

Chapter 10  
Biodiversity  
Section 3, The Future of Biodiversity

**DAY ONE**



## Saving Species One at a Time

- When a species is clearly on the verge of extinction, concerned people sometimes make extraordinary efforts to save the last few individuals.
- These people hope that a stable population may be restored someday.
- Methods to preserve individual species often involve **keeping and breeding** the species in captivity.



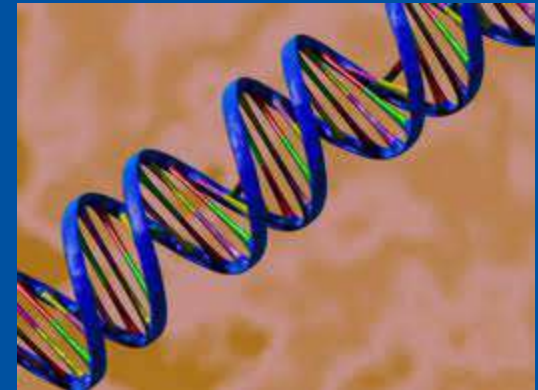
## Captive-Breeding Programs

- Wildlife experts may attempt to restore the population of a species through **captive-breeding programs**.
- These programs involve breeding species in **captivity**, with the hopes of reintroducing populations to their natural habitats.
- This type of program has been used successfully with the **Californian condor**, for example. But the question remains whether or not these restored populations will ever reproduce in the wild.



## Preserving Genetic Material

- One way to save the essence of a species is by preserving its genetic material.
- **Germ plasm** is hereditary material (chromosomes and genes) that is usually contained in the protoplasm of germ cells and may be stored as seeds, sperm, eggs, or pure DNA.
- Germ plasm banks store germ plasm in controlled environments for future use in research or species-recovery efforts.



## Zoos, Aquariums, Parks, and Gardens

- In some cases, zoos now house the few remaining members of a species and are perhaps the species' last hope for survival.
- Zoos, wildlife parks, aquariums, and botanical gardens, are living museums of the world's biodiversity.
- But, these kinds of facilities rarely have enough resources or knowledge to preserve more than a fraction of the world's rare and threatened species.



## More Study Needed

- Ultimately, saving a few individuals does little to preserve a species as captive species may not reproduce or survive again in the wild.
- Also, small populations are **vulnerable** to infectious diseases and genetic disorders caused by inbreeding.
- Conservationists hope that these strategies are a last resort to save species.



## Preserving Habitats and Ecosystems

- The most effective way to save species is to **protect** their habitats.
- Small plots of land for a single population is usually not enough because a species confined to a small area could be wiped out by a single natural disaster. While other species require a large range to find adequate food.
- Therefore, protecting the habitats of endangered and threatened species often means **preserving or managing** large areas.

## Conservation Strategies

- Most conservationists now give priority to protecting entire ecosystems rather than individual species.
- By doing this, we may be able to save most of the species in an ecosystem instead of only the ones that have been identified as endangered.
- The general public has now begun to understand that Earth's biosphere depends on all its connected ecosystems.





## Conservation Strategies

- While conservationists focus on the hotspots discussed earlier to protect biodiversity worldwide, they also support additional strategies.
- One strategy is to **identify** areas of native habitat that can be preserved, restored, and linked into large networks.
- Another promising strategy is to **promote** products that have been harvested with sustainable practices.



## More Study Needed

- Conservationists emphasize the urgent need for more serious study of the workings of species and ecosystems.
- Only in recent decades has there been research into basic questions as, How much fragmentation can a particular ecosystem tolerate?
- The answers to questions asked now may be years or decades away, but decisions affecting biodiversity continue to be made based on available information.

## Legal Protection for Species

- Many nations have laws and regulations designed to prevent the extinction of species, and those in the United States are among the strongest.
- For example, in 1973, the U.S. Congress pass the Endangered Species Act.
- The **Endangered Species Act** is designed to protect any plant or animal species in danger of extinction.



