Family Fun

Endangered Animal Timelines

Enduring Understanding: Populations of endangered animals change over time due to both human and natural factors.

Materials

- Graph paper
- Pencils and pens
- Endangered animal scenarios

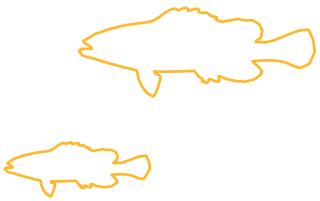
Setup:

1. Print multiple copies of each endangered animal scenario from which students can choose.

Program outline:

What are some things that can disrupt a food web or an animal population?

- Natural disasters, pollution, invasive species, carrying capacity, loss of habitat, resource competition, and extinction of a species are examples.



Ecosystems comprise both living and nonliving components. Ask students to think about aspects of an ecosystem that fit into each category.

- How do living and nonliving components affect each other?
- How is the food web affected by both living and nonliving components?
- How are specific species affected by both living and nonliving components?

Analysis of populations of endangered species over time

- Students choose from three different animal scenarios, all of which are native endangered animals from the San Francisco Bay Area.
- Students create a bar graph and a line graph from the information to show the population changes of their chosen animal over a ten-year span.

Program outline continued:

completely historically accurate, but they represent real threats to each animal species.
- Students should label key events where drastic population changes occurred.

- Students gather into groups according to the animal they chose and share their timelines with each other to see if they got similar results.
  - Or have timeline groups pick a representative to share their animal's timeline with the class (optional).

Endangered species action plans

- While still in their animal groups, have students work together to generate action plans to remove their chosen animal from the endangered list.
  - What are the main threats to this animal?
  - What are some actions humans can take to help this animal survive?
- Have each group share their action plan with the class
  - Do elements of the different plans overlap?
  - Could some actions help multiple species at the same time?
  - Are these action plans realistic and doable?

Further questions to explore

- What other endangered animals live in the San Francisco Bay Area?
- Is going extinct a natural part of life for different species?
  - What would make the extinction of a species "natural" or "unnatural"?

Background information:

Endangered Animals

A species is considered endangered when there are so few of its kind left that they run the risk of extinction. Both plants and animals can be endangered. There are many factors that can lead to an animal becoming endangered, including both natural and human impacts. For example, loss of habitat is a major threat that can quickly decimate the population of a species. This affects most plant and animal species worldwide, whether they're endangered or not. Not only does habitat destruction reduce the amount of shelter for animals, it increases competition for food and resources and can isolate populations of species, making it harder for them to find mates and reproduce. Though most habitat loss is caused by human activities, such as land development and logging, it can also be caused by natural disasters, such as large forest fires.

Another factor that can lead to endangerment is the introduction of nonnative (invasive) species that outcompete the native species for resources. The spotted owl and the Pacific pond turtle are both good examples of this. Because invasive species are not native to the area, they aren't likely to have any natural predators, which normally help to keep population numbers in check. In addition, the native animals they prey on have not evolved strategies to protect themselves from the invasive species and are therefore less able to defend themselves and survive.

As the number of individuals in a species decreases, so does that species' genetic diversity, making it increasingly difficult to produce healthy and successful offspring. Genetic diversity allows populations to have more variability among them and increases their chance of successfully adapting to a changing environment. When there are very few members of a species left, there is very little genetic diversity, which threatens their continued survival.

Sadly, endangered species can be found all over the world. There are nearly 100 threatened or endangered species in the San Francisco Bay Area. The Wildlife of the San Francisco Bay website (http://www.sfbaywildlife.info/species/endangered.htm) gives a comprehensive overview of the many local endangered species.

Northern Spotted Owls

Northern spotted owls are native to the Bay Area and much of the Pacific Northwest. They are considered an "indicator" species because an ecosystem that can support a spotted owl is also able to support a diversity of other plants and animals. They eat many small rodents, rabbits, snakes, insects, bats, and even other small birds. They live in large trees, often in old-growth forests. They do not build their own nests but take over nests left behind by other animals. These owls have been threatened by a variety of factors in recent years. Some of these threats include loss of habitat due to logging, feeding on rats that have been poisoned by rodenticides, predation of eggs by the common raven, human activities disturbing nesting sites, and competition for resources from the barred owl, an invasive species that is bigger and more aggressive. Although the barred owl population is currently fairly small in the Bay Area, it is expected to increase.

