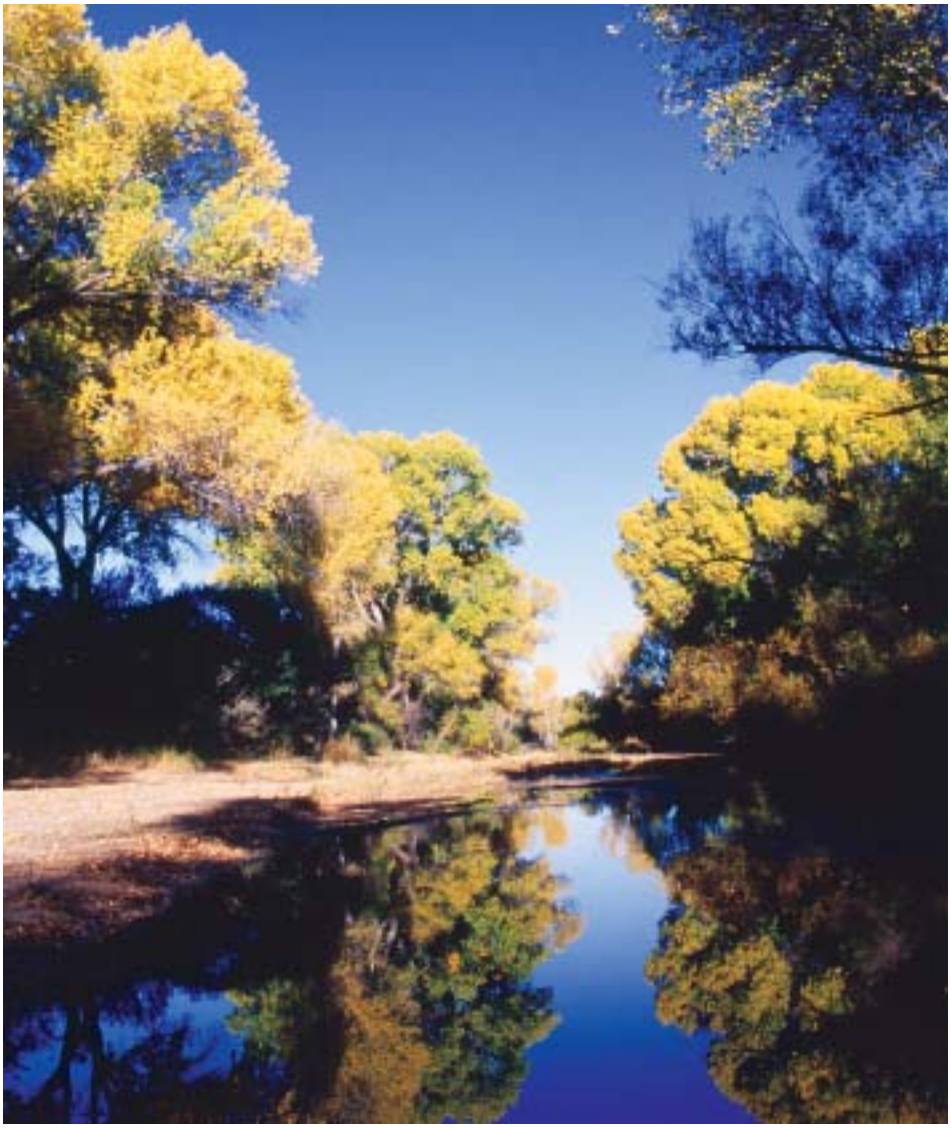
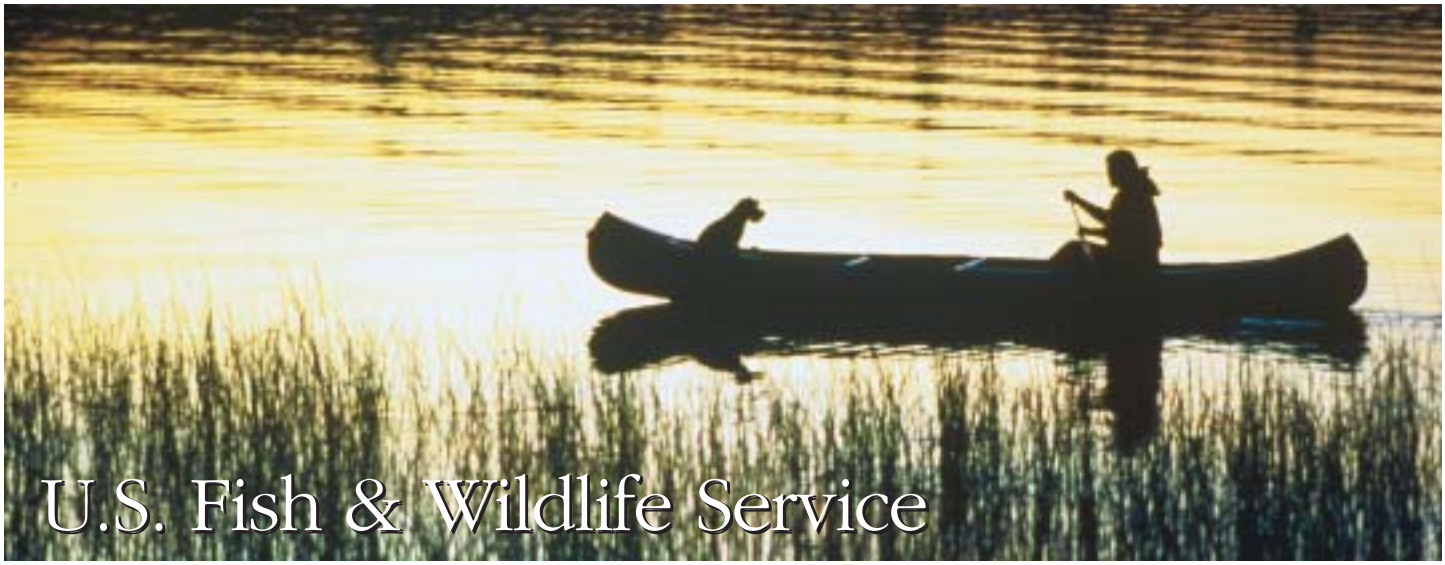
U.S. Fish & Wildlife Service

# ENDANGERED Species BULLETIN

January/February 2004 Vol. XXIX No. 1



*Partnerships, especially those that involve people representing a variety of interests, have become increasingly important in the effort to conserve vulnerable plant and animal resources. The broad-based effort to conserve the Pedro River (at left) is an example of this collaborative approach. Twenty government agencies and private organizations have joined to ensure that the San Pedro, one of the last undammed desert rivers in the United States, continues to support a rich diversity of wildlife. Through partnerships like this, government agencies, private landowners, conservation organizations, and individuals can pool their resources, talents, and experiences to achieve common goals. In this* Bulletin, *we take a look at some important conservation partnerships.*

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**On the Cover**
San Pedro River
© *Dave Bly*

**Left**
To commemorate the 30th anniversary of the Endangered Species Act, the Endangered Species Program released a new poster, "Working Together: Partnerships for Endangered Species Recovery." This poster celebrates the many successes achieved in conserving our Nation's threatened and endangered fish, wildlife, and plants by working in partnership with others (see pages 18-19). A fact sheet briefly describing each species and its partnerships can be accessed at http://endangered.fws.gov/partners/poster/index.html.

*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.*

*We also welcome your comments and ideas. Please e-mail them to us at esb@fws.gov.*

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# Partnerships for Plant Conservation in Texas

by Robyn Cobb and
Gena Janssen

**Johnston's frankenia is a long-lived perennial endemic to three counties in western south Texas and three states of northeastern Mexico. In 1984, when the Fish and Wildlife Service listed this plant as endangered, only five populations were documented in the U.S. and one in Mexico, with the total number of plants estimated at 1,500. Because the species was known only from privately owned lands, much of the potential habitat in Texas and Mexico had never been surveyed.**

**This plant grows in areas where soils are extremely salty, a characteristic that evidently gives it a competitive edge. Analyses of soils from within a number of frankenia sites showed salinity and sodium content that was approximately 10 times greater than that found in other soils in the area. Physiological adaptations, including the ability to extrude salt, allow frankenia's persistence in these hypersaline conditions and limits the encroachment of many other plants, including invasive, introduced grasses that are commonly planted in that region.**

For some endangered or threatened plant species, research into their distribution, abundance, and basic life history is the first step in developing a recovery plan. Sometimes this data collection process leads to the establishment of long-term, beneficial relationships between agencies and other partners, including private landowners. Such was the case for the Johnston's frankenia (*Frankenia johnstonii*), a semi-woody perennial of southern Texas and northern Mexico that is currently listed as endangered. Partnerships targeting conservation of the frankenia have also proved helpful in efforts to locate and study other rare plants of the south Texas brushland.

The frankenia's recovery plan calls for studies to fill information gaps about habitat requirements, population biology, and ecology, and for status surveys to determine abundance and distribution. The potential threats listed in the recovery plan, including the effects of habitat modification and destruction, heavy grazing, and introduction of nonnative, invasive forage grasses, needed more quantification as well. In response to interest from landowners and the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS), the Texas Parks and Wildlife Department (TPWD) undertook a study of this plant. The objectives included developing landowner confidence; quantifying habitat, plant abundance, and distribution; determining flowering cycles and fecundity; and examining historical land use practices. Using funding provided by the Service, TPWD partnered with Texas State University (TSU) to address these issues.

Co-author Gena Janssen, then a botanist working for the TPWD, began this project in 1993. Much of her early work involved reaching out to landowners, trying to earn their trust and gain access to the then undocumented frankenia populations. She used endangered species displays at community events like the Zapata County Fair, helped host a conservation summer camp for kids, and organized landowner meetings to discuss endangered species issues in Webb, Zapata, and Starr counties. To accomplish the extensive population surveys needed to determine the frankenia's distribution and abundance, Janssen had to identify landownership and get written permission to access land and collect data. This involved visiting with landowners, their neighbors, and other long-time residents, as well as developing a close working relationship with the NRCS and the county Soil and Water Board members. Outreach and persistence paid off. The gates literally began to open and the number of verified frankenia populations grew. Once access was granted, Janssen set about mapping populations, counting and/or estimating individual plant numbers, and other field studies.

The Endangered Species Act protects endangered plants on private land only if they could be jeopardized by federally funded or permitted activities. This raised the question of whether the frankenia, or any other plant that exists in large part on private land, could ever be delisted if it could be legally destroyed at any time. Since many of the ranchers that Janssen met promised her that they would not destroy the endangered plants on their land, she struggled to come up with a mechanism

to demonstrate this commitment to the conservation community. A conservation agreement seemed a plausible solution. In the mid-1990s, conservation agreements were beginning to be used under the Act, but only between federal agencies and usually for listing candidates. In 1995, a landowner meeting was held to discuss the concept of a voluntary conservation agreement. At the end of the meeting, Janssen asked, "So, do you want to do it?" After a lengthy silence, one landowner finally said, "I'll do it." With that, the others in the room said, "Well, okay, but we need to see this thing in writing!"

