

# ENDANGERED *Species* BULLETIN

January/February 2002

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*The writer Wallace Stegner, who served as Assistant Secretary of the Interior in the Kennedy Administration, once called national parks “the best idea we ever had. Absolutely American, absolutely democratic, they reflect us at our best....” Since Yellowstone National Park was established in 1872, the National Park System has grown to encompass 83 million acres (34 million hectares) in 385 areas within 49 States, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the U.S. Virgin Islands. Its mission is “to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.” Conserving endangered species is an important part of that mission.*



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#### On the Cover

A visitor to Grand Canyon National Park thrills to the sight of a California condor. This rare bird is being reintroduced into the wild just north of the park.

Photo by Elaine Leslie/NPS

#### Opposite page:

Rocky Mountain National Park, Colorado

The Endangered Species Bulletin welcomes manuscripts on a wide range of topics related to endangered species. We are particularly interested in news about recovery, habitat conservation plans, and cooperative ventures. Please contact the Editor before preparing a manuscript. We cannot guarantee publication.

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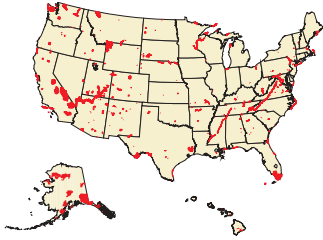
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by Loyal A. Mehrhoff and  
Peter A. Dratch

# Endangered Species and the National Park Service



**The National Park System (in red)**  
represents ecosystems throughout  
the United States. For details, visit its  
website at [www.nps.gov](http://www.nps.gov)

Like all federal agencies, the National Park Service is required by the Endangered Species Act (ESA) to protect endangered and threatened species, and to avoid any actions that might jeopardize their survival or adversely modify their critical habitats. In addition, the National Park Service recognizes that the ESA goes further by requiring federal agencies to actively promote the conservation of listed species. The National Park Service extends these responsibilities to protecting state-listed as well as federal candidate species.

Currently, we know of 398 federally listed species of plants and animals that occur on lands managed by the National Park Service. This represents about 30 percent of the 1,244 federally listed species within the United States and its territories (as of June 1, 2001). Plants comprise the greatest number of listed species in areas managed by the National Park Service, but there are a large number of mammals and birds as well (Table 1 on page 6). These species are found throughout the National Park System from the Virgin Islands to Maine, Alaska, and American Samoa. In all, over 187 parks provide habitat for at least one listed species. Parks in Hawaii, California, and Florida contain the greatest number of listed species, although parks in other biodiversity hot spots, such as the southern Appalachian Mountains, also have significant numbers (Table 2 on page 6).

Recovery plans approved by the U.S. Fish and Wildlife Service and National Marine Fisheries Service recommend thousands of tasks for the National Park Service to undertake. Implementing these tasks continues to pose enormous

technical and fiscal challenges. The issues are diverse, ranging from removing nonnative zebra mussels (*Dreissena polymorpha*) from a river to reestablishing populations of extirpated bird species such as the California condor (*Gymnogyps californianus*). In the year 2000, the National Park Service spent \$13.8 million on the recovery of federally listed species, compared to \$3.3 million in 1993. These figures show that recovering listed species has become an important activity in the National Park System\*, but there is still much to do.

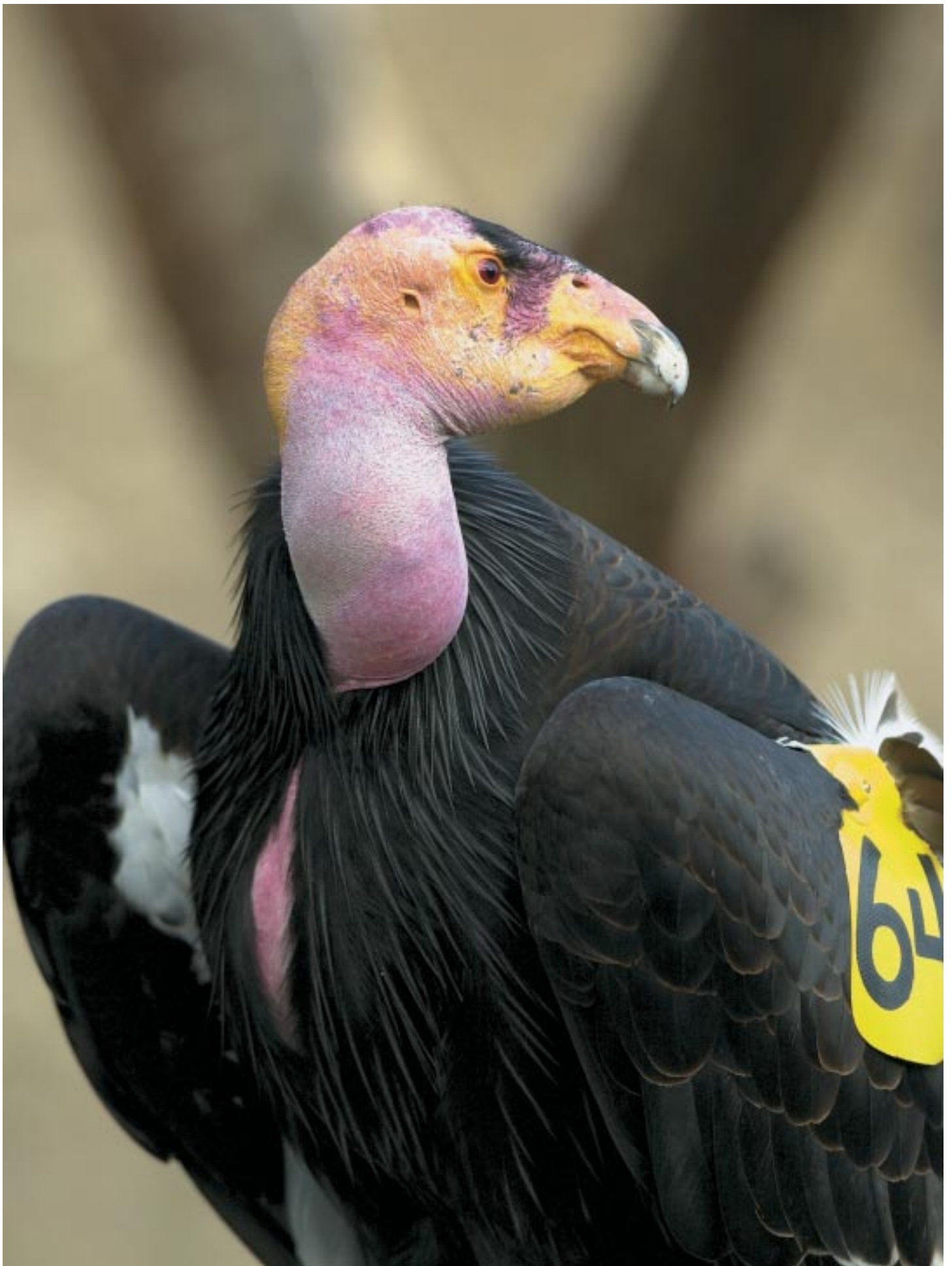
How does the National Park Service protect and restore endangered species? First, we rely on highly capable park personnel who work hard to conserve rare animals and plants and to enforce laws for their protection. It is at the individual park unit level that much of the work is accomplished. Second, a regional and national level organization prepares policies, administers programs, and provides expertise to committed

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\*The areas managed by the National Park Service include National Parks, National Preserves, National Recreation Areas, National Seashores, National Historic Parks, and many others.

**(Opposite page) California condor**  
Photo by Scott Frier/Nikon, Inc.







**Nonnative zebra mussels attach to native mussels and can cause their death.**

USFWS photo

### One Threat, Many Names

Many words have been used to label the plants, animals, and other organisms from elsewhere that overrun our natural areas. Alien, exotic, introduced, invasive, nonnative, nonindigenous, and weed (for plants) are the primary ones and are generally synonymous. In this issue, the National Park Service authors use several of these terms to describe the litany of species that are infesting our national parks.

*Editor's note: The Fish and Wildlife Service recognizes that a nonnative species may not necessarily take over and cause a problem. Some agricultural crops won't reproduce without human help. Conversely, native species have invaded their own habitats when one or more natural factors were altered. For example, although cattails are native to the Everglades, fertilizer in irrigation runoff has caused the normally small cattail patches to spread densely over thousands of acres. According to Presidential Executive Order 13112 (President Clinton's 1999 directive), an invasive species is "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health."*

Park Service employees. Some of the conservation projects underway within the National Park System are described in the following articles.

Beginning in 2000, Congress funded the first year of a 5-year initiative called the Natural Resource Challenge. The Challenge seeks to protect native and endangered species, aggressively control nonnative species, accelerate natural resource inventories, and expand monitoring activities. The Biological Resource Management Division was formed in Fort Collins, Colorado, as part of this effort. Our Endangered Species Program, one part of the Division, is charged with administering the Park Service's nationwide endangered species effort, reviewing policies, and providing scientific expertise to parks and senior management. To be successful, our program must directly benefit the units of the National Park System and their efforts to recover endangered species. That means working closely with park personnel, the regional Endangered Species Coordinators, and other programs, such as alien weed control, fire

management, and inventory and monitoring. Currently, we are focusing our efforts in six key areas:

**1. Information.** We will soon complete an endangered species database that tracks the status of listed species in the National Park System. This database, developed in cooperation with

Taxonomic Group	Species
Plants	193
Invertebrates	43
Fish	40
Amphibians	4
Reptiles	19
Birds	53
Mammals	46
<b>Total</b>	<b>398</b>

**Table 1. Endangered, threatened, proposed, and candidate species found in units of the National Park Service.**

National Park	Plants	Animals	Total
Haleakala National Park, Hawai'i	35	12	47
Hawaii Volcanoes National Park, Hawai'i	27	15	42
Channel Islands National Park, California	15	18	33
Golden Gate National Recreation Area, California	14	15	29
Santa Monica Mountains National Recreation Area, California	10	13	23
Kalaupapa National Historic Park, Hawai'i	15	7	22
Natchez Trace Parkway, Mississippi	8	12	20
Everglades National Park, Florida	7	12	19
Great Smoky Mountains National Park, Tennessee	4	12	16

**Table 2. Areas in the National Park System with the largest numbers of endangered, threatened, proposed, and candidate species.**

the National Park Service's Inventory and Monitoring Program, the Association for Biodiversity Information, and the Colorado State Heritage Program, will provide the distribution of listed species in our parks, the status of these species in each park, identify needed recovery actions, and track our successes in implementing those actions.

**2. Making the Units of the National Park System Ecologically Whole.** Many people think of national parks as pristine areas where plants and animals thrive relatively undisturbed. Although some are indeed in good condition ecologically, many are not. Moreover, many of our parks are rapidly becoming islands of native habitat within a sea of disturbed lands. We know that past human activities have eliminated many endangered, threatened, proposed, and candidate species on National Park Service lands. The list of species now missing from at least one national park unit includes 41 plants, 18 birds, 14 mammals, 6 fish, 4 invertebrates, 2 amphibians, and 1 reptile. Our ultimate goal is to reestablish and maintain all species native to the National Park System, provided that this can be done in a safe and ecologically sound manner. We cannot accomplish this goal without the help of other federal agencies, the states, Native American Tribes, and partners such as universities, zoos, and other organizations.

**3. Genetic Safety Net.** The National Park System harbors at least 193 species of plants that are endangered, threatened, proposed, or candidates for listing. Many of these species occur in very low numbers or in scattered, vulnerable populations. The Park Service is working with institutions of the Center for Plant Conservation and the U.S. Department of Agriculture's National Seed Storage Laboratory to collect seed samples from listed plant populations and place them into long-term storage. These collections will form a genetic safety net in case a park's wild population continues to decline or is lost.

