
Module 1: A Unique Species

Introductory Activity

Adapted from NWF Animal Track's "Biodiversity: the Spice of Life"



At a glance:

Students will compare several species to determine which has the characteristics that might leave it susceptible to becoming endangered. This activity will work best as an introductory lesson before completing other activities in this Module, to establish context and background knowledge for students.

Objectives:

Students will be able to:

- Describe current conservation and wildlife protection measures and agencies
- List the characteristics that may lead species to become endangered
- Explore personal values and beliefs regarding biodiversity

Time: 50 minutes

Background Information

What Is Conservation?

- The management of a natural resource so that it can be sustained over the long term.
- The care and protection of resources to prevent loss or waste.

Conservation is different from preservation. Conservation assumes the active use of resources. Preservation refers to protecting a resource by removing it from use. It is not practical to assume that all natural areas can be removed from human use. Humans are part of ecosystems and how we use them must be wisely managed.

Conservation and Protection Measures

The world is an incredibly diverse place with millions of different species. There are species that have yet to be discovered or described. Unfortunately, because of humans, many of these species have either become extinct or are very close to it. The current rate of species extinction is higher than it has ever been before on the planet. We need to co-exist on the planet in order to meet the needs of the human species without compromising the needs of other species.

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There are multiple layers of protection and conservation for wildlife in this country (and others). The United States Fish and Wildlife Service (USFWS) is responsible for implementing the endangered species act (ESA) and the recovery of endangered and threatened species in the US. NOAA (National Oceanic and Atmospheric Administration) is responsible for specific critical marine species, such as endangered salmonids. At the state level, state fish and wildlife agencies are responsible for managing species. The USFWS and all States maintain separate endangered/threatened species lists. Oregon Department of Fish and Wildlife (ODFW) has the Oregon Conservation Strategy which is a blueprint for managing wildlife in Oregon. Species may be listed as endangered or threatened at the state level in addition to the federal level. However, all species listed under the ESA are protected.

At the international level, there is the International Union for Conservation of Nature (IUCN). Their mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

The IUCN maintains the IUCN Red List. This is a comprehensive information source on the status of wild species and their links to human livelihoods. The IUCN Red List assesses the extinction risk of species. Assessments of all mammals, birds, amphibians, sharks, reef-building corals, cycads and conifers have been completed. Efforts are underway to assess all reptiles, fishes and selected groups of plants and invertebrates.

Also at the International level is the Convention on International Trade in Endangered Species, or CITES. It is a wildlife conservation agreement that is a vital tool to combat the threat to plants and animals which are trafficked through the international wildlife trade. The wildlife trade monitoring network of World Wildlife Fund (WWF) and the World Conservation Union (IUCN) works with governments, industry and communities to ensure that wildlife trade is sustainable and that CITES is effective in regulating and protecting wild animals and plants sold in the international marketplace.

The two most important provisions of CITES are listings of species in either Appendix I or Appendix II. Appendix I contains species that are so endangered by trade, such as the tiger or Asian elephant, that they cannot be commercially traded internationally by member countries. A listing on Appendix II means that a species is threatened by trade, such as many parrots and corals, and cannot be internationally traded unless member countries ensure that the trade is sustainable through monitoring and regulations. CITES also monitors the sustainability of trade in species that may not be endangered, but that are important parts of the planet's resources for the future.

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Definitions of key terms (from USFWS):

Endangered species: An animal or plant species in danger of extinction throughout all or a significant portion of its range. Local examples include short-tailed Albatross, leatherback sea turtle and gray wolf.

Endangered Species Act of 1973: The Endangered Species Act of 1973, as amended, is Federal legislation that is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and animals. The law is administered by Interior Department's FWS and Commerce Department's NOAA Fisheries, depending on the species. Some relevant sections are:

Endemic species: A species native and confined to a certain region; generally used for species with comparatively restricted distribution. Examples include lemurs of Madagascar, rhinos of Java, and Santa Cruz kangaroo rat.

Extinct species: A species that no longer exists. For ESA, a species currently believed to be extinct. Examples include Stellar's sea cow, Baiji white dolphin, the Dodo bird and the great auk.

Extirpated species: A species that no longer survives in regions that were once part of its range, but that still exists elsewhere in the wild or in captivity. Examples include American red wolf, California condor, American bison and white rhinoceros.

