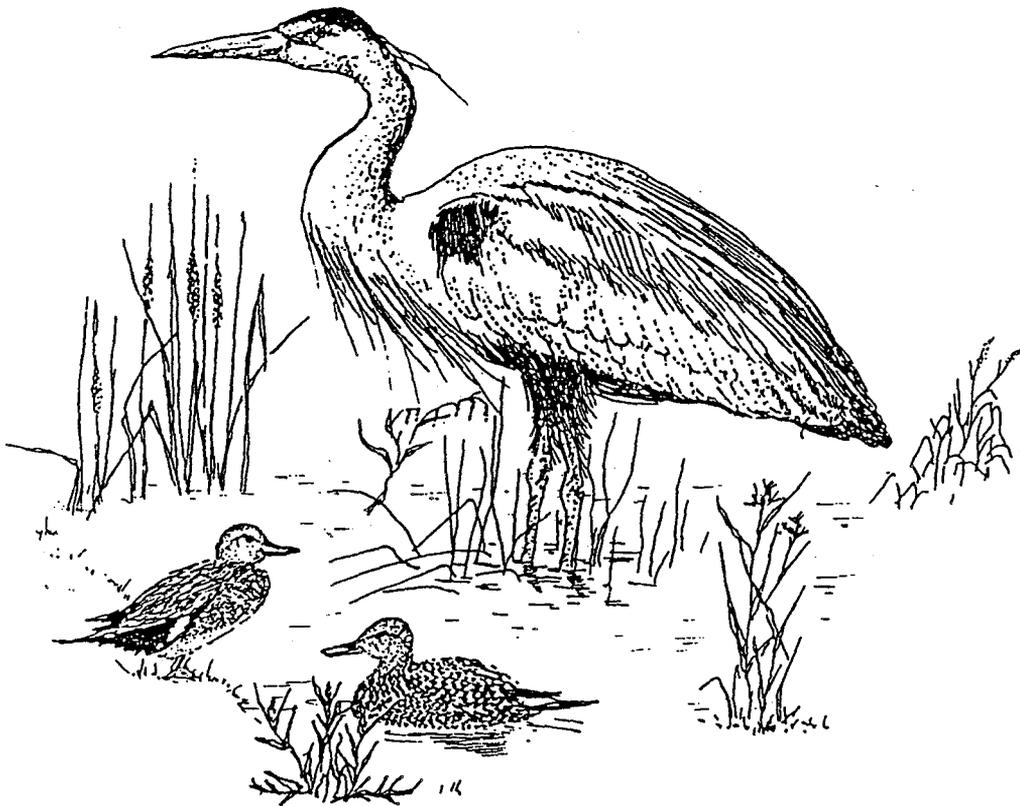


Sacramento National Wildlife Refuge

Discovery Pack

Activity Sheets and Guide



Sacramento National Wildlife Refuge Complex
752 County Road 99W
Willows, CA 95988
(530) 934-2801

HOW TO USE THE DISCOVERY BACKPACK

Objective:

Educators and group leaders will be able to lead and facilitate interactive activities on the **Wetlands Walk** trail by making reservations and checking out one to three **Discovery Packs**.

Method:

Educators and group leaders may use one or more of the five activities contained in the **Discovery Pack**. Each activity has a numbered site on the **Wetlands Walk** trail where it needs to take place. The numbered sites are marked in the **Along the Wetlands Walk** guide and in the **Wetlands Walk** trail brochure.

Background:

Background information is provided in three guides in the **Discovery Pack**. The guides are: the Discovery Pack Introduction and Background Information, the Along the Wetlands Walk, and the Plant Guide.

Materials:

All materials needed for all of the activities are contained within the **Discovery Pack**. One **Pack** is sufficient for a class of 30. For the best learning experience and most enjoyment, classes should, if possible, be divided into smaller groups. If educators or leaders (parents, student teachers, volunteers, etc.) are available, the activities can be rotated, or up to three packs may be checked out.

Procedure:

- 1) Call or write the Refuge for reservations. It is highly recommended that the educators and leaders tour the Refuge and familiarize themselves with the **Discovery Pack**, **Wetlands Walk** trail, and **auto tour** before bringing a group for a visit.
- 2) When arriving at the Refuge, check in at the headquarters office. Refuge staff will greet the group and check out the **Discovery Pack(s)** to your group.
- 3) To begin your walk, start at the **Wetlands Walk** sign near the visitor center. Refer to the map. Continue across the road, following the signs. Continue to the site # for the chosen activity.
- 4) If you complete all five of the activities in the **Discovery Pack**, walk back to the headquarters office along the auto tour road. If you have chosen to do fewer than five, back track to the headquarters on the **Wetlands Walk** trail.
- 5) When you have completed your visit, return the **Discovery Pack(s)** to the headquarters office.

