

Recovery: What Does it Mean?

Recovery is the process by which the decline of an endangered or threatened species is reversed, the threats to its survival are overcome, and the species is restored to a point that its population in the wild is healthy and secure. The goal of recovery is to restore the species so that extinction is no longer a threat. Typically, recovering a species is a gradual process that may take years.

Recovery plans, which are documents that summarize threats, and identify a series of actions to conserve or recover the species, begin the recovery process. Recovery plans serve as blueprints for private, Federal and State cooperation in the conservation of species and the ecosystems on which they depend. Teams that draft recovery plans include biologists familiar with the species. In addition, teams often feature representatives of affected communities and industries, major landowners, and other people with expertise and an interest in the species. Coordination among Federal, State, and local agencies, conservation organizations, species experts, and affected private individuals is a key ingredient for effective recovery plan development and implementation. The recovery planning process is designed to allow potentially affected segments of the public to participate in decision making and allows the special local knowledge of affected communities to be fully considered. Draft plans then are made available for public review and comment, and all affected or interested individuals and groups are encouraged to participate. Federal, State, and private agencies and

organizations may be identified in recovery plans as having opportunities to undertake various recovery tasks. While the plans do not require that these actions be taken, they do lay out a coordinated strategy for reaching recovery goals. Strategies outlined in recovery plans may be modified when needed to incorporate new information and ensure that species remain on the most effective path to recovery.

Recognizing that listed species may share similar habitats and face similar threats, the Service is developing recovery plans that combine recovery activities for several listed and sensitive species whenever possible. This “multispecies” or “ecosystem” approach is often more efficient, thus decreasing the recovery costs and increasing the effectiveness of the recovery actions. The Service, in cooperation with NMFS, the Florida Game and Fresh Water Fish Commission, State agencies, local governments, the academic community, conservation organizations, and private entities, is preparing a Multi-Species Recovery Strategy to address the recovery needs of all federally-listed threatened and endangered species in the South Florida Ecosystem. This recovery strategy will be one of the first recovery plans that is specifically designed to meet the needs of multiple species that do not occupy similar habitats. It also will be one of the first recovery plans that is designed to approach recovery by addressing the needs of an entire watershed, in this case, the critical Kissimmee-Okeechobee-Everglades Watershed. In addition to the 68 federally listed species, the Multi-Species Recovery Strategy will address the recovery needs of the two candidates for federal listing, species listed by the State of Florida, and other sensitive species, such as the over 400 species of migratory birds, that depend on the South Florida ecosystem.



A conservation agreement between land managers in Utah for protection of the endangered Virgin River chub and woundfin also protects habitat for the Virgin River spinedace and many other species. The conservation agreement resulted in the Service being able to withdraw the proposal to list the Virgin River spinedace.

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What Kind of Recovery Activities Can Help a Listed Species?

The specific actions needed to restore a plant or animal to a secure status vary from species to species. Some may be as simple as gating the entrance to a cave to protect specific habitat for an endangered bat or cave fish. Other activities may be more complex and lengthy, requiring extensive cooperation among State and Federal agencies, Tribal governments, independent groups, and individuals to ensure their successful completion.

Examples of recovery activities include:

- ◆ Plant propagation efforts for 10 critically endangered plants from Kauai, Hawaii, have greatly enhanced their chances for recovery thanks to a National Tropical Botanical Garden project funded by the Service;
- ◆ Captive breeding has produced California condors, whooping cranes, red wolves, and black-footed ferrets for release back into their historic range;
- ◆ Record numbers of Puerto Rican parrot chicks have been produced during the last three breeding seasons through implementation of nest enhancement procedures.

Indiana Bat

The Service coordinated the construction of a bat conservation gate to protect a New Jersey cave that is an important bat wintering site. This gate protects the vulnerable cave from intruders, while still allowing the bats to come and go as needed. This project was a partnership effort between the Service, the New Jersey Department of Environmental Protection, Bat Conservation International, and the American Cave Conservation Association. In addition, two new populations of bats were discovered because of an intensive survey at military installations and two large tracts of forest. A summer roosting area and a nursery habitat have also been preserved.



*Nobody knows which
species may be
essential in the future
or what is lost when a
species goes extinct,
but one thing is
certain: Extinction
is Forever.*

Why is Recovery a Complex and Challenging Endeavor?

Many of the reasons for a species' decline are the result of as much as 300 years of habitat destruction and degradation. Just as threats accumulate through time, reversing them also requires time. Options for restoring habitat that a species depends on may be limited because of competing needs and uses.

