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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife  
Service, Washington, D.C. 20204

### Austin Regional Habitat Conservation Plan

David A. Tilton<sup>1</sup>  
and  
Joseph E. Johnston<sup>2</sup>

Austin, Texas, and its environs contain one of the largest known concentrations of Endangered and other vulnerable species in a major metropolitan area. Because of concerns for these animals and plants, and for the effects that their protection could have on development in the Austin area, a committee of developers and conservationists has been formed to prepare an Austin Regional Habitat Conservation Plan (Regional Plan).

The committee's objective is to identify and carry out measures, such as the establishment of a habitat preserve, that would ensure the survival of Austin's endangered wildlife while accommodating orderly economic development. Interest in these issues is running high. In 1988, an environmental organization, Texas Earth First!, gave notice of intent to sue several developers and government agencies for alleged violations of the Endangered Species Act. Although no suit has been filed, the organization's notice helped to bring the divergence between advocates for Austin's endangered wildlife and many development interests into focus. Both sides now appear to have a greater appreciation for the benefits of a conservation partnership.

The six listed species in the Austin area covered by the Regional Plan are a songbird, the black-capped vireo (*Vireo atricapillus*), and five cave-dwelling invertebrates: the Tooth Cave spider (*Lep-toneta myopica*), Tooth Cave pseudoscorpion (*Microcreagris texana*), Tooth Cave ground beetle (*Rhadine persephone*), Bee Creek Cave harvestman (*Texella reddelli*), and Kretschmarr Cave mold beetle (*Texamaurops reddelli*). The Regional Plan also addresses three Category 2 listing candidates: another songbird, the golden-cheeked warbler (*Dendroica chrysoparia*), and two plants, the bracted twistflower (*Streptanthus bracteatus*) and the Texas amorphia (*Amorpha roemeriana*).

The status of the black-capped vireo is of particular concern. Biologists with the Service's Fort Worth, Texas, Field Office



photo by Alisa Shull

*black-capped vireo*

report a continuing decline in the species' nesting population within Travis County (which includes Austin). In 1987, there were indications of 81 nesting pairs in the area. By 1988, however, the number had dropped to 40, and in 1989 only about 27 nesting pairs remained.

#### Take and Incidental Take

Under certain circumstances, construction activity within the habitat of a listed species can constitute "take," a violation of the Endangered Species Act and its implementing regulations. Take is defined in the Act as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Fish and Wildlife Service regulations define "harass" and "harm" as follows:

**harass**—an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but

are not limited to, breeding, feeding, or sheltering.

**harm**—an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 10(a) of the Act authorizes the Service to grant permits to non-Federal entities for the "incidental take" of listed species under certain circumstances. The Service defines this term as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity." To obtain an incidental take permit, the applicant must submit a Habitat Conservation Plan to the Service outlining the likely impacts on listed species from the taking, procedures for minimizing and mitigating the impacts, and funding sources for implementing these procedures. (See 50 CFR 17.22.) At a minimum, the Habitat Conservation Plan must ensure that any

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## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1**—The new Western Peregrine Falcon Recovery Team is now in place. (See previous note in BULLETIN Vol. XIII,

Nos. 9-10.) The team consists of five biologists: Dr. James Anderson, team leader (Colorado College); Dr. Al Harmata (Montana State University); Dr. Grainger Hunt (Biosystems Analysis, Incorpo-

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**Region 8** (FWS Research and Development nationwide), Washington, D.C. 20240; Richard N. Smith, *Regional Director*; Al Sher, *Endangered Species Specialist* (703-358-1710).

rated); Lloyd Kiff (Western Foundation of Vertebrate Zoology); and Dr. Clayton White (Brigham Young University). The Fish and Wildlife Service coordinator for the team is Rich Howard from the Boise, Idaho, Field Office. He is being assisted by David Harlow (Region 1), Robert Mesta (Region 2), and Rob Hazelwood (Region 6).

The team is working on two tasks: 1) developing recommendations for the Fish and Wildlife Service on producing a 1990 peregrine falcon (*Falco peregrinus*) reintroduction plan for the western United States (Regions 1, 2 and 6); and 2) preparing an addendum plan that combines the existing Pacific and Rocky Mountain/Southwest recovery plans. The addendum also will provide an outline for the recovery effort during the next 5 years.

Three geographic working groups, composed of State and Federal biologists, are being formed to help the team develop the addendum plan. The Pacific area working group (covering Oregon, Washington and California), Northern area working group (Idaho, Montana, Wyoming, North and South Dakota, and Nebraska), and Southwest area working group (Nevada, Utah, Colorado, Kansas, New Mexico, Arizona, Oklahoma, and Texas) also will monitor the status of the peregrine populations.

The Western Peregrine Falcon Recovery Team can be contacted through Dr. Jim Anderson, Department of Biology, Colorado College, Colorado Springs, Colorado 80903. Inquiries concerning Service responsibilities should be directed to Rich Howard, 4696 Overland Road, Room 576, Boise, Idaho 83705 (telephone: 208/334-1931, or FTS 8/554-1931).

**Region 2**—The small Arizona desert nesting population of bald eagles (*Haliaeetus leucocephalus*) fledged only 13 young from 9 successful nests in 1989—the lowest production since 1983. This year's production is in sharp contrast to 1988, when the population fledged 24 young from 15 successful nests. The primary cause for the drop in production appears to be the higher than normal temperatures that occurred during the incubation period and throughout the breeding season. Arizona experienced a record 143 days with temperatures exceeding 100° F (38° C). Temperatures recorded at exposed cliff nest sites late in the breeding season commonly exceeded 120° F (49° C). It is very difficult for the eagles to successfully incubate eggs or brood young if they are subjected to such high temperatures early in the nesting cycle.

Fish and Wildlife Service observers documented that the eagles suffered much more from the heat this year than in previous years. One pair of eagles abandoned their nest during incubation after a week of temperatures between 100 and 110° F (38 and 43° C). Later in the season, older chicks were observed seeking

(continued on next page)



# Emergency Protection for Winter-Run Chinook Salmon in the Sacramento River

The National Marine Fisheries Service (NMFS), U.S. Department of Commerce, published a notice in the August 4, 1989, *Federal Register* taking emergency action to list the winter run of chinook salmon (*Oncorhynchus tshawytscha*) in the Sacramento River, California, as Threatened and to designate a section of the river as Critical Habitat. During the 240-day life of the emergency rule, NMFS will proceed with plans to give these fish long-term Endangered Species Act protection.

Winter-run chinook salmon are distinguishable from the other runs of chinook salmon in the Sacramento River by the timing of their upstream migration and spawning season. They return to the river almost exclusively as 3-year-old fish. According to NMFS, the winter run of chinook salmon in the Sacramento River declined between 1967 and 1985 from a 3-year (1967-1969) mean size of nearly 84,000 fish to a 3-year (1983-1985) mean size of just under 3,000 fish. Since then, the decline has continued. The California Department of Fish and Game estimates that the 1989 winter run numbered only about 500 fish. On the basis of this information, California has listed the winter run of chinook salmon in the Sacramento River under State law as endangered.

The primary causes for this steep decline in the winter run are believed to be the Red Bluff Diversion Dam and human activities that degraded spawning and rearing habitat in the Sacramento River. The dam has acted as a barrier to upstream spawning areas and restricted the passage of fish downstream to the ocean. Some salmon are captured by fisheries workers and helped over the barrier, and others pass up through fish ladders, but the numbers are not high enough to ensure the run's survival. In addition, changes in river flows resulting from operation of the dam can alter water temperatures and make them unsuitable for fish reproduction.

In 1988, NMFS, the California Department of Fish and Game, the U.S. Bureau of Reclamation, and the U.S. Fish and Wildlife Service signed an agreement to implement a 10-Point Winter-Run Restoration Plan. The plan assigns a number of tasks to the Bureau of Reclamation, including raising the gates at the Red Bluff dam seasonally to allow fish access to spawning habitat above the dam and maintaining water temperatures in the spawning habitat below the levels that are lethal to salmon eggs. The Fish and Wildlife Service is cooperating by attempting

to propagate winter-run stock from the Sacramento River at Coleman National Fish Hatchery. Service biologists also are conducting various studies to determine measures to restore the winter-run.

Under Section 7 of the Endangered Species Act, interagency consultations on the restoration plan will be conducted to consider whether additional conservation measures are needed. Consultations are being conducted with the U.S. Army Corps of Engineers on the effects of gravel dredging and with the Pacific Fishery Management Council on the effects of sport and commercial fishing.

The incidental take of chinook salmon during sport and commercial fishing is not considered a primary cause for the winter run's decline; therefore, the emergency listing rule contains a provision exempting fishermen who incidentally take salmon from the winter run while fishing lawfully under applicable State and Federal regulations.

The Critical Habitat designated in the emergency listing rule includes the Sacramento River channel and adjacent riparian zones from the Red Bluff Diversion Dam (River Mile 243), Tehama County, upstream to the Keswick Dam (River Mile 302), Shasta County.

## Regional News

(continued from previous page)

shade on their nest cliffs. In a few cases, they ended up falling. Although the observers were able to capture these chicks and return them to their cliff nest, one eaglet died from injuries suffered in the fall.

\* \* \*

The loach minnow (*Tiaroga cobitis*) population in the East Fork and mainstem White Rivers on the White Mountain Apache Indian Reservation in Arizona was sampled during the summer and fall of 1989. Not much was known about this population, which was rediscovered in 1985. As a result of the study, the loach minnow appears to be much more abundant and widespread in the East Fork than previously thought. More work needs to be done to determine the downstream limits of the fish in the mainstem and its distribution in the North Fork.

\* \* \*

Surveys conducted in 1989 show the status of the Gila topminnow (*Poeciliopsis occidentalis*) to be declining. In Arizona, this Endangered fish apparently is extirpated from 2 of the 11 sites where it once naturally occurred. One disappearance is due to an invasion of competing mosquitofish (*Gambusia affinis*) and the other was the result of unknown factors. Mosquitofish also have invaded a third site

from which they had been removed several years ago, and their return could threaten the native topminnow population there as well.

The 1989 surveys also found that 14 reintroduced Gila topminnow populations have failed since the last survey in 1987. There remain approximately 50 topminnow populations, many of which are located in aquaria and other captive facilities. Several of the wild populations were introduced in 1989, including the first in the topminnow's historic range in New Mexico. The status of the topminnow in the Mexican portion of its range is believed to be stable, but information is sketchy.

\* \* \*

A second year of below average rainfall in Arizona has adversely affected the habitat of two Endangered small mammals, the Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*) and the Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*). Dry conditions have restricted the moist seep and spring-side habitats of the vole in the Hualapai Mountains, further restricting and isolating the vole populations. In the Pinaleno Mountains, the drought is believed to have contributed to the failure of the Englemann spruce (*Picea engelmannii*) and corkbark fir (*Abies lasiocarpa* var. *arizonica*) cone crops, the primary winter food for the Mount Graham red squirrel.

This is the second year in a row that the spruce-fir cone crops have failed. Trials to assess the usefulness of artificial feeding are under way. If Arizona's dry conditions persist into the 1990's, as climatologists predict, additional measures may have to be considered to ensure the survival of both the Hualapai Mexican vole and the Mount Graham red squirrel.

\* \* \*

Status surveys have been initiated for two caddisflies (*Metrichia volada* and *Protopila balmorhea*), one amphipod (*Crangonyx gracilis* ssp.), and one snail (*Pyrgulopsis morrisoni*) at the Page Spring/Bubbling Springs/Oak Creek aquatic complex in central Arizona. With the exception of *Protopila balmorhea*, these species are thought to be localized endemics. Records of *P. balmorhea* indicate it is found at this site and at one other spring system in West Texas. Development, recreational use, and the planned expansion of a State fish hatchery threaten the habitat of these species.

\* \* \*

The northern aplomado falcon (*Falco femoralis septentrionalis*) inhabits savanna and desert grasslands of the Neotropics. Its range once extended as far north as southern Texas, New Mexico, and southeastern Arizona. This subspecies disappeared from the United States by the late 1940's, probably due to

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# Pacific Flying Foxes Surveyed

Don E. Wilson

Biological Survey, National Ecological Research Center  
National Museum of Natural History

Biologists from the U.S. Fish and Wildlife Service's Honolulu, Hawaii, Field Office and Biological Survey Office (Washington, D.C.) recently surveyed fruit bat populations in American Samoa, Western Samoa, and Fiji. These large, fruit-eating mammals are often called flying foxes. The Service's Office of Scientific Authority recently supported moving several species of fruit bats protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) from CITES Appendix II to the more protective Appendix I and adding all remaining species of the genus *Pteropus* to Appendix II. This was in response to a growing demand for importation of these animals to Guam, where they are a traditional delicacy. The Service is particularly interested in the status of the Samoan fruit bat (*Pteropus samoensis*).

One objective of the surveys was to determine the status of a subspecies of *P. samoensis* endemic to Fiji. Service biologists were joined by research staff from Bat Conservation International for surveys on Viti Levu, the major island in the Fiji group. A rough assessment of the habitat potential suggested that both *Pteropus samoensis* and *P. tonganus*, the Pacific flying fox, should continue to do well on Fiji. The team found large numbers of *P.*

*tonganus* and fewer, but significant, numbers of *P. samoensis*.

The Service has been concerned with the status of flying foxes in American Samoa since the early 1980's, when botanical researchers suggested that drastic declines had occurred. A subsequent petition to list *P. samoensis* as Endangered led to a survey of the populations in American and Western Samoa. As a result of that survey, the petition was ultimately found to be "not warranted," but controversy over the species' status continued and a plan to resurvey the areas was developed.

In both Western and American Samoa, sites that had been surveyed in 1986 were revisited to assess population trends for both species. Data were gathered using the same methodology. The team found that both species were numerous and that there apparently is little immediate danger of extinction.

Overall results for 49 sites surveyed for *P. samoensis* showed a total of 242 bats in 1986 and 176 in 1989. The bulk of this decrease was at 17 sites on the island of Upolu in Western Samoa, where the total dropped from 96 in 1986 to 29 in 1989. Upolu has a high human population and the terrain favors clearing for plantations, which has resulted in considerable habitat loss for the bats. Several important new

sites with high bat population densities were found on Savaii, the other island of Western Samoa. The government of Western Samoa has taken steps to reduce the take from hunting by restricting the season on fruit bats.

In American Samoa, on the main island of Tutuila and the smaller islands of Ofu, Olesega, and Ta'u, the outlook was considerably better, with population numbers stable or slightly increasing. In 1987, a typhoon devastated these islands, but the population has recovered from any losses sustained at that time.

In both American and Western Samoa, concern for the fruit bats has been conveyed to the general public quite effectively. On all islands visited, residents were knowledgeable about the plight of the bats, and frequently were aware of steps being taken to ensure bat survival. Conservation efforts will continue. A meeting in Honolulu in February 1990 allowed appropriate representatives from most of the Pacific islands to discuss management concerns for fruit bats. That meeting was made possible by Bat Conservation International, with logistic support from the Fish and Wildlife Service and considerable input from the academic and conservation communities.



Many tropical plants depend on fruit bats like the Samoan flying fox for pollination and seed dispersal. People donating \$6.50 or more to the protection of the 30,000-acre Falealupo lowland rainforest in Western Samoa, which contains important fruit bat habitat, can receive a 16.5 by 27-inch color edition of the above poster. Donations can be sent to the Botany Department (attn: Janice Jutila), Brigham Young University, Provo, Utah 84602; make checks payable to "Brigham Young University—Falealupo Rainforest."

# Endangered Mussel Studies on the Upper Mississippi River

Leslie E. Holland-Bartels  
National Fisheries Research Center  
La Crosse, Wisconsin

The National Fisheries Research Center in La Crosse, Wisconsin, recently completed studies on the habitat needs, host fish requirements, and early life history of the Higgins' Eye pearly mussel (*Lampsilis higginsi*). This Endangered mollusk is found only in the upper Mississippi River.

All hosts identified for the parasitic larval stage of the Higgins' Eye pearly mussel in laboratory studies are perciform fishes common to abundant in much of the upper Mississippi River. They include the walleye (*Stizostedion vitreum*), sauger (*S. canadense*), largemouth and smallmouth bass (*Micropterus salmoides* and *M. dolomieu*), white bass (*Morone chrysops*), and freshwater drum (*Aplodinotus grunniens*). The identified host fishes for the Higgins Eye mussel are the same ones needed by the closely related pocketbook mussel (*Lampsilis cardium*).

Juvenile Higgins' Eye pearly mussels were routinely produced in large numbers at the laboratory using hatchery-reared largemouth bass and walleye as hosts. Metamorphosed juveniles were maintained easily for 2 weeks with minimal mortality, but rearing of young for longer periods has been relatively unsuccessful.

The Center also found that habitat characteristics of adult Higgins' Eye mussels do not vary noticeably from those of many common species of mussels in the upper Mississippi River. Adult Higgins' Eye mussels were found in a wide range of main channel border habitats with various current velocities and sediment types. However, the mussel was most common at sites where summer currents ranged from 0.5 to 0.7 feet per second and where there were medium-fine to fine sand substrates. These are common habitats in the main channel border area throughout much of the upper Mississippi River. Therefore, it appears unlikely that a lack of suitable hosts or habitat is responsible for the observed sparse distribution of this species. How host fish distribution

relates to the distribution of the Higgins' Eye pearly mussel is still unknown, but it may be that there is an insufficient overlap of the range of the mussel and its needed hosts. This hypothesis remains untested and is difficult to study directly in the large Mississippi River system, but it may be supported by the abundance of the pocketbook mussel, which has similar hosts but prefers coarser substrates.

