

SPECIES PROTECTION: ECONOMIC ISSUES, MYTHS AND FACTS

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The Economic Benefits Of Biological Diversity Protection

Introduction

The federal Endangered Species Act (ESA) was signed by President Richard Nixon in 1973. It is currently being considered for Congressional re-authorization. Debate around the protection of rare and endangered species often focuses on the contention that species protection and economic prosperity are incompatible. That view is widely reported in the media and is often voiced by politicians, particularly in recent months.

However, an array of respected economic and scientific experts and institutions maintain that species protection in particular, and environmental protection in general, is essential to both short and long term economic growth and development.

A notable example is the California Biodiversity Executive Council which includes the 17 largest state and federal resource and land management agencies plus county associations from throughout the state. The Biodiversity Council has stated in its Memorandum of Understanding (September 19, 1991) that,

"The state's rich natural heritage....provides the basis for California's economic strength and quality of life. Sustaining the diversity and condition of [California's] natural ecosystems is a prerequisite for maintaining the state's prosperity."

The late Mollie Beattie, former director of the U.S. Fish and Wildlife Service (USFWS), advised environmental reporters (Beattie, 1995):

"If an industry is truly threatened by measures to protect an ecosystem, ask what its prospects were anyway. Ask if the measures to be taken are probably sound stewardship with or without endangered species."

This paper will review some of the information that is available on the economic consequences of species protection, including its impacts on economic growth and employment. The paper also discusses some of the widely-repeated anecdotes that permeate the species protection debate.

Species vs. jobs or jobs vs. jobs?

Discussions of species protection are often overshadowed by fears that species protection will result in widespread job losses, even losses of entire industries or "ways of life". Closer examination, however, often reveals that the actual tradeoff is between one type of

job and another, rather than between species protection and employment; that is, jobs that depend on one species, such as redwood or cotton, may be in conflict with jobs that depend on other species such as salmon, or on tourism.

Jobs are associated with a variety of species, and with ecosystems. Forests in the western U.S., for example, provide jobs through timber harvest. Forests also provide jobs and income through commercial fishing, through the industries associated with recreational fishing and hunting, through the harvest of mushrooms, and through the harvest of other "special forest products" such as Pacific yew (*Taxus brevifolia*). Allowing environmentally damaging harvest of one species can jeopardize jobs that depend on other species.

- A 1989 study found that in the Pacific Northwest, harvest and sale of mushrooms and other special forest products was a \$128.5 million industry employing more than 10,000 people. The industry has grown substantially since that time (Savage, 1995).
- Commercial salmon fishing was a \$25.8 million industry in the Northwest alone (Oregon, Washington and northern California) in 1989, fully or partially employing more than 17,000 workers (Thomas et al., 1993).
- In 1991, the USFWS estimated that recreational anglers spent \$1.7 billion in California fishing for trout and other sport fish, while hunters spent more than \$640 million, primarily for deer and game birds (California Department of Fish and Game Fact Sheet).

Another example is provided by commercial ocean fishing. Salmon is one of the traditional bases of the California ocean fishing industry. Recently overfishing, habitat destruction and other factors have driven commercial fishers to seek other ocean products, such as sea urchin and seaweed.

- \$35 million worth of sea urchins were harvested in California in 1991, primarily for export to Japan (Independent Coast Observer 3/25/94).

These lucrative industries require viable and well-distributed populations of mushrooms, sea urchin, salmon, and trout in order to survive. Without strong species and habitat protections, we are in danger of repeating past mistakes and wiping out these new industries as we have lost large portions of the logging and commercial fishing industries.

- According to the California Department of Fish and Game, overfishing already threatens the sea urchin fishery (Independent Coast Observer 3/25/94).
- The Forest Service and other agencies are finding it necessary to regulate the harvest of mushrooms and other special products to prevent overharvesting (Molina, et al.,

1993).

As is the case with salmon, species protections for sea urchins and mushrooms are not only compatible with preservation of jobs; they are necessary for the survival of the industries.

Wildland species provide economically and socially important services and products; many more remain to be discovered.

A recent study in the journal *Nature* estimates the minimum annual value of global ecosystem services and natural capital at U.S. \$33 trillion. Ecosystem services include climate regulation, flood control, nutrient cycling, recreation, and erosion control. Natural capital includes genetic resources, foods, and medicines (Costanza et al., 1997).