One way to think about recovery is to view it as a puzzle with pieces that need to be placed skillfully together to ensure the species is secure and will continue to survive in years to come. Because of the unique biological requirements and the many threats to the species, the road to recovery for each species is different. Federal agency coordination, public participation, grants to the States, recovery tasks implementation, and recovery or species agreements are some of the pieces that make recovery a reality.



Scientists estimate that more than 500 species in the United States slipped into extinction during the 300 years before the Act was passed.



The Tooth Cave spider is part of a unique cave ecosystem that is being preserved in the Texas hill country.
Wyman Meinzer/USFWS

How do Cooperative Partnerships Assist with Recovery?

Recovery of threatened and endangered species depends on a network of Federal, State and private organizations, and individuals working in partnership with the Service. A 1993 study by the Association for Biodiversity Information and The Nature Conservancy revealed interesting statistics about listed species populations. Only twenty-five percent of all listed species occur primarily on Federal lands. In addition, more than half of the listed species have at least 80% of their habitat on private lands. Therefore, recovering endangered species requires partnerships with people who manage the non-federal lands. Many partnerships already have been developed to help coordinate recovery efforts for listed species, but there is still more work to be done. There are numerous examples that illustrate how these partnerships have helped to conserve or recover species and their habitats, including:

California least tern: Threats such as habitat disturbance had reduced the California least tern to a low of 625 pairs in 1973. Recovery efforts, including habitat protection and management, have since led to an increase in the population to at least 2,400 pairs. Partners essential to this successful recovery program include the California Department of Parks and Recreation, the Department of the Navy, and the University of California.

Small-whorled pogonia: Residential and commercial development have been the primary threats to the small whorled pogonia. However, since the plant's listing, State and municipal conservation efforts and private landowner contributions have afforded permanent protection for the largest-known population of this plant, allowing it to be reclassified as threatened.

Partners in Flight Program: Initiated by the Service, this program focuses on conserving imperiled birds and restoring their habitat and includes about 90 cooperators in three countries from Federal and State agencies, non-governmental organizations, and industry. The program not only helps imperiled birds, but benefits other species that depend on the same habitat. Habitat conservation alliances like these can decrease the need to list species, because their efforts focus on conserving species and their habitat before they are listed. Many recovery activities that aid in conserving and recovering species can be implemented through these cooperative ventures or alliances.



Populations of the prairie fringed orchid have been stabilized, in part because of recovery efforts such as this research project.
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All 50 States, as well as U.S. territories and commonwealths, have entered into cooperative agreements with the Service to conserve threatened and endangered species.

How Can Landowners Become Involved?

Cooperative partnerships aren't just for government agencies and other large groups. Private landowners are essential to the conservation and recovery of many listed plants and animals, especially when you consider that more than 700 species are known to occur on private or non-Federal lands. A simple action, such as placing a fence next to a stream to eliminate grazing along the banks, thus reducing erosion, could require little time or money, but may be critical to the survival of a listed plant, fish, or mussel. For example, the Minnesota Department of Agriculture works with hundreds of private landowners who are willing to adopt land-use practices to benefit rare species, such as changing the use of pesticides on their lands. Some private individuals act as voluntary caretakers of the Minnesota dwarf trout lily after the species was discovered on their land. Other landowners are protecting habitat for the threatened Western prairie fringed orchid through voluntary landowner agreements and efforts by the State. The land where this species is found has been protected, and populations have been stabilized.

Wyoming Toad

The Wyoming toad is benefiting greatly from restrictions on pesticide use within its native habitat. In addition, an intensive survey program is being conducted to try to find additional populations and habitat. These recovery activities are the result of a cooperative effort among concerned organizations.

Loggerhead Sea Turtle

Recovery efforts are helping protect sea turtles by monitoring nest sites, limiting structures that hinder sea turtle nesting, and reducing artificial lighting used near beaches at night. (Lights cause both adult and newly hatched sea turtles to become disoriented.) The Florida Department of Natural Resources has conducted workshops for private, State, and Federal personnel to teach them how to assess sea turtle nesting success.

The Florida Department of Natural Resources also implements regulations designed to protect sea turtles on the beach and in the water, conducts research on sea turtle ecology, and oversees research conducted by other agencies or individuals. The Center for Marine Conservation and the Caribbean Conservation Corporation assist in funding the Archie Carr National Wildlife Refuge (one of the areas preserved for the turtles) reviewing measures proposed to protect sea turtles, and seeking public support for such measures.

