



Jacquelyn Fallon

Back From the Brink

Students graph and compare human and animal populations over time, then profile sample endangered species.

SECTION 3 Social Systems

Subjects:

*sociology,
mathematics,
biology, economics,
government*



Approximate lesson time:

2 hours



Materials:

*graph paper,
pen/pencil,
copies of
endangered
species profiles*

STUDENT OBJECTIVES:

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

1. Summarize the Endangered Species Act.
2. Classify the reasons why an animal might become “endangered.”
3. Graph population trends over time.

VOCABULARY:

population • Endangered Species Act • endangered species list • extinct • recover • extirpate • endangered • threatened

TEACHER BACKGROUND:

As early as the 1930s, wildlife biologists were noticing steep declines in wildlife abundance and began passing laws to protect game animals. However, these laws were usually not applied to “vermin” (problem) animals like wolves, crows and coyotes, or to nongame animals like insects and songbirds.

In 1973, the U.S. Congress passed the Endangered Species Act to protect the plants and animals of our country. A species is listed as “endangered” if the U.S. Fish and

Wildlife Service (USFWS) decides that it is in danger of becoming extinct. It is listed as “threatened” if the USFWS decides that an animal is in danger of becoming “endangered.”

Animals listed as endangered or threatened are not allowed to be imported, exported, hunted, collected, harassed, transported for commerce or used in any way without permission from the USFWS. The act requires the USFWS to develop a recovery plan for the listed species. The recovery plan must describe what the USFWS will do to increase the listed species’ population until it is out of danger of extinction.

Scientists estimate that at least one species of plant or animal disappears every 30 minutes—that’s 17,520 species that go extinct every year.

Animals are generally more prone to becoming endangered or going extinct if they:

1. Interfere in some way with people’s activities. Some animals kill livestock, prize game animals (like elk or fish), or damage agricultural crops. Many animals have been killed for this reason (wolves,

mountain lions, ospreys, eagles).

2. Have particular nesting or food requirements. If an animal species needs a specific kind of habitat in which to nest and raise young, or if an animal eats only one or a few kinds of food, when those habitats or food sources disappear, so does the animal species. Worldwide, 60 percent of animal extinctions are due to habitat loss. As the human population increases, space for wildlife habitat decreases.

3. Have small litters or long gestation periods. Animals that have few young in a litter, such as bison, are more likely to become endangered than those animals that have many young in a litter, like rabbits.

4. The animal has high commercial value. Some animals, like beavers in the 1700s and 1800s, were so valuable for their pelts that they were hunted almost to extinction. A similar trend can be seen in whale hunting today. Even if an animal is protected by national and international laws, if the price is right, some people are willing to ignore the laws.

5. Are highly sensitive to chemical pollutants. Certain species of frogs and fish are sensitive to toxic chemicals. From the 1940s to the 1960s, bald eagle populations dropped significantly because they had eaten fish that had high levels of DDT. This toxin caused the birds to lay fragile eggs, and the eggs were crushed during incubation.

See Appendix II for more information about the Endangered Species Act.

ACTIVITIES:

PART ONE: Dangerous Trends

1. Statistics often help researchers understand particular aspects of a problem. Instruct students to graph trends for worldwide human population growth, U.S. human population growth, urban land growth, U.S./Canada mammal and bird extinctions, world mammal and bird extinctions, amount of trash generated per person, per day, and U.S. gray wolf populations (see tables on page 81)
2. Discuss:
 - Which graphs are similar to each other?
 - Which seem to run opposite to each other?
3. In small groups, instruct students to theorize how the statistics in these graphs may be related to each other.
 - How would larger cities affect species?
 - What trend do you see in animal populations over the past 50 years?
 - What could humans do to reverse this trend?
 - What have humans done to prevent animals from going extinct?
4. Discuss what the Endangered Species Act is and what it does to protect animals. Or distribute Appendix II as a reading page to familiarize them with the act.



Daniel Cox, naturexposures.com

National Science Education Standards

Unifying Concepts and Processes

Evidence, models, and explanation

Change, constancy, and measurement

Life Science (5–8)

Populations and ecosystems

Science in Personal and Social Perspectives (5–8)

Risks and benefits

Science in Personal and Social Perspectives (9–12)

Population Growth

Natural Resources

Environmental Quality

PART TWO: Profile of an Endangered Species

1. As a class, brainstorm a list of endangered species. Look over the “Endangered Profile” and come up with three reasons why species become endangered.
2. Divide students into small groups, and make sure each group can explain why each animal on the brainstormed list is in danger of going extinct.
3. As a class, discuss each group’s ideas.
 - Are there exceptions to these reasons? (e.g., coyotes and black flies are “pest” species, and we can’t seem to get rid of them)
 - Why do we seem to have an overabundance of certain species (e.g., starlings, zebra mussels)?

