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# ENDANGERED SPECIES

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What is an *endangered species*? An endangered *species* is a plant or animal in danger of becoming *extinct* throughout all or a significant portion of its range. The United States Fish and Wildlife Service manages this nation's endangered species program, including developing and maintaining the federal list of endangered and *threatened species*.

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## Extinction Is Forever

**E**xtinguishment is a natural process. For millions of years different types of plants and animals have lived and then have become extinct. We don't always know why a species has become extinct, but we do know that extinction can be caused by natural occurrences. Many times extinction is caused by more than one natural event, including climate change, disease, overpopulation, or competition for food.

When a species becomes extinct because of a natural process, it usually means its environment has changed, and more than likely the species will be replaced by a new, emerging one. It can be disturbing when a species becomes extinct, but we can more readily accept that loss when it comes naturally. However, most of the extinction and near extinction that is occurring today is not natural. And there has been a great increase in the rate of extinction. This increase is primarily caused by the activities of humans.

## Tarantulas Are Terrific

**O**ne of the most difficult tasks educators face is teaching children about the intrinsic value of each species on the face of the Earth. Presently, in the environmental field, there is a strong push to educate about the non-monetary value of each species. This is being accomplished through the teaching of environmental ethics.

One leader in the environmental ethics field, Hugh W. Nibley, states: "We have taught our children by precept and example that every living thing exists to be converted into cash, and that whatever would not yield a return should be quickly exterminated to make

way for creatures that do." Teaching environmental ethics with its emphasis on the intrinsic value of all species will have the positive effect of helping people understand the benefits of the endangered species program.

These benefits may be summarized as follows:

**1.** Endangered species generally serve as indicators of larger environmental problems and, when detected, allow analysis and correction of more involved problems during the pursuit of a preservation program.

**2.** The "Era of Endangered Species" has initiated a process of maturation within fish and wildlife agencies as they begin to consider **all species** in their program planning, not simply those with an obvious economic value.

**3.** By preventing the unnatural extinction of life forms, we automatically preserve any benefits to humans which they may possess, but which research may not yet have revealed.

**4.** Perhaps the most important reason for preserving endangered species is the realization that all life is connected and interdependent.

## No Place To Go

**B**ecause of its variety of habitats, the Mojave Desert is home to a tremendous diversity of plants and animals. Some of these habitats are being destroyed or altered by humans. *Groundwater* pumping, construction of roads, agricultural pollutants, construction of large residential tracts, grazing of domestic stock, and many other factors affect the desert *ecosystem* and the plants and animals living there. As these habitats are destroyed, the danger of extinction increases. Today the Mojave Desert is home to many threatened and endangered species.

This unit is designed to enable students to become aware of endangered species, the causes and threats leading to their extinction, and the reasons why their preservation is important to each of us. Students will realize that they, as individuals, are empowered to foster change. They will be able to take actions contributing to the removal of threats to the well-being of species.

## Activity 1 Living On The Edge

**OBJECTIVES:** List two reasons some plants and animals in the Mojave Desert are endangered. Describe two ways you can help protect *endangered species*.

**MATERIALS:** Discovery Activity Page #1.

**SUBJECTS:** Language arts, science.

**SKILLS:** Analysis, comparison, discussion, inference, observation, synthesis, prediction, reading.

**METHOD:**

**1.** Hand out the activity page.

**2.** Explain to students that some plants and animals have limitations as to where and how they can live. The more limitations they have, the more likely they are to become endangered. Provide clear examples, such as polar bears or fish.

**3.** Have the children look at the paired pictures on the activity page and circle the one in each pair which is most at risk.

**4.** After the children have made their choices, review their selections. Ask them why they made the choices they did.

**5.** After you have gone over all the answers, ask the children which of the plants and animals they would want

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to be? Why would they want to be that plant or animal? Which plant or animal would they not want to be? Why? Which plants and animals are most likely to become endangered? Why? What actions can students take to help organisms most at risk?

**EXTENDING THE EXPERIENCE:** Create an entire desert *ecosystem* in an area of the school, from floor to ceiling, with wildlife peeping out from all corners. Include life hiding below the soil and life soaring in the sky. Illustrate positive actions humans can take to protect and preserve desert ecosystems.

## Activity 2 And Then There Were None

**OBJECTIVES:** Define, compare, and contrast the terms *endangered* and *extinct*. Analyze the impact of human social, economic, and political activities on other living things. Name two endangered plant or animal species living in the Mojave Desert.

**MATERIALS:** Six small tokens (or slips of paper) for each student, tape, index cards.

**SUBJECTS:** Language arts, science, social studies.

**SKILLS:** Analysis, comparison, inference, observation, prediction, public speaking, reporting, research.

**METHOD:** The students will do an activity which demonstrates how natural populations are effected by human interference.

