

ENDANGERED AND THREATENED

Understand how species in the Sonoran Desert Region may become endangered or threatened and what is being done to protect them.

ARIZONA SCIENCE STANDARDS

SC03-S4C3-03&04,
SC08-S1C3-07,
SC05-S3C2-02

OBJECTIVES

Students should:

- Define the terms endangered and threatened.
- Explain some of the principal factors that cause species to become endangered or threatened.
- Describe how endangered and threatened species are protected by the Endangered Species Act.

BACKGROUND

Your students may already be familiar with the terms endangered and threatened but might not realize that they apply to animals and plants found close to home. This activity provides background information and questions to introduce and discuss the plight of endangered and threatened species in the Sonoran Desert Region (see teacher background information page 5.)

GETTING READY

Assemble the materials listed in the left margin of this page.

DOING THE ACTIVITY: READ UP ON IT

SETTING THE STAGE

- 1) Ask your students if they can think of any endangered or threatened animals. List their ideas on the board. Ask if someone can define what it means to be endangered or threatened. Elaborate on their answers and explain that endangered species are plants and animals whose numbers have dropped so low that they are in danger of becoming extinct if nothing is done to help them immediately. Threatened species are any plants or animals whose numbers are very low or decreasing rapidly. They are likely to become endangered in the future if nothing is done to protect them.
- 2) Choose one of the animals listed on the board (preferably something from Africa or Asia) and ask the students if they know for what reasons that particular animal is endangered or threatened.
- 3) See if they have listed any animals from the Sonoran Desert Region. Point one out and discuss it as above. If not, ask the students if they think we have any endangered or threatened species in our

area. Explain that, although we often hear of endangered species like Bengal tigers or panda bears from far away places, right here, some plants and animals are endangered or threatened with extinction. Tell them they will do some activities to explore why plants and animals face the threat of extinction here in the Sonoran Desert Region.

READ UP ON IT: ENDANGERED AND THREATENED

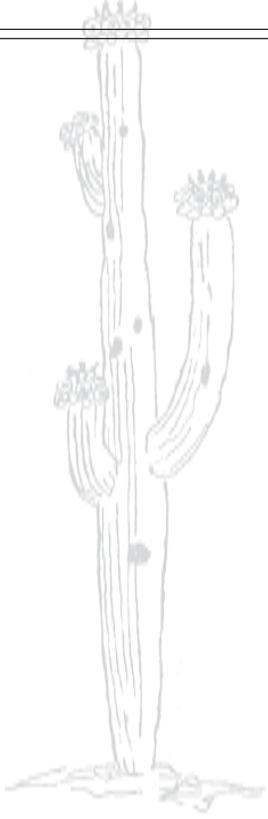
Pass out a copy of *Student Handout - Endangered and Threatened Species of the Sonoran Desert Region* to each student. Have the students read the handout, discussing new vocabulary or questions they may have. Give them a few moments to answer the questions at the end of the reading, then discuss them as a group.

DISCUSSION

Answers to questions:

- 1) What are two reasons species are becoming endangered or threatened in the Sonoran Desert Region? (Answers include: habitat loss, draining of riparian areas, diversion of rivers, invasive species introduction, logging, overgrazing, pollution, off-road vehicle use in sensitive habitat, illegal hunting, collecting, and misuse of pesticides.)
- 2) What is habitat? Why is it important to protect habitat? (Habitat is where living things get what they need to survive. If they don't have habitat, they cannot survive.)
- 3) What happened to Colorado pikefish numbers after dams were built? (They laid less eggs and therefore there were

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MATERIALS

· a copy of *Student Handout - Endangered and Threatened Species of the Sonoran Desert Region* for each student

VOCABULARY

Biodiversity
Conservation
Endangered species
Endangered Species Act
Habitat
Invasive
Native
Threatened species

fewer young.) Why is this a problem? (The population might drop that the species may become extinct.)

- 4) How do non-native species affect native species? (They compete with native species for water, food, and breeding space, and sometimes eat native species.)
- 5) What is biodiversity? (Biodiversity is the variety and number of species found on Earth.) What happens to biodiversity when buffelgrass takes over? (It gets reduced, we lose biodiversity.)
- 6) What is the best way to protect species? (Protect the habitat that species depend on.)
- 7) What is the Endangered Species Act? (A federal law passed in 1972 designed to identify, list, and protect plants and animals in trouble.)