Species of concern: An informal term referring to a species that might be in need of conservation action. This may range from the need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. A similar term is "species at risk," which is a general term for listed species as well as unlisted ones that are declining in population. Canada uses the term in its new "Species at Risk Act." "Imperiled species" is another general term for listed as well as unlisted species that are declining. Local examples include pygmy rabbit, Northern goshawk, Northern Pacific pond turtle and Goose Lake sucker.

Threatened species: An animal or plant species likely to become endangered within the foreseeable future, throughout all or a significant portion of its range. Local examples include western snowy plover, Oregon silverspot butterfly, and many Chinook and Coho salmon.

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Local Conservation Projects (to be shared if there's time)

Oregon Fish & Wildlife - Newport Field Office (information sourced from www.fws.gov)

The Newport Field Office opened in 1995 bringing Ecological Services staff to the coastal community. The office is co-located with the Oregon Coast National Wildlife Refuge Complex Office near the Mark O. Hatfield Marine Science Center in Newport, Oregon. They work in all of Oregon's coastal counties: Columbia, Clatsop, Tillamook, Lincoln, Lane, Douglas, Coos, and Curry Counties.

Working in the local community, the field office collaborates with federal, state, tribal, county, local agencies, watershed councils, as well as private entities to address natural resource issues. They provide technical and financial assistance for watershed assessment, restoration, management, and Endangered Species Act consultation.

Current activities by the ODFW Newport Field Office:

Species Recovery. Working to recover and conserve listed and sensitive species, including Western snowy plover, Oregon silverspot butterfly, and Western lily.

ESA Consultations. Conducting ESA (Endangered Species Act) consultations for projects that may affect listed species.

Coastal Program. Working to restore fish and wildlife habitat on federal, state, tribal, county and private lands. Restoration projects primarily occur in seven Focus Areas that span the length of the Oregon coast line. Enhancement of salmon habitat is a high priority.

Species Monitoring. The Western snowy plover (Oregon Biodiversity Information Center Annual Report) and the Oregon silverspot butterfly are monitored annually to evaluate species recovery.

Conservation Planning. Recently approved a draft Habitat Conservation Plan developed by Oregon Parks and Recreation Department to protect and restore habitat and boost the population of Western snowy plovers on State Parks land. Also finalized a Safe Harbor Agreement to help private property owners recover Oregon silverspot butterfly habitat on their land.

Volunteers. Fish and Wildlife Service volunteers provide invaluable support by conducting Black Oystercatcher surveys on the Oregon coast, and by assisting in captive rearing programs for Oregon silverspot butterflies at the Woodland Park Zoo and Oregon Zoo.

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What Characteristics Lead Animals to Become Endangered or Threatened?

Rhinoceroses, pandas, condors, and many other endangered species have more in common than just their endangered status. Many share characteristics that make them extremely susceptible to becoming extinct, such as those explained below.

Animals are more prone to extinction if they...

- *Interfere in some way with people's activities.* Some animals may kill livestock, eat or ruin crops or feed on animals that people also like to eat. Because they interfere with people's activities, these animals are often shot, poisoned, or otherwise harmed. Predators such as wolves, tigers, eagles, and crop-eating geese and other birds have suffered because of their interference with human activities.
- *Migrate.* Animals that migrate usually depend on several different habitat areas. As a result, they can be very vulnerable to habitat destruction, natural disaster, and diseases that spread in large groups. For example, many songbirds that migrate to tropical forests in winter are in trouble because thousands of acres of rain forest habitat have been burned or developed.
- *Have very specific food or nesting requirements.* Some animals are very picky about what they eat or where they live, or both. These specialized animals can become endangered if their food source or nesting site disappears. For example, Karner blue butterflies lay their eggs on only one type of plant, the wild lupine. Loss of lupine habitat has led to the butterfly's decline.
- *Are very sensitive to changes.* Many animals have a hard time adapting to changes in their environment. Birds of prey, for example, are very sensitive to chemical changes in their environment, such as the introduction of pesticides. Other animals can't compete with introduced species for food or nesting sites. Bluebirds have declined due to their inability to compete with starlings, which were introduced to North America from Europe in the early 1900s.
- *Have small broods and long gestation periods.* What are some animals that give birth to only one or two young every year or so? (elephants, bats, condors) When the populations of these animals drop, it takes a long time for them to recover because of their low birth rate.
- *Have low birth rates.* They don't reproduce fast enough to produce offspring that can adapt to changing conditions. This point is made clear if you compare the birth rate of an elephant with that of a cockroach. An elephant has about three young every 10 years and

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a cockroach produces 80 young every half year. At those rates, an elephant requires 60 years to produce 6 generations of young, while a cockroach can do so in only 3 years. Because of their high birth rate, cockroaches have more opportunities to adapt to changes in their environment.

