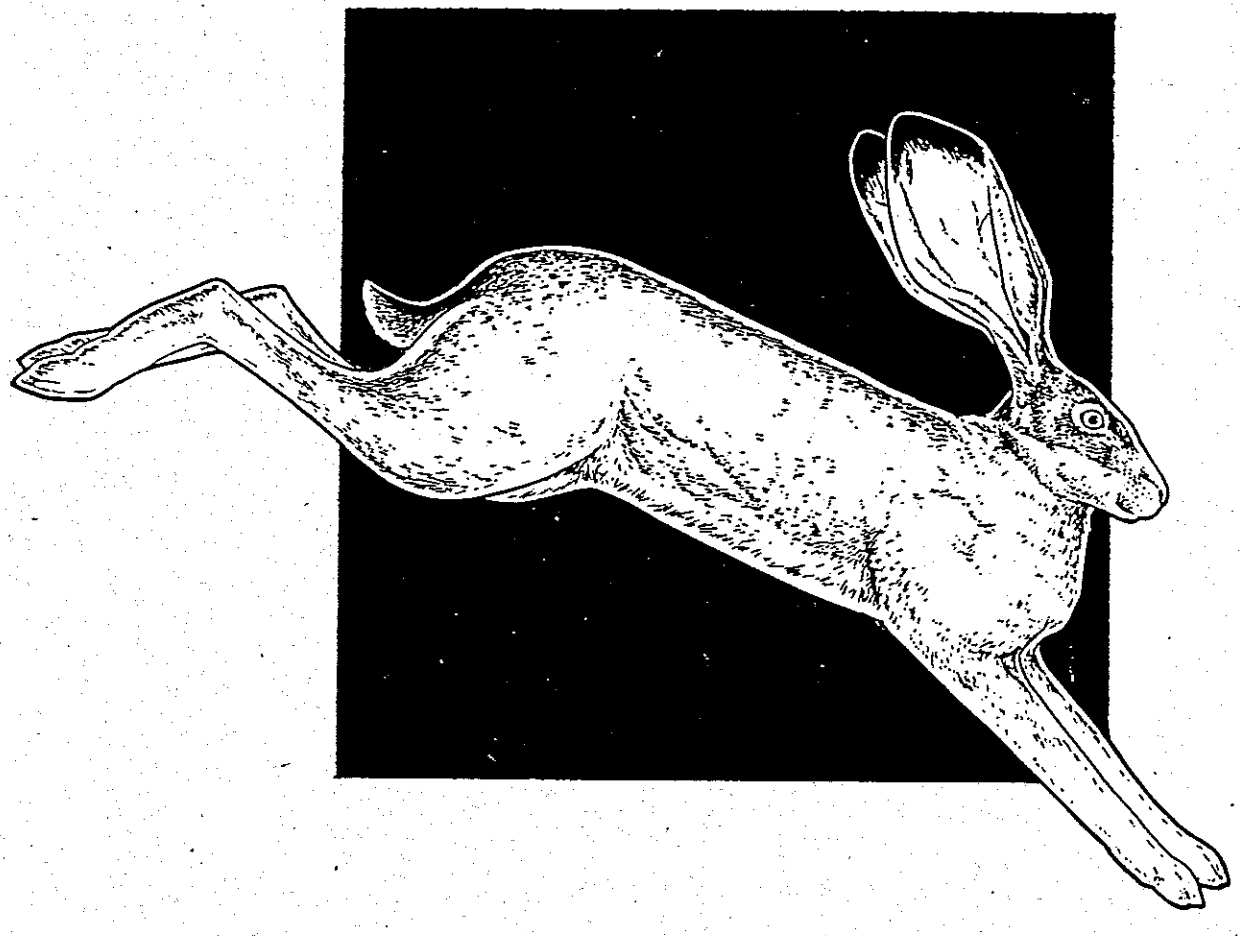
Cosumnes River Preserve

curriculum—grades k - 3



Cosumnes River Preserve
13501 Franklin Blvd.
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(916) 684-2816
1995

outline

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Much of the material contained within was adapted from other curricula. Each source is credited with the related activity.

Please Note:
Cosumnes River Preserve Staff welcomes any comments/suggestions on this first edition curriculum. With your input, the next edition promises to be even better.

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introduction

Do not try to satisfy your vanity by teaching a great many things. Awaken people's curiosity. It is enough to open minds; do not overload them. Put there just a spark. If there is some good inflammable stuff, it will catch fire.

Anatole France

Welcome to the Cosumnes River Preserve, a cooperative project of The Nature Conservancy, Ducks Unlimited, the U.S. Bureau of Land Management, California Department of Fish and Game, The Wildlife Conservation Board, Sacramento County Department of Parks and Recreation, and the American Farmland Trust. These organizations work together on this Preserve to conserve agricultural lands, restore freshwater wetlands, and to protect and expand the best remaining example of valley oak riparian (streamside) forest left in the world. This 5,400-acre Preserve is located on the eastern edge of the 1,153-square-mile Sacramento-San Joaquin Delta, which is a rich network of waterways, wetlands, and (in this century) agricultural land.

We are pleased that you have requested these materials and look forward to your field-trip to the Preserve. As you prepare for the trip and review the following pages, you will notice some reoccurring themes. These are the fundamental concepts we hope students will grasp as they venture out onto the Preserve—we also hope that they bring them back to the classroom and their personal lives. Please take the time to discuss the following concepts with your students:

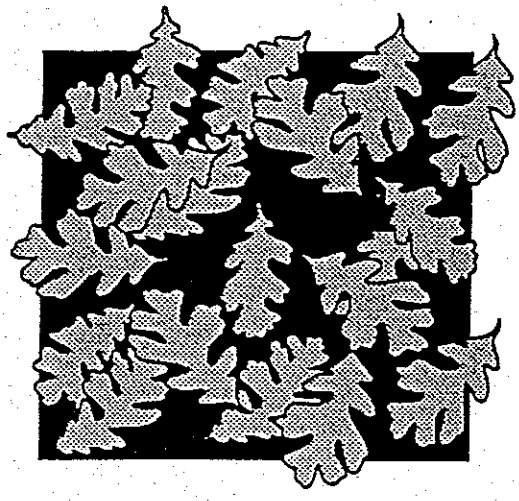
1. The Cosumnes River is the last undammed river flowing from the Sierra Nevada through California's Central Valley and ultimately to the Pacific Ocean. The river is partially channelized and levied (especially near agricultural lands) to control flooding. Because the river is not dammed, it floods naturally in some areas, and this flooding creates some important environmental conditions.

2. Natural flooding still occurs in winter and spring. This flooding is the key ecological process underlying the natural regeneration of

the rare valley oak riparian forest. Flood waters are beneficial to valley oak forests in several ways: (1) they deposit rich silty soils which nourish existing valley oaks; (2) they drown small herbivores, such as mice, which normally eat acorns (oak tree "seeds"), leaving larger numbers of acorns to sprout; and (3) they scour weeds from the landscape, cutting down on competition for soil nutrients and moisture and clearing the way for oak seedlings.

3. Restored and created freshwater marshes are managed to provide habitat for migratory waterfowl spending the winter at the Preserve. Central Valley wetlands have gradually been lost over the years. The Preserve is committed to protecting many species of birds that are dependent upon seasonal and permanent wetlands. This includes increasing the acreage available as habitat for these animals. A bird's basic mission when it comes to the Central Valley in the winter is to rest-up and get fat. They are preparing for the spring return to their nesting grounds and the rigors of raising young. The Delta marshes at the Preserve provide precisely what these birds need before flying north in early spring.

The natural flooding that occurs at the Cosumnes River Preserve in the winter also explains why we encourage your visits in the spring and fall. The following activities are actually designated for those two seasons, though you will see that many can be used interchangeably. Enjoy your visit, and please do not hesitate to call Preserve Outreach Coordinator (916-683-1700) if you have any questions.



fall





Scrub Jays—How Can They Help?*

Background

Acorn-consuming animals such as western grey squirrels and some birds play active roles in the regeneration of oak trees by caching the carbohydrate-rich seeds in the ground. The cantankerous scrub jay, for example, may bury as many as 5,000 acorns in one season, but may consume only one-third to a half of this bounty, leaving the others to grow into seedlings. In fact, scrub jays bury approximately one billion acorns a year in California. When they bury them, they usually do so in loose duff on the forest floor or nearby—this is the perfect place to plant acorns.

Scientists who study re-vegetation believe that after the most recent Ice Age (12,000 years ago), oak trees re-colonized their range faster than may be explained by the simple act of acorns falling to the ground and sprouting naturally. These scientists hypothesize that jays and other animals that cache acorns may be responsible for the oak's higher rate of re-colonization. Some scientists believe that scrub jay activity is essential to the sustainability of California's oak woodland. The jays provide a valuable "ecological service" to the woodlands—they do work that helps maintain the valley oak.

Although California supports many species of oak, today, with the exception of the Cosumnes River Preserve, it is rare to find extensive stands of the magnificent valley oak. These trees hold a special place in California's natural history. The valley oak is native to California's Great Central Valley and once flourished in large riparian (streamside) forests throughout the region. Natural flooding of all of the region's rivers provided the perfect environmental conditions for this tree. However, extensive agricultural clearing, urban

* This activity is adapted from *Autumn Oaks: A Series of Hands-on Ecology Investigations* (Redding California: Carter House Natural Science Museum, 1994), p. 10.

development, and flood control efforts have, with the exception of the Cosumnes River Preserve, drastically reduced natural floods.

What makes the Cosumnes so special? The Cosumnes River is the only remaining undammed river flowing from the Sierra Nevada through California's Central Valley. It is, therefore, the only river in the area which is actually allowed to flood. Thanks to the environmental conditions this flooding creates, and to the scrub jay and other acorn-consuming animals, natural regeneration of the valley oak still occurs.

Although natural re-forestation does occur on the Cosumnes River Preserve—acorns continue to fall to the ground and sprout naturally or they are "planted" by animals—dedicated staff and volunteers assist and jump-start nature by planting hundreds of trees at the Preserve. You and your students will see this rare forest on your upcoming visit, and you will experience the results of natural and human re-forestation.

Objectives

Students will predict the importance of scrub jays to oak trees, understand how they are related, and practice observing scrub jays in the wild.

Materials

- Scrub Jay coloring page—(xeroxed from packet) one per student
- Valley Oak Tree coloring page—(xeroxed from packet) one per student
- Acorn coloring page—(xeroxed from packet) one per student
- Crayons
- Photographs of scrub jays and various species of oaks and acorns (optional)

Procedure

This activity is most effective if undertaken in the autumn months—just as soon as the acorns begin to fall. Introduce your students to the scrub jay. Most children are already familiar with this common bird, but often call it a "blue jay." Blue jay is the name of a crested jay that is common in the eastern United States. Our black-crested jay in the mountains is the Stellar's jay, and the crestless jay common among the Central Valley oaks is the scrub jay. Show students any photographs of scrub jays you have found. Have them color the scrub jay

coloring page. Ask them to imagine or guess how a scrub jay could help an oak tree, and write down their ideas on the board.

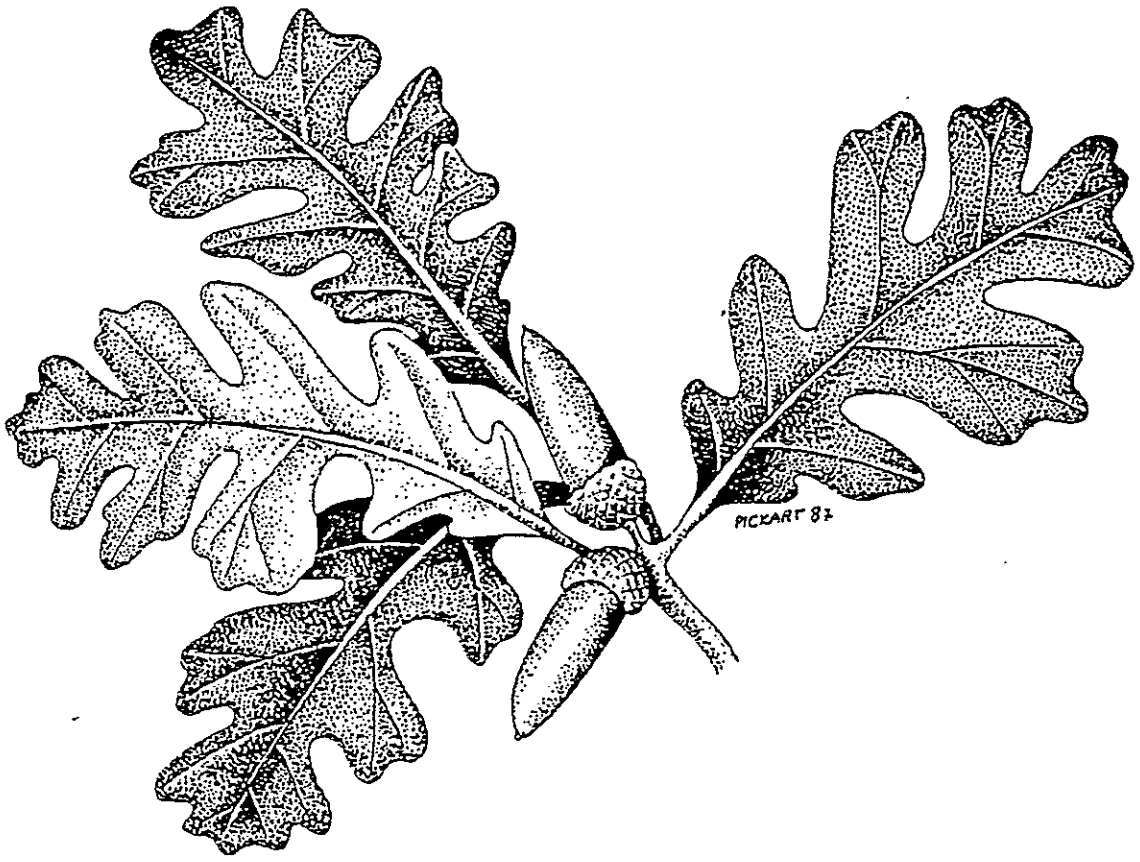
Then, tell your students about scrub jays and acorns. Spend some time with the class outside in the school yard. Encourage them to look for signs of scrub jays burying acorns. Have them watch to see if the jays pick acorns from the trees or off the ground. Jays usually ignore fallen acorns because they are often infested with insect larvae. Instead, jays pick fresh acorns directly off the branches and fly with them to their cache sites. Students should be able to see jays flying with something green in their beaks—acorns! Jays can carry up to 6 acorns at a time in their crop (the sac at the bottom of the esophagus in many birds that is used to store food for later digestion).

Jays are wily and students will have to watch carefully to see them burying acorns. Look for jays pounding the acorns into the ground. Listen for a muffled knocking sound under bushes, and look carefully to see if it is a jay. Can students tell if jays "plant" acorns point down, point up, or sideways? Encourage your students to report their findings to the class.