Ask the students who decides if a species should be listed as endangered or threatened (state and federal agencies that manage plants and animals). Ask how these agencies get their information. (Scientific research on a particular species lets them know how populations have dropped and if there are threats to a species.) Explain that all kinds of scientists and policy-makers are involved. It takes the information from researchers like wildlife biologists to help make the decision to protect a species. Ask the students about what is done once a species is listed as Endangered and Threatened. How, for example, are wildlife managers trying to protect the Colorado pikeminnow? (Fish are raised in a captive breeding program then released into their historical habitats when they are big enough to avoid competition and being eaten by largemouth bass.)

After students have discussed the answers to the questions, take the discussion one step further. Ask if they think it is necessary to have an Endangered Species Act. They should generate a variety of responses. Perhaps they will think it is important for people to intervene when a species is about to become extinct, and that a law protecting that species is the best way to go about it. Others may think that the loss of a species is not important, that the planet has lost species before, and it is no big deal. Try to get a feel for the opinions of the group. Accept any reasonable answer. If there is a diversity of opinions, ask those who believe it is important to protect endangered species why should we care about endangered or threatened species. Remind them that losing biodiversity means losing species that play an important role in their habitats and that may play an important role for people, too. If one species is lost, it affects all the other species around it.

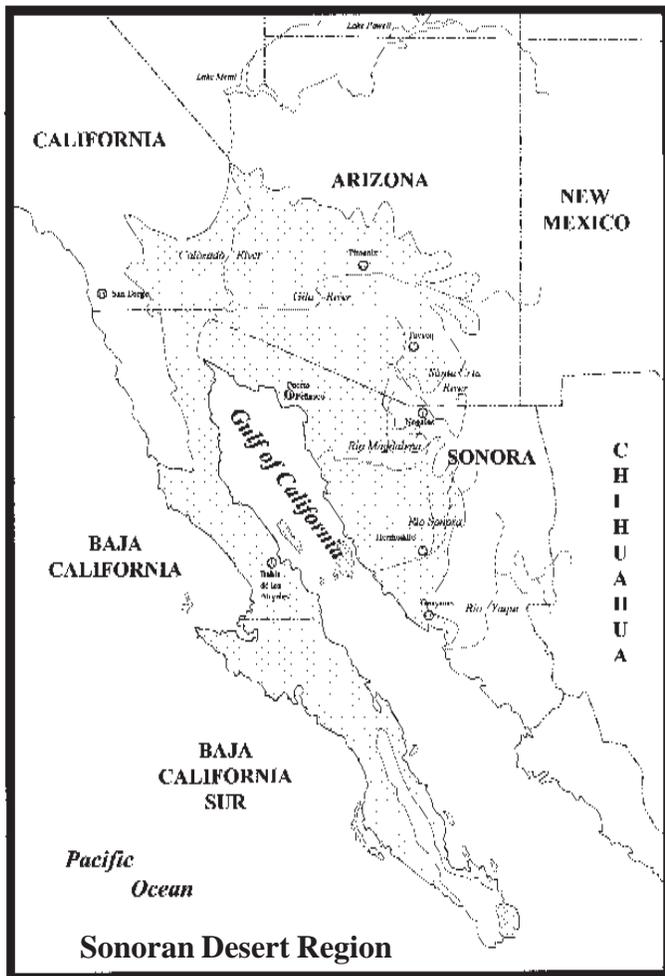
EXTENSION

Have the students research a particular animal or plant of the Sonoran Desert Region which is listed as Endangered or Threatened. They should use scientific reports from magazines, the internet, television, or other media. (See the resources section, p.2, for links to Arizona Endangered and Threatened Species.) Have them write a report that includes information about the animal's or plant's range, habitat requirements, when and why it was listed as Endangered or Threatened, and what kind of recovery plans, if any, are underway to protect it. If no recovery plan is listed, have them propose their own.