That was almost 10 years and more than 10 conservation agreements ago. Today, there are 58 verified Johnston's frankenia populations in south Texas, and 19 of the largest ones are being protected voluntarily by private landowners. So, do voluntary conservation agreements work? For Johnston's frankenia, the answer has been yes. Since these agreements have been in place no population sites have been destroyed. One potential complication is the fact that some landowners do not own the subsurface oil and gas rights. So far, however, the ranchers have been keeping gas drilling companies on their toes and off of the endangered plants. One rancher actually got a gas company to transplant 20 plants as a new gas well was drilled. Another rancher told a gas company that it would have to choose a different site for a new well because he had signed an agreement to protect his endangered plants. When the gas company was reluctant to make the change, the landowner told it to call TPWD, but the company got the message and agreed to move the well.

As a result of this progress, the Service proposed on May 22, 2003, to remove Johnston's frankenia from the list of threatened and endangered species. Developing working relationships with private landowners has not always been easy, but the benefits have extended far beyond the frankenia delisting proposal. For example, extensive surveys on private ranches also revealed seven new populations of the endangered ashy dogweed (*Thymophylla tephroleuca*) and allowed for scientific studies (again by the team of TPWD and TSU) of that species as well. Probably the most valuable aspect of this intensive outreach has been the newfound understanding and trust among landowners, conservation biologists, and government agencies. Not only are the populations covered under voluntary conservation agreements being preserved, but even sites not covered under signed agreements remain intact. Although some landowners opted not to sign agreements, they did give their word that they would do their best to take care of their population sites. In the end, it may be the reinforcement and recognition of successful stewardship that actually makes this conservation partnership work. Today, when Janssen calls for permission for a site visit, the response she gets is, "Sure, come on out! And bring the family!"

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***The tolerance of Johnston's frankenia for hypersaline soils gives it an advantage against encroaching vegetation and makes it easy to spot the plants in these photos.***
*Photos courtesy Robyn Cobb*

# The Upper San Pedro Partnership

by Doug Duncan and
Lynn Slagle

***Upper San Pedro River***
*Photo by William G. Kepner/EPA*

People have lived in the desert Southwest for thousands of years. To survive in this arid land, early settlers had to develop special skills and adapt to a desert-based way of life. Today, communities throughout the region face a similar challenge: learning how to grow sustainably while conserving water and functioning ecosystems.

This part of the country has an old saying: "Whiskey's for drinkin' and water's for fighting." There are no easy answers for managing water resources in the arid Southwest, but cooperative approaches have made fighting unnecessary. In southeastern Arizona, 21 government agencies and private organizations have banded together as a group to ensure that the region will continue to have an adequate ground water supply for area residents and the natural resources of the San Pedro River. They call this group the Upper San Pedro Partnership.

The purpose of the Partnership is to cooperate in identifying, prioritizing, and implementing policies and projects to assist in meeting water needs in the Sierra Vista Subwatershed of the Upper San Pedro River Basin.

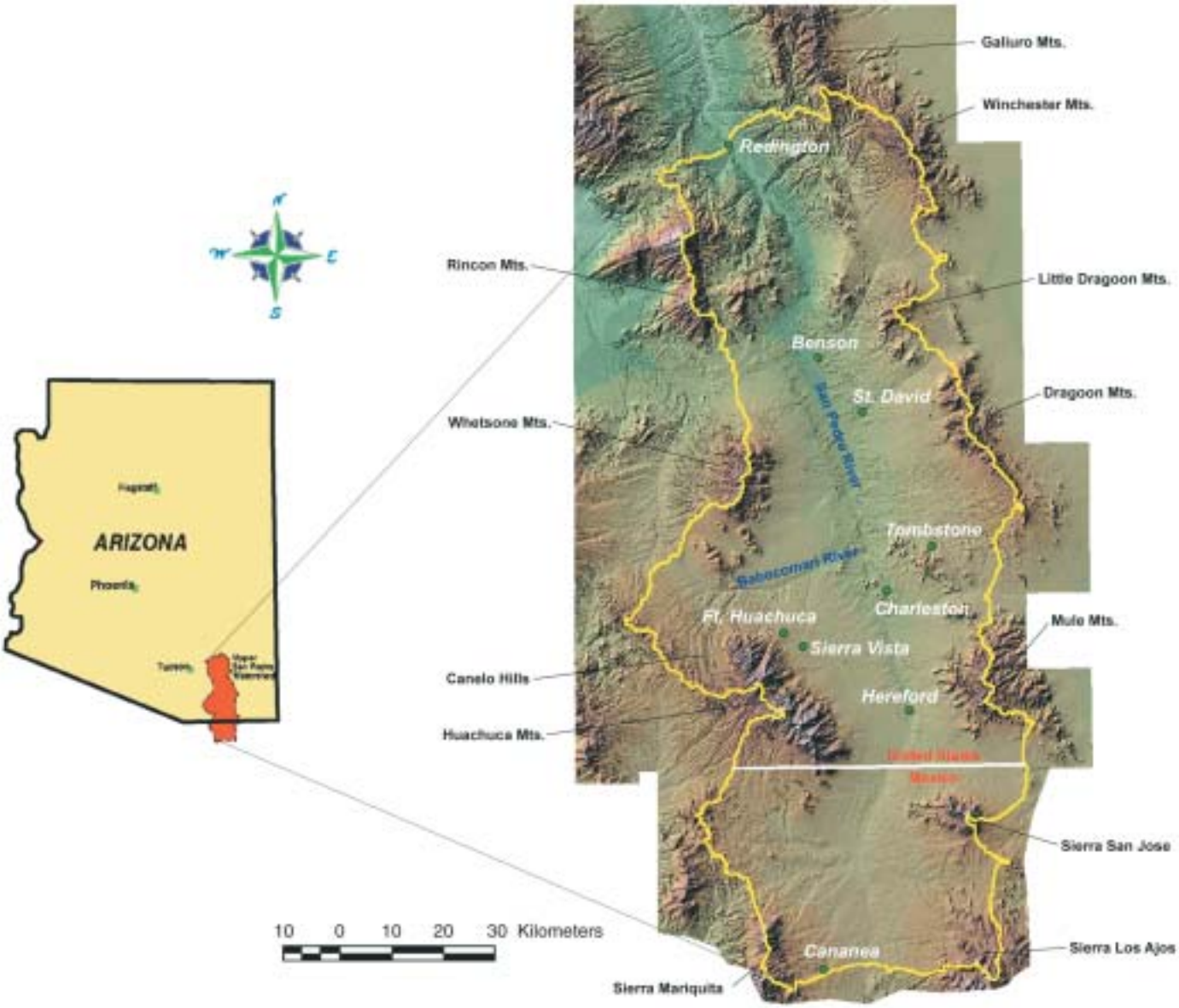
**The Challenge**

The San Pedro is considered one of the most significant perennial undammed desert rivers in the United States. It provides important habitat for almost 400 species of migratory birds, 80 species of mammals, and 40 species of reptiles and amphibians. Many of these animals rely on the riparian vegetation of the Bureau of Land Management's San Pedro Riparian National Conservation Area (SPRNCA), which Congress designated in 1988. This area includes marshland, cottonwood-willow forest, mesquite forest, and various shrub lands. The water stored in the aquifer supports this vegetation and the perennial flow of surface water.

The Upper San Pedro River Basin and the San Pedro River are home to several listed species and provide suitable or potential habitat for several more. The river provides most of the occupied habitat for the endangered Huachuca water-umbel (*Lilaeopsis schaffneriana* var. *recurva*). This small, cryptic, semi-aquatic plant has 33 miles (53 km) of designated critical habitat along the San Pedro River. The San Pedro River also contains critical habitat for two threatened fish species, the spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*), and potential habitat for a host of other native fishes.

The Upper San Pedro Basin uplands provide significant habitat for the threatened Mexican spotted owl (*Strix occidentalis lucida*) and the nectar-feeding lesser long-nosed bat (*Leptonycteris curosoae yerbabuenae*). This endangered bat occurs seasonally in protected roosts on Fort Huachuca and the Coronado National Memorial. The watershed also provides potentially

# Upper San Pedro Watershed




**Congress addressed the importance of preserving both the San Pedro River and Fort Huachuca in Section 321 of the National Defense Authorization Act for 2004. The bill acknowledges the importance of "collaborative water use management" and gives congressional recognition to the Upper San Pedro Partnership and its continuing efforts to eliminate deficit groundwater pumping by 2011. The legislation also requires that the Secretary of the Interior, in consultation with the Secretary of Agriculture, the Secretary of Defense, and the Partnership, prepare annual reports on local water mitigation efforts to restore and maintain sustainable yield of the aquifer by 2011.**

**The U.S. Geological Survey will generate much of the science-based information for the report, while the Bureau of Land Management, which administers the San Pedro Riparian National Conservation Area, will contribute much of the management-based information. The first report is due to Congress by December 31, 2004. The 2004 Defense Authorization Act precludes the consideration of cumulative effects of water use in future ESA-section 7 consultations regarding Fort Huachuca, although the Fish and Wildlife Service will still address water use that is an indirect effect or an interrelated or interdependent action. It is anticipated that funding for future projects will take into account whether the Partnership has met its goals.**

Image Omitted

***Loach minnow***
*Illustration © Joseph Tomelleri*

suitable but currently unoccupied habitat for species such as the black-tailed prairie dog (*Cynomys ludovicianus)* and the endangered northern aplomado falcon (*Falco femoralis septentrionalis*).

Average yearly rainfall in the subwatershed ranges from 14 inches (36 centimeters) in the valley to 36 inches (91 cm) in the Huachuca Mountains. Most of the precipitation falls as heavy, almost daily rainstorms between July and September. The period between the summer and winter rains is very dry.

About 70,500 people share the Sierra Vista Subwatershed with the San Pedro Riparian NCA. Residents of the city of Sierra Vista, Fort Huachuca, and the surrounding area depend on the same groundwater resources that support the river's riparian vegetation. The combined demand for water is currently greater than the area's natural recharge. Interagency consultations between the Department of the Army (for Fort Huachuca) and the Fish and Wildlife Service have estimated an annual water deficit of 5,000 ac-ft (6,167,500 $m^3$). As a result of each year's deficit, the decrease in total water storage since about 1940 is about 100,000 to 200,000 ac-ft (123,350,000-246,700,000 $m^3$). This change is reflected in the continuing decline of the water table in some areas.

Without an adequate long-term water supply, neither the people of the area nor the river will thrive. The Partnership and its members are dedicated to meeting the long-term groundwater needs of both residents and the San Pedro River. Responsible use of groundwater involves managing it in a way that can be maintained for an indefinite period of time without causing unacceptable environmental, economic, or social consequences.