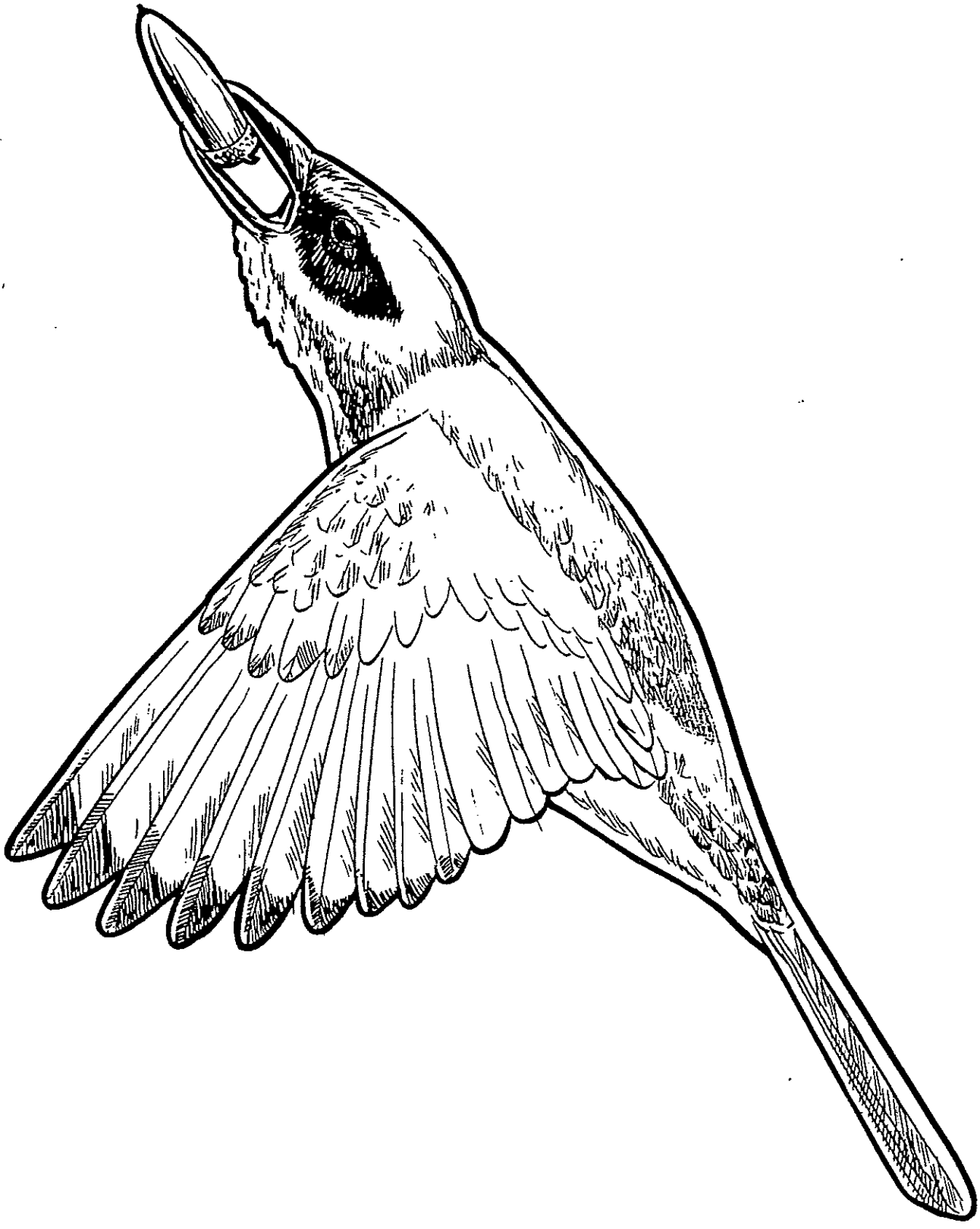
Ask students to observe scrub jays on their way home from school, at a park, or in their yards. After a week or two of observing, both at home and with the class at school, have students draw a picture about how scrub jays help oak trees.

Prepare your students for the trip to the Preserve. Tell them about the rare valley oak stream-side forest—many of these trees were probably planted by scrub jays. Explain that they will look up close at that part of the Preserve on a "One Hundred Inch Hike," and that there are many different areas they will see as well.

Acorn Coloring Page



Scrub Jay Coloring Page



Valley Oak Coloring Page



Extensions

- If there are oak trees in your school yard, have students measure their circumference. If you have time at the Preserve, you are also welcome to measure oak trees here—both oaks planted years ago (perhaps by scrub jays!) and oaks planted by Preserve volunteers.

- Look at other ways seeds get planted in the wild. Most plants need to have an efficient way to disperse their seeds so more plants will grow. Most plants cannot grow in the shadow of their parent because it would be difficult to compete for light and water. So, seeds need to travel away from the parent plant. There are many different ways seeds can travel. Ask your students to collect plants from around the neighborhood. There are so many different kinds of plants, you should see a great variety of seed types as well. Some common ways plant seeds travel: seed pods shoot out their seeds with force (milkweed), prickly or sticky seeds rely on animal carriers (burrs, grasses), fruit seeds are eaten by animals and either dropped on the ground or are found in animal droppings (berries), lightweight seeds are carried by the wind (dandelions). Try using a plant identification book from the library to identify the seeds and plants.

- Play some observation games with seeds. Put several kinds of seeds into a bag and ask students to reach in and try to identify the type of seeds using only their sense of touch. (Would it stick to an animal? Would its shape help it float on water or fly with the wind? Will an animal eat it?) See which seeds float in a glass of water. Which ones fall slowly or "helicopter" slowly to the ground? Which seeds would stick to clothing? Put several kinds of seeds out on a piece of paper. Ask a student to look away and then remove one of the seeds. Which kind of seed is missing?

The One Hundred Inch Hike*

Background

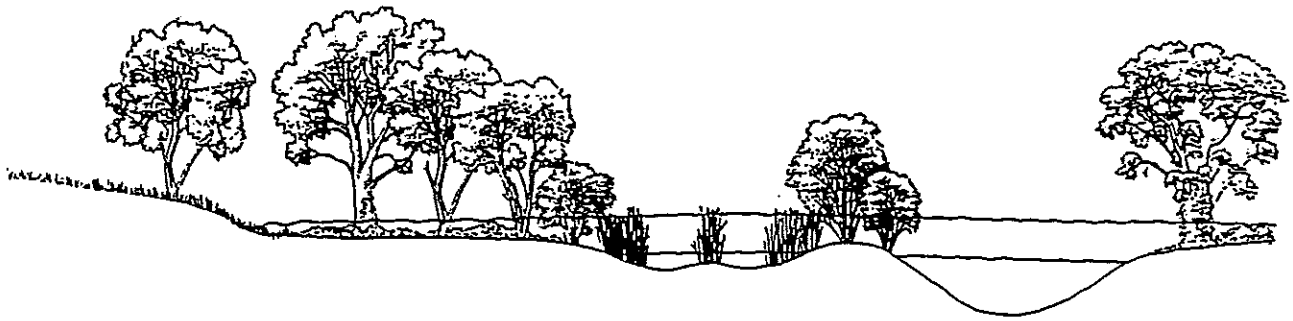
The Cosumnes River Preserve provides a marvelous "laboratory" in the wild, a place that protects thousands of acres of diverse habitat and is recognized as one of the Central Valley's most significant natural areas. You and your students can explore diverse and important wetland habitats and the varied surrounding uplands using the "One Hundred Inch Hike" described below. If you use the preceding scrub jay activity, you will probably want to begin your exploration in the Preserve's valley oak riparian forest.

The valley oak riparian forest presents the most complex structure of any vegetation type in California. The banks and upper terraces of the Cosumnes River sustain a stand of trees so dense that the foliage of one tree often merges with its neighbor. The under layers are a savage tangle of wild grape, poison oak, berry vines, wild rose and nettles. The understory of younger trees along the Willow Slough trail is dominated by native grasses, sedges and wild rose. The river's edge is dominated by cottonwoods and willows, which are joined by Oregon ash, box elder, and buttonbush on the more stable lower terraces. Valley oaks occupy the higher terraces and thin-out away from the river as less dense woodlands. This forest supports one of California's most diverse wildlife communities. From the tree tops above to the rich soil below, every part of the valley oak forest provides habitat for hundreds of vertebrate and thousands of invertebrate species.

The valley grassland habitat will also provide an accessible, dry area for the "One Hundred Inch Hike." Valley Grasslands support more than just grasses. Many species of wildflowers grace the springtime landscape, while occasional trees appear like islands among a living sea of grasses. These grasslands also provide

* This activity is adapted from *Environmental Education Curriculum Manual* (Watsonville, California: Elkhorn Slough National Estuarine Research Reserve, 1991), p. 40.

food and habitat for birds, mammals, reptiles, amphibians, legions of insects, and countless microscopic soil organisms.



Grasslands **Oak Riparian Forest** **Slough** **River**

Because of wet conditions, you will not want to perform the "One Hundred Inch Hike" in the seasonal wetlands, tidal wetlands, or river habitats. However, be sure to point-out these habitats to your students—they are very important aspects of Preserve's complex biological communities.

Objectives

Students will increase their observation skills by focusing on a small area at the Preserve. They will practice teamwork skills and be able to make predictions about their observations.

Materials

- One hundred inch-long strings—one piece for each small group
- Magnifying glasses—one for each student if possible
- Paper and pencils for recording and drawing observations—one pad/clipboard for each small group
- Crayons—a variety of colors for each group
- "One Hundred Inch Hike" data sheets (xeroxed from this packet)

Pre-Visit Preparation

Familiarize students with the activity before visiting the Preserve. Remind students that nature is best observed while they are still and quiet. Disturb the site as little as possible. Avoid trampling and uprooting plants. Return rocks and

sticks to their original position if you move them. Never disturb nesting animals or animals with young. **Remember, you are the visitor here—act with respect and you will be rewarded with knowledge!**

Students should understand that they are to look only at things that touch their lines and are no taller than they (the students!) are. Have them relay what they see to a recorder. Ask them to make predictions about how this "hike" may be different when done at the Preserve. How would they describe the habitat in the schoolyard? Discuss that a prediction is not an answer and is not "right" or "wrong," rather something to test or "check-out."

Procedure

Decide early on if you wish to structure the activity by assigning each group of students to a different habitat area. If so, the grasslands, the forest, and the edge of the freshwater marsh found along the Willow Slough trail will all serve this purpose well. Otherwise, students will naturally gravitate to areas that interest them and they will probably spread out into these habitats on their own. If walking along the Willow Slough trail, you may allow students to set up a study area close to the trail.

At the Preserve, students should work in small groups, each group accompanied by an adult "assistant." Students lay their strings over the most "interesting" ground in the selected study area. Students should remember to look above the string and use the magnifying glasses as they work. The adult assistant should make a list of the students' observations, encouraging them to note things they see (plants, animals, nibbled leaves, etc.), feel (soil temperature, air temperature, smooth or rough surfaces, wet or dry things), hear, and smell (strong odors, sweet flowers, etc.). Students should note and draw any special plants, animals, or rocks they find. They should also make predictions about the animals that live within the hike area. General impressions are very important, so adults should encourage the students to mention things they like and do not like!

If time permits, once students have mastered the activity at the Preserve, spread them around in other areas and repeat the exercise. Compare observation results and discuss the variety they find.

After the hike is complete, gather all of the field equipment and reassemble the group in a circle, seated on the ground. As a conclusion, tell the group that everyone will observe with their ears next. Students should remain quiet for several minutes and wait to hear both natural (bird songs, wind rushing through leaves and grasses, frogs, crickets, etc.) and unnatural sounds (planes, cars, trains, horns, etc.). Listening with eyes closed sometimes helps cut out distractions and students can hold up one finger for each sound they hear. You may decide to discuss what was heard, or simply leave the area with those sounds in mind. (This also makes a good post-visit activity for use in the school yard.)

Later at the Preserve or back at school (using the board), discuss the students' field observations. Write the commonly occurring words or phrases for the group. What was found the most? What might this tell them about the other animals that might live there? Discuss their predictions about the animals that might live in the habitat observed. Were the differences between the school hike and the Preserve hike as they expected? (Remember, there are no right or wrong answers—this is a comparison.) Would their findings have been different in a different season? Did anyone spot a scrub jay? A valley oak?

Note: poison oak is common on the Cosumnes Preserve. It may appear as low ground cover in shaded areas, or as a robust shrub on sunny open areas—poison oak also climbs up into valley oak trees (the bark is very smooth compared to the bark of a wild grape vine). Get to know this plant—but only from a distance! Many people are severely allergic to the potent oils released from the leaves and stems of this cantankerous member of the sumac family. The best protection is avoidance! If you do not know what poison oak looks like, please ask Preserve staff!

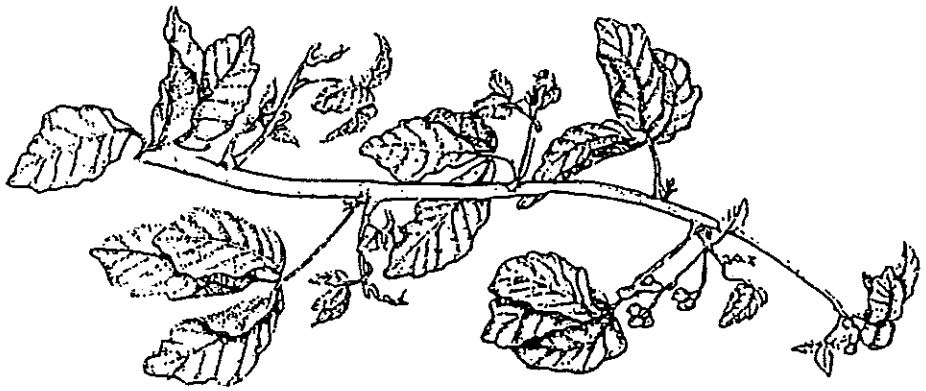
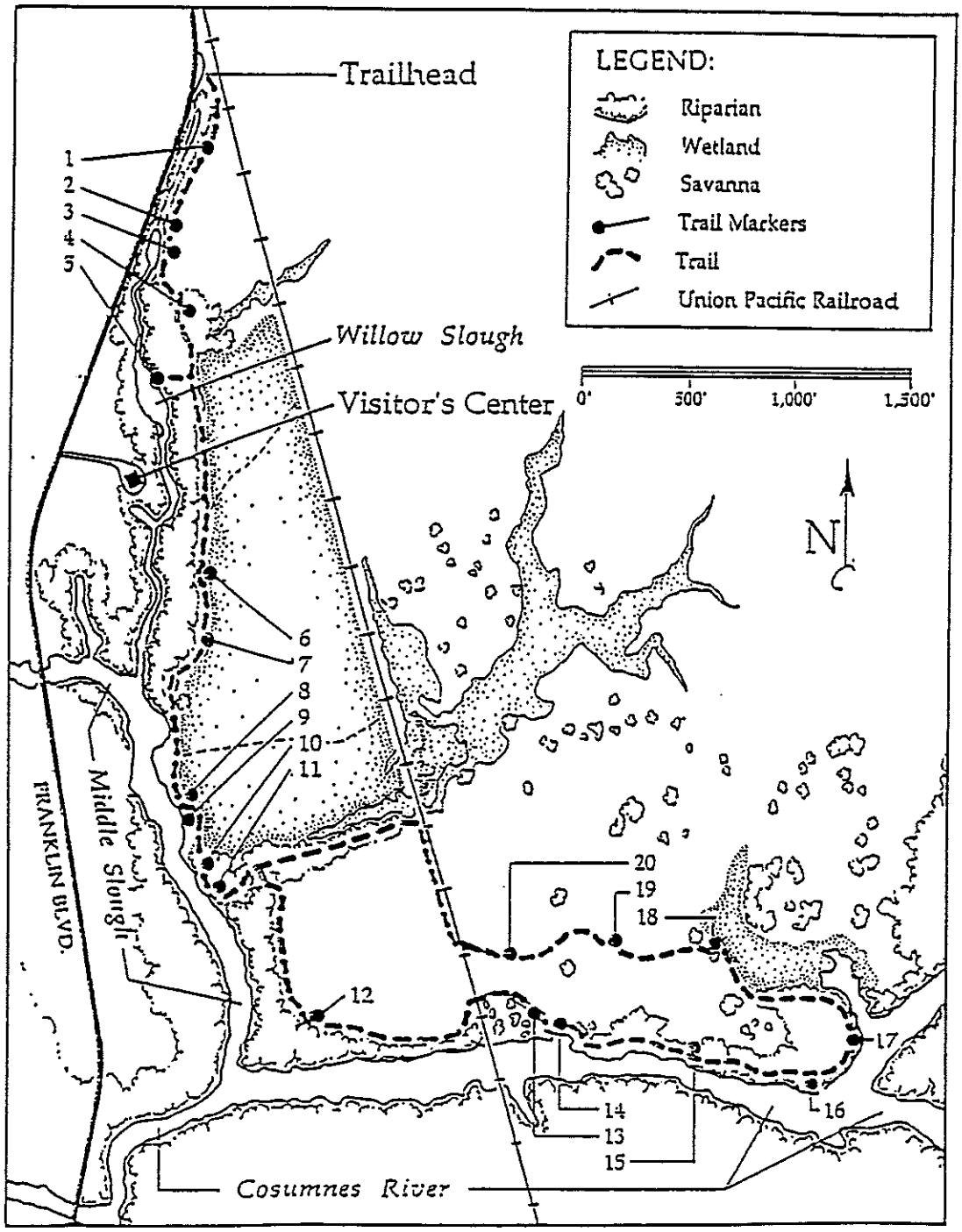


Illustration by Jan Meninga

Suggested Location

Willow Slough Trail

Note: Stops 5 and 12 are especially good, because the forest, grasslands, and marsh or river are all nearby.