Economist Norman Myers (1995) noted in the journal *Science*:

"Forests can supply such an exceptional array of goods and services that they should be reckoned among our most valuable natural resources. Only a few products are generally harvested, however, [and that harvest often damages] the forests' many other potential outputs. Thus forests are overexploited and underutilized."

Any species may be tomorrow's source for new or improved foods and medicines, or of genetic material for breeding better crops. But this is true only if the species still exists. Protection of wildland species and their habitats, therefore, makes economic as well as environmental sense.

Medicines

- Nearly 1/4 of prescriptions written in the U.S. are based on substances derived from natural products (S.F. Chronicle. 5/8/95). Some examples include:
 - Pacific yew (*Taxus brevifolia*) produces taxol which is used to treat ovarian and breast cancers.
 - Purple foxglove (*Digitalis purpurea*) produces digitalis which is used to treat heart ailments.
 - Madagascar periwinkle (*Vinca sp.*), which is near extinction, produces vincristine which is used to treat leukemia in adults and children like 6 year old Jaclyn Buckley, 1995 poster child for the Endangered Species Coalition.
 - Microorganisms have been the source of more than 3,000 antibiotics (Abramovitz, 1997), including penicillin, which is produced by the fungus *Penicillium*.

- Of 250,000 species of higher plants known on earth, only a handful (5%) has been studied chemically (SF Chronicle 5/8/95).
- One study (Bialick and Mendelsohn, 1992) calculated that native forests in Belize are worth between \$726 and \$3327/hectare for their medicinal plants alone.

Foods

- Of the more than 4,000 plant species that have been used for food by humans, only about 150 are widely produced today. Many past and potential food species are in danger of becoming extinct.

Examples include *tarwi*, a pea family species that fixes nitrogen, contains up to 46% protein, and produces an insect repellent. The *basi* fruit from the Amazon produces 30 times the vitamin C of oranges. Because of the potential benefits from these and other species, the United Nations Food and Agriculture Organization has initiated a project to identify and protect these species (SF Chronicle 10/20/93).

- Crop production is often dependent on wild species. Eighty percent of the world's 1,330 cultivated crop species (fruits, vegetables, legumes, coffee, tea, cocoa, spices) are pollinated by wild and semiwild pollinators. Honeybee pollination services are 60-100 times more valuable than the honey they produce (Abramovitz, 1997).

Genetic resources

The array of species and varieties found in nature provides a reservoir of genetic resistance to crop diseases, as well as genetic material for breeders to improve the productivity of cultivated species.

- The U.S. Department of Agriculture cites the 1970 Southern corn leaf blight which was facilitated by the widespread use of a single susceptible corn genotype. The blight cost U.S. farmers almost \$1 billion. An old resistant variety provided breeders with the means to defeat the disease. The USDA seeks out wild relatives of corn and other crops to fight future epidemics; however programs are threatened by reductions in funding (U.S. News and World Report 4/10/95).
- The U.S. Forest Service has instituted programs to protect rare tree species, subspecies, and ecotypes in order to promote long term forest diversity and associated ecosystem resilience, health and productivity (Millar, 1986).

- The U.S. National Research Council also has proposed conservation actions to preserve genetic resources worldwide for breeding new crops and medicine in response to diseases and changing global needs (National Research Council, 1991).

Pest and pollution control

- The bacterium *Bacillus thuringiensis* is a widely-used natural insecticide. Bacteria also produce substances that degrade PCBs and other pollutants and toxics, and others used for medicines and industrial products (Tiedje, 1994).
- Bat colonies in Texas can eat 250 tons of insects each night. Twenty-six percent of world's bat species are at risk of extinction (Abramovitz, 1997).
- Declines of insectivorous cavity-nesting birds due to poor forest management and excessive logging has been cited as a contributing factor to lethal insect outbreaks in north American forests (Block and Finch, 1997).
- Because of their rarity, endangered species often provide early warnings of environmental problems that may threaten human health. The endangered bald eagle, for example, provided early warning of the health problems posed by the carcinogen DDT. The timely prohibition of DDT use in the U.S. significantly reduced potentially serious and costly public health problems.

Effects of species protection on economic growth and development

It is widely believed that species protection "closes down" ecosystems and therefore leads to economic decline. However, economic studies do not bear this out.