Balancing the needs of the San Pedro River with the needs of current and future residents must also take into account the framework of state and federal legal issues and statutes that pertain to groundwater withdrawals from the upper San Pedro River basin. These include:

- Gila River Adjudication and Sub-flow Technical Report: Arizona Department of Water Resources;
- Arizona Groundwater Management Act;
- Arizona Corporation Commission Certificate of Convenience and Necessity issued to private water utilities;
- SPRNCA enabling legislation;
- National Defense Authorization Act of 2004-Section 321;
- Sikes Act;
- Federal Land Policy and Management Act;
- National Environmental Policy Act; and
- Endangered Species Act.

**The Nature of the Partnership**

The Upper San Pedro Partnership includes representatives of agencies and organizations that own or control land or water use in this portion of the Upper San Pedro River Basin. They have the authority and resources to identify reasonable, cost-effective projects and policies and the ability to implement them. This broad coalition believes that working together, pooling available resources, and using the best available science will ultimately lead to long-term, sustainable solutions to water challenges.

To reach its overall goal of meeting the long-term water needs of the area, the Partnership has defined the most important things it needs to do:

1. *Develop an annual water management and conservation plan*.
2. *Provide leadership* by speaking with one voice to get funding for projects, form good water policy, and lend support to the conservation efforts of member agencies.
3. *Find ways to collaborate with Mexico* whenever possible. Because the San Pedro River flows north into the United States from headwaters in Mexico, a bi-national element is essential for long-term conservation.
4. *Encourage activities* that will ensure an adequate groundwater supply to support a diverse economic environment for the people of the region and meet the needs of the SPRNCA.
5. *Clearly define the range of hydrological conditions* that are needed for maintaining a healthy subwatershed.
6. *Develop useful ways for the public to get involved*, provide ideas and methods for using water wisely, and find ways for the public to help plan its own future.

**Partnership Research**

The Partnership is committed to using the best available scientific research to understand the intricacies of basin hydrology and to help identify conservation and management actions that will

have the greatest impact with the least cost. Learning how water moves underground and how the aquifer and the river interact will help prioritize conservation strategies. That's why the Partnership has sponsored several studies to provide the foundation for a science-based planning effort. The research is carried out by the U.S. Geological Survey, Agricultural Research Service, universities, and consulting firms.

The aquifer is more complex than once assumed. Partnership studies are exploring these complexities to better describe how the system responds to climate change, groundwater pumping, and riparian zone changes. Additional research is underway to determine the relative economic costs and water yields for about 60 different water conservation and management options. This research is an important step in developing guidelines for sound water policy.

**Developing a Water Conservation Plan**

The Partnership established as its highest priority the development of a Water Management and Conservation Plan. The overall intent of the plan is to identify those areas that need to be addressed immediately, identify additional opportunities, and provide direction for subsequent years. In February 2003, the Partnership adopted its first annual plan. Recently, the Partnership developed its 2004 Water Management and Conservation Plan. It includes a summary of 2003 accomplishments, a review of member agency activities, recommended water management and conservation actions, background on the state of the subwatershed, and tasks to be undertaken by the partnership in 2004.

Because of their complexity, water conservation issues in the San Pedro Basin cannot be resolved quickly. The work of the Partnership will continue indefinitely. Since its inception in 1999, the Partnership has produced an array of objectives, strategies, studies, water conservation and management alternatives, and recommendations for future agency activities. The Partnership currently has a $33.9 million, five-year financial plan that pulls together the resources of several agencies.

The work of the Upper San Pedro Partnership and its member groups provides a model on how to address water conservation issues. If the model works as planned, and the water resources in the Sierra Vista subwatershed are used sustainably, the health of the river will be maintained, the water needs of area residents will be met, and the species that rely on the river will be one step closer to recovery.

***Huachuca water-umbel***
*Photo by Jim Rorabaugh*

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**"The collaborative efforts of the Partnership have allowed us to harness significant resources for research and monitoring that no one entity could have brought to the table alone. That has given member agencies the kind of information needed to begin making water conservation and management decisions based on sound science." –** ***Holly Richter, Upper San Pedro Project Manager, The Nature Conservancy, Chair USPP Technical Subcommittee***

**"The Upper San Pedro Partnership is a stellar example of a federal, state, and local public-private partnership working together. The Partnership has completed some very successful water conservation projects, such as saving at least 2,200 acre-feet/year of water through a reclamation project and 1,000 acre-feet/year through a recharge project." –** ***Congressman Jim Kolbe (R-Az)***

# Joining Forces for an Island of Biodiversity

by Peter J. Tolson, Paul Schoenfeld, and Patricia Loop

Nestled in the rain shadow of the Sierra Cristal, the U.S. Naval Base at Guantanamo Bay, Cuba, has baked in sleepy isolation from the other biodiversity hot spots of the Western Caribbean for more than 100 years. Now that "GTMO" has been thrust into the forefront of our nation's defense against terrorism, our awareness of the strategic importance of the base's 17 miles (27 kilometers) of perimeter fence has increased substantially. Fewer of us realize the value of this barrier in conserving a substantial component of Cuban biodiversity.

***A hutia feeds in a* Phyllostylon *tree.***
*Photos by Peter J. Tolson*

***A* Coccothrinax fragans *palm forest near Windmill Beach.***

With an annual rainfall of less than 19.5 inches (500 millimeters) per year, the arid landscape of the Guantanamo Naval Base is dominated by tropical xeric (dry) habitats, precisely the habitats that are most imperiled throughout the West Indies. During an ecological assessment of the base completed in 1998, The Nature Conservancy identified no fewer than five forest alliances, three woodland alliances, and five shrubland alliances that comprise the plant communities of the base.

Fifty-one of the 193 plant species identified during the floristic surveys are endemic to Cuba, and four are endemic to GTMO and the adjacent dry forests outside the fence line. Ten species are endemic to southeastern Cuba, eight to eastern Cuba, and nine to central and southeastern Cuba.

Endemic reptiles abound on the base, from the diminutive Sphaerodactylus geckos to the Cuban ground iguana (*Cyclura nubila*) and the Cuban boa (*Epicrates angulifer*), the largest terrestrial reptiles of Cuba. The size of these animals and the population densities are unusual. Cuban boas greater than 9.8 feet (3 meters) in total length are rare outside of the base, but are commonly encountered in a variety of GTMO habitats. Ground iguanas exist in greater densities on the base than anywhere else on the island. Conservatively, the base's population of 2,000 iguanas represents more than 5 percent of the total number living in Cuba. At least 26 reptile species are found on the base. As on other Caribbean islands, native mammal biodiversity is low, with eight species of bats and one species of rodent, the hutia (*Capromys pilorides*).

Also contributing to this biodiversity are 167 species of birds identified by the Institute for Bird Populations, a nonprofit organization that fosters a global approach to the study of changes in bird populations, while it conducted avian field research at GTMO. Noteworthy among these are eight endemic species, including the bee hummingbird (*Mellisuga helenae*), the world's smallest bird, and the Cuban tody (*Todus multicolor*), a small, colorful bird that digs tunnels in embankments for nesting. Thirty-one additional species are considered uncommon and 19 species are considered rare. The endangered

Antillean brown pelican (*Pelicanus occidentalis occidentalis*) is common on the base, and there are reliable sightings, as yet unconfirmed, of the endangered Cuban parrot (*Amazona leucocephala*) in a remote area of GTMO.

In a facility with more than 12 miles (19.3 km) of coastline, we might expect GTMO to have substantial marine resources. The quality of reef habitats and mangrove forests, habitats that have been substantially degraded elsewhere on the island, is excellent on the base. Coral reefs fringing the coastline and southern portions of Guantanamo Bay are relatively pristine. In addition to the many common coral species building the reefs, large stands of undisturbed staghorn (*Acropora cervicornus*) and elkhorn (*A. palmate*) corals are found here. Seagrass beds support an abundance of queen conch (*Strombus gigas*), and endangered West Indian manatees (*Trichechus manatus*) are frequently seen feeding in these areas. Mangrove forests and fringes provide habitat for a variety of birds, including nesting resident shore birds and neotropical migratory landbirds. Mangroves are also essential for many marine fish, and mangrove-dependent species such as snook (*Centropomus undecimalis*) and mangrove snapper (*Lutjanus griseus*) are quite common. GTMO beaches provide nesting habitat for four species of threatened or endangered sea turtles, and juvenile sea turtles are found frequently in and around the coral reef and seagrass habitats.

The Navy puts considerable effort into managing and conserving the natural resources of GTMO. New personnel indoctrinations include an environmental session where they learn about such subjects as hazardous material minimization, hazardous waste management, recycling, recreational fishing and diving, species at risk, and applicable regulations. Mission-essential operations are reviewed for environmental impacts and are planned to avoid adverse effects. These operations include live-fire training in Caribbean ranges where environmental requirements include aerial surveys for endangered or threatened species, marine life, and other nontarget hazards before training exercises begin. Aerial surveys are also followed by spotter and safety craft to curtail operations should marine life or nontarget hazards enter the ranges during the exercises.

The GTMO staff of environmental professionals manages several research programs for endangered and threatened species. In addition to the bird surveys described above, ongoing cooperative research programs with the San Diego and Toledo Zoos study the ecology and demography of GTMO boa and iguana populations. The environmental office also places a strong emphasis on outreach and educational programs to inform base personnel of the importance of environmental and natural resource management. These elements combine to ensure awareness among the base residents and military mission planners about environmental and natural resources considerations during the daily living and working routine.

***A male Cuban ground iguana.***

**Phyllostylon brasiliensis*/cactus forest.***

*Peter J. Tolson is Director of Conservation at The Toledo Zoo. Paul Schoenfeld is the Natural Resources Manager, U.S. Naval Base, Guantanamo Bay Cuba, and Patricia Loop is the Environmental Director, U.S. Naval Base, Guantanamo Bay Cuba.*

# Giving Nature a Second Chance

by Lois Winter

In 1999, when the George's River chapter of Trout Unlimited and other river restoration supporters began to advocate removing Sennebec Dam on the St. George River of Maine, it looked like the start of a classic environmental confrontation. River and sea-run fish restoration advocates wanted the dam removed to restore free passage and habitat for fish, including the endangered Atlantic salmon (*Salmo salar*) and other diadromous (migrating between fresh and salt water) species. However, members of the Sennebec Pond Association, who lived in homes surrounding the upstream pond, wanted to maintain the pond's water level.

Thanks to three years of careful negotiation and respectful dialog, both groups have received what they wanted. An engineering study identified costs and benefits of several alternatives. The consultants demonstrated that the 18-foot (6-meter) high, 200-foot (65-m) long Sennebec Dam could be replaced with a low-head dam located 400 yards (365-m) upstream at the Sennebec Pond outlet. The new low-head dam, actually a roughened ramp constructed with a 20-to-1 slope, would maintain water levels in Sennebec Pond while allowing fish passage. "The study proved the incredible," said Susan Harris, president of the Sennebec Pond Association. "A high maintenance, high impact dam is not needed to keep the pond. The current water level can be maintained by a two-foot high rock wall. It's inexpensive and easy to maintain, it looks good, and it's good for the fish!" "Everybody's a winner," agreed Tom Whiting, a member of Trout Unlimited and one of the dedicated volunteers and driving forces behind the restoration project. "The Pond Association replaced a deteriorating structure with one that won't leak and will be cheaper to maintain, while the fish gain access to 17 miles of the St.George River above the Dam."