One Hundred Inch Hike

Names: _____

Date: _____

Time: _____

Location: _____

Write or draw about the following

things we see (nibbled leaves, insects, seeds - colors?)

things we feel (soil/air temperature, wet or dry, smooth or rough)

things we smell (strong odors, sweet flowers, earthy smells)

things we hear (bird songs, crickets, trains, leaves rustling)

things we think about (beauty, quiet, peaceful, lonely)

Extensions

- Back in the classroom, re-read the observations and field notes made at the Preserve. Have each student draw a section of their hike, recording as many details as they can remember.

- Have the students pretend they are only one inch tall. What do they need to live along the string habitat? Write a group story about being one inch tall.

Wild Animal Scramble*

Background

After your trip to the Preserve, talk with your students about the things they remember from the visit. On the "One Hundred Inch Hike," did they see any animals or signs of animals? What kinds of habitats did they observe (grasslands, marshes, forests, river, etc.)? The following classifying activity will help reinforce concepts you taught on the trip. The object of this game is for each student to guess what kind of animal they are by asking other students questions. It will help bring out three important qualities which can easily be emphasized when teaching environmental education:

1. Open-mindedness: avoiding preconceptions and snap judgments ("Let's see, I live in the forest; I'm warm-blooded; I'm active at night, and I can fly. Well, that means I'm a bird." Actually, the correct answer might have been "a flying squirrel.")

2. Discrimination: using new information, and testing the validity of new information. Sometimes players are mistakenly given false answers to their questions. "I can swim, and I'm warm-blooded. (Then I have to be a bird or a mammal. What birds and mammals swim?)" or "A member of the rodent family? But I'm a predator. I think I can discount Jerry's answer, because few rodents are predators. Besides, I have dog-like tracks. I bet I'm a coyote or a fox. I'll ask Mary if I have a high-pitched howl."

3. Concern for others: One positive feature of this game is the concern and encouragement the players show toward each other. Many players will feel they have not really finished the game until everyone else has guessed his animal correctly.

---

* This activity is adapted from Joseph Cornell's *Sharing Nature with Children* (Nevada City, California, Dawn Publications, 1979) p. 78.

Objective

Students will be able to identify and classify many animals. They will gain practice describing important features and testing the validity of information.

Materials

- Index cards
- Masking tape
- Pictures of animals—especially those easily found at the Cosumnes River Preserve (optional)

Procedure

Make a list on the board of some common animals (using those animals you encountered on the Preserve will strengthen this as a follow-up activity after your field trip). Then make one index card for each, either writing the word or using a picture. Pictures work well as they stimulate more interest and enable the players to give more accurate responses. Review the entire list with your students, describing each animal briefly. This review can be treated as a matching game if you like. (A list, with descriptions of animals from the Preserve is on pages 18-19.)

Tape one card or picture on the back of each player. At your signal, the players take turns asking questions to get clues to their own identities. Encourage them to question everyone in the group. The players can ask as many questions as they want, but answers should be limited to yes, no, and maybe.

As soon as each player feels certain they know their animal, have them write down their name and answer. After everyone has finished, begin the "award ceremony." Call the players one at a time to the front of the group. Then announce the player's guess. Encourage the audience to applaud correct guesses. Listed below are some starter questions:

1. "Am I a vertebrate (animal with a backbone)?"
   If the answer is yes, there are five possibilities: fishes, amphibians, reptiles, birds, or mammals. To divide the vertebrates into still smaller groups, ask whether the animal is cold-blooded or warm-blooded. A cold-blooded vertebrate is an animal whose body temperature changes to match changes in

the temperature of the surrounding environment. Fishes, amphibians, and reptiles are cold-blooded vertebrates. Warm-blooded vertebrates are animals that maintain the same body temperature, regardless of whether it is cold or hot outside—they include birds and mammals.

If the answer is no, the animal is an invertebrate (animal with no backbone). Some of the more common invertebrates include worms, starfish, snails, crabs, crayfish, spiders, and insects.

2. Some questions that will help narrow the choices even further: Do I have fur?... feathers?... or scales? Am I a predator?... Can I swim?... Can I fly?... Do I live in the river?... grasslands?... or forest?... Do I have 2 (4, 6, 8, more than 8) legs? Am I brightly colored? Am I active at night? Am I smaller than a ...?

Wild Animal Scramble at the Cosumnes River Preserve

(Note : CB = cold-blooded WB = warm-blooded)

Animal	Classification	Description
Crayfish	Invert crustacean CB	Inhabits wetlands, food for otters, feeds primarily on small fish, snails, insects; walk or swim.
Garden spider	Invert, spider CB	Brightly colored, beautiful web, feeds on insects.
Monarch (butterfly)	Invert, insect CB	orange brown wings, lays eggs on milkweed, larvae use milkweed as food source, while milkweed flowers are specialized for butterfly pollination, migratory.
Fly	Invert, insect CB	Food for birds, has wings.
Grasshopper	Invert, insect CB	Greatly enlarged hind legs, feeds on plants.
Dragonfly	Invert, insect CB	Legs grouped to form spiny basket, strong efficient wings enable them to catch insects in the air, aquatic in immature stages.
Chinook salmon	Vert, fish CB	Aquatic, migratory, adults spend two years in ocean where they feed on small fish and shrimp, swim in freshwater rivers to lay eggs, after which they die.
Pacific tree flog	Vert, amphibian CB	Inhabit ponds and moist areas, suction discs on each toe which makes vertical climbing possible, feeds on insects, eggs are laid in quiet stream or pond.
Western fence lizard	Vert, reptile CB	Feeds on insects, such as beetles, ants, wasps, aphids, insect larvae, and spiders; hibernates in winter.
Gopher snake	Vert, reptile CB	Yellowish brown with dark diamond or rectangular shaped markings, inhabits grasslands, feed on rodents.
Western pond turtle	Vert, reptile CB	Inhabits slough and rivers, feeds on aquatic plants, insects, and carrion.

Animal	Classification	Description
Duck	Vert, bird WB	Inhabit ponds, some are migratory, feeds on aquatic invertebrates.
Red-tailed hawk	Vert, bird WB	Flies, nests in trees, feeds on rabbits, ground squirrels, insects and snakes.
Great horned owl	Vert, bird WB	Inhabits forest and grasslands, nest in trees, feed on skunks, small mammals and reptiles.
California quail	Vert, bird WB	Nests on the ground, inhabits grasslands and wooded areas, feeds on seeds, leaves, some invertebrates.
Jack rabbit	Vert, mammal WB	Longer hind legs, inhabits grasslands, feeds on vegetation, they are food for owls, hawks, eagles, coyotes, foxes.
Meadow mouse	Vert, mammal WB	Rodent (gnawing mammals), inhabits meadows and grassy fields, feeds on vegetation, food for owls, hawks, snakes, herons.
Beaver	Vert, mammal WB	Rodent (gnawing mammals); tail is large, hairless and flat; makes homes (dens) along river and slough banks, feed on bark and twigs, have continuously growing front teeth so they must constantly gnaw on hard materials to keep the teeth worn down, active at night.
Coyote	Vert, mammal WB	Inhabits foothill woodlands and grasslands, feeds on rodents and rabbits, hunt alone or in pairs.
River otter	Vert, mammal WB	Inhabits wetlands and rivers, feeds on crayfish and fish, very secretive and seldom seen, active at night.
Black-tailed deer	Vert, mammal WB	Hoofed mammal, feeds on grass, leaves and twigs, inhabits forests.

Extensions

- Add another layer of information to the "Wild Animal Scramble" by making cards for the habitats that you and your students observed at the Preserve. Include riparian forest, river, grasslands, wetlands, and agricultural land. Once the students have reviewed and selected the correct description of each area, have them "distribute" the animals they classified into the proper habitat. Some animals will live in more than one area. Use this information for a discussion about the needs which are met for those animals in each area.

- Play a "concentration game" using natural objects found in the schoolyard. Before assembling the children to play, secretly gather from the immediate area about 10 common natural objects such as branches, seeds, galls, plant parts, and some signs of animal activity. Lay the objects out on a handkerchief and cover them with another handkerchief. Call the children close around and tell them, "Under this cloth are 10 natural objects that you'll be able to find nearby. I will lift the handkerchief for 25 seconds so you can take a good look and try to remember everything you see."

  After looking at the objects, the children spread out and collect identical items, keeping their findings to themselves. After five minutes of searching, call them back. Dramatically pull out the objects from under the handkerchief, one at a time, telling interesting stories about each one. As each object is presented, ask the children if they found one just like it.

  Children have a lively curiosity about the kinds of things that you will show them. When you repeat the game several times, it has a noticeable strengthening effect on concentration and memory.

- Use the following quote to motivate your students and prepare them to act out the plants and animals they saw at the Cosumnes River Preserve. Students can work in small groups to present one or two different plants or animals to the class. This can be used as a type of charades or guessing game, or if you prefer, ask the performers to describe in words, as well as in actions, their plant or animal.

> I held a blue flower in my hand, probably a wild aster, wondering what its name was, and then thought that human

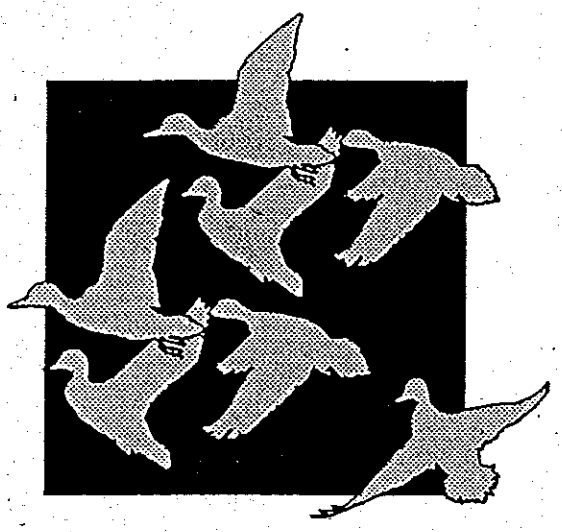
> names for natural things are superfluous. Nature herself does not name them. The important thing is to know this flower, look at its color until the blueness becomes as real as a keynote of music. Look at the exquisite yellow flowerettes in the center, become very small with them. Be the flower, be the trees, the blowing grasses. Fly with the birds, jump with the squirrel.†

Note: if remembering details from your field trip makes this activity difficult, take your students outside at school and have them observe everything they can within a given area. Then, ask them to act out something in that area for their classmates. The immediacy of the environment may simplify the task!

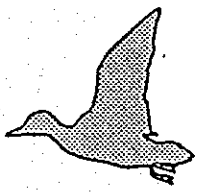
Remind students that wildlife (animals and plants) are everywhere—not just at a nature center or natural area. Ask students to survey their own neighborhood or city park looking for wildlife, and then have them draw pictures or write descriptions of the wildlife they find.

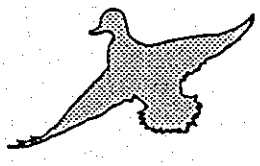
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† Sally Carrighar, *The Earth Speaks* (Warrenville, Illinois: The Institute for Earth Education, 1983) p. 117.



spring







Everybody Needs A Home*

Background

Humans and other animals, including pets, farm animals, and wildlife, have some of the same basic needs. Every animal needs a home. But that home is not just a "house" like people live in. Home, for many animals, is a much bigger place—and it is the out-of-doors. The scientific term for an animal's home is "habitat." An animal's habitat includes food, water, shelter or cover, and space.
A Habitat has everything needed for an animal to survival. The shelter that an animal calls home might be underground, in a bush, in the bark of a tree, in some rocks, or in a special birdhouse built by a human!

Objectives

Students will be able to recognize that people and other animals share the basic need to have a home. Students will also understand the specific habitat needs of three animals they are likely to see at the Cosumnes Preserve.

Materials

- Drawing paper
- Crayons or colored pencils
- Photographs of wildlife homes from magazines
- Copies of "Habitat Sweet Habitat" sheets (xeroxed from this packet)

Procedure

Part One

Ask each student to draw a picture of where he or she lives, or to draw a picture of where a person they know lives. In their drawings, they should include images of the things they need to live where they do; for example, a place to cook and keep food, a place to sleep, a neighborhood.

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* This activity is adapted from *Project Wild Aquatic* (Boulder, Colorado: Western Association of Fish and Wildlife Agencies and the Western Regional Environmental Education Council, 1986), p. 31.

Once the drawings are finished, start a discussion. Ask students to point out the things they need to live as included in their drawings. Make a "Homes" display using the drawings. Point out that everyone has a home.

Ask students to close their eyes and imagine the following: a bird's home, an ant's home, a beaver's home, the President's home, their own homes. Show them pictures of different places that animals live.

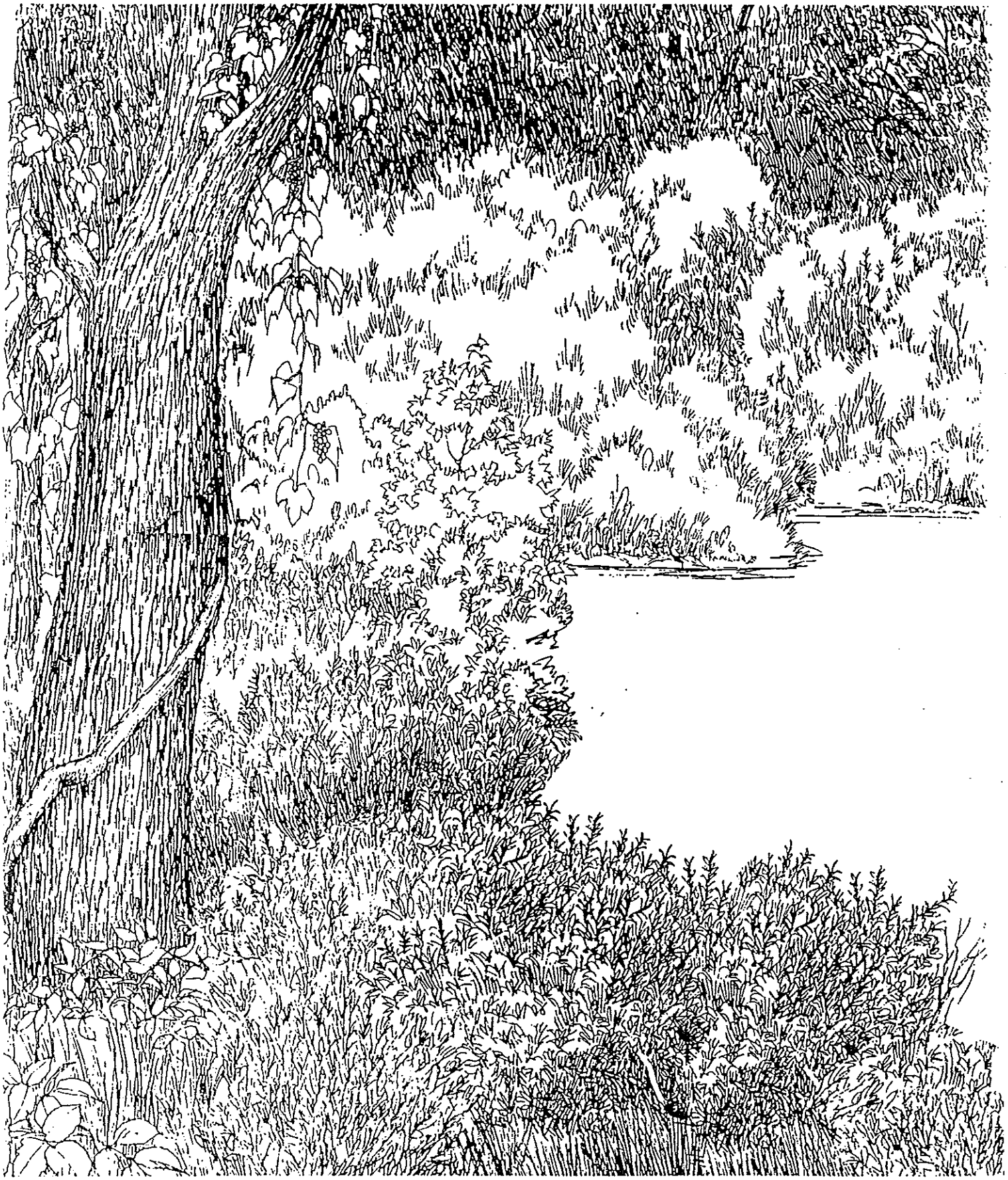
Discuss the differences and similarities among various homes. Talk about the things every animal needs in its home: food, water, shelter, and space in which to live. (If your students need help grasping the concept of "space," try making a circle of rope on the ground. Ask one student to stand inside the circle and then add children until they understand they are running out of "space" in the circle.) Summarize this discussion by emphasizing that though the homes are different, every animal, including people, pets, farm animals, and wildlife, needs a home. For animals, we call the place where all of the survival needs are met a habitat. People go outside their homes to get food, at a store, for example. Birds, ants, beavers, and other animals have to go out of their "houses" or places of shelter to get the things they need to live.