**4. Training.** It is important to ensure that natural resource professionals have access to training on new conservation theories, technological advances, and regulatory processes. We plan to provide expanded training opportunities through National Park Service training courses, increased use of web-based information, and training at facilities run by partners such as the U.S. Fish and Wildlife Service's National Conservation Training Center.

**5. Research.** Recovery for many listed species will be difficult without research focused on their biology or on the threats facing them. We need to encourage scientists to work in the units of the National Park System. To this end, the National Park Service will continue to promote key research in cooperation with other government agencies and our academic partners.

**6. Funding.** The National Park Service, like other federal agencies, lacks the funds to accomplish all or even most of the restoration actions identified in species recovery plans. We need to find ways to continue funding for those species that show signs of stabilization or recovery while expanding our efforts for species that are still in decline. While this may require new funding sources, it also means working better with partners such as the National Park Foundation, National Fish and Wildlife Foundation, Partners in Parks, conservation organizations, and corporate sponsors.

As stewards of America's National Parks, we must continue to rise to the challenge of recovering the threatened and endangered species that inhabit our most cherished wild places.

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*Loyal Mehrhoff is the Endangered Species Program Manager for the National Park Service, and Peter Dratch is the Endangered Species Specialist for animals for the National Park Service. Both are with the agency's Biological Resources Management Division in Fort Collins, Colorado.*



NPS photo

**A Message from National Park Service Director Fran Mainella**

**"There are no better places to recover endangered species than our national parks. Our challenge is to ensure that these special places—places we go to for inspiration and solace—are also functional for the rarest plants and animals. While the National Park Service should be a leader in restoring species, many park units are not big enough for us to succeed alone. We must work closely in this vital effort with other federal agencies, with states, and with private citizens."**

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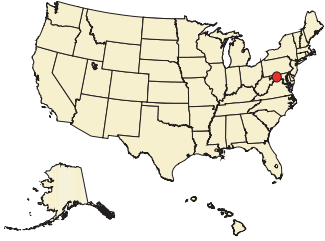
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by Diane Pavék

# Endemic Amphipods in our Nation's Capital



**Kenk's amphipod**  
Photo by Irina Sereg

Hidden away in shallow, subsurface groundwater communities, the entire known distribution of two tiny species is restricted to only a few springs along Rock Creek in the District of Columbia. Rock Creek Park protects native biodiversity not found elsewhere within the fragmented landscape of the greater Washington, D.C., metropolitan area. Legislation in 1890 established the Rock Creek Park as a unit of the National Park Service (NPS). Once the best sources of drinking water during the 1700s and 1800s, nearly all of the District's original springs outside the parks have disappeared due to the diversion of rain water or direct piping into the sewers. Other springs and streams were entombed in concrete, filled in and paved over, or contaminated.

Both of the park's endemic species are amphipods, small shrimp-like freshwater crustaceans. The Hay's Spring amphipod (*Stygobromus hayi*) is known to exist only in five springs, all along Rock Creek. This District endemic was first collected from a spring within the National Zoological Park in 1938 (Hubricht and Mackin 1940, Holsinger 1967) and was listed federally as endangered in 1982. In the late 1990s and early 2000s, the Hay's Spring amphipod was confirmed to exist in four other springs within the borders of Rock Creek Park, which adjoins the National Zoo.

The park is a long-term advocate for amphipod conservation. Researchers and cooperators from universities, the U.S. Fish and Wildlife Service, and the Maryland Department of Natural Resources provide important assistance to Rock Creek Park natural resource managers. These professionals assist with monitoring questions, data gathering and

analyses, and species identifications. While Rock Creek Park does not have a formal management plan for the Hay's Spring amphipod, conservation measures in the park include restricting activities in an area around the springs and in their recharge areas.

We know little about Hay's Spring amphipod biology, its population dynamics, or the ecological community in which it lives. This tiny creature grows to only 0.4 inches (10 millimeters) in length and, because it lives primarily below the surface, is colorless and blind. We do not know whether it resides primarily in the flooded fractures of the park's metamorphic rock or only in the saturated overburden above the bedrock, or both. It appears that the Hay's Spring amphipod may spend its life in a shallow groundwater zone, moving in water that percolates among sand grains and gravel unless large volumes of water flush it up and out of an exit as a spring.



The unconsolidated sediments in running water are an important interstitial habitat; in many cases, the interstitial aquatic genera overlap those found in caves (Culver et al. 2000). Subterranean species are difficult to monitor since they appear seasonally and sporadically in seeps and springs or may not appear even during high water flows. Obvious vulnerability comes from the narrow distribution in the specialized subterranean habitat, and threats come from potential groundwater pollution. The urban area surrounding the park poses potential risks due to toxic spills (such as oil and gas), nonpoint source inputs (such as fertilizers and pesticides), land disturbances, sewer leaks, and excessive stormwater flows that might adversely affect groundwater. Except for parklands, additional potential habitat where Hay's Spring amphipod populations may have occurred in the District has largely been lost to development.

Another vulnerable species, Kenk's amphipod (*Stygobromus kenki*), occurs in Rock Creek Park in two other springs and may be more rare than the Hay's Spring amphipod. Kenk's amphipod was first found in 1967 (Holsinger 1978). Similar in general appearance to the Hay's Spring amphipod but smaller (up to 0.23 inches or 6 mm), Kenk's amphipod is considered by The Nature Conservancy to be highly rare and critically imperiled in the District of Columbia. At this time, our highest conservation priority for Kenk's amphipod is learning more about the distribution of this tiny creature.

Because of limited funds and competing needs, Rock Creek Park must be creative and persistent in its efforts to find funding for conservation efforts and outreach. American University zoologist Dr. David Culver will conduct a 2-year study in Rock Creek Park, to determine whether Kenk's amphipod is more secure than suspected or needs immediate intervention. In addition to monitoring spring outflows, a small pump attached to a pipe driven into the sediments will be used to search for

groundwater invertebrates. These cores allow a more thorough and direct sampling of the fauna and reduce sampling error (such as artificially low frequencies due to cumulative habitat disturbance). This spring, the Maryland Department of Natural Resources received funding from the Fish and Wildlife Service to conduct a status survey for the species outside of national parks. The information that is gathered by these partnerships may prevent the need to list Kenk's amphipod as endangered or threatened.

*Diane Pavek is a Regional Botanist and Threatened and Endangered Species Coordinator for the National Capital Region, National Park Service, in Washington, D.C.*



**Dr. Florian Malard of the University of Leon, France, and American University graduate student Irina Sereg search for Kenk's amphipod in Rock Creek Park.**

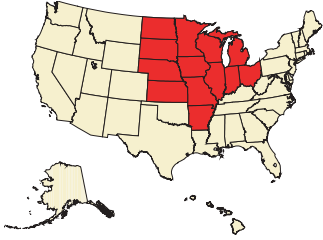
*Photo by Bill Yeaman/NPS*

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by Dan Licht

# Endangered Species in Midwestern Parks



**Black-footed ferret**

Photo by M. R. Matchett/USFWS

Along with such celebrated species as the black-footed ferret (*Mustela nigripes*) and the gray wolf (*Canis lupus*), a variety of important but lesser known endangered and threatened animals and plants occur within the Midwest Region of the National Park Service. They can be found in a rich assemblage of habitats from rivers to caves, savannas, wetlands, prairies, lakeshores, and forests.

The Midwest Region, for example, contains several riverine parks that support rare mussels. Sensitive to turbidity and toxic chemicals, these mollusks act as barometers for the health of the ecosystems upon which our society and economy depend. Freshwater mussels are the most rapidly declining animal group in the United States. St. Croix National Scenic Riverway, which traverses western Wisconsin and the Wisconsin/Minnesota border, alone is home to 40 mussel species. It is one of the most diverse assemblages in the world and includes one of the few remaining populations of the endangered Higgins' eye pearl mussel (*Lampsilis bigginsi*) and the world's only reproducing population of the endangered winged-mapleleaf mussel (*Quadrula fragosa*). Threats to these species are numerous, including the potential invasion of their habitat by the exotic zebra mussel (*Dreissena polymorpha*). To respond to this threat, park staff work in cooperation with the U.S. Fish and Wildlife Service to protect these native "pearls."

Another lesser known aquatic organism is the endangered Topeka shiner (*Notropis topeka*), a small fish historically found in streams in the central and eastern Great Plains. Decades of harmful

land use practices have degraded water quality in much of the shiner's historic habitat, leaving only a few remnant populations. The shiner is found at the recently established Tallgrass Prairie National Preserve in eastern Kansas. The Preserve will improve habitat for the Topeka shiner through management programs that reduce or eliminate sedimentation, pesticides, and harmful fish species not native to the site.

The Buffalo National River in the Arkansas Ozarks has already taken action to protect caves for the benefit of summer and winter colonies of the endangered Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), and Ozark big-eared bat (*Corynorhinus townsendii ingens*). One cave supported an estimated 172,500 gray bats in early 2001, making it the largest bat hibernation cave in Arkansas. Bat conservation at the park also includes the restoration and protection of abandoned mines.

Indiana Dunes National Lakeshore is actively restoring habitat for the endangered Karner blue butterfly (*Lycaeides melissa samuelis*). The primary food of Karner blue larvae is wild lupine (*Lupinus perennis*), which requires open to partially shaded areas such as oak savanna to survive. Decades of fire suppression in the heavily populated area of southern Lake Michigan have resulted in succession from oak savanna habitat to closed-canopy forest. This has caused the decline of the lupine and, ultimately, the Karner blue butterfly. The park staff has used mechanical controls, herbicides, and burning to restore natural savanna conditions. Because the degradation had been severe over a long period, park personnel planted locally collected lupine seeds to expedite restoration.

The threatened western prairie fringed orchid (*Platanthera praecleara*) was documented at Pipestone National Monument, Minnesota, in 1985. Intensive long-term monitoring is a critical component of orchid management, since the plant exists in fire-evolved prairie habitats that require regular burns. Nonnative plants threaten the existence of the orchid by degrading the native prairies at Pipestone. The park is using well-timed prescribed burns to promote orchid populations and reduce the spread of nonnative plants. Following these burns, over 125 orchids were counted flowering during 2000, which was well above the previous counts that never exceeded 55 in other recent years.

Like the orchid, invasive nonnative plants also threaten the Pitcher's thistle (*Cirsium pitcheri*). However, instead of occurring in lush tallgrass prairie vegetation, this species' habitat is the sandy beaches and dunes of Lake Michigan. Sleeping Bear National Lakeshore in Michigan protects one of the largest remaining populations. The park has initiated a study to determine whether nonnative plants affect the germination and seedling establishment of the thistle.

Sleeping Bear National Lakeshore also is home to the endangered population of the piping plover (*Charadrius melodus*), a small shorebird that nests on Lake Michigan's sandy beaches. The park provides habitat for 8 of the 30 pairs recorded in the Great Lakes region during 2000. Educating the public is a major component of the park's management program. Park staff, student interns, Student Conservation Association biological assistants, and volunteers are all involved in the education effort.

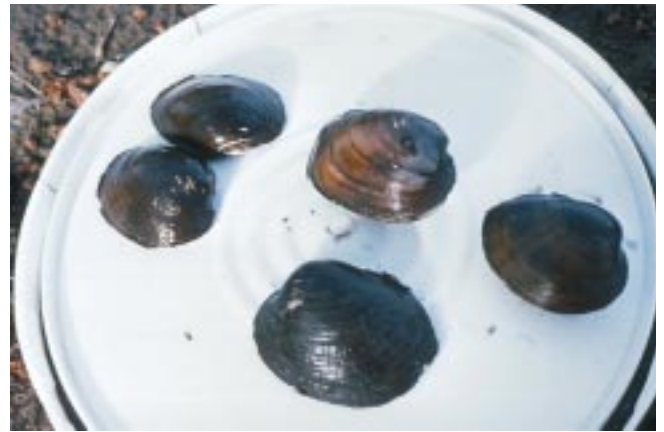
Conservation education takes place at visitor centers, through the media, and in the field. Under the watchful eye of park staff and their assistants, the park allows visitors to view the birds through spotting scopes from a distance that does not disturb the birds or affect their survival and behavior. Being able to view the

plovers gives visitors a greater appreciation for this rare species.