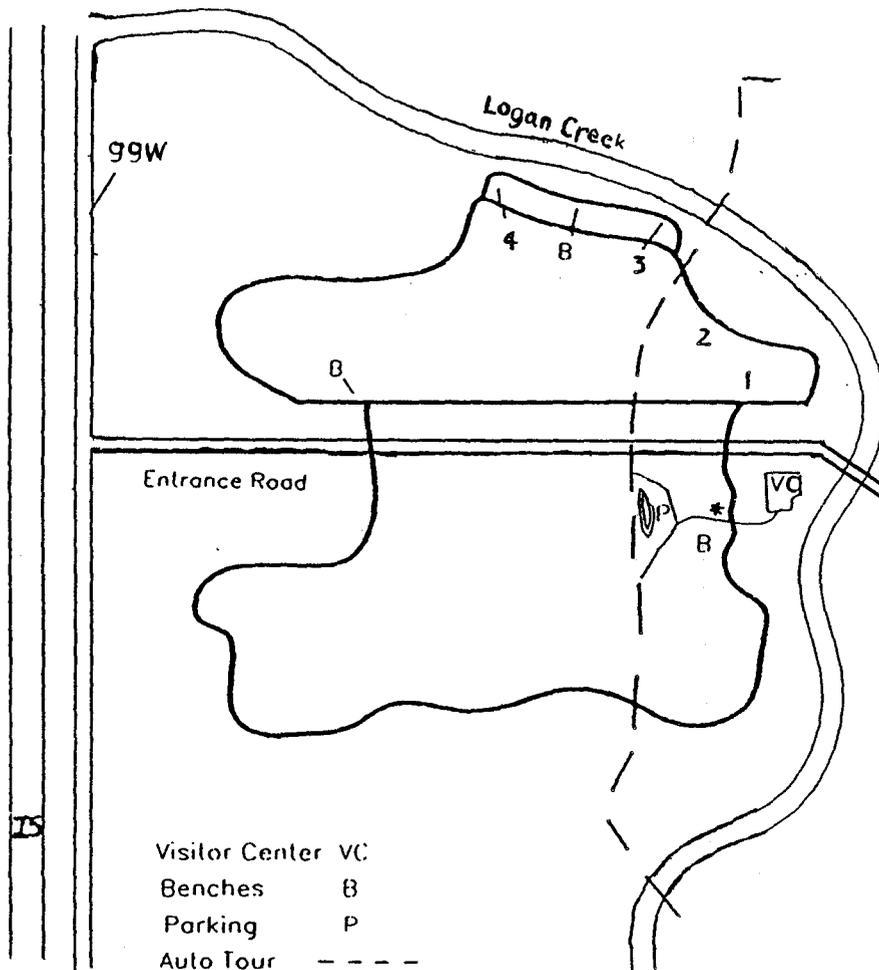
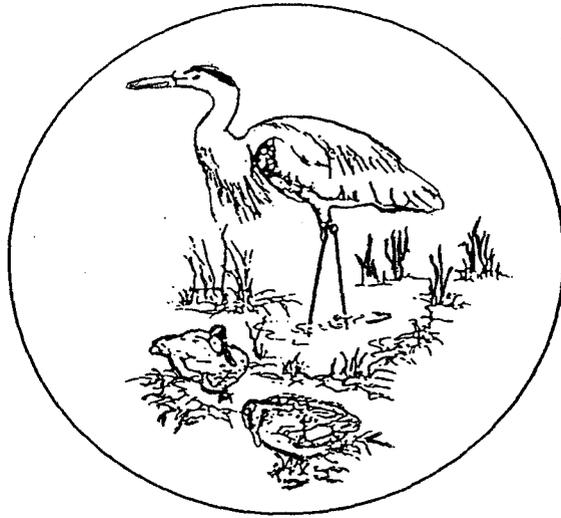
Time consideration:

To complete all five of the activities, allow at least one hour.

Notes:

For further information, call or write the Sacramento National Wildlife Refuge, Willows, CA, (530) 934-2801.

Wetlands Walk



- Visitor Center VC
- Benches B
- Parking P
- Auto Tour - - - -
- Wetlands Walk ———
- Trailhead *

"THEY'RE ALL WET!"

Site location:

1 on the Wetlands Walk trail.

Objective:

Students will become aware that wetland plants have special adaptations that enable them to live in the wetland environment.

Method:

Students will examine cut pieces of cattail and observe other wetland plants that are growing in the wetlands.