The new roughened ramp allows passage not only for Atlantic salmon but also for alewives (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American eel (*Anguilla rostrata), rainbow smelt (Osmerus mordax*), and American shad (*Alosa sapidissima*), all of which had largely been eliminated from the upper half of the St. George River at least since the 1910s, when the hydroelectric facility at Sennebec Dam was built. Sennebec Dam generated power into the 1950s, when the advent of larger electrical generation facilities made the dam obsolete. In 1961, the owners sold the dam to the Sennebec Pond Association for one

***(below) Before it was replaced, Sennebec Dam was a barrier to endangered Atlantic salmon and other fish species.***
*USFWS photo*

***(opposite page) The St. George River, looking downstream from the newly installed roughened ramp that replaced the dam.***
*USFWS photo*

dollar, ensuring the Association's ability to control the water levels. However, over next 40 years, the dam deteriorated, and by the late 1990s, the Pond Association found itself in the position of owning a derelict dam that posed threats to downstream property owners.

Historically, the St. George River was noted for its abundant fish. In 1605, the British explorer Captain George Weymouth and his crew visited the lower river, where they noted "plenty of salmon and other fishes of great bigness." Despite overfishing, loss of habitat, pollution, and dams, Atlantic salmon runs persisted for several centuries in the St. George River, and reports from the 1910s suggest that large schools of Atlantic salmon congregated at the base of the Sennebec Dam during its construction. In the 1990s, fishermen occasionally sighted a few Atlantic salmon and large numbers of alewives below the dam, sparking interest in river restoration. "With the federal declaration of Atlantic salmon as endangered, anything we can do to increase available habitat is critical," commented Jeff Reardon, Trout Unlimited's New England Conservation Director. With the removal of Sennebec Dam, Atlantic salmon now have access to more abundant and higher quality habitat throughout the entire St. George River watershed.

The State of Maine's Department of Marine Resources had long identified the removal of Sennebec Dam as a high priority. This dam was the only remaining fish barrier in the watershed. For years, Maine Department of Marine Resources had managed a limited "trap and truck operation" to move downstream alewives above the dam and maintain alewives in the watershed, but this approach was always regarded as a temporary measure until dam removal could be realized.

The removal of Sennebec Dam restores 1,100 acres (445 hectares) of Sennebec Pond and Quantabacook Lake as prime spawning habitat for a quarter-million alewives. In turn, restoring healthy alewife populations promises to provide multiple benefits. In the ocean, alewife populations help support commercially important fish, seabird colonies, and marine mammals. When alewives return to the rivers, they provide abundant forage for resident and sea-run fish, waterbirds, and raptors. In addition, Maine's lobstering industry depends on a sustainable source of alewives as bait. Finally, healthy populations of alewives are critical for restoring Maine's Atlantic salmon. In the ocean and in the rivers, alewives provide important prey for Atlantic salmon, and in the spring, large numbers of in-migrating alewives provide vital "cover" for out-migrating salmon smolts that are otherwise subject to predation.

State and federal agencies, working in partnership with regional and local organizations, completed the $317,000 St. George River dam removal and restoration project in 2002. State agencies — the Maine Atlantic Salmon Commission and Maine Department of Marine Resources — provided staff to document habitat suitability and conduct biological surveys before and after restoration. Federal agencies provided technical support and more than half of the funding through three block grant programs administered by the Gulf of Maine Coastal Program: the Service's Landowner Incentives Program, the National Fish and Wildlife Foundation's Maine Habitat Restoration Partnership, and the Foundation's Maine Atlantic Salmon Conservation Fund. In addition, NOAA Fisheries (U.S. Department of Commerce) and the Natural Resources Conservation Service (U.S. Department of Agriculture) also provided funds. Trout Unlimited and American Rivers provided the remainder of the funding, and regional and local representatives from Trout Unlimited spearheaded and coordinated the project.

Jack Tibbetts, a retired NRCS engineer and site manager for the restoration project, summed it all up. "I've been watching the alewives bang their noses on that dam. Now, I can watch them swim through!"

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by Bert Byers

# One Step Closer to Key Deer Recovery

A year-long effort to translocate endangered Key deer (*Odocoileus virginianus clavium*) from Big Pine Key to Upper Sugarloaf Key in Florida came to fruition in June 2003 when two deer were released into a "soft release" pen, allowing them to acclimate to the area prior to release into the National Key Deer Refuge.

Ann Klee, until recently counselor to the Interior Secretary Norton and chair of the South Florida Ecosystem Restoration Task Force, officiated by opening the gate and releasing the first deer into the release pen. The task force group represents a partnership including the federal departments of the Interior, Agriculture, Defense, Justice, and Commerce; the Environmental Protection Agency; tribal representatives from the Miccosukee and Seminole Tribes; the Florida Governor's Office and South Florida Water Management District; cities and counties of South Florida; and citizens' groups.

***Key deer***
*USFWS photo by John Oberheu*

Dr. Phil Frank, project leader of the refuge and a Key deer specialist, was instrumental in establishing the deer release program. "We want to take advantage of the habitat on Sugarloaf and Cudjoe Keys to better distribute the deer," said Frank. "Having several populations of Key deer is important to protect the deer in case of a catastrophic event, such as a disease outbreak or a hurricane. The refuge staff erected a temporary eight-foot high fence to enclose about 18 acres to use as a soft-release pen. The pen allows the deer to adjust to the new surroundings and prevents them from returning to Big Pine Key immediately upon release."

Since the initial trap and release, three more deer have been translocated to the soft-release pen on Upper Sugarloaf Key. Four of the translocated deer have been released from the soft release pen into the unfenced habitat of the key. These deer remain in the general area on the refuge and have been observed making themselves at home. They are tracked with radio telemetry equipment every other day to record movements.

One deer is unaccounted for and believed dead. Its radio equipment failed after the deer was released from the soft-release pen. Searches were conducted to no avail, and a buck has been recorded as lost.

Current plans call for the Fish and Wildlife Service to trap and move three more deer to Upper Sugarloaf Key. When the final three of the first eight deer translocated to Upper Sugarloaf Key are released, the Service will undertake an evaluation of the program, including the science and results to date.

The next step is to begin translocation to Cudjoe Key. A total of 24 deer will be moved to each release site within the next three years. The plan also requires that both genders be released at each site.

The refuge has been working in conjunction with our South Florida Ecological Services Office in Vero Beach to aid in the recovery of this species.

"Our research indicates the deer population has substantially increased over the past 10 years," says Jay Slack, field office supervisor, "but the increases are mainly on Big Pine Key." Slack says the translocation is fueled by concerns over the lack of deer in outlying habitats. This move makes such a catastrophe less likely to decimate the species. The populations on the nearby keys have decreased, in some instances to zero.

"We believe this is one of the final steps in our efforts to recover the Key deer," says Slack. "The location is ideal as deer habitat, literally a smorgasbord of deer food. With good science and no catastrophes, we are on the road to recovery of the deer in the foreseeable future."

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***Ann Klee watches as the Key deer she just released from the fenced enclosure (right) scurries down the trail.***
*USFWS photo*

# Agencies Streamline Permit Process

by Doug Zimmer

***Attendees at a streamlining workshop listen as Congressman Brian Baird (in suit) makes a point. To his right is Ken Berg, Manager of the FWS Western Washington Fish and Wildlife Office, and on his left Steve Landino, NOAA Fisheries Director for Washington.***

*Photo courtesy Dena Horton, Representative Baird's staff*

"I came here expecting to complain about problems. But after listening to what you've done and what you're planning to do next, I'm disappointed to say that I can't find anything to complain about."

The speaker, an experienced county commissioner concerned about what many of his constituents call "unwarranted government interference in our lives," was addressing a public meeting hosted by Washington Congressman Brian Baird to look into complaints about federal environmental permitting.

Since the listing of several salmon species and the bull trout in 1998, requests for Endangered Species Act (ESA) section 7 consultations and U.S. Army Corps of Engineers Clean Water Act permits in western Washington state have increased dramatically. With limited staff and budget resources, federal and state agencies struggled against a growing backlog of consultation and permit requests.

Then, in April of 2001, Congressman Baird called the agencies and his constituents to the table to find ways to resolve the issue. In a day-long marathon beginning on the banks of the Columbia River and ending halfway to Puget Sound, Baird chaired three meetings to let the agencies and the public talk about the permits issue and the problems each faced. Baird said he called the meetings because "I thought it was important for people from around the district to be able to interact with the state and federal agency representatives."

Congressman Baird followed up with a second road trip of meetings a year later and a third in July of 2003. Participating agencies included the U.S. Fish and Wildlife Service; NOAA Fisheries (the U.S. Department of Commerce agency that has primary jurisdiction under the ESA for most marine species); U.S. Army Corps of Engineers, Seattle and Portland districts; Environmental Protection Agency; and Washington departments of Fish and Wildlife, Ecology, and Transportation. Attendees included state legislators, county commissioners, other local elected officials, and county planning staffs; private citizens; and nongovernmental organizations such as the Audubon Society, Fish First, and Washington Homebuilders Association.

Challenged by the congressman to find ways to make the permit system work better, faster, and more smoothly without sacrificing natural resource protection, representatives from state and federal agencies began looking at the system with new eyes. "We found that by working cooperatively with NOAA Fisheries and the Corps on a series of programmatic consultations covering the most common types of requests, coordinating our responses, pooling resources and people, and seeking innovative ways to do business, we could better serve both the public and the natural resources of our area," said Ken Berg, Manager of the Service's Western Washington Office. Berg participated in the meetings during all three years.

"We got together and took a hard look at what we were doing, what we needed to do, and what we could do,"

said Steve Landino, NOAA Fisheries Director for the State of Washington. "We looked at our resources, at the tools we had, and we set out to make it better, step by step. We haven't solved everything yet, but we've come a long way in three years."

Federal streamlining improvements include a web-based consultation submission system and web-based data banks to allow applicants to track the progress of their applications, internal electronic data banks and regular meetings to ease inter-agency coordination, an increased use of programmatic consultations, design guidance for fish-friendly piers and bulkheads, and the expanded use of contractors to review biological evaluations.

Congressman Baird called a joint progress report from the Service, NOAA Fisheries, and Corps symbolic of how the agencies are working together to solve permitting issues. He commended the agencies, saying, "If you were a private company and you could improve your product the way these agencies have improved their product, you'd be winning awards."

Congressman Baird was not alone in his praise. Bill Lehning, Cowlitz County Commissioner, told the group, "I just want to say: this is working." Eric Johnson, a Lewis County Commissioner, called the streamlining efforts a "unique model in leadership."