It has been hypothesized that habitat requirements for juveniles may be limiting factors for many species. Unfortunately, it was not possible to distinguish larval and early juvenile Higgins' Eye pearly mussels from pocketbook mussels and other common lampsilid mussels under light microscopy. It is possible to use scanning electron microscopy to distinguish among juveniles of different species on a statistical basis, but even then individual specimens cannot be identified with certainty. Thus, field verification of hosts and identification of juvenile habitat needs for the Higgins' Eye pearly mussel in the upper Mississippi River appear to be impractical at this time.

## Evaluating Translocation Strategies

Brad Griffith<sup>1</sup> and J. Michael Scott<sup>2</sup>

Many endangered species recovery plans include options for translocating (reintroducing) species into their former ranges. (In unusual cases where the historical range no longer contains suitable habitat, a plan may recommend introducing a species into a new range.) Most recovery plans, however, do not quantitatively assess the probability that translocation will result in a self-sustaining population, nor do they evaluate alternate translocation strategies.

Translocation success and strategies can be evaluated with replicated experimental releases or simulation modeling, but these approaches are complex, time consuming, and often impractical for extremely rare organisms. Alternatively, managers can estimate success and evaluate strategy by examining the outcome of similar translocations.

In a recent article, Griffith et al. (1989) analyzed contemporary (1973-1986) translocations of native birds and mammals in Australia, Canada, New Zealand, and the United States. Factors associated with successful translocations were identified, and regression models were presented for use in predicting the probability of success from alternate translocation strategies prior to testing them in the field.

Estimated translocation success rates varied widely (from less than 10 percent to greater than 90 percent) depending on the type of animal involved and the condi-

tions of release. Releasing small numbers of captive-reared Threatened, Endangered, or other vulnerable animals over a short time in areas of fair or poor habitat quality on the periphery or outside of their historical ranges, and where there were physically similar competitors present, was the least (less than 10 percent) successful approach. Releasing large numbers of wild-caught native game animals over several years into the core of the species' historical ranges in areas of high habitat quality, and where there were no physically similar competitors, was most (more than 90 percent) successful. Among wild-caught animals, translocations of animals from growing populations of moderate or high density were more successful than were translocations from low density, declining populations. Herbivores were translocated more successfully than carnivores or omnivores.

The success rate from releasing larger numbers of animals quickly leveled off, indicating that: 1) there is an optimum number of animals that should be released for specific situations, and 2) releasing more than the optimum number does little to increase the success of translocations. For translocations in the core of a species' historical range, the optimum number for release ranged from 80-120 for Threatened, Endangered, or other vulnerable birds to 20-40 for native game mammals.

Without high habitat quality, translocations had a low chance of success regardless of how many animals were released or how well they were conditioned. This reinforces the need to ameliorate the factors responsible for the species' original decline before attempting to reestablish a self-sustaining population. Species recovery through translocation is likely to work only in exceptionally favorable circumstances. Establishment of multiple captive breeding populations should be considered, and adequately planned for, long before translocation becomes a last resort for recovering a rare species. This will ensure that a single event could not cause the entire captive stock to become extinct. It should also help to build sufficient numbers for multiple releases, thereby increasing the chances of a successful translocation.

Griffith, B., J. M. Scott, J. W. Carpenter, and C. Reed. 1989. Translocation as a species conservation tool: status and strategy. *Science* 245:477-480.

<sup>1</sup>Assistant Leader (Wildlife), Maine Cooperative Fish and Wildlife Research Unit, University of Maine, Orono, Maine 04469

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photo by Don Bleitz

*The golden-cheeked warbler, a candidate for Endangered Species Act protection, has a restricted breeding range. It is reported to nest only in timbered parts of the Edwards Plateau region of south-central Texas. Some of its nesting habitat may receive protection under the Austin Regional Habitat Conservation Plan.*

## Austin Regional Plan (continued from page 1)

incidental take will not appreciably reduce the likelihood of the species' survival and recovery. The accompanying table provides an outline of some previous Habitat Conservation Plans.

### Austin Regional Plan

Acquisition of a habitat preserve in the Austin area is a likely cornerstone of mitigation measures that will be outlined in

the Regional Plan. The acquisition may require a mix of private, local, and Federal funding. Other anticipated provisions will encourage developers to incorporate on-site mitigation as part of their projects, to the extent practical, and to contribute toward acquisition of the preserve. Development of the Regional Plan requires extensive coordination, and is expected to take up to 2 years to complete.

The Service must determine whether issuing a Section 10(a) permit would be controversial or would be "a major Federal action significantly affecting the quality of the human environment." If either criterion is met, the Service will

likely publish an Environmental Impact Statement (EIS). Considering the potentially broad effects of the proposed permit and the public debate that will likely ensue, an EIS may indeed be necessary. The Service will also be required to conduct an internal, formal, Section 7 consultation under the Endangered Species Act prior to issuing the permit.

Austin's economic prosperity in the 1970's and early 1980's was reflected in numerous development projects, proposals, and plans as the business community took action to accommodate population growth. As land development projects and roads multiplied, habitat for the native wildlife was often damaged or even eliminated. The cumulative effects have contributed to the decline of the listed species covered by the Regional Plan. However, through careful planning to minimize the incidental take of listed species, secure a portion of the species' habitat, and compensate for take that does occur, it is possible that this trend can be reversed.

Interpretation of what constitutes take has been problematic, and is likely to require a case-by-case analysis wherever proposed development actions have the potential to impact listed species. For example, destruction of black-capped vireo breeding territories would clearly constitute taking. However, there are no definitive data on the extent to which small development actions adjacent to or surrounding these relatively small territories could affect the birds; in the extreme, such activity could render the territory unsuitable for vireos.

Austin's environmental community, development interests, and government agencies have undertaken an effort that, if successful, will benefit them all, and improve the outlook for some listed species as well. Implementation of the Regional Plan can provide a lasting framework for avoiding conflicts and, at the same time, conserving endangered species.

It is important to note, however, that factors beyond the Austin area could influence the fate of some species covered by the Regional Plan. For example, the black-capped vireo and the golden-cheeked warbler are both migratory species. The vireo winters on the west coast of Mexico, with the center of the range in the states of Sinaloa and Nayarit. The warbler spends the winter in the highlands of southern Mexico, Guatemala, Honduras, Nicaragua, and possibly Belize. Conservation of wintering habitat will be essential for the survival of these and other migratory birds.

<sup>1</sup>Division of Endangered Species and Habitat Conservation, Washington, D.C.

<sup>2</sup>Fort Worth, Texas, Ecological Services Office

# Examples of Habitat Conservation Plans

Plan Area	San Bruno Mountain California	Coachella Valley California	North Key Largo, Florida	Laguna Niquel California
Planning Committee Members	Cities, county, private landowners, FWS, State, conservation group	Cities, 2 conservation organizations, and Federal and State agencies	Primarily local developers	Federal, State, and local agencies, industry, and conservation group
Listed Species Covered by Plan	Butterfly	Lizard	Butterfly, 2 mammals, American crocodile	Least Bell's vireo [other species (candidate) considered but incidental take only for vireo]
Plan Status	Complete 3+ years	Complete 2+ years	2+ years (then process abandoned)	Ongoing
Plan Features	Preserved 86% of butterfly's habitat  Private land conveyed to city  Funding from developers to allow continued management  2-year study involving 50 field personnel  Resulted in enhancement of butterfly's survival	Preserves 11% of remaining occupiable habitat  Funding from government, developers, and conservation organizations acquired preserves	Clustered Development  Pesticide restrictions and other management  Government financing of habitat acquisition  No conclusion about long term effect of taking  There was no commitment from a local government to hold the permit	Habitat involved is covered under Section 404 of the Clean Water Act  Acquisition or zoning to compliment public ownership along a riparian corridor  Loss of some habitat not essential to the corridor  4 separate plans under 1 umbrella

## Prairie Dawn-- A New Common Name for an Uncommon Plant

**Julie Massey**  
Clear Lake, Texas,  
Ecological Services Field Office

*Hymenoxys texana*, the scientific name for one of Texas' endangered wildflowers, is a useful term for botanists, but admirers of this species decided that it needed a descriptive common name as well. Elementary school children in the Houston, Texas, area had a chance last year to create a common name and, at the same time, learn more about the conservation of rare plants and animals.

The Service's Clear Lake Field Office sponsored a poster contest to name the species, attracting over 250 entries from the 12 schools that participated. Separate prizes were awarded for the best name, best explanation of a proposed name, and best poster. The contest judges included representatives of the Texas Parks and Wildlife Department, U.S. Army Corps of Engineers, and Mercer Arboretum, which is conducting research on cultivation of the species.

Entries for a new common name ranged from "Yellow Stud" to "Texas Moon Dance," but Shataria Green, a sixth grader, won with "Prairie Dawn." Eric Craft won the prize for best poster. Another student, Alison Gadinez, won a prize for the explanation of her proposed name for the plant:

"I named the *Hymenoxys texana* the Lemon Drop because it has a lemon-like top and if you were to put the leaves that are on the bottom at the top it would look like a regular wildflower but they're at the bottom so you could say they dropped, and that's why I called it the Lemon Drop."

The contest provided an excellent opportunity for the Service to educate the children of Houston on the rare plants and animals of their area; slide shows on endangered species conservation were shown to more than 2,200 students. Their interest in the Prairie Dawn will be important for the long-term survival of this and other vulnerable species.



***Hymenoxys texana*, a rare Texas plant, was given the common name of "Prairie Dawn" for its bright yellow flowers.**

drawing reprinted from *Endangered, Threatened, or Protected Plants of Texas* with permission



# Listing Protection is Proposed for Two Animal Species

Two species of animals that now occur only in foreign countries were proposed recently by the United States for listing protection under the Endangered Species Act:

## White-necked Crow (*Corvus leucognaphalus*)

An island dwelling bird, the white-necked crow originally inhabited the forests of Haiti, the Dominican Republic, Puerto Rico, and St. Croix in the U.S. Virgin Islands. Due to habitat destruction and hunting, however, this species has been eliminated from almost all of its former range in the United States. Threats to the remaining birds and their habitat prompted the Fish and Wildlife Service to propose listing the white-necked crow as an Endangered species (F.R. 12/27/89).

The white-necked crow resembles the crows of the mainland United States, but it is distinguished by the pure white base of the feathers on the nape of its neck. Although crows are generally considered highly adaptable birds that can thrive in a variety of habitats, even if extensively disturbed by people, those species that are endemic to island ecosystems often cannot tolerate habitat alteration or close human activity. The Hawaiian crow (*Corvus hawaiiensis*) and Mariana crow (*Corvus kubaryi*) are examples of island crow species that are in danger of extinction from these factors.

The white-necked crow seems to thrive only where there are extensive growths of natural forest, and to disappear when the forests are cut down. This bird was extirpated from St. Croix long ago, and the last sighting on Puerto Rico was in 1963. Apparently, the white-necked crow still occupies remnants of forest in Haiti and the Dominican Republic, which share the island of Hispaniola. However, the same process of deforestation that eliminated the species elsewhere threatens these remaining birds.

Although habitat loss is the main problem, hunting has been a contributing factor. White-necked crows are considered to have good-tasting meat, and the species was extensively taken as a game bird on Puerto Rico and Hispaniola. Pressure on dwindling populations increased as the clearing of forests made the crows more accessible to hunters.

Although the Endangered Species Act does not provide protection from habitat loss or hunting in other countries, the Service hopes that recognizing the white-necked crow as an Endangered species will encourage local conservation efforts. In the event that the species is rediscovered or reintroduced in Puerto Rico and is therefore under U.S. jurisdiction, the white-necked crow and its habitat will receive full Endangered Species Act protection.



photo by E. S. Herald

*The Indus River dolphin, sometimes called the blind dolphin, has only rudimentary eyes that cannot resolve images but may be able to detect light. It is believed to navigate its turbid riverine habitat by means of echolocation. The above immature female shows the species' distinctive gar-like snout.*

## Indus River Dolphin (*Platanista minor*)

Known only from Pakistan, this freshwater dolphin historically occurred throughout the Indus River and up into the Sutlej, Ravi, Chenab, and Jhelum Rivers to the foothills of the Himalayas. Today, however, the species survives only in the middle section of the Indus River. In the November 9, 1989, *Federal Register*, the National Marine Fisheries Service proposed to list this species as Endangered.

A series of dams have divided the total population into six isolated subpopulations, at least two of which are on the verge of extirpation, and diversions of water have decreased the dolphin's dry-season range. Over-exploitation of these animals for their meat and oil has been another major factor in the decline. The establishment of one or more dolphin reserves and better enforcement of local restrictions on dolphin hunting are urgently needed to prevent the species' extinction.

## Travelling Exhibit on Bears Tours Nation

The nation's first major exhibit on the black bear (*Ursus americanus*) and the Threatened grizzly bear (*Ursus arctos*) is beginning a 3-year tour of the United States. Almost 5 years in the making, "Bears: Imagination and Reality" was put together by the Science Museum of Minnesota—the same museum that developed the award-winning "Wolves and Humans" exhibit. The new exhibit will explore bear behavior, natural history, and management, and will examine the role of bears in art, myth, folklore, literature, and history. It includes over 25 taxidermic displays, North American Indian artwork and artifacts, films, videos, touch-and-feel objects, computer games, a live

theatre presentation on bear-human issues, and material for schoolchildren and teachers. A section in the exhibit will examine human-caused bear mortality, habitat issues, bears on public and private lands, and the survival prospects for six other bear species worldwide.

"Bears: Imagination and Reality" opens at the Science Museum of Minnesota in Saint Paul on February 17 and runs through December 1990. From there, the exhibit will tour museums in Yellowstone National Park, Indianapolis, Boston, Boise, Green Bay, Denver, New York, Cincinnati, Philadelphia, and Washington, D.C. At least 10 more museums are on a waiting list for the exhibit.

# Current Status of the U. S. Ginseng Export Program

S. Ronald Singer<sup>1</sup>

Ginseng (*Panax* spp.) root is believed by some people to hold potent curative effects. It is consumed in teas, powders, and pills for a variety of ills or as a preventative medicine. Consequently, ginseng is a commercially valuable product and is widely traded. Demand is greatest in the Orient, although ginseng is used in many regions.

American ginseng (*Panax quinquefolius*) was placed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to manage exports and avoid depletion of wild populations. Accordingly, wild and cultivated American ginseng may only be international traded under CITES regulations. The cultivated form is usually priced at 75 to 80 percent below the cost of the wild root.

Wild ginseng may be exported from the United States only if the CITES Management Authority is satisfied that the specimens were legally obtained and the CITES Scientific Authority has determined that harvest for export will not be detrimental to the survival of the species. For exports of cultivated ginseng, a Certificate of Artificial Propagation may be issued by the Management Authority upon proof that the specimens were propagated in accordance with the provisions of CITES. In the United States, both the Management Authority and Scientific Authority are within the Fish and Wildlife Service.

While ginseng export is controlled by Federal law, the Department of the Interior's position is that States control and regulate the management, taking, and possession of resident species within State boundaries. Therefore, each State has been allowed to develop its own ginseng management and certification programs, provided that these programs satisfy the Service's export requirements.

A September 1, 1987, *Federal Register* notice discussed Management Authority requirements that all wild and cultivated ginseng for export from the U. S. is to be State-certified as to: whether it is wild or cultivated; whether it was legally taken; State of origin; year of harvest; and weight of shipment. States were urged to establish conservation programs and regulations that would enable the Scientific Authority to make appropriate findings for ginseng export.

Beginning with the 1982-1984 ginseng harvest seasons, the Service began to issue multi-year export findings. Such multi-year findings are beneficial because they allow ginseng export for 3 years without annually requalifying State ginseng programs. All State ginseng programs were reevaluated in 1985 and again in 1988, with export approval granted to qualifying States for the succeeding 3-year harvests.



photo by S. Ronald Singer

**Wild ginseng often has roots that are shaped somewhat like a human figure.**

Legally obtained ginseng from export-approved States in an approved year may enter international trade at any time, provided that the export is accompanied by valid U. S. Department of Agriculture and CITES permits, a State certificate of origin, and a signed shipper's invoice. Thus, for example, ginseng harvested and certified during 1985 in compliance with CITES regulations could be exported from an approved port in 1989, if accompanied by a current CITES ginseng export document for 1985 ginseng, a valid 1985 State certificate of origin, a permit from the Department of Agriculture, and a shipper's invoice for the export.

American ginseng is grown extensively in China, Korea, and other parts of the

world from seed exported from the United States. Roots from these plants are now entering international trade and vying with the American-grown crop for the market. Although the supply of cultivated ginseng is increasing, making this form less expensive to users, there will likely always be a market for wild ginseng. Many people believe that only the wild root is the "real" ginseng. Thus, the demand for wild American ginseng root will probably continue to put stress on natural populations in North America.