- One measure of the intensity of species protection is the number of listed species in a particular area. A 1995 MIT study found that between 1975 and 1990, the number of species listed under the federal ESA in a state had no impact on state economic performance measured by gross state product or growth in construction employment (Meyer, 1995).
- The MIT study further noted that species protection has an extremely minor economic impact when compared with others. "...[R]ecent military base closings have economic impacts hundreds of times greater than all the listings since the inception of the ESA. The number of jobs lost to leveraged buy-outs in the 1980s exceeds by many times the wildest estimates of jobs lost to species protection..." (Meyer, 1995).

- In a follow-up study looking at the housing sector, Meyer found that "[l]arger numbers of listed species [were] associated with *higher rates* of housing starts per capita in every period [studied]" (Meyer, 1996).
- The listing of the northern spotted owl as a threatened species in 1990 caused many observers to predict economic disaster for the Northwest. However, studies show that automation, log exports, and overharvesting already had doomed thousands of wood products jobs before the listing occurred. From 1980 to 1988, timber output grew by 19.2% while more than 13,800 timber jobs were lost in the Northwest (California Senate Office of Research, 1996).
- Moreover, the economy of Oregon has been booming, stimulated in part by an influx of high tech companies drawn by the clean air and open spaces protected by the ESA and other environmental laws. Oregon recently posted the lowest unemployment rate in 25 years - 5.2% (ABC News, 7/14/95)

Economically important species depend on other species for habitat

Some argue that only species that are known to be clearly and directly of value to humans need protection. However, species do not exist in isolation. Each species is part of an ecological network, providing food, moisture, and other necessities to other species. Douglas fir need mycorrhizal fungi. Soybeans need nitrogen-fixing bacteria. Whales need krill and plankton. Thus, the extinction of a single species, even a fungus or plankton, can easily impact ecosystem stability and commodity production.

- The U.S. Forest Service (1993) points out that the extinction of a single plant species can result in the disappearance of up to 30 other species of insects, plants and animals.
- Biologists argue that all species need protection because species' importance [to humans or within an ecosystem] is not proportional to their "size, abundance, position in the food web, or charisma" (Murphy et al., 1994). Microorganisms, for example, are often overlooked, but they recycle the earth's nutrients, protect soil from erosion, regulate diseases, and are central to the functioning of all ecosystems (Tiedje, 1994).
- Species diversity has been shown to promote ecosystem productivity and stability. Studies by Stanford's Peter Vitousek and other ecologists have demonstrated that experimental systems containing greater numbers of species are more resilient in the face of drought and other stresses than species-poor systems (Naeem, et al., 1994; Pennisi, 1994; Tilman, 1996).

The Facts Behind Some Common Endangered Species Act Myths

Much of the debate around species protection and the Endangered Species Act (ESA) is carried out through anecdote rather than fact. Some facts behind some widely-repeated anecdotes:

Listings are not scientifically rigorous

Anecdote:

Anyone can prompt USFWS to list a species simply by sending a letter to the agency. Little or no critical scientific review is involved in the process.

Fact:

Rarely, if ever, has a listing been reversed due to inadequate science. In general, studies show that the USFWS is too painstaking. The thoroughness of the process takes so much time that it can increase risk to species (Beattie, 1995).

The ESA increases fire danger

Anecdote:

Many people lost homes in the 1993 southern California fires because the USFWS did not allow disking around houses to reduce fuel material, due to the presence of the endangered Stephens' kangaroo rat.

Fact:

A 1994 U.S. General Accounting Office study found that the Riverside County Fire Department did prohibit disking in kangaroo rat habitat in 1989. Alternative weed abatement methods were allowed, such as mowing. The GAO found no evidence that disking would have saved homes. The GAO reported that "no data or evidence exists to conclusively determine why the 1993 Riverside fire destroyed ... homes." Nevertheless, since the fire the USFWS has worked with the County Fire Department to expand weed abatement options in kangaroo rat habitat to allay public concerns (U.S. General Accounting Office, 1994).

The ESA increases flood danger

Anecdote:

Protection of endangered species, such as the long-toed salamander, prevented flood control projects and thus caused or increased destruction from 1995 floods in the Pajaro and Salinas floodplains. Following the floods, California Governor Pete Wilson went to the banks of the Salinas river to suspend the California Endangered Species Act and attack overzealous environmental protection.

