

## 30 YEARS OF THE ENDANGERED SPECIES ACT

# PROTECTING OUR WORLD

### 30 YEARS OF THE ENDANGERED SPECIES ACT

#### 30 SPECIES SAVED FROM EXTINCTION



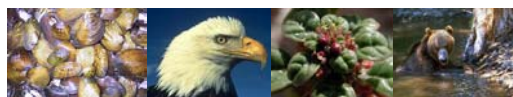
Each of the species in this report has been saved from near extinction by the Endangered Species Act. Some of these species have recovered so successfully that they have been removed from the endangered species list. However, most of these species have more challenges to overcome before they fully recover.

Included in this report are:

- Aleutian Canada goose
- American alligator
- Bald eagle
- Black-footed ferret
- California condor
- Chinook salmon
- Desert tortoise
- Devils Hole pupfish
- Florida manatee
- Florida panther
- Freshwater mussels
- Gray bat
- Gray wolf of the Great Lakes
- Green sea turtle
- Grizzly bear
- Karner blue butterfly
- Key deer
- Lynx in the Southern Rockies
- Masked bobwhite quail
- Mauna Kea silversword
- Peregrine falcon
- Pima pineapple cactus
- Pine Hill plants
- Piping plover
- Red-cockaded woodpecker
- Robbins' cinquefoil
- Seabeach amaranth
- Shortnose sturgeon
- Utah prairie dog
- Whooping crane

Imagine an eastern forest without the sharp pounding of the red-cockaded woodpecker, or imagine Yellowstone without ever being able to hear the howl of the wolf. Not long ago, these images were nearly a reality. Yet today, with the help of the Endangered Species Act of 1973 (ESA), these species and others are beginning to recover.

With the ESA, the federal government recognized that America's diverse wildlife was too valuable to squander. The law acknowledged that threatened or endangered "species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." As a result, the United States made a commitment to conserve species faced with extinction.



Under the ESA, 1821 species of plants and animals are currently listed as threatened or endangered in the United States and abroad. Listing announces that we've taken notice of a species' plight and intend to protect and recover it. Over the years, there have been successes that teach lessons of how to avoid future extinctions.

Many threatened and endangered species have benefited greatly from critical habitat provided by the ESA. Designation of critical habitat provides protection to areas essential to the conservation of the species.

To celebrate the 30th anniversary of the ESA, we have highlighted species that have avoided extinction, stabilized, or largely recovered due to the Act.

Unfortunately, despite the successes of the ESA, the law has opponents, including special interests that stand to benefit from reduced species protections and, most recently, the Bush administration.

The Bush administration has hand-picked some of the most fervent opponents of the Endangered Species Act to lead the agencies that administer it. One example, the Department of the Interior's Assistant Secretary for Fish, Wildlife, and Parks, Craig Manson, stated in an interview, "If we are saying that the loss of species in and of itself is inherently bad, I don't think we know enough about how the world works to say that."

The Bush administration has also opposed listing imperiled species. Since taking office, the administration has listed no species on its own accord. Under court order, the administration has listed 24 species. In comparison, the Clinton administration listed nearly three times as many species without legal action.

Furthermore, the ESA suffers from chronic funding shortfalls. The federal government acknowledges that \$153 million is needed to list and protect a backlog of more than 200 declining species, yet the Bush administration has requested only \$12 million for 2004. The ESA can protect species only if the government provides adequate funding and qualified experts to implement it.

We need stronger advocates for endangered species in the administration. Development in the U.S. continues at an unprecedented rate. Ecosystems altered by human activity are ravaged by invasions from non-native species. These threats and others demonstrate the folly of weakening the ESA.

These 30 success stories illustrate that Americans working together with the ESA can recover endangered species. The ESA works. With the protections of this law, we can leave a legacy of precious wildlife for generations to come.





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## ALEUTIAN CANADA GOOSE

Recovery of the Aleutian Canada goose is a remarkable story of cooperative conservation efforts under the Endangered Species Act. Recovery succeeded only with coordination of state and federal wildlife agencies, international partners, conservation groups, and private landowners.

HISTORY OF ENDANGERMENT

The Aleutian goose gets its name from the Aleutian Islands off the coast of Alaska where it breeds. Historically, there were no mammals on these islands, leaving nests and young birds relatively safe from predators. However, beginning in the 1750s, trappers and fur-farmers began releasing non-native arctic foxes onto more than 190 islands where the birds nest. With no natural defenses from these predators, the goose population was decimated. Hunting by humans on both their breeding and wintering grounds also diminished the population. With no geese sighted between 1938 and 1962, scientists began to fear the species was extinct.

In 1962, Robert Jones, a dedicated wildlife biologist, rowed a wooden dory to remote, rocky, wind-battered Buldir Island near the end of the Aleutian chain and discovered a small population of about 200 to 300 Aleutian geese. Buldir was one of few remaining islands with no foxes and a remnant goose population. So serious was the plight of the subspecies that the U.S. Fish and Wildlife Service (FWS) placed the Aleutian Canada goose on its very first list of endangered species in 1967.

ROAD TO RECOVERY

In 1973, the Aleutian Canada goose received protections under the newly-passed Endangered Species Act. That year, the federal government banned all hunting of the species. Federal biologists removed foxes from the islands and reintroduced geese to fox-free islands. All of the nesting islands were protected in the

Alaska Maritime National Wildlife Refuge.

Biologists banded birds at the islands to identify important migration and wintering grounds in the lower 48 states, finding populations in California and Oregon. Much of this habitat has been protected in National Wildlife Refuges. State and federal officials have also worked to keep Aleutian geese from being shot on their wintering grounds during waterfowl hunting season.



By 1990, the species had improved to the point that it was reclassified from endangered to threatened. In 2001, the Aleutian Canada

goose was declared fully recovered and removed from the list of threatened and endangered species.

CONSERVATION TODAY

Many private landowners on the California coast and in the Sacramento and San Joaquin valleys manage their lands to provide wintering habitat for the geese. Wheat and corn fields, short-grass pastures, and scattered wetlands attract the geese to farmland. The FWS has partnered with local landowners to protect and manage wintering habitat on private land with a combination of voluntary programs, conservation easements and title acquisition.

ECOLOGICAL VALUE

All ecosystems are a delicate balance. The decline of the Aleutian Canada goose demonstrates that non-native species can devastate an entire ecosystem.

OUTLOOK FOR THE FUTURE

The continued recovery of the Aleutian Canada goose will depend on the concern of the American people for the species and the continued commitment of wildlife agencies, conservation organizations and private landowners to protect its habitat. Although much of the breeding, migration and wintering areas have been protected, several key areas are threatened. Development of wetlands and farms could lead to the loss of the feeding grounds and food sources for the geese.

Hunting of Aleutian Canada geese could be re-opened. The Pacific Flyway Council and the Fish and Wildlife Service will evaluate plans to hunt the species if requested by a state, except in breeding and wintering grounds.





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# AMERICAN ALLIGATOR

More than one million American alligators live in the freshwater swamps, marshes, ponds, and rivers of the southeastern United States. The success of the population is a testament to the resilience of the species, which was near extinction just 25 years ago. There is little question that the Endangered Species Act was paramount in the alligator's recovery.

### HISTORY OF ENDANGERMENT

Habitat destruction and excessive hunting were the primary culprits in the American alligator's decline.

In the mid-1900s, even before the today's development boom, urban and suburban sprawl destroyed and drained the alligator's wetland habitat. Without proper habitat, alligators were not able to eat, mate, and raise their young.

Even worse, however, was the hunting that decimated the alligator population. To their detriment, American alligators produce high-quality leather that was coveted during the early 20<sup>th</sup> century. So many of the reptiles were killed to fuel the skins market that they were listed as endangered in 1967 under the Endangered Species Preservation Act.

### ROAD TO RECOVERY

The Endangered Species Preservation Act was not strong enough. In fact, it did not prohibit the hunting or killing of listed species, so alligator poaching continued into the 1970s.

With the passage of the Endangered Species Act of 1973, American alligator hunting became illegal, and the species finally began to recover. It was delisted in 1987, 20 years after receiving protection.

### CONSERVATION TODAY

Although the American alligator has been delisted, conservation continues even today. The alligator closely resem-

bles other crocodilian species that are still endangered, so the commercial use of alligator skins is highly regulated by the U.S. Fish and Wildlife Service.

### ECOLOGICAL & ECONOMIC VALUE

American alligators are predators at the top of the food chain. Within their wetland ecosystems, they control populations of prey species, including fish, turtles, and small mammals. The alligators thereby keep the ecosystem balance in check.



Adult male alligators also create "gator holes," small ponds that they excavate by clearing vegetation and digging with their mouths, claws, and tails. These depressions hold water during dry seasons and drought and are a great benefit to other wildlife species. Some species, particularly the Florida red-bellied turtle, use the holes to incubate their eggs. The displaced land around their holes also allows new plant growth.

Alligator recovery has paid huge economic dividends as well. Today, farmers raise alligators for commercial purposes in an industry that contributes millions of dollars to the economy. Southern states are now home to more than 150 alligator farms, primarily in Louisiana and Florida.

### OUTLOOK FOR THE FUTURE

American alligator populations continue to rise thanks to Endangered Species Act protections. However, alligators live in wetland areas that also appeal to humans. Wetlands attract developers who are eager to create housing and shopping complexes to accommodate burgeoning population growth in the south.

Rapid development is a significant problem for alligators, and Florida's development is a prime example: by 2020, the state's population is expected to increase by 25 percent to more than 21 million people. The development to accommodate this extreme growth will undoubtedly encroach into the alligator's habitat. Avoiding conflicts between humans and alligators will require that conservation groups and agencies monitor the threats associated with habitat destruction.



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## BALD EAGLE

Our national symbol, the bald eagle, is making a spectacular comeback from near-extinction thanks to the Endangered Species Act.

HISTORY OF ENDANGERMENT

Bald eagles suffered declines before the 1940s, beginning in the mid-to late 1800s. Biologists estimate that there may have been as many as 100,000 bald eagles in the lower 48 states before Europeans first arrived. Early population declines coincided with European settlement. Large-scale clear cutting operations and development in Canada and the United States destroyed bald eagle nesting habitat. Trophy and feather collection and shooting extirpated some eagle populations, and hunting of game reduced the amount of carrion available to wintering bald eagles. Persecution and reductions in prey availability caused population declines through the mid-1900s. The passage of the Bald Eagle Protection Act in 1940 slowed the rate of decline of bald eagles in most areas.

The most drastic decline occurred from the 1950s to the 1970s. The widespread use of DDT and other organochlorine chemicals caused wholesale reproductive failure, and by the early 1960s, fewer than 100 bald eagles were nesting in the northeastern United States.

ROAD TO RECOVERY

The bald eagle first received federal protection under the Migratory Bird Treaty Act of 1918. It was subsequently listed under the first federal endangered species law in 1967. But it was not until the Endangered Species Act of 1973 was passed, under which the eagle was listed as endangered in most of the lower 48 states, that agencies began to implement conservation measures to protect the bird.

Under the Endangered Species Act, the U.S. Fish and Wildlife Service (FWS) ini-

tiated a captive breeding program that produced birds for release into the wild.

Habitat protection goals were included in federal bald eagle recovery plans. Under these plans, eagle populations were not considered recovered until a certain



John &amp; Karen Hollingsworth/FWS

amount of breeding and wintering habitat was secured. Also, the plans designated buffers around nest sites. These habitat protection measures, which were only possible because of the Endangered Species Act, allowed rein-

troduction and monitoring programs to be successful.

CONSERVATION TODAY

Bald eagles are now found throughout the United States. The species was downlisted from endangered to threatened in the lower 48 states in 1995. In 1999 there were approximately 5,800 nesting pairs of bald eagles in the continental United States, indicating that populations of this magnificent raptor may be secure enough to remove it from the endangered species list altogether in the near future. Eagles in Alaska and Canada are already recovered.

ECOLOGICAL VALUE

Bald eagles are keystone predators in an ecosystem. They help to keep other bird populations, particularly cormorants and gulls, at bay in order to maintain the ecosystem's balance.

OUTLOOK FOR THE FUTURE

The bald eagle has now recovered to the point that it is proposed for delisting. However, the proposal has not been adopted because when the eagle's Endangered Species Act protections are lifted, there is no federal law that protects habitat. The Fish and Wildlife Service is revising the Bald and Golden Eagle Act to include better habitat protections, but eagles will remain a threatened species until the Act is amended.

The ongoing problems facing the species are habitat loss and toxic contamination of the environment. As development moves forward into the eagle's prime habitat, federal, state, and local governments will need to maintain their commitment to acquiring and managing vitally important lands.

The major sources of contamination, particularly DDT, have been controlled. However, chemical pollution still poses a threat to the species.