Members of the public said they were also pleased by agency efforts to move permits faster, improve customer service, and create and maintain electronic tracking systems to help applicants follow their permits through the system. Some offered suggestions for further improvement.

Congressman Baird promised to get the groups together again in a year for a progress report, and he praised the agencies' commitment to continued improvement. "The first year we held these roundtables, we heard about problems. The second year we heard about progress. This year we're hearing about kudos."

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*Doug Zimmer is the information and education supervisor in the Service's Western Washington Fish and Wildlife Office in Lacey, Washington (douglas_zimmer@fws.gov; telephone 360/753-4370). He attended all of the Streamlining Workshops.*

***Bull trout***
*Photo by Roger Peters*

*Puerto Rican parrot*
*Chiricahua leopard frog*
*Virginia big-eared bat*
*Mauna Kea silversword*
*Apache trout*
*green pitcher plant*
*Fender's blue butterfly*
*Kincaid's lupine*

# Partnerships for Endangered Species Recovery

U.S. Department of the Interior Fish & Wildlife Service

http://endangered.fws.gov/partners/poster

# Partners Restore Coastal Sage Scrub Habitat

by Sandy DeSimone

***California gnatcatcher***
*Photo © B. Moose Peterson/Wildlife Research Photogarphy*

Coastal sage scrub vegetation serves as breeding habitat for a threatened bird, the coastal California gnatcatcher (*Polioptila californica californica*). The 4,000-acre (1,620-hectare) Starr Ranch Sanctuary, a National Audubon Society preserve in Orange County, California, shelters at least 22 nesting pairs of gnatcatchers and approximately 1,964 acres (795 ha) of undisturbed coastal sage scrub. Working with the Carlsbad Fish and Wildlife Office, the Service's Partners for Fish and Wildlife Program is funding weed control on approximately 25 acres (10 ha) now occupied by a nonnative plant, the herbaceous perennial *Cynara cardunculus*. Once the exotic plants are removed, the land will be restored to coastal sage scrub for gnatcatchers and other native species.

***Nonnative artichoke thistle infestation before restoration (left). Area restored with* Artemisia californica *and other coastal sage scrub natives (right).***
*Photos courtesy of Starr Ranch Sanctuary*

Restoration efforts at Starr Ranch are initiated during the second year of treatment for control of *C. cardunculus*. Non-chemical control methods are based on experiments that indicated effectiveness of removal of *C. cardunculus* rosettes every three weeks during the rainiest months, and then every four weeks until the tops die back during the summer drought. Field crews switch to hoes for rosette removal from year three on, and cutting intervals become extended to four, six, or eight weeks depending on the results of monitoring data. All seeds for restoration to coastal sage scrub or to native purple needlegrass (*Nassella pulchra*) grassland are collected at Starr Ranch, and plugs are grown in the native plant nursery.

Ongoing experiments on planting techniques for native shrub and grass species guide decisions on plug and seed rates, low-cost methods of soil tamping, and the timing of plug planting and direct seeding. Experiments also help make decisions about timing and effectiveness of non-chemical methods—brush cutting, hand weeding, flaming, mowing, and burning—for control of exotic annual grasses and forbs. Restoration standards are derived from data collected in relatively pristine, mature coastal sage scrub and native grassland at Starr Ranch.

We are hopeful that the partnership between the Fish and Wildlife Service's Partners for Fish and Wildlife Program and the National Audubon Society at Starr Ranch will provide a national example not only of habitat restoration techniques but also of working cooperatively with private landowners for conservation purposes.

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*Photo courtesy of Starr Ranch Sanctuary*

***This project will help to sustain the core population of gnatcatchers at Starr Ranch (above) and provide opportunity to increase gnatcatcher numbers through colonization of restored habitats at the ranch. Other species that will benefit from habitat restoration include the cactus wren (Campylorhynchus brunneicapill) and orange-throated whiptail lizard (Cnemidophorus hyperythrus beldingi). Other plants and animals are also monitored over time in restoration sites.***

***Cactus wren***
*Photo © B. Moose Peterson/WRP*

***Orange-throated whiptail lizard***
*Photo © B. Moose Peterson/WRP*

# How the Swift Fox Escaped the List

by Joy Gober

Under the U.S. Constitution, most fish and wildlife management responsibilities in our country are retained by the states and tribes. The exceptions, trust species such as migratory birds, anadromous fish, and species listed under the Endangered Species Act (ESA), are jointly managed by federal and state governments through various treaties and laws enacted by Congress. While a listing under the ESA can provide an important conservation tool for a listed species, the law can be complex and challenging. Most state and tribal budgets are insufficient to fund work on all the species under their authority, but if a species declines to the point that it becomes a listing candidate, it is not surprising that agencies may devote additional resources to prevent the need for ESA protection.

The states developed a rangewide conservation plan for the swift fox (*Vulpes velox*) after it became a listing candidate in 1994. Their plan relied heavily on additional surveys and monitoring to document that the status of the swift fox did not warrant listing. Based on the information provided by the states and the long-term monitoring they committed to undertaking, the Fish and Wildlife Service removed the swift fox from the candidate list. The Service recognizes the significant resources that the states and tribes bring to the conservation table. Working collaboratively allowed those resources to be used to promote long-term conservation of the swift fox.

The conservation plan for the swift fox includes states in the area covered by its range: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming. The plan was developed by a team that includes Francie Pusateri (Colorado Division of Wildlife); Matt Peck (Kansas Department of Wildlife and Parks); Brian Giddings (Montana Department of Fish, Wildlife and Parks); Richard Bischof (Nebraska Game and Parks Commission); Terry Enk (New Mexico Department of Game and Fish); Jacquie Ermer (North Dakota Game and Fish Department); Julianne Hoagland (Oklahoma Department of Wildlife Conservation); Eileen Dowd-Stukel

(South Dakota Department of Game, Fish and Parks); Heather Whitlaw (Texas Parks and Wildlife Department); and Martin Grenier (Wyoming Game and Fish Department).

The team accomplished its goal to document that the fox didn't need listing under the ESA. Marsha Sovada from the U.S. Geological Survey developed and maintains a database that shows historic and current habitat use by the swift fox. It clearly demonstrates the extent of the swift fox range and was instrumental in justifying the removal of the species from the candidate list. But the team had its challenges. Such a broad-ranging species requires the cooperation of many entities and considerable resources. It took time and effort to amass the momentum to get the team functioning and to keep it going.

What lessons did the parties learn? When they involved the managing entities to assist in development of conservation plans, they obtained their "buy-in." The states can do a better job of managing certain species if conservation efforts take effect before the species gets to the point of needing ESA protection. They also learned that developing successful partnerships to manage broad-ranging species requires the breadth of experience, knowledge, and authority amply contributed by the states.

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*Photo courtesy NEBRASKAland Magazine/Nebraska Game and Parks Commission*

# A Partnership to Grow Plovers on the Plains

by Chuck Davis

*Photo by Dr. Fritz Knopf*

The first explorers to cross the "Great American Desert," the area we now call the high plains, observed large flocks of mountain plovers (*Charadrius montanus*). These birds laid their eggs on the ground in prairie dog towns and other short-grass prairie habitat heavily grazed by enormous herds of bison. Today, cattle and sheep have replaced bison on the grasslands of eastern Colorado and Wyoming, and large areas of former prairie have been converted to crop production.

In 1999, the Fish and Wildlife Service proposed to list the mountain plover as a threatened species. Some data, such as the Service's Breeding Bird Survey and the annual Audubon Christmas bird counts, suggested plover populations on the nesting grounds and wintering areas in central and southern California were declining. Research by U.S. Geological Survey scientist Dr. Fritz Knopf in the 1990s revealed that mountain plovers were nesting on cultivated crop fields in eastern Colorado, and other studies revealed that some plover nests were lost when those fields were cultivated for weed control or spring planting.

The Service's proposed listing identified the loss of nests on cultivated fields as one of the causes of the plover's population decline. The Service, Colorado State University, and the Colorado Division of Wildlife (DOW) funded further studies, in cooperation with the Colorado Farm Bureau, and Knopf began investigating the extent of nesting losses. The partnership's goal was to identify agricultural practices that could improve nesting success. Those practices could be encouraged through conservation measures included in a special rule under section 4(d) of the Endangered Species Act if the bird was listed. The plover already has some protection under the Migratory Bird Treaty Act, so the Farm Bureau members who participated in the study were hopeful that the research would provide feasible measures to reduce plover losses, thereby reducing the producers' legal vulnerability for direct take of the species during normal farming activities.

Knopf's data, compiled during the first three nesting seasons, revealed that nesting success on grasslands was approximately the same as the success on cultivated fields. Predators, such as coyotes, swift foxes, and skunks, are a major problem for ground nesting birds. These predators rarely venture into large cultivated fields because their prey base is not normally found in plowed furrows and sparse vegetation. Nests lost to cultivation machinery resulted in similar fledging success in both habitats.

Knopf's observations also indicated that some types of farm implements were less likely to result in nest loss, and some producers would avoid running

equipment over plover nests if they saw birds flush from the eggs. If there was a way to increase the nest success on cultivated fields, farmers could actually "grow" plovers on crop land. What if we could survey and flag plover nests before the producers worked the fields?

Knopf discussed this idea with Ken Morgan, Conservation Director with the Colorado Farm Bureau, who soon would assume a new job as Private Lands Coordinator with the Colorado DOW. Both men had a hunch that the producers on the high plains would consider allowing access to surveyors and then gladly guide their farm equipment around flagged plover nests.

Knopf next met with Ralph Morgenweck, the Service's "Mountain and Plains" Regional Director, who was highly receptive to the idea. The Service's regional office staff drafted a memorandum of understanding that could be signed with individual landowners. Participating producers would notify the DOW through a toll-free telephone number at least 72 hours before cultivating their fields during the spring plover nesting season. The Colorado Bird Observatory, under contract with the Colorado DOW, would survey the fields with all-terrain vehicles, using techniques developed by Knopf's field researchers. Plover nests would be flagged and, as long as producers did not cultivate within two feet of the flagged nests, Service and Colorado DOW law enforcement personnel would not refer cases of accidental take of plovers or their nests for prosecution.

In September 2003, the Service withdrew its proposal to list the mountain plover under the Endangered Species Act. New research indicated that the plover populations on the breeding grounds in Colorado and Wyoming were larger and more widespread than originally believed, and the downward population trend for the birds described in the proposed listing rule was not statistically valid. However, the withdrawal of the listing proposal did not stop the partners from pursuing conservation measures for the plover.

The 2004 nesting season is the first opportunity for widespread use of the memorandum of understanding concept. All of the stakeholders hope that small orange flags whipping in the breeze will mark the growth of plover populations on the eastern Colorado plains.