Background:

Read "They're All Wet!" in the Along the Wetlands Trail guide and cattail in the Plant Guide from the Discovery Pack.

Materials:

Hand lenses; bug boxes; plant guide; and pieces of cattail leaves, stems, seeds *.

Procedure:

- 1) Have students, without moving, point out as many different kinds of plants that they can see growing in or at the edge of the marsh. Introduce the idea that most plants, when given too much water, turn brown and die. Ask, "Why are these plants able to grow in or near the water and what special adaptations do these plants have?". The answers are: these plants have tiny holes to transport oxygen to the roots, air spaces for floating, and channels (tubes) for structure support and to transport nutrients.
- 2) Pass out small pieces of cattail stems, and have students look carefully at their piece (the small holes are visible without magnification). Have students share the hand lenses and magnifying lids of the bug boxes to look more closely at the pieces of stems for further details. Pass out small sections of cattail leaves. Examine them for small channels. These channels transport nutrients and water for growth and metabolism and provide strength and support.
- 3) Pass out some cattail fluff (seeds, found in the "hot-dog" looking seed head) for the students to put in the bug boxes. With the lids in place for magnification, have students look carefully for fertile (pollinated) "fat" seeds and for the "thin" (unpollinated) seeds.
- 4) Summarize the activity by having students explain why these plants are beneficial to the wetlands (food for muskrats, shelter and cover for wildlife, and nesting material for birds) and how they might have to be managed (burned or disced to prevent over growth).

Time considerations:

10 minutes is the average time for this activity.

Notes:

* Ask for, and pick up, prepared pieces of cattail leaves, stems, and seeds at the time you pick up the Discovery Pack at the visitor center.

"WATER CANARIES"

Site location:

2 on the Wetlands Walk trail.

Objective:

Students will become aware of the diversity and importance of seemingly insignificant freshwater aquatic organisms.

Method:

Students investigate one or more water samples taken from the sampling site.

Background:

Read "Water Canaries" in the Along the Wetlands Walk binder from the Discovery Pack.

Materials:

Dip net, bug boxes, plastic container, hand lenses, identification sheet, Golden Guide to Pond Life, and eye dropper.

Procedure:

- 1) Start by sharing the "canary in the mine story" with the students. Explain how the water organisms are the canaries of the wetlands.
- 2) The teacher or chosen student collects a half-container of water and places it on a level spot on the trail. The teacher or chosen students then sweeps the net gently around the base of plants or close to the pond bottom to net as many aquatic animals as possible. Release them carefully, by turning the net inside out, into the container of water.
- 3) Have the students gather around and hold the sample up to light. Ask, "Can you see the water canaries?"
- 4) Divide some of the water sample into the bug boxes, using the eye dropper to move some of the smaller organisms. Although many organisms are microscopic, several species are large enough to see swimming about in the water. Look with the hand lenses or through the magnifying tops on the bug boxes. One indicator species is the little water flea (*Daphnia pulex*). It is about 1/16 to 1/8 inch long and can be seen moving about in great numbers with its jerky flea-like movements. Identify, using the identification sheets and the Golden Guide to Pond Life, as many species as possible. As you look at the many different organisms, ask students how they think the organisms move, breath, and what adaptations they have that help them to live in the wetlands environment. Ask, "How important are these organisms to the wetlands food web?". Lead a discussion about what would happen if the water quality changed (pollution, temperature, pH, drought, etc.).
- 5) Carefully return the water and animals to the sampling site, and try more samples as time permits.
- 6) Summarize the activity by re-emphasizing that the diversity of life forms is a useful indicator of habitat quality. Also remind the students that the wetlands of the Sacramento NWR were created, and that through intensive management they are maintained to provide the habitat that is critical for wetland-dependent wildlife.

Time considerations:

Fifteen minutes is the average time to spend on this activity. This class can be extended, if a more in-depth study of aquatic invertebrates is desired.

Notes:

Brief the students on habitat courtesies and safety near the water. Remind them that all wildlife should be returned to its habitat **unharm**ed and encourage **care** in collecting techniques.

"WHOSE CLUES"

Site location:

3 on the Wetlands Walk trail.

Objective:

Students will be able to observe and identify wildlife clues. Using the scientific approach to problem-solving, students can make inferences about the types of wildlife present in the area and what their activities might be.

Method:

Students will locate and mark signs of animal evidence found along the Wetlands Walk trail.

Background:

Read "Whose Clues?" in the Along the Wetlands Walk guide from the Discovery Pack.

Materials:

Identification sheets of tracks, skulls, and scat; and strips of colored marker tape.