John &amp; Karen Hollingsworth/FWS



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# BLACK-FOOTED FERRET

**B**lack-footed ferrets, once thought to be extinct, are slowly resurging in the wild. This nocturnal carnivore has inhabited the mid-continent grasslands of North America for the past 30,000 years. The black-footed ferret remains a highly endangered species that would likely be extinct without the Endangered Species Act.

### HISTORY OF ENDANGERMENT

The black-footed ferret's fate is inextricably linked with that of its primary food source and habitat provider, the prairie dog. Prairie dogs provide 90 percent of the ferret's diet, and ferrets cannot survive in the wild outside of prairie dog colonies. Mistakenly thought to be a pest on rangeland, prairie dogs have been the target of an intensive and highly effective eradication program coordinated by the federal government. The ferret is a notable victim of the relentless campaign.

With only one known wild population, the black-footed ferret was listed under the Endangered Species Preservation Act of 1966. However, that law failed to provide the ferret with urgently needed habitat protection. In 1971, a captive population was taken from the sole known ferret site in South Dakota. After several years of unsuccessful breeding attempts, the last captive ferret died in 1979, and no ferrets were known to exist in the wild. Two years later, ferrets were found living among a white-tailed prairie dog population in Meeteetse, Wyoming. When this wild population began to plummet from disease, the remaining 18 ferrets were captured in hopes of preventing the species from disappearing altogether.

### ROAD TO RECOVERY

The ferret was listed as endangered in 1974. While declines in prairie dog habitat still occurred after the ferret's listing, its formal endangered status helped direct resources toward a recovery plan intended to restore ferrets across ten lo-

cations within their historic range. A significant obstacle to ferret recovery is the lack of large enough prairie dog complexes (groups of prairie dog colonies in close proximity to each other). Sylvatic plague has severely reduced one of the few remaining large complexes located on Thunder Basin National Grassland. Coal-bed methane development and continued extermination of prairie dogs degrades remaining ferret habitat.

### CONSERVATION TODAY

Within the United States, ferrets have been reintroduced into prairie dog habitat on federal and tribal lands throughout the west and southwest. Ferrets were also introduced into the largest remaining prairie dog complex in Chihuahua, Mexico. At several sites, ferrets are making a comeback, but recovery is faltering in most of the areas where ferrets have been reintroduced. There is only one self-sustaining population of ferrets in the wild, located at Buffalo Gap National Grassland in South Dakota.



### ECOLOGICAL VALUE

In addition to its inherent value as a native wildlife species, the black-footed ferret is an umbrella species for prairie dog ecosystems. A self-sustaining population of ferrets requires a 10,000-acre prairie dog complex. This large amount of prairie dog acreage can provide habitat for other species as well, including the mountain plover, swift fox, burrowing owl, and ferruginous hawk, and more than 100 other wildlife species that benefit from grassland habitat.

### OUTLOOK FOR THE FUTURE

With increasing populations of reintroduced ferrets at some sites, there is cause for optimism. Full enforcement of Endangered Species Act protections, including critical habitat designation, which the ferret lacks, would help ensure the recovery of this unique carnivore.

Black-footed ferret recovery rests on the protection of its lifeline—the prairie dog. This requires a shift in how federal and state governments and private parties regard the prairie dog ecosystem. Prairie dog shooting is still at an all time high in many areas, and urban sprawl is claiming many high-density prairie dog populations. Scientists have predicted “wave of secondary extinctions” which would include the black-footed ferret unless prairie dog population declines are halted.

As we celebrate the bicentennial of the Lewis and Clark exploration of the west—the explorers remarked about the extraordinary prairie dog ecosystem and a Great Plains teeming with wildlife—the fate of a charismatic member of that ecosystem, the black-footed ferret, hangs in the balance.



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## CALIFORNIA CONDOR

The California condor is North America's largest terrestrial bird, weighing up to 22 pounds with a wingspan of nine and a half feet. It can reach altitudes of 15,000 feet and may fly 140 miles a day in search of the carrion on which it feeds. Endangered Species Act protections have helped these magnificent birds to recover from near extinction.

HISTORY OF ENDANGERMENT

In prehistoric times, the condor ranged from southern British Columbia to Baja California and across the southern United States to Florida. By the time Europeans arrived in North America, however, the bird's range was limited to mountains along the Pacific coast, possibly due to the extinction of large Ice Age mammals.

In more recent history, the bird's decline can be attributed to shooting and lead poisoning. By 1940, only about 100 California condors remained, all confined to a U-shaped region in the mountains and foothills north of Los Angeles.

The California condor was federally listed as an endangered species in 1967. At the time, it was estimated that the entire wild population ranged from 50 to 60 individuals. When the Endangered Species Act was passed in 1973, the California condor was included as an endangered species.

ROAD TO RECOVERY

In 1985, when the entire wild condor population had been reduced to nine birds, all of the remaining wild birds were brought into captivity in order to preserve the species through captive breeding and reintroduction. The last free-flying California condor was captured in April of 1987.

From 1987 to 1991, the entire population of California condors existed in two captive breeding facilities—one at the San Diego Wild Animal Park and the other

at the Los Angeles Zoo. Fortunately, California condors breed well in captivity, and by 1991 a sufficient number of California condors had reproduced to initiate a release program for the reestablishment of a wild population.

Reintroduction of California condors to the wild began on January 14, 1992, when two captive-reared juveniles were released along with two juvenile Andean condors into the Sespe Condor Sanctuary in California. Since then, other releases have occurred in California and Arizona.

CONSERVATION TODAY

Scott Frier/FWS

The California condor survives today thanks to captive breeding programs that brought the species back from the brink of extinction. Captive breeding programs continue today as do protection efforts in the wild. As of 2003, there are 84 condors

in the wild and 135 in captivity, up from 52 total in 1991.

ECOLOGICAL & ECONOMIC VALUE

The reintroduction of condors to northern Arizona and the Big Sur area of central coastal California has lured bird-watchers and other wildlife enthusiasts to these areas. These visits benefit local businesses that enjoy increased tourism revenues. At the Grand Canyon, where the birds are regularly seen, the National Park Service has created special programs that are offered daily to educate people about the plight of this magnificent species.

Ecologically, scavengers like the California condor play an important role in maintaining balanced and healthy ecosystems. By feeding on the remains of dead animals, scavengers help recycle nutrients.

OUTLOOK FOR THE FUTURE

The California condor has bounced back from its brush with extinction, but it will be some time before the species nears the point of full recovery. It is only through human intervention that the condor exists at all today and that work must be continued.

Captive breeding programs and the aggressive monitoring of wild populations are essential to preserving the condor for future generations.

Fortunately, the condor has come to symbolize what humans can accomplish when faced with the immediate extinction of an animal. Condor rescue and breeding programs continue to garner public support, and stories about condor recovery efforts still make headlines, further educating the public about how close we came to losing this amazing bird forever.



David Clendenen/FWS



Scott Frier/FWS



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## CHINOOK SALMON

Chinook salmon are a symbol of the Pacific Northwest. Like most Pacific salmon, many populations of Puget Sound chinook remain unhealthy. However, recent efforts on the Skagit River have helped reduce the harmful impacts caused by the operation of Seattle City Light hydroelectric dams in Washington state's second largest salmon producing river.

HISTORY OF ENDANGERMENT

Puget Sound chinook, an evolutionarily significant unit (ESU) of salmon, were listed as threatened under the Endangered Species Act in 1999. An ESU is a subpopulation of fish reproductively isolated from other populations. ESUs are usually genetically distinct or distinguished by the timing and location of their migration.

The decline of Puget Sound chinook salmon can be attributed to many factors. Logging and mining on public lands have significantly degraded chinook habitat. As the region grows and urbanizes, suburban sprawl consumes habitat, and streams are piped underground or polluted by runoff. Hatchery fish also contribute to wild salmon declines by interbreeding with native fish.

In some Puget Sound rivers, dams are the biggest threat to salmon runs. Dams destroy habitat, block salmon from reaching historic spawning grounds, and alter the natural rhythm of river flows essential for healthy ecosystem function. Dams can also impair water quality by increasing temperature and decreasing dissolved oxygen.

ROAD TO RECOVERY

Even with these threats, it is still possible to rebuild healthy salmon runs.

Puget Sound chinook have begun rebounding in the Puget Sound area's largest river, the Skagit. This success is thanks to the efforts of the utility company, Seattle City Light, to minimize river fluctuations caused by peaking operations of its hydropower dams. Last year saw the greatest return of fall chinook since 1974, while populations in other Puget Sound rivers simultaneously continued to decline. According to the utility, these flow modifications cost only 20 cents per customer.

The Endangered Species Act is responsible for improvements along the Skagit. Changes to dam operations, forest practices, and habitat restoration have helped to curb the decline of chinook. Further implementation of the law in the Skagit estuary is critical to fully recover these amazing fish to abundance.

CONSERVATION TODAY

Chinook salmon throughout the West remain on the Endangered Species list. Clearly more work is needed, but efforts like those on the Skagit River are catching on. Other dam owners and operators are beginning to improve dam operations and even remove some dams. Improved flow regimes, habitat restoration, access to spawning grounds, and improved water quality are all going to be necessary if we are to improve the plight of this icon of the Northwest.

ECOLOGICAL & ECONOMIC VALUE

A natural indicator of the health of the Puget Sound environment and its communities, chinook salmon have long been tied to the fate of the Pacific Northwest. They are highly prized by commercial fishermen despite other more populous species of Pacific salmon, and anglers pay tens of millions of dollars annually to fish for salmon.

Generations of Native American tribes in the Puget Sound area continue to depend on chinook salmon both as a cultural necessity and as a food source.

OUTLOOK FOR THE FUTURE

Salmon are the keystone species for the region. The Endangered Species Act is not only critical to the protection and restoration of those fish, but everything else that depends upon them.

The Northwest must strike a balance between its thirst for cheap hydroelectric power and its love and respect for wild Pacific salmon. Hydropower dams continue to imperil several populations of chinook salmon.

Two ESUs of chinook salmon are at perilously low levels in the Snake River in eastern Washington. Four dams along the river keep juvenile salmon from migrating out to the ocean; each dam is responsible for the mortality of five to fifteen percent of each generation of young salmon. Providing ample water flow over the dams or removing the dams altogether will help to solve the problem of the chinook's decline.



FWS



Ice Harbor Dam, U.S. Army Corps of Engineers



Skagit River Estuary, USGS



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# DESERT TORTOISE

With a host of dangers threatening the desert, even an ancient species can be pushed toward extinction.

### HISTORY OF ENDANGERMENT

The desert tortoise is not adapted to many threats perpetuated by humans, including development, mining, livestock grazing, off-road vehicle use, vandalism, and military expansion into critical habitat areas. For example, garbage dumps near human settlements bring with them ravens that prey on young tortoises. Each of these changes to the native ecosystem has contributed to the tortoise's decline.

Introduced plants threaten the tortoise by competing with its preferred native plants and propagating desert fires.

In addition, livestock tramples baby tortoises and competes with them for food.



Beth Jackson/FWS

### ROAD TO RECOVERY

In 1980, the tortoises on Utah's Beaver Dam Slope were listed as threatened under the Endangered Species Act. In 1984, conservationists proposed listing all desert tortoises, but it was not until 1990 that tortoises west and north of the Colorado River were listed as threatened.

The U.S. Fish and Wildlife Service (FWS) completed a recovery plan to protect the species and its habitat. Scientists found that viable tortoise populations require large areas of habitat.

Thus, the FWS recovery team recommended establishing fourteen 2,000



Beth Jackson/FWS

square mile reserves. So far, FWS has designated approximately 16,000 square miles as critical habitat in Arizona, California, Nevada, and Utah.

### CONSERVATION TODAY

To implement the recovery plan, the National Park Service has protected areas within California's Joshua Tree National Park and the Lake Mead National Recreation Area in Nevada and Arizona. The Bureau of Land Management has established a Desert Tortoise Research Natural Area in California and protected additional land in Nevada. There are ongoing efforts to protect even more land in the future.

The FWS also has approved habitat conservation plans (HCPs) for the tortoise. HCPs are agreements with government agencies, private companies, and individuals that allow development on nonfederal lands containing tortoise habitat in return for habitat protections elsewhere. Also important for recovery, sheep grazing has been banned from most critical habitat and cattle grazing has been greatly reduced.

### ECOLOGICAL VALUE

The tortoise illustrates how cumulative impacts can jeopardize the survival of a species and an ecosystem. For a creature with a thick shell for defense and a 100-year lifespan, the tortoise should be a great survivor of the desert. Its unfortunate decline could spell disaster for the entire desert ecosystem, for tortoises disperse undigested seeds through their feces, ensuring that desert plants are renewed for another generation.