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*Chuck Davis, the endangered species listing coordinator for the Service's Mountains and Plains Regional Office, can be contacted at chuck_davis@fws.gov, or 303/236-7400.*

***Dr. Knopf (left) and Larry Nelson of the Colorado Division of Wildlife band a mountain plover***
*Photo by Sandy Nelson*

# Why all the Fuss Over a Frog?

by Randi Thompson

Scientists have known for years that frogs can tell us a lot about the health of aquatic ecosystems. Because frogs are very sensitive to changes in air and water quality, a decline in their population indicates possible problems with the health of their aquatic environment. If the water in their neighborhood is deteriorating, that can affect many other species, including humans. The important role that frogs play in indicating the health of their environment has convinced the State of Nevada, Nye County, and two federal agencies to create a conservation agreement for two subpopulations of the Columbia spotted frog (*Rana luteiventris*).

The conservation agreement establishes actions that federal and state agencies and Nye County will take to reduce threats, improve degraded habitat, and restore natural functions associated with riparian systems. These actions will also benefit pygmy rabbits (*Brachylagus idahoensis*) and sage grouse (*Centrocercus urophasianus*) that use the area as rearing habitat. Improving hydrological functions also has indirect impacts such as reduced downstream flooding, enhanced ranching and haying operations, and expanded recreational opportunities in this remote area not far from Las Vegas.

It is these indirect benefits, and the potential to make listing the frog as endangered unnecessary, that got the attention of Nye County and convinced it to become a partner in the agreement. One way the county will benefit is by the data collected in the annual frog surveys. By knowing where frog habitat is, and incorporating that information into land use planning, the county can avoid potential conflicts.

Farmers and ranchers in Nye County will see benefits without having to make improvements on their land. Most of the frogs currently found are on lands managed by the Forest Service, so work will be done primarily on federal lands.

***A winter view of Columbia spotted frog habitat in Nye County's Indian Valley.***
*USFWS photo*

Stabilizing river banks, restoring springs, and other actions also will increase the amount of water that flows down to grazing pastures and hay fields.

The agreement creates a Spotted Frog Technical Team that is responsible for developing the specific actions. The team includes representatives from the Fish and Wildlife Service, Forest Service, Bureau of Land Management, Nevada Department of Wildlife, Nevada Natural Heritage, and Nye County. Dr. James Marble, Director of Natural Resources for Nye County, is the team leader for the Toiyabe subpopulation.

Having a Nye County representative as leader of a team with federal partners is not something you would expect if you know the history of Nye County. In 1994, the United States filed suit against Nye County after the County challenged the control and management of federal land. The previous year, the Nye County Commissioners approved a resolution that claimed the State of Nevada, not the United States, owned national forests and other federal lands. Under this claim, Nye County would have the authority to manage the lands, roads, and trails within the county boundaries that are under federal management.

A closed road on land managed by the Forest Service was the start of this protest. When County Commissioner Dick Carver drove his tractor across national forest land to reopen a weather-damaged road, he and his supporters rekindled the 1970's "Sagebrush Rebellion" movement. In October of 1995, his story made the cover of Time Magazine.

The fact that Nye County signed this spotted frog conservation agreement is a testament as to how far the County and the Fish and Wildlife Service have both come to developing partnerships out of challenging relationships.

Dick Carver's widow, Roberta, attended the signing ceremony in Reno as Nye County's representative. She called the spotted frog conservation agreement an example of cooperation among the local, state, and federal levels of government. "It will be much more flexible, most assuredly will enjoy greater local support, and it will have far fewer undesirable effects on local residents than a listing would."

Nye County was willing to sign the spotted frog agreement in 2002 partly because of the favorable experience it had with an earlier conservation agreement. In 2000, Nye County signed the Amargosa Toad Conservation Agreement with federal and state partners and The Nature Conservancy (TNC). The Amargosa toad's total range is limited to a 12-mile (20-kilometer) stretch of the Amargosa River in Nye County's Oasis Valley. TNC purchased over 800 acres (325 hectares) of toad habitat from two willing ranchers and worked with Nye County, the University of Nevada at Reno, the town of Beatty, and the federal and state partners to restore the habitat and protect the toad. The conservation efforts have helped the toad and may also provide recreational and economic development for the community. The town of Beatty is proposing to acquire a long-term lease for public lands in the area that will allow limited public use while enhancing toad habitat.

At the spotted frog agreement signing, Dr. Marble said, "The conservation agreement gives Nye County the opportunity to play a leading role in a proactive conservation program, and shows that communities are willing and able to be leaders on species conservation."

That attitude promises a future of cooperation and partnership. If landowners, local governments, and federal agencies can work together to find a balance between economic development and species protection in Nye County, Nevada, it can happen anywhere.

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*Randi Thompson was a public affairs specialist in the Service's Reno, Nevada, Fish and Wildlife Office until recently leaving to pursue other interests.*

***Spotted frog***
*Photo by Anita Cook*

***Amargosa toad***
*Photo by Glen Clemmer*

# Recovery Planning in the 21st Century

by Karene Motivans and Debby Crouse

When the Endangered Species Act (ESA) was passed 30 years ago, it did not mention recovery plans or the need for recovery planning to chart the path for restoring a species. Instead, the ESA relied on reduction of take (through the section 9 prohibitions on direct takes and section 7 consultations on the impacts of federal actions) as the primary means for conserving endangered species. By 1978, the need for an active recovery program was recognized.

The 1978 amendments to the ESA required the development of recovery plans for all U.S. species, unless it is determined that a recovery plan will not promote the conservation of the species. Nevertheless, statutory guidance as to the form and content of recovery plans was minimal until the 1988 amendments added requirements to include site-specific management; objective, measurable criteria; and an estimate of the time and cost to reach recovery. In addition, all recovery plans are now required to be distributed for public review and comment. Ironically, to this day, there is still no definition of the term "recovery" in the ESA.

Obviously, over the 30 years since passage of the ESA, our perceptions of the need for recovery plans have been

***Many public agencies and private organizations have supported and operated programs to recover the nene, or Hawaiian goose.***

*photo by John & Karen Hollingsworth*

evolving. The early recovery plans, written before such documents were required, were brief, action-oriented documents intended for the use of agency biologists. We now have a greater understanding of the biological complexity of recovering a species, the number of endangered and threatened species has increased dramatically, more listed species are on private lands, the role of non-federal organizations and the public in contributing to recovery is better recognized, and more listed species are the subject of controversy. Accordingly, plans are now longer and more detailed, the planning process has become more complex, and the need for recovery plans to serve also as outreach documents has increased.

Today, the process of recovery planning involves bringing species experts, federal and non-federal land managers, landowners, and others together to make decisions on all necessary actions. Recovery plans organize, coordinate, and prioritize the many possible recovery actions, such as habitat restoration, developing conservation agreements with private landowners, reducing threats, conducting additional research, and monitoring species populations.

Since a recovery plan can be a valuable reference used by many organizations, universities, state and federal agencies, and property owners, it needs to justify the strategy and itemize recovery actions in clear terms. Recently, a study of recovery plans by the Society for Conservation Biology (Clark et al. 2002a & b) identified a number of strengths and weaknesses in recovery plans completed prior to 1999. This analysis has been a useful contribution to the development of new recovery planning guidance (Crouse et al. 2002). The two federal agencies that share primary responsibility for recovery, the Fish and Wildlife Service and NOAA Fisheries, will release new recovery planning guidance later this year. The guidance strives to 1) ensure consistency in the application of statutory, regulatory, and policy requirements for the development of recovery plans, 2) emphasize certain aspects of planning, and 3) assist in keeping plans useful and up-to-date.

**Plan Early and Often**

The draft recovery planning guidance requires that an early planning document, a recovery outline, be developed as soon as a species is listed. This outline is a succinct, strategic document used to direct the recovery effort pending the development of a final recovery plan, which can take three years or more to be written, reviewed, and approved. The recovery outline addresses several needs. Actions that are urgently needed at the time a species is listed can be planned quickly and guide recovery in a cohesive way until a complete recovery plan is available.

***One of the activities called for in the Red-cockaded Woodpecker Recovery Plan is the installation of next boxes.***
*photo by John & Karen Hollingsworth*

The guidance recommends several ways to keep the plans up-to-date with the most current scientific information. As threats to the species or habitat change in intensity or type, a threats assessment is a tool that can help planners anticipate recovery needs instead of simply react to changing conditions.

The long-term outlook for any endangered or threatened species depends largely on reducing or eliminating the problems that caused their endangerment. The new guidance calls for an explicit assessment of the sources and relative impacts of the various threats acting on a species, recovery actions that address every currently relevant threat, and recovery criteria that confirm the threats are eliminated or under control.

**Stakeholder Involvement**

Stakeholders in recovery planning are broadly defined as anyone who has an interest in the recovery of the species or particular actions taken to recover the species, including anyone who may be affected, negatively or positively, by these actions or anyone who can affect their outcome. One emphasis in the draft recovery planning guidance is to increase stakeholder participation early in the recovery process by: 1) making recovery outlines available to the public over web sites; 2) providing public notification regarding an anticipated timeline for recovery planning and opportunities for stakeholder involvement in planning and implementation; and 3) soliciting information about ways to minimize social and economic impacts of recovery actions.

Establishing relationships with stakeholders early in the recovery planning process is essential to building an effective foundation for the development of recovery strategies. The public and interested stakeholders are encouraged to provide input into the Service's planning process on a variety of issues including, but not limited to, specific species information, methods of habitat restoration, the reduction or elimination of threats, or other actions that may be necessary during the recovery process. Likewise, stakeholders may become involved through a variety of ways, such as participating at public hearings, submitting written material, or, when they might provide expertise on a particular issue, participating as a member of a recovery team.

Ultimately, any recovery plan is only good as good as its implementation. Many of the changes and additions to the new recovery planning guidance are intended to make plans more relevant, more understandable, and more practical. We hope these changes will lead to better implementation and, therefore, a more effective recovery program.

***Captive propagation and reintroduction into the wild was a vital part of the California Condor Recovery Plan. This captive-propagated California condor chick is fed using a condor puppet to avoid having the bird associating people with food.***
*Photo by Ron Garrison/San Diego Zoo*

***The reintroduction of captive-propagated pups was also essential under the Red Wolf Recovery Plan.***
*Photo by George Gentry*

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# Restoring the Columbian White-tailed Deer

by David L. Peterson

On July 24, 2003, decades of work to recover the Douglas County, Oregon, population of the Columbian white-tailed deer (*Odocoileus virginianus leucurus*) were recognized by the removal of this animal from Endangered Species Act protection.

The recovery of the Douglas County population of the deer was due largely to conservation efforts coordinated by the Fish and Wildlife Service and carried out by Douglas County, the Oregon Department of Fish and Wildlife, and the Bureau of Land Management. All parties worked in partnership to help remove threats and protect the population. Recovery measures included acquisition and management of habitat, hunting restrictions, and local ordinances designed to protect the deer population. Population estimates for the deer in Douglas County have demonstrated a fairly steady upward trend since management began, increasing from about 2,500 in the early 1980s to more than 6,000 today.