- *Are naturally rare.* Some animals are rare throughout their range, and others have a very limited range. Such animals are vulnerable to habitat destruction and other problems. Many of the native plants and animals that live on the islands of Hawaii are naturally rare. As more people move to the islands, many of these already rare species face habitat loss, competition from introduced species, new diseases, and other problems. Examples of rare animals with low population numbers are apex predators (wolves, grizzly bears, big cats).

Biodiversity and Reasons for Protection

The incredible variety of life is what we call biological diversity or biodiversity, for short. Scientists look at biodiversity on three levels. The most familiar is the species level, which includes plants, animals, and microorganisms. A broader level is the ecosystem level, which includes the variety of communities and physical settings where organisms live and evolve, such as estuaries, deserts, wetlands, prairies, and rain forests. And finally there's the third level, genetic diversity, which refers to the variety of genes within a species. Genes are the basic units of heredity that give an organism specific characteristics and behaviors, such as a lion's hair color or a cactus's ability to grow in hot, dry deserts. How much diversity do we need? No one knows for sure. Even experts can't predict the point at which the loss of biodiversity will have serious consequences for us and the planet. But we do know that biodiversity has a lot of benefits.

Here are some of the reasons people feel we should be concerned about the decline of biodiversity...

Diversity for Generations: It is important to preserve the diversity of life because no generation has the right to destroy the environment and resources on which future generations depend.

Ecological Health: It is important to protect the diversity of life because it helps maintain ecological health through oxygen production, pollination, water quality, climate control, decomposition, and flood control, which in turn help support all life on Earth.

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Inspiration / Curiosity: It is important to protect diversity of life because it provides inspiration and provokes curiosity and imagination. Art, music and poetry are often inspired by the diversity of life. And many of our scientific discoveries such as flight can be attributed in part to the possibilities that nature provides.

Medical / Economic: It is important to conserve the diversity of life for medical and economic reasons. Plants and animals could provide us with additional foods, medicines, and other products that will save lives and benefit society.

Rich Lives / Recreation: Our lives would not be as rich if we lost species such as bats, whales, hawks, frogs, elephants, and tigers, and the habitats where they live. The rich diversity of life also enriches important recreational activities such as hiking and camping.

Right to Exist: It is important to protect biodiversity because all species have a right to exist.

Activities

Materials:

- Conservation Concept Map Assessment Handouts (pg. 8) – 1 per student
- Rare Scare handouts (pg. 9-10) – 1 per small group (determine based on class size)
- Reasons to protect biodiversity (pg. 11) – 1 copy

Preparation:

- Familiarize yourself with the Background Information provided here so that you may share it effectively with students.
- Cut out “reasons to protect biodiversity” labels and hang each in a different location around the classroom (or you may make large posters of these labels for better visibility)

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Part 1: 10 minutes

Ask students what they think of when they hear the word “conservation”. Refer to the Conservation Concept Map Assessment Handout and ask them to complete it individually (5 minutes). Collect the handout and discuss what they came up with. Define extinct, endangered, and threatened, and other key terms. Describe conservation and protection measures currently in place (including both U.S. and international) and some local efforts being done by ODFW, if time allows.

Part 2: 20 minutes

Rare Scare

From the Background Information, introduce characteristics that make a species vulnerable. Refer to Rare Scare handouts. Divide students into small groups and have each group read and discuss the information for the species provided. Ask them which they think is the most likely to become extinct based on the vulnerability characteristics (you can take a vote or just discuss). Discuss as a class which they chose and why. Based on their characteristics, the Golden Cheeked Warbler is the species with the most vulnerability and the Ridley is a very close second. If time allows, have students name an animal they know to be endangered or threatened and discuss why that species might be vulnerable.

Part 3: 20 minutes

Reasons to Protect Biodiversity

Introduce reasons for protecting biodiversity – go around the room and explain each category on the wall. Have students go stand below the value that most closely fits their own views on nature and conservation, giving plenty of time for them to browse and consider which they agree with the most. If they do not agree with any of these values, direct them to a separate location. Instruct students to discuss why they chose that particular value with the other students who chose it. Have each group report out to the whole class why that one was most important to them. Direct students to return to their desks, then ask them if anyone has changed their minds about what their most important value is based on what they heard from others. What made them change their mind? If they didn't change their mind, what could make them change? Do they think most people share at least one of these values about nature? If time allows, ask students to share ideas for how they might encourage others to share their values.