<sup>1</sup>Formerly with the Service's Office of Management Authority, Ron Singer is now located in the Division of Endangered Species and Habitat Conservation.



photo by S. Ronald Singer

**Cultivated ginseng produces large, fleshy roots that are usually readily discernable from those of the more slowly growing wild plants.**



## Regional News

(continued from page 3)

the effects of livestock overgrazing and brush encroachment on its habitat. It was listed in 1986 as Endangered. (See story in BULLETIN Vol. XI, No. 3.)

The Santa Cruz Predatory Bird Research Group of The Peregrine Fund began releasing aplomados in 1985 at Laguna Atascosa National Wildlife Refuge in southern Texas. Nineteen birds have been released there, and 16 are known to have successfully dispersed. Of the seven birds hacked in 1989, however, two were killed by barn owls. Aplomados have now been sighted nearly year-round in the release area. A male released in 1988 returned to the hack site in 1989 and remained there through that season's release, roosting and feeding with the young birds.

Releases at the refuge are planned for several more years. As production increases at Santa Cruz, releases may be expanded to Arizona and New Mexico.

**Region 4**—The U.S. Forest Service has initiated efforts to augment small red-cockaded woodpecker (*Picoides borealis*) populations by transplanting juvenile females to colonies that contain single adult males. The Southeastern Forest Experiment Station developed the transplant technique, and experimentally transferred two juvenile females from the Francis Marion National Forest in South Carolina to two single male colonies at the Department of Energy's Savannah River Plant. Both transplants were successful, resulting in pairing and breeding. The Forest Service subsequently conducted six more transplants. One transplant involved subpopulations located in the Georgia piedmont, where woodpeckers were transferred from the Piedmont National Wildlife Refuge to the Oconee National Forest.

The other five transplants were between separate populations: two from the Kisatchie National Forest in Louisiana to the DeSoto National Forest in Mississippi; two from the Sam Houston National Forest to the Davy Crockett National Forest in Texas; and one from the Apalachicola National Forest to the Ocala National Forest in Florida. All of the transplanted birds were successful in pair bonding. Since most of the transplants were made late in the year, they could not be evaluated to determine whether breeding had occurred. However, the Oconee National Forest transfer was earlier in the year and those birds attempted to breed during the nesting season. All of these transplants have prevented colony abandonments, and have the potential to increase the number of red-cockaded woodpecker breeding colonies and enhance genetic diversity.

Robert Brannon, an officer of the Mississippi Department of Wildlife, Fisheries and Parks, recently arrested two

individuals for possession of 11 gopher tortoises (*Gopherus polyphemus*). The tortoises were taken from the DeSoto National Forest in Green County, Mississippi, where the species is protected both under Federal law as a Threatened species and under State law. The two men were prosecuted in Green County Justice Court, convicted, and fined \$1,200 each under the Mississippi Endangered Species Act.

During the Great Depression, the gopher tortoise was a significant food item for some people in the southeast, as reflected in its nickname—the "Hoover Chicken." Taking gopher tortoises from their burrows by "pulling" (use of a long flexible rod) remains a tradition in many rural areas throughout the species' range. The gopher tortoise is often unable to overcome the effects of even limited taking because of its low reproductive rate, the naturally high mortality of eggs and young, and the length of time required to reach sexual maturity. The fact that many gopher tortoise populations are in degraded habitats may further exacerbate the effects of taking.

**Region 5**—Eight of the 10 known sandplain gerardia (*Agalinis acuta*) populations in Massachusetts, Rhode Island, New York, and Maryland apparently grew from 1988 to 1989. Four of the populations were at 6-year highs, and three others had their second-best year since 1984. The two Massachusetts populations numbered 314 and 45 plants, which were the highest recorded counts for these sites. The Rhode Island site, which was discovered in October 1988, had 40 plants.

Although 1989 apparently was a good year for this Endangered plant, no new sites were discovered in spite of intensive searching. Also, one population on Long Island, New York, experienced a major decrease (from 266 plants in 1988 to 6 in 1989) when it was inadvertently covered with about 18 inches (46 centimeters) of 1-inch (2.5-cm) stone for about a week in April. The stones were placed along a railroad right-of-way to prevent the growth of weeds. However, the fact that six plants flowered and formed fruit was deemed encouraging for the future of the site. The completion of a recovery plan in November 1989 should help to prevent incidents like this in the future.

**Region 6**—The Cabinet/Yaak Grizzly Bear Management Citizens Involvement Group has endorsed the plan to augment the declining grizzly bear (*Ursus arctos*) population in the Cabinet Wilderness Area in northwestern Montana. The plan, which calls for the relocation of two wild grizzly bears from British Columbia, Canada, into the Montana wilderness area, was halted 2 years ago due to concerns about the effect of the relocation on the local economy and fears about public safety. With the aid of a pamphlet and slide show, the citizens involvement group was able to inform local citizens about grizzly bear

management and satisfy concerns regarding the augmentation proposal. Relocation of the bears is scheduled to occur in the summer of 1990.

Fall of 1989 marked the twenty-ninth whooping crane (*Grus americana*) migration monitored by the Cooperative Whooping Crane Tracking Project. The Service's Grand Island, Nebraska, Field Office is responsible for collecting data on the location of whooping cranes during migration. The first confirmed observations of migrant whooping cranes were recorded September 2 in Canada and September 17 in the United States. Sightings during the fall migration were reported from: Canada (37), North Dakota (4), Montana (1), South Dakota (2), Nebraska (5), Kansas (3), Oklahoma (2), and Texas (2). As of December 13, 1989, 146 whooping cranes were reported at Aransas National Wildlife Health Refuge in Texas.

A new livestock enclosure fence was erected this summer by the U.S. Forest Service around the Kendall Warm Springs, located along the upper Green River north of Pinedale, Wyoming. The springs are the only remaining habitat of the Kendall Warm Springs dace (*Rhinichthys osculus thermalis*), an Endangered fish. An old, dilapidated fence had been allowing livestock to reach the springs, thus reducing the water quality.

**Region 8**—During the final week of the deer-hunting season in Minnesota, four radio-collared gray wolves (*Canis lupus*) were shot in Superior National Forest. One of the animals had been studied since 1981. The Service's Division of Law Enforcement is investigating the incidents. Publicity from the cases led private individuals to offer a reward of \$3,000 for information leading to the first conviction of the wolf killers.

The Service's National Wildlife Health Research Center in Madison, Wisconsin, performed a necropsy examination of the juvenile red wolf (*Canis rufus*) that was killed by a car last November on Alligator River National Wildlife Refuge, North Carolina (see BULLETIN Vol. XIV, Nos. 11-12). The examination found that this wolf had a wide variety of parasites, including numerous heartworms (*Dirofilaria immitis*). Heartworm is a slowly progressive, frequently fatal infection transmitted by mosquitoes. This could be of particular concern in terms of the health of the other red wolves on the refuge.

The Service's National Fisheries Research Center at Gainesville, Florida, is conducting basic ecological research on the Endangered boulder darter (*Etheostoma [Nothonotus] sp.*), found in south-central Tennessee, and the Endangered Okaloosa darter (*Etheostoma okaloosae*), found in Florida's western

(continued on page 12)

# Expanding the Range of The Endangered Species Technical Bulletin

In 1981, cuts in the U.S. Fish & Wildlife Service budget forced the Office of Endangered Species to limit distribution of the Endangered Species Technical Bulletin. Prior to the cutbacks the bulletin was sent free of charge to anyone who wished to receive it. Since 1981, however, the Service has been able to distribute the bulletin to only federal and state agencies and official contacts of the Endangered Species Program.

The Endangered Species Update fills the gap left by this budget crunch. Published by the School of Natural Resources at The University of Michigan, the Update is part of a reprint program initiated in 1983. Since its inception, the program has established itself as an important forum for information exchange on endangered species issues. In addition to providing a reprint of the latest issue of the ESTB, the Update includes:

**A Feature Article** - concerning research, management activities, and policy issues for endangered species protection. (Upcoming topics include the Alaskan oil spill and the EPA's proposed endangered species and pesticides program.)

**A Book Review** - covering a recent publication in the field of species conservation.

**Opinion Page** - containing editorials and essays about endangered species protection issues.

**Bulletin Board** - listing upcoming meetings, current announcements, and news items.

## NEW RATES

From its inception, the UPDATE has been subsidized by the School of Natural Resources. Unfortunately, due to rising publication costs, the School can no longer afford to supply this support. Thus revenues from the UPDATE must now cover all printing and postage costs. Consequently, as of December 1, 1989, subscription rates for the UPDATE were increased. The new rates are \$18 for students and senior citizens, and \$23 for others (add \$5 for postage outside the US).

While we regret the increase, it is necessary in order to keep this unique source of information available to all of those working in species conservation. Obviously, we will need your support to make this happen. If you know of anyone who might be interested in receiving the Endangered Species UPDATE, please pass on the subscription information. Every subscription is vitally important to the continued operation and improvement of the reprint program.



To receive the UPDATE (approximately 10 issues/year), the rates are \$18 for students & senior citizens (please enclose advisor's signature or proof of age), and \$23 for others. (Add \$5 for postage outside of the US.) Send check or money order (payable to The University of Michigan) to: The Endangered Species UPDATE  
School of Natural Resources  
The University of Michigan  
Ann Arbor, MI 48109-1115

Name \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_



## Regional News

(continued from page 10)

panhandle. The research on the boulder darter involves spawning behavior and habitat requirements. The Okaloosa darter research is focusing on the biological interaction of the species with the introduced and ecologically similar brown darter (*Etheostoma edwini*). The study shows that the pattern of displacement by the brown darter, first detected in the 1970's, is continuing. This displacement is the most significant form of habitat degradation for the Okaloosa darter.

The Gainesville Center, in cooperation with the Service's field offices in Panama City and Jacksonville, Florida, and Asheville, North Carolina, also is studying the distribution and status of two Category 2 fishes, the bighead redhorse (*Moxostoma* sp.) and Cherokee darter (*Etheostoma [Ulocentra]* sp.).

## Rare Lichens Project

A project to determine the status of the lichens of Hawaii and North America (north of Mexico) was begun recently by Mason E. Hale, Jr., and Sherry K. Pittam of the Department of Botany, Smithsonian Institution, in cooperation with The Nature Conservancy. The goal is to generate a list of lichens that are rare and in need of protection. When possible, potential threats to individual species, as well as factors such as geographic distribution and abundance, will be noted. Taxonomy will follow Egan's checklist (as revised). The information gained will be provided to the Conservancy, other conservation organizations, and land-management agencies.

Interested persons are invited to provide names of potentially rare or endangered species of lichens, with available supporting information, to Sherry K. Pittam, Rare Lichens Project, Smithsonian, Botany/NHB 166, Washington, D.C. 20560 (telephone 202/357-2545).

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES TOTAL	SPECIES WITH PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	32	19	241	6	2	23	323	25
Birds	60	15	145	7	3	0	230	59
Reptiles	9	7	59	13	4	14	106	23
Amphibians	6	0	8	4	1	0	19	5
Fishes	49	2	11	25	6	0	93	47
Snails	3	0	1	6	0	0	10	7
Clams	34	0	2	0	0	0	36	23
Crustaceans	8	0	0	1	0	0	9	4
Insects	10	1	1	7	0	0	19	12
Arachnids	3	0	0	0	0	0	3	0
Plants	163	6	1	46	7	2	225	102
<b>TOTAL</b>	<b>377</b>	<b>50</b>	<b>469</b>	<b>115</b>	<b>23</b>	<b>39</b>	<b>1073*</b>	<b>307 **</b>
Total U.S. Endangered 427      Recovery Plans approved: 256								
Total U.S. Threatened 138								
Total U.S. Listed 565								

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, 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.

\*\*More than one species are covered by some recovery plans, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

March 1, 1990

January 1990

Vol. XV No. 1

# ENDANGERED SPECIES

## Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

### Mercury Contamination: Another Threat to the Florida Panther

PUBLIC DOCUMENTS  
DEPOSITORY ITEM

MAY 29 1990

Dennis Jordan  
Florida Panther Coordinator  
Florida Cooperative Fish and Wildlife Research Unit

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One of the Nation's most critically endangered animals, the Florida panther (*Felis concolor coryi*) is believed to number only 30 to 50 animals in the wild. Habitat loss, a reduction in the prey base, and the killing of panthers by people led to this subspecies' decline. Recently, information has emerged that indicates another potentially serious threat: contamination from mercury, a toxic metal. Extremely high levels of mercury—over 100 parts per million (ppm)—have been found in the liver of a panther that died in the Everglades last summer. Until her death in July, the 4-year-old female (known to researchers as #27) had been radio-tracked by Everglades National Park personnel daily for about 15 months.

Interest in mercury contamination issues has been growing in Florida over the past year. In 1989, the Florida Department of Health and Rehabilitative Services issued area-specific human health advisories regarding the consumption of fish. The current U.S. Food and Drug Administration action level for mercury in fish is 1.0 ppm, and concentrations as high as 4.4 ppm have been documented in largemouth bass (*Micropterus salmoides*) filets from sites in southeast Florida.

Samples from one section of Everglades National Park exceeded 1.5 ppm. Collections by the U.S. Fish and Wildlife Service in 1989 from Loxahatchee National Wildlife Refuge were found to range from 0.5 to 1.5 ppm. Appropriate health advisories were issued for the refuge and park in conjunction with Health and Rehabilitative Services.

Concern is focusing on finding the source of the mercury contamination problem in Florida, which is not limited to the southern part of the State. In other States, pulp and paper plants, chlor-alkali plants, and coal-fired power plants have been implicated. These sources, however, evidently are not a problem in Florida. While no generally accepted explanation has surfaced, a hypothesis was suggested in a December 1989 report



Fish and Wildlife Service photo

*The Florida panther once occurred throughout Florida and from eastern Texas or western Louisiana through Arkansas, Mississippi, Alabama, Georgia, and parts of Tennessee and South Carolina. Today, however, it is believed to survive only in remote parts of south Florida.*

released by the Technical Subcommittee of the Florida Panther Interagency Committee. (The Committee, formed in 1986, includes representatives from the U.S. Fish and Wildlife Service, National Park Service, Florida Game and Fresh Water Fish Commission, and Florida Department of Natural Resources.) Its report suggests that the mercury could be coming from a natural source: the peat and muck soils that are common throughout Florida. These often flooded and highly anaerobic soils provide a suitable environment for the methylation of inorganic mercury.

Methylmercury, a product primarily of anaerobic bacteria, is the biologically active and toxic form of mercury; inorganic mercury, on the other hand, is considered to be biologically innocuous.

The slow oxidation of peat and muck soils by burning, draining, or other disturbances provides an avenue for methylmercury to enter the food web, where this contaminant accumulates in the predators of aquatic animals. While no research has yet been conducted in Florida to verify this hypothesis, studies in Finland, a country with one-third of its land covered in peat soil, have traced mercury contamination to various types of surface disturbances.

Concern about mercury contamination had not been directed toward Florida panthers until the death of #27. A necropsy showed no obvious cause of death, but subsequent screening for selected pesticides and heavy metals by a laboratory under contract to the Service

(continued on page 6)





## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1**—The Fish and Wildlife Service's Sacramento, California, Field Station staff responded to a request from the

Federal Energy Regulatory Commission (FERC) for reinitiation of formal consultation under Section 7 of the Endangered Species Act for the Mojave-Kern River-WyCal Pipelines. Three natural gas

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**Region 2**, P.O. Box 1306, Albuquerque, NM 87103 (505-766-2321); Michael J. Spear, *Regional Director*; James A. Young, *Assistant Regional Director*; Steve Chambers, *Endangered Species Specialist*.

#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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**Region 4**, Richard B. Russell Federal Bldg., 75 Spring St., S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, *Regional Director*; David Flemming, *Endangered Species Specialist*.

**Region 5**, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director*; Ralph Pisapia, *Assistant Regional Director*; Paul Nickerson, *Endangered Species Specialist*.

**Region 6**, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

**Region 7**, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Rowan Gould, *Assistant Regional Director*; Ron Garrett, *Endangered Species Specialist*.

**Region 8** (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sher, *Endangered Species Specialist* (703-358-1710).

pipelines are being proposed by the applicants, two coming from Wyoming and the other from Arizona. They would converge in the Mojave Desert and cross the Tehachapi Mountains, ending in Kern County, California.

The Service had originally consulted with FERC on the pipelines in August 1987, resulting in a Biological Opinion that the project, as proposed, would jeopardize the clay phacelia (*Phacelia argillacea*), Uinta Basin hookless cactus (*Sclerocactus glaucus*), spineless hedgehog cactus (*Echinocereus triglochidiatus* var. *inermis*), San Joaquin kit fox (*Vulpes macrotis mutica*), giant kangaroo rat (*Dipodomys ingens*), blunt-nosed leopard lizard (*Gambelia silus*), and desert tortoise (*Gopherus agassizii*). After implementing the "reasonable and prudent alternatives" specified in the jeopardy opinion, the pipeline companies applied to FERC to amend portions of the original pipeline proposal. Since the original Biological Opinion was issued, the Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) was listed and the Mojave population of the desert tortoise was emergency-listed by the Service. In light of these changes, FERC has reinitiated Section 7 consultation on the pipelines. The Service's Sacramento Office is evaluating the effects of the pipelines and negotiating with the companies to mitigate impacts to the listed species. It will issue a revised Biological Opinion on the pipelines later this year.