Columbian white-tailed deer occur in two distinct population segments: 1) the Lower Columbia River population, found in Wahkiakum County in Washington, and Clatsop and Columbia counties in Oregon; and 2) the Douglas County population in southwestern Oregon. The two population segments are separated by about 200 miles (320 kilometers) of unsuitable or discontinuous habitat. The delisting of the Douglas County distinct population segment will not change the endangered status of the Columbia River distinct population segment, which remains fully protected by the Endangered Species Act. Efforts to recover that population will continue.

The Endangered Species Act requires the Service, in cooperation with the states, to monitor delisted species for at least five years. The purpose of this requirement is to detect any failure of the delisted species to sustain itself without the protective measures provided by the Act. If, at any time during the five-year monitoring period, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing. The draft monitoring plan is composed of three parts: 1) monitoring population size and other key population factors; 2) tracking the incidence of disease; and 3) conducting an annual assessment of habitat protection.

The Service's Roseburg, Oregon, Field Office will continue to work closely with the Oregon Department of Fish and Wildlife to monitor the deer and assist in the possible reintroduction of the species into suitable unoccupied portions of its historic range to the north in the Willamette Valley.

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*USFWS photo*

**The Columbian white-tailed deer is the westernmost of 30 white-tailed deer subspecies in North and Central America. Early records indicate that this subspecies was once numerous in its historic range, from the western slopes of the Cascade Mountains to the Pacific Ocean, and from Puget Sound in Washington southward to the Umpqua River Basin in southern Oregon. Intensive hunting by early settlers, who also drained marshes and cleared the riparian areas used by the deer, resulted in extensive loss of habitat and a severe decrease in numbers. In the 1940s, fewer than 700 Columbian white-tailed deer existed along the Columbia River in Oregon and Washington, and fewer than 300 remained within Douglas County.**

# Karner Blue Butterflies and Necedah NWR

by Brian Czech

The Karner blue butterfly (*Lycaeides melissa samuelis*) has been endangered primarily by habitat loss, much of which has been due to urbanization and wildfire prevention (Andow et al. 1994). The lack of wildfires has resulted in plant community succession from old savannas and pine barrens (the natural habitat of the Karner blue) to communities dominated by woody vegetation. The range of the Karner blue is also limited by the distribution of wild lupine (*Lupinus perennis*), the only known food source for the Karner blue in its larval stage (U.S. Fish and Wildlife Service 2003).

Karner blue populations vary from a few individuals at some sites (especially in New York, New Hampshire, and Minnesota) to several thousand at larger sites in Michigan and Wisconsin. In recent years, the entire population is estimated between 80,000 and 120,000 adults.

*Photo by Thomas A. Meyer*

The Necedah National Wildlife Refuge in Wisconsin supports one of the largest populations. In 2002, the refuge contained about 1,200 acres (485 hectares) of Karner blue habitat. The population fluctuated between 6,000 and 31,000 from 1993 to 2002, according to Richard King, Necedah's wildlife biologist. The Necedah Wildlife Management Area is also administered by the Necedah National Wildlife Refuge. It contains about 150 acres (60 ha) of Karner blue habitat and supports about 7,000 butterflies .

One of the goals identified in the Karner Blue Butterfly Recovery Plan is to establish a viable metapopulation of Karner blue butterflies on the Necedah Refuge. (A metapopulation consists of multiple subpopulations, some of which may "blink out" periodically but are restored via immigration from other subpopulations.) To achieve this goal, refuge personnel intend to restore approximately 4,000 acres (1,620 ha) of oak savanna within a 10 square-mile (26 square-kilometer) area. We estimate this acreage could support approximately 70,000 butterflies.

Tens of thousands of butterflies would seem to offer considerable genetic and demographic viability, but the small number of significant populations is worrisome. Outside the Necedah area, the only major Karner blue sites occur at Fort McCoy, Crex Meadows, and Fish Lake Wildlife Area (Wisconsin), Indiana Dunes National Lakeshore (Michigan), and the Saratoga Airport (New York). Other populations may occur on two state-managed game areas in Michigan.

The Fish and Wildlife Service has worked to increase carrying capacity on refuges and provide more geographical security for the Karner blue. The Great Bay National Wildlife Refuge includes a 28-acre (11-ha) easement near Concord, New Hampshire, that has unoccupied Karner blue habitat, according to Michael Amaral, Northeast Regional Senior Endangered Species Specialist with the Service in Concord. This parcel connects larger sites that have been inhabited by the species in recent years.

A new potential threat is the proliferation of field corn engineered with genes of *Bacillus thuringiensis* (Bt). "Bt corn" produces proteins that are toxic to lepidopteran species, which include the European corn borer, the most problematic corn pest in the Midwest. Several native lepidopterans, most notably Karner blue and monarch butterflies, may also be affected when their populations are adjacent to cornfields dusted with Bt corn pollen (Obrycki et al. 2001). Fortunately, not many of the Karner blue populations are adjacent to cornfields at this time.

The trend of the Karner blue population during the 1990s was down, but Cathy Carnes (the Service's Karner Blue Butterfly Recovery Coordinator, Green Bay, Wisconsin) believes the management efforts of the Service and partners are improving the species' conservation and recovery potential in all seven states supporting the Karner blue. Three reintroductions (Ohio, New Hampshire, and Indiana) and one population augmentation (Minnesota) are underway. The Michigan Department of Natural Resources is developing a statewide habitat conservation plan for the Karner blue, and the Wisconsin statewide habitat conservation plan is in its fifth year of implementation by 36 partners.

Larry Wargowsky, Necedah Refuge Manager, notes that there are many side benefits of the prescribed burning program in addition to restoring oak savanna habitat for the endangered Karner blue. "Songbird and plant species diversity has greatly increased within the oak savanna restoration units. Rare plant species as well as conservation priority bird species have been identified."

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# RULEMAKING ACTIONS

**From July through December of 2003, the Fish and Wildlife Service published the following proposed and final rules in accordance with the Endangered Species Act (ESA). The full text of each action can be found on the internet at http://endangered.fws.gov.**

## Final Listing

**Dugong (*Dugong dugon*)** The dugong, a marine mammal somewhat resembling the manatee, was listed in 1970 as an endangered species throughout its range, which includes tropical and subtropical coastal and inland waters from eastern Africa to the Solomon Islands in the western Pacific. Habitat degradation and illegal hunting reduced the dugong to remnant populations.

Because of a technicality in the ESA, dugongs in the Republic of Palau, an island nation in the western Pacific, were dropped from the law's coverage in 1988. On December 17, 2003, with the full support of the local government, ESA protection was once again extended to the small, vulnerable dugong population in Palau.

## Final Reclassification

**Missouri Bladderpod (*Lesquerella filiformis*)** On October 15, we recognized the improved status of the Missouri bladderpod, an annual in the mustard family (Brassicaceae), by reclassifying it from endangered to the less critical category of threatened. Habitat acquisition and management have benefited some bladderpod sites by allowing the control of competing invasive and nonnative plants. Fencing has protected some populations where cattle grazing posed a threat. The discovery of additional populations also makes the species more secure. Delisting is not yet possible, however, because some sites are still threatened.

## Final Delisting Rules

**Hoover's Woolly-star (*Eriastrum hooveri*)** This plant, an herb in the phlox family (Polemoniaceae), was delisted on October 7. The discovery of additional populations, and the implementation of conservation actions recommended in the species' recovery plan, led to a determination that the Hoover's woolley-star no longer needs ESA protection. Additionally, researchers found that the plant is more resilient and less vulnerable to disturbance than previously known. The Bureau of Land Management, which administers habitat for a substantial number of the newly discovered populations, will continue to monitor the woolly-star's status.

**Truckee Barberry (*Berberis (=Mahonia) sonnei*)** Recent work by taxonomists indicates that this plant, an evergreen shrub in the family Berberidaceae once believed endemic to a floodplain along the Truckee River in California, is not a discrete entity and, therefore, does not meet the definition of a species as described in the ESA. It is now considered synonymous with *Berberis repens*, a common and widespread plant. For this reason, we removed *B. sonnei* from the list of threatened and endangered species on October 1.

**Sacramento Splittail *(Pogonichthys macrolepidotus)*** This fish, a species native to California's Central Valley, was listed in 1999 as threatened due to changes in water flows and water quality, drought, loss of habitat, and the effects of agricultural and industrial pollutants. The listing was challenged, and the U.S. district court sent the issue back to the Service for further consideration. After additional review and public comment periods, the Service found that the threats are being addressed through habitat restoration and water management actions underway to benefit Central Valley fish, including several federally protected species. Accordingly, a "notice of removal" from the ESA list was published September 22 for the Sacramento splittail.

**Columbian White-tailed Deer (*Odocoileus virginianus leucurus*)** On July 24, we published a final rule recognizing two distinct population segments (DPS) of the Columbian white-tailed deer, the Douglas County DPS and the Columbia River DPS, and removed the Douglas County DPS from the list of threatened and endangered wildlife. (See "Partners Restore the Columbian White-tailed Deer" in this edition of the *Bulletin*.) The delisting of the Douglas County DPS will not change the endangered status of the Columbia River DPS, which remains listed by the ESA.

## Proposed Delisting Rule

**Two Australian Parakeets** On September 2, we proposed to delist two birds native to Australia, the scarlet-chested parakeet (*Neophema splendida*) and turquoise parakeet (*Neophema pulchella*). Both species were listed in 1970 as endangered, but a recent review indicates that they have recovered. Wild populations are now stable or increasing, trade in wild-caught specimens is strictly limited, and the species are protected by Australian regulations and by national and international treaties and laws.

## Withdrawn Listing Proposal

**Mountain Plover (*Charadrius montanus*)** On September 3, we withdrew our proposal to list the mountain plover, a bird of the Great Plains, as a threatened species. New research indicates that populations are more stable and widespread than originally believed. (See "Growing Plovers on the Plains" in this edition of the *Bulletin*.) Cooperative conservation measures for the mountain plover will continue, however.

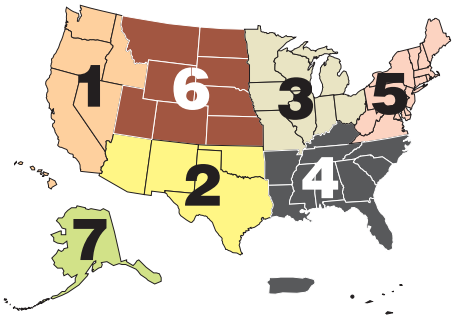
## Final Critical Habitat Rules

**Fifteen Vernal Pool Species** We designated critical habitat on August 6 for 15 species, 4 crustaceans and 11 plants, that depend on vernal or seasonal pools in California and southern Oregon. About 1,184,500 acres (418,000 hectares) fall within the critical habitat boundaries.

**Forty-one Hawaiian Plants** On July 2, we designated critical habitat for 41 listed plant taxa known historically from the Island of Hawai'i (or the "Big Island"). The areas total about 208,000 acres (84,200 ha).