Although generally small in size, the Midwest Region's national parks provide important habitat for a large number of endangered and threatened species. These parks also foster public awareness and support for the conservation of regional biodiversity.

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*Dan Licht is a Regional Wildlife Biologist and T&E Coordinator--Animals for the NPS Midwest Region and is currently stationed at Badlands National Park, South Dakota.*



**Higgins' eye pearl mussel**

Photo by Tom Strekal



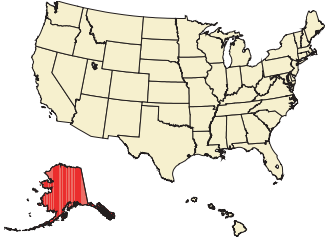
**Western prairie fringed orchid**

Photo by Martin Bowles/USFWS



# Alaska: A Great Land for Wildlife

by Peter A. Dratch and  
Terry D. DeBruyn



Alaska, the name given our largest state, comes from an Aleut word, *Alasbka*, meaning “great land.” Alaska’s national parks are indeed a great land for wildlife. More than 54 million acres (21.8 million hectares) support most of the state’s native species at incredible levels of abundance. Alaska contains 65 percent of the National Park System’s total land area but only about one percent of the species listed under the Endangered Species Act.

While many of Alaska’s parks still have not been inventoried for wildlife and plants, surveys to fill the gaps have begun under the National Park Service’s Natural Resource Challenge. (See “Endangered Species and the National Park Service,” beginning on page 4.) Of the 1,244 federally listed species, only 13 are currently listed as endangered or threatened in Alaska, and we expect that all are present in national parks except the endangered Aleutian shield fern (*Polystichum aleuticum*) and leatherback sea turtle (*Dermochelys coriacea*). The listed species in Alaskan national parks

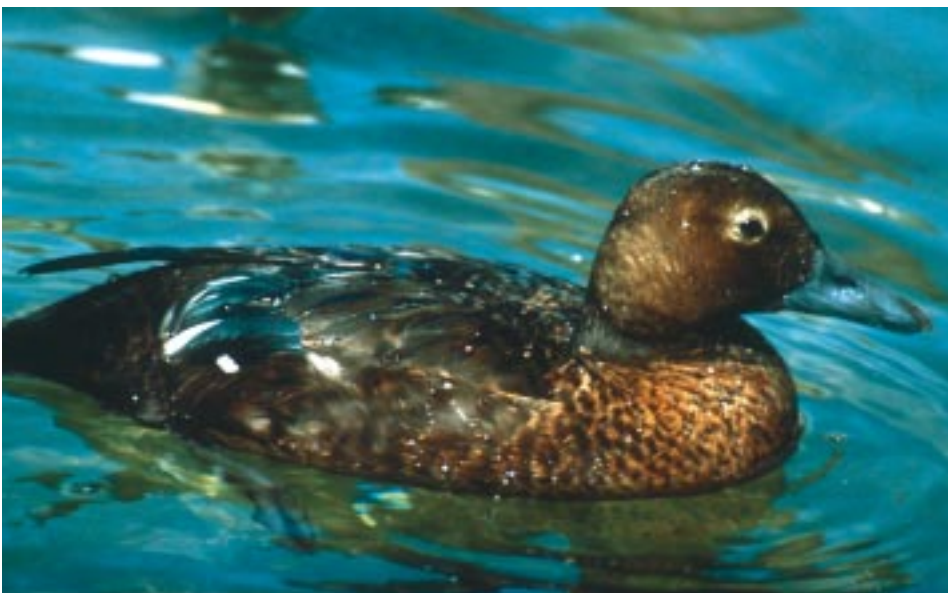
are all migratory; they breed in ecosystems that are different from where they overwinter. This not only makes monitoring difficult but sometimes requires international cooperation for their recovery. Two of the rarest migratory species in Alaska’s national parks are the short-tailed albatross (*Phoebastria albatrus*) and the Eskimo curlew (*Numenius borealis*), both endangered.

While Alaska’s national parks are generally considered remote, they are experiencing significant increases in human visitation. During 1999, recreational visits totaled more than two million, a seven percent increase over the previous year. Because wildlife viewing is predicted to increase even faster than the rate of the state’s rapid population growth, it is likely that the pressures on wildlife will increase as well.

In southern coastal Alaska, Glacier Bay National Park provides critical habitat and an important marine sanctuary for endangered finback whales (*Balaenoptera physalus*), endangered humpback whales (*Megaptera novaeangliae*), and the threatened population of Steller sea-lions (*Eumetopias jubatus*). Humpback cows and calves seek refuge and forage within the deep waters of the Kenai Fjords National Park and Preserve (NPP), but a marked increase in tourism within the park has resulted in conflicts between the whales and recreational boats and tour vessels. Two humpback whales have collided with tour boats. In one instance, a 120-foot (36-meter) boat traveling at 20 knots (23 mph) hit a humpback, resulting in considerable damage to the boat. Although there was no visible injury to the whale, this is still considered “take” under the Endangered Species Act. Four other endangered

## Steller’s eider hen

Photo by Glen Smart/USFWS





whales are also found in Alaska's park waters: the sei (*Balaenoptera borealis*), blue (*Balaenoptera musculus*), bowhead (*Balaena mysticetus*), and sperm (*Physeter catodon*) whales.

To prevent similar incidents, Kenai Fjords NPP works with the U.S. Coast Guard and the National Oceanic and Atmospheric Administration (NOAA) to hold an annual workshop for tour boat owners. The workshop helps to ensure that the 60 - 80 attending boat operators receive a consistent message on adherence to the marine mammal protection guidelines established by NOAA's National Marine Fisheries Service. Furthermore, by following these guidelines, operators learn that this will improve the quality of the viewing experience for the park visitors.

Katmai and Lake Clark NPP's may harbor some of the largest known wintering populations of threatened Steller's eiders (*Polysticta stelleri*). Steller's eiders breed in northern Russia and on the central coastal plain of Alaska, primarily near Barrow. The number of nesting pairs in Alaska is estimated to be only 1,000 out of the estimated 220,000 birds in the world population. However, at least 150,000 of these eiders winter in Alaska's shallow near-shore marine waters from the eastern Aleutian Islands to the Lower Cook Inlet.

In February 2001, critical habitat in western coastal Alaska was designated in four areas for the threatened spectacled eider (*Somateria fischeri*) and in five areas for the Steller's eider. Such designations are intended to ensure that any actions permitted, funded, or conducted by federal agencies will not adversely modify habitat necessary for the conservation of the eiders.

An example of the progress in recovery of Alaska's threatened and endangered species came in March 2001, when the Aleutian Canada goose (*Branta canadensis leucopareia*) was delisted. With the cooperative efforts of many federal and state agencies and private landowners, particularly in

controlling nonnative Arctic foxes (*Alopex lagopus*) on the nesting islands, the goose has recovered from fewer than 1,000 individuals in 1975 to more than 37,000 today.

The American peregrine falcon (*Falco peregrinus anatum*) was declared recovered and was delisted in 1999. After delisting, resource agencies are required to monitor a species' condition for at least 5 years to ensure that population declines do not recur. Post-recovery monitoring of the falcon in Alaska is being conducted primarily on Yukon-Charley NPP with funding provided by the U.S. Air Force. (See *Endangered Species Bulletin* Vol. XXVI, No. 1.) The gray whale, delisted in this part of its range in 1994, is not currently the focus of monitoring efforts.

Alaska's great size and few residents have kept most species off the endangered species list. With the increased tourism and residential growth, Alaska will be the best test of our ability to manage wildlife properly.

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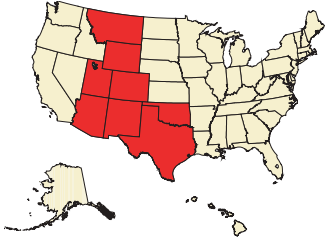


**Steller sea lions**  
Photo © Craig Johnson

**Humpback whale**  
Corel Corp. photo



# Diverse Challenges in the Intermountain Region



**T**he California condor (*Gymnogyps californianus*), rising above one problem after another as it struggles back from near extinction, exemplifies the challenges facing the National Park Service's Intermountain Region. The Intermountain Region is vast, including diverse ecosystems in eight states from Texas to Montana, and it contains more than 20 percent of the areas managed by the Park Service. These areas provide habitats for many endangered and threatened species. Conservation activities carried out in the Intermountain Region include genetic research, reducing visitor impacts, and participating in national resource inventories.

The California condor reintroduction project in northern Arizona began in 1996 when the U.S. Fish and Wildlife Service and The Peregrine Fund—in cooperation with the National Park Service and a number of other federal and state agencies, Native American tribes, and private wildlife conservation organizations—released six captive-propagated condor chicks at the Vermilion Cliffs, just north of Grand Canyon National Park. By 1999, the project had succeeded in establishing 26 juvenile condors. As with previous condor reintroduction efforts, however, early success was followed by setbacks. In 2000, several birds died from lead poisoning. The remaining birds had to be captured for treatment and were eventually released. Now, one of the most important tasks in the condor restoration effort is finding a way to discourage the curiosity of young birds towards humans and human activity. Condors that come into close contact with people often become casualties.

During the past 15 years, Padre Island National Seashore in southern Texas has provided protected habitat for the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*). (See "Turtle Patrol on Padre Island," page 22.) Each summer from 1978 to 1988, biologists shipped approximately 2,000 turtle eggs to Padre Island from the species' main nesting beach at Rancho Nuevo, Mexico, in an attempt to establish a secondary breeding colony. After the hatchlings were released at Padre Island so that they would imprint on the beach, they were sent to the National Marine Fisheries Service laboratory in Galveston, Texas, for captive rearing and eventual release at Padre Island.

The transfer of Kemp's ridley eggs to Padre Island from Rancho Nuevo ended in 1988, and scientists waited for the released turtles to mature and nest in southern Texas. In 1996, two turtles experimentally imprinted on Padre Island as hatchlings returned there to nest. By 1999, biologists had found 16

Kemp's ridley nests on the Texas coast, 13 of them at Padre Island. Efforts to promote recovery in southern Texas include monitoring and protecting nesting sea turtles and their nest sites, and satellite tracking of adult Kemp's ridleys.

In southern Arizona, an endangered fish, the Quitobaquito pupfish (*Cyprinodon macularius eremus*), inhabits the springs, stream, and pond at Quitobaquito on Organ Pipe Cactus National Monument. It also occurs in several isolated pools in the ephemeral Rio Sonoyta in Mexico. Researchers recently found unique mitochondrial DNA markers that differentiate this fish from other desert pupfish in the region. Census results for 2000 were below average compared to previous surveys (1992-1996) and the cause of the decline is not clear. Researchers found many young fish and the overall reproduction looked good, and observers did not detect nonnative fish or other obvious threats. The park is continuing with its monitoring to learn more about fluctuations in the Quitobaquito pupfish population.

Parks in the Intermountain Region provide habitat for endangered and threatened plants as well. One example is the sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophylax*), a plant endemic to the limestone rim rock and vertical cliffs of the Kaibab Plateau in northern Arizona. The Park Service has monitored the population that grows on the South Rim of Grand Canyon National Park since 1983. We found that one of the primary causes for the population's decline was trampling by visitors to the park. To protect the site, the Park Service constructed a fence in 1990. As a result, the population increased steadily during the next decade from 240 plants to 510 plants.

A threatened orchid species, the Ute ladies'-tresses (*Spiranthes diluvialis*), occurs in Dinosaur National Monument, which straddles the Colorado-Utah border. Inventories that were conducted in 1998 and 1999 and funded by the Bureau of Reclamation found this orchid growing along the Green River. Because



**California condor**  
Photo by Elaine Leslie/NPS

the species' survival could be affected by water releases from the upstream Flaming Gorge Reservoir, the National Park Service is collaborating with Utah State University geomorphologists to determine the likely impacts on the plant if dam operations change.