Fact:

According to the California Department of Fish and Game, no rare salamanders or any other endangered species have ever been found in the Pajaro or Salinas rivers and the California Endangered Species Act played no role in the flooding. In addition, the federal Endangered Species Act clearly states that in emergencies, emergency response and disaster relief come first; habitat and species issues are dealt with later (SF Chronicle 3/24/95).

Attacks on the federal and state Endangered Species Acts were renewed following the floods of January 1997. However, hearings before the California Assembly Water, Parks and Wildlife Committee found "no evidence [that] levee failures could be attributed to the application of endangered species or environmental quality regulations (California State Assembly Water, Parks, and Wildlife Committee, 1997).

USFWS arrests innocent farmers for merely trying to make a living

Anecdote:

Without warning, a strike force of 25 USFWS agents arrested a small family farmer in Kern County and seized his tractor. His offense was plowing his own land which includes habitat for the kangaroo rat and other endangered species.

Fact:

The farmer, Taung Ming-Lin, is not a small family farmer. He is an entrepreneur who paid \$1.65 million for 723 acres in 1991. Federal and state wildlife officials repeatedly advised him and his staff of the presence of listed species and of the need to work with the agencies to obtain permits before plowing his land. A tractor was seized on February 20, 1993. The seizure was a response to plowing that occurred just a few days after California Department of Fish and Game staff came to the farm, and again informed farm staff that permits were required and offered to help the farm obtain the permits (L.A. Times 6/10/94). Subsequently, Wang Lin Co. has settled the USFWS with for \$5,000 (donated to a nonprofit organization towards species protection in Kern County) and has agreed to obtain proper permits before plowing

the land. Michael Spear, Regional Director of USFWS stated "The bottom line is that ... Lin has agreed to obey the law, which is all we sought in the first place"(Sacramento Bee 5/21/95).

The kangaroo rat is a "keystone species" which is essential to the proper functioning of the ecosystem that it inhabits. Kangaroo rat burrows provide habitat for lizards and small animals. Kangaroo rats are prey for raptors and large mammals. Soil disturbance and nutrient cycling by kangaroo rats is essential to the maintenance of the unique plant communities that occupy rat habitat (MacNeil-Lehrer News Hour, 5/25/95).

The ESA obstructs business activity and development

Anecdote:

If they are allowed, the USFWS will micromanage the daily lives and businesses of every private property owner and will close down land use and development.

Fact:

A General Accounting Office study examined 18,211 consultations by the USFWS and the National Marine Fisheries Service between 1987-1991. 89% of consultations were handled informally and without any interference with the project, business or property owner. In only 181 projects (less than 1%) did the USFWS conclude that there was a threat to a species. And even in those cases, most of the 181 projects were completed after successful cooperation between the USFWS and the project sponsors (U.S. General Accounting Office, 1992).

John Sawhill, President of the Nature Conservancy has noted that, according to government data for the years 1987-1991, a developer faced a greater chance of having an airplane crash into something he built than having the project stopped by the ESA" (Endangered Species Coalition, 1995b).

Even Congressmen are harmed by the ESA

Anecdote:

Congressman Richard Pombo (R-CA) testified before a U.S. Senate subcommittee that his land had been declared critical habitat for the San Joaquin kit fox. He claimed that the declaration had subjected him and his family to severe personal and financial hardship.

Fact:

The USFWS has declared no critical habitat for the San Joaquin kit fox in California. Pombo now acknowledges he has never been harmed by a critical habitat designation (MacNeil-Lehrer News Hour, 5/25/95).

The ESA is another federal boondoggle

Anecdote:

The USFWS is wasting billions of tax dollars during times of dwindling resources.

Fact:

The USFWS spent only \$32 million in 1991 on the endangered species program which is less than it costs to build one mile of urban highway and less than Washington DC residents spent on Domino's pizza that year. In the 1994 fiscal year, 67.5 million was appropriated for the program (Endangered Species Coalition, 1995).

Success stories

The ESA has been partially or completely responsible for the survival and even the recovery of many species, some very "charismatic". Examples include the gray whale, the sea otter, the bald eagle, the osprey, and the brown pelican. The ESA has therefore at least begun to fulfill the goals for which it was enacted.

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