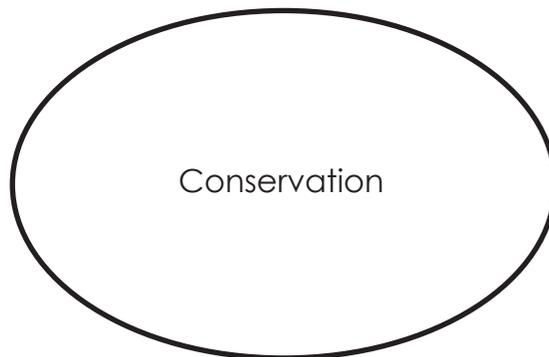
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WORKSHEET: CONSERVATION CONCEPT MAP

Please write down as many words, ideas, images, phrases or thoughts that come to mind when you hear the phrase "conservation." Draw lines between these concepts to **show** how they are related to one another. Use linking words between the concepts to **explain** how they are related to each other.



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RARE “SCARE” SPECIES

Humpback Whale

- occurs in open oceans worldwide
- winters in shallow tropical waters then migrates thousands of miles north to deeper polar feeding grounds in the summer
- commercial fishing boats
- feeds on various fish, plankton, and crustaceans that it filters from the water with its baleen
- reproduces slowly, bearing one calf every 2 to 3 years; gestation period lasts 11 to 12 months
- valued by whalers for their blubber, bones, and oils

Golden-Cheeked Warbler

- neotropical songbird that spends the winter in forests of Central America and then migrates to spend the summers in Texas (found exclusively in a limited area of central Texas)
- requires ashe juniper trees that are old enough to shed their bark because it only builds its nest out of juniper bark; also requires oak trees for foraging
- returns year after year to same nesting location
- feeds on insects and spiders
- lays 3 to 5 eggs per year; incubates eggs for 12 days
- vulnerable to cowbirds which lay their eggs in warbler nests and whose chicks out-compete warbler chicks

Lynx

- inhabits mature, intact forests across northern United States
- requires relatively large home range
- vulnerable to disturbance from humans
- population levels closely linked to population of its primary food source snowshoe hares
- valued by trappers for its beautiful fur

Grizzly Bear

- prefers undisturbed wilderness forests, interspersed with moist meadows and grasslands
- opportunistic and adaptable feeders, will eat vegetation, roots, insects, meat, and anything available
- known to predate livestock and pets; has an aversion to extended contact with humans, can demonstrate aggressive behavior toward humans

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- occupies enormous home range of 800 to 1,000 square miles (one of the largest home ranges for a land mammal)
- migrates to lower elevations in spring/fall; returns to higher elevations in midsummer, and stays in high elevation dens during the winter
- average interval between births is 3.5 years, with 1 to 2 cubs per litter; long gestation period of 7.5 to 8.5 months

Kemp's Ridley Sea Turtle

- ancient, air-breathing reptile; spends most of its long life in the ocean, primarily in and around the Gulf of Mexico
- eats blue crabs and other crab species
- often inhabits same area as shrimp fisherman; frequently trapped and drowned in shrimpers' nets; comes to shore every 2 to 8 years to lay an estimated 80 to 200 eggs
- builds nest only on a single beach in Mexico
- young turtles suffer high mortality rate during their risky journey from their beach nests to the surf and then during their early years among the various predators found in the open ocean

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“REASONS TO PROTECT BIODIVERSITY LABELS

It is important to preserve biodiversity because no generation has the right to destroy the environment and resources on which future generations depend.

It is important to protect biodiversity because it helps maintain ecological health through oxygen production, pollination, water quality, etc. which in turn helps support all life on Earth.

It is important to protect biodiversity because it provides inspiration and provokes curiosity and imagination. Art, music and poetry are often inspired by the natural world. And many of our scientific discoveries such as flight can be attributed in part to the examples that nature provides.

It is important to conserve biodiversity for medical and economic reasons. Plants and animals could provide us with additional foods, medicines, and other products that will save lives and benefit society.

It is important to protect biodiversity because it enriches important recreational activities such as hiking and camping and gives us a sense of wonder about the natural world.

It is important to protect biodiversity because all species have an equal right to exist.