## U.S. Laws

- Under the first provision of the Endangered Species Act, the U.S. Fish and Wildlife Service (USFWS) must **compile** a list of all endangered and threatened species in the United States.
- As of 2002, **983** species of plants and animals were listed.
- The second main provision of the act **protects** listed species from human harm.
- The third provision **prevents** the federal government from carrying out any project that jeopardizes a listed species.

## U.S. Laws

### Major Provisions of the Endangered Species Act

- The U.S. Fish and Wildlife Service (USFWS) must compile a list of all endangered and threatened species.
- Endangered and threatened animal species may not be caught or killed. Endangered and threatened plants on federal land may not be uprooted. No part of an endangered and threatened species may be sold or traded.
- The federal government may not carry out any project that jeopardizes endangered species.
- The U.S. Fish and Wildlife Service must prepare a species recovery plan for each endangered and threatened species.

## Recovery Plans

- Under the fourth main provision of the Endangered Species Act, the USFWS must **prepare** a species recovery plan for each listed species.
- These plans often propose to protect or restore habitat for each species.
- However, attempts to restrict human uses of land can be controversial.
- Real-estate developers may be prohibited from building in certain areas, and people may lose income and may object when their interests are placed below those of another species.



## Habitat Conservation Plans

- Battles between environmentalists and developers are widely publicized, and in most cases, compromises are eventually worked out.
- One form of compromise is a habitat conservation plan.
- A **habitat conservation plan** is a land-use plan that attempts to protect threatened or endangered species across a given area by allowing some tradeoffs between harm to the species and additional conservation commitments among cooperating parties.



## International Cooperation

- At the global level, the International Union for the Conservation of Nature and Natural Resources (**IUCN**) facilitates efforts to protect species and habitats.
- The IUCN publishes **Red Lists** of species in danger of extinction around the world, advises governments on ways to manage their natural resources, and works with groups like the World Wildlife Fund to sponsor projects such as attempting to stop poaching in Uganda.





## International Trade and Poaching

- One product of the IUCN has been an international treaty called **CITES** (the Convention on International Trade in Endangered Species).
- The CITES treaty was the first effective effort to **stop** the slaughter of African elephants being killed by poachers who would then sell the ivory tusks.
- In 1989, the members of CITES proposed a total worldwide ban on all sales, imports, and exports of ivory, hoping to put a stop the problem.

## International Trade and Poaching

- Some people worried that making ivory illegal might increase the rate of poaching instead of decrease it.
- They argued that illegal ivory, like illegal drugs, might sell for a higher price.
- But after the ban was enacted, the price of ivory dropped, and elephant poaching declined dramatically.



## The Biodiversity Treaty

- One of the most ambitious efforts to tackle environmental issues on a worldwide scale was the United Nations Conference on Environment and Development, also known as the first **Earth Summit**. An important result of the Earth Summit was the Biodiversity Treaty.
- The **Biodiversity Treaty** is an international agreement aimed at strengthening national control and preservation of biological resources.

## The Biodiversity Treaty

- The treaty's goal is to **preserve** biodiversity and ensure the sustainable and fair use of genetic resources in all countries.
- However, the treaty took several years to be adopted into law by the U.S. government.
- Some political groups objected to the treaty, especially to the suggestion that economic and trade agreements should take into account any impacts on biodiversity that might result from the agreements.

## Private Conservation Efforts

- Many private organizations work to protect species worldwide, often more effectively than government agencies.
- For example, the World Wildlife Fund encourages the sustainable use of resources and supports wildlife protection. The Nature Conservancy has helped purchase millions of hectares of habitat preserves in 29 countries. Conservation International helps identify biodiversity hotspots. And, Greenpeace International organizes direct and sometimes confrontational actions.

## Balancing Human Needs

- Attempts to protect species often come into conflict with the interests of the world's human inhabitants.
- An endangered species might represent a source of food or income. Or a given species may not seem valuable to those who do not understand the species' role in an ecosystem.
- Many conservationists feel that an important part of protecting species is making the value of biodiversity understood by more people.

## Ticket out the Door

1. What is a captive breeding program?
2. What is germ plasm?
3. What is the Endangered Species Act?
4. When was the Endangered Species Act passed?
5. What is a habitat conservation plan?
6. What is CITES?
7. What is the Biodiversity Treaty?