### OUTLOOK FOR THE FUTURE

The Endangered Species Act prompted federal agencies to protect tortoises.

Active management of desert habitat must continue. Desert tortoises may require barriers to protect their habitat from human disturbance, as well as patrols to enforce restrictions on activity in tortoise habitat. In addition, fencing along highways could keep tortoises away from traffic. A possible solution to tortoises being killed on the road is the creation of tunnels that allow tortoises to cross under the highway.

Overall, however, a better long-term solution would be to reduce the amount of development that takes place in close proximity to tortoise habitat and for the Bureau of Land Management to fully implement the recovery plan.



California Bureau of Land Management



Beth Jackson/FWS

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# DEVILS HOLE PUPFISH

The Devils Hole pupfish was one of the first species protected under the Endangered Species Act. The tiny fish was in danger of extinction when development threatened the water source for the cave pool in Devils Hole, the pupfish's only natural home.

### HISTORY OF ENDANGERMENT

The world's entire naturally occurring Devils Hole pupfish population resides in southern Nevada in a single small pool at the bottom of a limestone cave, where it has evolved in isolation for more than 10,000 years.



In a move to protect the species, Devils Hole was designated part of the Death Valley National Monument in 1952. However, water use by ranchers and developers near Devils Hole increased until the size of the pool was so small that it put a severe strain on the pupfish population. If water levels recede below the shelf where pupfish feed and breed, it would mean certain extinction for the species. A water shortfall this extreme nearly happened in the late 1960s and early 1970s when the pupfish population dropped as low as 124 individuals.

### ROAD TO RECOVERY

The Devils Hole pupfish was listed as endangered in 1967 under the Endangered Species Protection Act, followed by the Endangered Species Act of 1973. By the 1970s, the plight of the pupfish was national news, and the public began pressing the government to protect the rare fish and its unique habitat.

The Endangered Species Act protections for the pupfish were enforced by a 1976

court decision that ruled that groundwater pumping in Ash Meadows should be halted and a minimum water level should be set for Devils Hole. In doing so, the court set a precedent, implicitly reserving groundwater for an endangered species.

The land surrounding Devils Hole was purchased from developers, and the 22,000-acre Ash Meadows National Wildlife Refuge was created in 1984. Because the pupfish's habitat remains at risk, two additional populations were created to be reintroduced to Devils Hole in the event that a natural disaster eliminates the original population.

### CONSERVATION TODAY

The protection of the area surrounding Devils Hole helps to ensure that the pupfish will have habitat to survive and thrive. The wetlands, springs, and channels of Ash Meadow National Wildlife Refuge are protected from outside use in an effort to ensure that water levels remain suitable for the Devils Hole pupfish and for other plants and animals that depend on the area for their survival.

### ECOLOGICAL VALUE

Ash Meadows National Wildlife Refuge has the distinction of having the highest concentration of endemic species of any location in the United States. It provides habitat for at least 24 plants and animals found nowhere else in the world, including 12 threatened and endangered plants and animals.

The refuge and the Devils Hole pupfish played a formative role in today's environmentalism. The impending extinction of this tiny desert fish caused people to question whether new agricultural and urban development should take place at the expense of the survival of a species and its ecosystem. The court's decision set a precedent that has protected numerous species since 1976.

### OUTLOOK FOR THE FUTURE

Though it was once at the brink of extinction, the Devils Hole pupfish has been brought back to a stable population of 450 individuals through the protections of the Endangered Species Act.

Unfortunately, there continue to be decreases in the water level in the cavern, and the fish is constantly threatened by the effects of natural erosion like surface runoff of silt and sand, vandalism, and development in the surrounding area.





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# FLORIDA MANATEE

Gentle and leisurely animals, manatees live in shallow, slow-moving rivers, estuaries, saltwater bays, canals, and coastal areas from Texas through Florida and as far north as Virginia. Endangered Species Act protections have allowed southern waters to become home to an increasing number of manatees.

### HISTORY OF ENDANGERMENT

Manatees are slow-moving; fortunately, they have no natural predators or enemies, so they can live up to 60 years in the wild. Many manatee deaths are human related, mostly occurring from collisions with watercraft. Manatees are also crushed or drowned in canal locks and flood control structures, injured by eating fish hooks or litter, and killed in crab trap lines.



Jim P. Reid/FWS

These threats combined to reduce the manatee population to such low numbers that the species was listed as endangered in 1967 under the Endangered Species Preservation Act. Subsequently, West Indian manatees

received protection under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972.

### ROAD TO RECOVERY

Under the Endangered Species Act, the U.S. Fish and Wildlife Service designated critical habitat for the manatee in 1976 and developed a comprehensive recovery plan. To complement the preservation of critical habitat, a number of sanctuaries, refuges, and protection areas have been established for the manatee.

Within protected areas, boats are required to respect slow speed zones to prevent boat-manatee collisions. Dock and marina development is also restricted so that some manatee habitat remains pristine.



© Photo courtesy of David and Theresa Schrichte

### CONSERVATION TODAY

Even with increased education and boater awareness, manatees continue to die as a result of collisions with watercraft. In 2002, a record 95 manatees were killed by accidents with boats.

Ultimately, however, loss of habitat is the most serious threat facing manatees. Conservation groups continue to seek protections for waters essential to the survival and recovery of this delicate sea creature.

### ECOLOGICAL & ECONOMIC VALUE

Manatees have voracious appetites perfect for cleaning waterways clogged with weeds and plants.

Outdoor recreation and tourism related to manatees is growing, particularly in Florida. Interested citizens can now participate in tours to view and swim with manatees, thereby pumping money into local economies and invalidating the myth that Florida's economy has been negatively affected by the adoption of manatee protection measures. In addition, there is evidence that property values increase by as much as 15 percent with a manatee slow speed zone adjacent to the property.

### OUTLOOK FOR THE FUTURE

Because the threats to manatees continue to increase with the growing human population and the sheer number of vessels on the water each year, conservation groups and concerned citizens need to be vigilant in enforcing speed zones. The Florida Manatee Recovery Plan has a Manatee Recovery Team which monitors and assesses recovery efforts and makes recommendations to government officials on additional manatee protection needs as necessary.

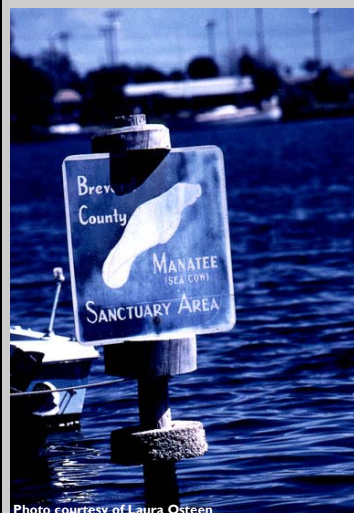


Photo courtesy of Laura Osteen



Photo courtesy of Laura Osteen



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# FLORIDA PANTHER

The Florida panther, one of 30 subspecies of cougar, is the most endangered of all of North America's cats, with less than 100 individuals believed to remain in the wild. The panther most certainly would not exist today if not for the Endangered Species Act.

### HISTORY OF ENDANGERMENT

In colonial times, the panther ranged throughout the Southeast, from Texas to the Atlantic to Tennessee and South Carolina. Historically, the panther's populations were threatened by hunting for sport, their fur, and for the perceived threat to livestock.

These days, the biggest problem for Florida panthers is habitat loss and degradation. For habitat, panthers require a large mosaic of forest and other open lands, but agriculture and residential development consumed a third of Florida's forests between 1936 and 1987.



Development has fragmented large expanses of forest into small, unusable areas of habitat. As a result, panthers must pursue suitable habitat and travel into developed areas. Since 1972, 44 panthers have been killed by cars.

With so few panthers, the species' small gene pool causes reproductive disorders and increased susceptibility to disease.

### ROAD TO RECOVERY

The panther was listed as endangered in 1967 and received further protections under the Endangered Species Act of 1973. The U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, National Park Service, Florida Department of Environmental Protection, and nongovernmental conservation groups have worked exten-

sively to recover panthers.

Panther kittens have been taken from the wild for captive breeding. In addition, for habitat protection, the Florida Panther National Wildlife Refuge set aside 24,000 acres of intact land and 56,000 acres of the Corkscrew Regional Ecosystem Watershed have also been preserved.

It is estimated that there are less than 100 panthers left in the wild. This number is remarkably low, but it is an improvement from the 30 to 50 panthers recorded in a 1989 census.

### CONSERVATION TODAY

Conservationists are working to protect existing panthers and habitat, build public support for the cats, and reintroduce them into suitable areas.

Innovative solutions, like constructing underpasses below Interstate 75, the major highway responsible for high panther mortality, have successfully reduced collision incidents.

To reduce inbreeding and curb the loss of genetic diversity, scientists introduced Texas cougars, a closely related subspecies, into the Florida panther population in 1995. This program was an attempt to reverse negative effects of inbreeding, and the initial results have been good. There have been increases in population, signs of improved genetic health, and additional colonization of areas previously unoccupied.

### ECOLOGICAL VALUE

The Florida panther is a symbol of vanishing wilderness. Lands established to preserve the panther's habitat benefit other imperiled species, including wood storks and eastern indigo snakes.

The Florida panther plays an essential role in the ecosystem by managing populations of deer and hogs.

### OUTLOOK FOR THE FUTURE

The Endangered Species Act has given the Florida panther a fighting chance for survival. However, coordination of efforts poses a problem for full species recovery. When numerous agencies work closely together, decision-making and implementation can become painstakingly slow, as has been the case with panther recovery.

Recently, a panel of independent scientists designated by the Fish and Wildlife Service has identified significant flaws in the manner in which panthers have been managed in the past several years. The Fish and Wildlife Service now has an obligation under the Endangered Species Act to update its management strategy to reflect these findings of the Scientific Review Team.

Hopefully, this new information will help tackle the problems Florida panthers face such as sprawling development and habitat degradation, automobile collisions, and environmental contamination, such as mercury pollution.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# FRESHWATER MUSSELS

Freshwater mussels were once remarkably abundant, but over the last hundred years, they have become among the most endangered of all North American species. About 12 percent of mussel species are extinct and 23 percent are threatened or endangered. The Endangered Species Act has slowed the decimation of these species, and recovery efforts have proven enormously successful in replenishing mussels. In the Southeast, which contains more than 95 percent of all federally listed mussels, active conservation initiatives have had some impressive success.

### HISTORY OF ENDANGERMENT

The world's greatest diversity of freshwater mussels is in the continental U.S., where populations of these nearly 300 species once thrived. However, mussel populations have been dropping sharply due to siltation of waterways from development, pollution of waters with toxins, dredging of waterways for navigation, and encroachment of non-native species such as the zebra mussel.



Zebra mussels. USGS

### ROAD TO RECOVERY

The assistance of environmental laws, federal, state, local, and tribal agencies, as well as academic institutions and private parties, have contributed to a number of remarkable recovery efforts. In particular, habitat protections and population augmentation of mussel species under the Endangered Species Act have been helpful for recovery.

### CONSERVATION TODAY

The U.S. Fish and Wildlife Service's (FWS) Asheville, North Carolina field office has implemented large mussel recovery programs for regional ecosystems. Through funding under the Endangered Species Act, the Asheville field office has been operating a cooperative riparian habitat restoration project to improve the habitats of endangered mussels.

Depleted to the brink of extinction, the Tan riffleshell mussel, for example, was designated as endangered in 1977. These mussels were raised in captivity over a number of years and recently released into the Hiwassee River in Tennessee through a partnership between government agencies, Virginia Polytechnic Institute and State University and others. Endangered mussels in two other tributaries of that river have also been augmented, in hopes that the populations can become sustainable.

A successful refugia program has been developed for Mississippi River mussels through which thousands of fish have been used as hosts for larval mussels and released into habitats free of competition from non-native zebra mussels. By holding host fish in cages in the river, hundreds of thousands of these mussels have been released.

### ECOLOGICAL & ECONOMIC VALUE

Freshwater mussels are an important food source for many animals. In addition, they improve water quality by filtering pollutants, particulates, and excess nutrients. Due to their sensitivity to water quality, reductions in mussel numbers serve as valuable indicators of decreased water quality.

Mussels also have considerable economic value. The mussel shell industry has provided tens of thousands of jobs and an estimated at \$40 to \$50 million to the economy.

### OUTLOOK FOR THE FUTURE

The Endangered Species Act has been instrumental in the slow recovery of some species of freshwater mussel. For several other species, however, challenges stand in the way of recovery.

Decreased water quality has particularly hurt mussels, and future prospects have appeared bleak for the numerous species.

If wildlife managers focus on improving water quality, combating invasive species, decreasing siltation, and otherwise improving mussel habitat, they could further foster the stabilization of mussel species.