National parks in the Intermountain Region provide important sanctuary for listed plants and animals by protecting particular sites and actively restoring and monitoring populations.

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*Laura Hudson, the Threatened and Endangered Species Coordinator for the Intermountain Region of the National Park Service, is stationed at the University of Montana in Missoula.*

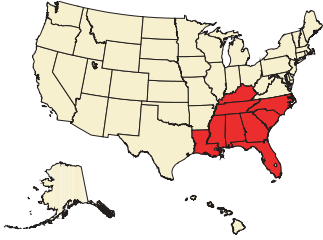


**Dinosaur National Monument provides important habitat for the Ute ladies'-tresses, a rare orchid.**  
Photo © Jim Rorabaugh



by Deborah Jansen and  
Tom Logan

# Improving Prospects for the Florida Panther



**Florida panther cubs**  
Photo by Deborah Jansen/NPS

This country's big wildcat—called a puma or mountain lion or panther (*Puma concolor*) in different regions—is common in some units of the National Park System west of the Mississippi River. However, it was thought to be extinct in the eastern United States and was listed by the U.S. Fish and Wildlife Service as endangered throughout its eastern range in 1967 under the precursor to the Endangered Species Act. In the 1970s, successful searches by the Florida Fish and Wildlife Conservation Commission for the southeastern subspecies, the Florida panther (*Puma concolor coryi*), gave hope that a viable remnant population remained in southern Florida.

Scientific evidence soon confirmed that the vast and nearly roadless Florida Everglades and Big Cypress Swamp were

the last strongholds where panthers survived. Everglades National Park and Big Cypress National Preserve (Big Cypress) secure more than 2 million acres (0.8 million hectares) where the Florida panther faces relatively few human impacts.

Habitat loss is a major reason why many species, including the panther, are endangered; however, genetic and demographic consequences of a small population size also have significant effects. Surveying and monitoring in and around these two parks in the 1970s and 1980s revealed the presence of few panthers. Those remaining were compromised by inbreeding and consequently the loss of genetic variation. A genetic bottleneck resulted in a prevalence of innocuous characteristics such as a “cowlick” or a whorl of hair on the animal's back and a “kink” or fusion of bones at the end of the tail. More importantly, unhealthy traits, such as heart defects, abnormal sperm, immune deficiencies, and overall loss of reproductive vigor, were also present. Panthers appeared to be hanging on but in poor health, and their numbers were not increasing despite protection of the cats and a portion of their remaining habitat.

In 1991, scientists recommended improving the gene pool by releasing healthy individuals from a western subspecies to

mate with panthers in south Florida (Seal 1991). Consequently, in partnership with the Florida Panther Interagency Working Group (formerly the Florida Panther Interagency Committee)—whose members are the Florida Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, the National Park Service (NPS), the South Florida Water Management District, the Fish and Wildlife Service, and the U.S. Forest Service—Everglades National Park and Big Cypress became focus areas for the genetic restoration of the Florida panther. Eight female mountain lions of the subspecies *P. c. stanleyana* were captured in Texas and brought to southern Florida in 1995. Two were released into Everglades National Park and four into Big Cypress. The other two were released in Fakahatchee Strand State Preserve. Five of the eight females have produced 17 known first-generation progeny sired by male Florida panthers and at least 23 second-generation progeny (Darrell Land, Florida Fish and Wildlife Conservation Commission, Naples, Florida, personal communication).

**Everglades National Park**  
Photo by Richard Frear/NPS





The physical characteristics, vigor, and productivity of the *P. c. coryi* x *P. c. stanleyana* intercrosses suggest that the negative effects of inbreeding in the Florida panthers of the 1970s are being remedied. Few of the intercross offspring have had a cowlick or kinked tail. Preliminary analysis of sperm quality and female productivity from a small number of these animals suggests the frequency of harmful traits may be decreasing. Further, the panther population in Big Cypress has shown a recent increase, likely because of the genetic restoration program. Only one male was found in the 540,000-acre (216,000-ha) study area when the NPS initiated work in Big Cypress in 1989, but 21 panthers of both sexes were present during 2000. The Texas cats now have third-generation progeny occupying previously vacant habitats. Throughout south Florida, between 60 and 70 panthers are now estimated to occur (McBride 2000).

The preservation of sufficient suitable habitat for this increasing population is another critical element of panther recovery. Habitat purchases have included the Florida Panther National Wildlife Refuge, a 26,500-acre (10,700-ha) area, established in 1989. An additional 146,000 acres (58,400 ha) of prime panther habitat came under the jurisdiction of Big Cypress in 1996. Another 110,000 acres (44,000 ha) are being acquired to enlarge Everglades National Park, as well as 35,000 acres (14,170 ha) to protect the Okaloacoochee Slough. Previously acquired public land containing panther habitat includes Corkscrew Swamp Sanctuary (1954) and Fakahatchee Strand State Preserve (1974).

An estimated one million acres (0.4 million ha) of significant panther habitat in southern Florida are privately owned. Urban and agricultural demands for these lands continue to diminish the acreage usable by the panther. Consequently, the key to the long-term survival of the Florida panther depends on the proper management of public conservation lands coupled with effective methods to work cooperatively with

landowners to conserve panther habitat on private lands.

As a multiple use area, Big Cypress allows hunters to harvest white-tailed deer (*Odocoileus virginianus*) and feral hogs (*Sus scrofa*), which are the two main prey items of the panther. The NPS and the Florida Fish and Wildlife Conservation Commission have regulated the harvest of game through quota restrictions, antler length limits, prohibition on dog use, and harvest reporting compliance since the mid-1980s. The NPS has removed undeeded backcountry camps and restricted the use of off-road vehicles. It does not appear that the ability of panthers to secure adequate food has been compromised by the current deer and hog harvest by hunters.

Big Cypress has intensified its work for the future of the Florida panther by funding a special team to radio-collar more panthers. The team will complement existing study efforts being conducted by the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service. It will also help to maintain an adequate sample of study animals for the continuing assessment of natural and human-caused impacts and to guide further management decisions.

Implemented through a collaborative approach to recovery among scientists and agencies, gene flow between the Texas and Florida subspecies improves the prospects for long-term survival of the Florida panther. While genetic restoration has been instrumental in increasing panther numbers and improving their health, cooperative management efforts are now vital to maintaining



**Florida panther (with characteristic kinked tail, inset) at Big Cypress National Preserve**

Photo by Deborah Jansen/NPS

sufficient habitat and prey to ensure panther recovery.

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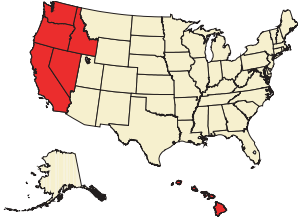
*Deborah Jansen is a Wildlife Biologist for the National Park Service at Big Cypress National Preserve. Tom Logan is the Endangered Species Coordinator for the Florida Fish and Wildlife Conservation Commission.*

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# Endangered Species in Pacific and Western Parks

by Loyal A. Mehrhoff and Jonathan Bayless



**Mission blue butterfly**

Photo by Dr. Edward S. Ross/USFWS

## **Mojave tui chub habitat**

NPS photo



The Pacific West Region of the National Park System encompasses our western coast and Pacific island national parks. With this vast area of states and territories comes a complex set of endangered species issues, ranging from old-growth forests to desert springs to sea turtle nesting beaches and Samoan rain forests. Here are a few examples of our many activities that benefit endangered and threatened species:

**Mohave Tui Chub (*Gila bicolor mohavensis*)** This fish originally occurred in Nevada's Mojave River and its adjacent natural lakes. During the late Pleistocene Epoch about 10,000 years ago, the climate became drier and these interconnected lakes disappeared. The tui chub survived by adapting to life in deep pools and slow-moving portions of the Mojave River.

In the 1930s, anglers introduced nonnative fish into the headwaters of the Mojave River when they used arroyo chub (*Gila orcutti*) for live bait. Hybridization and competition with the arroyo chub caused populations of the tui chub to decline dramatically. By 1968, genetically pure tui chub had been virtually eliminated from the Mojave River system.

Today, pure tui chub are found in only four locations. The largest population is at the artificial Lake Tuenedae in California's Mojave National Preserve. This lake holds a population of approximately 3,500 chubs—over half of all known individuals.

The Mohave tui chub is listed as endangered, and a recovery plan was

issued in 1984. Last fall, the Preserve began improving the habitat of Lake Tuenedae by removing aquatic vegetation and deepening the lake. This expensive maintenance needs to be completed every 10 years or the lake will become increasingly unsuitable habitat for this chub. With these actions, the Preserve is maintaining the population until suitable natural habitat is restored.

**Mission Blue Butterfly (*Icaricia icarioides missionensis*)** This endangered butterfly is restricted to four small areas in the greater San Francisco Bay, California, region, two of which are within Golden Gate National Recreation Area. The butterfly's host plant, the silver-leaved lupine (*Lupinus albifrons* var. *collinus*), is threatened by nonnative plants, particularly thoroughwort (*Agertina adenophora*). Golden Gate's staff are restoring the habitat by removing thoroughwort and replanting these areas with local lupine seeds. They will continue to monitor the butterfly, its host plant, and the invading plants.

**Restoration of Hawaiian Ecosystems.** The Hawaiian Islands are among the world's most imperiled ecosystems. A quarter of all the listed species in the United States (312 of 1,244) occur in Hawaii, and 101 listed, proposed, or candidate plants and animals occur on National Park Service lands in Hawaii. These species and their unique ecosystems are threatened by wildfires, development, and nonnative species. The recovery strategy for Hawaiian parks has primarily focused on controlling nonnative goats, pigs, deer, sheep, and key ecosystem-altering plants. If left unchecked, these species will eventually eliminate native ecosystems. Monitoring indicates that controlling these nonna-



tives has benefitted some rare plant species such as the Haleakala silversword (*Argyroxiphium sandwicense* ssp. *macrocephalum*), a Maui endemic that now numbers in the tens of thousands.

Because the Hawaiian parks face many of the same challenges, they have often shared resources and expertise. Together, these parks are coordinating new efforts to:

- Inventory and monitor vital natural resources, such as endangered species, to improve the management of park ecosystems.
- Propagate, reestablish, and stabilize extremely endangered plants. The parks have identified 50 endangered plant species for special conservation efforts. Thirty of these species currently have fewer than 25 individuals remaining in the wild. This project will propagate and reestablish these species in Hawaiian national parks with significant native habitat. The goal is to stabilize populations of these species so that we have a base upon which to reestablish species as other ecosystem restoration projects mature in the future.
- Control nonnative animals. The parks are continuing their efforts to reduce the effects of feral goats, pigs, sheep, and deer and to expand efforts to control rats, mongooses, and feral cats. Rats, cats, and mongooses can decimate resident bird populations. Ground-nesting birds such as the endangered nene or Hawaiian goose (*Branta sandwicensis*) and Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) are particularly vulnerable. Both Hawaii Volcanoes National Park and Haleakala National Park are expanding efforts to protect remote areas of the park that harbor key habitat for native endangered birds.
- Protect and restore plant communities. The Hawaiian National Parks have teamed together to host a multipark Exotic Plant Management Team that focuses on finding new infestations of nonnative plants and

controlling them before they become serious threats to the parks or other natural areas. This team and other park efforts also target long-established nonnatives such as grasses, gingers (*Hedychium* spp.), miconia (*Miconia calvescens*), and fire tree (*Myrica faya*) that can overrun and replace native ecosystems. The parks are beginning to actively restore invaded areas through the use of prescribed fire or herbicides and then planting a new community of native species.

Conservation of unique island and inland ecosystems with their endemic species are priorities in the Pacific West Region. We are able to provide protection for many populations of federally listed species that are otherwise threatened by habitat loss due to development, disturbance from recreation, and invasion by nonnative species.