In response to requests from local government planning agencies, development companies, and other groups, the Service's Laguna Niguel and Ventura (California) Field Stations have prepared 1:100,000-scale maps showing their best estimate of the current distribution of desert tortoises in California. These maps are intended to assist all affected parties in avoiding the potential take of this Endangered species. Narratives also were prepared to interpret the maps and provide recommendations on what kind of surveys would be appropriate to determine if tortoises are present on any given parcel of land.

The U.S. Coast Guard has initiated formal Section 7 consultations with the Service on the potential effect of proposed shipping lanes off the California coast on southern sea otters (*Enhydra lutris nereis*). After a December 5, 1989, meeting with the Service, the Coast Guard has agreed to provide data on the oil spill risk from the proposed lanes and develop a hypothetical lane with a 99 percent probability of oil spills not reaching the shore. Consequently, the consultation process has been placed on hold until the information is available.

(continued on page 4)



# Fish and Wildlife Service Undertakes Review of the Bald Eagle's Status

The Nation's symbol, the bald eagle (*Haliaeetus leucocephalus*), has received a great deal of attention since it was listed as one of the Nation's first Endangered species in 1967. The decline of this magnificent bird was traced to many factors, including habitat loss, disturbance of nest sites, and illegal shooting, but the greatest problem was environmental contamination by the organochlorine pesticide DDT. With the banning of DDT in 1972 and the efforts of Federal, State, and private agencies to protect eagles and their habitat, the species' numbers have increased from an estimated 400 nesting pairs in the 48 conterminous States in the early 1960's to over 2,660 nesting pairs in 1989. Currently, the eagle is still listed as Endangered in 43 States and Threatened in Washington, Oregon, Minnesota, Wisconsin, and Michigan.

In four of the five bald eagle recovery regions in the United States (i.e., Pacific Northwest, Southwest, Northern States, and Chesapeake Bay), the eagle has reached the goals in the respective recovery plans for reclassification from Endangered to Threatened. Eagle populations also have increased in the fifth recovery region, the Southeast, although the distribution of eagles over the 12 States involved is not yet satisfactory.

With the dramatic increase in bald eagle numbers, the Fish and Wildlife Service believes it is time to conduct a comprehensive review of the species' status and determine whether or not it should be proposed for reclassification from Endangered to the less critical Threatened category throughout its range. Before proposing such a change, however, the Service wants to be sure that it has the most up-to-date information available. Consequently, a notice of intent was published in the February 7, 1990, *Federal Register* to solicit additional information. The Service will review comments on this notice and the 1990 bald eagle breeding data before deciding on a reclassification proposal.

It is important to emphasize that the Service is not considering removing the bald eagle from the Endangered and Threatened Species List. Even if the species is reclassified to Threatened, bald eagles and their habitat would continue to receive protection under the Endangered Species Act, as well as two other Federal laws, the Eagle Protection Act and the Migratory Bird Treaty Act. Anyone taking, attempting to take, or otherwise illegally possessing a bald eagle or eagle products without a permit would be subject to the same penalties now in force. Section



photo by Mike Lockhart

**The status of the bald eagle has improved since the use of DDT was curtailed, but pressure on its habitat is a continuing concern.**

7 of the Act also would continue to protect this species from Federal actions that could jeopardize its survival. The Service will continue to work with Federal and State agencies and private groups to seek full recovery of the bald eagle.

Bald eagles in Alaska and Canada, where the species is considered relatively plentiful, are not listed as Endangered or Threatened. They are protected, however, by the Migratory Bird Treaty Act and, in Alaska, also by the Eagle Protection Act.

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## Listing Approved for Price's Potato-bean

The first final listing rule published in 1990 classified Price's potato-bean (*Apios priceana*) as a Threatened species. A member of the pea family (Fabaceae), this twining perennial vine grows up to 15 feet (5 meters) in length, has pinnately compound leaves, and bears greenish-white to purplish-pink flowers. It historically has been reported from 21 sites in 5 States, but apparently it survives at only 13 disjunct sites in Alabama (3 populations), Kentucky (3), Mississippi (4), and Tennessee (3). Only 5 of these sites support 50 or more plants, and the remaining sites have no more than 30 plants each.

Most of the populations occur on privately owned land, and many are declining. The survival of this species is threatened by habitat modification and loss due to cattle grazing/trampling, clearcutting, road improvements or right-of-way maintenance activities (such as herbicide application), urbanization, and vegetative succession.

The Service proposed listing Price's potato-bean as Threatened in the May 12, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 6), and the final rule was published January 5, 1990.

# 10 Foreign Animals Proposed for Listing as Endangered

Ten foreign animal species—four monkeys and six birds—were proposed by the U.S. Fish and Wildlife Service on January 16, 1990, for listing as Endangered species. If the proposals are approved, these animals will receive the protection available to foreign taxa under the Endangered Species Act.

The four snub-nosed monkeys or langurs, all in the genus *Rhinopithecus*, occur in eastern Asia. In size, these animals range from 20 to 33 inches (51 to 83 centimeters) in head and body length, and 20 to 38 inches (51 to 97 cm) in tail length. They usually inhabit high mountain forests but many descend to lower elevations in winter. All four species are considered among the most critically endangered primates in the world.

The four monkey species included in the listing proposal are:

- **Sichuan or golden snub-nosed monkey (*R. roxellana*)**—found on the southeastern slopes of the Tibetan Plateau in the Chinese provinces of Sichuan, Shaanxi, Hubei, Gansu, and Yunnan.

- **Yunnan or black snub-nosed monkey (*R. bieti*)**—occurring in the Yunnan Range of Tibet and Yunnan.

- **Guizhou or gray snub-nosed monkey (*R. brelichi*)**—native to the Fanjin Range in the Chinese province of Guizhou.

- **Tonkin snub-nosed monkey (*R. avunculus*)**—found in northern Viet Nam.

The range and numbers of all four species have been reduced substantially in recent years. Hunting of these animals to obtain food, pelts, and parts for medicinal purposes has been one factor in their decline. The most serious problem, however, is habitat loss, especially forest destruction due to slash-and-burn agriculture. One species, *R. avunculus*, also probably suffered losses from military activity during the Viet Nam War. This monkey was listed in 1976 as Threatened, but a reclassification to the more critical category of Endangered would reflect its increasingly vulnerable status.

The bird species recently proposed for listing as Endangered include:

- **northern bald ibis (*Geronticus eremita*)**—This species, also known as the hermit ibis or waldrapp, measures about 30 inches (75 cm) from the end of its tail to the tip of its curved beak. It has a completely naked head, red legs and beak, and generally dark plumage. The northern bald ibis originally had a very wide distribution, occurring across much of southern Europe, northern Africa, and southwestern Asia. Extensive habitat modification, pesticide applications, human disturbance at nesting sites, and hunting have eliminated this species from Europe and reduced its known range to a few small populations in Morocco and one

in Turkey. The single greatest threat to the remaining birds is believed to be pesticide pollution, to which this species is extremely susceptible.

- **white-winged guan (*Penelope albipennis*)**—Reaching a length of up to 28 inches (70 cm), this bird is generally brown in color but has white outer primary feathers. It is endemic to a small part of extreme northwestern Peru. Unfortunately, its habitat is rapidly being destroyed through the burning of forests to produce charcoal. There are believed to be no more than 100 birds remaining.

- **cheer pheasant (*Catreus wallichii*)**—This species is similar in size and proportions to the common ring-necked pheasant (*Phasianus colchicus*), but lacks the pronounced markings. The cheer pheasant is generally light brown and has a large crest of feathers on the back of its head. It originally was found in the Himalayan foothills of Pakistan, India, and Nepal. The modification of its forest and meadow habitat for agriculture has reduced its distribution to small, fragmented populations. These sedentary birds are said to be relentlessly persecuted by poachers.

- **red-tailed or blue-cheeked parrot (*Amazona brasiliensis*)**—A colorful bird, this species is green with a red crown, a blue throat and upper breast, bluish-purple cheeks, and a tail with yellow lateral feathers and a red patch. It is about 15 inches (37 cm) in length. Red-tailed parrots occur in the coastal forests of southeastern Brazil, which have been largely destroyed in recent decades by human development. The illegal collection of these birds for the pet trade is another threat.

- **Norfolk Island parakeet (*Cyanoramphus novaezelandiae cookii*)**—The plumage of the Norfolk Island parakeet is mainly green, but the top and sides of the head are red and the outer webs of the tail feathers are violet-blue. It measures about 11 inches (28 cm) in length. As its name indicates, this subspecies is endemic to Norfolk Island, a 14 square mile (35 square kilometer) Australian possession between New Zealand and New Caledonia in the southwestern Pacific. Its decline has resulted from a number of factors, including the destruction of forest habitat, competition and diseases from introduced bird species, predation by introduced rats and cats, and persecution as an agricultural pest. With only about 20 surviving individuals, the Norfolk Island parakeet is among the world's most critically endangered birds.

- **Madagascar red owl (*Tyto soumagnei*)**—Related to the common barn owl (*Tyto alba*) of North America, but much smaller, this species reaches only about 9 inches (23 cm) in length and is mostly reddish in color. Its range in the

rainforest of eastern Madagascar is being cleared for agriculture and is subject to other human impacts. Its numbers are not known but are believed to be very low. Only a few specimens have been collected, the most recent in 1934. A single individual also was reported in 1973.

The above monkeys and birds are already on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which restricts commerce in rare animals and plants. Listing them under the Endangered Species Act would reinforce the prohibition on U.S. import or export of these species without a permit. The Act also authorizes the Service to assist foreign wildlife management agencies in the conservation of listed species by providing training, personnel, and (if available) limited funding.

## Regional News

(continued from page 2)

On January 3, 1990, three female Andean condors (*Vultur gryphus*), W-8, W-9, and W-10, were released from a new hack site in the backcountry of Ventura County, California. Within 3 hours of their release, all three birds had attempted to fly. W-8 was the first to attempt to interact with the older Andean condors, which were released about a year ago. After joining them in a soaring flight, she quickly tired, lost altitude and dropped into the chaparral about 660 feet (200 meters) from the release platform. W-8 used a series of short flights over the course of several days to return to her release site. The other two condors are successfully performing short flights around the release platform.

The four Andean condors released last year are all doing well and have integrated with the newly released condors. Three more Andean condors are being acclimated at the hack site and are scheduled for release soon. Like all of the Andean condors released so far, these birds have been tagged with radio transmitters. The purpose of these temporary releases has been to test techniques for the eventual reintroduction of native California condors (*Gymnogyps californianus*).

The Central Idaho Wolf Recovery Steering Committee met December 5-6, 1989, in Missoula, Montana, with the Northwest Montana Wolf Recovery Group. John Gunson, from the Alberta Wildlife Department, described the experience of the Alberta, Canada, gray wolf

(continued on page 6)



# Studies Under Way to Recover Two Conasauga River Fishes

K. Winkler, M. Freeman, and B. Freeman  
Institute of Ecology/Museum of Natural History  
University of Georgia, Athens

The amber darter (*Percina antesella*) and the Conasauga logperch (*Percina jenkinsi*) are rare fish species inhabiting the Conasauga River in northwest Georgia and southeast Tennessee. Both were listed by the Fish and Wildlife Service in 1985 as Endangered. As a result, the Tennessee Wildlife Resources Agency, Georgia Department of Natural Resources, and University of Georgia's Institute of Ecology/Museum of Natural History joined forces, with funding support from the U.S. Fish and Wildlife Service, to conduct the research needed for recovering these vulnerable species.

Both fishes occur in a limited reach of the upper Conasauga River; their designated Critical Habitat encompasses only 33 miles (54 kilometers) for the darter and 11.5 miles (18.5 km) for the logperch. This part of the river still has clear water and relatively silt-free shoals, whereas downstream sections have suffered from siltation and loss of streamside vegetation. Even in the upper Conasauga, however, riparian destruction and increased development within the watershed threaten the water quality.

The amber darter was discovered in a tributary of the Etowah River in northwest Georgia in 1948, but the construction of

Allatoona Reservoir in the 1950's impounded this free-flowing habitat. Despite repeated surveys, only one amber darter has been found in the Etowah system in the past 10 years. In 1971, however, the species was discovered in the Conasauga River. Biologists have found that the darters are restricted to relatively fast riffles of moderate depth with swift currents along the channel bottom. Studies indicate that amber darters occur in water depths from 11 to 19 inches (29 to 49 centimeters) and that the average current velocity at the substrate ranged from 3 to 11 inches per second (7 to 27 cm/second). Although there are many such shoals within the river, amber darters are found in only a small percentage. No precise estimates of population size are available; however, survey data indicate that there are no more than 2 or 3 individuals per 1,100 square feet (100 square meters) within any given shoal. This indicates that the population could be at a critically low level.

Life history studies are being conducted to determine the darter's longevity, growth rates, and reproductive habits. Its spawning behavior has not been observed, and it is not known if juveniles require specific habitats. Tuberculate males have been

observed between the months of December and May, suggesting that spawning occurs between late winter and spring. Efforts will be made to observe and record this behavior in detail.

The Conasauga logperch (described scientifically in 1985) also requires clear water, but it prefers deep, fast-flowing chutes and pools rather than shallow riffles. Before this study, the known range of the Conasauga logperch was restricted to 11.5 miles (18.5 km) of the river. Recent surveys, however, revealed that the logperch's range extends downstream an additional 12 miles (20 km). Although this is an encouraging discovery, the known population remains small.

Because of their low abundance and restricted ranges, both species are vulnerable to extinction from a single catastrophic event. Accordingly, recovery plans recommend considering the reestablishment of amber darters and Conasauga logperch in currently unoccupied historical habitat. Locating suitable reintroduction sites and developing management plans will require additional research, but we believe that such studies could help lead to the recovery of these endangered species.



photo by Dick Biggins

Amber darters are slender fish generally less than 2.5 inches in length. They have a golden brown upper body, accented by dark, saddle-like markings, and a yellowish belly.

## Mercury Contamination

(continued from page 1)

recorded mercury at 98 ppm in the panther's liver. Additional testing at the Service's Patuxent Wildlife Research Center laboratory revealed a concentration of 110 ppm.

As a result of these findings, liver and hair samples from other archived dead panthers, along with hair samples from live panthers, were analyzed. Mercury concentrations in the 10 liver samples analyzed ranged from 0.005 to 20.0 ppm, and 6 of the specimens contained mercury at levels of 7.8 ppm or higher. Mercury levels in hair samples from 10 panthers ranged from 0.02 to 130.0 ppm, and again 6 registered levels of over 7.8 ppm.

To address these problems, the Technical Subcommittee convened an ad hoc working group on November 7 and 8, 1989. The objectives were to discuss the significance of current information; to develop sampling plans to gain additional data; and to make specific recommendations for addressing mercury contamination problems.

Based on current information, the Technical Subcommittee has concluded that mercury contamination of the panther is potentially a serious threat. Panther #27 contained levels of mercury in her liver consistent with mercury toxicosis reported from laboratory experiments and from field observations of domestic cats. Although none of the elevated mercury levels documented in the other dead and live panthers analyzed were as high as those in panther #27, some were at levels high enough to be of concern.

The Technical Subcommittee also concluded that the Fakahatchee Strand and East Everglades areas appear to be hot spots for mercury contamination of panthers. The presumed source of the contamination is the panther's prey, particularly raccoons, which bioaccumulate mercury through the aquatic food web. Because both hot spots have low numbers of deer and hogs, which are important prey species for the panthers, there is a higher than normal predation of small mammals, such as raccoons, in these areas. The reproductive success of female panthers is lower in areas where small prey is the predominant food

source. This may be the result of poor nutrition, but mercury contamination also may be affecting reproduction.

The Technical Subcommittee raised several concerns about three living panthers. One male panther (#16) had highly elevated levels of mercury in hair and blood samples collected in February 1988. Two others (#9 and #23) have the same prey base (primarily raccoons) as #27 and consequently may be at risk for mercury poisoning as well.

To address this situation, the Committee recommended in January 1990 to 1) accelerate the routine testing of panthers in the wild, 2) establish an action level of 1.4 ppm for whole blood in panthers, 3) take action to better identify problem areas and contaminated prey resources, and 4) increase the populations of uncontaminated prey through habitat management and harvest regulations. The Committee also recommended screening panthers for other potential pollutants, including other metals, organochlorines, and PCB's, and supporting efforts to identify and rectify the source of mercury contamination.

## Regional News

(continued from page 4)

(*Canis lupus*) management program. Alberta's wolf population is stable or slightly declining, with about 500 wolves being taken annually by trappers, hunters, and landowners. Controlling problem wolves is an important element of Alberta's program. Gunson stated that it is important to initiate a public information program on wolves and their management in order to gain support for wolf recovery efforts.

