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SECTION 4
Wildlife Management

Subjects:
biology, sociology, reading skills, geography

Approximate lesson time:
4 hours

Materials:
copies of wildlife management plans, pictures of animals, paper, pencils

Management Plan Analysis

Students compare existing wildlife management plans.

STUDENT OBJECTIVES:

At the end of this lesson, students will be able to:

1. Define wildlife management.
2. Identify at least two components of a management plan.
3. Outline some reasons a management plan might succeed or fail.

VOCABULARY:

limiting factor • endangered species • carrying capacity • management

TEACHER BACKGROUND:

Many wildlife species are "managed" by humans. Various measures, from hunting and trapping to feeding and breeding programs, control the numbers and range of all sorts of wildlife species. Even a habitat improvement project can be considered a wildlife management strategy, since wildlife populations will benefit from better habitat.

In the United States, each state typically has jurisdiction over the plants and animals in its state. States usually have an agency such as a Department of Natural Resources or a Department of Fish and Game that is charged with the task of overseeing the wildlife populations in their state. Often, these agencies prepare a plan for what they want to see happen to certain key species. Elk, bear and pheasants often have well-established management plans, while woodchucks, red squirrels, mice and porcupines are often not closely managed. Occasionally, the federal government will supersede state authority and develop comprehensive management plans for endangered or threatened species.

At its most basic level, managers must establish a basic framework of goals to develop a management plan.

Management Plan Framework:

1. Identify the basic habitat needs of the animal in question (food, water, shelter, space).
2. Determine the density or sometimes the number of animals that will be considered an optimal population level.
3. Identify any limiting factors that are keeping the species from maintaining the desired population level, and how human activity could bring about increases (or in some cases, decreases) in the species population.

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National Science Education Standards

Unifying Concepts and Processes

Systems, order, and organization

Life Science (9–12)

Interdependence of organisms

Behavior of organisms

Science in Personal and Social Perspectives (5–8)

Populations, resources, and environments

Risks and benefits

Science in Personal and Social Perspectives (9–12)

Population Growth

Natural Resources

Environmental Quality

4. Create a plan that is designed to bring the target species to the desired population level. Keep in mind that actions that benefit one species may have the opposite effect on another.

Often, state natural resource agencies will solicit input from the public when preparing a management plan. Individual citizens may favor a certain species and want to see more done to protect it; others may dislike that species and want the agency to reduce its numbers.

ACTIVITIES:

1. Divide students into "management teams" of four students. Assign each team a wildlife management plan (on pages 5-8).
2. Review as a class the components of a wildlife management framework (above).
3. Tell students to review their assigned plan and identify how managers addressed the framework in their plans.
4. Instruct each team to select a new animal native to their area. Students should research their chosen animal, determine its habitat needs, and create a management plan that will increase (or decrease) this animal's population in its home territory, using the steps outlined in the framework. The worksheet on page 134 may be helpful to organize information the students gather.
5. Each group should present its plan to the class.

Discussion:

Ask students: If you were going to build a house, would you ask the people walking past the property to design the structure, or would you ask an architect to design it? If we are going to design a wildlife management plan, who should be asked to design it?

ASSESSMENT:

1. Each group will hand in a three-page wildlife management plan describing their management recommendations.
2. Students will be given an essay quiz.
   a. What steps do wildlife managers follow to create a management plan?
   b. How did your group manage your animal's population?
   c. What biological, economic, political or cultural barriers may prevent your plan from working?

EXTENSIONS:

1. Contact a local wildlife specialist (e.g., ecologist or Department of Natural Resources staff) and ask what endangered species (plant or animal) live in the region. Instruct students to develop management plans for some of these species, using topographic maps of the region, and proposing how managers could recover the endangered animal or plant.
2. Invite a wildlife manager to your classroom to talk about his or her experiences managing wildlife populations.

WILDLIFE MANAGEMENT CASE STUDY

Pacific Salmon

The five species of Pacific salmon—chinook, coho, sockeye, chum and pink—have been an invaluable resource to people living on the Pacific Coast for thousands of years. Today, the livelihoods of both commercial and recreational fisherman, tribal groups and coastal communities are still very much dependent on healthy populations of these fish.

Dams and Hydropower

Pacific salmon are anadromous fish, which means they spend most of their adult lives in the ocean but migrate up rivers to spawn (or breed) in fresh water. In the past 40 years, thousands of hydropower dams have been built on important salmon rivers, making it difficult for them to reach prime breeding locations. The proliferation of dams in the West has also altered the natural environment of many key salmon rivers by reducing the velocity of the water and changing water temperatures. Slowing down the rate at which the water flows increases the chances for predators to prey on juvenile salmon, and increasing the water temperatures causes salmon to behave abnormally. Scientists believe that partially removing the dams on the Lower Snake River in southeastern Washington has an 80 to 99 percent chance of restoring healthy salmon runs by reversing the habitat damage caused by the dams.