Mike Pinder  
FWS



M.C. Barnhart  
Unio Gallery, <http://courses.smu.edu/mcb095f/gallery>



Hiwassee River



M.C. Barnhart  
Unio Gallery, <http://courses.smu.edu/mcb095f/gallery>



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# GRAY BAT

Historically, 2.25 million gray bats lived in limestone caves throughout the southern and Midwestern United States. Aware that gray bats were imperiled by habitat disturbance and faced with extinction, the U.S. Fish and Wildlife Service (FWS) used Endangered Species Act protections to arrest the bat's decline.



Private Forest Management Team

### HISTORY OF ENDANGERMENT

Gray bats are meticulous in selecting maternity and hibernation caves. Even with thousands of potential caves, the bats raise their young in only five percent of them. Gray bats find ideal maternity and roosting sites only where streams run through large, dome-shaped caves that collect heat at the ceiling. The bat is equally particular about hibernation sites, requiring deep, vertical caves that trap cold air.

Human activity in or near the caves can cause the bats to vacate caves entirely or drop their offspring to the cave floor during the breeding season. Such disturbance to a single cave could annihilate an enormous percentage of the species. Thus, the gray bat is endangered throughout its range.

Bats also suffer from pesticide use on agricultural land. Chemical pesticides flow into the water bodies where bats forage, poisoning aquatic insects, which the bats eat.

By 1976, the year the species was listed as endangered, habitat disturbance and

other threats had reduced the gray bat population to just 128,000.

### ROAD TO RECOVERY

The FWS has started to reverse the bat's decline by purchasing and protecting some of its most valuable habitat. In particular, the FWS now owns the Blowing Rock and Sauta Caves in Alabama, two of the species' most important summer roosting sites. The FWS also acquired Fern Cave, the site of the greatest population of hibernating bats. The entrances to these and many other caves are gated to keep curious visitors from agitating roosting and hibernating bats.

The gates have proven successful; the total gray bat population is estimated to be 1,500,000 individuals. More than 250,000 bats live in Sauta Cave alone, almost double the number left in the country at the time of the bat's endangered listing.

### CONSERVATION TODAY

Many protected caves and surrounding lands have been designated as National Wildlife Refuges. Management within these refuges exemplifies the FWS's ecosystem approach to conservation. With this model, bats are not viewed in isolation; proper management of all living organisms near the cave including plants, animals, and human settlements, are considered in conjunction with environmental factors such as water and air quality in and around the cave.

### ECOLOGICAL & ECONOMIC VALUE

Gray bats play a vital role in keeping ecosystems in balance. A single bat can catch hundreds of insects during its nightly forage, and bat colonies are known to eat tons of insects each night. Some of the prey insects are beetles and moths that can destroy crops, costing farmers hundreds of thousands of dollars.

### OUTLOOK FOR THE FUTURE

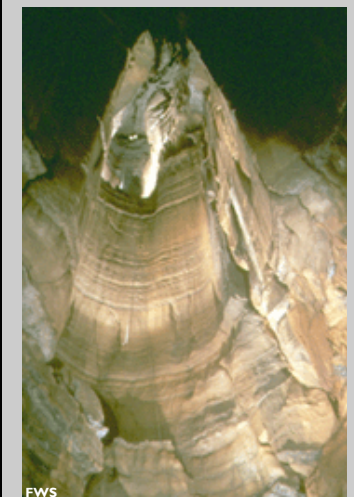
Gray bat populations are on the path to recovery. However, several management activities must continue to ensure that entire bat colonies, some of which constitute large segments of the remaining population, are not wiped out.

Given the very few caves used by the gray bat, gating of roosting and hibernating habitat must continue. Where entrance into caves is permitted, visitors and spelunkers must be educated about the vulnerability of bats and how to avoid disturbing them.

Pesticide contamination remains a problem for bats. Efforts to rid bat habitat of the poison and control its future spread will pay ecosystem-wide dividends.



Kentucky Bat Working Group



FWS



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# GRAY WOLF OF THE GREAT LAKES

Approximately 3,100 gray wolves are living in the Great Lake states of Michigan, Minnesota, and Wisconsin, with the majority occupying forest and remote areas of the region. Gray wolves were once one of the reigning mammals in North America, but their population has been decimated. With Endangered Species Act protections, recovery efforts have started to make a difference.



FWS

Act protections, recovery efforts have started to make a difference.

### HISTORY OF ENDANGERMENT

Historically, gray wolves once occupied all or significant portions of the lower 48 states. However, human persecution through hunting and predator control programs, the diminished availability of prey, and the loss of habitat took its toll. In the 1960s, wolf populations had dropped to the point where only 300 animals could be found in northern Minnesota, along with an estimated population of 20 wolves on Isle Royale.

### ROAD TO RECOVERY

In 1974, gray wolves were listed as endangered. Under these protections, Great Lakes populations increased substantially in Minnesota, and wolves naturally recolonized in parts of northern Wisconsin and Michigan's Upper Peninsula. By 1978, Minnesota's wolf population was downlisted to threatened. Wolves in other parts of the lower 48 states, including the Rockies, have also benefited from listing under the Endangered Species Act.

### CONSERVATION TODAY

Wolves continue to be one of the more popular of our country's endangered species, and many local and national organizations remain dedicated to saving these majestic creatures. In the Great Lakes region, wolves and people

coexist quite peacefully amid these recovery efforts.

### ECOLOGICAL & ECONOMIC VALUE

As carnivores at the top of the food web, gray wolves help maintain diverse and healthy ecosystems. Wolves improve the gene pool of their prey species over time by culling old, sick, and genetically inferior individuals. In addition, carrion left over from wolf kills increases food sources available for a wide range of scavenging species, which may help to increase biodiversity by leaving adequate foods available to other species. Without wolves and other top predators, the number of herbivores can skyrocket leading to overgrazing, decreases in ground-nesting bird and small mammal populations, and an unhealthy ecosystem.

Wolves are also a tremendous tourism draw for many states. In Ely, Minnesota, a survey was conducted to assess the impact of a local wolf recovery center on the surrounding community. The results clearly showed that wolves are indeed a



Gary Kramer/FWS

tourist attraction. In total, the wolf center had \$3 million impact on the local economy in one year and either directly or indirectly provided the equivalent of 66 full-time jobs. According to the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 39 percent of all American adults participate in some form of wildlife-related recreation, including fishing, hunting, and wildlife watching. Wildlife watchers alone spent \$38.4 billion in 2001.

### OUTLOOK FOR THE FUTURE

The Endangered Species Act has helped gray wolves to recover, but the future of the species may not be so bright.

On April 1, 2003, wolves within the Great Lakes region were designated as part of the Eastern Distinct Population Segment and reclassified from endangered to threatened. The Fish and Wildlife Service has since proposed delisting this wolf population entirely and removing its federal protections. Once delisting occurs, wolf management will be handed over to the states.



Lurray Parker/FWS



FWS



John & Karen Hollingsworth/FWS



FWS

## 30 YEARS OF THE ENDANGERED SPECIES ACT

## GREEN SEA TURTLE

Green sea turtles are among the oldest reptiles on earth; the turtle's ancestors began gracing the seas 150 million years ago. The periphery of the green sea turtle's range can extend as far north as New York, though it is found mainly in tropical areas of the Atlantic, Pacific, and Indian Oceans. Several factors contributed to the species' decline, and the Endangered Species Act has been an important tool to ensure that green sea turtles survive for millions more years.

HISTORY OF ENDANGERMENT

Historically, green sea turtles were coveted as a meat high in protein. Later, turtle meat became a delicacy, and green sea turtles became commercially important for cosmetics and leather.

Green sea turtles nest on open beaches that are vulnerable to erosion, storms, human traffic, and development. Lights from vacation resorts along the coast bewilder breeding females, discouraging them from coming ashore. The lights also disorient hatchlings, luring them away from the ocean.

Green sea turtles can mistake pollution, such as plastic bags and styrofoam, for food that, when consumed, interferes with digestion and can poison the turtles with toxic chemicals.



In recent history, commercial fishermen have had the most devastating effect on green turtles, which are often snared by fishing gear intended for other species. Longlines and fishing nets entangle tur-

gles, drowning them because they are unable to rise to the surface to breathe.

ROAD TO RECOVERY

In 1978, green sea turtles were listed as endangered in Florida and along the Pacific coast of Mexico and threatened in the rest of their extensive range. To comply with the Endangered Species Act,



David Vogel/FWS

Turtle Excluder Devices have been added to fishing nets in order to allow sea turtles to escape.

Lighting ordinances have been enacted in areas surrounding vital green turtle nesting grounds, particularly in Florida.

CONSERVATION TODAY

Habitat acquisition and protection have been fundamental in the green sea turtle's turnaround. The National Marine Fisheries Service, the U.S. Fish and Wildlife Service, state governmental agencies, and conservation groups have teamed up to recover green sea turtles. In Florida, the Archie Carr National Wildlife Refuge was established to protect one of the most productive nesting grounds in the world for green sea turtles. Thirty-five percent of the world's remaining green sea turtle population nests on the twenty mile stretch of beach within the refuge. Since the refuge's designation in 1991, green turtle nests have gone from zero in 1982 to a remarkable 2,970 nests in 2002.

ECOLOGICAL VALUE

The problems facing green sea turtles—development, pollution, and poor regulation of the fishing industry—do not affect turtles alone. The best available science shows that ecosystems are intricately intertwined. Therefore, near extinction of green sea turtles could decimate other species that depend on them for survival in a chain reaction that ends with the break down of the entire ecosystem.

OUTLOOK FOR THE FUTURE

The success of green sea turtles in Florida's Archie Carr National Wildlife Refuge demonstrates that habitat protections play a critical role in species recovery. It also underscores the importance of protecting more of the turtle's breeding grounds. As population growth explodes in Florida and throughout the south, there will be continuous pressure to develop more and more of the turtle's habitat. The Endangered Species Act remains one of the only mechanisms available for the on-going protection of the turtle.

There is also a need to further reform fishing practices to reduce the unintended capture of sea turtles by longlines and fishing nets. Fishermen often throw back into the ocean as much as a quarter of their catch, which frequently includes green sea turtles.



FWS



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# GRIZZLY BEAR

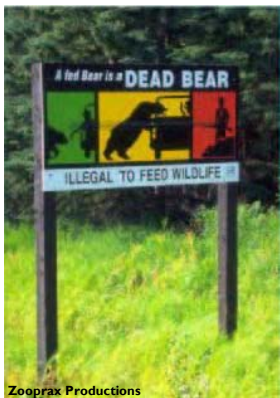
Experts agree that the grizzly bear would have disappeared in the lower 48 states but for protections afforded in 1975 by the Endangered Species Act.

### HISTORY OF ENDANGERMENT

As many as 50,000 to 100,000 grizzlies roamed the west before Europeans arrived, but fewer than one thousand (or one to two percent) remained in the lower 48 at the time of listing in the Northern Rockies and North Cascades. The primary reasons for this precipitous decline were destruction of habitat and excessive killing of an animal with one of the lowest reproductive rates in North America.

### ROAD TO RECOVERY

Endangered Species Act protections stopped grizzly hunting. The law also prompted cleanup of garbage dumps and other sources of human foods, thereby minimizing grizzly-human conflicts. And the Endangered Species Act's "look before you leap" requirements led to: 1.) mitigating harmful developments; 2.)



reducing road-building and logging in key habitat, and; 3.) reducing domestic sheep grazing, which was a major source of human-bear conflicts and grizzly mortality. Grizzly recovery has been slow, and the size of the two most robust of the remaining populations (Yellowstone and Glacier) have only increased slightly since 1975. The other three populations—the Selkirks, Cabinet Yaak, and North Cascades—are so small that the U.S. Fish and Wildlife Service has determined they are "warranted" for up-listing to endangered status, a designation not granted due to other agency priorities.

### CONSERVATION TODAY

Conservation organizations are working to protect remaining habitat and ensure ecological connections between Yellowstone and other ecosystems to the north and west, including Canada. Experts maintain that expanding and reconnecting fragmented habitat could support perhaps 3,000 grizzlies in the lower 48 states, which, if achieved, would constitute sustainable populations.



Considerable effort is now focused on reducing human-bear conflicts and human-caused bear mortalities, which have recently ranged between 20 and 40 each year. Strides are being made in some areas, particularly through garbage management and education.

### ECOLOGICAL & ECONOMIC VALUE

Because grizzlies require large areas of secure habitat in order to survive, protection of their habitat means that habitat is maintained for all other wildlife, large and small, from the wolf and lynx to fish and songbirds. As pioneering bear researchers Frank and John Craighead said, saving the Great Bear will save their wildland ecosystem.