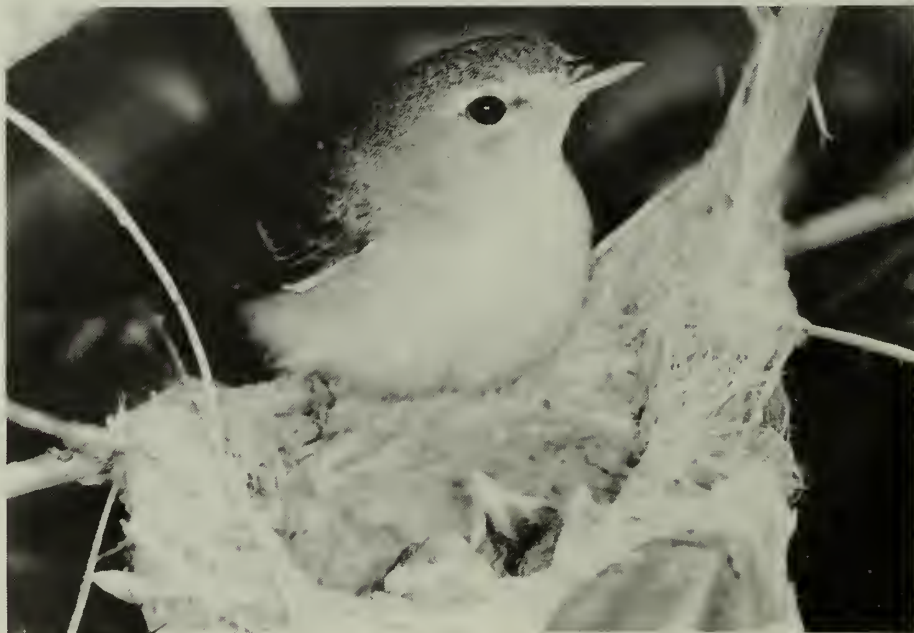
In response to protests, British Columbia, Canada, authorities called off a proposed wolf hunt just north of Glacier National Park, Montana, last fall. Although the Glacier National Park pack did not successfully raise pups this year, a pack just a few miles north of the border did. This area may be a source of dispersing wolves for central Idaho.

The Central Idaho Wolf Recovery Committee will shortly publish an annual report on wolf activity in central Idaho. Printouts of all probable wolf sightings for the past 10 years will be sent to the U.S. Forest Service, Bureau of Land Management, and Idaho Fish and Game Department district offices. The Committee also is working with the Public Policy Analysis Group of the University of Idaho in preparing a public survey of Idaho residents' attitudes on natural resource issues. Questions on wolf recovery may be included in the survey.

The Service is nearing completion of its negotiations with the Environmental Protection Agency (EPA) on an international sewage project proposed for construction near the U.S./Mexico border, not far from the Pacific Ocean. The project is being funded by the EPA to handle both the Tijuana, Mexico, sewage that is flowing into the U.S. and sewage expected from future growth in the San Diego, California, area. Two Endangered birds, the light-footed clapper rail (*Rallus longirostris levipes*) and the least Bell's vireo (*Vireo bellii pusillus*) could be affected by the project.

Section 7 consultations continue over the potential effects of the proposed Brown Creek timber sale on grizzly bears (*Ursus arctos*) in the Idaho panhandle national forests. The timber sale is under appeal by the National Wildlife Federation and involves bear habitat managed by the U.S. Forest Service, Washington-Idaho Forest Industries, and Idaho Department of Lands. The Fish and Wildlife Service's Boise Field Station has been attempting to get the parties to reach a settlement via Section 7 consultation and Interagency Grizzly Bear Committee involvement.

(continued on next page)



least Bell's vireo

photo by B. Moose Peterson



## Regional News

(continued from previous page)

Plans are being made for Idaho's third transplant of Endangered woodland caribou (*Rangifer tarandus caribou*) this spring. It is hoped that 24 caribou will be added to the existing 50 to 60 caribou in the Selkirk Mountains. Students from the University of Idaho are continuing to study caribou habitat. This information will assist the Service with Section 7 consultations and help other land managers with planning activities in caribou habitat. The International Mountain Caribou Technical Committee is revising sections of the recovery plan, which is due for an update in fiscal year 1990.

The Service's Boise Field Office has completed negotiations for a 3-year conservation agreement to protect habitat of the Bruneau Hot Springs snail, which has been proposed for listing as an Endangered species (see BULLETIN Vol. X, No. 9). The agreement provides for fencing to protect the spring's riparian zone from livestock use, and provides unrestricted access to the property by Service staff and cooperators in scientific investigations of the species.

Dr. Robert Hershler of the Smithsonian Institution is preparing a scientific description of this snail in the family Hydrobiidae. The species description should be published later this year. Life history research on the snail also is being conducted by biologists at Idaho State University.

**Region 2**—Endangered interior least terns (*Sterna antillarum*) returning from Latin America to nest in the Tulsa, Oklahoma, area this April will find that additional segments of their breeding habitat along the Arkansas River have been protected. Two Tulsa companies have signed memoranda of understanding with The Nature Conservancy to try to protect river bottom habitat, and a private real estate investor has donated river bottom parcels (valued at \$1,000 per acre) to the Arkansas River Least Tern Preserve. These agreements and donations bring the total protected area in the preserve up to approximately 1,000 acres (400 hectares) within 9 river miles (14 kilometers). Additional areas may be acquired before the terns return.

The Arkansas River Least Tern Preserve was established in 1986 by the Conservancy, with assistance from the Service's Tulsa Field Office and the Tulsa Audubon Society. A committee consisting of the Conservancy, Service, Audubon Society, Oklahoma Department of Wildlife Conservation, Oklahoma Ornithological Society, Tulsa River Parks Authority, and Army Corps of Engineers manages the preserve and works to increase public awareness. Last year, 50 tern chicks fledged within the preserve, and their story made local and regional television,

newspaper, and radio news 38 times—a 100 percent increase in annual media coverage since 1986. The preserve has produced a 3-year average of 1.5 fledglings per breeding pair, compared to 0.5 elsewhere on the river. In addition, the preserve provides habitat for migrating piping plovers (*Charadrius melodus*) and peregrine falcons (*Falco peregrinus*), and wintering bald eagles (*Haliaeetus leucocephalus*).

**Region 4**—Three additional State agencies in Region 4 are developing Endangered Species Act-Section 6 cooperative agreements with the Service. The Mississippi Department of Wildlife, Fisheries and Parks already has an agreement for animals, but it now has approval from the State to develop an agreement for plants. In fiscal year 1989, the Alabama Department of Conservation and Natural Resources and the Louisiana Department of Wildlife and Fisheries agreed to begin developing agreements for animals. Agreements from the agencies are expected early in fiscal year 1990. Neither agency, however, has State legislative authority to enter into cooperative agreements for plants.

The Missouri Department of Conservation has notified the Service's Jackson, Mississippi, Field Office of new sightings of the Threatened Ozark cavefish (*Amblyopsis rosae*) in Missouri. In 1989, the presence of cavefish in Jackson Cave (Greene County) was confirmed by Dr. Steven Jones of Drury College. Another population was found in Hayes Spring Cave (Stone County). Although this population is located within the historic range of the cavefish, it is the only currently known population in Stone County. It was believed that the cavefish had been extirpated from Fantastic Caverns (Greene County), but a single cavefish was observed there in 1989. This marks the first time the species has been observed in the caverns since 1981. Finally, in January of 1990, cavefish were observed in a spring at the Neosho National Fish Hatchery at Neosho, Missouri. There are now 9 known populations of the Ozark cavefish in Missouri and 21 populations rangewide.

The Fish and Wildlife Service's Asheville, North Carolina, Field Office has worked with the U.S. Forest Service to draft guidelines for the management of the Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*) on national forests in North Carolina and Tennessee. Once adopted by the Forest Service, these guidelines should aid in the recovery of this Endangered squirrel.

Biologists from the Asheville Office, in cooperation with the U.S. Forest Service and the North Carolina Plant Conservation Program, have developed a 10-year management plan for the mountain

golden heather (*Hudsonia montana*). This Threatened plant occurs at only two locations, both of which are managed by the Forest Service. Previous experimental work with this species has indicated that fire suppression is adversely affecting the plant, especially within the Linville Gorge Wilderness, by allowing the encroachment of competing vegetation. Prescribed burning will be the primary management tool used to recover the plant.

**Region 6**—A memorandum of understanding for the study and management of bald eagles in the Greater Yellowstone Ecosystem in northwestern Wyoming was recently agreed upon by the Wyoming Game and Fish Department; Montana Department of Fish, Wildlife and Parks; Idaho Department of Fish and Game; U.S. Fish and Wildlife Service; U.S. Forest Service; National Park Service; Bureau of Land Management; and Bureau of Reclamation. The agreement should make it easier for agencies to prioritize research projects and to direct funding, ultimately increasing the agencies' ability to maintain a viable bald eagle population in the Yellowstone region. Most of the nesting bald eagles in Wyoming are found in this area.

A 1-year old male whooping crane (*Grus americana*) was found dead on October 31, 1989, after hitting a powerline near McCook, Nebraska. The bird was killed while migrating from Canada to the Texas Gulf Coast. The Service met with the company that owns the powerline and discussed its responsibilities under the Endangered Species Act and ways to avoid collision deaths in the future. The Service requested the power company, as well as all other power companies in Nebraska, to attend an educational seminar on the problem of bird collisions with powerlines.

The seminar, hosted by the Service's Grand Island, Nebraska, Field Office, was held on January 18, 1990, and was attended by 37 of the 41 Nebraska public power companies. The companies requested that the Service identify specific mortality sites and mitigation measures to enhance the visibility of the powerlines to birds in flight. The companies in turn agreed to take appropriate actions to reduce the problem of powerline mortality. It is estimated that 2.5 to 3 million birds die each year in the United States as a result of collisions with manmade objects.

**Region 8**—Biochemical analyses of tissues from 72 Minnesota gray wolves (*Canis lupus*) indicated that more than 50 percent may contain mitochondrial DNA from coyotes (*Canis latrans*). If this is true, these hybrids can only be the result of male gray wolves mating with female coyotes. This has serious implications for the conservation of pure gray wolves in Minnesota.

## Regional News

(continued from page 7)

To provide more rapid processing of post-mortem results for endangered animals and expedite the development of summary data reports on endangered species mortality, the Service's National Wildlife Health Research Center in Madison, Wisconsin, has assigned Ron Windingstad to serve as a liaison with field biologists, endangered species coordinators, and law enforcement agents. Ron will be working closely with Dr. Nancy Thomas, the primary pathologist for endangered species and law enforcement cases. Individuals needing information or advice regarding diseases in endangered species should contact Ron at FTS 364-5411 or 608/271-4640.

**Region 9**—The Service's Division of Endangered Species and Habitat Conservation (EHC) has released a new regional wetland flora document, "National List of Plant Species That Occur in Wetlands: Caribbean (Region C)." Although this regional list was designed specifically for wetlands in Puerto Rico and the U.S. Virgin Islands, it has utility throughout the Caribbean Basin and parts of Central America. EHC staff, working with the Service's Office of International Affairs, has distributed over 180 copies of the list to researchers and wetland managers in 19 countries.

The Caribbean list is one of many regional wetland flora documents published by the Service in cooperation with the National and Regional Inter-agency Review Panels. These panels consist of representatives from the Service, Army Corps of Engineers, Environmental Protection Agency, and Soil Conservation Service. Copies of the Caribbean and the 12 other regional wetlands inventory plant lists can be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (telephone 703/487-4650). Plants lists for each individual State also are available.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	51	241	8	23	323	25
Birds	75	145	10	0	230	59
Reptiles	16	59	17	14	106	23
Amphibians	6	8	5	0	19	5
Fishes	51	11	31	0	93	47
Snails	3	1	6	0	10	7
Clams	34	2	0	0	36	23
Crustaceans	8	0	1	0	9	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	169	1	53	2	225	102
<b>TOTAL</b>	<b>427</b>	<b>469</b>	<b>138</b>	<b>39</b>	<b>1073*</b>	<b>307**</b>

Total U.S. Endangered **427** (258 animals, 169 plants)

Total U.S. Threatened **138** ( 85 animals, 53 plants)

Total U.S. Listed **565** (343 animals, 222 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 256 recovery plans approved. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

February 28, 1990

February 1990

Vol. XV No. 2

# ENDANGERED SPECIES

## Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

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### Service Publishes Revised Plant Notice

The Fish and Wildlife Service (Service) published an updated and revised notice in the February 21, 1990, *Federal Register* identifying the vascular plant taxa native to the United States that are being reviewed for possible addition to the Federal List of Endangered and Threatened Plants. A major purpose of the notice is to solicit additional information on the status of these plants and the threats they face in order to assist the Service in determining whether or not to propose listing them for protection under the Endangered Species Act.

The identified plants are placed into one of three categories:

**Category 1** comprises those plants for which the Service has enough data on biological vulnerability and threats to support a proposal to list them as Endangered or Threatened. Currently, there are 527 taxa in this category. The development of proposed listing rules on these plants is anticipated; however, because of the large number, it will take years to clear the backlog. With its current resources, the Service estimates that it will be able to list approximately 50 taxa (plants and animals) per year.

**Category 2** contains taxa for which there is some evidence of vulnerability but for which there are not enough data at

this time to support a listing proposal. Further study will be necessary to ascertain the status of the 1,572 taxa in Category 2. It is likely that some will be found to be not in need of Endangered Species Act protection, while others could be determined in greater peril of extinction than some taxa in Category 1.

Those taxa in Categories 1 and 2 are considered by the Service as candidates for future listing. For the first time, California has the highest number of candidate plants (636) of any State. As a result of taxonomic revisions, the number of plant candidates in Hawaii has dropped

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photo by Peter Rowlands

The Eureka Dunes shining milk-vetch (*Astragalus lentiginosus* var. *micans*) is one of the 636 plant taxa in California that are candidates for listing proposals.





## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1**—The Fish and Wildlife Service's Boise, Idaho, Field Station staff reviewed and provided comments on the

draft 1989 Wolf Observation Public Survey Report prepared by the Central Idaho Wolf Recovery Steering Committee. During 1989, 78 sightings of gray wolves (*Canis lupus*) in Idaho were rated as probable.

#### U.S. Fish and Wildlife Service Washington, D.C. 20240

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#### TECHNICAL BULLETIN

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#### Regional Offices

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#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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**Region 3**, Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); James C. Gritman, *Regional Director*; Gerald R. Lowry, *Assistant Regional Director*; Ronald L. Refsnider, *Endangered Species Specialist*.

**Region 4**, Richard B. Russell Federal Bldg., 75 Spring St., S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, *Regional Director*; David Flemming, *Endangered Species Specialist*.

**Region 5**, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director*; Ralph Pisapia, *Assistant Regional Director*; Paul Nickerson, *Endangered Species Specialist*.

**Region 6**, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

**Region 7**, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Rowan Gould, *Assistant Regional Director*; Ron Garrett, *Endangered Species Specialist*.

**Region 8** (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sher, *Endangered Species Specialist* (703-358-1710).

The Idaho Department of Fish and Game and the U.S. Forest Service (Boise, Challis, and Sawtooth National Forests) are planning a status survey study of the wolverine (*Gulo gulo*), a Category 2 candidate species, in the Sawtooth-Upper Wood River area of Idaho.

Three more Andean condors (*Vultur gryphus*) have been released from the hack site in the backcountry of Ventura, California (see BULLETIN Vol. XV, No. 2). There are no plans to release more Andean condors in southern California. The Service has begun capturing the four birds released there last year to determine if the condors released this year will assume the same movement patterns. The Andean condors released last year flew over populated areas. By removing the four older condors and using a different hack site, biologists hope to see if the six younger condors released this year stay in the backcountry. If the younger birds follow the same patterns and fly over populated areas, then the four older birds will be released back into the wild. If, however, the younger birds stay in the backcountry, then the older birds will be held for an indeterminate period.

The Andean condor release experiment is scheduled to end in December, although there may be a short extension. All of the Andean condors released in California will be captured and introduced back in Colombia, South America, part of their native habitat.

The first California condor (*Gymnogyps californianus*) egg laid in January 1990 hatched successfully March 12. As of March 14, the egg count for this year stood at 11, of which 6 were fertile, 2 were infertile, 1 was of unknown fertility, 1 was broken, and 1 had hatched. Eggs were produced from both captive-breeding flocks. Of the 8 eggs laid in February, 4 came from condors that had never laid eggs before, 3 came from condors that had laid eggs earlier this year and had recycled, and 1 egg came from a condor that had laid eggs in a previous year.

The Service's Office of Management Authority issued a permit in January under Section 10(a) of the Endangered Species Act for the California Department of Corrections' proposed Delano State Prison in Kern County, California. This action culminates a 5-month effort by the Department of Corrections, the California Department of Fish and Game, and the Service to resolve an Endangered species conflict on the proposed prison site. San Joaquin kit foxes (*Vulpes macrotis mutica*), Tipton kangaroo rats (*Dipodomys nitratoides nitratoides*), and blunt-nosed leopard lizards (*Gambelia silus*) were discovered there just prior to the scheduled commencement of construction in August 1989.

This is believed to be the first small-scale project that has been issued a section 10(a) permit. The Service worked

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# The Nature Conservancy and the Heritage Programs: Working Together to Preserve Biodiversity

Jeffrey Griffin  
Science Division  
The Nature Conservancy

Gifford Pinchot, one of the founders of the U.S. Forest Service, once said, "The most important quality for accomplishing anything is continuity of purpose." Since its formation in 1951, The Nature Conservancy has maintained a focus on one purpose: the preservation of biological diversity. Its philosophy in preserving biological diversity is simple: cooperation gets more results than confrontation. Today, with a membership of over 550,000 concerned citizens, a staff of nearly 1,000 people, and offices in 48 States, the Conservancy secures protection for an average of 1,000 acres (400 hectares) every day. To date, it has protected over 5 million acres (2 million ha) of land throughout the Americas. Although much of this land has been transferred to public agencies and other private conservation organizations for management, the Conservancy itself actively manages more than 1,000 preserves, encompassing over 1,000,000 acres (405,000 ha)—the largest privately owned nature preserve system in the world.