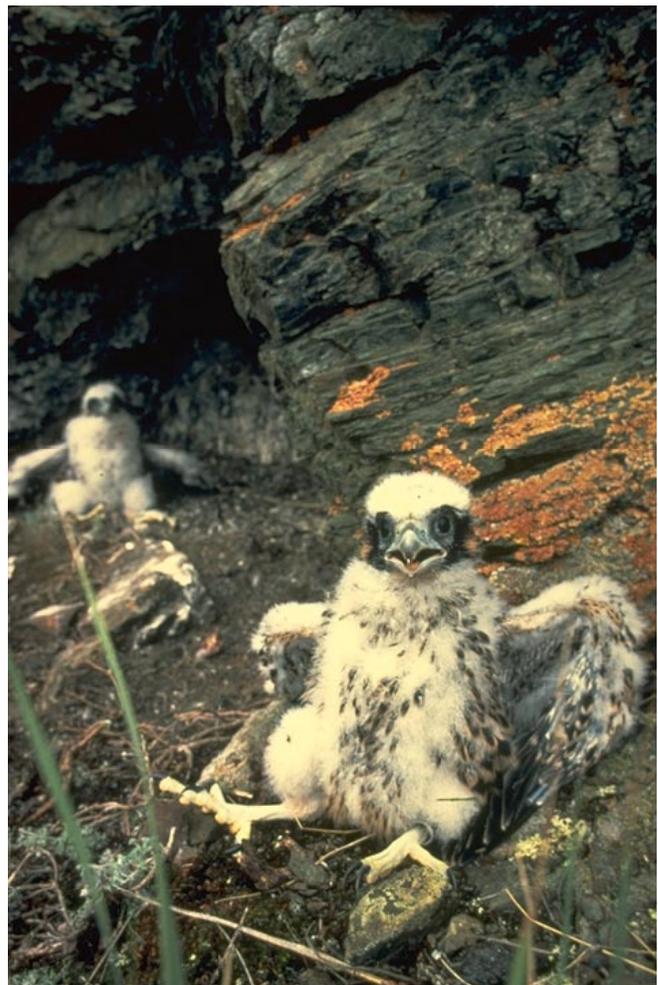
What Successes have been Achieved?

Recovery of threatened and endangered species is a tremendous challenge, but it is doable, and the successes are much celebrated by the American public. Of all the species listed between 1968 and 1993, only seven, or less than one percent, have been officially recognized as extinct. Preventing the extinction of the remaining 99 percent is perhaps the biggest success story of the Act. This success is attributed to the efforts of other Federal agencies, States, Tribal governments, private organizations, and individuals working with the Service towards a common goal. The Service and its partners in recovery are collecting biological information, developing recovery strategies, and implementing management activities that will stabilize, halt, or reverse the trends towards extinction. There are numerous successes in these efforts. A few follow.

American Peregrine Falcon

Nesting precariously on high cliff faces and diving at speeds in excess of 200 mph to capture prey, this magnificent American bird is an indicator of the overall health of its environment. However, it all-but-succumbed to pesticide contamination (which caused thinning of eggshells and adult mortality) in the early 1970's. Declines in this species' population were also attributed to habitat loss and illegal shooting. The falcon has benefited greatly from cooperative recovery efforts, such as the ban on the pesticide DDT and broad-based public involvement. More than 3,400 young

falcons were released into the wild through nationwide recovery efforts. The release of these falcons and other recovery activities have helped to stabilize the falcon's population to the point where it no longer may need protection of the Act.



Widespread public involvement has helped lead to dramatic increases in American peregrine falcon populations.
Skip Ambrose/USFWS



Recovery efforts have increased black-footed ferret numbers from 18 to more than 400.
Rick Krueger/USFWS

Black-footed Ferret

The black-footed ferret formerly lived throughout the Great Plains from Alberta, Canada, south to northern Texas and eastern Arizona, and with its primary prey, the prairie dog, was an important species in this ecosystem. Prairie dog control programs, which reduced the ferret's food source, greatly impacted the populations of the black-footed ferret. Once thought to be extinct, black-footed ferrets were rediscovered in 1981 near Meeteetse, Wyoming. A captive breeding program, founded by the 18 survivors of this population, has been extremely successful, resulting in a population of more than 400 by mid-1992. In the fall of 1991, 49 juvenile ferrets were released in the Shirley Basin area of southeast Wyoming. The release was the result of considerable landowner cooperation, because about 55 percent of the management area where the ferrets were released is in private ownership. Similar releases were conducted in north-central Montana and the Conata Basin/Badlands area of South Dakota in 1994. In the fall of 1996, family groups of ferrets (including pups whelped that summer) were released into the Aubrey Valley in northern Arizona. Releases continue at all sites. Now, there are young born in the wild, too!