Part Two

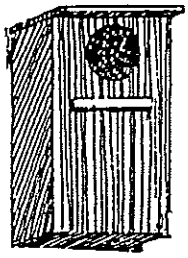
Make a "Habitat Sweet Habitat" booklet. Provide students with drawing paper and magazines for pictures. Have them label four separate pages Food, Water, Shelter, and Space (or make those pages for younger students). One side of each page is for the students' drawings or pictures of their own food, water, shelter, and space. What is their favorite food? Drink? What does their shelter look like? For space, they may draw or find a picture of a place in which they like to play, like a park or their backyard.

Next, have students choose the wood duck or the coyote (enclosed in this packet) to complete their "Habitat Sweet Habitat" booklets - using the other side of the pages they created before. Discuss the upcoming visit to the Cosumnes River Preserve, and tell students that they will visit the habitats of these (and many more!) animals to observe first-hand. They may want to embellish or "perfect" their habitat booklets after the trip to the Preserve!

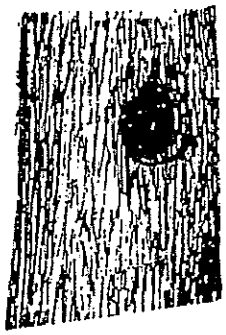
Habitat Sweet Habitat



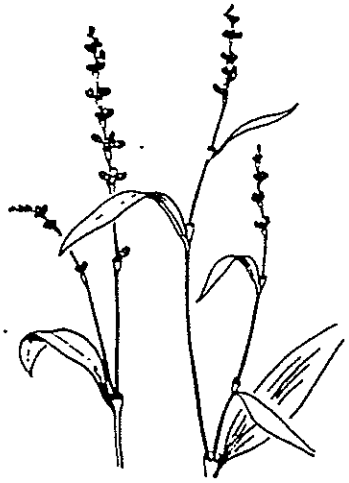
River bank



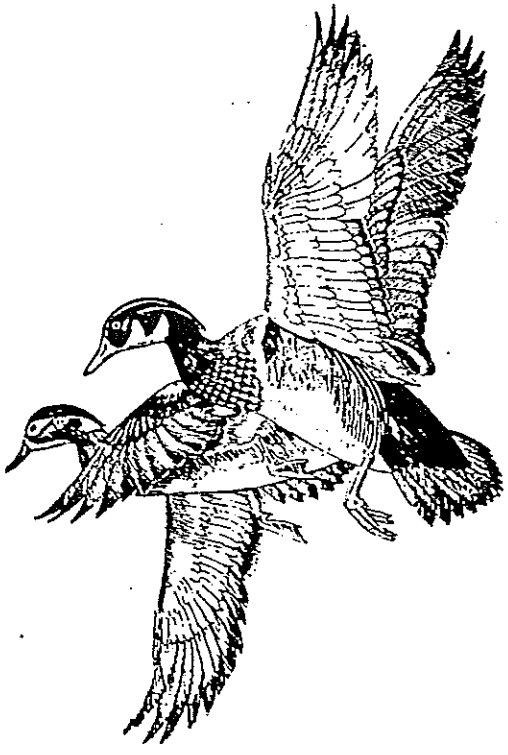
Wood duck box



Hole in tree

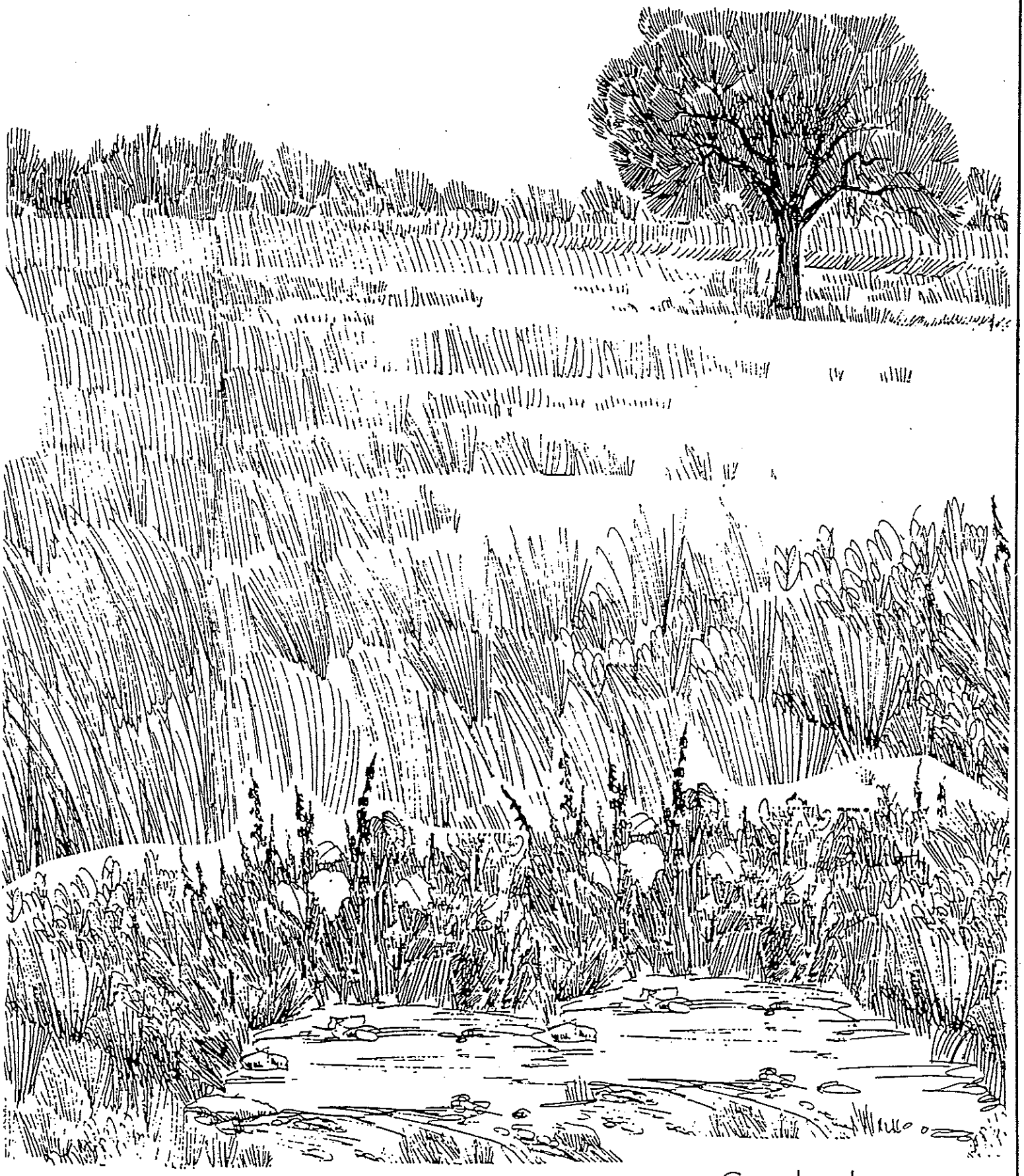


Smartweed



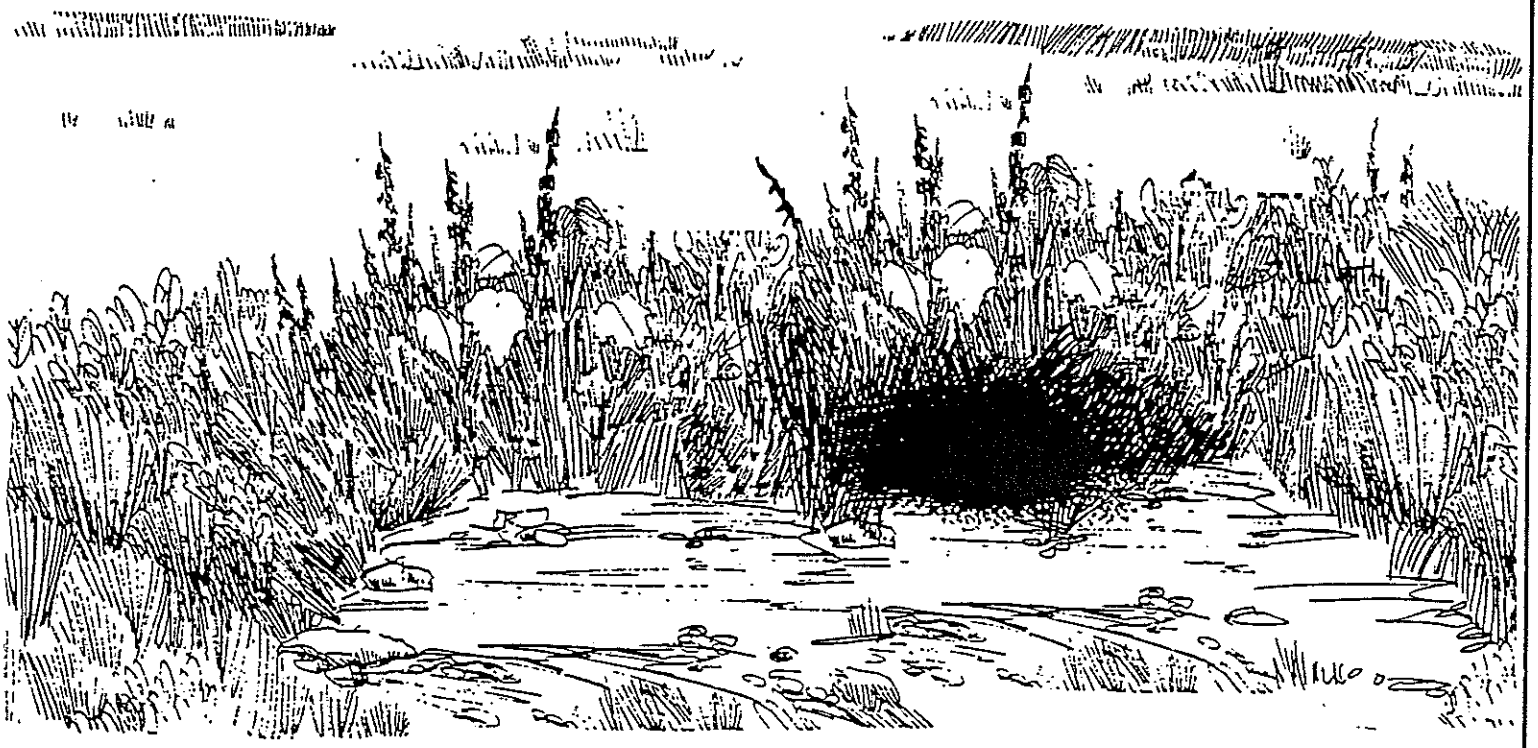
Wood ducks

Habitat Sweet Habitat



Grasslands

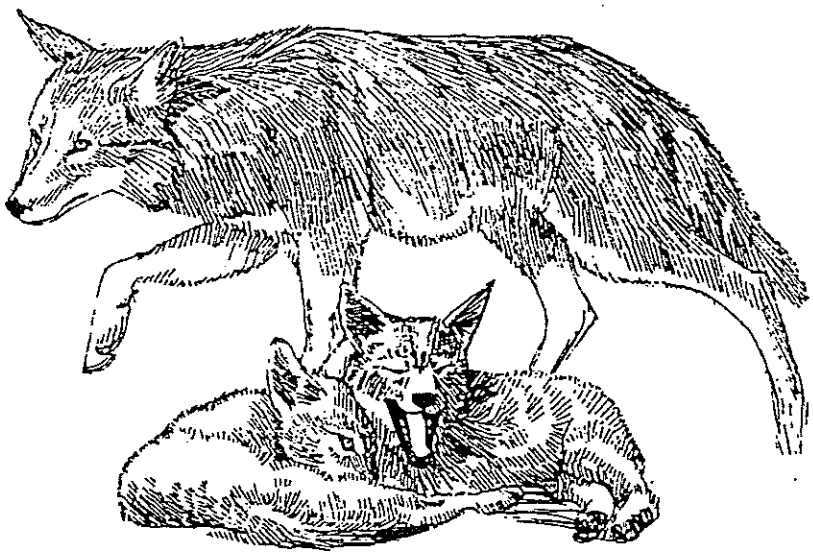
Habitat Sweet Habitat



Grasslands



Jackrabbit



Coyote and pups

Extensions

- Consider working with other teachers and classes at your school to certify your school as a "Backyard Wildlife Habitat." Contact the National Wildlife Federation at 1-800-432-6564 for the instructional pamphlet, "The Backyard Naturalist," and an application for certification (ask for item number 79919, $2.00 plus $3.25 shipping). This program provides wonderful opportunities for outdoor education. It also provides excellent information about how your schoolyard can be enhanced as a safe, welcoming place for wildlife.

- Discuss other ways you and your students can help make better habitat for wildlife and plant life. Tell your students they will be able to find a very special tree during their visit to the Cosumnes River Preserve—the valley oak tree. Ask if anyone is interested in volunteering with their family to plant acorns on the Cosumnes River Preserve so that there will be more valley oaks one day. Is there a "Nature Club" at your school that might attend one of the Preserve's Saturday activities? Or at a different natural area? (Information is included in this packet about volunteer activities at the Cosumnes River Preserve.)



Habitat Hide and Seek

Background

Will we see much wildlife on our visit?

The abundance of wildlife living in a natural area can be explored at the Cosumnes River Preserve in many ways. During a visit, you and your students will get hands-on observation practice. You will also become familiar with many of the unique aspects of the Preserve. Encourage students to walk slowly and quietly. When all of their senses are really ready, they will find clear hints or signs of many wildlife species. For example, a hole in the ground may be evidence of a ground squirrel or snake; visible nibbles on young willows, cottonwoods, and alders may be signs of deer and beaver snacking spots; trails through tall grasses are left by meadow voles and other small rodents; and well-worn trails cutting across the footpaths are made by beavers, river otters, or humans. The tracks and scat of raccoons, birds, and snakes are other clues you will probably observe.

What is so special about the valley oaks?

Valley oak riparian (streamside) forests are unique to California's Central Valley. Before extensive agricultural clearing began in the 1880's, dense forests dominated by these trees were miles wide and extended along the region's rivers. Over the last 150 years, however, this forest has lost ground to agricultural and urban development. Because these oaks depend on natural flooding, the Cosumnes River Preserve is one of the only spots left which can support them. Flooding nourishes the soils, cuts down on competition from weeds, and reduces rodents that would otherwise eat oak seeds—the acorns. Be certain to make time to find a valley oak with your students during your visit to the Preserve.

What about those boxes in the oak trees?