Procedure:

- 1) Share with the students that few people are able to witness the types of scenes of wildlife seen on National Geographic, and Disney films, or the Discovery channel on TV. However, wildlife does leave an abundance of clues. Scat, bones, feathers, fur, snapped off twigs, nests, nest sites, and tracks all tell a great deal about the wildlife, their activities, and what they have been eating. Introduce the word **evidence** and have students brainstorm what types of animals might live here and what clues they might leave behind.
- 2) Have the students work in small teams between Site #3 and Site #4. Tell the students they will have five minutes to explore for evidence. Pass out two pieces of colored marker tape per team. Explain that when they have found evidence, they are not to touch or remove it, but to mark the evidence with their tape (tie it on a twig nearby, or lay it next to evidence) and to go to site #4 when finished.
- 3) After all the students have returned to site # 4, walk slowly along the trail back to site # 3, allowing the teams to share and identify their discoveries. Encourage them to tell a story about the evidence they found (ex. a few tufts of fur or pile of feathers show where a predator captured or ate a bird or mammal). As you move along the trail collect all the tape markers and return them to the bag.
- 4) Summarize the activity by discussing the diversity of wildlife that depends on wetlands as evidenced by all the clues they have found; and that humans, too, sometimes leave behind clues. Don't pollute!

Time consideration:

Fifteen minutes is the average time to spend on this activity.

Notes:

All evidence is to be left exactly where it is found. During the team sharing times, some of evidence may be handled (bones, fur, feathers may be handled and returned to where they were found).

"HABITAT IS WHERE IT'S AT"

Site location:

After leaving site # 2, continue until you are at the auto tour route, and stop before crossing the road.

Objective:

Students will become aware of different types of wetland habitats and their inhabitants.

Method:

Students will stand in one place and observe three different managed wetland habitats.

Background:

Read "Habitat is Where It's At" in the Along the Wetlands Walk guide, and **cattail** and **bulrush** in the Plant Guide from the Discovery Pack.

Materials:

None.

Procedure:

- 1) Standing at this point, you can see three distinct types of habitat. Have the students stand as a concentrated group in the middle of the trail. While facing the road, turn to your right and look north. Notice the grasslands or **uplands**, a type of habitat that is not intentionally flooded. This habitat provides a home for jack rabbits, coyotes, many small rodents, and the raptors that prey on them.
- 2) Next, while facing the road, turn to your left and look south over the **seasonal marsh** that you have just walked beside. The dense stands of bulrush and cattails provide habitat for not only migratory species of waterfowl (ducks, geese, and swans), but a home for a diversity of other wildlife, such as: coots, red-winged blackbirds, marsh wrens, raccoons, muskrat, beaver, gopher snakes, dragonflies, and frogs.
- 3) Turn once again and face the road. Looking ahead and slightly to your right you will notice a line of trees (cottonwood and willows) along the small creek. This **riparian** habitat is another unique and managed habitat that supports other types of wildlife. Introduce the concept of a food chain. Ask the students to think of a food chain for each habitat.
Examples: **Uplands:** plants → voles → Barn owl. **Seasonal marsh:** plants → ducks → human. **Riparian:** plants → mosquito larva → mosquito fish → egret.
- 4) Summarize by reminding students that all plants and animals need a special habitat that includes **food, water, shelter, and space**, all in appropriate amounts.

Time consideration:

Three to five minutes, depending on grade level, is an adequate length of time for this activity.

Notes:

This activity can be expanded to include the concepts of: a food web, food pyramid, and energy loss.

"WILD WINGS"

Site location:

Anywhere along the **Wetlands Walk** trail and the auto tour route.

Objective:

Students will observe and become aware of several species of birds found in wetland habitats.

Method:

Students, with the help of guides and checklists, identify birds.

Background:

Read "**Wild Wings**" in the Along the Wetlands Walk guide, and "**Migration**" in the Introduction and Background Information guide, from the Discovery Pack.

Materials:

Young Peoples Checklist, Golden Guide—Birds of North America, Ducks at a Distance, laminated Western Waterfowl sheets, and Wildlife for the Sacramento Valley National Wildlife Refuges.

Procedure:

Encourage students to keep their eyes and ears tuned to the many different sights and sounds of birds along the trail. Capture the moment of a large flock of geese, a circling raptor, or the "music" of hundreds of blackbirds.

Time consideration:

As time permits. If you are just birding, allow at least forty-five minutes to complete the auto tour route and one hour to walk the Wetlands Walk trail.

Notes:

If a couple of students, parents, or others in group are avid birders, assign them to be "lookouts" for the entire group.