Mountain Beavers

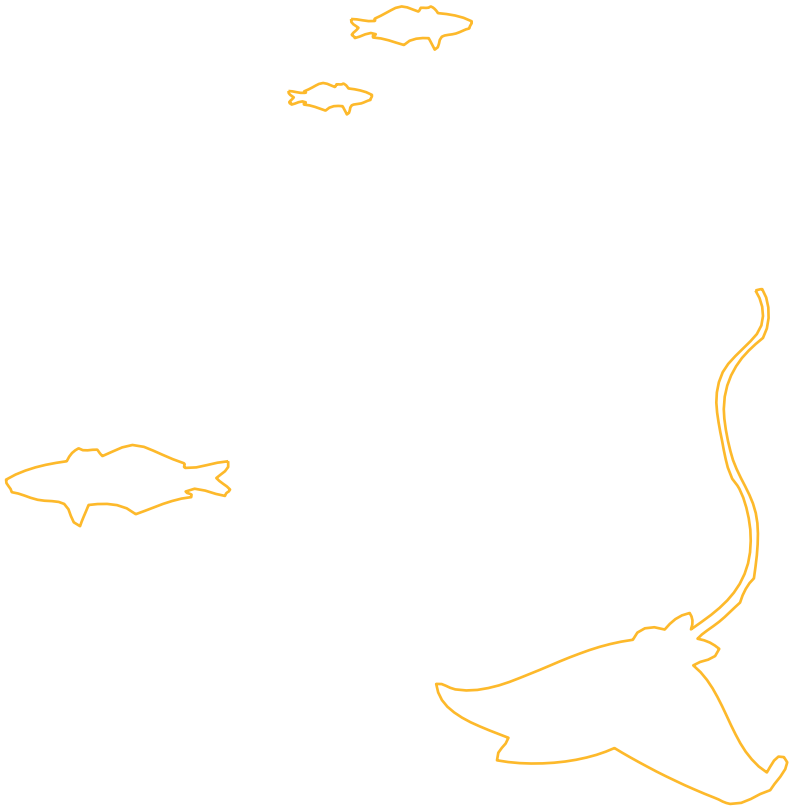
San Francisco has a subspecies of beaver called the Point Reyes mountain beaver, which is endemic to western Marin County. Mountain beavers feed mostly at night, eating a wide variety of plants. They must consume about one-third of their body weight in water each day, which restricts them to living

Background information continued:

near water. A fire in 1995 greatly destroyed their habitat and drastically reduced the number of beavers in the area. It is expected to take 20 years or more for their numbers to fully recover.

Western Pond Turtles

Western pond turtles (also known as Pacific pond turtles) are California's only native freshwater turtle. Many efforts are currently underway to combat declining populations in the Bay Area. Breeding programs take turtle eggs from the wild and raise the babies until they are too big to be eaten by invasive bullfrogs, at which point they are released back into the wild. They are also threatened by several invasive freshwater turtle species, many of which were released to the wild by irresponsible pet owners. Western pond turtles are usually found in ponds, rivers, marshes, lakes, or streams. They tend to prefer areas with lots of logs or boulders on which they bask in groups.



glossary:

Endangered Species: Species of plant or animal that is at serious risk of extinction

Endemic: Species of animal that is endemic to an area is found only in that particular area and nowhere else in the world.

Extinct: An animal is considered extinct if it has not been seen in the wild in 50 years or more.

Invasive Species: Organism whose introduction to a new ecosystem by human activities causes ecological harm in an environment where it is not native

Native Species: Species that naturally occurs in an area, having arrived there or become established there without human assistance or involvement

Name: _____

Endangered Animal Scenario Timelines

1.) Northern Spotted Owls

These native owls have been threatened by a variety of factors. Although the current population is considered stable, they are still considered endangered. Northern spotted owls are counted by number of pairs known in habitat conservation areas.

1990: 650 pairs known - population stable
1991: 600 pairs known - some population loss due to human disturbance of nesting sites
1992: 480 pairs known - great loss of habitat due to timber harvest
1993: 410 pairs known - still losing habitat to timber harvest
1994: 435 pairs known - some habitat restored due to logging regulations
1995: 430 pairs known - population fairly stable
1996: 310 pairs known - many owls become sick or die from eating rats that have been poisoned with rodenticide
1997: 240 pairs known - population still declining due to poisoned rats
1998: 160 pairs known - population continuing to decline
1999: 150 pairs known - public discouraged against using rodenticides for rats
2000: 115 pairs known - common raven population expands (common ravens eat northern spotted owl eggs)

2.) Mountain Beavers

The Point Reyes mountain beaver is a subspecies of beaver endemic to western Marin County, which means it is found nowhere else in the world. This information shows the number of individual beavers estimated in this habitat.

1990: 5,800 beavers - population stable
1991: 6,050 beavers - plenty of resources available; good year for reproduction
1992: 5,250 beavers - human removal of blackberry and poison oak reduces available food
1993: 5,200 beavers - population stable
1994: 5,150 beavers - population stable
1995: 20 beavers - a large fire destroys 40 percent of the mountain beaver's known habitat
1997: 35 beavers - recovery of vegetation in some areas after the fire
1998: 60 beavers - more vegetation recovery
1999: 80 beavers - numbers continue to slowly recover
2000: 95 beavers - numbers continue to slowly recover

Name: _____

Endangered Animal Scenario Timelines

3.) Western Pond Turtles

Western pond turtles are the only native freshwater aquatic turtle in California. Their main threats are loss of habitat and competition from nonnative animals. This set of data looks at how many individual turtles are in one particular pond each year.

1990: 120 turtles - population stable
1991: 105 turtles - invasive red-eared slider turtles bring diseases and start competing for food and shelter
1992: 85 turtles - red-eared slider populations continue to increase
1993: 95 turtles - efforts are made to remove red-eared sliders from this area
1994: 100 turtles - population stable
1995: 75 turtles - invasive bullfrogs enter the area and eat western pond turtle eggs
1996: 60 turtles - bullfrog populations continue to increase
1997: 35 turtles - bullfrog populations continue to increase
1998: 40 turtles - efforts are made to remove bullfrogs from this area
1999: 50 turtles - population stable
2000: 30 turtles - population decreases due to building development and loss of habitat