Recent management efforts have addressed the negative impacts of dams on Pacific salmon species. Government agencies have joined forces with concerned citizens and interest groups to improve salmon habitat by removing unproductive hydropower dams. The removal of dams has reestablished many miles of free-flowing rivers and improved overall habitat.

Sustainable Harvesting

The five species of Pacific salmon are highly coveted by commercial and recreational fisherman. The sockeye, chinook and coho salmon are extremely popular for food, which causes them to be harvested in larger quantities. The low number of Pacific salmon today is very much a result of intense harvesting in the past.

Recent management strategies have changed the way these fish are harvested in hopes of reducing the impact of harvesting on the overall population. Some management plans have regulations that cut the number of commercial salmon fishing permits by half, which allows more salmon to remain in the water to spawn and increase populations.

Habitat

The most critical issue addressed in salmon management plans is the protection and restoration of habitat. Pacific salmon are sensitive to water quality and have very specific habitat requirements. These fish require cool, free-flowing rivers with gravel or cobbled riverbeds for successful reproduction. Certain land-use practices like clear-cutting, mining, and removal of riverbank vegetation cause soil to be washed away by rains and carried into the rivers, which jeopardizes the habitat of many important salmon rivers.

Large-scale irrigation efforts in the West have also contributed to the loss of Pacific salmon habitat. As more water is diverted from the rivers, the water level drops, and water temperature consequently increases. The Klamath River in Washington is a prime example of salmon habitat affected by irrigation. The Klamath, which was once the third most productive salmon river system in the United States, now has less than 10 percent of its historic population because upstream irrigation has caused water levels to drop and water temperatures to increase.

For more information:

http://www.pcffa.org/klamath.htm

http://www.wildsalmon.org/about/indexhtm

http://www.whywild.org/threats.html

https://www.nwd.usace.army.mil/ps/factors.htm

WILDLIFE MANAGEMENT CASE STUDY

Elk

As a grazing animal, elk play an important role in the ecosystem and have important cultural value as well. In many western states, elk hunting is a special tradition that brings a substantial amount of income into the economy.

National Elk Refuge

In the early 1900s, elk in the west-central part of Wyoming had trouble finding enough food in the winter because of human settlements and cattle. Many elk died during the especially severe winters between 1909 and 1911. In 1910, rather than hurt the local residents and interests groups that relied on the elk by restricting elk hunting, local citizens and government officials began to provide extra food for the elk during wintertime. In 1912, after assessing the importance of the Jackson elk herd to the state of Wyoming, the federal government established the National Elk Refuge (NER), which protected the elk and their food supply. Today, the NER includes almost 25,000 acres of wintering habitat for the Jackson elk herd.

To help maintain the elk during the winter, the grasslands at the NER are managed to produce as much natural forage as possible. However, when large snowfalls make it harder for the elk to find food, or the natural forage is no longer available, supplemental feeding is provided in the form of alfalfa pellets.

As a result of the winter feeding program, the Jackson elk herd is one of the largest in the world. This has enabled Jackson Hole to support a large hunting, outfitting and wildlife viewing industry, which has contributed to the local economy and culture of the surrounding area.

Even so, with such a large number of elk grazing inside the National Elk Refuge, there has been much concern about the impact they are having on the land. Not surprisingly, concentrating a large number of elk on the same area for close to 100 years has decreased the amount of woody vegetation available, like aspen and willow.

Therefore, to decrease the possibility of overgrazing, the NER tries to limit the number of elk that winter on the land. The NER and Wyoming Game and Fish Department have determined the optimum number of elk for the range to be 7,500. They work to maintain this number by allowing people to hunt elk during the fall on the NER and surrounding public lands.

For more information:

http://nationalelkrefuge.fws.gov/index.htm

WILDLIFE MANAGEMENT CASE STUDY

Black-Footed Ferrets and Prairie Dogs

One of only three species of ferrets in the world, the black-footed ferret has been on the brink of extinction since the 1940s. Biologists discovered that the main reason for the species' decline involves factors influencing their primary food source: prairie dogs.

History

As early settlers populated the west, prairie dog populations began to decline due to losses in habitat. People converted grasslands into farms, ranches, towns and grazing areas for livestock, which left prairie dogs with very few places to live. At one point, prairie dogs reportedly occupied more than 100 million acres of grassland and prairie; however, by 1960 that area was reduced to only an estimated 1.5 million acres.

In addition to losses in habitat, many landowners established pest control programs because they viewed prairie dogs as pests. In the late 1980s, $6.2 million was spent on poisoning prairie dog colonies in just one area of South Dakota. Another factor influencing the species was outbreaks of disease in many prairie dog colonies. Deadly diseases, like the sylvatic plague, resulted in the eradication of entire prairie dog populations. All of these factors, losses in habitat, pest control programs and outbreaks of disease, helped contribute to the dramatic decline of the prairie dog. Moreover, since prairie dogs make up 91 percent of the black-footed ferret's diet, the decline in prairie dogs caused the ferrets to decline as well. By the 1960s, the black-footed ferret was on the verge of extinction.