A 2001 national recreation survey conducted by the Department of Interior revealed that 82 million U.S. residents 16 years old and older participated in wildlife recreation and spent \$38.4 billion pursuing these activities, including nearly \$3.5 million in the Rocky Mountain region.

### OUTLOOK FOR THE FUTURE

The grizzly is still threatened by energy development, rural sprawl, logging, and motorized vehicle use, which are mounting in previously secure habitat.

Out of the five remaining grizzly populations, the Cabinet Yaak population is now on the verge of extinction, with as few as 10 to 15 grizzlies. A proposed mine in key habitat would, if built, likely lead to the extinction of this tiny population.

The Glacier grizzly population is threatened by energy development along the Rocky Mountain Front, as well as mounting off road vehicle use.

In Yellowstone, development pressures, global warming, and introduced diseases threaten key grizzly food sources such as whitebark pine seeds and Yellowstone cutthroat trout. Loss of these key foods in core grizzly habitat will force the bear to roam more widely, expanding the size of habitat needed for recovery.

If the Fish and Wildlife Service removes the Yellowstone grizzly from the endangered species list, oil and gas development, logging and roadbuilding, and other harmful extractive industries will have easier access to grizzly habitat. Further, a grizzly bear hunt will be renewed in Idaho, Montana and Wyoming. Together with habitat loss, this hunt could push the grizzly closer to extinction in the long-run.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## KARNER BLUE BUTTERFLY

The Karner blue butterfly lives in pine barrens of the upper Midwest and Northeast. Efforts under the Endangered Species Act to restore butterfly habitat may spark its recovery.

## HISTORY OF ENDANGERMENT



The key to Karner blue survival is wild blue lupine, a wildflower that grows in pine barrens and oak savannas. The Karner blue butterfly

lays its eggs on the blue lupine, and its caterpillars feed exclusively on its leaves. Pristine pine barrens and oak savannas are mosaics of woody vegetation and open grasslands, maintained by wildfires that keep hardwood trees at bay. This ecosystem provides ideal habitat for the Karner blue because, in addition to blue lupine, resident species like dogbane and New Jersey tea supply nectar to the adults.

Development, fire suppression, and conversion of land for agriculture have destroyed these delicately balanced areas. Logging, grazing, and urbanization—all driven by rapid population growth—further damage butterfly habitat.

The Karner blue was listed as an endangered species in 1992. Biologists believe the species is now extinct in Massachusetts, Ohio, Pennsylvania, and perhaps Illinois. There have been few occurrences in Michigan, New York, New Hampshire, and Minnesota. The largest remaining concentration is in Wisconsin.

## ROAD TO RECOVERY

The Wisconsin Department of Natural Resources has launched a habitat conservation plan that coordinates corpo-

rate interests, private landowners, and governmental agencies. The plan establishes guidelines that allow landowners to engage in development activities, even on butterfly habitat. For example, the Department of Transportation can help butterfly survival by adopting a mowing regime that avoids lupine areas from mid-April through September when the butterflies need the plants.

Habitat restoration programs in New Hampshire also have paid dividends for the Karner blue. The state Department of Fish and Game, working closely with the New Hampshire Army National Guard, U.S. Fish and Wildlife Service, and the city of Concord, has a prescribed fire program that restores butterfly habitat. In 2000, the last remaining wild butterfly populations had been extirpated from the state. With eggs from New York, the Department began rearing and breeding the butterfly in captivity to reintroduce into the wild. For the first time, in 2003 the butterfly began mating and reproducing in the wild. As early as next year, wildlife managers expect significantly improved populations.

## CONSERVATION TODAY

Reintroduction and habitat restoration programs in Wisconsin and New Hampshire have helped to save Karner blue populations. In addition, researchers are studying the butterfly to determine ways to better manage the land for the butterfly's survival.

## ECOLOGICAL VALUE

The Karner blue butterfly shares its habitat with other rare species, including the frosted elfin butterfly, Blanding's turtle, and loggerhead shrike. These species' survival prospects are improved by restored Karner blue habitat.

## OUTLOOK FOR THE FUTURE

Under the Endangered Species Act, management at the state level may save the Karner blue butterfly from extinction. However, the species' numbers are still perilously low and habitat restoration continues, but with difficulty.

The butterfly's pine barren habitat is naturally maintained by fire. Recreating that process can pose problems, as human development often borders the targeted restoration areas. Habitat managers go to great lengths to protect surrounding communities from fire.

The greatest problem that plagues the butterfly is development that sprawls from urban areas into open space. When habitat is used for commercial and residential development, butterfly populations quickly decline. Fragmented habitat—small areas of ideal habitat separated by roads or other development—keep butterfly populations from expanding and colonizing nearby pine barrens.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# KEY DEER

Competition between man and deer for limited land on Big Pine Key, Florida is the story of the Key deer and its decline. The slow recovery of the species in the midst of scarce land demonstrates the cooperative nature of the Endangered Species Act.



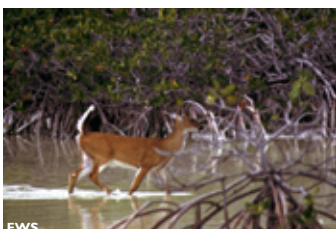
John Oberheu/FWS

### HISTORY OF ENDANGERMENT

Key deer are a smaller, salt-tolerant subspecies of the white-tailed deer. Key deer originally ranged throughout the southern Florida Keys, but were hunted to near extinction during the 1900s. By 1950 only about 25 deer remained. In 1973, when Congress passed the Endangered Species Act, the Key deer was among the first species listed.

In 1970 Big Pine Key was sparsely populated with barely 1200 residents, and the Key deer pinelands were virtually untouched. In the 1970s, tourism, road building, and housing increased dramatically. At the time, the U.S. Fish and Wildlife Service (FWS) estimated that all privately owned land would be cleared within 20 years if the rapid rate of development continued.

Habitat loss to roads and highways poses another threat to the Key deer, as many are killed by traffic on the Keys.



FWS

### ROAD TO RECOVERY

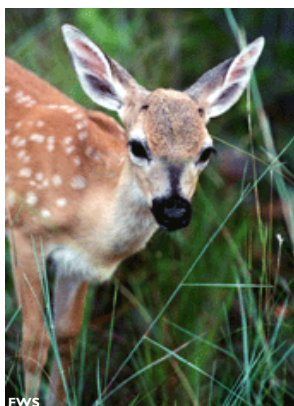
The National Key Deer Refuge was established in 1957. At the refuge, wildlife managers monitor the health of the species, restore and enhance the deer's limited habitat with prescribed fire, and control the spread of invasive, non-native species that can wreak havoc on the ecosystem. Through the Endangered Species Act and the refuge, the Key deer population today numbers over 500.

### CONSERVATION TODAY

In the National Key Deer Refuge, the FWS is helping Key deer to recover through a combination of land acquisition, habitat restoration, and wise land management. The Endangered Species Act provides for the FWS to pay private landowners a reasonable price for their land, which the federal agency manages to promote the species' survival.

The Endangered Species Act has also

allowed private landowners and local governments in the Keys to work out a cooperative agreement with FWS, called a Habitat Conservation Plan, which attempts to provide long term solutions to conflicts between human development desires and species habitat needs.



FWS

### ECOLOGICAL & ECONOMIC VALUE

The Key deer are the centerpiece of the unique ecosystem which has evolved in the Florida Keys pinelands.

In addition to their biological value, they are also a popular tourist attraction, drawing 90,000 visitors annually to the National Key Deer Refuge.

### OUTLOOK FOR THE FUTURE

Without the Endangered Species Act, Big Pine Key could be devoid of Key deer. Although the species is staging a comeback, the threats of living so close to human development continue to plague the species.

One of the biggest problems these days is illegal roadside feeding. Hand feeding makes deer less wary of humans, leading to poaching, health problems from non-natural food, and the spread of disease between deer that congregate in likely feeding areas. Furthermore, road kills account for 70 percent of the deer's mortality, as they are fed near highways by motorists.

Population growth in Florida is not expected to subside. In fact, the state is experiencing its fastest population growth ever. Even though habitat protections have improved the Key deer's chances of survival, increasing development continues to jeopardize the species.



Defenders of Wildlife



Defenders of Wildlife



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## LYNX IN THE SOUTHERN ROCKIES

Although Canada lynx historically ranged across the Southern Rockies, sustained trapping and habitat degradation and loss reduced lynx in the region to very small numbers and possibly extirpated them altogether. Colorado initiated a release effort in 1999 that has, so far, enjoyed significant success. Although recovery of lynx in the region is still uncertain, the birth of wild lynx kittens in the spring of 2003 marks a key milestone in this effort.

HISTORY OF ENDANGERMENT

Canada lynx once lived throughout the mountains of Colorado, northern New Mexico, southern Wyoming, and occasionally the Uinta Mountains of Utah. While possibly never occurring in high numbers, they clearly existed in much greater abundance at the beginning of the 20<sup>th</sup> century than at the beginning of the 21<sup>st</sup>. Trapping devastated populations of lynx and other native carnivores. Habitat loss, degradation, and fragmentation exacerbated their decline. If indigenous lynx remain in the region, they occur in extremely small numbers.

ROAD TO RECOVERY

In 1999, while an Endangered Species Act listing petition for the Canada lynx was pending, the state of Colorado undertook an effort to recover the lynx in the Southern Rocky Mountains. In hopes that the lynx would begin reproducing, the Colorado Division of Wildlife transported and released animals from the northern part of the range into the south.

Through this effort, the state has released a total of 129 lynx



Colorado Division of Wildlife

in southwestern Colorado over the last five years. Initial mortality rates were high, but they have since dropped. The

program is now celebrating the first known wild lynx births in the region. At last count, 16 lynx kittens had been found in the spring of 2003, the first documented lynx reproduction in decades.



Sinapu

CONSERVATION TODAY

The future for lynx in the Southern Rockies looks promising if land management agencies like the Forest Service protect lynx habitat and if state agencies adopt and implement programs to minimize accidental lynx deaths. The Endangered Species Act has played an important role in encouraging and facilitating the lynx recovery effort in the Southern Rockies. The Endangered Species Act ensures that shooting and trapping lynx remain illegal and provides incentives for states like Colorado to adopt programs aimed at reducing the likelihood of accidental deaths. Endangered Species Act protection for the lynx is also resulting in increased attention to protecting lynx habitat.

ECOLOGICAL VALUE

As a result of rapid human population growth, rampant urban sprawl, poorly managed recreation, and unchecked resource extraction, we have wiped out virtually every top carnivore in the Southern Rockies ecoregion. Restoring the lynx means conserving critical old growth forest habitat, managing recreation and motorized travel, and protecting key wildlife linkages.

OUTLOOK FOR THE FUTURE

Although the birth of wild lynx kittens is a critical milestone, the future depends on both habitat protection and human tolerance and acceptance of the species. Forests with large trees and woody debris on the ground provide the best habitat. Unfortunately, these areas are often targeted for commercial logging.

Roads and motorized recreation also take a toll. Lynx are killed in collisions with vehicles; competitors like coyotes and bobcats use motorized routes to travel into lynx habitat; and roads fragment and degrade habitat. Ski resort development continues to devastate key lynx habitat, and other land uses, such as oil and gas development, also pose a serious threat.

While habitat degradation and loss pose the greatest threat, lynx continue to be shot and trapped by humans. Because of the lynx's status as a threatened species under the Endangered Species Act, it is no longer legal to kill lynx. However, lynx are mistaken for bobcats by hunters and sheepherders, and traps set for other carnivores easily kill lynx. As a result, hunting and trapping, which decimated native lynx populations, remain a threat.



Colorado Division of Wildlife



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## MASKED BOBWHITE QUAIL

One of Arizona's most famous birds, the masked bobwhite quail was saved from extinction by the Endangered Species Act.

HISTORY OF ENDANGERMENT

The known range of the masked bobwhite in the United States includes the Altar and Santa Cruz valleys in Arizona. The masked bobwhite was first identified in 1884 and was recognized as highly endangered just a short while later. The primary cause of this bird's imperilment was cattle grazing, which depleted native grasses and forbs vital for bobwhite nesting and foraging cover. In addition, cattle grazing caused the invasion of scrub into the desert grassland almost irreversibly destroying masked bobwhite habitat.

By the early 1900s, the masked bobwhite was feared extinct. Occasional sightings continued through the early 20<sup>th</sup> century, and a population was found in the wild near Sonora, Mexico in 1964. Some masked bobwhites were captured from the Sonora site to provide a breeding stock for a captive propagation program in the United States.

ROAD TO RECOVERY

The masked bobwhite quail was first listed under the Endangered Species Conservation Act of 1969 and was subsequently designated as an endangered species under the Endangered Species Act of 1973. The masked bobwhite recovery plan provides for the establishment of two viable populations in the United States, cooperation with the Mexican government to reintroduce two or more

populations to Mexico, and the maintenance or increase of the existing population in Mexico.