Endangered and Threatened Species of the Sonoran Desert Region

Endangered or Threatened

When you hear about **Endangered** or **Threatened Species**, what do you think of? Giant pandas in China, Bengal tigers in India, or other large mammals from other places? Unfortunately, many plants and animals right here in the Sonoran Desert Region are endangered or threatened with extinction.



What does it mean to be endangered or threatened? **Endangered species** are animals or plants whose numbers have become so low that they may become **extinct** if something is not done to help them immediately. **Threatened species** are any plants or animals whose numbers are very

low or decreasing rapidly. They are likely to become endangered in the future if nothing is done to protect them.

Why Are Animals and Plants in Our Area in Trouble?

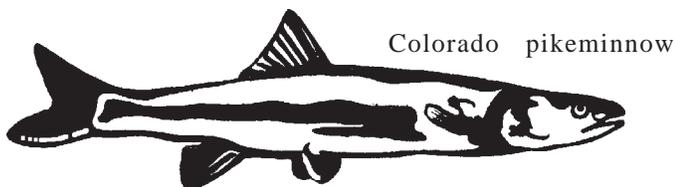
The main threat to Sonoran Desert Region plants and animals is loss of **habitat**. A habitat is the area where a species lives and finds the food, water, and shelter it needs to survive and reproduce. It is a plant's or animal's home. As the human **population** increases, cities, farms, ranches, factories, and shopping malls grow larger and expand into the wilderness including the Sonoran Desert. This leaves less habitat for animals and plants. Many of them cannot survive in other places. Their populations drop, and they become in danger of extinction.

In our dry region, water is a precious resource. Wherever you find it, you find many plants and animals, too. Areas along streams, rivers, and water holes are called **riparian** areas. Almost 75% of all species in Arizona depend on riparian habitats for survival! As more people have moved here, our increased need for water has affected riparian areas. Many rivers and water holes have been pumped dry, destroying habitat for animals like **native** fish, frogs, and otters. Rivers have also been re-routed or dammed to provide more water to cities and farms. This affects the creatures that live in or along waterways.

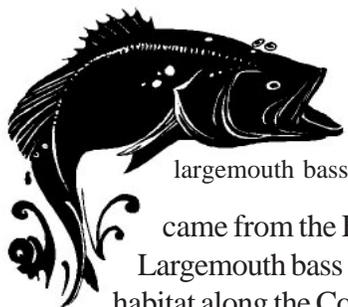
Riparian areas are important habitat for many species in the Sonoran Desert Region

Case Study: The Colorado Pikeminnow

Take, for example, the Colorado pikeminnow. This fish is North America's largest minnow! A hundred years ago, the Colorado pikeminnow could be found all along the Colorado River and in large rivers that join it. It was not uncommon for people to catch a six-foot long pikeminnow that weighed almost 100 pounds! There were so many that farmers caught them in their irrigation ditches with pitchforks and used them to fertilize their fields. Today the Colorado pikeminnow is almost extinct in Arizona, and it is rare to find a big adult fish anymore. What happened?



The main reason is that people changed the fishes' habitat. Dams were built along the Colorado River to generate electricity, provide water for use in farms and cities, and to control spring floods. The dams changed the flow and temperature of the water. Before the dams, pikeminnows produced their eggs in late spring and early summer. As spring floods ended, the river water level would drop, and the sun would warm up the water. This warmer, shallower water told the pikeminnows that it was time to lay their eggs. But once dams were built, people controlled water flow into the river below the dams. The water stayed higher and cooler in the spring and summer. The pikeminnows stopped producing their eggs like before. Their numbers dropped because fewer young were born.

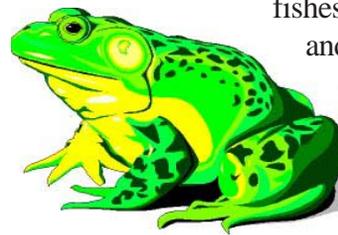


Also, people added different fish to the river to have new fish to catch. One kind, largemouth bass, came from the Eastern U.S. Largemouth bass did well in the "new" habitat along the Colorado River. They

began to compete with pikeminnows for food and living space. They even ate Colorado pikeminnow eggs and young, causing their populations to drop even more.