**1.** Referring to the Fun Facts list in this unit, write the names of the plants or animals on index cards. Make one for each student.

## GLOSSARY

**biological community** — all of the living things, both plants and animals, living in a particular environment, working together to fulfill their individual needs.

**ecosystem** — the interaction of the *biological community* (all living things) and the physical environment (water, air, minerals).

**endangered species** — a species of plant or animal in danger of extinction throughout a significant portion of its range.

**exotic** — not *native*, something that did not exist in the area before humans brought it from another place.

**extinct species** — a species which has vanished from existence.

**groundwater** — water that is stored beneath the surface of the ground, coming from precipitation and surface

water that has percolated down. Water that supplies wells and springs.

**habitat** — the place where a plant or animal lives, an organism's home. Provides food, water, shelter, and space in a *suitable arrangement*.

**native species** — a plant or animal that evolved or was transported to an area through natural means.

**species** — a genetically and adaptively unique plant or animal able to reproduce itself and to evolve.

**suitable arrangement** — when those things necessary for survival (food, water, shelter, space) are accessible, adequate in quantity, and in keeping with the biological lifestyle of a species.

**threatened species** — a species present in its range but in danger because of a decline in numbers.

**2.** Have students stand in a large circle. Tape a card with the name of an animal or plant to each student's shirt.

**3.** Distribute six tokens to each student. Tell them the tokens represent all the individuals of their species found in a specific area. Tell them each token may represent more than one individual.

**4.** Read these instructions: I am going to read some survival factors for your organism (taken from the survival factors list on page 4). Each time I read a statement that limits or reduces your chances of survival, put one token on the floor in front of you. Whenever I say, "Human Population Growth," everyone puts down a token. When you have only two left, sit down on the floor and say, "I'm in big trouble."

**5.** Continue to play until everyone is

sitting. Discuss the results of the activity by asking questions such as these: How many of you have tokens left? How many have none? Why? Is this realistic? Why or why not? What are the important ideas about animal populations in this activity?

**6.** Write the words extinct and endangered on the chalkboard. Tell students their populations became endangered when they became small in number. Endangered refers to any population of plants or animals in danger of extinction. There are still some left. Extinction is final. The plant or animal is gone forever.

**7.** What factors influence the survival of populations of plants and animals in the Mojave Desert? Can students think of some factors this activity did not consider?

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## SURVIVAL FACTORS

- People have released *exotic* fish into your *habitat* and they are over populating.
- A long-term drought has affected the water level in your habitat.
- Because you are rare and beautiful, you have been gathered or stolen by collectors.
- Human population growth
- The exotic tamarisk tree has invaded your habitat, using up the water you depend on.
- A poacher has shot you illegally.
- The thickets of willows and other shrubs you live in are being trampled by domestic livestock and feral burros.
- Spreading urban cities are reducing the habitat you live in.
- Dams have been built upstream from you causing water temperatures to decline and the water to be too clear.
- Illegal off-road vehicle use has caused damage to your burrow.
- A major road is built across your habitat dramatically increasing traffic.
- Wetlands that you need to survive are drying up due to *groundwater* pumping.
- Human population growth
- Illegal use of off-road vehicles is destroying vegetation you use for food and shelter.
- Introduced exotic species of fish are competing with you for your food supply.
- A strip mine is operating on the slope you live on.
- Agricultural fertilizers have washed into the marsh you live in.
- Pesticides have polluted the spring you live in.
- The pesticide DDT sprayed in Central and South America is carried to you through the migratory birds you prey on, causing your eggshells to be too weak to survive.
- You are a predator thought to be a threat to domestic livestock.
- Willow and cottonwood trees you need for nesting have been destroyed because of diversion and overuse of water upstream.
- Someone enters the cave you are hibernating in causing you to wake in the middle of winter when it is too cold for you to survive.
- Past hunting practices have significantly reduced your population.
- The edge of the small spring you live in is being trampled by humans and livestock, causing salt and mud to cloud the water, depleting your oxygen supply.
- Human population growth

**EXTENDING THE EXPERIENCE:** Have each student select an endangered or threatened species to research. Have them present short reports, giving each species' current status and highlighting any programs under way to protect the plant or animal. Find out what regulations regarding endangered species affect development in your community. Research situations where the presence of an endangered species has halted or threatened to halt a development. What have been the local reactions?

## Activity 3

### What Endangered Or Threatened Species Am I?

**OBJECTIVES:** Compare and contrast the terms *endangered* and *threatened*. Name two endangered plants or animals found in the Mojave Desert.