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**Ground-nesting birds such as the dark-rumped petrel are especially vulnerable to nonnative predators.**

*Photo by Robert Shallenberger/USFWS*

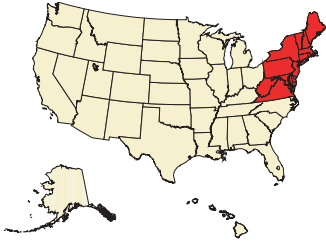
**This critically endangered *Cyanea glabra* is being smothered by the invasive weed kahili ginger (*Hedychium gardnerianum*).**

*NPS photo*



by Chris Lea and  
Shanda H. King

# Restoring an Atlantic Barrier Island Endemic



In 1967, graduate student Elizabeth Higgins conducted a floristic survey of Assateague Island, a barrier island straddling the Maryland-Virginia state line, found seabeach amaranth (*Amaranthus pumilus*) growing on several wash flats. In 1993, the Fish and Wildlife Service (FWS) found that this plant had declined to the point that it was vulnerable to extinction and warranted listing as a threatened species. By that time, its range was reduced to isolated population clusters on Long Island, New York, and on barrier islands of North and South Carolina. This plant is endemic to Atlantic barrier island beaches and was believed to be extirpated from six of the nine states in its historic range, which extended along the coast from Massachusetts to South Carolina.

The National Park Service (NPS) Northeast Region, the Maryland Departments of Natural Resources (MDNR) and Agriculture (MDA), The Nature Conservancy, and the FWS teamed up to plant seabeach amaranth on the beaches of Assateague Island National Seashore in 2000. This planting is one part of a multiyear restoration study by the NPS. Evaluating environmental and genetic factors is critical in the ongoing study to improve overall restoration efforts.

The seabeach amaranth seems to be well adapted to the harsh and windy habitat of the upper parts of barrier island beaches and wash flats where storm surges scour competing vegetation. It is a low-growing annual with somewhat succulent leaves. The plant's decline is primarily attributed to habitat alteration or loss caused by shoreline development and stabilization projects. A fecund seed producer, the seabeach amaranth may rely on seed banks and prolific dispersal to maintain populations when conditions for the growing plants are poor. Such a strategy is not successful when there is insufficient habitat.

**Seabeach amaranth**

Photo by Helen Hamilton/NPS





Maintenance of seabeach amaranth populations requires a balance between the processes of creation and stabilization: new habitat is created when beaches are scraped clean by storms, and existing habitat is lost when an absence of natural disturbances allows the succession of more competitive species.

Assateague Island changed greatly in the decades since the last sighting of the seabeach amaranth in 1967. Both the NPS at Assateague National Seashore and the FWS at Chincoteague National Wildlife Refuge had built high dunes on the island to protect park facilities and habitat for wildlife. Extensive sand flats had been overgrown by vegetation or converted to impoundments for waterfowl, preventing the ongoing creation of appropriate habitat for the amaranth.

Changes in shoreline management policy by the NPS and significant storm events during the 1990s restored some seabeach amaranth habitat to Assateague. While monitoring the piping plover (*Charadrius melodus*) in August 1998, NPS biological technician Shanna Ramsey found a single seabeach amaranth plant on the north end of Assateague Island. This and a nearby plant were the first seabeach amaranth seen on Assateague in more than 30 years.

Storm surges from Hurricane Bonnie threatened both plants in late August 1998. The NPS, MDNR, and the FWS conferred on emergency measures. Because these were the only known plants along 300 miles of coast, we removed one plant to a greenhouse for breeding; the other plant perished in the storm. The rescued plant was tended by MDA horticulturist Shelley Hicks and produced 20,000 seeds. Using the species-specific germination methods pioneered by Jerry and Carol Baskin at the University of Kentucky, Hicks grew 1,000 seedlings for transplanting.

Current threats to seabeach amaranth restoration may be competing plants such as the nonnative Asiatic sand sedge (*Carex kobomugi*) and the native American beachgrass (*Ammophila breviligulata*). These species may

threaten the maintenance of viable seabeach amaranth populations if natural disturbances do not create new areas of habitat. Because the nonnative occupies the same habitat as seabeach amaranth, efforts are planned to map Asiatic sand sedge colonies, identify appropriate control treatments, and monitor results.



Additional threats come from herbivore damage. Nonnative Sika deer (*Cervus nippon*) and native white-tailed deer (*Odocoileus virginianus*) caused some seabeach amaranth transplant deaths during 2000. Subsequently, marker flags were bent into a protective triangle over the plants to prevent browsing. Caterpillars of various moth species (webworms) also are known to cause significant seabeach amaranth mortality. We will monitor for insect damage weekly during the growing seasons.

Quantifying the amount of genetic variation present in the populations is another facet of the restoration effort. Despite reduced genetic diversity due to the fact that one plant was the progenitor of 20,000 seeds, we believe that variability could be restored by reintroducing large numbers of individual plants. In this case, we transplanted 800 of the 1,000 germinated seedlings, and we will follow up with assessments of genetic diversity.

Work on recovery of the seabeach amaranth contributes to the ecology of a mid-Atlantic barrier island ecosystem beleaguered by land use changes and

urbanization pressures. Results of the restoration may be useful at other sites where seabeach amaranth exists now or was extirpated, including these units of the NPS: Fire Island National Seashore, Gateway National Recreation Area, Cape Hatteras National Seashore, and Cape Lookout National Seashore.

Early results of the restoration project on Assateague were seen in June 2001. Eight hundred seedlings have been found at the previous year's restoration sites, and small numbers continue to germinate. Perhaps equally as significant for restoration of seabeach amaranth as initial "in situ" reproduction is the ability of the new population to disperse to new habitat.

Some of these new seedlings have appeared up to a mile from the nearest known sites for plants in 2000. One day, success might be defined as the time when we, like Elizabeth Higgins back in 1967, can call seabeach amaranth "just another plant" among many.

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*Chris Lea is an ecologist and Shanda H. King is a botanist at Assateague Island National Seashore.*

**(Above) Seabeach amaranths form small dunes that appear to protect the stems from moisture loss and allow growth of additional branches that in turn produce more flowers.**

*Photo by Helen Hamilton/NPS*

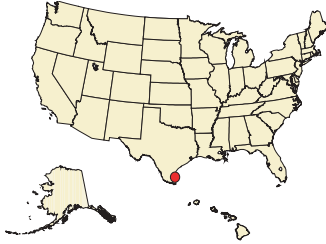
**(Below) A volunteer plants a seabeach amaranth seedling at Assateague Island National Seashore.**

*Photo by Alex Almaria/NPS*



by Darrell Echols

# Turtle Patrol on Padre Island



A frantic radio call came into the Padre Island National Seashore Ranger Station on April 29, 1991: a park visitor reported that a sea turtle was crawling ashore! In a flash, we loaded a 4-wheel-drive truck with all the necessities for excavating sea turtle eggs and drove the mile (1.6 kilometer) of beach to the nest site. In that 20-minute drive, I realized that I was about to witness a nesting sea turtle for the first time in my life.

Ordinarily, National Seashore staff

patrolled about 110 miles (177 km) of beach along the south Texas coast daily from March through June to locate the nesting sea turtles or their nests, and have done so since 1990. That day, we had reluctantly decided to cancel the patrol because tides were higher than normal, which limited our driving ability. Luckily, a

visitor had noticed the signs placed along the beach asking that they contact us if a sea turtle was seen.

Despite my training on the characteristics of nesting sea turtles, I was awed by the sight before me. The turtle was a Kemp's ridley (*Lepidochelys kempii*), the most endangered of the world's sea turtles, and she was in the process of digging a nest cavity to lay her eggs. About five minutes after we arrived, she settled down and began laying the first of about 100 white, leathery eggs. I was amazed and curious how she could carry so many eggs inside of her, especially since each one was the size of a ping-pong ball. Once the eggs were laid, she

covered the evidence by using her flippers to sling sand over them. Meanwhile, she rocked back and forth to tamp down the sand. Even though she weighed only about 80 pounds (36 kilograms), I could feel the vibrations from her tamping nearly 20 feet (6 meters) away. Finally she finished, lumbered back across the beach to the water, and swam away.

At Padre Island National Seashore, we have the distinction of being the only location in the United States where all five protected species of sea turtles occurring in the Gulf of Mexico have nested. The rarest of these species is the Kemp's ridley, listed as endangered in 1970. In 1978, Mexico and the U.S. initiated a 10-year project that brought Kemp's ridley eggs from the species' main nesting beach in Mexico to Padre Island as a means of reestablishing the population in Texas. Now, each spring these released turtles nest sporadically along the southern Texas coast.

As a continuing part of the recovery effort, Kemp's ridley eggs from southern Texas nests are carefully removed and placed into artificial incubators for increased hatching success. When left to hatch in the wild, most eggs are lost to predation, poaching, inundation by high tides, or crushing from beach traffic. Among sea turtles, Kemp's ridleys hide their nests the best. Besides being relatively lightweight and not leaving large, noticeable tracks, they nest on windy days, which helps erase any traces. Sometimes patrollers spend an hour finding a nest after seeing a turtle or its tracks in the sand.

Once the nest is located, it generally takes about 15 minutes to pack the eggs gently into styrofoam coolers, insert a



**Darrell Echols and NPS staff with nesting Kemp's ridley turtle**

*NPS photo*

probe for monitoring their temperatures, and cover them with a plastic screen and sand. Eggs can safely be transported for the first 24 hours after laying; after that, the embryo attaches itself to the top of the egg, and it can suffocate if the egg is rotated after attachment. A passenger holds the cooler during transport to the incubators to avoid scrambling the fragile contents.

Hatching success can be less than 40 percent in the wild but up to 90 percent in the incubation facility. Dr. Donna Shaver, formerly with the National Park Service at Padre Island, leads the sea turtle research in her current position with the U.S. Geological Survey's Biological Resources Division. This research extends beyond the boundaries of Padre Island National Seashore. Dr. Shaver developed the standardized egg collection and incubation methods. After seven weeks of incubating, the eggs hatch, and the hatchlings are released onto the beach where the eggs were collected to begin the cycle again.

After 10 years at Padre Island, I have not lost that special feeling I get from doing the right thing for an animal needing help, but it has been difficult at times. It is hard to see what might be the fruits of our labor destroyed after we've put forth such a tremendous effort. I am referring here to the dead turtles that periodically wash ashore along the Texas coast. The cause of death for some of these animals is obvious, but for most it is not.

In addition to the presence of dead turtles, patrol efforts are sometimes hampered by events that are beyond our control. Twice each year, during the spring and fall, ocean currents change along the coast of Texas and cause seaweed (*Sargassum* spp.) mats to come ashore in large masses. This seaweed provides nutrients and food to shorebirds and helps to stabilize sand and build dunes. Although the seaweed doesn't affect the turtles, their tracks are concealed by it, increasing the possibility that our patrollers will miss a nest.

Padre Island National Seashore staff will continue to do what we can to help increase the numbers of nesting Kemp's ridleys. In addition to our partnership with the Geological Survey's Biological Resources Division, we also work with the National Marine Fisheries Service, U.S. Coast Guard, and U.S. Fish and Wildlife Service to increase patrols outside the park, provide data for law enforcement in state and federal waters, and standardize egg collection methods.

It has been more than 10 years since I saw my first sea turtle as a patroller. I knew then that it was a rare treat. Not another sea turtle nested at Padre Island for three more years, and in 2000, there were still only 18 nests. I am now a manager and supervisor of the National Park Service sea turtle monitoring program at Padre Island National Seashore and have been fortunate to remain involved in this program. It is truly a rewarding experience to know that your efforts are helping protect this turtle species and bring it back from the edge of extinction. To all the biologists caring for endangered species, I would like to offer the following quote from *The Lorax* by Dr. Seuss: "Unless someone like you cares a whole awful lot, nothing is going to get better. It's not!"

Keep up the great work!