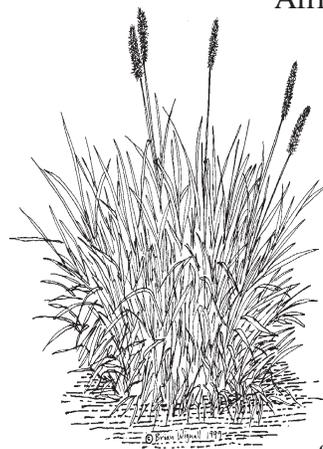
Problems with Introduced Non-native Species

As the large-mouth bass and pikeminnow story shows, when people bring non-native species into an area, it affects native species of plants and animals. Non-native species compete with native species for water, food, and breeding space, and even eat native species. Some, called **invasive** species, are so aggressive that they take over and displace native species from their habitat. Bullfrogs are an invasive species, brought to the area by people for food. (Yum, frog legs!) They have spread throughout riparian areas of the Sonoran Desert Region and are taking over or eating native frogs,



fishes, and garter snakes and causing them to disappear in some places.

But animals aren't the only invasive species. Did you know plants can be invaders, too? One called buffelgrass is a huge problem in the Sonoran Desert. Buffelgrass is native to



buffelgrass

Africa. It was brought to southern Arizona and Sonora, Mexico and planted in the desert to feed cattle. It spread quickly. As buffelgrass spreads, it takes over the habitat for native plant species. Its thick cover removes open habitat needed by lizards, quail, and other animals. It also fuels hot fires that cactuses and other native plants cannot survive. After a fire, buffelgrass moves in and takes over the area, and native plants cannot grow back.

Arizona's wild plants and animals face other threats as well. Logging, overgrazing, and pollution affect the quality of their habitat. Driving vehicles off roads or trails, illegal hunting or collecting, and misuse of **pesticides** (chemicals used to kill insects) can directly affect them.



Driving off of marked roads or trails affects wildlife habitat.

Why Should We Care About Loss of Species?

Every living thing depends on other species for survival. If the Colorado pikeminnow becomes extinct, then every animal that relies on it for food will also suffer and may become threatened or endangered. If we lose species, we lose **biodiversity**. Biodiversity is how the world is in its natural state, with a great variety of plant and animal species, all relying on each other in different ways. We all depend on plants and wildlife - for food, for medicine, for ideas for new technologies. If we lose species, we lose all of these benefits, and we will never know how they might have improved our lives or those of other living things. Not to mention that different plants and animals make our world more interesting!

What Can We Do to Protect Endangered and Threatened Species?

A big step toward the protection of animals and plants in the U.S. was the passing of the **Endangered Species Act** in 1972. It is designed to identify, list, and protect plants and animals in trouble. Scientists study populations of different species to learn if their numbers are low or dropping and why. This information can be used by national and state wildlife management agencies to protect endangered and threatened species.

Protection includes plans for recovering the species. Recovery may mean restoring the animal or plants' habitat, removing invasive species, or breeding members of the species in captivity to release back into the wild. In the case of the Colorado pikeminnow, fish are raised in a captive breeding program then released into their historical habitats when they are big enough to avoid competition and being eaten by large-mouth bass. They have been released into the Verde and Salt Rivers in central Arizona, where efforts are underway to restore their old habitat.

It is sometimes too difficult to bring a species back. The best way to be sure that all species are protected into the future is to protect enough of their habitat in the present. In Pima County around Tucson, people are working on the Sonoran Desert **Conservation** Plan. The plan will help find and preserve habitat that is important to many species in the area, including endangered and threatened species, so that it will not be lost as the city grows.

Questions

- 1) What are two reasons species are becoming endangered or threatened in the Sonoran Desert Region?

- 2) What is habitat? _____
Why is it important to protect habitat? _____
- 3) What happened to Colorado pikefish numbers after dams were built? _____
Why is this a problem? _____
- 4) How do non-native species affect native species? _____
- 5) What is biodiversity? _____
What happens to biodiversity when buffelgrass takes over? _____
- 6) What is the best way to protect species? _____
- 7) What is the Endangered Species Act? _____