Greenback cutthroat trout recovery efforts have restored this species to more than 40 lakes and streams.
Bruce Rosenlund/USFWS

Greenback Cutthroat Trout

Over millions of years, a diversity of trout species evolved across the West, each adapted to the unique characteristics of the streams and lakes that they inhabited. One of these, the greenback cutthroat trout, is a species that is both extremely beautiful and a challenging sport fish. This native cutthroat trout declined, because of overharvest, widespread destruction of habitat, and the introduction of nonnative trout into its native streams. At the time of its listing, only two small populations were known to exist. Efforts to conserve those populations and recover the species started in 1959 through a cooperative effort by the Bureau of Land Management, Colorado State University, the Service, Forest Service, National Park Service, and the Colorado Division of Endangered Species. Establishing new populations of the greenback cutthroat involved removing nonnative fish, restoring habitat, and regulating fishing. Since it was listed in 1967, the species has been restored in more than 40 lakes and streams in Colorado, and there is catch and release fishing for the species in 15 lakes. The species is nearing its recovery goals, and with continued reintroduction into its native streams and control of nonnative trout, the species may soon be delisted.

Louisiana Black Bear

The Louisiana black bear once roamed throughout the towering bottomland forests and wetlands of the Mississippi River Delta. By 1980, more than 80 percent of the historical habitat of the Louisiana black bear was gone, and breeding populations existed only in the Tensas and Atchafalaya river basins. Today, it is threatened because of habitat loss due to the conversion of bottomland hardwoods into open agriculture lands. Recovery efforts have been initiated by the Black Bear Conservation Committee (BBCC), a broad coalition of about 50 State and Federal agencies, forest and agricultural companies, various special interest organizations, and universities. Since its formation, the BBCC has published

both the Black Bear Management Handbook and a comprehensive Black Bear Restoration Plan. A full-time coordinator has been hired to focus on public education and outreach. The BBCC has been instrumental in promoting support for black bear restoration and recovery. The BBCC also ensures that forest management activities include those that support a sustained yield of timber products and wildlife habitats, thereby maintaining forest land conditions necessary for bear recovery. This alliance is a major key to continued successful recovery efforts for the Louisiana black bear and its habitat.



The Louisiana black bear benefits from forest management practices that also support timber product harvest.
Theresa Rabot/USFWS

Aleutian Canada Goose

Smaller than most of its relatives, the Aleutian Canada goose nests primarily in meadows and marshes on the Aleutian and Kuril Islands off the coast of Alaska and winter along the Pacific Coast of the Lower United States. It is a symbol of the fragile Arctic ecosystem. In the late 1700's, fur farmers began to introduce Arctic foxes on various islands. The Aleutian Canada goose populations began to decline because the introduced foxes killed the geese. Buldir Island was the only place not invaded by foxes, allowing its geese to survive. When the Act was passed in 1973, the States of Alaska, California, and Oregon, along with the private sector and the Federal government, began recovery efforts for the species. The three main parts of the recovery strategy include: removing foxes and restoring geese to the islands, protecting geese from hunting pressures, and securing the winter habitat of the geese. Implementation of these

strategies have caused an increase in the populations to approximately 7,900 birds.

Aleutian Canada geese have responded so well to recovery activities that the species' status was reclassified in 1990 from endangered to the less critical category of threatened.

Cheat Mountain Salamander

The rich hardwood forest is a delicate ecosystem in the West Virginia mountains, and contain many of nature's treasures among the tall poplar, oak, and maple trees. A lot of people would not see a salamander as a treasure. The Cheat Mountain salamander, is part of the delicate ecosystem that is threatened by human disturbance. The prospects for this species look relatively bright despite drastic historical



Thanks to successful recovery efforts, the Aleutian Canada goose is no longer endangered.
USFWS



Cooperative management protects 95 percent of known Cheat Mountain salamander populations.
Craig Stihler/WV Department of Natural Resources

decreases in the range of the Cheat Mountain salamander. Sixty-three known populations of this amphibian exist today, and approximately 95 percent of these known populations are on protected lands, primarily National Forests. The populations are not quite stable and appear to be susceptible to drought, reduction of forest canopy by storms, competition with other salamanders, and pollution, such as acid rain and snow. Protection has been provided to the salamanders through the movement or modification of proposed roads, trails, and timber harvests throughout its native habitat. As part of the recovery effort, numerous areas of the Monongahela National Forest are being surveyed for salamanders. Three quarters of the populations identified as necessary for recovery of the Cheat Mountain salamander are being protected and managed through the cooperative efforts of the State of West Virginia, the Service, and the Forest Service. Additional habitat of the Cheat Mountain salamander also was protected in 1994 as a result of the establishment of the Canaan Valley National Wildlife Refuge.