## Proposed Critical Habitat Rule

**Peirson's Milk-vetch (*Astragalus* magdalenae var. peirsonii)** We proposed on August 5 to designate critical habitat for this threatened plant in the desert of Imperial County, California. The proposal encompasses about 52,780 acres (21,360 ha) of open sand dunes.




**Regional staffers have reported the following news:**

## Region 3

**Whooping Crane (*Grus americana*)** The successful effort to reintroduce migratory whooping cranes to the eastern United States continued as 20 of the reintroduced whoopers migrated back to Wisconsin on their own from Chassahowitzka National Wildlife Refuge in Florida during the spring of 2003. One crane stopped short of Wisconsin and stayed in northern Illinois for the spring and summer, but most remained in and around Wisconsin for the summer. Though primarily staying in the vicinity of Necedah National Wildlife Refuge, they also demonstrated appropriate foraging and roosting behavior on a number of other state, federal, and private wetlands. Three juvenile female whoopers made their way to South Dakota. Whooping Crane Eastern Partnership (WCEP) biologists and South Dakota Game, Fish and Parks staff mutually agreed that WCEP would retrieve the three birds and return them to Necedah Refuge in Wisconsin (the original reintroduction site). Unfortunately, one of the birds became stressed after it was retrieved and eventually had to be euthanized.

Sixteen whooping cranes that hatched at the Patuxent Wildlife Research Center (Maryland) in the spring spent the summer training to follow behind ultralight aircraft. Those whooping cranes began their ultralight-led migration south to Chassahowitzka on October 16, 2003. We hope to add the 16 new cranes from this year's reintroduction to the 20 adult and juvenile whooping cranes from the 2001 and 2002 reintroductions.

**Higgin's Eye Pearlymussel (*Lampsilis higginsii*)** As a result of a 2000 Biological Opinion that determined jeopardy for the Higgin's eye pearlymussel from operation and maintenance of the Army Corps of Engineer's Upper Mississippi River Nine-foot Channel Project, we are working with the Corps' on the Interagency Mussel Coordination Team to carry out conservation measures identified in the Biological Opinion. Those measures include genetic studies, mussel culture at the Genoa National Fish Hatchery, culture in cages in the Upper Mississippi River and tributaries, stocking juvenile mussels, relocating adults, stocking fish inoculated with glochidia (parasitic mussel larvae), cleaning and stockpiling adult mussels, and survey/monitoring activities. Those activities are presented in the report "Saving the Higgins' Eye Pearlymussel (*Lampsilis higginsii*) from Extinction: 2002 Status Report on the Accomplishments of the Mussel Coordination Team," found on the web at http://www.umesc.usgs.gov/mussels/documents/mct_2002_status_report.pdf

Recovery plans for the following listed species in Region 3 were completed and made public in September 2003:

**Piping Plover (*Charadrius melodus*)** Destruction of habitat, disturbance, and increased predation rates are described as the main reasons for the endangered status of the Great Lakes population and continue to be the primary threats to its recovery. The remaining birds, whether on the breeding or wintering grounds, mostly inhabit public or undeveloped beaches. These populations are vulnerable to predation and disturbance.

Piping plovers nest on wide sand and cobble beaches with little vegetation and disturbance. These shore and dune areas also support a community of other rare plants and animals, including the threatened Pitcher's thistle, dwarf lake iris, and Houghton's goldenrod. Over the past decade, Great Lakes piping plovers have bred primarily in Michigan and Wisconsin, although occurrence during migration has been recorded in other Great Lakes states. During winter, these birds roost and forage on beaches, dunes, and sandy and muddy flats of the Atlantic and Gulf coasts. Public and private efforts to recover the plover are already underway. State and federal agencies and private citizens in Michigan and Wisconsin, and throughout the states where the birds over-winter, are working to protect habitat and manage land uses in areas where many of the piping plovers live.

**Lake Erie Water Snake (*Nerodia sipedon insularum*)** The Lake Erie water snake is a nonvenomous snake that lives only on the islands and in the waters of the western Lake Erie basin. The recovery plan is the result of several years of effort by scientists familiar with the water snake and its habitat. Most of the population decline can be attributed to intentional and accidental human-induced mortality. Habitat loss and degradation, such as occur through development of the snake's shoreline habitat with marinas and houses, are other significant threats. The recovery plan recommends monitoring the snake populations, implementing voluntary programs to manage both public and private land where the snake occurs, participating in outreach to ensure that visitors to Lake Erie islands are aware of the significance of this unique animal, and conducting research to ensure that major threats are alleviated.

**Mead's Milkweed (*Asclepias meadii*)** Mead's milkweed is a threatened plant found in eastern Kansas, Missouri, south-central Iowa, and southern Illinois. It has disappeared from Indiana and Wisconsin. The plants grow primarily in tallgrass prairie, especially areas that have not been plowed and are only lightly grazed. Remaining patches of tallgrass prairie continue to be lost throughout the Midwest to agriculture and residential development. Recovery steps proposed in the plan include protection and management of habitat, identification of new populations or potential habitats for reintroduction, and research on restoration, management, and reintroduction techniques.

**Tumbling Creek Cavesnail (*Antrobia culveri*)** The Tumbling Creek cavesnail is found only in Tumbling Creek in Taney County, Missouri. The

number of cavesnails has significantly decreased over the past few decades, and only a single individual was found within established survey areas between January 11, 2001, and April 22, 2003. However, a small population of approximately 40 individuals exists upstream of the area that is regularly surveyed. The primary cause for the cavesnail's decline appears to be decreased water quality due to increased erosion and pollution in the waters that feed the cave stream, although research is needed to confirm this. The plan recommends steps to protect habitat, monitor contaminants, conduct research on the species, and raise awareness of the cavesnail and its link to good water quality.

## Region 5

**Chittenango Ovate Amber Snail (*Novisuccinea chittenangoensis*)** Mark-release-recapture studies continued during the 2003 field season for this highly endemic, terrestrial snail. Marking studies in 2002 by the State University of New York College of Environmental Science and Forestry, the New York State Department of Environmental Conservation, and the Service's New York Field Office led to a population estimate of 145 to 222 snails. A third year of intensive monitoring and population assessment work is planned for 2004. The combined data should provide an accurate baseline population estimate for the snail. In addition, efforts are underway to complete the draft revised recovery plan.

**Bog Turtle (*Clemmys muhlenbergii*)** The New York Field Office and New York State Department of Environmental Conservation held two workshops in May and June 2003 to increase coordination among state and federal agencies within the New York range of the bog turtle. They were the first workshops of this type in New York and were considered quite successful. The classroom portion included presentations on bog turtle biology and recovery, as well as on various state and federal regulations. The field portion was designed to help agency personnel learn more about the characteristics of potentially suitable habitat.

**Seabeach Amaranth (*Amaranthus pumilus*)** The Service's Long Island Field Office, in partnership with the New York Natural Heritage Program and the Long Island Chapter of The Nature Conservancy, assisted land managers in the management and surveys of seabeach amaranth on Long Island during the 2003 growing season. Assistance included instruction on survey protocol, participation in data collection, installation of fencing to mark the plants, and supplying fencing equipment and public education signs. The field office also hosted a meeting in May 2003 with stakeholders to coordinate on amaranth management, recovery, and research.

Seabeach amaranth populations on Long Island have increased from 182 plants in 1994 to 190,500 plants in 2002 (2003 data will be available soon). Field office biologists are participating in rangewide efforts to assess amaranth recovery, revise the recovery plan, and develop guidance on management and survey protocols.

## Washington Office

In a historic effort to broaden international wildlife conservation planning, the Fish and Wildlife Service and the U.S. Department of State brought together decision-makers from throughout the Western Hemisphere to develop strategies for cross-boundary conservation of migratory species and collaboration on wildlife conservation issues.

The Western Hemisphere Migratory Species Conference took place in Termas de Puyehue, Chile, on October 6, 7, and 8, 2003. Attendees included representatives from 25 countries in the Western Hemisphere as well as members from over 40 international non-governmental organizations (NGOs) and wildlife conservation stakeholders. The products of the meeting included a detailed, prioritized list of issues needing international collaboration; an emerging matrix of tools available from NGO's, international conventions, and government bodies to address these identified needs; and a call for an interim forum to build upon the momentum of the conference.

***FWS attendees at the Migratory Species Conference***
*USFWS photo*

This interim forum will be headed by a committee composed of five government representatives from various regions of the Western Hemisphere, four representatives from the NGO conservation community, and representatives from applicable international conventions. The conference's country representatives unanimously elected Herb Raffaele, Chief of the Service's Division of International Conservation, to chair the interim committee and to ensure that the progress in international collaboration for wildlife conservation made at the conference continues.

Endangered migratory species of the Western Hemisphere that are likely to benefit from enhanced collaboration between nations include imperiled species of cranes, sea turtles, neotropical migratory birds, whales, bats, dugongs, and waterfowl, to name just a few.

# BOX SCORE

Listings and Recovery Plans as of February 29, 2004

| GROUP | ENDANGERED U.S. | ENDANGERED FOREIGN | THREATENED U.S. | THREATENED FOREIGN | TOTAL LISTINGS | U.S. SPECIES W/ PLANS |
|---|---|---|---|---|---|---|
| MAMMALS | 65 | 251 | 9 | 17 | 342 | 55 |
| BIRDS | 76 | 175 | 14 | 6 | 271 | 76 |
| REPTILES | 14 | 64 | 22 | 15 | 115 | 33 |
| AMPHIBIANS | 12 | 8 | 9 | 1 | 30 | 14 |
| FISHES | 71 | 11 | 43 | 0 | 125 | 95 |
| SNAILS | 21 | 1 | 11 | 0 | 33 | 23 |
| CLAMS | 62 | 2 | 8 | 0 | 72 | 64 |
| CRUSTACEANS | 18 | 0 | 3 | 0 | 21 | 13 |
| INSECTS | 35 | 4 | 9 | 0 | 48 | 31 |
| ARACHNIDS | 12 | 0 | 0 | 0 | 12 | 5 |
| ANIMAL SUBTOTAL | 386 | 516 | 128 | 39 | 1,069 | 409 |
| FLOWERING PLANTS | 569 | 1 | 144 | 0 | 714 | 577 |
| CONIFERS | 2 | 0 | 1 | 2 | 5 | 2 |
| FERNS AND OTHERS | 24 | 0 | 2 | 0 | 26 | 26 |
| PLANT SUBTOTAL | 597 | 1 | 147 | 2 | 747 | 607 |
| GRAND TOTAL | 883 | 517 | 275 | 41 | 1,816* | 1,016 |

**TOTAL U.S. ENDANGERED:** 983 (386 animals, 597 plants)
**TOTAL U.S. THREATENED:** 275 (128 animals, 147 plants)
**TOTAL U.S. LISTED:** 1,258 (514 animals**, 744 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.

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

ENDANGERED Species BULLETIN

*U.S. Department of the Interior*
*Fish and Wildlife Service*
*Washington, D.C. 20240*

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