**MATERIALS:** Masking tape, index cards.

**SUBJECT:** Language arts, science.

**SKILLS:** Application, discussion, listening, problem solving.

**METHOD:**

**1.** Referring to the Fun Facts list in this unit, write the names of plants and animals on index cards. Repeat species so there are three or four of each.

**2.** Select three or four students to come to the front and turn so their backs are facing the rest of the group. Tape the cards for one species on the students' backs.

**3.** Have these students ask questions about their species that can be answered "Yes" or "No" by the rest of the group.

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For example, “Do I fly?”

4. After the students have successfully guessed their identity, take some time to add interesting information about the species, including its status as threatened or endangered and some threats to its survival. If the students cannot guess their identity, have the rest of the group help by describing some of the species’ characteristics.

5. Repeat for the other species.

## EXTENDING THE EXPERIENCE:

Why all the fuss about endangered species? How can we prevent organisms from becoming endangered or extinct? Do we have any responsibilities when organisms become endangered? What is one action you can take to prevent an organism from becoming endangered?

## Activity 4 Who Lives Here?

**OBJECTIVES:** Name two things that happen to a community of plants and animals when *habitat* is destroyed. List some of the human activities which change the desert. Discuss what happens to the plants and animals that live in a habitat when it has been disturbed.

**MATERIALS:** Chairs, crayons, drawing paper, record or tape player, recording of the song “Home on the Range.”

**SUBJECTS:** Art, language arts, music, science, math.

**SKILLS:** Analysis, comparison, discussion, drawing, inference, listening.

**METHOD:** One of the greatest threats to plants and animals today is habitat depletion. What happens to these plants and animals when their habitats are disturbed? In this activity children will play a game of musical chairs with the

chairs representing habitats.

1. Have students draw a picture of a Mojave Desert plant or animal and label it. Have them also draw a picture of its habitat.

2. Tape a picture of a plant or animal on each student. Tape a picture of a habitat on each chair.

3. Place chairs in a row, alternately facing left and right. Students stand in a circle around the chairs. There should be one less chair than there are students. When the music starts, indicate the direction students are to start walking. When the music stops, they are to find a seat. Remove a chair after each round. Explain that this habitat has been removed because of a human impact, such as bulldozing for a housing site or collecting *native species* of plants. Play until just one species is left, the survivor.

4. Play several rounds of the game, varying each set by introducing additional factors, such as imaginary roads or fences species can’t cross or natural disasters which eliminate additional habitat.

5. Summarize this activity with a discussion. How many different desert plants or animals did we begin with? How many different habitats? What happened to the habitats? What are some reasons for human activities which are changing the desert (need for more homes, increased roads, increased demand for recreation, desire to make the desert like another habitat by introducing *exotic species*)? What happens to the plants and animals when an area is disturbed?

## EXTENDING THE EXPERIENCE:

Have students research descriptions, accounts, and photographs of their local area as it was seen by early pioneers and explorers. Compare and contrast the area today with the past. Are there

more or fewer native species of plants and animals? What are native plants and animals which have become threatened, endangered, or extinct? What exotic plants and animals now live in this area? Locate natural springs and other natural water sources. Are these water sources still accessible to wildlife? What actions can students take to protect desert plants and animals near their homes?



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## Fun Facts — SOME THREATENED AND ENDANGERED SPECIES OF THE MOJAVE DESERT

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS
<b>Plants</b>		
Bear-paw poppy	<i>Arctomecon californica</i>	C
Foxtail cactus	<i>Escobaria vivipara</i> var. <i>alversonii</i>	C
Eureka Valley Evening Primrose	<i>Oenothera arita eurekaensis</i>	E
Panamint daisy	<i>Enceliopsis covillei</i>	C
Sticky buckwheat	<i>Eriogonum viscidulum</i>	C
<b>Mammals</b>		
Amargosa southern pocket gopher	<i>Thomomys umbrinus amargosae</i>	C
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	S
Mountain lion	<i>Felis concolor</i>	C
Townsend's big-eared bat	<i>Plecotus townsendii</i>	C
<b>Birds</b>		
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
California brown pelican	<i>Pelecanus occidentalis californicus</i>	E
Least Bell's vireo	<i>Vireo bellii pusillus</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E
<b>Reptiles</b>		
Coachella Valley fringe-toed lizard	<i>Uma inornata</i>	T
Desert tortoise	<i>Gopherus agassizii</i>	T
<b>Amphibians</b>		
Lowland leopard frog	<i>Rana yavapaiensis</i>	C
<b>Fish</b>		
Bonytail chub	<i>Gila elegans</i>	E
Colorado squawfish	<i>Ptychocheilus lucius</i>	E
Devil's Hole pupfish	<i>Cyprinodon diabolis</i>	E
Mohave tui chub	<i>Gila bicolor mohavensis</i>	E
Humpback chub	<i>Gila cypha</i>	E
Razorback sucker	<i>Xyrauchen texanus</i>	E
<b>Insects and Snails</b>		
Badwater snail	<i>Assimineea infima</i>	C
Devil's Hole warm springs riffle beetle	<i>Stenelmis calida calida</i>	C