ASSESSMENT:

A. Assessment Quiz

1. Give examples (written or oral) for three ways in which the graphs in Part One are related to each other.
2. Hypothesize other factors (not described in the graphs) that may affect animal and human populations.

B. Assessment Project “Animalopia National Wildlife Survey”

1. Give students the hypothetical “Animalopia National Wildlife Survey.” Tell students they have been hired as wildlife consultants to the nation of

Animalopia (a small country in Eastern Europe that has a climate and landscape similar to Montana). Their job is to figure out which animals are in danger of extinction and why.

2. Once they have decided which animals need protection, tell them that finances in Animalopia are tight, and the government can only work to recover one species at a time. Have students rank the animals in order of preference, from first species recovered to last species recovered. Students should explain the reasons for their rank order.

EXTENSION:

1. Have students research animal species that have gone extinct in the past 200 years. Using the criteria for why species may become endangered, have students determine why these creatures went extinct. Are there additional reasons for why an animal might go extinct that the classes didn’t list in the above activity?
2. Animalopia National Wildlife Survey: After students have decided which animals need government protection, make a class list of the animals that students agree would be in danger of going extinct, based on the criteria the class discussed earlier in the activity.

U.S. POPULATION

Year	Population (in millions)
1800	5
1820	9
1840	19
1860	28
1880	54
1900	80
1920	110
1940	136
1960	180
1980	230
1990	249
2000	281
2005	295

Source: www.npg.org

WORLD POPULATION

year	millions of people
1650	550
1700	610
1750	760
1800	950
1850	1210
1900	1630
1950	2520
2000	6200
2005	6462
2010	6840 (projected)

Source: www.npg.org

GLOBAL SPECIES EXTINCTION

Year	Recorded extinctions per year
1600	0
1650	5
1700	17
1750	10
1800	22
1850	25
1900	115
1950	140
2000	35–150 species every day

Source: <http://math.ucr.edu/home/baez/extinction/>

TRASH GENERATED

Year	Trash generated (in lbs./person/day)
1960	2.6
1970	3.5
1980	3.7
1990	4.5
1995	4.4
2000	4.6
2005	4.4

Source: National Solid Waste Management Association

U.S. GRAY WOLF POPULATION

(EXCLUDING ALASKA)

Year	Estimated number of wolves
1900	?
1960	600
1970	768
1980	1310
1990	1624
2000	3427
2005	4816

Source: International Wolf Center

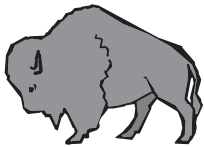
Endangered Species Profiles



Gray Wolf

Gray wolves are predators who kill and eat elk, deer, moose and other prey. They average four to six pups in a litter every year. Pups are ready to breed in two or three years, but usually only the alpha, or “breeding,” pair in a pack has pups. Other pack members help raise the young. Gray wolves have been hunted, trapped and poisoned for the past 300 years in North America because they were seen as a threat to livestock and big-game animals.

American Bison



The American bison, or buffalo, once roamed the Great Plains in herds numbering in the millions. Market hunting and wholesale slaughter decimated the bison herds and led to government protection. Recently, bison near Yellowstone National Park have been shot due to concerns that they may spread a bovine disease to nearby livestock. Bison only have one calf per year.

Osprey



An osprey is a hawklike raptor that hunts fish in rivers and lakes. It swoops down out of the sky and grabs a fish in its talons. It then lands on a tree branch, nest or beach and eats its dinner. The osprey, like many raptors, was seen as a competitor for resources with humans. Many ospreys and other raptors were shot as “chicken hawks,” which might eat a farmer’s poultry. Raptors are now protected by federal laws against hunting and poisoning. But since the 1940s, agricultural chemicals such as DDT have caused declines in osprey populations. Some of these chemicals are stored in an osprey’s fat cells when they eat

contaminated fish, and cause ospreys to lay thin or sterile eggs. Destruction of rain-forest winter-nesting areas is also harming osprey populations.