In 1985, Arizona's Buenos Aires National Wildlife Refuge, containing approximately 118,000 acres of savannah grassland in the Altar Valley, was created for the masked bobwhite. It contains the only population of the birds in the United States.

CONSERVATION TODAY

There are nearly 1,000 masked bobwhites in a breeding facility on the Buenos Aires National Wildlife Refuge, the chicks from which are annually released into the wild. Population estimates in the wild at the refuge are approximately 300 to 500 individuals. No cattle grazing or quail hunting is permitted on the Buenos Aires refuge. In addition, habitat restoration on the refuge includes prescribed burning to restore native grasses, inhibit woody vegetation, and stimulate the growth of important bobwhite food plants. However, the refuge has not been able to sustain a viable, breeding population. Although recent prescribed burns have resulted in some native grasses re-emerging, more habitat restoration is urgently needed.

ECOLOGICAL & ECONOMIC VALUE

Conservation of the masked bobwhite has provided collateral protection to a wide range of wildlife species in the southwest. The Buenos Aires National Wildlife Refuge provides refuge to more than 325 bird species, 53 species of reptiles and amphibians, and 58 mammal species, many of which are endangered. In a 2001 survey, the U.S. Fish and Wildlife Service found that some 66 million American adults watch wildlife annually and spend \$38.4 billion per year in expenses related to this activity. In addition to its striking appearance and high public profile, the masked bobwhite is very popular to bird watchers in the southwestern United States.

OUTLOOK FOR THE FUTURE

The recovery plan for the masked bobwhite estimates that downlisting should be initiated in 2003. However, downlisting criteria have not been met. In particular, only one population of masked bobwhites exists in the wild in the United States, and this population persists only because of repeated release of captive-bred birds. Without any viable populations of masked bobwhites in the United States, and decreasing populations in Mexico, there is grave cause for concern. In addition, dependence on captive breeding as a longterm recovery strategy is problematic given the potential for genetic problems related to captive propagation.

However, without the protective provisions of the Endangered Species Act, masked bobwhites would likely have vanished altogether. With more habitat protection and continued conservation efforts, the masked bobwhite can have a second chance.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# MAUNA KEA SILVERSWORD

The Mauna Kea silversword, a plant subspecies that grows on the high slopes of Hawaii's Mauna Kea volcano, is a dramatic plant covered in foot long



© Gerald D. Carr

dagger-like leaves and silvery hairs that grow to form a rosette two feet in diameter. Today, scarcely four dozen of the plants survive, but management efforts following

the plant's endangered listing are helping the species to recover.

### HISTORY OF ENDANGERMENT

The decline of the Mauna Kea silversword is primarily the result of grazing mammals that were introduced to the island by humans. Feral sheep and goats, as well as mouflon sheep imported for sport hunting, have reduced the silversword's range to steep cliffs, which constitute about one percent of its original range.

Secondarily, the silversword's reproduction has slowed due to decreased levels of pollinators.

The root of the problem lies in human impacts on naturally rare and specialized species. The silversword illustrates the fate that awaits—or has already overtaken—many island species.



M. Brueggemann/FWS

### ROAD TO RECOVERY

The Mauna Kea silversword was federally listed as an endangered species in 1986. Since then, mouflon sheep and feral goats that grazed and trampled the

plants have been removed from the silversword's forest reserve, and the plants have begun to increase in number.

### CONSERVATION TODAY

Reduced to a single naturally occurring population outside of the Waipahoehoe Gulch, today's conservation efforts are seeking to establish new populations of the species to help it reclaim some of its former territory.



© Gerald D. Carr

Other conservation measures that have been put in place include hand pollination of the plants by biologists and the subsequent collection and propagation of seeds from the flowers. This assisted propagation, coupled with other projects designed to protect the plants and their habitat from exotic species, offer the best hope for the continued survival of the Mauna Kea silversword.

### ECOLOGICAL VALUE

The ecological value of the Mauna Kea silversword comes from this plant's relatively unique life cycle. After germination, it can take up to 50 years for the silversword to bloom, which it does only once before dying.

The plant itself is a beautiful, majestic specimen that produces a five-foot tall stalk of one-inch flowers. Dramatic and beautiful, silverswords are popular tourist attractions in Hawaii.

### OUTLOOK FOR THE FUTURE

The outlook for the Mauna Kea silversword, once bleak, is now bright.

There are, however, a number of challenges still to overcome. Grazing livestock pose a threat to the species. Exotic insects are also a continuing problem, as ants and wasps not native to the island devastate populations of yellow-faced bees, the natural pollinator of the silverswords.

However, continued efforts targeted at introducing populations into the wild should remain successful and will help ensure the survival of this island plant species.



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M. Brueggemann/FWS



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## PEREGRINE FALCON

Peregrine falcons were listed as endangered in 1970 and removed from the list in August 1999. Though considered fully recovered, peregrine falcons will continue to be monitored under the Endangered Species Act through 2013.

HISTORY OF ENDANGERMENT

Before 1940, there were an estimated 3,875 pairs of breeding peregrine falcons in North America.

As many as 350 pairs were estimated to exist in the eastern United



States. In the 1940s, however, peregrine falcons started suffering significant declines due to indiscriminate use of the pesticide DDT.

In the 1800s and early 1900s, prior to the DDT-induced decline, eastern peregrine populations began to decline primarily due to egg collection, nestling collection, and intentional shooting. Shooting of adult peregrines was thought to have caused the most significant mortality in most areas, but in some states biologists estimated that egg collectors reduced populations by as much as 33 percent. For example, at least 49 clutches were taken from one Massachusetts nesting site from 1864 to 1931, and as many as three clutches were taken in one breeding season.

By 1970, only 10 to 20 percent of the historical falcon population remained. Although the decline was nearly global, the eastern U.S. and European populations suffered the greatest losses. A 1964 survey documenting the decline in North America did not find a single occupied cliff in the eastern states or Canadian maritime provinces.

Modern threats to peregrines are direct human disturbance to nesting birds,

trauma from collisions with vehicles and aircraft, environmental contamination, and loss of habitat.

ROAD TO RECOVERY

The pesticide DDT was banned in 1972, a few years after the peregrine was listed as an endangered species. Without the threat of DDT and with the protection of the Endangered Species Act, there was hope for re-establishing peregrines.

Under the Endangered Species Act, the U.S. Fish and Wildlife Service (FWS) and its recovery teams produced four regional recovery plans. Each plan included the release of captive-bred young to historic nesting sites (excluding Alaska), the protection and enhancement of critical breeding and wintering habitat, increasing and maintaining productivity in the wild, preventing human disturbance to nesting sites, and identifying causes of mortality and reduced productivity.

Reintroduction continued during the 1990s. A total of 6,000 peregrines were released in 34 states from 1974 to 1997.

CONSERVATION TODAY

By 1997, there were more than 1,400 pairs of peregrines maintaining breeding territories in North America, more than double the original recovery goal of 631 pairs. These recovery efforts were deemed so successful that the FWS removed the peregrine falcon from the list of endangered species in August 1999.

ECOLOGICAL VALUE

As a top predator in its ecosystem, the peregrine falcon helps to control populations of its prey species, mostly smaller birds, and keep the ecosystem in balance.

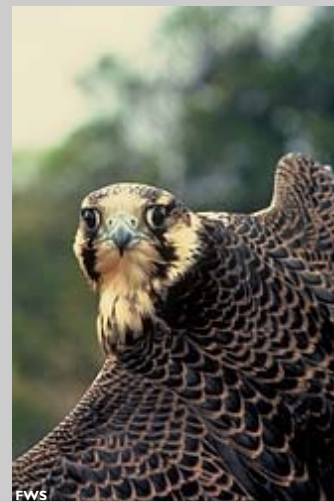
The falcon's rapid decline after the widespread use of DDT also identifies the species as an indicator of environmental health.

OUTLOOK FOR THE FUTURE

Since the peregrine is no longer protected by the Endangered Species Act, there is no federal law that protects peregrine breeding habitat. States are continuing to try to minimize disturbance at nesting sites and protect habitat for the long term, but there is no federal law backing these protections.

Following the final rule to delist the peregrine falcon nationwide, the Fish and Wildlife Service developed a post-delisting monitoring plan, which addresses issues such as harvesting for falconry and the use of falcons in sample surveys to monitor population trends.

The monitoring plan is meant to ensure that healthy falcon populations are maintained. Unfortunately, the population assessments that warrant the take of the chicks for falconry were derived from outdated data that may allow too many chicks to be taken. As a result, falcon counts in Nevada, New Mexico, and Utah have indicated that peregrine numbers are on the decline.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# PIMA PINEAPPLE CACTUS

The Pima pineapple cactus was once abundant throughout its small range in the lower Sonoran Desert of southern Arizona. Over time, the growth of several cities and surrounding communities endangered the cactus and its habitat. The Endangered Species Act saved the Pima pineapple cactus from extinction, and a conservation plan is in the works to protect the remaining habitat for the cactus.



Photo by Lorena B. Moore, [www.mineralarts.com](http://www.mineralarts.com)

### HISTORY OF ENDANGERMENT

The Pima pineapple cactus naturally occurs only within a 50-mile by 45-mile area of Sonoran Desert grassland and scrub in southern Arizona and northern Sonora, Mexico. Only about 1,500 individual cacti remain in the United States.

Over the past 150 years, urban sprawl, livestock grazing, mining, the introduction of non-native grasses, and modification of the fire regime have radically altered the landscape of the Sonoran desert grassland and scrub habitat. Trampling by cattle and off-road vehicles also are serious threats to the cactus.

The primary threat, however, is sprawling development in several urban areas; an estimated 75 percent of the cactus's current range could be lost to urban development around Tucson in the next few years.

### ROAD TO RECOVERY

The Smithsonian Institution recommended in its 1975 report on 1,726 imperiled plants that the Pima pineapple cactus be listed as threatened. However, like many other plants in that petition, the cactus languished unprotected for years as populations declined further. It was finally listed as endangered in 1993.

Since that time, agencies and individuals have made attempts to protect indi-

vidual cacti where they are found. However, it was not until recently that a comprehensive plan to protect the habitat was proposed. Currently, the Sonoran Desert Conservation Plan, a habitat conservation plan for 5.9 million acres in southern Arizona, proposes to manage human development and open space to protect habitat for the Pima pineapple cactus and a multitude of other species, as well as preserving the character of the desert as a whole.

### CONSERVATION TODAY

The cactus has now been listed as Endangered for ten years. Although it is far from recovered, its prospects have vastly improved with protections from the Endangered Species Act and subsequent funding for management and monitoring.

The Sonoran Desert Conservation Plan will offer habitat protection for the cactus and other endangered species, set guidelines for land management within the habitat, and bring in federal funding for surveys and land acquisition for the protection and recovery of threatened and endangered species.

### ECOLOGICAL VALUE

The Pima Pineapple cactus is an integral part of the Sonoran Desert ecosystem. Beautiful silky yellow flowers bring color to the desert each summer. The succulent fruits provide an essential source of food and water to several desert animals.



Tom Newmahr/FWS

The protection of the Pima pineapple cactus is one of the issues

driving the Sonoran Desert Conservation Plan, which offers to protect habitat for 19 other threatened and endangered species. It is widely accepted that this is necessary to maintain ecological integrity, quality of life, and economic growth in the area.

### OUTLOOK FOR THE FUTURE

The survival prospects for the Pima Pineapple cactus and all native species within their range have greatly improved with endangered species listing.

While the increasing population of Pima county, with a growth rate of 25 percent every 10 years, continues to encroach on more habitat, the proposed Sonoran Desert Conservation Plan provides hope for the cactus and other endangered species, as well as the desert in general. Without such a plan, conservation efforts will likely continue to be piecemeal at best, and populations will very probably decline as more desert habitat is lost under uncontrolled development.



Photo by Lorena B. Moore, [www.mineralarts.com](http://www.mineralarts.com)



Daniel Patterson



Jim Rorabaugh/FWS



## 30 YEARS OF THE ENDANGERED SPECIES ACT

# PINE HILL PLANTS

The Pine Hill plant community is a collection of native plants, including eight rare species, which have adapted to unusual soil and climate conditions in a small area in the foothills of the Sierra Nevada. Approximately 740 distinct plant species have been recorded in the Pine Hill area, and five Pine Hill plant species are protected under the Endangered Species Act.

### HISTORY OF ENDANGERMENT



Habitat loss has been the most significant risk factor for Pine Hill plants. Extensive housing construction and commercial development have reduced their habitat to a small fraction of original gabbro soils, which are generally deep red, mildly acidic, rich in iron and magnesium, and low in calcium.