## The Natural Heritage Program Concept

One of the keys to ensuring that development is compatible with conservation is to put organized scientific information into the hands of planners and decision-makers. By knowing the location, abundance, and distribution of the rarest and most endangered species and ecosystems, we can set protection priorities and make the best use of our organizational resources. The Nature Conservancy realized this 15 years ago, when we initiated the natural heritage program network. Working with State, provincial, tribal, and national governments, the Conservancy has established natural heritage programs in every State and Puerto Rico, 3 national parks, the Navajo Nation, 2 hydroelectric authorities, 1 Canadian province, and 11 countries throughout Latin America and the Caribbean (where they are called conservation data centers, or CDCs)—a total of 76 centers as of February 1990.

Natural heritage programs conduct ongoing, cumulative inventories of their respective State or regional biological resources. Heritage biologists typically begin the process by gathering background information from published literature, individual scientists, museum collections, public agency files, and knowledgeable individuals. Information is



photo by George Fenwick

*Maryland heritage program staff seining for vertebrates in an intermittent wetland in eastern Maryland. This is one of many ongoing species inventories of the Maryland heritage program.*

gathered about species, biological community types, sites of conservation significance, existing preserves, and land ownerships. One of the most important kinds of data is the "element occurrence record," the individual examples of important species populations, natural communities, and other biotic features and phenomena. Field surveys are conducted to determine if the features are still extant, to verify the accuracy of the secondary information, and to look for occurrences in new areas. This continuing field work adds considerably to the depth and completeness of the heritage databases.

## Data Management

To effectively organize and use the massive amount of data collected, the heritage programs employ sophisticated PC-based data management systems composed of over 15 interrelated computer files and a full set of topographic maps of their States or regions.

The Conservancy recently completed development of the fifth generation of computer software for the heritage programs. We believe that this software, dubbed the Biological and Conservation Data System, or BCD, is the most advanced conservation data management system in existence. The BCD system integrates all of the Conservancy's various files, such as locations of species,

exemplary sites of natural communities, and bibliographies, plus a new set of files for managing cadastral, financial, and stewardship information in the Conservancy's field offices, into one powerful, user-friendly package.

Although not every heritage program uses BCD yet, every program, whether in Paraguay or Alaska, uses compatible data management systems. Such standardization, which allows data to be shared and compared among heritage programs, is the strength of the network.

## Priority Ranking of Elements

The Nature Conservancy and heritage programs have developed a system to rank elements in the heritage databases for conservation priority. The ranking process assigns global (G), national (N), and state (S) conservation priority ranks to every species and ecosystem. Each rank (G,N,S) is assigned a number on a scale of 1 to 5, with 1 being the rarest and most imperiled and 5 being the most widespread, abundant, and secure. This system allows for specificity on local and regional levels while maintaining a consistent global picture. For example, the tamarack (*Larix laricina*) is rare (G5N5S1) in Maryland but abundant (G5N5S5) in Minnesota and Michigan. Species ranked G1, G2, and G3 typically have been listed  
(continued on page 5)



***The shaded areas are covered by the natural heritage programs/conservation data centers network***

map provided by The Nature Conservancy



# The Nature Conservancy and its Heritage Programs

(continued from page 3)

by the Fish and Wildlife Service under the Endangered Species Act or are candidates for listing.

An element's rank reflects such factors as its number of occurrences, estimated overall abundance, range, ecological fragility, and threats to its existence. These ranks, combined with site-specific data, enable the heritage programs to formulate site-by-site and State-by-State conservation priority lists, thereby directing the land protection efforts of the Conservancy and other conservation agencies.

## Uses of the Heritage Program Databases

Government and industry are the primary users of the heritage databases. Heritage data banks are consulted hundreds of times each day for conservation and development planning purposes. For example, the Idaho Natural Heritage Program is used by the Fish and Wildlife Service's Boise Field Office in its inter-agency consultations under Section 7 of the Endangered Species Act. Virtually all projects in Idaho that depend on Federal lands or Federal money are reviewed by the heritage program to determine if any listed, proposed, or candidate plants or animals are known or likely to be in the project area. Such advance planning helps to avoid potential conflicts.

Across the United States, heritage program data support Federal and State conservation agencies by providing the evidence needed to list a species as endangered or, in many cases, to remove it from consideration:

- In Arkansas, the heritage program is responsible for maintaining the State list of threatened and endangered plant species, and it works with the Game and Fish Commission to maintain the State threatened and endangered animals list.

- In Louisiana, the heritage program is playing a pivotal role in the development of the State's first official threatened and endangered species list.

- In California, the Natural Diversity Data Base or CNDDDB (heritage programs go by many names) is the repository and clearinghouse for the data upon which State listings are based. All 25 plants recently designated as State listing candidates were suggested by the CNDDDB.

Heritage data also guide development decisions throughout the country. For example, MCI, a long-distance telephone company, used heritage program maps to route a new fiber-optic cable across New York State, enabling the company to anticipate environmentally sensitive areas and plan the route accordingly. By using heritage data, MCI shortened the review

## Foreign Mailings

Some of our readers pass along extra copies of the BULLETIN to their colleagues in foreign countries. While this is fine, please note that the BULLETIN self-mailer works *only* for mailing to an address in the United States. When mailing to another country, the BULLETIN must be enclosed in an envelope or the U.S. Postal Service *will not* deliver it.

process, avoided conflicts, and saved money.

In just 15 years, the Conservancy, working with foundations, corporations, State and Federal agencies, universities, botanical gardens, museums, and other conservation organizations, has established a network of natural heritage programs throughout the Americas. Robert Jenkins, the Conservancy's Vice President for Science and originator of the heritage programs, notes, "The heritage network represents the most successful machinery ever developed for gathering and organizing biological and conservation information at all levels and for



putting it to use in conservation and development planning."

For more information on the Conservancy and the natural heritage programs, contact The Nature Conservancy, Science Programs, at 1815 N. Lynn Street, Arlington, Virginia 22209 (telephone 703/841-5300).

## Reference Note

All Fish and Wildlife Service notices and proposed and final rules are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/3/85)—identify the month, day, and year on which the relevant notice or rule appeared in the *Federal Register*.

## Final Listing Rules Approved for Three Plant Species

During February of 1990, Endangered Species Act protection was provided to these plant species:

### Palma de Manaca (*Calyptronoma rivalis*)

This arborescent palm, a member of the family Arecaceae, may reach up to 40 feet (10 meters) in height and 10 inches (25 centimeters) in trunk diameter. It is endemic to Puerto Rico, where it is found along streambanks in semi-evergreen seasonal forests of the northwestern karst region. Conversion of these forests to agricultural and pasture land has reduced habitat and may have eliminated some populations of the palm. Today, only three natural populations of about 275 plants are known. There are also two small, introduced populations. The species continues to be threatened by flash flooding (due to deforestation in surrounding areas), agricultural expansion, rural development, and resort construction. The Fish and Wildlife Service proposed the palma de manaca for listing as a Threatened species in the February 7, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 3), and the final rule was published February 6, 1990.

### Two Colorado Plants

The **Dudley Bluffs bladderpod** (*Lesquerella congesta*) and **Dudley Bluffs twinpod** (*Physaria obcordata*) are two rare species in the mustard family (Brassicaceae) that grow in the Piceance Basin in Colorado. The Dudley Bluffs bladderpod is an extremely small, cushion-shaped plant up to 1.2 inches (3 cm) in diameter with long, bright yellow flowers and silvery leaves. The Dudley Bluffs twinpod, which grows to 7.2 inches (18 cm) tall, also has yellow flowers and silvery leaves. Both of these herbaceous perennial plants occur primarily on oil shale outcrops along two adjacent drainages. Five major populations of each species are known. Most of the sites are on public land administered by the Bureau of Land Management. This region contains rich deposits of oil shale and sodium minerals (nahcolite and dawsonite). If the deposits are mined, the survival of both species could be threatened.

Both of the Dudley Bluffs plants were proposed for listing as Threatened in the January 24, 1989, *Federal Register* (see BULLETIN XIV, Nos. 1-2), and the final rule was published February 6, 1990.

## Service Publishes Revised Plant Notice

(continued from page 1)

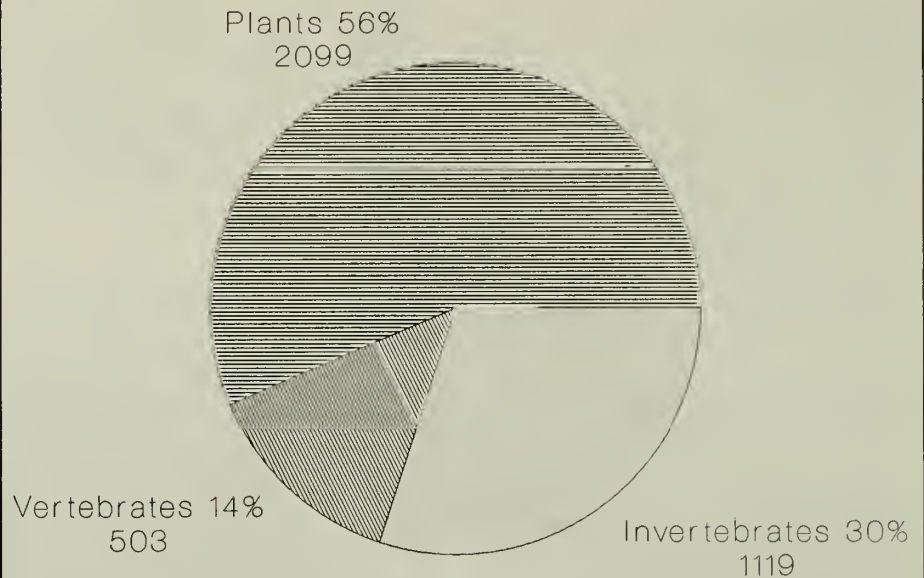
to 327. The third highest total is for Florida (160); Texas (159) and Utah (121) rank fourth and fifth. Categories 1 and 2 also contain some taxa whose status in the recent past is known but that may already be extinct.

**Category 3** is made up of taxa that once were considered for listing as Endangered or Threatened but that are no longer under consideration. There are three subcategories: **3A** (taxa for which the Service has persuasive evidence of extinction); **3B** (names that, on the basis of current taxonomic understanding, do not represent taxa that meet the Endangered Species Act's definition of a "species"); and **3C** (taxa that have been found to be widespread and/or not subject to any identifiable threat).

Until they are listed as Endangered or Threatened, plant candidates do not receive legal protection; however, it is the policy of the Service to advise other agencies of these candidates when inquiries are made about species in a project area that are already listed or proposed for listing. Federal land-managing agencies and others with the authority to conserve species prior to their listing under the Act now have more up-to-date guidance. Early consideration of these taxa in the planning process should lead to fewer potential land-use conflicts, since there is likely to be greater flexibility when accommodating the needs of such plants at an early stage.

The format of the 1990 plant notice is different from earlier versions in that plants already listed as Endangered or

## Listing Candidates\* Plants and Animals



\*These numbers, current through April 3, 1990, do not include species that have been proposed for listing.

Threatened, and those assigned to Category 3 in previous notices, are not included. Copies of the plant notice and the most recent list of Endangered and Threatened plants are available from the Publications Unit, U.S. Fish and Wildlife Service, 130 Arlington Square, Washington, DC 20240.

The Service requests additional status information on the plants named in the revised notice, data on threats to these plants, and nominations for additional

candidates. Data and comments should be sent to the appropriate Regional Directors (addresses on page 2 of the BULLETIN) or to the Chief, Division of Endangered Species and Habitat Conservation, 400 Arlington Square, U.S. Fish and Wildlife Service, Washington, DC 20240. All new information received will be considered in revising the Service's listing priorities, preparing listing documents, and compiling the next plant notice (tentatively scheduled for early 1992).

## Regional News

(continued from page 2)

closely with the applicant in preparing a conservation plan for the project, which expedited the permitting process. Construction of the much needed prison has begun.

**Region 4**—The results of a recent population survey for two Endangered mussels, the penitent mussel (*Epioblasma penita*) and Judge Tait's mussel (*Pleurobema taitianum*), in the lower Buttahatchee River of Mississippi are discouraging. The Buttahatchee River is a unique lotic (flowing water) ecosystem, with slow, deep, and swampy pool reaches connected by steep gradient gravel riffles. Cypress (*Taxodium distichum*) and tupelo gum (*Nyssa aquatica*) trees are among the dominant streamside vegetation. The river channel is in excellent shape, with a few localized exceptions. Impoundment of the Tombigbee River in Mississippi and Alabama for the

Tennessee-Tombigbee Waterway has affected the lower 1.9 miles (3 kilometers) of the Buttahatchee River by reducing the current and scouring capacity of the river. Abandoned kaolin (clay) mines and abandoned and active gravel mines also appear to be causing impacts. Above the portion of the river affected by the impoundment of the Tombigbee River, the Buttahatchee River channel has broken into gravel mines excavated adjacent to the channel, eroding former riffle areas and creating ponds. Further north, an estimated 17,000 tons (15,000 metric tons) of sediment are eroding annually from abandoned kaolin mines and moving through the Buttahatchee system.

All mussel populations in the lower reaches of the Buttahatchee River have declined dramatically. Over 1,200 individual mussels in the family Unionidae, including 92 specimens of *E. penita*, were sampled from two reaches in the lower portion of the river in 1977, but in 1989 only 75 unionids (including 3 penitent mussels) were found. Fortunately, the numbers of penitent mussels collected

from two reaches immediately above the gravel mines approached or exceeded the 1977 survey. Few specimens of Judge Tait's mussel have ever been collected from the Buttahatchee River, and none were collected there in 1989.

The Mississippi Department of Wildlife, Fisheries and Parks will continue its survey and recovery efforts during the 1990 field season to determine the numbers, condition, and location of penitent and Judge Tait's mussel populations in the upper Buttahatchee River.

The Fish and Wildlife Service has received an additional \$1.957 million for the recovery of the Puerto Rican parrot (*Amazona vittata*). This money came out of a special congressional supplemental appropriation to respond to the massive destruction wrought by Hurricane Hugo last September (see BULLETIN Vol. XIV, Nos. 9-10). Region 4 and Region 8 (Research) will use the funds to replace equipment and facilities that were lost or damaged, including the aviary where the

(continued on next page)



## Regional News

(continued from previous page)

captive flock was housed, to conduct population assessments of the wild flock, and to continue other recovery efforts. The U.S. Forest Service also has received Hurricane Hugo relief funding for repairing damage and enhancing Puerto Rican parrot facilities in the Caribbean National Forest.

In addition to relief funding for the Puerto Rican parrot, Region 4 received \$74,000 to assist the Forest Service in its red cockaded woodpecker (*Picoides borealis*) recovery activities in the Francis Marion National Forest, South Carolina, \$5,000 to monitor the bald eagle (*Haliaeetus leucocephalus*) in South Carolina, and \$112,000 for other Endangered plants and animals in Puerto Rico and the U.S. Virgin Islands.

**Region 5**—The Service has awarded a special challenge grant to an authority on the American burying beetle (*Nicrophorus americanus*) to support the recovery of this Endangered insect in New England. The grant will match funds from The Nature Conservancy and a local historic preservation society. The funds will be used for research involving similar species, maintenance of a captive population, and survey work to identify a reintroduction site.

Region 5 has produced a new brochure entitled "What's all this about ... CRITICAL HABITAT FOR PIPING PLOVERS?" The brochure explains what a Critical Habitat designation means, why the Service is preparing a proposal to designate Critical Habitat for the piping plover (*Charadrius melodus*), how the designation process works, and what the effect of the designation will be. Copies of the brochure may be obtained from the Service's New England Field Office, 22 Bridge Street, Concord, NH 03301-4901 (telephone: 603/225-1411 or FTS 834-4411).

In December 1989 and January 1990, recovery planning meetings were held for the Cheat Mountain salamander (*Plethodon nettingi*) and two plants, the swamp pink (*Helonias bullata*) and shale barren rock cress (*Arabis serotina*). Interested biologists from Federal and State agencies and private organizations participated in the meetings. The Cheat Mountain salamander recovery plan will be prepared by the State of West Virginia. The recovery plan for the swamp pink is being prepared by Lynn Wilson from the Service's New Jersey Field Office, while the Virginia Department of Conservation and Recreation's Natural Heritage Program is preparing the shale barren rock cress recovery plan. Drafts of all three plans should be available for comment this spring.

**Region 6**—The number of gray wolves in Montana has increased since last year. For the past several years, the Wigwam Pack (with seven wolves) and the Camas Pack (with six wolves) have maintained home ranges in Montana and British Columbia, Canada. The surviving female wolf from the Marion Pack that the Service attempted to move to Glacier National Park in September 1989 (see BULLETIN Vol. XIV, Nos. 11-12) travelled from the relocation site to an area northwest of Missoula, Montana, about 35 miles (56 km) east of the designated Central Idaho Wolf Recovery Area. She has been seen with a large male wolf, and probably will breed and have a litter of pups this spring. In addition, a new pack with four or five wolves has been confirmed in an area west of Dupuyer, along the eastern foothills of the Rocky Mountains. The Forest Service is monitoring the pack and plans to work with the Fish and Wildlife Service to capture and radio-collar the wolves this summer.

