

The Value of Endangered Species: the Importance of Conserving Biological Diversity¹

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Background

A species is endangered when it is threatened with extinction. Since time began, countless species have gone extinct from natural processes. The extinction of dinosaurs is the best known example.

Why save endangered species?

If extinction is a natural process, why should we make an effort to save endangered species? Because we can no longer attribute the accelerating extinction of plants and animals to natural causes. Today most species of plants and animals become extinct because of habitat destruction (loss of living space to development or pollution), introduction of non-native organisms, and direct killing (over-harvesting, poisoning). Florida's endangered wildlife includes the American crocodile (Figure 1), loggerhead sea turtle (Figure 2), the West Indian manatee (Figure 3).



Figure 1. American crocodile.

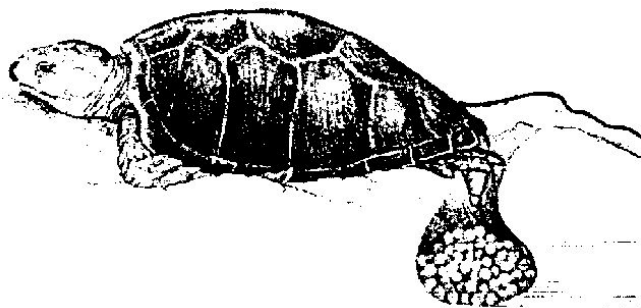


Figure 2. Loggerhead sea turtle.

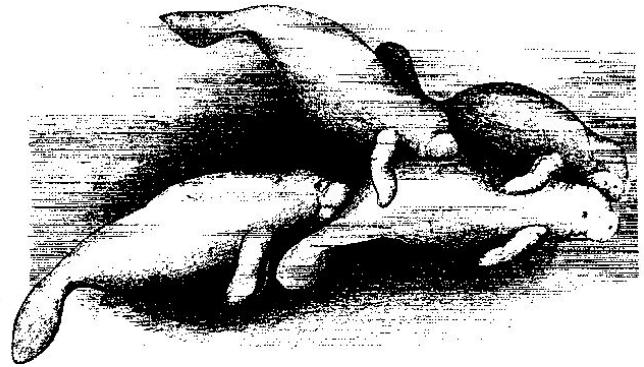


Figure 3. West Indian manatee.

Changing Perceptions

Our understanding of the value of endangered species to humans has increased together with the recognition that human activities cause extinction. In general, benefits of species can be classified as ecological, economic, and social. Different combinations of benefits occur for any particular species, and some species are obviously more "valuable" than others.

More important than knowing why a particular species is valuable is understanding why so many kinds of plants and animals are valuable.

Biological Diversity

The assemblage of populations of plants and animals in an area is termed its "biological diversity." The term biological diversity is often used interchangeably (sometimes confusingly) with two other terms, "genetic diversity" and "ecological diversity." Genetic diversity (amount of genetic variability among individuals of the same species) and ecological diversity (number and relative abundance of species) are both components of biological diversity.

Genetic diversity is directly related to a species' ability to survive environmental change. For example, plants and animals can be characterized by their ability to exist under different climatic (moisture and temperature) conditions.

However, within different species there is a certain amount of variability in the tolerance of individuals to climatic conditions. The ability of different species to cope with

environmental--in this example climatic—change depends on this variability. When genetic variability is reduced, as with the Florida panther, the risk of extinction increases.

The loss of a single species can set off a chain reaction affecting many other species. The total impact of extinction is not always apparent, and is difficult to predict, but it is clear that conserving biological diversity is essential for maintaining intact ecosystems.

Benefits of Biological Diversity

How does maintaining biological diversity benefit humanity? It only takes a moment to realize that throughout history plants and animals have provided humans with food, clothing, energy, medicines, and structural materials. Today, solutions to problems in agricultural production in tropical countries, reliance on petrochemicals, and the cures for cancers may lie in organisms not yet discovered. It would be a shame to lose these benefits without even knowing we had them.

Ecotourism

One way that conservation of biological diversity is being linked directly to economic and social development is through a relatively new process called ecological tourism, or simply ecotourism. This is particularly important in developing countries that otherwise could not afford conservation programs. Example: The exploitation of renewable natural resources (woods, nuts, oils) in tropical rain forests may bring greater economic benefits than conversion to more intensive land uses.

Agricultural Benefits

Only a small proportion of the world's plants have been cultivated for food on a large-scale basis. Wild plants can benefit modern agriculture as sources for new crops, genetic material to improve existing crops, and as sources of new biodegradable pesticides. Many of our common foods have tropical origins and it is natural to turn to tropical forests as a source for new crops. The tropics are also a source for relatives of commercial species. Continual crossbreeding is necessary to improve crop yield, nutritional quality, adaptiveness to different growing conditions, and resistance to pests and diseases. Undiscovered plants have a great potential for providing new medicines. Many plants have developed chemical defenses to deter animals that eat them. These plants may be cultivated to provide sources of bio-degradable pesticides in the future. Wild plants are also important as a source for new medicines. At least 25 per cent of all prescription drugs dispensed in the United States contain active principals that are still extracted from higher plants. We should never forget that a lowly mold gave us penicillin.

Unrecognized Benefits

Unrecognized benefits of maintaining biological diversity are those services we receive when ecosystems function normally. These ecosystem functions include energy fixation, chemical cycling (oxygen production by rainforests), soil generation and maintenance, ground water recharge, water purification, and flood protection. These services are provided to us at no cost.

When we destroy the ability of ecosystems to function naturally we not only lose these free services but all too often have to pay to replace them. There is no more dramatic example of the problems caused by ecosystem degradation and species endangerment than the loss of wetlands, especially the Everglades, in Florida. Floods, problems in water quality and quantity for natural and human systems, and declines in fish and wildlife populations have all been linked to the drainage of the Everglades. The price tag for fixing these problems is hundreds of millions of dollars.

Species as Indicators

Certain species are especially important as indicators of environmental quality. Endangered species act as our miner's canary, they tell us when something is wrong in our life-support system. The rapid decline in bald eagles and peregrine falcons was a dramatic warning of the dangers of DDT.

Many non-endangered species are used to monitor environmental quality. In Florida, largemouth bass and other sportfish have warned us of mercury contamination in freshwater ecosystems, and the spread of cattails into freshwater marshes formerly dominated by sawgrass warned us of nutrient problems in the Everglades. Without environmental monitors, we may not have learned of these contaminants until much more damage was done.

What You Can do

The conservation and management of threatened and endangered species is a tremendous challenge. Because of efforts of federal, state, regional, and local agencies—sometimes in cooperation with private interests—some endangered species now have a better chance of survival. The involvement of every individual, especially private citizens is essential. The following list includes some of the things you can do to help save endangered species:

- Support the Nongame Program of the Florida Game and Freshwater Fish Commission.
- Support the imperiled species program of the Florida Fish and Wildlife Conservation Commission.
- Visit a national, state or local park where resident naturalists describe local ecosystems. Look into volunteer activities at these locations.
- Attend public hearings concerning land and water use decisions. Regional planning Councils, water

management districts, and county and city commissions are all charged with the responsibility of making decisions affecting biological diversity.

Become informed, then involved.

- Report violations of conservation laws to federal and state authorities.

- Plant a refuge for wildlife (and energy and water conservation). Contact your local UF/IFAS Extension office for more information on landscaping for wildlife.

Endnote

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