In addition, human suppression of fire, once a natural process in the California foothills, has restricted the normal reproduction of fire-adapted species and allowed other plants to move into the ecosystem. Non-native plants threaten Pine Hill plants by competing with them for water, nutrients, and sunlight. Declines in native wildlife such as native insect pollinators further imperil the rare plants.

In 1996, concern about five Pine Hill plants—Pine Hill ceanothus, Stebbins' morning glory, El Dorado bedstraw, Pine Hill flannelbush, and Layne's butterweed—resulted in their listing as threatened or endangered under the Endangered Species Act.

### ROAD TO RECOVERY

To protect this unique plant community, a consortium of state and federal agencies, local governments, and the local na-

tive plant society established the Pine Hill Preserve. The Preserve provides a safe and stable habitat for the preservation of the Pine Hill rare plants and the ecosystems in which they live.

When complete, the Preserve will comprise about 5,000 acres of habitat. Though only about one sixth of the original reach of the plant community, this area should be large enough to maintain the viability of the species. By covering as much of the gabbro soil region as possible, the Preserve maximizes the biological integrity and diversity of the original plant and animal communities.

### CONSERVATION TODAY

A centerpiece of the Preserve's management is its fire plan. In order to keep the risk of catastrophic fire to a minimum and to maintain the health of the fire dependent rare plant community, an ongoing program of fuel reduction and careful prescribed burning on Preserve lands is critical. Protection of human life and property is the highest priority.

### ECOLOGICAL & ECONOMIC VALUE



All native plants are integral to the function of ecosystems. For humans, their inherent beauty and diversity attracts wildflower watchers and naturalists. But plants also offer an irreplaceable bank of chemical products and genetic traits—over half of all medicines are derived from wild plants. Humans already rely on the genetic diversity in wild plants to protect crops from disease

and climate change. Because the rare plants in the Pine Hill Preserve thrive on inhospitable and infertile soils, they may eventually teach us lessons about rehabilitating degraded lands and using marginal lands.

### OUTLOOK FOR THE FUTURE

The Endangered Species Act saved Pine Hill plants from an almost certain extinction. But protecting enough habitat for Pine Hill plants to recover is an ongoing challenge. The plants are part of a unique community of nearly 10 percent of the native plant species in California. All of these plants are confined to an area of 30,000 acres, making it a nationally significant site of species diversity.

Three rare plants are endemic to the Pine Hill region, meaning that they grow nowhere else in the world. Thus, if we lose even a small portion of this habitat, these plants could quickly be extinct.

The Pine Hill Preserve encompasses 3,100 acres, more than 60 percent of the ultimate goal for protected land. Procuring the remaining land and continuing to fund management of the Preserve is the key to the species' survival.



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## PIPING PLOVER

**N**amed for its melodic call, the piping plover, like many other shorebirds, is threatened by habitat loss and human disturbance. The Endangered Species Act has provided for intensive management of important nesting areas reversing the decline of the Great Lake and Atlantic populations. The Great Plains population is declining, however.

HISTORY OF ENDANGERMENT

The piping plover nests on beaches of the northeast Atlantic coast, shorelines of the Great Lakes, and river sandbars and lake shorelines of the Great Plains. The plover winters from North Carolina to eastern Mexico.

Piping plovers originally disappeared due to excessive hunting for the milliner trade, but they recovered partially after the enactment of the Migratory Bird Treaty Act. However, after the 1940s, the populations again declined sharply.

Coastal development has destroyed much of the piping plover's beach habitat on the Atlantic

Coast during the past 60 years. Human disturbance causes birds to repeatedly leave or even abandon nests, exposing eggs or chicks to the summer sun and predators. Off-road vehicles provide increased access to previously remote beach areas, cause disturbance, and can crush eggs or chicks. Dogs and cats can harass and kill the birds, and gulls and fox, which feed on our fish and food scraps, also can kill chicks. Efforts to stabilize beaches by building large storm berms to protect development from storms allow vegetation to overgrow open sand nesting areas. In the Great Plains, extensive drought has dried habitat and allowed



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vegetation encroachment in certain areas, while in certain rivers, agency manipulation of river levels has reduced the early spring floods that maintain sparsely vegetated sandbar habitats while summer releases wash out nests and flightless chicks.

Recent surveys estimate the Atlantic population at 1690 pairs, the Great Lakes population at 51 pairs, and the Northern Great Plains at 1291 pairs.

ROAD TO RECOVERY

In 1986, the Atlantic Coast and Northern Great Plains breeding populations were listed as threatened, and the Great Lakes breeding population was listed as endangered. The Great Plains and Great Lakes breeding populations and the wintering range have critical habitat; all three populations have recovery plans. Monitoring of nesting populations has provided information that aids conservation efforts, but additional studies are needed, particularly of migratory and wintering plovers.

CONSERVATION TODAY

State and federal agencies, environmental organizations, and local citizens are protecting piping plover nesting areas on public and private lands through the management and monitoring, reducing disturbance and predation, and protecting natural processes that sustain habitat. Threats still remain, particularly to migratory and wintering habitats as well as Great Plains breeding habitats.

ECOLOGICAL VALUE

The piping plover is an integral component of several beach, river, and lake ecosystems. Protecting areas critical to the piping plover will help preserve the natural character of our disappearing beaches, as well as aid numerous threatened and endangered species such as the roseate tern, loggerhead sea turtle, northeastern beach tiger beetle, and sea-beach amaranth.

OUTLOOK FOR THE FUTURE

Piping plover populations would again decline if the protections for nesting areas and habitat were discontinued. Human population growth in coastal areas continues to increase threats from habitat destruction and disturbance.

Some off-road vehicle users continue to oppose piping plover protections. Long running disputes regarding agency manipulation of river levels on the Great Plains raise significant concerns about political interference with recovery efforts. However, overall, extensive conservation efforts have been very helpful for the piping plover. Without the Endangered Species Act's significant legal protections, the future for this beautiful shorebird would be in question.



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## 30 YEARS OF THE ENDANGERED SPECIES ACT

# RED-COCKADED WOODPECKER

**R**educed to only one percent of its former range, the red-cockaded woodpecker has become as rare as its beleaguered habitat. However, the Endangered Species Act is providing hope for the restoration of an important ecosystem and the woodpecker itself.

### HISTORY OF ENDANGERMENT

In the early 1900s, vast stands of centuries-old pines stretched from the Atlantic coast to Oklahoma. The red-cockaded woodpecker is dependent on these mature forests for both nesting and feeding. The birds use their sharp beaks to hammer nesting cavities into living pines. Holes drilled around these cavities cause sap to run down the tree trunks in rivulets, helping to prevent predators from climbing up to the nests.



Jim Hanula/U.S. Forest Service

Woodpeckers search for their insect food in pine stands at least 30 years old. Today, these old pine forests are largely gone, as trees are often cut before they mature. Only one percent of the woodpecker's habitat remains; logging and deforestation have claimed the rest. Fire suppression has also adversely altered the woodpecker's habitat.

In the past, these birds ranged from New Jersey to Florida and west to Oklahoma. Today, fewer than 15,000 survive. The species has been completely wiped out in New Jersey, Kentucky, Tennessee, Maryland, and Missouri. Across the rest of its range, the woodpecker exists in isolated groups requiring careful management.

### ROAD TO RECOVERY

By the 1960s, studies indicated that the species might soon become extinct. Consequently, the bird was added to the Endangered Species List in 1970. Even after listing, however, traditional logging practices on public lands allowed the harvesting ancient pines.

Over the past 25 years, the Endangered Species Act has placed restrictions on habitat modifications. Consequently, the U.S. Forest Service and the military, both of which have lands containing large woodpecker populations, have adopted better woodland management. For example, Camp LeJeune Marine Corps Base has an active conservation program to restore woodpecker habitat while still maintaining lands for military training.

### CONSERVATION TODAY

Although stabilizing red-cockaded woodpecker populations on public lands is important, it is only a part of the effort to conserve the species. The U.S. Fish and Wildlife Service has looked to private landowners to help the species survive.

Since 1995, over 500,000 acres of private lands have been enrolled in conservation programs designed to benefit the woodpecker. Also, many forest product companies have developed habitat conservation plans for the woodpecker.

Efforts on both public and private lands have benefited from new techniques, supported by Endangered Species Act funding, to drill artificial nest cavities and to reintroduce birds into restored habitat.

### ECOLOGICAL VALUE

The woodpecker's diligent work creating cavities in pine trunks is beneficial for several species in the ecosystem. The cavities frequently provide shelter to other birds, as well as a variety of reptiles, amphibians, bees, wasps, and squirrels.

### OUTLOOK FOR THE FUTURE

Building on Endangered Species Act protections, management of the woodpecker's habitat must continue for the species to fully recover.

The Sandhills area of North Carolina is home to two populations, found on Fort Bragg and Camp Mackall, separated by several miles. Restoration of the intervening habitat on private lands is key. Fortunately, well over 30,000 acres of these intervening lands are now being voluntarily managed for the bird by private landowners through incentives under the Endangered Species Act.



Ralph Costa/FWS



Ralph Costa/FWS

## 30 YEARS OF THE ENDANGERED SPECIES ACT

# ROBBINS' CINQUEFOIL

The Robbins' cinquefoil, an alpine plant species of the rose family, is found only at two locations on the cold slopes of the White Mountains of New Hampshire. The plant grows in some of the harshest conditions found anywhere in New England. Though the plant can withstand freezing temperatures and high winds, it required Endangered Species Act protections to escape extinction.

### HISTORY OF ENDANGERMENT

In 1819, the Crawford Path was completed as a bridal path ascending Mount Washington in the White Mountains of New Hampshire. In 1824, the Robbins' cinquefoil was discovered there. Approximately 95 percent of the cinquefoil's known habitat was found on just one acre of the mountain. Throughout the 19<sup>th</sup> and most of the 20<sup>th</sup> centuries, the cinquefoil began to disappear from the trampling of horses and hikers and from commercial plant collectors.

### ROAD TO RECOVERY

In 1980, the Robbins' cinquefoil was listed as endangered under the Endangered Species Act. The cinquefoil's known habitat was designated as critical habitat under the Act.

The Appalachian Mountain Club and the New England Wild Flower Society teamed up with the U.S. Fish and Wildlife Service and the U.S. Forest Service to relocate the Crawford Path, educate the public, and reestablish healthy populations of the Robbins' cinquefoil. The Appalachian Mountain Club was involved in monitoring the plants, collecting seeds from the plants, and educating the public about how to avoid disturbing them.

In 1982, the New England Wild Flower Society instituted a reintroduction program. With collected seeds, they began growing the Robbins' cinquefoil at their Garden in the Woods in Framingham, Massachusetts. The plants are raised for

two to three years before mature plants are transplanted in the autumn.

Thanks to this cooperative recovery effort, the Robbins' cinquefoil population rebounded from 1,801 in 1973 to over 14,000 in two separate populations on Mount Washington and the Franconia Ridge in 2002. The plant was removed from the endangered species list in August 2002.



### CONSERVATION TODAY

The Appalachian Mountain Club, U.S. Forest Service, and U.S. Fish and Wildlife Service continue to monitor the Robbins' cinquefoil. The Robbins' cinquefoil is a success story of bringing an endangered species back from the brink of extinction through its Endangered Species Act listing, designation of critical habitat, development of a recovery plan, and implementation of the recovery plan with the cooperation of government agencies and concerned citizens.

### ECOLOGICAL VALUE

Robbins' cinquefoil is an important component of the fragile alpine ecosystem of the Appalachian Mountains.

The species has aesthetic value for many people, and its recovery has provided scientific and educational value as we've come to have a greater understanding of the ecosystem.

### OUTLOOK FOR THE FUTURE

The Robbins' cinquefoil, though no larger than a quarter when in bloom, has fought the worst of nature's elements. With protections from the Endangered Species Act, the plant has also withstood human destruction of its environment.

The species has now recovered, but management will not immediately end. For five years, until 2007, plant managers will continue to supplement the re-established population and monitor its success to ensure that it does not fall into another downward spiral.





## 30 YEARS OF THE ENDANGERED SPECIES ACT

## SEABEACH AMARANTH

For many plants, Endangered Species Act listing can mean the difference between slipping unnoticed into extinction and receiving the attention necessary to spur conservation efforts. Such is the case with the seabeach amaranth, which is now found in relatively secure numbers only in North Carolina.

HISTORY OF ENDANGERMENT

The seabeach amaranth occupies a very limited niche on barrier island beaches. As such, it is vulnerable to natural events such as hurricanes and to human alteration of its habitat.