KEY TO FEDERAL STATUS:

E — Endangered

T — Threatened

C — Candidate

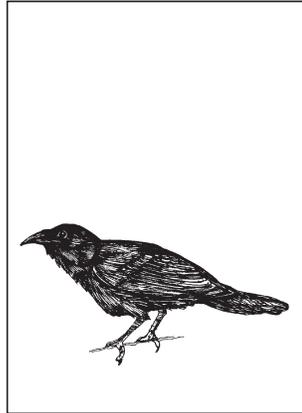
S — Sensitive

# Discovery Activity Page #1

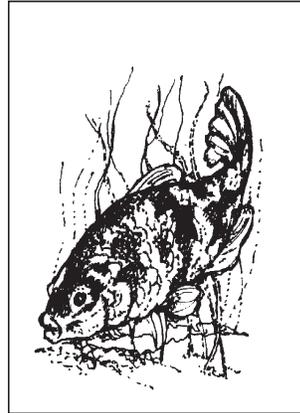
## DESERT DYNAMICS



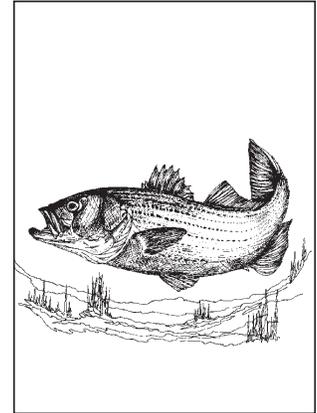
The peregrine falcon eats other birds that migrate from countries where dangerous pesticides are still used.



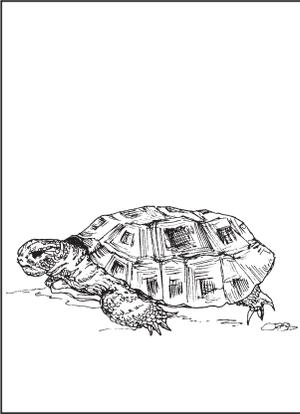
The raven eats a variety of food and lives in many different environments.



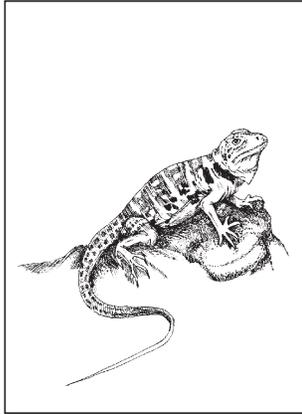
The desert pupfish lives in small pools of water that can dry up if too many wells pump out the water.



The striped bass lives in both fresh water and salt water.



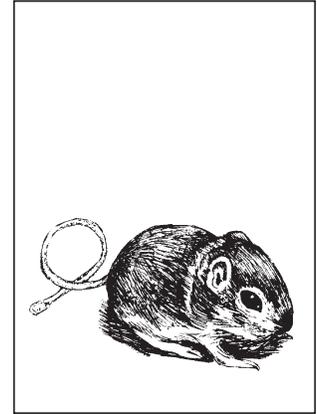
The desert tortoise lives mostly in the Mojave Desert and moves too slowly to get out of the path of off-road vehicles.



The collared lizard lives throughout the Southwest and can move very quickly.



The desert bighorn sheep must live near springs in order to get the water it needs to survive.



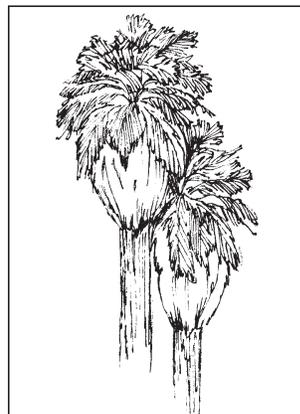
The kangaroo rat doesn't drink water; it makes all the water it needs in its digestive system.



The Townsend's long-eared bat lives in very isolated caves.



The coyote lives in many locations throughout the country.



The fan palm tree lives near seeps and springs and relies on this water to survive.



The mesquite is a common plant and gets the little water it needs from occasional rain.