The Florida manatee is being protected through multi-agency habitat protection and law enforcement efforts.
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Northeastern beach tiger beetle is reintroduced into its native habitat at Sandy Hook, NJ.
Annette M. Scherer/USFWS

Northeastern Beach Tiger Beetle

An entire ecosystem of specialized plants and animals evolved along the sandy beaches and dunes of our eastern seaboard. Today, the northeastern beach tiger beetle and several other species are threatened because so little undeveloped beach remains. A project to develop and field test a translocation technique using larvae of the northeastern beach tiger beetle was undertaken at the Gateway National Recreation Area, Sandy Hook Unit. The effort, conducted by the Service in cooperation with Randolph-Macon College, National Park Service, and the New Jersey Department of Environmental Protection, was the first step in determining a successful technique to be used for future reintroductions of the beetle.

During a 1995 survey of the reintroduction sites, 55 adult northeastern beach tiger beetles were found, confirming that reintroduced larvae were able to overwinter successfully and emerge as adults. Adult beetles displayed normal behavior; both feeding and mating were observed. In mid-September, 21 larvae were discovered at Sandy Hook near

the area where the adult beetles had been abundant during the summer survey. This discovery indicated that the emerged adults had mated successfully and laid eggs, and that the larval young had survived. Future reintroductions using this successful technique will help recover the species.



The northeastern beach tiger beetle are mating successfully after reintroduction.
Annette M. Scherer/USFWS

Haleakala Silversword

Island ecosystems provide unique opportunities to study the evolution of species. Hawaii is a natural laboratory with many species, such as the beautiful Haleakala silversword, that are found nowhere else in the world. This species of silversword is found only in a 250-acre area in the crater and on the outer slopes of Haleakala, a dormant volcano on the island of Maui, Hawaii. Population declines were attributed to habitat disturbances, detrimental effects from introduced species, and vandalism. The Haleakala National Park was established to aid in the conservation of the species. Although this eliminated some of the threats, others continued, and the silversword was listed in 1991. Now, the most dangerous threat is the loss of the plant's native pollinators, which are being threatened by the Argentine ant, an introduced species that preys on native insects. Biologists are working to find an effective control for the ants. A collaborative effort with the Park Service has saved the species from extinction, but challenges remain.



Ongoing Haleakala silversword research is addressing the remaining threats to this species.
R.J. Shallenberger/USFWS



At this time, fewer than 1 percent of the world's 250,000 flowering plants have been analyzed to determine whether they hold the key to a new medicine or cure for human diseases.

Peter's Mountain Mallow

Peter's Mountain mallow now is restricted to a single site in the wild, a mountainous tract of land in southwestern Virginia owned by The Nature Conservancy. The species declined drastically over the past two decades, and by 1991, only three adult plants remained in the wild. The decline of Peter's Mountain mallow has been attributed to many factors, including overgrazing by large mammals, such as deer and feral goats, excessive plant collection by wildflower enthusiasts, and lack of fire. The heat of fire breaks dormancy in Peter's Mountain mallow seeds by rupturing the hard seed coat and making seeds permeable to water. Fire also eliminates competing vegetation and increases light and nutrients for the plants, thereby enhancing seedling survival and contributing to flower and fruit production.

The U.S. Forest Service and Virginia Department of Forestry provided the technical assistance necessary to conduct controlled burns in the springs of 1992-1994 at the Nature Conservancy Preserve. Seeds germinated and grew after each of these prescribed burns. In the autumn of 1995, 49 Peter's Mountain mallow plants were found in the wild because of fire management and restoration efforts.

Another recovery effort includes the work done by botanists from Virginia Polytechnic Institute and State University, who were able to find viable seeds in the leaf litter on Peter's Mountain and germinate them by using fire. These seedlings then were used to establish a garden population that produced many more seeds, allowing study of the germination and seed set problems occurring in the natural population. The Virginia Department of Conservation and Recreation's Division of Natural Heritage also designed and implemented prescribed fire research and seedling establishment at the natural population site and in experimental gardens.