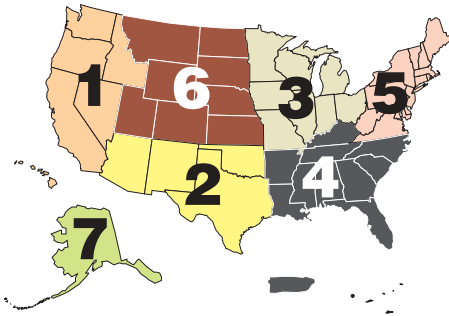
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*Darrell Echols is a Biologist for the National Park Service and is located at Padre Island National Seashore in Corpus Christi, Texas.*



**Nesting Kemp's ridley turtle**  
Photo by Stuart Porter/USFWS





Regional endangered species staffers have reported the following news:

## Region 1



**Contra Costa wallflower**

Photo by Paul Opler

**Rare Plant Propagation** The Fish and Wildlife Service's San Francisco Bay National Wildlife Refuge (NWR) Complex has completed a new greenhouse facility next to the refuge's existing native plant nursery. The new greenhouse is dedicated to the propagation of endangered plants of Antioch Dunes NWR, the Antioch Dunes evening primrose (*Oenothera deltooides* ssp. *howellii*) and Contra Costa wallflower (*Ersimum capitatum* var. *angustatum*). With its increased capacity, the refuge will be able to meet its endangered plant restoration needs in-house.

Reported by LaRee Brosseau of the FWS Portland Regional Office.

## Region 4

**Spring Creek Bladderpod (*Lesquerella perforata*)** The FWS Cookeville, Tennessee, Field Office, state of Tennessee, and city of Lebanon have signed a cooperative management agreement for the protection of a Spring Creek bladderpod population occurring on property recently acquired by the city. The city purchased approximately 3.5 acres (1.4 hectares) adjacent to a road construction project for the perpetual protection of Spring Creek bladderpods occurring on the property. This site is one of only 17 known locations harboring this endangered species and is the first to receive this level of protection.

By providing for the perpetual protection of this species while allowing for the road construction, this agreement represents a cooperative approach to resolving issues between development and habitat protection. We have been able to secure similar management agreements for the Spring Creek bladderpod with two Lebanon-based corporations, Cracker Barrel Old Country Store, Inc., and TRW Automotive. All 17 occurrences of this plant are located on private property and efforts are underway to encourage the other landowners to follow the city's lead.

Reported by Tyler Sykes of the FWS Cookeville Field Office.

## Region 5

**American Burying Beetle (*Nicrophorus americanus*)** The largest American burying beetle reintroduction effort in the 12-year history of the species' recovery program took place recently on Nantucket Island off the Massachusetts coast. The Roger Williams Park Zoo in Providence, Rhode Island, raised well over 300 of the endangered beetles for release on Nantucket Island, a historic locality for the species. On June 11 and 12, 320 American burying beetles (160 pairs) were given dead quail for food (the beetles require carrion to reproduce) and released at the Massachusetts Audubon Society's Sesachacha Wildlife Sanctuary. With each pair of beetles capable of raising 10-20 larvae, the 2001 release may result in thousands of beetles on the island by late fall.



**American burying beetle**

Photo by Andrea Kozol

This effort is probably one of the largest reintroductions ever undertaken for an endangered insect species.

Present to document the work was a film crew from the TV program, Wild Moments, and the Providence Journal newspaper. Partners in the work include the Rhode Island Division of Fisheries and Wildlife, Massachusetts Division of Fisheries and Wildlife, Roger Williams Park Zoo, Massachusetts Audubon Society, University of Massachusetts' Boston Field Station, University of Rhode Island, Maria Mitchell Natural History Museum, and Nantucket Conservation Foundation.

**Indiana Bat (*Myotis sodalis*)** As a result of a multi-agency partnership, endangered Indiana bats have been documented to migrate to the Lake Champlain Valley in Vermont from a hibernaculum in New York. Biologists tagged five Indiana bats (four females and one male) with radio transmitters as the bats left their hibernaculum (hibernation site) in early May. Three females were located by air and subsequently by land in Vermont within one to six days after release. Multiple roost trees for two of the females were identified; most of the roost trees were shagbark hickories. Evening counts of bats leaving the roosts ranged from 4 to 120 bats (probably more than one species roosted together). All of the Indiana bats were found on private land and all landowners granted permission for field staff to locate the bats.

The success of this study was due to a substantial cooperative effort by state and federal agencies and concerned citizens. Staff and equipment were provided by our New England and New York Field Offices, the New York State Department of Environmental Conservation (which also provided the airplane and pilot), the Green and White Mountain national forests, and the Vermont Agency of Natural Resources. The West Virginia Department of Natural Resources loaned additional equipment. High school and college students also volunteered their time.

**Karner Blue Butterfly (*Lycaeides melissa samuelis*)** In early May, Partners for Fish and Wildlife (PFW) staff from our New York Field Office restored 24 acres (9.7 ha) of habitat at the Albany Pine Bush, an unusual pine barrens ecosystem located in Albany, New York. This property will provide valuable habitat for the endangered Karner blue butterfly. A PFW Biological Science Technician operated a Hydro-Ax to remove unwanted vegetation on approximately 20 acres (8 ha). Additionally, 4 acres (1.7 ha) degraded by an invasive stand of black locust (*Robinia pseudo-acacia*) were restored to native grasslands. After the locust were removed, the site was prepared and seeded with a mixture of warm season grasses/forbs. A PFW Biological Science Technician provided technical assistance to Albany Pine Bush staff who seeded the site. Prescribed fire will be used regularly to maintain the 20-acre Hydro-Ax site, as well as the 4-acre seeded site. The two restored sites will provide habitat for the Karner blue butterfly and furnish educational opportunities for the Albany Pine Bush Commission.

**Piping Plover (*Charadrius melodus*)** Four students from the Ross School in East Hampton, New York, are involved in a plover protection effort on the town's beaches. They will be using two video surveillance cameras to monitor nesting sites plagued by chick mortality. This study is a continuation of a prior school project that demonstrated fencing off nesting sites provided almost total protection from predators and boosted productivity. East Hampton beaches have been the preferred nesting location for about 22 pairs of threatened piping plovers in the last several years, but chick mortality has been around 60 percent.

**Roseate Tern (*Sterna dougallii dougallii*)** Roseate tern productivity in Long Island may get a boost from the combined efforts of private organizations and state, county, and federal government agencies to restore Warner's Island in Long Island's Shinnecock Bay. Warner's Island historically provided habitat for the endangered roseate tern, which prefers nesting on small islands under or adjacent to objects that provide cover. Erosion has gradually reduced the elevation of the island to the point where it is being overwashed and inundated. This has resulted in a decrease in the number of nesting pairs from 30 pairs several years ago to three pairs last year.

The island has been restored using sand barged to the site and off-loaded with an amphibious excavator purchased by the FWS Long Island Refuge Complex and our New York Field Office's Partners for Fish and Wildlife program. Other cooperators included the New York State Department of Environmental Conservation, Southampton Town Trustees, National Audubon Society, New York Fish Trade Tackle Association, Long Island Beach Buggy Association, and Suffolk County Department of Parks, Labor, and Public Works. The restoration team, using sandbags and sandfill, raised the profile of the island to protect tern nests from disturbance and inundation. The team was successful in its cooperative efforts and the island is being monitored to assess nesting success. Volunteers are planning to make decoys and place them on the island to attract roseate terns in time for next year's nesting season.

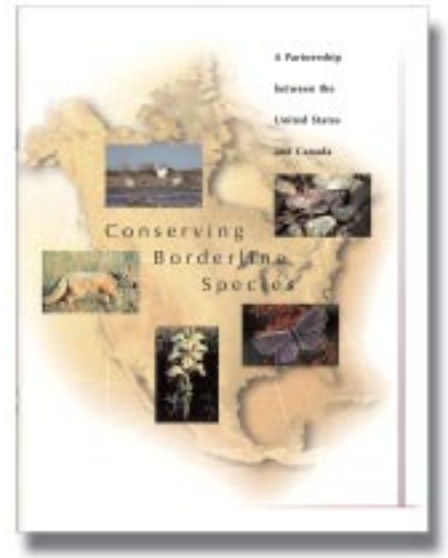
*Reported by Mark Clough of the FWS New York Field Office.*



**Roseate tern**  
Photo by Michael Bender

## National Office

**International Outreach** The Canadian Wildlife Service and the FWS Endangered Species Program have completed a 28-page joint publication, "Conserving Borderline Species—A Partnership Between the United States and Canada."



The booklet highlights 10 species considered at risk that range or migrate between the two countries and for which both countries have cooperated on recovery efforts. These species are the black-footed ferret, swift fox, woodland caribou, grizzly bear, whooping crane, piping plover, marbled murrelet, Lake Erie water snake, Karner blue butterfly, and western prairie fringed orchid. The publication may be obtained by calling 703-358-2390 or by going to this website: [http://www.speciesatrisk.gc.ca/species/sar/publications/cbs/index\\_e.htm](http://www.speciesatrisk.gc.ca/species/sar/publications/cbs/index_e.htm)

*Reported by Susan Jewell of the Endangered Species Program in the FWS Arlington, Virginia, headquarters office.*

From November 2000 through August 2001, the Fish and Wildlife Service published the following proposed and final Endangered Species Act (ESA) rules in the *Federal Register*. The full text of each action can be accessed through our website:

<http://endangered.fws.gov>.

## Proposed Listing Rules

### Smalltooth Sawfish (*Pristis pectinata*)

The National Marine Fisheries Service, which has ESA jurisdiction for most marine species, has completed a comprehensive status review of the smalltooth sawfish and found that North American populations are in danger of extinction. On April 16, NMFS proposed to list the distinct population segment (DPS) of smalltooth sawfish in waters of the southeastern coastal United States as endangered. Extensive degradation or loss of coastal habitats, water pollution, and incidental capture during commercial fishing in coastal and estuarine areas are believed to be responsible for the population's decline.



**Smalltooth sawfish**

Photo by Colin Simpfendorfer/Mote Marine Laboratory

**Twelve Hawaiian Insects** Twelve species, from what biologists believe is one of most remarkable cases of habitat-specific evolution in any group of animals, were proposed on January 17 for listing as endangered. Known as Hawaiian picture-wings, these insects are part of the intensely studied Drosophilidae family, which is found throughout the main islands of the Hawaiian archipelago.

Hawaiian picture-wings are known for the elaborate markings on their otherwise clear wings. They also have been called the "birds of paradise" of the insect world because of their spectacular courtship displays and defense of their territories.

As many as 1,000 species of Hawaiian picture-wings may exist, each one adapted not only to a particular island but also to a specific habitat type. Individual species have adapted to a wide diversity of ecosystems ranging from desert-like habitats to rain forests and swamplands. In many cases, a species requires a specific native plant host during portions of its breeding cycle.



**Picture-wing fly**

USFWS photo

Each of the 12 Hawaiian picture-wing species proposed as endangered is found only on a single island, and each breeds only on a single or a few related species of plants, some of which are also listed as threatened or endangered species. Threats to the survival of the picture wings include habitat degradation caused by feral animals and alien plants, habitat loss from fire, biological pest control, and predation from alien ants and wasps.

**Dolly Varden (*Salvelinus malma*)** On January 9, we proposed to protect the fish known as the Dolly Varden in the Coastal-Puget Sound region of Washington under the "similarity of appearance" provision of the ESA, because the Dolly Varden so closely resembles the bull trout (*Salvelinus confluentus*), which is listed as a threatened species.

Under the ESA, a species may be treated as if it were endangered or threatened when it so closely resembles a protected species that law enforcement personnel would have substantial difficulty in distinguishing between the two species. If the proposal is finalized, it will help eliminate situations where people mistakenly "take" bull trout when they believe they are taking Dolly Varden. Take is defined in the ESA as killing or harming a protected species or destroying or substantially altering its habitat.