The Service is administering a newly expanded wolf monitoring system to better document the presence of wolves in Montana. Wolf recovery in Montana will continue to rely on the dispersal of wolves from Canadian populations and the cooperation of local residents with State and Federal management agencies.

The Greenback Cutthroat Trout Recovery Team met in Denver, Colorado, in January 1990 to discuss 1989 activities and the future of the greenback cutthroat trout (*Onchorynchus clarki stomias*) recovery program. The recovery team, comprised of representatives from the Fish and Wildlife Service, National Park Service, Forest Service, Bureau of Land Management, and Colorado Division of Wildlife, concluded that the subspecies is approaching the recovery goal of 20 self-sustaining populations distributed adequately between the Arkansas and South Platte River systems. The recovery team will prepare a report on the fish's current status in both river systems and identify the tasks needed to attain full recovery. The team believes that the trout can be delisted within 5 years if currently planned recovery work is funded.

The Service's Pierre, South Dakota, Field Office is studying the effects of selenium on two Endangered birds, the piping plover (*Charadrius melodus*) and the interior least tern (*Sterna antillarum*). Selenium, a naturally occurring trace element, is essential in small amounts but toxic at higher concentrations. Added least tern and piping plover eggs were collected in 1988 along the Missouri River in South Dakota and analyzed for selenium. Selenium concentrations in the eggs ranged between 4.4 and 8.7 milligrams/kilogram dry weight (1.06 to 2.31

mg/kg wet weight). The tolerance of tern and plover eggs to selenium toxicity is unknown; however, selenium levels in all of the collected eggs were within or over the range of concentrations associated with embryo deformity or mortality in other bird species. For this reason, we believe that selenium poisoning may have contributed to the hatching failure of least tern and piping plover eggs.

**Region 8 (Research)**—The Puerto Rico Research Group, including Patuxent Wildlife Research Center biologists, found territorial behavior by Puerto Rican parrots at three traditional nest sites in the Caribbean National Forest, but imminent nesting activity is likely in only two territories. The group will search rarely visited valleys in the national forest in an attempt to locate additional parrots.

Based on a January 1990 survey, the Hawaii Research Group, which includes Patuxent biologists, reports that the estimated population of palilas (*Loxioides bailleui*) on Hawaii's Mauna Kea volcano is 5,332 birds. This estimate is a significant increase over the January 1989 estimate of 3,567 birds. Palilas continue to concentrate in the island's mamane forests.

On Mauna Loa, efforts to control exotic animals and plants in Hawaii Volcanoes National Park have resulted in a dramatic improvement of the park's natural montane habitats. Native bird populations on Kulani Correctional Facility lands were surveyed during January with the help of Earthwatch Expeditions, Inc., in the hope of locating a source of native birds to reintroduce into the national park.

At least 17 brown pelicans (*Pelecanus occidentalis*) apparently died of exposure along the Mississippi and Texas Gulf coast during last December's unusually cold weather. Five of the birds were analyzed by the Service's National Wildlife Health Research Center in Madison, Wisconsin.

Twenty-nine captive propagated Mississippi sandhill cranes (*Grus canadensis pulla*) were released at the Mississippi Sandhill Crane National Wildlife Refuge during December 1989. As of mid-March 1990, two of the birds had died. Necropsies by scientists at the National Wildlife Health Research Center indicated that one of the birds had succumbed to attacks by a predator.

In January 1990, Dr. David Ellis of Patuxent's Captive Propagation Research Group conducted human avoidance tests with the released cranes. During the tests, all birds fled when approached by humans.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	52	244	7	22	325	25
Birds	75	145	10	0	230	59
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	31	0	93	47
Snails	3	1	6	0	10	7
Clams	35	2	0	0	37	23
Crustaceans	8	0	1	0	9	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	169	1	53	2	225	102
<b>TOTAL</b>	<b>428</b>	<b>472</b>	<b>137</b>	<b>38</b>	<b>1075*</b>	<b>308 **</b>

Total U.S. Endangered **428** (259 animals, 169 plants)

Total U.S. Threatened **137** ( 84 animals, 53 plants)

Total U.S. Listed **565** (343 animals, 222 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 257 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

April 3, 1990

March 1990

Vol. XV No. 3

# ENDANGERED SPECIES

## Technical Bulletin

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

FIRST CLASS  
POSTAGE AND FEES PAID  
U.S. DEPARTMENT OF THE INTERIOR  
PERMIT NO. G-77





# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

### Service Reclassifies Chimpanzees as Endangered

Wild populations of the chimpanzee (*Pan troglodytes*), as well as wild and captive populations of the pygmy chimpanzee (*Pan paniscus*), were reclassified recently by the Fish and Wildlife Service from Threatened to the more critical category of Endangered (F.R. 3/12/90).

*Pan troglodytes* historically occurred in 25 countries of equatorial Africa, from Senegal in the west to Tanzania in the east. The much rarer *Pan paniscus* is found only in part of southern Zaire. In 1976, both species were listed by the Service as Threatened. Since that time, however, their status has continued to decline due to massive habitat destruction, commercial exploitation, and excessive hunting for food. The reclassification is intended to more accurately reflect the current biological status of both species and to reinforce the protection they receive under the Endangered Species Act.

Under the new rule, all populations of *P. paniscus* are now listed as Endangered. In the case of *P. troglodytes*, however, captive populations will remain classified as Threatened, and individuals of that species held legally in the United States will continue to be covered by a special regulation that allows their use for

certain activities (such as medical research) that are otherwise prohibited. For details on the reclassification and the special rule, see the March 12, 1990, *Federal Register*.

Few chimpanzees have been imported legally into the United States for more than a decade, in accordance with the Endangered Species Act and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Both species are on Appendix I of CITES, which means essentially that import and export are prohibited by member nations

unless such activity is found "not detrimental" to the species. Unfortunately, the CITES regulations and laws enacted by various nations to protect chimpanzees (and other rare wildlife) are sometimes bypassed or weakly enforced.

Because there is still a substantial commercial demand for chimpanzees internationally, poaching is a serious problem. Entire family groups may be killed to capture one infant, and it has been estimated that 5 to 10 chimpanzees die for every young chimpanzee delivered to an overseas buyer.

### Federal and State Endangered Species Expenditures in Fiscal Year 1989

For the first time, the Fish and Wildlife Service has published a report for Congress summarizing species-by-species expenditures by Federal agencies and by States receiving Federal funds under Section 6 of the Endangered Species Act. The report, required by the 1988 amendments to the Act, gives the first general indication of where a significant portion of Endangered species funding was expended during the year. Congress requested the information in order to determine how Federal money was being distributed for the more than 500 U.S. species on the List of Endangered and Threatened Species.

Many Federal and State agencies assisted in preparing the report. The International Association of Fish and Wildlife Agencies compiled the data on total State expenditures.

#### Federal and State Expenditures in 1989

A total of \$43.7 million was reported as being spent in fiscal year 1989 by Federal and State agencies for the conservation of 347 Threatened and Endangered species — approximately two-thirds of all listed species in the United States. Of the money reported, the Fish and Wildlife Service spent approximately \$18 million, other Federal agencies (such as the

Bureau of Land Management, National Park Service, and the U.S. Forest Service) spent a total of about \$21 million, and the States expended about \$4 million.

Spending ranged from a low of \$100 for species such as the noonday snail (*Mesodon clarki nantahala*) and autumn buttercup (*Ranunculus acriformis* var. *aestivalis*) to a high of \$3.1 million for the recovery of the bald eagle (*Haliaeetus leucocephalus*). The median expenditure was \$11,750 per species. Seventy-two species accounted for over 90 percent of all expenditures. Twelve species had reported expenditures exceeding \$1 million each, accounting for over half the total. Ranked in descending order of expenditure, these species were: bald eagle; grizzly bear (*Ursus arctos*; \$2.9 million); red-cockaded woodpecker (*Picoides borealis*; \$2.8 million); American peregrine falcon (*Falco peregrinus anatum*; \$2.7 million); gray wolf (*Canis lupus*; \$2.2 million); whooping crane (*Grus americana*; \$1.4 million); southern sea otter (*Enhydra lutris nereis*; \$1.3 million); West Indian (Florida) manatee (*Trichechus manatus*; \$1.2 million); Tumamoc globe-berry (*Tumamoca macdougalii*; \$1.2 million); black-footed ferret (*Mustela nigripes*; \$1 million); piping plover (*Charadrius melodus*; \$1 million); and Kirtland's warbler (*Dendroica kirtlandii*; \$1 million).

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Photo by Jim Page

Except for captive specimens of *Pan troglodytes*, all chimpanzees are now classified as Endangered.



## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1** - A third group of 12 woodland caribou (*Rangifer tarandus caribou*) has been translocated successfully from British Columbia, Canada, to Idaho. The

Idaho Fish and Game Department, Washington Department of Wildlife, British Columbia Wildlife Branch, U.S. Forest Service, and Fish and Wildlife Service cooperated in capturing the caribou on March 4 and 5. After testing for bru-

cellosis, the caribou were transported to northern Idaho and released in the Selkirk Mountains on March 8.

Current plans call for capturing another 12 caribou in British Columbia and releasing them in the Selkirk Mountains this year. This will conclude the 3-year effort to augment the existing herd. The Selkirk Mountains herd now numbers 50-60 caribou.

Three more California condor (*Gymnogyps californianus*) eggs were laid from mid-March through mid-April, bringing the total number of eggs produced by the 2 captive-breeding flocks this year up to 15 (as of April 11). An egg laid March 16 was the third one produced by condor AC-5 this year at the San Diego Wild Animal Park. It was fertile, but two eggs laid in late March by other condors were infertile. The egg laid in April at the Los Angeles Zoo also is fertile and came from a pair of condors that had never laid eggs before.

Three more California condor chicks have hatched since the last BULLETIN (Vol. XV, No. 3) and more are expected. The chick that hatched on March 22 at 12:30 a.m. was a landmark event because it was the first California condor chick in the history of the captive propagation program to hatch without the assistance of zookeepers. The chick, named Honsi (an Indian word for spirit), emerged from its shell about 51 hours after pipping. Congratulations are in order for the parents, Paxa and Almiyi, on their first hatchling. Honsi is doing well with the capable assistance of the condor keepers at the San Diego Wild Animal Park. The first chick to hatch at the Los Angeles Zoo emerged on March 23. On April 10, another chick hatched at the San Diego Wild Animal Park.

Two more chicks were pipping at the two facilities on April 11 and were expected to emerge shortly. Another four more condor eggs are being incubated and should hatch this spring.

**Region 2** - The only wild population of masked bobwhite quail (*Colinus virginianus ridgwayi*) in the United States occurs on Buenos Aires National Wildlife Refuge in southern Arizona. Biologists believe that 1989 was the worst year for native quail in Arizona in 35 years. The limited summer rains of 1989 apparently were inadequate for good quail reproduction. Although the 1989 pre-nesting population was estimated in April 1989 to be 350 birds in 34 coveys, and 1,180 additional pen-reared birds were released on the refuge in the summer and fall, biologists located only 15 coveys with 147-160 birds in the winter of 1989-1990.

John Turner, Director of the U.S. Fish and Wildlife Service, and H. Anthony

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# Proposed Listing Rules — March 1990

Four species native to the United States—a fish and three plants—were proposed by the Fish and Wildlife Service during March 1990 for listing as Endangered. If the proposals are approved, Endangered Species Act protection will be extended to the following:

## Cahaba Shiner (*Notropis cahabae*)

Known only from the Cahaba River in central Alabama, this small, silvery fish occurs in low numbers throughout approximately 60 miles (97 kilometers) of the main channel within Perry, Bibb, and Shelby Counties. Water pollution already has eliminated the species from about 20 percent of its historical range, and the remaining habitat is vulnerable to continued degradation. On March 19, 1990, the Service proposed to list the Cahaba shiner as Endangered.

Cahaba shiners are found only in large shoal areas and appear to have specialized habitat requirements, making them particularly vulnerable to environmental changes. Residential and industrial sewage effluents, along with non-point source pollution from mining, forestry, agriculture, and construction activities, pose a threat to the small, scattered populations that remain. For example, a gas company has applied for a permit to discharge wastewater produced from methane gas wells, which could result in a discharge of up to 6.3 million gallons (24 million liters) of brine per day into the Cahaba River system. If the shiner is listed, Federal agencies that regulate discharges will be required to avoid any activities that jeopardize this fish's survival.

## Gentian Pinkroot (*Spigelia gentianoides*)

A rare perennial herb, this species takes its name from its pink, tubular flowers, which resemble those of gentians. It is currently known from only three sites in northwestern Florida. Recreation and certain forestry practices pose potential threats to the remaining populations, and the Service has proposed to list *S. gentianoides* as an Endangered species (F. R. 3/14/90).

All members of the genus *Spigelia*, which belongs to the strychnine or logania family (Loganiaceae), contain chemicals with potential medicinal and/or poisonous properties. The widespread species known simply as pinkroot (*S. marilandica*), now frequently used as a garden plant for its showy flowers, was a popular folk remedy in the nineteenth century. (It was used to treat people for worms, although it has been blamed for killing

some of the patients.) *Spigelia gentianoides* has not been tested for potential drug uses, but uncontrolled collecting by people interested in medicinal plants could easily deplete the very small populations of this plant that remain.



drawing by Anna-Lisa King

*The gentian pinkroot (Spigelia gentianoides) produces sharply ridged stems up to 12 inches (30 centimeters) in height. Its pink flowers, which resemble those of true gentians, bloom in May and June.*

The main threat to the gentian pinkroot, however, is habitat modification. This species once occurred in at least five Florida counties, but recent surveys have located only three very small populations, all in Jackson and Calhoun Counties. It is believed that conversion of upland forests to farms eliminated some habitat. Two of the remaining colonies, which in 1988 numbered no more than 30 plants each, are found in mixed upland pine-oak forests. The third and largest population is in a long-leaf pineland with an understory of mixed grasses. Although the trees at this site were logged in 1988, the cutting was done with relatively little site disturbance, and gentian pinkroots flowered there again in 1989. Trees are being replanted at the site by hand to minimize disturbance.

Florida already lists *S. gentianoides* as endangered under State law, which regulates take and trade in this plant. Listing the gentian pinkroot federally would reinforce and complement State protection, in part by requiring Federal agencies to avoid any activities that could jeopardize the species. For example, one population of gentian pinkroots near Lake Seminole is on property owned by the U.S. Army Corps of Engineers and administered by the State as a picnic area. If the species is listed, the Corps will be required to ensure that the use and management of the site are not harmful to the plant. Additional protection could result from Federal and State herbicide regulation programs under development.

## Little Aguja Creek Pondweed (*Potamogeton clystocarpus*)

*Potamogeton clystocarpus*, an aquatic plant, maintains a precarious existence in a single intermittent creek within Little Aguja Canyon in the Davis Mountains of west Texas. The creek is underground over most of its course, surfacing only occasionally. This species, a slender-branched plant with linear leaves, is restricted to a few deep pools. Except for spikes that are emergent when the plant flowers, the Little Aguja Creek pondweed grows completely submerged.

Three populations of the species are known, all on private property. Because permanent water sources in this generally arid area have been examined thoroughly, it is unlikely that any other populations will be discovered. The main threat to the species is habitat damage associated with the presence of livestock. At least one pool is a favorite watering hole and shows erosion around its edge. Cattle and horses trample and uproot the plants, and may eat them, but the main damage is from the deterioration of water quality. Manure overfertilizes the pools and promotes explosive growths of algae, which form a green scum that chokes the pondweed.

Because of its very restricted distribution and the threats to its habitat, the Little Aguja Creek pondweed was proposed by the Service on March 15 for listing as Endangered.

\* \* \*

(continued on page 10)

## Notice

The reproduction in BULLETIN Vol. XV, No. 1, of a rainforest conservation poster was not intended to imply the photographer's endorsement of the article on that page.

# List of Approved Recovery Plans

Restoring Endangered and Threatened plants and animals to the point where they are again secure, self-sustaining members of their ecosystems is one of the main goals of the Fish and Wildlife Service's endangered species program. To help guide the recovery effort, the Service is working to develop plans for all listed species native to the United States. As of March 31, 1990, 257 recovery plans for 308 species had been completed and approved. Many others are in various stages of development. Recovery plans also may be revised, if and when appropriate; the dates listed below are for current plans or the latest revisions.

Funding and personnel resources determine the pace at which recovery plans can be carried out. The Service's system for setting recovery priorities was published in the September 21, 1983, *Federal Register*. (See story in BULLETIN Vol. VIII, No. 10.)

Copies of recovery plans are available for purchase about 6 months after they are approved, and can be ordered from the Fish and Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814, or call toll-free 800/582-3421. (In Maryland, call 301/492-6403.) The recovery plans shown below are arranged alphabetically by common name to follow the format used for animals in the U.S. List of Endangered and Threatened Wildlife and Plants; copies of the latest list are available free of charge from the Publications Unit, U.S. Fish and Wildlife Service, 130 Arlington Square, Washington, DC 20240.