Woodland Caribou

Woodland caribou are native to the boreal forests of North America. When loggers came to Maine, Minnesota and other areas, they hunted the caribou for food and clear-cut large areas of the northern forest. After logging, forest fires from slash piles (branches) left behind by loggers burned up the caribou moss (thick, gray, ground-dwelling lichen) on which the caribou depended for food. Caribou are now extirpated from most areas of the lower 48 states.



Black-footed Ferret

The black-footed ferret lives in the Great Plains and feeds almost exclusively on prairie dogs. As ranchers raised livestock on the Great Plains starting in the late 1800s, the holes that prairie dogs dug came to be seen as a threat to cows, who might step in a hole and break their leg. Subsequent prairie dog eradication projects sharply reduced the food source for the ferret.



Lynx

The lynx is a wild cat about the size of a bobcat that lives in the boreal forests of the northern United States and southern Canada. The lynx feeds almost exclusively on the snowshoe hare. Hare populations fluctuate in a 10-year cycle. In years when the hare population is low, some lynx starve; in years when the hare population is high, the lynx eat well.



Animalopia National Wildlife Survey

This is a survey of wildlife in the newly independent (fictitious) nation of Animalopia. You have been asked to assess the nation's wildlife resources and determine which animals are in need of government protection. Please list reasons for your answers. The Animalopia Legislature must see sufficient evidence to justify funding research and recovery planning for each species.



Go Fish Freshwater fish species, has 20 to 30 young per year, eats mosquito larvae and several other aquatic worms in swamps and ponds, often introduced to new areas by humans to help control mosquito populations.



Hunny Bear Species similar to the U.S. black bear, but is half the size, and the fur has a distinctive bluish cast. Historically hunted for valuable fur, it eats a wide range of fruits, nuts and insect larvae. Females have only one cub every two years.

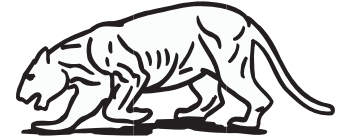


Mystery Beetle Beetle species found in only one valley on the outskirts of the capital city of Waldorn. This beetle may carry a disease that is fatal to fruit trees in the region. It eats leaves and flowers of many kinds of plants. But for some reason (possibly climatic conditions or a rare flower eaten by the beetle larvae), the beetle isn't found outside its home valley.

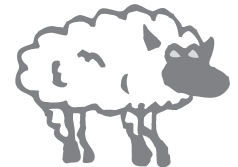
Who Caribou A species similar to caribou in North America, it eats lichen off of bare rock outcrops that were recently burned by forest fires. Females have one to two calves every year. Some wild caribou have been domesticated by northern residents and are raised like cattle in open pastures.



Cool Cat A species similar to our mountain lion. It kills caribou, sheep, deer and occasionally cows for food. Females have one to two cubs per year. Cool cats have been known to kill humans.



Bo Peep Sheep A wild sheep species. Females outnumber males in the population by four to one. Females produce two to three young every year, sometimes breeding twice in one year. They eat grass and a variety of other woody and herbaceous plants. Main predators include humans and cool cats.



You Can Toucan This bird nests in forest edges near farm fields and cities. It eats wild seeds and insects but can also collect food from garbage dumps. It lays eggs every other year.



Patriot Hawk National bird. Eats mice and small rabbits. Requires tall old-growth pine trees for nesting. Migrates to North Africa during the winter. Birds are eight years old before they reach sexual maturity.



Itsy Bitsy Spider Eats small flies and other small insects. Common in forests at least five miles from agricultural lands. Very susceptible to agricultural pesticides. It has a significant impact on fly populations in its regions.



APPENDIX II

What is the Endangered Species Act?

And what is the federal process of reclassifying and delisting the gray wolf, *Canis lupus*?

Purpose of the Endangered Species Act

The Endangered Species Act (ESA), passed by Congress in 1973, is intended to conserve endangered and threatened species and their habitats and to improve the species' status so that they no longer need ESA protection. When their recovery has progressed to that point, the U.S. Fish and Wildlife Service (USFWS) takes steps to delist, or remove, the species from the federal list of Endangered and Threatened Wildlife and Plants. If a species has been listed as endangered, the USFWS sometimes reclassifies it to threatened status as an intermediate step toward removal of ESA protection. Once a species is removed from the federal list, management authority for the species generally returns to the states and tribes that have jurisdiction over the areas that the species inhabits.