Bill Adams/FWS

Like most imperiled plants, the seabeach amaranth is threatened primarily by continued habitat loss, particularly beach stabilization by bulkheads, sea-walls, or artificial dune construction. On Assateague Island National Seashore, in Maryland and Virginia, the amaranth disappeared soon after the park service built sand dunes in the mid-1960s to block storm surges from crossing the island.

Once development limited suitable habitat, the remaining populations of seabeach amaranth became highly vulnerable to natural catastrophes. Beginning with Hurricane Hugo in 1989, a series of strong storms caused substantial storm-related erosion that threatened the heart of the amaranth's last large populations in the Carolinas.

ROAD TO RECOVERY

As early as 1983, seabeach amaranth was recognized as a candidate for En-

dangered Species Act protection, but it was not listed because of insufficient information to support a proposed rule. By time the amaranth was listed as threatened in 1993, the plant was believed to have been eliminated from six of the states in its range.

An Endangered Species Act listing drew attention from scientists and land managers to the special needs of the species and encouraged conservation actions from federal, state, and private agencies, conservation groups, and individuals. At the time of listing, almost half of the known populations occurred on federal land. Therefore, federal agencies had to consult with the U.S. Fish and Wildlife Service (FWS) to ensure that any activities authorized, funded or carried out on the land did not jeopardize the species or adversely modify its habitat.

In 1996, the FWS approved a recovery plan for the seabeach amaranth that set goals, defined its habitat needs, and provided measures to protect existing populations and essential habitat from destructive alterations.

CONSERVATION TODAY

Recently, the plant has naturally re-established itself in Maryland and Delaware where it had not been seen for 100 years. The amaranth's seeds can survive for decades. When dispersed by the wind or ocean currents, its seeds can colonize areas far from existing populations. Efforts are now underway to restore the plant on barrier islands throughout the mid-Atlantic and to supplement pioneer populations in areas where the plant has re-established itself.

ECOLOGICAL VALUE

Seabeach amaranth has been described as a dune builder because it grows closer to the high tide line than any other coastal plant. Once established, it binds sand within its roots. One large plant can create a sand mound of two to three cubic yards, helping to stabilize beaches.

OUTLOOK FOR THE FUTURE

The seabeach amaranth continues to be threatened by construction of sea walls and dune fencing, development, fragmentation of habitat, heavy recreational use, and off-road vehicle use.

The seabeach amaranth's recovery plan calls for more research into the plant's ecology. Increased knowledge about the plant will better equip wildlife managers to monitor the plant, search for new populations, and re-establish populations within suitable habitats in its historic range.



Bill Adams/FWS



Barton College



www.delawarewildflowers.org

## 30 YEARS OF THE ENDANGERED SPECIES ACT

## SHORTNOSE STURGEON

Before the dinosaurs existed, the shortnose sturgeon filled rivers, estuaries, and coastal waters. The species continues to survive along the east coast of North America from New Brunswick, Canada to Florida. Over time, human activities have almost wiped out the shortnose sturgeon entirely, but Endangered Species Act protections are helping to recover this resilient species.

HISTORY OF ENDANGERMENT

Shortnose sturgeon are born in freshwater rivers and streams, migrate out to the ocean where they spend most of the year, and return upstream to spawn several times throughout their lives. Heavy damming of many spawning rivers has posed an impassible obstacle for migrating shortnose sturgeon, contributing most significantly to their decline. By altering the natural flow of streams, dams hinder the spawning journey and increase water temperatures, sometimes to lethal levels.

Development near the river and estuary habitat of the shortnose sturgeon has created several problems. Residential and commercial development, in addition to agricultural and forestry practices, have contributed to siltation and pollution in the sturgeon's waters.

Overfishing of the shortnose sturgeon was an additional factor in the species' initial decline, as its eggs were once a significant source of domestic caviar.

Shortnose sturgeon numbers declined so precipitously that they were first listed as endangered in 1967 and they subsequently received protections under the Endangered Species Act of 1973.

ROAD TO RECOVERY

Dams can so greatly alter river ecosystems that their costs can sometimes outweigh their benefits. As a result, more than 500 outdated dams have been removed from rivers since 1912. In addition to removing dams, which is most

likely the most efficient way to restore shortnose sturgeon to their historic levels, a recovery plan released in 1998 by the National Marine Fisheries Service closes the shortnose sturgeon fishery for two decades or more, seeks to reduce and eliminate the accidental catch of sturgeon, and protects spawning sites.

CONSERVATION TODAY

In 1999, the Federal Energy Regulatory Commission made the decision to deny the operating license for the Edwards



Edwards Dam



Kennebec River after dam removal

Dam on the Kennebec River, finding that the benefits from the small amount of energy generated by the dam were not great enough to allow the continued harm to the ecosystem.

With the removal of the dam, shortnose sturgeon are migrating to their historic spawning grounds, a journey that was impossible since the dam was commissioned in 1837. Federal authorities predict that removal of the Edwards Dam will boost the shortnose sturgeon population in the Kennebec to more sustainable levels.

ECOLOGICAL VALUE

Sturgeon are bottom feeders; they suck small plants and animals into their tube-like mouth. This reliance on the simplest building blocks makes them a good indicator of ecosystem health and viability. Given that shortnose sturgeon have lived successfully for millions of years, outlasting even dinosaurs, humans should be alarmed that we have nearly caused their extinction in a mere 200 years.

OUTLOOK FOR THE FUTURE

Even though removal of Edwards Dam greatly improved the chance of recovering shortnose sturgeon in the Kennebec River, the species is far from full recovery.

The shortnose sturgeon recovery plan developed under the Endangered Species Act calls for separate management of populations in different rivers. While focusing on rivers where shortnose sturgeon are already found—they have been extirpated from all but 16 rivers—fisheries managers can narrow their work. However, before settlers arrived in North America, the sturgeon were found in nearly all east coast rivers. Restoring habitat and reintroducing the fish throughout more of their historic range will further ensure that the shortnose sturgeon survives for future generations.

Fisheries managers will need to be patient in their recovery efforts. Because shortnose sturgeon can take between six and 18 years to reach sexual maturity, recovery of the species will be slow. In fact, the shortnose sturgeon recovery plan estimates that the species may not reach sustainable levels until 2024.



Juvenile Shortnose sturgeon. Univ. of Massachusetts



University of Massachusetts



## 30 YEARS OF THE ENDANGERED SPECIES ACT

## UTAH PRAIRIE DOG

The Utah prairie dog, located in southwestern Utah, exists today largely because of protection provided by the Endangered Species Act.

HISTORY OF ENDANGERMENT

The U.S. Bureau of Biological Survey decreed in 1902 that prairie dogs rob cattle of 50 to 75 percent of their forage. Thus ensued a tremendous extermination effort, largely implemented by the federal government, which featured as many as 120,000 people employed to poison prairie dogs in some years in the 1930s. This eradication effort was quite successful, with prairie dog acreage dwindling by 98 to 99 percent in the first half of the 20<sup>th</sup> century.

With the smallest range of the four prairie dogs inhabiting the U.S., the Utah prairie dog was especially harmed by this poisoning campaign, shooting, and the threat of sylvatic plague, which first appeared within the range of the Utah prairie dog in 1936. As a result, the Utah prairie dog dwindled from occupying 448,000 acres to only 6,977 acres by 1995. Population numbers dove from 95,000 individuals before the eradication programs to only 3,300 by 1972.

ROAD TO RECOVERY

Endangered Species Act protections in 1973 prohibited the take of the prairie dog, helping the population to nearly triple by 1981 to 9,300 individuals. Subsequent years saw declines in prairie dog

numbers, yet the U.S. Fish and Wildlife Service (FWS) downlisted the species to threatened in 1984, in response to steady pressure from the state of Utah.

Had it not been for the Endangered Species Act's slowing down of the eradication program aimed at the Utah prairie dog, this species would likely have vanished altogether.

CONSERVATION TODAY

The Utah prairie dog colony in Bryce Canyon National Park is one of the most robust populations left, and it has been intensively studied. Research has found that prairie dogs reproduce slowly relative to other rodents, thus underscoring the need to increase protections for this small mammal.

Other researchers are trying to devise ways to confront the threat of plague, which is suspected to be a significant limiting factor in Utah prairie dog recovery. Prairie dogs have no immunity to this exotic disease.

Efforts are also underway by conservation organizations to upgrade the Utah prairie dog's status to endangered and to enhance private landowner incentives to conserve the species on private land.

ECOLOGICAL VALUE

Research on prairie dogs indicates that they have the most complex communication system of any non-human animal. The Utah prairie dog, like other types of prairie dogs, plays a keystone role in its ecosystem by creating habitat and serving as a prey base for as many as 140 other wildlife species, including raptors, grassland songbirds, small mammals, herptiles, and a variety of predators.



National Park Service

OUTLOOK FOR THE FUTURE

While saved from extinction by the Endangered Species Act, we must address certain problems in order to ensure that the Utah prairie dog will persist and recover.

The primary obstacle to recovering the Utah prairie dog may be the recovery program itself. The recovery strategy is to move the species from private land to habitat on federal lands. Unfortunately, due to poor translocation protocol and continued habitat destruction on public lands, the relocation program has been unsuccessful. More than 19,000 prairie dogs have been moved to public lands, yet populations are lower on public lands now than they were in the 1980s and 1990s. Private land populations are also declining.

The *New York Times Magazine* cited the Utah prairie dog as one of six species that likely won't survive the 21<sup>st</sup> century. Utah prairie dogs should be returned to endangered status instead of their current threatened status under the Endangered Species Act. This will ensure full protection of the species and the ecosystems of which it is a part.



Jess Alford



Jess Alford

## 30 YEARS OF THE ENDANGERED SPECIES ACT

# WHOOPING CRANE

The whooping crane has been experiencing a difficult but successful rebound from the brink of extinction. Impressive efforts by the U.S. Fish and Wildlife Service (FWS) and conservation groups in recent decades have led to significant recovery for the whooping crane, the tallest bird species in North America.

### HISTORY OF ENDANGERMENT

In 1870, between 500 and 1,400 whooping cranes inhabited North America; by 1941, the migratory population had dropped to 16 individuals. Whooping crane numbers fell due to several factors, including hunting and specimen collection, human disturbance, and conversion of nesting habitat for agriculture. Collisions with power lines and fences are known hazards to wild whooping cranes. Others have died of avian tuberculosis, avian cholera, and lead poisoning. Whooping cranes also are vulnerable to natural disasters such as hail storms or drought due to their long migration route.

### ROAD TO RECOVERY

Active intervention by the U.S. and Canadian governments, as well as conservation groups, have helped this flock recover from less than 20 birds in the 1940s to nearly 400 birds today. In 1967, when the crane was listed as endangered, the FWS began a captive breeding and intensive recovery program. Captive

management has been challenging, for the bird is very sensitive to human contact. Through this program, three facilities are now captively rearing whooping cranes for reintroduction into the wild, and flocks have been reintroduced into the wild at two

sites. There are currently seven captive flocks in the U.S. and Canada.

Excess eggs have been removed from the wild and raised in captivity while artificial insemination has also proven successful. Today, there are nearly 400 whooping cranes in the wild and in captivity.

### CONSERVATION TODAY

The FWS's whooping crane recovery program, conducted by a partnership of non-profit organizations and government agencies, has been so successful that other countries have adopted similar methods to protect other threatened crane species.



Sixteen cranes, recently hatched at the Patuxent Wildlife Research Center in Texas, are being trained to fly and migrate by following an aircraft. Twenty cranes released during the last two years migrated back to Wisconsin from Florida during the 2003 spring.

### ECOLOGICAL & ECONOMIC VALUE

Whooping cranes are among the most dynamic and charismatic bird species and are a favorite of birders. The whooping crane's elaborate dance is well known and attracts birding fanatics and casual observers alike. A 1991 FWS survey estimated that \$14.4 billion is spent annually on bird watching by more than 24 million Americans.

### OUTLOOK FOR THE FUTURE

Recent whooping crane reintroduction efforts offer hope. The whooping crane partnership, including the U.S. Fish and Wildlife Service, has shown that establishing a wild population migrating between Wisconsin and Florida may indeed prove successful.

Still, however, increased human impacts on crane habitat pose serious threats for the birds. The last wild flock of migrating whooping cranes (numbering only 187 birds) migrates between Aransas National Wildlife Refuge in Texas and Wood Buffalo National Park in Canada. This flock's food source could be contaminated by leaks from chemical barges on the Gulf Coast. Oil and gas wells and connecting pipelines could also cause a disaster.

Habitat loss throughout the Central Flyway is a serious threat. Whooping cranes depend on wetlands and rivers to rest and refuel as they migrate between summer and winter ranges. Increased irrigation and municipal water use are drying up key migration stopover points, such as the Platte River in Nebraska. Rollbacks to the Clean Water Act also threaten the long term survival of these remarkable birds.