Habitat restoration is an important concept and evidence of it is easily seen at the Preserve. For example, plantings of native species are found just outside the

Visitor Center, and the WIllow Slough trail passes by forest and wetland restoration sites. Nesting boxes for North American wood ducks are located close to the Visitor Center, and along the Willow Slough trail.

The North American wood duck is a resident species that nests and winters on the Preserve. This brilliantly colored duck is a cavity nester—dependent upon large trees that are old enough to have holes in which to nest. The Preserve's riparian forest naturally provides this habitat for these unusual ducks, however, the rapid decline of riparian forests has had a limiting effect on wood duck populations. To ease this "housing crunch," three of the Preserve's neighbors began a program that has resulted in placement of over 200 specially built nesting boxes on the Preserve. These boxes must be carefully maintained to prevent take-over by introduced birds such as starlings, as well as squirrels, opossums, and barn owls. They are the boxes you see attached to the oak trees along the slough and river. This is an example of habitat restoration.

Objectives

Students will observe signs of various wildlife species at the Preserve. They will identify valley oak trees, and they will understand the concept of active habitat restoration.

Materials

- Copies of "Clues Checklist" (xeroxed from this packet) —one per student or small group of students
- Pencils
- Clipboards or books with rubber bands to hold paper—one per group
- Tape measure

Procedure

Once you have oriented your students at the Preserve, review the "Clues Checklist". Discuss each clue and ask students to predict which animal might be responsible. Begin searching in small groups, each assisted by a chaperone. Check off each clue found and encourage students to make drawings (or notes) about interesting details observed. Once everyone has had plenty of time to look, gather students together and discuss the signs they found. Have students discuss which animals left the clues they found. What clues do people leave (hopefully only footprints—people's tracks) at the Preserve? Outside of the Preserve?

Explain the concept of a habitat restoration. Can the students provide an example of restoration that they saw today (the wood duck box)? Explain that another form of habitat restoration also takes place on the Cosumnes River Preserve: every year many people volunteer to plant species that are native to the area, especially trees such as Oregon ash, box elder, willows, cottonwoods, and the valley oak. There are volunteer work days at the Preserve when students and families can help restore the forest. Everyone is invited to participate in these events, and up-to-date information is included in the Teacher Packet in the case students are interested.

Finally, make time to show your students a valley oak tree. If you brought a tape measure, you may measure the circumference of the trunk. This up-close observation might help students remember more about this special tree. Ask students to measure the circumference of one of their classmates! Compare the results. If you are on Willow Slough Trail near trail markers #1 - 3, point out the young valley oaks nearby—these trees were planted by Preserve volunteers in 1988!

After the hike is complete, gather all of the field equipment and reassemble the group in a circle, seated on the ground. As a conclusion, tell the group that everyone will observe with their ears next. Students should remain quiet for several minutes and wait to hear both natural (bird songs, wind rushing through leaves and grasses, crickets, etc.) and unnatural sounds (planes, cars, trains, horns, etc.). You may decide to discuss what was heard, or simply leave the area with those sounds in mind. (This also makes a good post-visit activity for use in the school yard.)

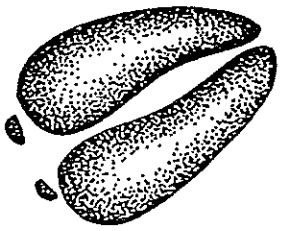
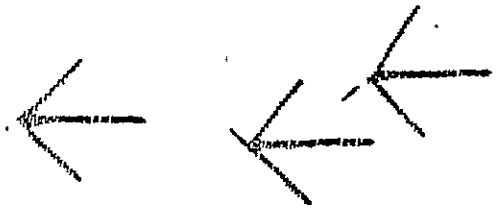
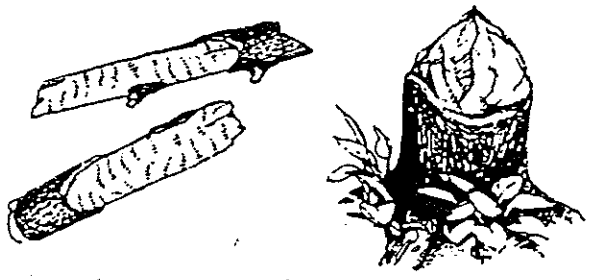
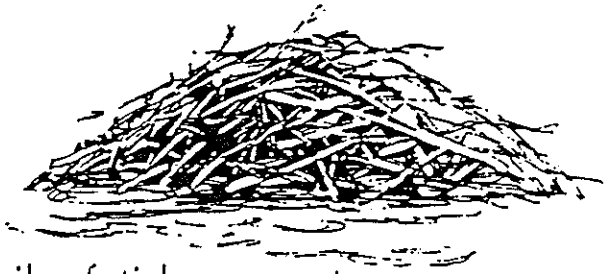
Clues Checklist

Names: _____

Date: _____

Time: _____

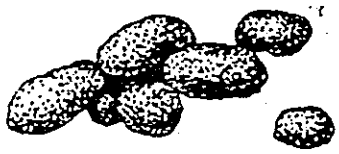
Location: _____

 mammal track	 mammal track
 bird track	 bird track
 broken or matted grass	 chewed tree or sticks
 pile of sticks near water	 pile of leaves

Clues Checklist



long hairy scat



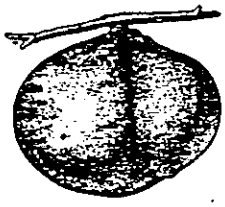
small pellet scat



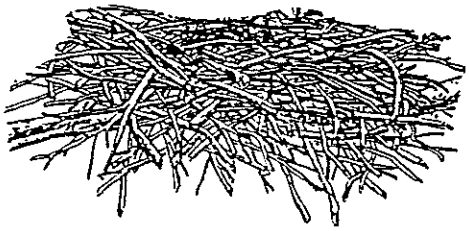
broken nuts or acorns



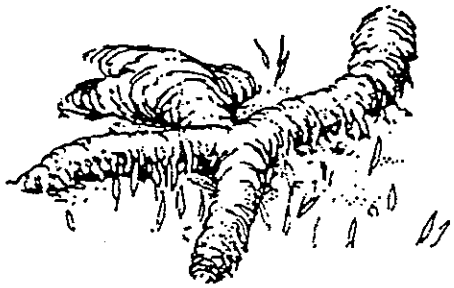
path through grass



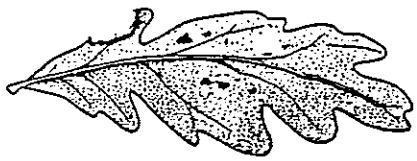
oak gall



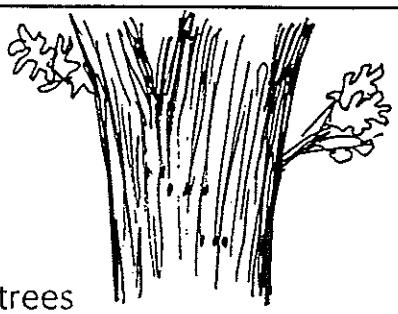
nest



path through earth

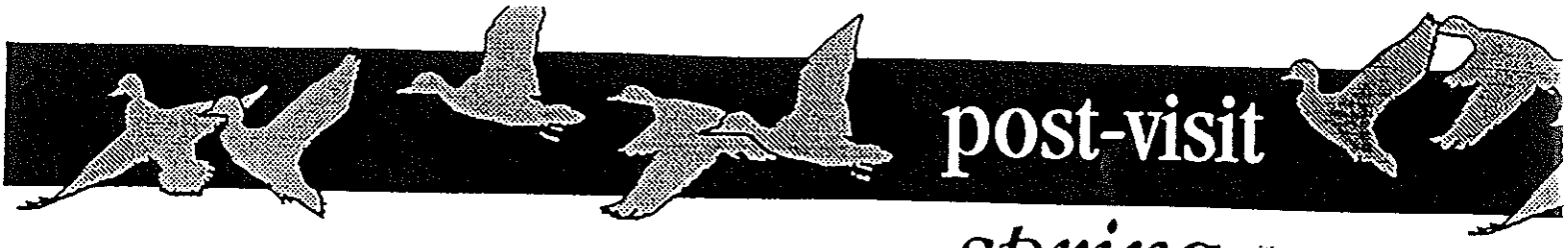


leaves with holes



holes in trees

Other clues?



Migration Basics*

Background

In spring and fall, the sky can become filled with countless birds flying between their breeding grounds in the North (the areas where birds nest and raise their young) and their warmer wintering grounds in the South. This seasonal movement is called migration. Birds are not the only animals that migrate (many species of mammals, insects, fish, reptiles, and amphibians also migrate), but for the purposes of this packet, we will examine migratory birds and their needs for different habitats at different times of the year.

The Pacific Flyway is a route taken by many migratory birds during their annual flights between the North and the South. The Cosumnes River Preserve falls within this highway in the sky, and it plays an important role in migration—as do all the wetlands of the West—by providing birds with a protected resting area during their difficult journey. Birds use many techniques to guide them along the flyway during their migration. They recognize landmarks (like rivers and mountains), follow weather patterns, sense the magnetic field of the earth (for direction) and follow strong inherited instincts.

There are many theories about why birds migrate, but the decreased availability of food and water as the seasons change is probably the most important reason. When birds arrive at the Cosumnes Preserve in the fall, they have left the dropping temperatures, the shorter days, and the dwindling food supply in the North (insects and plants die off in cooler temperatures). In the south, winters are warmer and vegetation is more ample. The wetlands of the Preserve provide just the habitat these birds require. Some birds end their migration at the Preserve and winter here. Others make a "rest stop" before continuing farther south. Then, in the spring, birds complete their migration, leaving the Preserve or passing

* This activity is adapted from *Aquatic Project Wild* (Boulder, Colorado: Western Association of Fish and Wildlife Agencies and the Western Regional Environmental Education Council, 1986), pp. 49-52.

through as they fly north to areas where the summers are cooler and the nesting grounds await.

Times of annual migrations are not the same for all birds. Shorebirds begin their fall migration in early July, but other species, such as geese, do not begin until late fall. Some birds undertake a leisurely migration, while others fly swiftly to their destinations. Generally, spring migrations are faster than fall migrations because of the stimulus to breed and nest. Migrating birds may travel during the day or night, or they may travel continuously, depending on the bird species.

Objectives

Students will understand that one way some animals survive in the wild during the cold season is to migrate to warmer areas. They will also recognize the benefits of wetland areas to migrating birds.

Materials

- Winter coat, hat, gloves
- Water bottle
- Pillow
- Small bag of rice
- Corn (an ear or a can of corn)
- Toy cradle or crib
- Picture of hotel
- Picture of beach with people relaxing in the sun
- Copies of "Migrating Birds For Finger Puppets," (xeroxed from this packet)
- Crayons or markers
- Scissors
- Small strips of paper, approximately 1" x 4", one for each student
- Tape
- California state map
- Pacific Fyway map - provided with this packet
- Snacks

Procedure

Have a discussion with your students about some of the things people do to survive in cold weather (go inside to a warm house or building, put on a sweater, coat, hat and/or gloves, turn on the heat, build a fire, cover up with a blanket,

drink a hot drink, travel to a warmer place, etc.). Then ask what animals do to survive in cold weather (become more active, hibernate, wait in a sheltered area [like ants underground], grow a warmer coat [cats, dogs, rabbits, sheep], migrate to a warmer place. Then tell the students that for this lesson, they will be concentrating on migrating birds—why birds migrate, and why the Cosumnes River Preserve is a good place for migrating birds to visit.

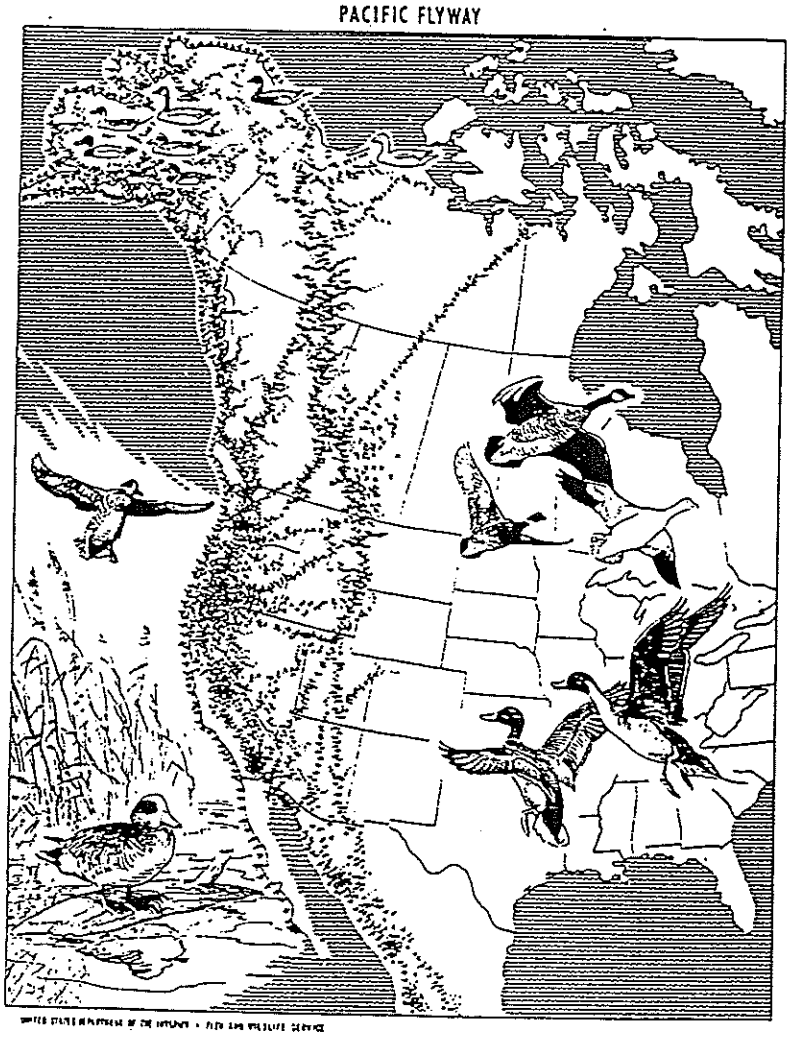
Have students come up with some of the reasons that a bird would migrate south as winter approaches (decreasing supplies of food and water as the weather gets colder), and to the north as the spring and summer approach (more comfortable weather, more abundant food supplies, better places to nest and raise their young). Then ask what some of the birds' needs would be along the way as they travel south in the winter and north in the spring (food, water, a place to rest, possibly a place to hatch their eggs or stop for protection). Explain that wetland areas, like the Cosumnes River Preserve, provide perfect "stopping over" places for many birds as they migrate. The marshes contain many species of grasses, sedges, and rushes that provide protective cover, seeds, and tubers for food, and homes for aquatic insects that also serve as food for many birds. Some birds eat frogs, mice, and other small birds that live in the Preserve's wetlands. Corn, wheat and rice (the "cereal" grains) from the agricultural fields on the Preserve also make good food for birds such as sandhill cranes.

Show students the props you have collected. Either use them as you guide the discussion above, or as a review, ask for students to volunteer to explain to the class what each one has to do with your conversation about migrating birds.