The ESA should be thought of as an emergency room for species; it provides emergency temporary care to ensure the species' survival and to pull it back from the brink of extinction. Once species are listed as threatened or endangered, the resulting intensive care they receive under the ESA, such as hunting restrictions or habitat protection, ideally leads to "recovery" to the extent that the species can be moved back to the more routine care and management of the states and tribes. The species can be delisted at that point.

"Recovery" under the ESA does not mean that the species will be returned to population levels that the geographic area could or should support before the species can be delisted. Rather, "recovery" under the ESA means that the species no longer needs the ESA's emergency care to keep it from becoming extinct in the foreseeable future.

Listings and Delistings Are Federal Rule Makings

Rule making is the name of the formal process by which a species is listed as endangered or threatened, and eventually reclassified or delisted. The same process is used for establishing special regulations for a species or for designating critical habitat. The rule-making process is designed to promote public involvement in the decision so that it is based on the best available information and to provide a full explanation of the decision when it is announced. For ESA listings, reclassifications and delistings, the rule-making process has a minimum of four steps:

1. The USFWS publishes the proposed change and the reasons for it in the Federal Register. The proposal is also publicized in other ways to ensure that interested individuals and organizations are aware of it.
2. A public comment period of at least 60 days provides an opportunity for any interested party to provide data or opinions relevant to the proposed action. If requested, the USFWS will hold one or more public hearings. There is often a 120-day comment period for gray wolf proposals, and numerous hearings and informational meetings are usually held when a new rule is proposed.

3. After the public comment period has closed, the USFWS reviews all new data and comments and reconsiders the proposed action. Alternate actions or modifications of the proposal are also considered.
4. The final decision is published in the Federal Register, announcing the effective date of the action. In some cases, the final decision may be to withdraw the proposed action or to adopt a modified version of it. Decisions are usually published within one year of the publication of the proposal.

Recovery Plans

After the gray wolf was placed on the endangered species list in 1974, the USFWS developed recovery programs in three regions of the United States: Western, Southwestern (Mexican wolf), and Eastern (also known as the Eastern Timber Wolf Recovery Program). The USFWS also operates a separate recovery program for a related species, the red wolf (*Canis rufus*), which is being reintroduced to sites in the southeastern United States.

Each of the three regions has its own recovery plan, which was developed by a team of experts on the species in that part of the country. Those plans contain recovery (that is, delisting) and reclassification criteria that specify goals for the distribution and numbers of wolves in each of the recovery regions. These criteria guide the USFWS in deciding if the ESA protections can be reduced (by reclassifying to threatened) or removed (by delisting the species).

Flexibility Under the ESA

In situations when the USFWS cannot or chooses not to delist a species for various reasons, the ESA contains a variety of clauses that allow for more flexible management of the species when appropriate.

- 4(d) rule: Allows the USFWS to make regulations that apply to threatened species that will benefit the conservation of that species. The USFWS uses this clause to allow certain people to kill wolves under certain circumstances, for example, when a wolf kills livestock.
- 10(a)(1)(A) rule: Allows actions toward endangered species that would otherwise be prohibited by the ESA if those actions will enhance the propagation or survival of the affected species.
- 10(j) rule: Allows the USFWS to release wolves into new areas to further the conservation of the species. Those wolves and their offspring can be declared “experimental,” which allows them to be treated as “threatened” outside of national parks and refuges even though naturally occurring wolves in those areas would have been classified as “endangered.”

Criteria to Evaluate Recovery Success

The recovery and reclassification criteria spelled out in the recovery plans are not the only yardsticks that must be used to determine if federal status of the gray wolf should be changed. The ESA identifies five factors that must be considered in any listing, reclassification or delisting decision:

1. threats to, or actual destruction of, the habitat needed by the species;
 2. threats from the overuse of the species for commercial, recreational, scientific or educational purposes;
 3. threats from disease or predation;
 4. the amount of protection provided to the species or its habitat by other laws and regulations;
- and

5. any other natural or human-made factors that might affect the continued existence of the species.

Achievement, or nearing achievement, of the recovery plan's delisting or recovery criteria causes the USFWS to evaluate the species using these five factors. This evaluation includes an assessment of whether these factors are likely to increase and reendanger the species if it is delisted. A discussion of these five factors must be included in any ESA proposal that is published in the Federal Register.