Dolly Varden would only be treated as a listed species where its range overlaps with that of the Coastal-Puget Sound population of bull trout in Washington state. In the Coastal-Puget Sound areas, Dolly Varden occupy the same habitat as bull trout and are so similar that the two species cannot easily be told apart in the field. We are proposing protection for Dolly Varden to increase the chances that bull trout will be able to recover.

Under the proposal, Dolly Varden would be covered by the existing special rule for bull trout, which exempts certain activities from the ESA's prohibition on take. These exemptions include fishing activities authorized under state, National Park Service, or Native American tribal laws. Fishing for Dolly Varden in other areas, outside of the Coastal-Puget Sound area covered by the bull trout listing, would not be affected.

Dolly Varden have light-colored spots on a darker background, just the opposite of the pattern on salmon and most trout, which have dark spots on a light background. Creamy to pale yellow spots cover the back, and red or orange spots cover the sides. The fins have white or cream-colored margins. This unique coloration is particularly striking in the male during spawning and led to the common name Dolly Varden, in reference to a colorfully clothed character in the Charles Dickens novel *Barnaby Rudge*.

**Scotts Valley Polygonum (*Polygonum bickmanii*)** The Scotts Valley polygonum, a small annual in the buckwheat family (Polygonaceae), has linear-shaped leaves and produces white flowers. As its name indicates, this plant species is endemic to Scotts Valley, which falls within Santa Cruz County, California. Its known distribution is restricted to two sites. Threats to the survival of this species include habitat loss resulting from urbanization and displacement by nonnative grasses. On November 9, we proposed to list the Scotts Valley polygonum as an endangered species.

## Final Listing Rules

**Ventura Marsh Milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*)** The





**Ventura Marsh milk-vetch**

USFWS photo

Ventura Marsh milk-vetch, a plant once thought to be extinct, was listed on May 21 as endangered. Until its rediscovery by a Fish and Wildlife Service biologist in 1997, the species had not been seen since 1967. This plant is a perennial in the pea family (Fabaceae) with silvery-haired leaves and clusters of yellowish or cream-colored flowers. The only known population is located on less than one acre (0.4 hectare) of privately owned beach dune in Ventura County that has historically been used for oil field waste disposal. When the species was rediscovered in 1997, 374 plants were counted at the site. In 1998, the population declined to fewer than 200 plants and it has continued downward.

**White Abalone (*Haliotis sorenseni*)** The National Marine Fisheries Service listed the white abalone on May 29 as an endangered species. This mollusk historically occurred along the west coast of North America from Point Conception, California, south to Punta Abrejos in Baja California, Mexico. Over-harvesting of the white abalone for human consumption caused a decline of approximately 99 percent.

**Nine Texas Cave Invertebrates** Nine species of invertebrates endemic to caves in northern Bexar County, Texas, were listed on December 26 as endangered. Threats to the survival of these invertebrates include destruction or degradation of their habitat due to construction; filling of caves and loss of permeable cover on the surface; groundwater contamination resulting from septic effluent, sewer leaks, and chemical runoff; predation by, and competition with, nonnative fire ants; and vandalism.

**Atlantic Salmon (*Salmo salar*)** The Fish and Wildlife Service and the National Marine Fisheries Service, which share ESA responsibility for most rare anadromous fishes, jointly listed the Gulf of Maine DPS of the Atlantic salmon as endangered on November 17. The listing covers native Atlantic salmon found in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot rivers and Cove Brook. Although the state of Maine's salmon conservation plan has made some progress, threats such as disease and the escape of farm-raised salmon of other strains from Maine's aquaculture industry imperil the native Atlantic salmon stocks.

## Proposed Delisting Rules

**Robbins' Cinquefoil (*Potentilla robbinsiana*)** A partnership between the Fish and Wildlife Service, Forest Service, and Appalachian Mountain Club has restored the Robbins' cinquefoil, an endangered plant native to the White Mountains of New Hampshire, to a secure status. As a result, we proposed on June 8 to remove this wildflower from the federal list of threatened and endangered species.

A member of the rose family (Rosaceae), Robbins' cinquefoil only occurs in the alpine zone of the White Mountain National Forest. It is a small, almost stemless perennial that bears a yellow flower. Prior to its listing, a census revealed that the species' main population numbered 3,700 plants. Today, the population totals more than 14,000 plants.



**Robbins' cinquefoil**

Photo by Susi von Oettingen/USFWS

At the time of its listing, Robbins' cinquefoil was threatened by plant collectors and disturbance from hikers along the Appalachian Trail. In 1983, the White Mountain National Forest and the Appalachian Mountain Club helped reroute the trail away from the species' critical habitat and built an enclosure to protect the primary population. Signs alerted hikers that no admittance was allowed without a permit. Biologists also successfully reintroduced two additional populations to suitable habitat in the national forest.

Although a final determination to delist Robbins' cinquefoil would remove it from ESA protection, an agreement between the Fish and Wildlife Service and the White Mountain National Forest would protect this species in perpetuity.



**Hoover's woolly-star**

USFWS photo

**Hoover's Woolly-star (*Eriastrum hooveri*)** This California plant, listed in 1990 as a threatened species, was proposed March 6, 2001, for delisting. Surveys conducted since 1990 have expanded its known range to Fresno, Kern, Kings, Los Angeles, Santa Barbara, San Benito, and San Luis Obispo counties. Biologists have found that the plant is more resilient to certain activities than once thought, and changes in federal land management have given additional protection to the species' habitat. Hoover's woolly-star is an annual herb in the phlox family (Polemoniaceae).

## Final Delisting Rule

**Aleutian Canada Goose (*Branta canadensis leucopareia*)** Highlighting a successful 35-year conservation effort involving federal and state agencies, conservation organizations, and private landowners, we officially recognized the recovery of the Aleutian Canada goose on March 20 by removing this bird from the list of threatened and endangered species.

A subspecies of the Canada goose, the Aleutian Canada goose nests only on a few of Alaska's remote, windswept Aleutian Islands. It winters in California, stopping along the migration at points on the Oregon coast. The population numbered only in the hundreds in the mid-1970s, but today the estimated population has grown to 37,000 and the threat of extinction has passed.

Since 1967, biologists have worked hard to eliminate nonnative foxes from former nesting islands and to reintroduce geese. The removal of these predators has benefitted many other bird species on the islands, including puffins, murres, and auklets. Besides removing foxes, the federal and state wildlife agencies closed Aleutian Canada goose hunting in wintering and migration areas, banded birds on the breeding grounds to identify important wintering and migrations areas, and released families of wild geese on fox-free islands in the Aleutians. In California's Sacramento and San Joaquin valleys, and along the northern California coast, many private landowners have helped by managing their lands to provide wintering habitat for Aleutian Canada geese.

## Experimental Populations

**Whooping Crane (*Grus americana*)** Whooping cranes will migrate across the skies of eastern North America this fall for the first time in more than a century as part of a bold experiment conducted by a partnership of federal and state wildlife agencies, conservation groups, and other private organizations led by the Fish and Wildlife Service. The project will be facilitated by a June 26 rule classifying the eastern migratory flock as a "nonessential experimental population." Such a designation protects the birds while giving



USFWS photo

natural resource managers a greater degree of flexibility.

Biologists will train a flock of about 10 young whooping cranes to follow an ultralight aircraft across seven states from Necedah National Wildlife Refuge (NWR) in Wisconsin to Chassahowitska NWR in Florida. If all goes as planned, the birds will learn the migration route and return from Florida to Wisconsin on their own next spring, thereby establishing a second migratory whooping crane flock in North America.

The experiment will be conducted by the Whooping Crane Eastern Partnership, a consortium that includes the Service, the U.S. Geological Survey, state agencies, conservation organizations, and private citizens. Private donors are contributing more than half of the \$1.3 million needed to complete the project. More than 40 private landowners have offered the use of their property as overnight sites for the migrating birds.

The whooping crane, named for its loud and penetrating mating call, is one of America's best known and rarest endangered species. Cranes live and breed in extensive wetlands, where they feed upon crabs, clams, frogs, and other aquatic organisms. Whooping cranes stand 5 feet (1.5 meters) tall and are white in color with black wing tips and a red crown.

**Seventeen Freshwater Mollusks** In an effort to restore populations of a number of endangered Alabama freshwater mollusks, we designated nonessential experimental population status on June 14 for reintroduced populations of 16 mussels and one aquatic snail in the Tennessee River below Wilson Dam.

Our action was taken at the request of the Alabama Division of Wildlife and Freshwater Fisheries. This designation will be applied to species released in the free-flowing reach of the Tennessee River between Wilson Dam and the backwaters of Pickwick Reservoir. The designation will also extend five miles (8 kilometers) upstream of all tributaries that enter the Wilson Dam tailwaters. The Tennessee Valley Authority, operator of the Wilson Dam, supports the proposed experimental population designation and has offered to assist in reintroduction efforts.

**Four Southeastern Fish** As part of a broad partnership to recover threatened and endangered wildlife in the Tennessee River system, we proposed on June 8 to reintroduce four native fish species into the Tellico River in Monroe County, Tennessee. They would be designated as a non-essential experimental population.

Biologists believe the four fish—the endangered duskytail darter (*Etheostoma percnurum*), the endangered smoky madtom (*Noturus baileyi*), the threatened yellowfin madtom (*Noturus flavipinnis*), and the threatened spotfin chub (*Cyprinella [=Hybopsis] monacha*)—likely inhabited the Tellico River in the past. The Tellico River is a Little Tennessee River tributary that is just downstream from the mouths of Abrams and Citico Creeks, and all four fishes were found in these creeks. Before the construction of reservoirs on the main stem of the Little Tennessee River, no physical barriers prevented the movement of these fish between Abrams Creek, Citico Creek, and the Tellico River.



Duskytail darter

Photo by Richard Biggins/USFWS





**Smoky madtom**

Photo by Richard Biggins/USFWS

The reintroduction is part of a major initiative by federal and state agencies and private conservation groups to recover native species in the Tennessee River system. Since the mid-1980s, Conservation Fisheries, Inc., a nonprofit fish conservation organization located in Knoxville, Tennessee, has been successfully reintroducing these four species into Abrams Creek with support from the Fish and Wildlife Service, Tennessee Wildlife Resources Agency, National Park Service, U.S. Forest Service, Tennessee Valley Authority, and Tennessee Aquarium. The proposed native fish reintroduction effort into the Tellico River was developed at the request of the Tennessee Wildlife Resources Agency.

## Proposed Critical Habitat Rules

**Critical Habitat** Critical habitat, as defined in the ESA, is a term for a geographic area that is essential for the conservation of a listed species. Critical habitat designations do not establish a wildlife refuge, wilderness area, or any other type of conservation reserve, nor do they affect actions of a purely private nature. They are intended to delineate areas in which federal agencies must consult with the Service to ensure that actions these agencies authorize, fund, or carry out do not adversely modify the designated critical habitat. Within designated critical habitat boundaries, federal agencies are required to consult except in areas that are specifically excluded, such as developed areas within the boundaries that no longer contain suitable habitat. Maps and more specific information on critical habitats are contained in the specific *Federal Register* notice designating each area. For more information on critical habitat designations in general, go to the website for our Endangered Species Listing Program (<http://endangered.fws.gov/listing/index.html>) and click on "About Critical Habitat."

and click on "About Critical Habitat."

### Carolina Heelsplitter (*Lasmigona decorata*)

Portions of nine rivers and creeks in western North and South Carolina were proposed on July 11 as critical habitat for an endangered freshwater mollusk, the Carolina heelsplitter. This mussel survives only in scattered pockets of suitable habitat remaining in portions of three small streams in North Carolina and six small creeks and one river in South Carolina.

### Otay Tarplant (*Deinandra conjugens*)

On June 13, we published a proposal to designate critical habitat for the Otay tarplant, a threatened annual in the sunflower family (Asteraceae), on approximately 6,630 acres (2,680 ha) in San Diego County, California.