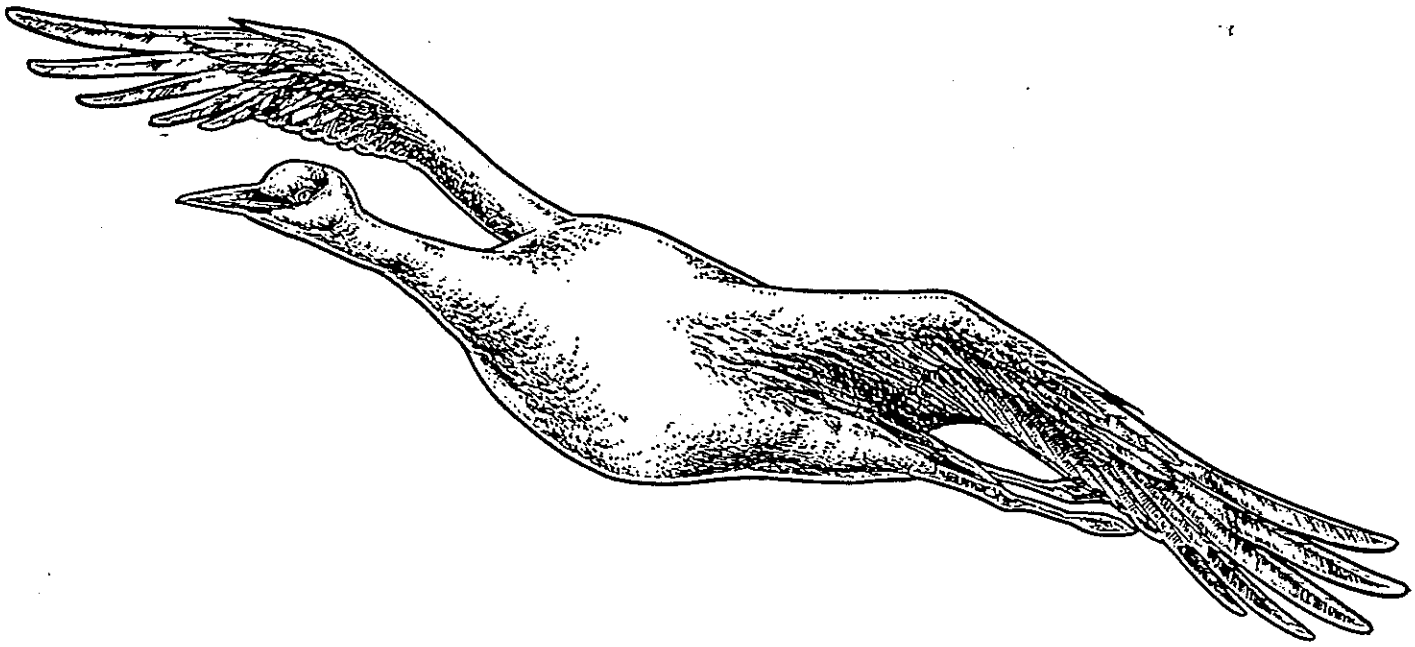
Finally, explain to the class how to make migrating bird finger puppets.
Give each student one of the migrating bird copies to color and cut out. Then, show everyone how to make a ring for their finger, using a strip of paper wrapped around the finger and taped closed. The students may want to work in pairs, helping each other tape the rings. The back of the bird cutout is then taped to the ring, so the students can actually "wear" their bird finger puppets.

Discuss which direction is north and which direction is south. You may want to show your students a map of the local area or a California state map, so they can connect a familiar place with the directions. Show them the map of the Pacific Flyway and point out some of the cities they are familiar with along the way.

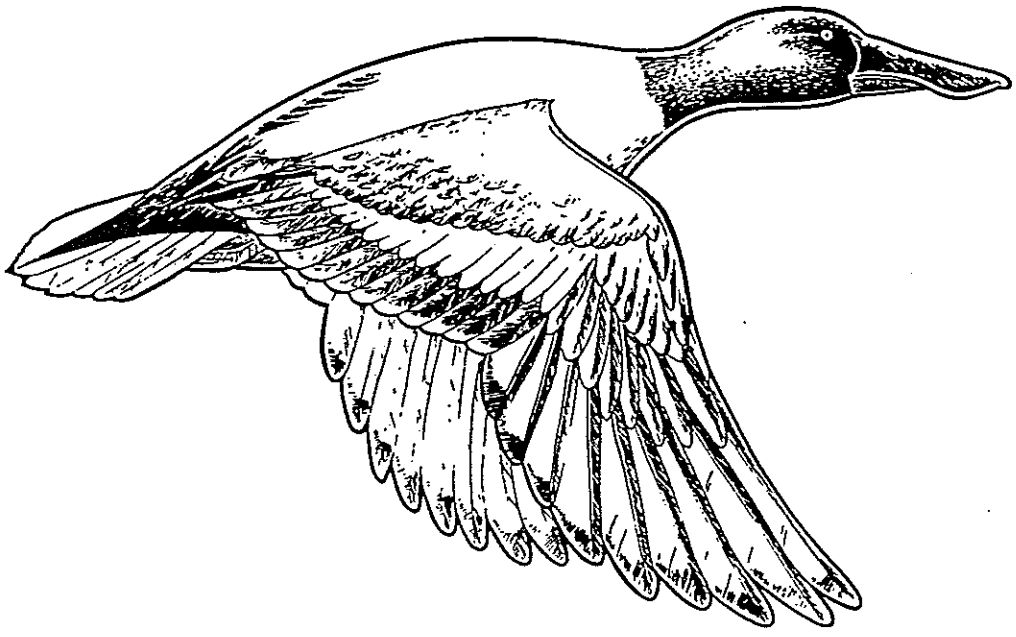
Make some kind of marker in the classroom, or outside in the schoolyard so the students will remember north and south. Then, creating your own version of the Pacific Flyway, designate a chair or a tree as one familiar city in the southern part of the flyway, another desk or bush or tree as the Cosumnes River Preserve, and a third "landmark" as the northernmost city. Snacks should be available at the Preserve stop (if desired). Invite students to "migrate" with their bird puppet along the flyway, stopping over at the Cosumnes River Preserve to rest, eat, etc., before continuing on to their destination. Then, everyone should "migrate" back in the opposite direction, stopping over at the Preserve again for food, water, rest, relaxation, etc. You may choose to place the food props at the Preserve stop, reminding students about why so many birds visit the Preserve during migration.



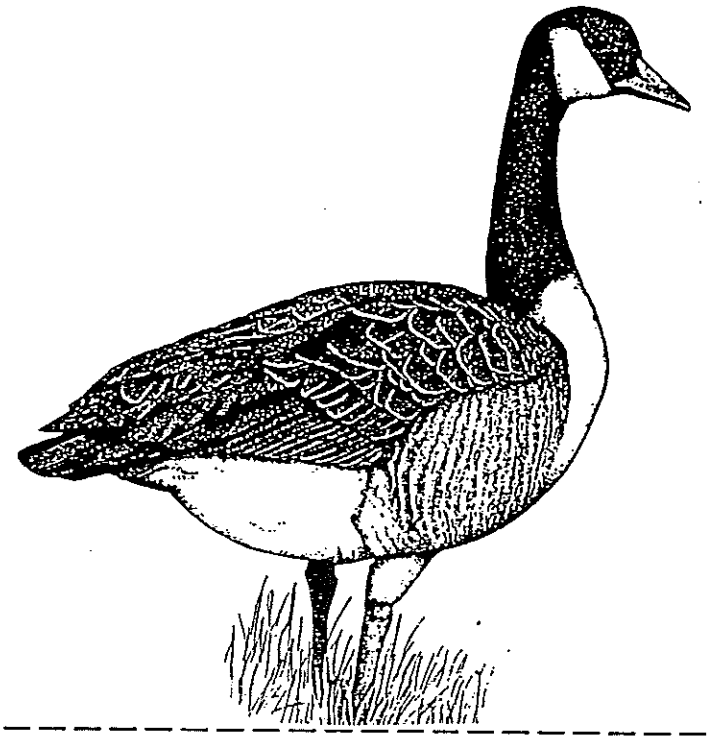
Migrating Birds for Finger Puppets



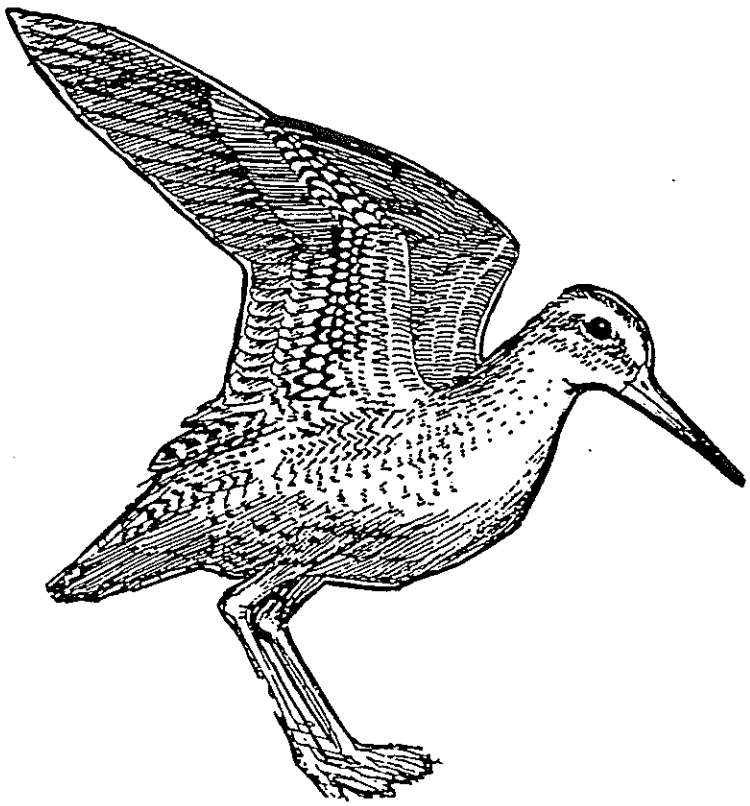
sandhill crane



northern shoveler



Canada goose



dowitcher

Extensions

- Learn about the other flyways (Atlantic, Mississippi, and Central) and draw them onto a large map of the United States.

- Write a story about a bird's migration from the bird's point of view. Include some of the difficulties a bird might encounter during the trip (severe storms, hunters, predators, no wetlands along the way). Older students may find out how long the trip would take, how long the bird stops to rest along the way, what foods it prefers to eat, etc.

- Write a letter to a government official about the importance of protecting wetland areas for migrating birds. Use the letter form provided (xeroxed from this packet), or design one of your own. For information on elected officials call: 916-366-2051 (Sacramento County) or 209-468-2885 (San Joaquin County).

- Use the following vocabulary activity to introduce new vocabulary words or to review words already introduced to students. Use it with any lesson where vocabulary growth is important.

  Vocabulary Bingo

  1. Make a copy of the Bingo Grid Sheet for each student.

  2. Review the vocabulary words and their definitions with students. Repeat the words one at a time, asking them to write one word in each square on their grid sheet in any order.

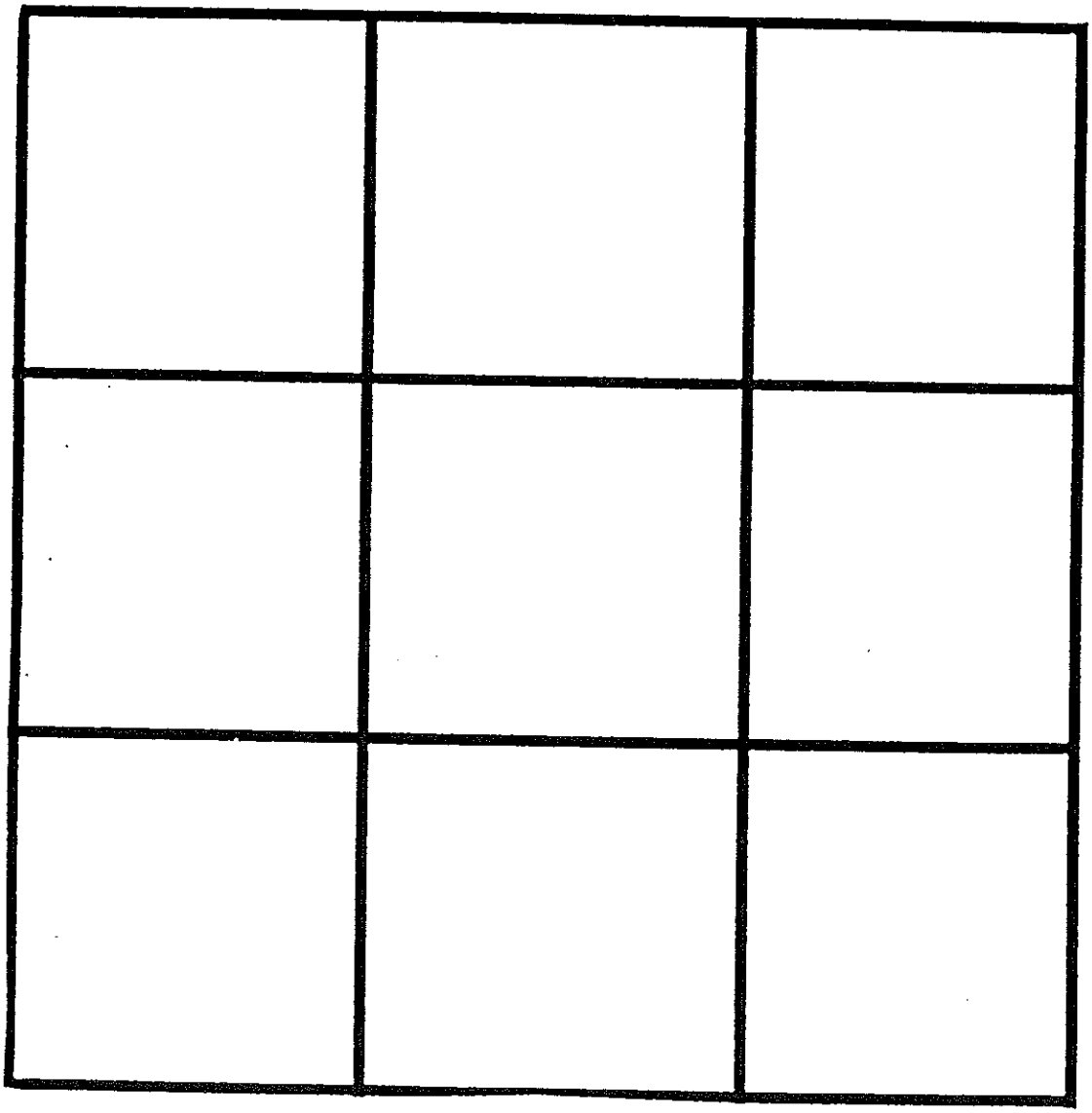
  3. Have the students tear 9 small pieces of paper that are big enough to cover one word.

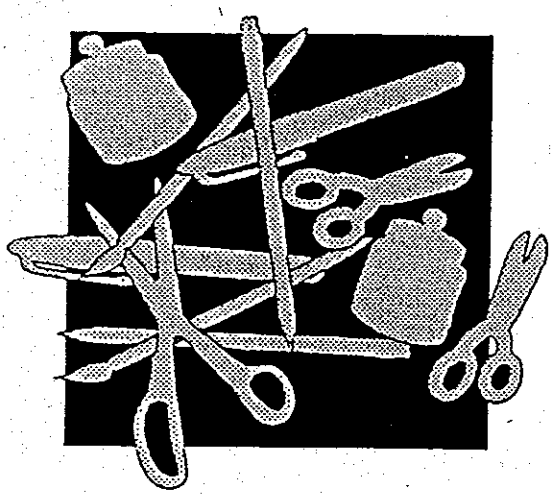
  4. Read vocabulary definitions aloud to the class one at a time. After reading a definition, ask students to find the word on their grid that matches it. For example, if you read "a kind of animal or plant," the students must find the word "species" on their grid.

     Each student finds the word independently. Once they find the word that matches the definition, he/she covers it with a small piece of paper.

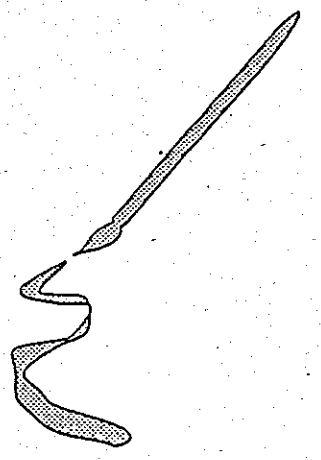
5. The first student to cover three words across, diagonally or vertically in a line is the winner and calls out "Bingo!" After a student calls out "Bingo," check the winning grid and repeat then identify aloud which word belongs to which definition. If the students is unable to identify the correct words, the game continues until there is a new winner.