One important ingredient that the USFWS considers when evaluating human-made factors that affect the continued existence of wolves is the management wolves will receive after the anticipated delisting. Because delisting essentially means returning management authority over wolves to state or tribal agencies where wolves live, the USFWS must assure that those entities have management plans in place that will provide adequate protection to wolves so they will not need the ESA's emergency care again in the foreseeable future. As part of the delisting process, the USFWS must approve the state and tribal wolf management plans.

Post-Delisting Monitoring

As additional insurance to protect species that might have been delisted prematurely, the ESA requires that delisted species be monitored for at least five years. If monitoring indicates that the delisting was premature, the USFWS can relist the species, even on an emergency basis, to protect the species under the ESA. Emergency listings can be completed in a matter of weeks and take effect as soon as the relisting notice appears in the Federal Register. They provide full, but short-term, protection by the ESA while the USFWS determines if relisting is needed.

Efforts to Delist the Gray Wolf

Acknowledging the increasing wolf population in certain areas of the lower 48 United States, the USFWS has taken steps to reduce or remove federal protections from wolves. Decreasing federal protection over wolves would result in increased state or tribal authority over wolves.

March 2003: USFWS reclassifies the gray wolf

In March 2003, the USFWS reclassified certain gray wolf populations from endangered to threatened and removed the ESA protections across 30 states where gray wolf recovery was not feasible or not necessary under the ESA. It established three "Distinct Population Segments" (DPS) for the gray wolf, which allowed for recovery to proceed independently in each of the three geographic areas: East, West, and Southwest.

In the Eastern DPS, including states from the Great Plains to the Atlantic coast, the USFWS downlisted wolves to threatened instead of the previous, more protective endangered status. Wolves in the state of Minnesota had been classified as threatened since 1978, so the March 2003 action did not change the classification of wolves there. The USFWS determined that the expanding population of wolves in Minnesota, Wisconsin, and Michigan had met or exceeded recovery goals and each state possessed an acceptable management plan. Because of the successful reintroduction of wolves into Yellowstone National Park and central Idaho and the successive wolf population growth in that area, the USFWS reclassified wolves from endangered to threatened in the Western DPS, an area consisting of states along the Pacific coast and into the Northern Rocky Mountains region. The reduction in status allowed special regulations for increased management

flexibility in removing wolves that caused problems with human activities. Certain portions of that region had previously been classified as “nonessential experimental,” and those areas retain this classification.

Wolves in the Southwestern DPS, which contains Arizona, New Mexico and portions of Utah, Colorado, Texas and Oklahoma, retained their endangered classification because the wolf population there had not yet reached recovery goals.

Several lawsuits were filed in response to this USFWS ruling.

July 2004: USFWS proposes to delist the gray wolf from the Dakotas to Maine

In July 2004, the USFWS proposed to remove wolves in the Eastern DPS from the federal list of endangered and threatened species. The proposal declared that the gray wolf in this region had met the population criteria set forth in the original recovery plan and is, therefore, no longer in need of recovery or federal protection. Gray wolves outside of the Eastern DPS were unaffected by this proposal.

In the proposal, the USFWS recognized that Minnesota’s gray wolf population is large enough to assure future survival and that populations in Wisconsin and Michigan have reached stable and viable levels. In addition, the proposal confirms that the USFWS carefully examined and approved the individual management plans for all the states and tribal authorities that possess wolf populations in that region.

Delisting the gray wolf in the Eastern DPS would officially finalize gray wolf recovery for the area, and it would help shift attention—time and money—toward other species that are in more dire need of protection.

2005: Courts rule on 2003 lawsuit, revoke reclassification

In district courts in Oregon and Vermont overturned the 2003 USFWS rule reclassifying wolves. The rulings nullified the creation of the three Distinct Population Segments and returned wolves to their pre-2003 classifications. As a result of these rulings, wolves in the Eastern and Western regions moved one step away from delisting, resuming the more protective “endangered” status. In the Western region, certain areas continue to be managed as “nonessential experimental” because that designation was established prior to, and separate from, the 2003 rule. Similarly, in the Eastern region, the wolves in Minnesota continue to be classified as threatened because that designation was established prior to the 2003 rule. Because the courts’ decisions overturned the basis on which the USFWS declared wolves in the Eastern region ready for removal from the list, the decision postpones the possibility that wolves there will be delisted.

Resources:

The USFWS provides information about the Endangered Species Act, including the document itself, on their Web site: <http://endangered.fws.gov/>. You may also contact them for more information at 1-800-344-9453.