Conservation and Status

To help the black-footed ferret, biologists and government officials listed them as endangered in 1967 under a law that preceded the Endangered Species Act of 1973. However, even under this protection black-footed ferrets were thought to be extinct in the wild by 1978.

In 1981 a small population of black-footed ferrets was accidentally discovered by a rancher's dog in Meeteetse, Wyoming. This gave biologists a second chance to try to save the species. They began to study this elusive species, gaining important new information about their life history and behavior.

Nevertheless, sylvatic plague and canine distemper, which are lethal to ferrets, broke out in the population and almost destroyed it entirely. In another effort to save the black-footed ferret, biologists captured the 18 remaining individuals and began a captive breeding program. Today, there are six main captive facilities in the United States and Canada that breed black-footed ferrets. The national recovery goal for the United States is to have 1,500 breeding adult ferrets in at least 10 populations by the year 2010. As of June 2003, black-footed ferrets had been reintroduced into parts of Wyoming, Montana, South Dakota, Arizona, Colorado, Utah and even northern Mexico.

To improve the survival of black-footed ferrets, prairie dog habitat must be conserved and protected. Setting aside land for prairie dogs would provide them with a place to breed and increase in numbers, which is beneficial to black-footed ferrets because it means more prey would be available. If this is not done, the future of both prairie dogs and black-footed ferrets will remain in jeopardy.

For more information:

www.blackfootedferret.org

www.wildlife.utah.gov/publications/pdf/newferrt.pdf

http://biology.usgs.gov/s+t/noframe/c040.htm

http://mountain-prairie.fws.gov/species/mammals/blackfootedferret/

WILDLIFE MANAGEMENT CASE STUDY

Whooping Crane

The survival of the whooping crane is considered one of the most successful cases of animal conservation in North America. After 60 years of conservation work, the whooping crane is finally making a comeback.

Twice each year, at speeds of up to 35 to 40 miles per hour, members of the only remaining wild flock of whooping cranes fly an estimated 2,500 miles between their wintering habitat in southern Texas and breeding habitat in northern Canada. During this migration, the cranes stop at particular sites along the way to get much needed rest and find food, such as insects, frogs and crayfish.

History

Before 1870, the total population of whooping cranes was estimated at around 500 to 1,400 birds. As Europeans settlers continued to move throughout North America, much of the whooping crane's habitat of wetlands and marshes was drained and converted for use by agriculture. Not only did this conversion affect the areas where whooping cranes bred or stayed for the winter, it also affected the availability of certain stopping points along their migration route. In addition, collisions with power lines, uncontrolled hunting and human disturbance of nest sites caused the species to suffer. As time progressed, whooping crane populations experienced a steady downward decline, which resulted in just 15 known individuals in 1941.

Restoration Efforts

To help save the whooping crane from extinction, the U.S. and Canadian governments took a variety of conservation actions. In 1922, Canada established Wood Buffalo National Park, and in 1937, the United States established Aransas National Wildlife Refuge. These actions protected both the breeding and wintering habitats for the last remaining flock of whooping cranes. Then, in 1967, the whooping crane was designated an endangered species under a law that preceded the Endangered Species Act of 1973.

According to the whooping crane recovery plan, which was created by crane specialists from both Canada and the United States, two additional flocks of 25 breeding pairs each would be needed to improve the health of the species. Therefore, in 1990 and 2001, two additional flocks were added by incubating wild eggs. A nonmigratory flock was added to central Florida, and a migratory flock that breeds in Wisconsin and winters in Florida was established by training chicks to follow an ultralight airplane. It only took one flight for them to remember how to get back to Wisconsin!

As of September 2004, an estimated 318 whooping cranes existed in the wild. So far, the only flock that has not reached the goal of 25 breeding pairs (or 50 adults) is the Wisconsin-Florida migratory flock with an estimated total of 35 adults.

Even though the whooping crane has made a substantial comeback, their habitat is still at risk of being reduced or destroyed. In many areas in the United States, growth in the human population has increased the demand for water, which has resulted in more water being diverted or taken from freshwater sources. If not monitored carefully, the change in water flow could affect a variety of different factors in wetlands, including the amount of food available for whooping cranes.

For more information:

www.npwrc.usgs.gov/resource/distr/birds/cranes/grusamer.htm#dist

http://training.fws.gov/library/Pubs/crane.pdf

www.whoopingcrane.com

www.bringbackthecranes.org

Name _____

Management Plan Analysis:

Writing a Management Plan

Species: _____

Current population:_____ Target population:_____

Related species (prey species, predators):

Description of preferred habitat:

Food needs:

Water needs:

Special considerations (low reproduction rate, susceptibility to human disturbance etc.):

Limiting factors (threats such as diseases, weather, change of food or habitat, human activity, predation etc.):

What actions will you take to increase (or decrease) the population?