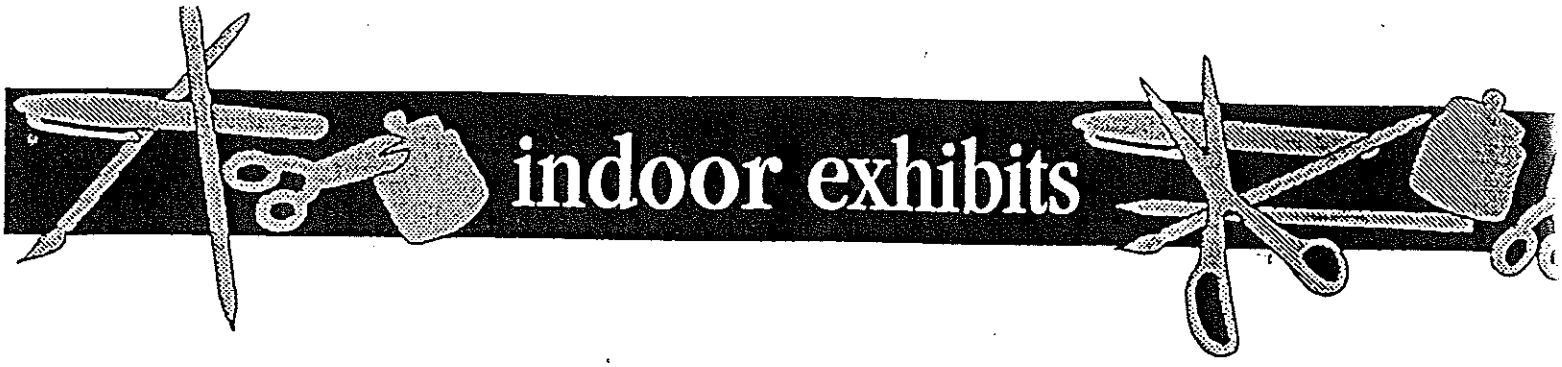
Bingo Grid





indoor exhibits





What's a Habitat? What do you find there?

Objective

Students will learn about the habitats of the Cosumnes River Preserve and some of the animals that live there.

Materials

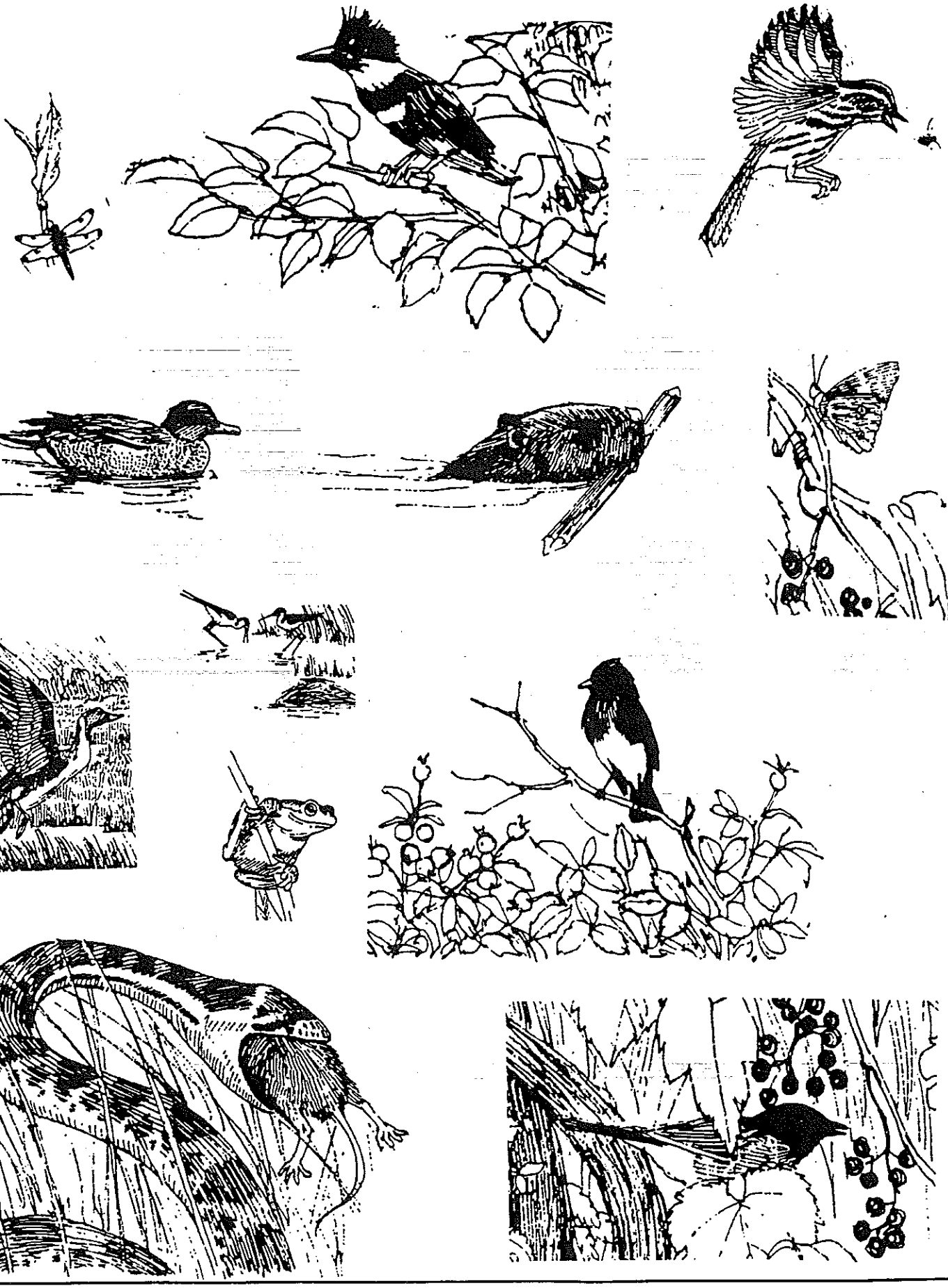
- crayons
- blank paper
- tape
- clipboards or cardboard—one per student
- "Plants and Animals of the Cosumnes River Preserve" (xeroxed from this packet) - one animal for each student

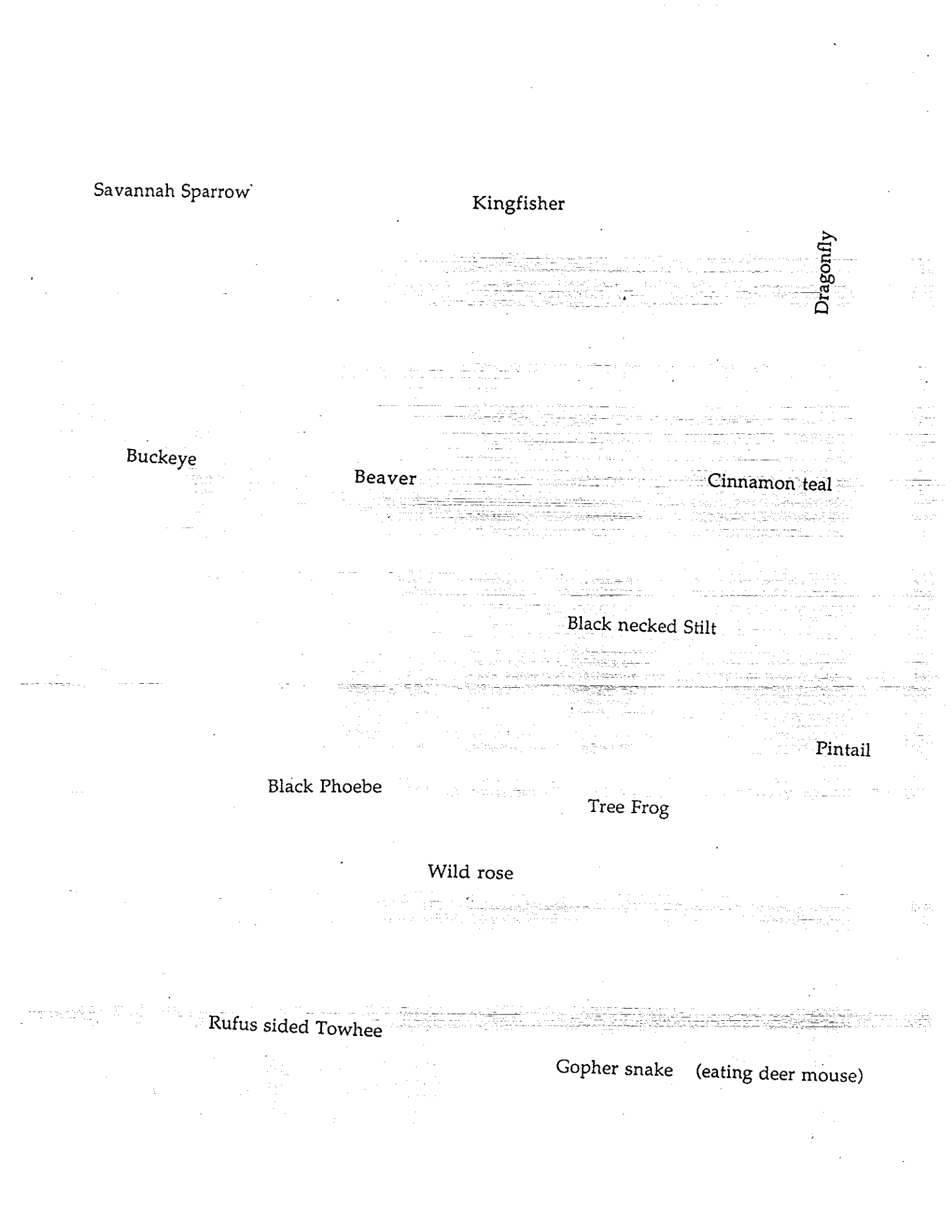
Procedure

Give each student one of the animal illustrations. Ask them to find their animal within one of the six murals. Ask the students to sit and draw the habitat where the animal is found. Concentrate on colors, plants and other animals found in the area. Students can tape their xeroxed animal onto their drawing or draw their own version!

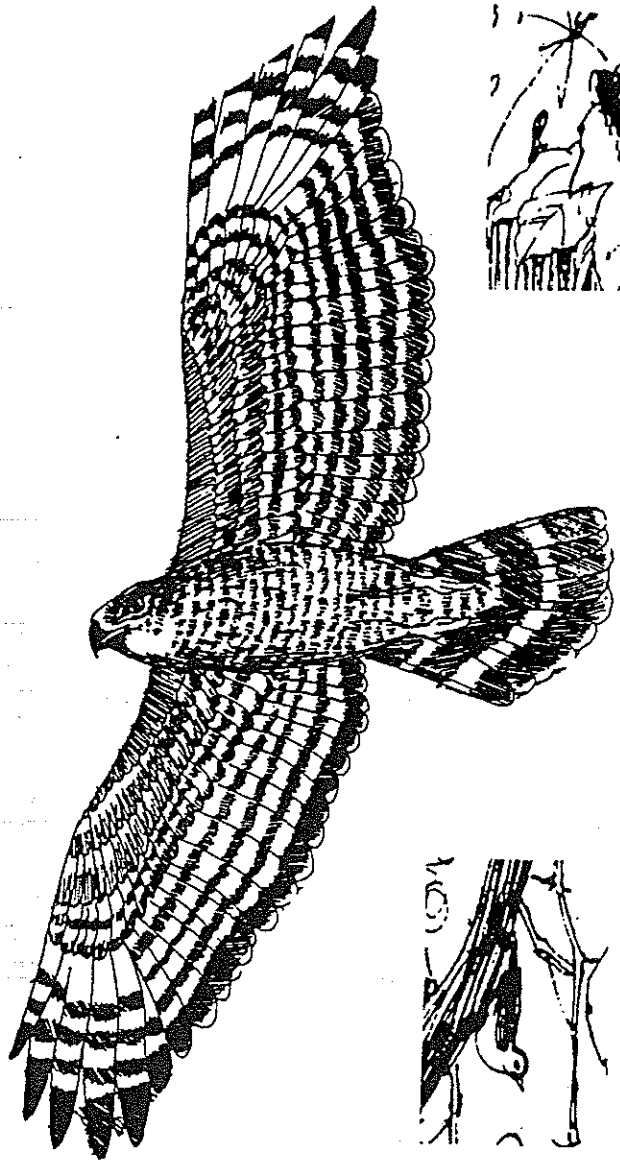
When the students are finished with their drawings, divide them into six groups representing the six habitats where their animals live. Layout all the drawings for each mural and have the students describe their animal, where it was found and something about the habitat they just illustrated. Ask students to observe things that are different, and things that are same amoung the various habitats.

Plants and Animals of the Cosumnes River Preserve

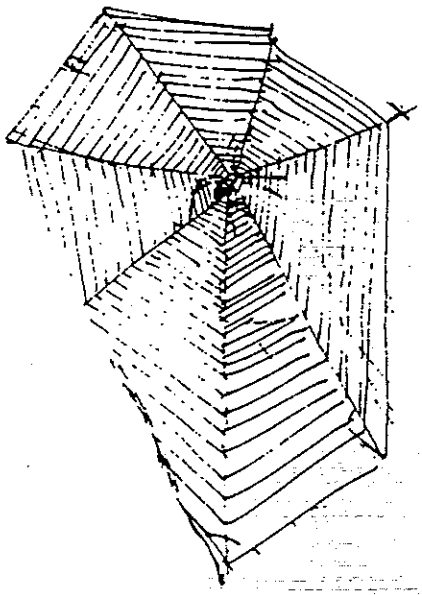



Savannah Sparrow
Kingfisher
Dragonfly
Buckeye
Beaver
Cinnamon teal
Black necked Stilt
Pintail
Black Phoebe
Tree Frog
Wild rose
Rufus sided Towhee
Gopher snake (eating deer mouse)

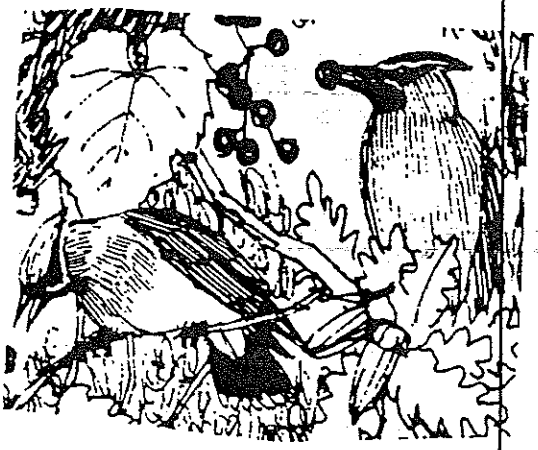
Plants and Animals of the Cosumnes River Preserve





















Red Admiral Butterfly

Garden spider (on Web)

