this hill in the upland habitat also live in the wetlands just ahead of us? (No.)

Do

As you walk down the trail use your [plant identification guide](#) to identify any interesting plants.

SALT MARSH

Do

Walk along the boardwalk until it begins to bend to the left. Have the students face left towards the upland.

STOP #4

Ask

? Are the plants taller on the upland habitat (the hill where we just were) or on the ground below this boardwalk? (The plants are taller in the upland.)

Do

Point out the plant border where the upland ends and the salt marsh begins.

Ask

? Does the land look more wet on the upland habitat or on the ground below this boardwalk? (Should look more wet on the ground below the boardwalk- unless it is raining.)

Do

Have students look over the sides of the boardwalk at the marsh below.

Read

- “The habitat below this boardwalk is called the salt marsh habitat. The plants that live in the salt marsh drink salty water.
- The plants in the salt marsh use their energy to get rid of the salt, instead of using their energy to grow as tall as the plants in the upland.”

Ask

?What is the predominant plant you see below us in the salt marsh? (Pickleweed)
?What endangered species lives in and feeds on the pickleweed? (The salt marsh harvest mouse)
?What animals might eat a salt marsh harvest mouse? (Hawks, eagles, owls, egrets, rails, foxes)

Read

“They all depend on the salt marsh for their food, water, shelter, and space.”

Do

Show the salt marsh harvest mouse picture.



Salt Marsh Harvest Mouse

Ask

? What does endangered mean? (Endangered means almost gone, extinct means no more left.)

Read

“The salt marsh harvest mouse is endangered because the space that it needs to survive is growing smaller and smaller. A lot of the salt marshes have been destroyed. As a result, the mouse lost much of its pickleweed home (habitat).”

SLOUGH & MUDFLATS**Do**

Continue walking along the boardwalk, until you are halfway across the bridge. Face right (or north towards the Coyote Hill). The slough goes out to the Bay in the direction you are facing.

STOP#5**Ask**

? What types of animals and plants do you think live in this waterway? (Plankton (small drifting plants and animals), fish, sharks, bat rays, ducks)

Read

“This waterway provides food, water, shelter and space for many different types of plankton, fish, sharks, bat rays, and ducks. The name of this waterway is the slough (rhymes with 'you') habitat.”

Ask

? Which direction is the water traveling?

- (Have the students point to the direction that the water is traveling. If the tide is coming in, the water is moving south towards the second foot bridge and Headquarter's hill.
- If the tide is going out, the water is moving towards the bay and the Dumbarton Bridge. *Point to the bridge.*)

Read

“This waterway, which is called the slough, connects to the San Francisco Bay and then to the ocean.”

Ask

? Can you see the mudflat along side the slough habitat? (If yes, then this may indicate that it is low tide. If no, this may indicate that the tide is high.)

Read

- “There is a plant that looks like a tall grass growing out of the mudflat.
- If the mudflat is covered with water you can still see the top of this tall plant.
- When the plant breaks up in to little pieces it becomes good food for the animals in the slough.”

Do

Use the plant identification guide to help identify the cordgrass, the tall grass growing out of the mud.

Ask

? What kinds of animals do you think live in the mudflat? (Crabs, clams, worms, snails, mussels, shorebirds, like the snowy egret, and the endangered California Ridgway's rail which feeds in the mud.)

Do

Show pictures of the crabs, clams, worms, snails, mussels, shorebirds, and the California Ridgway's rail.



California Ridgway's Rail

Read

“The mudflat provides food, water, shelter, and space to crabs, clams, worms, snails, mussels, shorebirds, like the snowy egret, and the endangered California Ridgway's rail. Some of these animals also eat the cordgrass that grows tall. ”

Do

Look for animals that are feeding in the mudflats. Use your bird identification guide to identify any birds that you see.

SALT MARSH

Do

After discussing the slough, continue crossing the bridge walk to the end of the boardwalk and turn to the plants on the left. You can get a close up view of the salt marsh plants at this point.

STOP #6

Read

“We are going to take a close look at the salt marsh habitat again. Plants in the salt marsh live in salty soils and salty water. They have to drink salt water because it is the only water available to them.”

Ask

- ? **Can you and I drink only salt water?** (No.)
- ? **What would happen to us if we drank only salt water?** (We would become more thirsty, get sick, and would have to stop drinking salt water and drink fresh water to live.)

Do

Find salt grass in the salt marsh, using the plant identification guide to identify them. Point it out to the students.