**'Elepaio**

Photo by Eric VanderWerf/USFWS

### O'ahu 'Elepaio (*Chasiempis sandwichensis ibidis*)

We proposed on June 6 to designate approximately 66,350 acres (26,850 ha) of critical habitat on the Hawaiian island of O'ahu for the endangered O'ahu 'elepaio, a forest bird once considered the most common native land bird on the island. The five areas proposed for critical habitat are concentrated in the Wai'anae and Ko'olau mountain ranges.

### Four Central California Coast Plants

About 25,800 acres (10,440 ha) of critical habitat were proposed on February 15 for the Monterey spineflower (*Chorizanthe pungens* var. *pungens*) and 1,640 acres (665 ha) for the robust spineflower (*Chorizanthe robusta* var. *robusta*). Both species are found in southern Santa Cruz and northern Monterey counties.

Also on February 15, 310 acres (125 ha) in Santa Cruz County were proposed as critical habitat for the Scotts Valley spineflower (*Chorizanthe robusta* var. *bartwegii*) and the Scotts Valley polygonum (*Polygonum bickmanii*). These two plants exist only in small ecologically unique "wildflower fields" on private property in northern Scotts Valley in the Santa Cruz Mountains.



**Appalachian elktoe**

Photo by Richard Biggins/USFWS

### Appalachian Elktoe (*Alasmidonta raveneliana*)

Critical habitat for this endangered freshwater mussel was proposed on February 8. The Appalachian elktoe has been eliminated from much of its range and survives only in scattered pockets of suitable habitat in portions of the Little Tennessee River system, Pigeon River system, and Little River in North Carolina, and the Nolichucky River system in North Carolina and Tennessee.



**Quino checkerspot butterfly**

Photo by Paul Opler

### Quino Checkerspot Butterfly (*Euphydryas editha quino*)

We proposed on February 7 to designate critical habitat on approximately



301,010 acres (121,820 ha) of land in Riverside and San Diego counties, California, for the endangered Quino checkerspot butterfly.



**Wenatchee Mountains checker-mallow**

Photo by Ted Thomas/USFWS

**Wenatchee Mountains Checker-mallow (*Sidalcea oregana* var. *calva*)** On January 18, we proposed to designate 6,137 acres (2,483 ha) of seasonal wetlands on state, federal, and private lands in central Washington as proposed critical habitat for the Wenatchee Mountains checker-mallow, an endangered plant native to the Wenatchee Mountains of Chelan County. Most of the plants are found on the state's Camas Meadows Natural Area Preserve. Others are scattered on adjacent U.S. Forest Service land and on a small parcel of private property.

**Kootenai River White Sturgeon (*Acipenser transmontanus*)** A designation of critical habitat for the endangered Kootenai River population of the white sturgeon was proposed on December 21 for a total of about 11.2 river miles (18 river km) of the Kootenai River in Idaho.

**San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*)** On December 8, we proposed designating approximately 55,410 acres (22,425 ha) of alluvial sage scrub in San Bernardino and Riverside counties, California, as critical habitat for this endangered mammal.

**Hawaiian Plants** During November and December 2000, we published the following proposals to designate critical habitat for endangered or threatened plants in the Hawaiian Islands:

- 76 plant species found on the islands of Kaua'i and Ni'ihau (November 7),
- 38 plants found on the islands of Maui and Kaho'olawe (December 18),
- 18 plants found on the island of Lana'i (December 27), and
- 32 plants found on the island of Moloka'i (December 29).

Lists of these plant species and other information are contained in the *Federal Register* notices.

## Final Critical Habitat Rules

**Piping Plover (*Charadrius melodus*)** On July 10, we designated 165,211 acres (66,860 ha) along 1,798 miles (2,892 km) of coastline in eight southern states as critical habitat for the wintering population of the piping plover, a shorebird listed as threatened (except the Great Lakes breeding population, which is listed as endangered). The designation includes shoreline habitat in North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas.



**Spruce-fir moss spider (greatly enlarged)**

Photo by Joel Harp/USFWS

**Spruce-fir Moss Spider (*Microhexura montivaga*)** Portions of Avery, Caldwell, Mitchell, Swain, and Watauga counties in western North Carolina and Sevier and Carter counties in eastern Tennessee were designated on July 6 as critical habitat for the spruce-fir moss spider. This tiny relative of the tarantula has been devastated by an invasion of nonnative insects, which have killed many of the trees in the spider's mountaintop habitat. The resulting increased light and temperature and decreased moisture on the forest floor causes the moss mats on which the spider depends to dry up and become unsuitable habitat for the spider.

**Riverside Fairy Shrimp (*Streptocephalus woottoni*)** A May 30 rule designated approximately 6,870 acres (2,780 ha) of land in San Diego, Orange, Riverside, Los Angeles, and Ventura counties as critical habitat for the endangered Riverside fairy shrimp, a small aquatic crustacean unique to vernal or temporary spring pools in southern California.

**Great Lakes Population of Piping Plover** On May 7, we designated approximately 201 miles (323 km) of mainland and island shoreline in eight Great Lakes states as critical habitat for the endangered breeding population of the piping plover. The designation applies to mainland and island shoreline in Michigan, Illinois, Indiana, Wisconsin, Minnesota, Ohio, Pennsylvania, and New York.



**Bay checkerspot butterfly**

Photo by Paul Opler

**Bay Checkerspot Butterfly (*Euphydryas editha bayensis*)** On April 30, we designated 23,903 acres (9,673 ha) of critical habitat for the

threatened bay checkerspot butterfly in California's San Mateo and Santa Clara counties. Critical habitat for the bay checkerspot includes grasslands with stands of native plantain (*Plantago erecta*), as well as areas that provide corridors for the butterfly to travel between habitats. Serpentine soils, unusual soils high in magnesium and low in calcium, are a strong indicator of potential habitat for the butterfly.

**Arkansas River Shiner (*Notropis girardi*)** A total of approximately 1,148 river miles (1,846 km) and 300 feet (91 meters) of adjacent riparian zones were designated as critical habitat on April 4 for the Arkansas river shiner. This small fish occurs not only in stretches of the Arkansas River in Kansas but also in parts of the Cimarron River in Kansas and Oklahoma, the Beaver/North Canadian River in Oklahoma, and the Canadian/South Canadian River in Oklahoma, Texas, and New Mexico.



**California red-legged frog**  
Photo by Mark R. Jennings/USFWS

**California Red-legged Frog (*Rana aurora draytonii*)** On March 13, we designated 4.1 million acres (1.7 million ha) in 28 California counties as critical habitat for the threatened California red-legged frog. This native amphibian is widely believed to have inspired Mark Twain's fabled short story, "The Celebrated Jumping Frog of Calaveras County."

**Arroyo Toad (*Bufo californicus*)** On February 7, we designated about 182,360 acres (73,800 ha) as critical habitat for the endangered arroyo toad. These lands encompass portions of Monterey, Santa Barbara, Ventura, Los Angeles, San Bernardino, Orange, Riverside and San Diego counties in California.



**Arroyo toad**  
Photo © Jim Rorabaugh

**Morro Shoulderband Snail (*Helminthoglypta walkeriana*)** Also on February 7, about 2,566 acres (1,038 ha) of mostly state-owned land in western San Luis Obispo County, California, were designated as critical habitat for the endangered Morro shoulderband snail, a species also known as the banded dune snail.

**Zayante Band-winged Grasshopper (*Trimerotropis infantilis*)** A final February 7 rule designated about 10,560 acres (4,270 ha) in Santa Cruz County, California, as critical habitat for a rare insect, the endangered Zayante band-winged grasshopper.

**Two Alaskan Sea Ducks** On February 6, we designated critical habitat in Alaska for two threatened species of sea ducks, the spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*). Critical habitat for the spectacled eider includes areas on the Yukon-Kuskokwim Delta (Y-K Delta), Norton Sound, Ledyard Bay, and Bering Sea between St. Lawrence and St. Matthew Islands totaling approximately 24.9 million acres (10.1 million ha). Critical habitat for the Steller's eider includes breeding



**Male (left) and female Steller's eiders**  
Photo by Glen Smart/USFWS

habitat on the Y-K Delta and four units in the marine waters of southwest Alaska, including the Kuskokwim Shoals in northern Kuskokwim Bay, and Seal Islands, Nelson Lagoon, and Izembek Lagoon on the north side of the Alaska Peninsula totaling approximately 1.8 million acres (733,300 ha) and 852 miles (1,363 km) of shoreline.



**Female (left) and male spectacled eiders**  
Photo by Glen Smart/USFWS














**Mexican Spotted Owl (*Strix occidentalis lucida*)** Approximately 4.6 million acres (1.8 million ha) of federal lands in four southwestern states were designated as critical habitat for the threatened Mexican spotted owl on February 1. The designation includes 830,000 acres (335,900 ha) in Arizona, 525,000 acres (212,465 ha) in Colorado, 54,000 acres (21,850 ha) in New Mexico, and 3.2 million acres (1.3 million ha) in Utah. No private, state, or tribal lands are included in the designation.

**Peninsular Bighorn Sheep (*Ovis canadensis*)** We announced on February 1 the designation of 844,897 acres (341,929 ha) in San Diego, Imperial, and Riverside counties, California, as critical habitat for the endangered Peninsular Ranges population of bighorn sheep. More than half of the acreage is under state jurisdiction and includes portions of the Anza-Borrego Desert State Park. Much of the rest of the land is managed by federal agencies, including the Bureau of Land Management and the U.S. Forest Service, or by local agencies.

**Zapata Bladderpod (*Lesquerella thamnobila*)** We published a final rule on December 22, 2000, designating 5,158 acres (2,088 ha) in the lower Rio Grande Valley of Starr County, Texas, as critical habitat for this endangered plant, a herbaceous perennial in the mustard family (Brassicaceae).

# BOX SCORE

Listings and Recovery Plans as of December 31, 2001

GROUP	ENDANGERED		THREATENED		TOTAL LISTINGS	U.S. SPECIES W/ PLANS**
	U.S.	FOREIGN	U.S.	FOREIGN		
 MAMMALS	64	251	9	17	341	50
 BIRDS	78	175	14	6	273	75
 REPTILES	14	64	22	15	115	31
 AMPHIBIANS	11	8	8	1	28	12
 FISHES	71	11	44	0	126	95
 SNAILS	21	1	11	0	33	27
 CLAMS	62	2	8	0	72	56
 CRUSTACEANS	18	0	3	0	21	12
 INSECTS	35	4	9	0	48	29
 ARACHNIDS	12	0	0	0	12	5
<b>ANIMAL SUBTOTAL</b>	<b>386</b>	<b>516</b>	<b>128</b>	<b>39</b>	<b>1,069</b>	<b>392</b>
 FLOWERING PLANTS	567	1	142	0	710	555
 CONIFERS	2	0	1	2	5	2
 FERNS AND OTHERS	26	0	2	0	28	28
<b>PLANT SUBTOTAL</b>	<b>595</b>	<b>1</b>	<b>145</b>	<b>2</b>	<b>743</b>	<b>585</b>
<b>GRAND TOTAL</b>	<b>981</b>	<b>517</b>	<b>273</b>	<b>41</b>	<b>1,812*</b>	<b>977</b>

**TOTAL U.S. ENDANGERED:** 981 (386 animals, 595 plants)

**TOTAL U.S. THREATENED:** 273 (128 animals, 145 plants)

**TOTAL U.S. LISTED:** 1,254 (514 animals\*\*\*, 740 plants)

\*Separate populations of a species listed both as Endangered and Threatened are tallied once, for the endangered population only. Those species are the argali, chimpanzee, leopard, Stellar sea lion, gray wolf, piping plover, roseate tern, green sea turtle, saltwater crocodile, and olive ridley sea turtle. For the

purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 530 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

\*\*\*Nine animal species have dual status in the U.S.

**ENDANGERED**  
*Species*  
**BULLETIN**

*U.S. Department of the Interior  
 Fish and Wildlife Service  
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