Nuttall's woodpecker

Red-shouldered Hawk

Native Grape

Cedar waxwings

White breasted nuthatch

Goldfinch

Wrentit

star thistle

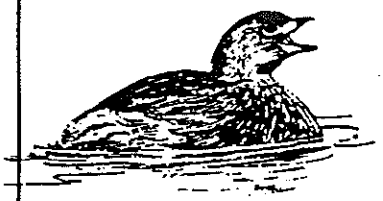
Blackberry

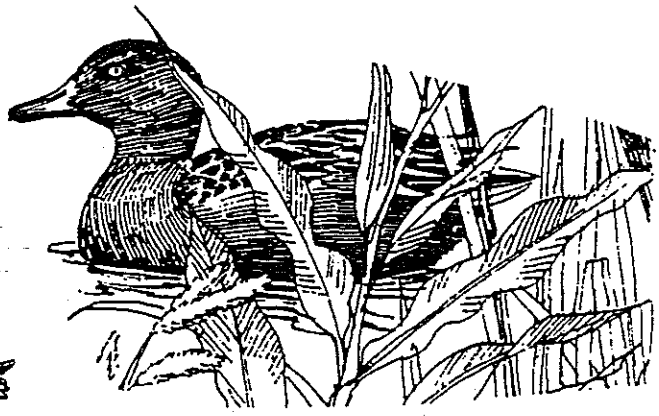
Gray Fox

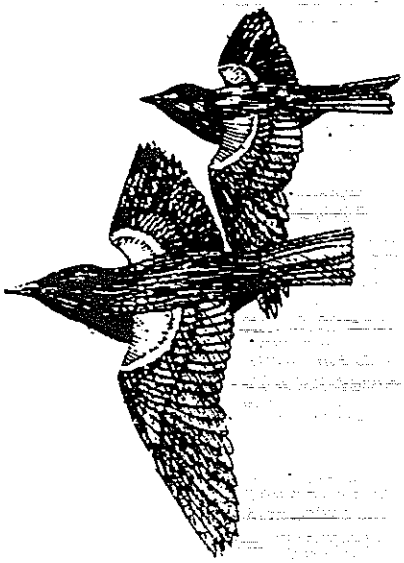
Monarch Butterfly

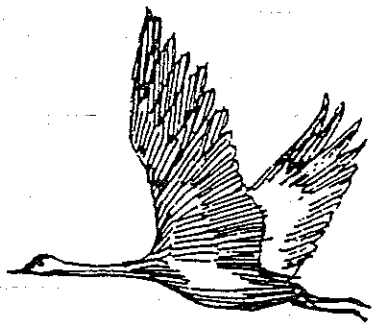
Muskrat

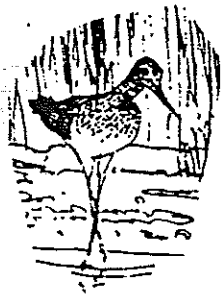
Plants and Animals of the Cosumnes River Preserve



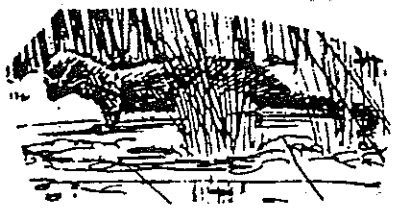


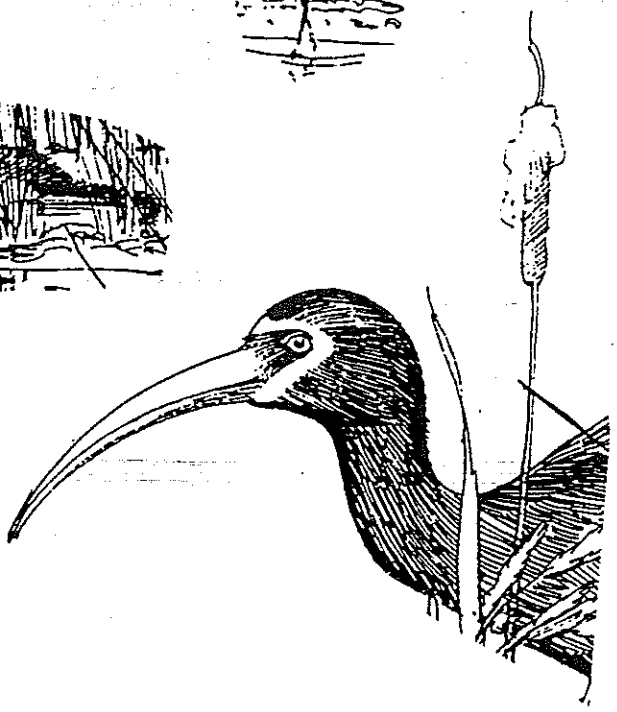


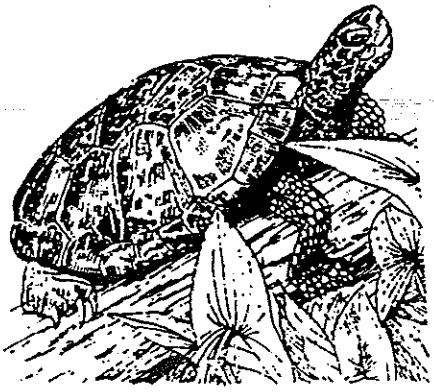


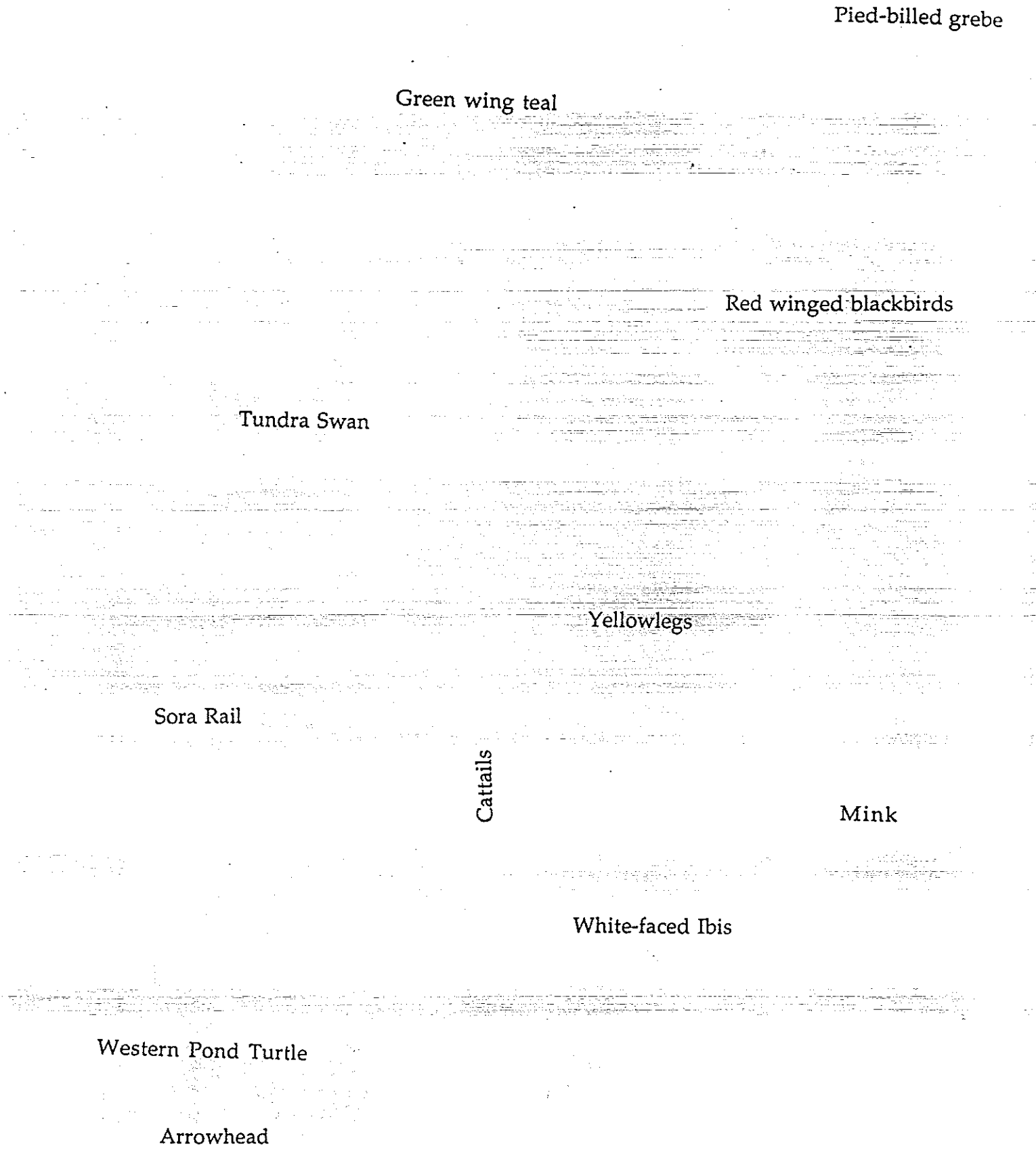








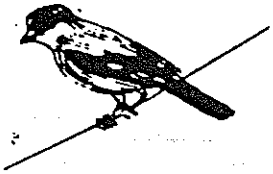



Pied-billed grebe
Green wing teal
Red winged blackbirds
Tundra Swan
Yellowlegs
Sora Rail
Cattails
Mink
White-faced Ibis
Western Pond Turtle
Arrowhead

Plants and Animals of the Cosumnes River Preserve



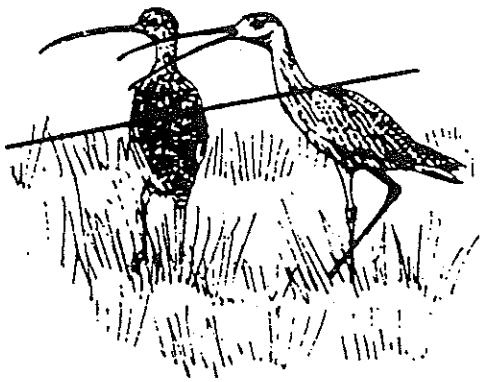




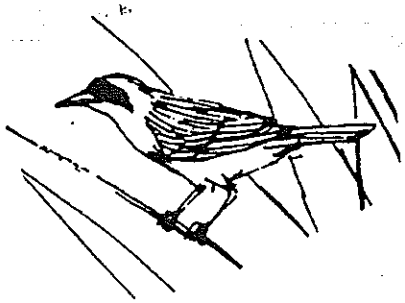












Western fence lizard

Cliff swallow

Loggerhead shrike

Sandhill crane

River Otter

Quail

Alfalfa Butterfly

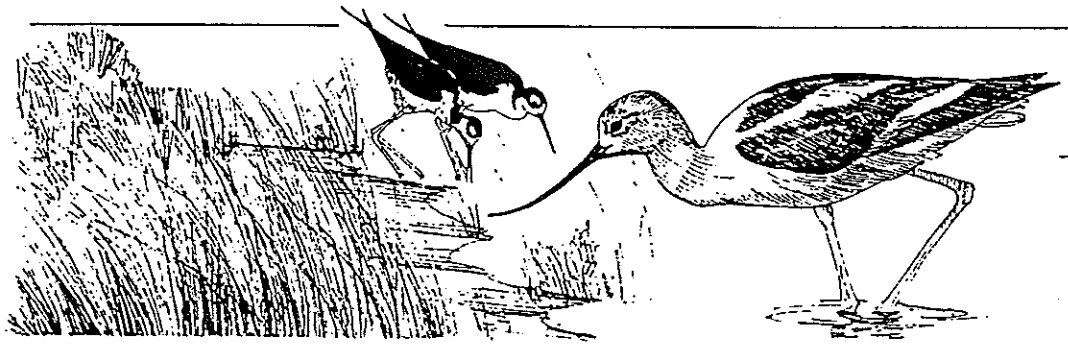
Long-billed Curlew

Black-tailed Deer

Common yellowthroat

Extension

- Ask the students to think about and illustrate their own habitat. What do they "do" in their habitat? Where would they be found eating, sleeping, using the restroom or playing? When would they be in a group? When would they be found alone?



glossary

Adaptation: A special feature that helps an animal or plant live more successfully.

Amphibian: A cold-blooded vertebrate that usually hatches as aquatic larva and grows into an adult with air-breathing lungs.

Aquatic: Living in water.

Bird: A warm-blooded, egg-laying, feathered vertebrate with fore-limbs modified to form wings.

Breeding ground: The areas where birds nest and raise their young.

Cold-blooded: An animal whose body temperature changes to match changes in the temperature of the surrounding environment. Fishes, amphibians, and reptiles are cold-blooded vertebrates.

Crop: A sac at the bottom of the esophagus in many birds that is used to store food for later digestion.

Ecosystem: A collection of living things interacting with each other and with their physical environment; all living things in a region that depend on one another and their environment.

Gall: A tumor-like growth on a plant that occurs when an insect lays its eggs on the plant. The structure provides shelter and food for the larvae growing within.

Habitat:	An area that provides an organism (plant or animal) with the particular things it needs to survive: space, shelter, food, and water.
Insect:	A small invertebrate, the adults of which have three pairs of legs, a segmented body with three parts, and usually two pairs of wings.
Invertebrate:	An animal without a backbone (spinal column). Worms, snails, crayfish, spiders, and insects are examples of common invertebrates.
Larva(e):	The immature form of many invertebrate species (for example, a caterpillar is the larva of a butterfly).
Mammal:	A warm-blooded animal with a backbone, the female mammal produces milk and gives birth to live young.
Migration:	Seasonal movement from one region to another. For example, a hawk might migrate from southern Canada to Central America for the winter.
Natural regeneration:	Healthy regrowth of vegetation, such as trees, subsequent to its elimination.
Pacific Flyway:	A route taken by many migratory birds of the West during their annual flights between the North and the South.
Predator:	An animal that hunts and kills other animals for food.
Reptile:	A cold-blooded animal with a backbone which lays eggs that are viable in dry or extreme conditions.
Riparian:	Occurring along the bank of a creek, stream, river or lake.

Seasonal Wetlands: Transient marshes, ponds, or vernal pools that are filled with water only during the rainy season or until evaporation occurs.

Seed Dispersal: The process by which a plant's seeds are distributed for regeneration. Seeds are dispersed in many ways, including wind, water, and animals.

Spider: An animal in the arachnid family that has eight legs and two body parts.

Vertebrate: An animal with a backbone.

Warm-blooded: Animals that maintain the same body temperature, regardless of whether it is cold or hot outside. They include birds and mammals.

Wetlands: Areas that, at least periodically, have waterlogged soils or are covered with a layer of water. Wetlands include ponds, bogs, freshwater and saltwater marshes, mudflats, channels, and seasonally ponded areas.

sources and resources

The California Class Project
California Department of Education
P.O. Box 271
Sacramento, CA 95812-0271
1-800-995-4099 (Bureau of Publications)
1992

A Child's Place in the Environment: Caring for Aquatic Systems and *Preserving and Restoring Healthy Ecosystems*
California Department of Education
P.O. Box 271
Sacramento, CA 95812-0271
1-800-995-4099 (Bureau of Publications)
1994

Science and Environmental Education Resource Guide
California Department of Education
Bureau of Publications
P.O. Box 271,
Sacramento, CA 95812-0271
1-800-995-4091
1991

Autumn Oaks
Carter House Natural Science Museum
P.O. Box 990185
Redding, CA 96099
916-225-4125
1994

Birds of the Shasta-Cascade Region: Ornithology Activities
Carter House Natural Science Museum
P.O. Box 990185
Redding, CA 96099
916-225-4125
1992

Energy Flow Through Spring Ponds
Carter House Natural Science Museum
P.O. Box 990185
Redding, CA 96099
916-225-4125
1995

Keepers of the Earth, Native American Stories and Environmental Activities for Children
Caduto, Michael and Joseph Bruchac
Fulcrum Publishers

WOW!: The Wonders of Wetlands
Environmental Concern Inc.
P.O. Box P
St. Michaels, MD 21663
410-745-9620
1991

Bottle Biology
Kendall/Hunt Publishing Co.
4050 Westmark Dr.
Dubuque, Iowa 52002
1-800-228-0810
1993

Wading Into Wetlands and *Birds, Birds, Birds*
National Wildlife Federation
1400 16th Street NW
Washington, DC 20036
1-800432-6564

The Stream Scene: Watersheds, Wildlife and People
Oregon Department of Fish and Wildlife
P.O. Box 59
Portland, OR 97207
1992

Salt Marsh Manual, An Educator's Guide Trekking the Refuge
San Francisco Bay National Wildlife Refuge
P.O. Box 524
Newark, CA 94560
510-792-0222
1992

Watershed Education Program
San Francisco Estuary Project
Friends of the Estuary
510-286-0769

California's Water Problems
The Water Education Foundation
717 K Street, Suite 517
Sacramento, CA 95814
916-444-6240

California's Water Story
The Water Education Foundation
717 K Street, Suite 517
Sacramento, CA 95814
916-444-6240

Investigating Your Environment
USDA Forest Service,
Public Affairs
Pacific Northwest Region
P.O. Box 3623
Portland, OR 97208-3623
1993

Sacramento Zoo Conservation Celebration Teacher Resource Guide
Sacramento Zoological Society
3930 West Land Park Drive
Sacramento, CA 95822
916-264-7714

Learning Science Process Skills
Kendall/Hunt Publishing Co.
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