Read

“This plant can drink salt water and survive because it “sweats” the salt out through openings on its leaves.”

Ask

- ? **Do you see salt crystals?** (Note: this may be difficult if the plant is wet. The salt crystals will be in solution and not visible.)

Do

- Allow the students to feel the leaves on these plants, but **do not pick these plants**. The leaves should feel chalky from the salt.
- Walk down a little further on the trail and look at the pickleweed found under the Hunter’s Cabin sign on the left.

Ask

- ? **Do you see salt crystals on this pickleweed?** (No.)

? **If pickleweed does not sweat salt out like the other plants, does anyone know how it gets rid of the excess salt?** (Pickleweed sends the salt to the tips, which turn red and fall off.)

? **What do you think pickleweed tastes like?** (Salt, pickles, bitter.)



Pickleweed

Read

“I will pick some pickleweed for us to taste and find out. **Remember never to eat a plant unless an adult tells you it is safe.** Some plants are poisonous and can make you very sick.”

Do

Only the leader should pick some pickleweed and give a small taste to each student. Students should not pick any plants.

Ask

- ? **Do you remember what endangered species lives in and feeds on pickleweed?** (The salt marsh harvest mouse.)
- ? **Do you remember why it is endangered?** (Loss of pickleweed habitat.)

Do

Show the picture of the salt marsh harvest mouse.

SALT POND

Do

Turn the students’ attention to the salt pond behind you. Have the students observe the salt pond from the shore.

STOP #7

Read

- “This large pond is another place where animals can find food, water, shelter, and space.
- The water in this pond originally came from the bay.
- Each year the water disappears by evaporating into the sky and to make clouds leaving behind the salt crystals. The salt is harvested and sold.

- Since the water is so salty only certain types of animals can live here.”

Ask

? What types of animals do you think live here?

(Shorebirds, ducks, gulls, and other birds, brine shrimp, and brine flies.)

Read

“The name of the animals that live in this pond are brine shrimp and brine flies. Shorebirds, ducks, gulls, and other birds feed on these small animals. The name of this habitat where these animals find food, water, shelter, and space is the salt pond habitat.”

Do

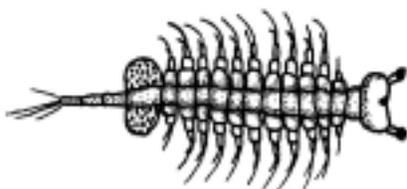
Show the picture of the brine shrimp and brine flies. Focus the students attention on the edges of the salt pond.

Ask

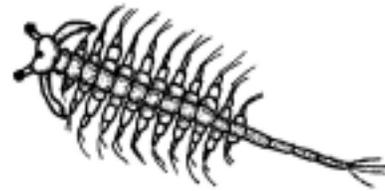
? Look in the salt pond water. Can you see any brine shrimp? Find a male and a female. What is the difference? (Male brine shrimp have claspers and the females have egg sacks.)

? Find a brine fly. How are brine shrimp and brine flies different? (Brine flies have wings, no gills, and 6 legs, while brine shrimp have no wings, gills on their legs, and 22 legs; brine flies are insects and brine shrimp are crustaceans.)

? Look at the edge of the salt pond. Can you see all of the salt crystals around the edge of the salt pond habitat? (The salt crystals are what left behind after the water evaporates. This salt is harvested and sold. This salt pond water is very salty!)



female brine shrimp



male brine shrimp

Discussion (5 minutes)

Ask

? What are the four things necessary for animals to survive in their home? (Food, water, shelter, space.)

? Do all the habitats that we saw today provide food, water, shelter and space for all of the animals that live there? (Yes.)

? What animals need the upland home to live? (The uplands provide a home for birds, rodents, snakes, insects, and lizards.)

? What animals need the salt marsh home to live? (The salt marsh is home for the endangered California Ridgway's rail and the salt marsh harvest mouse. It is also home for birds such as ducks and egrets.)

? What animals need the slough and mudflat homes to live? (The slough and mudflats provides food for shorebirds, ducks, and egrets. Sloughs bring bay water into the marsh with each high tide, mudflats are a home for mud creatures and sloughs area a home for fish and bat rays.)

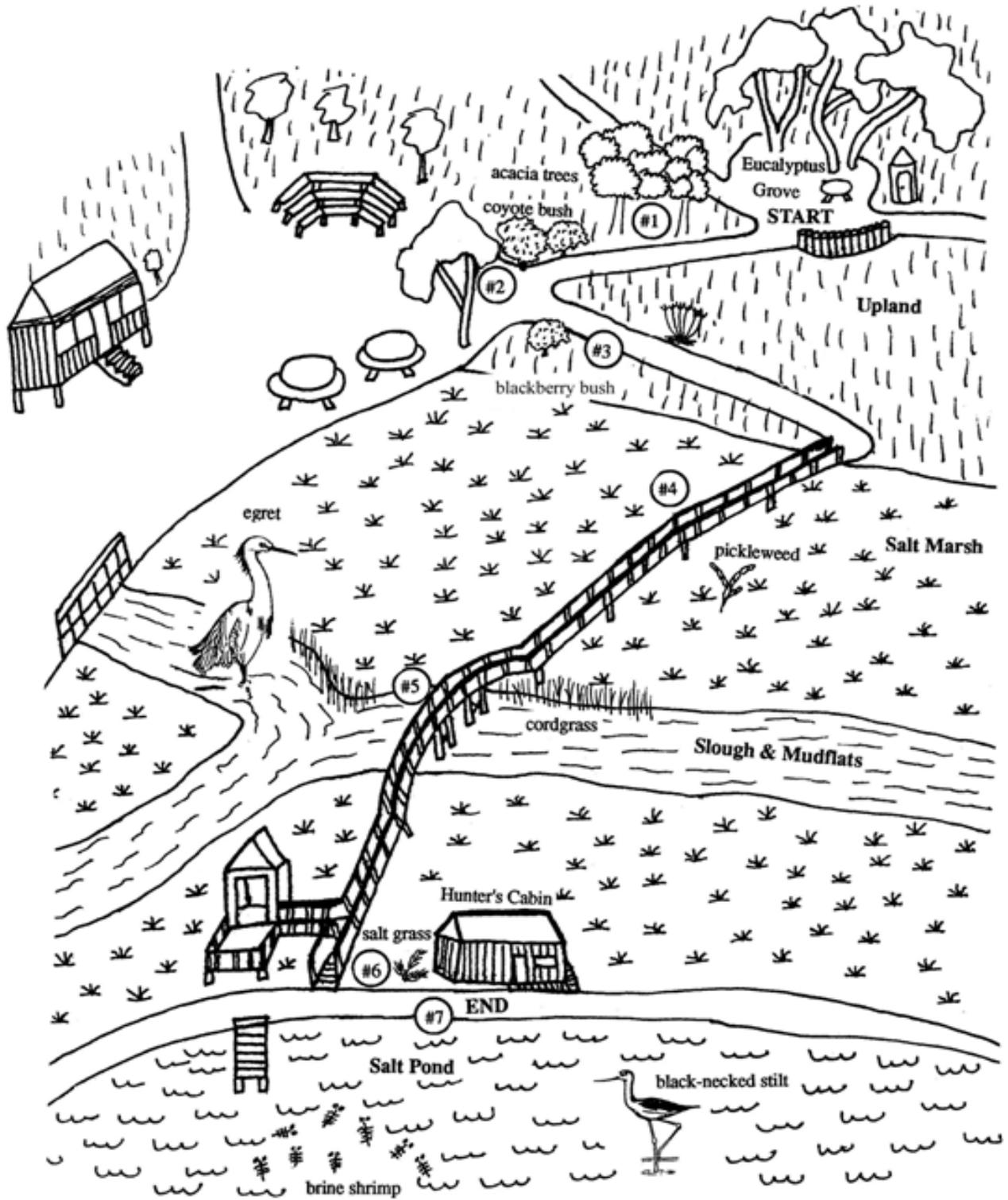
? What animals need the salt pond home to live? (Salt ponds provide food for shorebirds; they are a home for brine shrimp and brine flies.)

? What can you do to keep these Bay habitats healthy and clean for these animals? (Never pour anything down storm drains, don't litter, reduce, reuse, recycle, learn about the habitats and teach others, etc.)

Do

If there is time at the end, review the Habitat Hunt Sheets. Collect clipboards, pencils, and Habitat Hunt Sheets.

HABITAT COMPARISON WALK MAP (K-2)



HABITAT HUNT DATA SHEET

Cross off the things you see.

Name: _____

		
Acacia	Coyote Bush	Blackberry
		
Ground Squirrel	Pickleweed	Salt Grass
		
Duck	Cordgrass	Egret
		
Dumbarton Bridge	Shorebird	Brine Shrimp