SPECIES	PLAN TITLE	DATE APPROVED
<b>Mammals</b>		
Bat, gray	Gray Bat	08-Jul-82
Bat, Indiana*	Indiana Bat*	14-Oct-83
Bat, Ozark big-eared	Ozark Big-eared and Virginia Big-eared Bat	08-May-84
Bat, Virginia big-eared	Ozark Big-eared and Virginia Big-eared Bat	08-May-84
Bear, grizzly	Grizzly Bear	29-Jan-82
Caribou, woodland (Selkirk)*	Selkirk Mountain Caribou*	23-Dec-86
Cougar, eastern	Eastern Cougar	02-Aug-82
Deer, Columbian white-tailed*	Columbian White-tailed Deer*	14-Jun-83
Deer, key*	Key Deer*	19-Jun-85
Ferret, black-footed*	Black-footed Ferret*	08-Aug-88
Fox, San Joaquin kit	San Joaquin Kit Fox	31-Jan-83
Manatee, West Indian (Florida)*	Florida Manatee (West Indian)*	24-Jul-89
Manatee, West Indian (Puerto Rico)	West Indian Manatee (Puerto Rico Population)	24-Dec-86
Mouse, Alabama beach	Beach Mice (3 ssp.)	12-Aug-87
Mouse, Choctawhatchee beach	Beach Mice (3 ssp.)	12-Aug-87
Mouse, Perdido Key beach	Beach Mice (3 ssp.)	12-Aug-87
Mouse, salt marsh harvest	Salt Marsh Harvest Mouse/California Clapper Rail	16-Nov-84
Otter, southern sea*	Southern Sea Otter*	26-Dec-85
Panther, Florida*	Florida Panther*	22-Jun-87
Pronghorn, Sonoran	Sonoran Pronghorn	30-Dec-82
Rat, Morro Bay kangaroo	Morro Bay Kangaroo Rat	18-Aug-82
Seal, Hawaiian monk	Hawaiian Monk Seal [NMFS]	01-Apr-83
Squirrel, Delmarva Peninsula fox*	Delmarva Peninsula Fox Squirrel*	09-May-83
Wolf, gray (eastern timber)	Eastern Timber Wolf	05-Jun-78
Wolf, gray (Mexican)	Mexican Wolf	15-Sep-82
Wolf, gray (Northern Rocky Mountain)*	Northern Rocky Mountain Wolf*	03-Aug-87
Wolf, red*	Red Wolf*	18-Sep-84
<b>Birds</b>		
'Akepa, Hawaii	Hawaii Forest Bird (4 spp.)	03-Feb-83
'Akepa, Maui	Maui-Molokai Forest Birds (7 spp.)	30-May-84
'Akialoa, Kauai	Kauai Forest Birds (6 spp.)	29-Jul-83
'Akiapola'au	Hawaii Forest Bird (4 spp.)	03-Feb-83
Blackbird, yellow-shouldered	Yellow-shouldered Blackbird	25-May-83
Bobwhite, masked*	Masked Bobwhite*	16-Mar-84
Caracara, Audubon's crested (FL population)	Audubon's Crested Caracara (FL population)	14-Nov-89
Condor, California*	California Condor*	31-Jul-84
Coot, Hawaiian ('alae-ke'oke'o)*	Hawaiian Waterbirds (4 spp.)*	11-Sep-85
Crane, Mississippi sandhill*	Mississippi Sandhill Crane*	29-Jun-84
Crane, whooping*	Whooping Crane*	23-Dec-86
Creeper, Hawaii	Hawaii Forest Bird (4 spp.)	03-Feb-83
Creeper, Molokai	Maui-Molokai Forest Birds (7 spp.)	30-May-84
Crow, Hawaiian ('alala)	'Alala (Hawaiian Crow)	28-Oct-82
Duck, Hawaiian (koloa)*	Hawaiian Waterbirds (4 spp.)*	11-Sep-85



## SPECIES

## PLAN TITLE

DATE  
APPROVED

Duck, Laysan	Laysan Duck	17-Dec-82
Eagle, bald (Chesapeake population)	Bald Eagle (Chesapeake population)	19-May-82
Eagle, bald (Northern States)	Bald Eagle (Northern States)	29-Jul-83
Eagle, bald (Pacific States)	Bald Eagle (Pacific States)	25-Aug-86
Eagle, bald (Southeastern States)	Bald Eagle (Southeastern States)	03-Aug-84
Eagle, bald (Southwest population)	Bald Eagle (Southwest Population)	08-Sep-82
Falcon, American peregrine (Alaska)	Peregrine Falcon (Alaska-2 ssp.)	04-Oct-82
Falcon, American peregrine (Pacific)	Peregrine Falcon (Pacific)	12-Oct-82
Falcon, American peregrine (Rocky Mountain/Southwest)*	Peregrine Falcon (Rocky Mountain/Southwest)*	14-Dec-84
Falcon, Arctic peregrine	Peregrine Falcon (Alaska-2 ssp.)	04-Oct-82
Falcon, peregrine (Eastern)*	Peregrine Falcon (Eastern)*	09-Jun-87
Finch, Laysan	Northwest Hawaiian Island Passerine Birds (3 spp.)	04-Oct-84
Finch, Nihoa	Northwest Hawaiian Island Passerine Birds (3 spp.)	04-Oct-84
Goose, Aleutian Canada*	Aleutian Canada Goose*	08-Sep-82
Goose, Hawaiian (nene)	Nene	14-Feb-83
Hawk, Hawaiian	Hawaiian Hawk	09-May-84
Honeycreeper, crested	Maui-Molokai Forest Birds (7 spp.)	30-May-84
Kite, Everglade snail*	Florida Snail Kite*	09-Sep-86
Millerbird, Nihoa	Northwest Hawaiian Island Passerine Birds (3 spp.)	04-Oct-84
Moorhen, Hawaiian common*	Hawaiian Waterbirds (4 spp.)*	11-Sep-85
Nightjar, Puerto Rico	Puerto Rican Whip-poor-will	19-Apr-84
Nuku-pu'u, Kauai	Kauai Forest Birds (6 spp.)	29-Jul-83
Nuku-pu'u, Maui	Maui-Molokai Forest Birds (7 spp.)	30-May-84
'O'o, Kauai	Kauai Forest Birds (6 spp.)	29-Jul-83
'O'u (Hawaii)	Hawaii Forest Bird (4 spp.)	03-Feb-83
'O'u (Kauai)	Kauai Forest Birds (6 spp.)	29-Jul-83
Palila*	Palila*	27-Jun-86
Parrot, Puerto Rican*	Puerto Rican Parrot*	08-Apr-87
Parrotbill, Maui	Maui-Molokai Forest Birds (7 spp.)	30-May-84
Pelican, brown (California population)	Brown Pelican (California Population)	03-Feb-83
Pelican, brown (Eastern population)	Brown Pelican (Eastern Population)	19-Jul-79
Pelican, brown (Puerto Rico population)	Brown Pelican (Puerto Rico/Virgin Islands Pop.)	24-Dec-86
Petrel, Hawaiian dark-rumped	Hawaiian Sea Birds (2 spp.)	25-Apr-83
Pigeon, Puerto Rican plain	Puerto Rican Plain Pigeon	14-Oct-82
Plover, piping (Atlantic Coast)	Piping Plover (Atlantic Coast)	31-Mar-88
Plover, piping (Great Lakes/Northern Plains)	Piping Plover (Great Lakes/Northern Plains)	12-May-88
Po'ouli	Maui-Molokai Forest Birds (7 spp.)	30-May-84
Prairie-chicken, Attwater's greater	Attwater's Prairie Chicken	20-Dec-83
Rail, California clapper	Salt Marsh Harvest Mouse/California Clapper Rail	16-Nov-84
Rail, light-footed clapper*	Light-footed Clapper Rail*	24-Jun-85
Rail, Yuma clapper	Yuma Clapper Rail	04-Feb-83
Shearwater, Newell's Townsend's ('a'o)	Hawaiian Sea Birds (2 spp.)	25-Apr-83
Shrike, San Clemente loggerhead	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Sparrow, Cape Sable seaside	Cape Sable Seaside Sparrow	06-Apr-83
Sparrow, Florida grasshopper	Florida Grasshopper Sparrow	19-May-88
Sparrow, San Clemente sage	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Stilt, Hawaiian (ae'o)*	Hawaiian Waterbirds (4 spp.)*	11-Sep-85
Stork, wood (U.S.)	Wood Stork (U.S. Population)	09-Sep-86
Tern, California least*	California Least Tern*	27-Sep-85
Tern, roseate	Roseate Tern	20-Mar-89
Thrush, large Kauai	Kauai Forest Birds (6 spp.)	29-Jul-83
Thrush, Molokai	Maui-Molokai Forest Birds (7 spp.)	30-May-84
Thrush, small Kauai	Kauai Forest Birds (6 spp.)	29-Jul-83
Warbler, Kirtland's*	Kirtland's Warbler*	30-Sep-85
Woodpecker, red-cockaded*	Red-cockaded Woodpecker*	11-Apr-85

## Reptiles

Anole, Culebra Island giant	Culebra Island Giant Anole	28-Jan-83
Boa, Mona	Mona Boa	19-Apr-84
Boa, Puerto Rican	Puerto Rican Boa	27-Mar-86
Boa, Virgin Islands tree	Virgin Islands Tree Boa	27-Mar-86
Crocodile, American*	American Crocodile*	02-Feb-84
Gecko, Monito	Monito Gecko	27-Mar-86
Iguana, Mona ground	Mona Ground Iguana	19-Apr-84
Lizard, blunt-nosed leopard*	Blunt-nosed Leopard Lizard*	26-Dec-85

**SPECIES****PLAN TITLE****DATE  
APPROVED**

Lizard, Coachella Valley fringe-toed	Coachella Valley Fringe-toed Lizard	11-Sep-85
Lizard, island night	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Lizard, St. Croix ground	St. Croix Ground Lizard	29-Mar-84
Rattlesnake, New Mexico ridge-nosed	New Mexico Ridge-nosed Rattlesnake	22-Mar-85
Snake, eastern indigo	Eastern Indigo Snake	22-Apr-82
Snake, San Francisco garter	San Francisco Garter Snake	11-Sep-85
Turtle, Alabama red-bellied	Alabama Red-bellied Turtle	08-Jan-90
Turtle, flattened musk	Flattened Musk Turtle	26-Feb-90
Turtle, green sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, hawksbill sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, Kemp's ridley sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, leatherback sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, leatherback sea (St. Croix population)	Leatherback Sea Turtle (St. Croix population)	23-Oct-81
Turtle, loggerhead sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, olive ridley sea (Caribbean)	Marine Turtles (6 spp.) [NMFS]	19-Sep-84
Turtle, Plymouth red-bellied*	Plymouth Red-bellied Turtle*	25-Sep-85
Turtle, ringed sawback	Ringed Sawback Turtle	08-Apr-88

**Amphibians**

Coqui, golden	Golden Coqui	19-Apr-84
Salamander, desert slender	Desert Slender Salamander	12-Aug-82
Salamander, Red Hills	Red Hills Salamander	23-Nov-83
Salamander, San Marcos	San Marcos River E/T Species (1 plant, 3 animals)	08-Apr-85
Salamander, Santa Cruz long-toed*	Santa Cruz Long-toed Salamander*	23-Dec-85
Toad, Houston	Houston Toad	17-Sep-84

**Fishes**

Cavefish, Alabama*	Alabama Cavefish*	23-Sep-85
Cavefish, Ozark	Ozark Cavefish	17-Dec-86
Chub, bonytail	Bonytail Chub	16-May-84
Chub, Borax Lake	Borax Lake Chub	04-Feb-87
Chub, Chihuahua	Chihuahua Chub	14-Apr-86
Chub, humpback*	Humpback Chub*	15-May-84
Chub, Mohave tui	Mohave Tui Chub	12-Sep-84
Chub, Pahrnagat roundtail (bonytail)	Pahrnagat Roundtail Chub	28-Mar-86
Chub, slender	Slender Chub	29-Jul-83
Chub, spotfin	Spotfin Chub	21-Nov-83
Cui-ui*	Cui-ui*	22-Nov-83
Dace, blackside	Blackside Dace	17-Aug-88
Dace, Kendall Warm Springs	Kendall Warm Springs Dace	12-Jul-82
Dace, Moapa	Moapa Dace	14-Feb-83
Darter, amber	Conasauga Logperch/Amber Darter	20-Jun-86
Darter, bayou	Bayou Darter	08-Sep-83
Darter, fountain	San Marcos River E/T Species (1 plant, 3 animals)	08-Apr-85
Darter, leopard	Leopard Darter	20-Sep-84
Darter, Maryland*	Maryland Darter*	25-Sep-85
Darter, Niangua	Niangua Darter	17-Jul-89
Darter, Okaloosa	Okaloosa Darter	23-Oct-81
Darter, slackwater	Slackwater Darter	08-Mar-84
Darter, snail*	Snail Darter*	05-May-83
Darter, watercress*	Watercress Darter*	27-Mar-84
Gambusia, Big Bend	Big Bend Gambusia	19-Sep-84
Gambusia, Clear Creek	Clear Creek Gambusia	14-Jan-82
Gambusia, Pecos	Pecos Gambusia	09-May-83
Gambusia, San Marcos	San Marcos River E/T Species (1 plant, 3 animals)	08-Apr-85
Killifish, Pahrump	Pahrump Killifish	17-Mar-80
Logperch, Conasauga	Conasauga Logperch/Amber Darter	20-Jun-86
Madtom, smoky	Smoky Madtom	09-Aug-85
Madtom, yellowfin	Yellowfin Madtom	23-Jun-83
Pupfish, Comanche Springs	Comanche Springs Pupfish	02-Sep-81
Pupfish, Devil's Hole	Devil's Hole Pupfish	15-Jul-80
Pupfish, Leon Springs	Leon Springs Pupfish	14-Aug-85
Pupfish, Owen's	Owen's River Pupfish	17-Sep-84
Pupfish, warm springs	Warm Springs Pupfish	10-Nov-76
Shiner, Cape Fear	Cape Fear Shiner	07-Oct-88
Squawfish, Colorado	Colorado Squawfish	16-Mar-78



SPECIES	PLAN TITLE	DATE APPROVED
Stickleback, unarmored 3-spine	Unarmored Threespine Stickleback	27-Dec-77
Topminnow, Gila	Gila & Yaqui Topminnow (2 ssp.)	15-Mar-84
Topminnow, Yaqui Gila	Gila & Yaqui Topminnow (2 ssp.)	15-Mar-84
Trout, Apache (Arizona)*	Arizona Trout*	22-Sep-83
Trout, Gila*	Gila Trout *	03-Jan-84
Trout, greenback cutthroat*	Greenback Cutthroat Trout*	30-Sep-83
Trout, Paiute cutthroat	Paiute Cutthroat Trout	25-Jan-85
Woundfin*	Woundfin*	01-Mar-84
<b>Snails</b>		
Snail, Chittenango ovate amber	Chittenango Ovate Amber Snail	24-Mar-83
Snail, flat-spined three-toothed	Flat-spined Three-toothed Snail	09-May-83
Snail, Iowa Pleistocene	Iowa Pleistocene Snail	22-Mar-84
Snail, noonday	Noonday Snail	07-Sep-84
Snail, painted snake coiled forest	Painted Snake Coiled Forest Snail	14-Oct-82
Snail, Stock Island tree	Stock Island Tree Snail	09-Mar-83
Snail, Virginia fringed mountain	Virginia Fringed Mountain Snail	09-May-83
<b>Clams</b>		
Mussel, Alabama lamp pearly	Alabama Lamp Pearly Mussel	02-Jul-85
Mussel, Higgins' eye	Higgins' Eye Mussel	29-Jul-83
Pearly mussel, Appalachian monkeyface	Appalachian Monkeyface Pearly Mussel	09-Jul-84
Pearly mussel, birdwing	Birdwing Pearly Mussel	09-Jul-84
Pearly mussel, Cumberland bean	Cumberland Bean Pearly Mussel	22-Aug-84
Pearly mussel, Cumberland monkeyfaced	Cumberland Monkeyfaced Pearly Mussel	09-Jul-84
Pearly mussel, Curtis'	Curtis' Pearly Mussel	04-Feb-86
Pearly mussel, dromedary	Dromedary Pearly Mussel	09-Jul-84
Pearly mussel, green-blossomed	Green-blossom Pearly Mussel	09-Jul-84
Pearly mussel, orange-footed	Orange-footed Pearly Mussel	30-Aug-84
Pearly mussel, pale Lilliput	Pale Lilliput Pearly Mussel	22-Aug-84
Pearly mussel, pink mucket	Pink Mucket Pearly Mussel	24-Jan-85
Pearly mussel, tuberculed-blossom	Tuberculed, Turgid, & Yellow-blossom Pearly Mussel	25-Jan-85
Pearly mussel, turgid-blossom	Tuberculed, Turgid, & Yellow-blossom Pearly Mussel	25-Jan-85
Pearly mussel, white cat's paw	White Cat's Paw Pearly Mussel	25-Jan-90
Pearly mussel, white wartyback	White Wartyback Pearly Mussel	19-Sep-84
Pearly mussel, yellow-blossom	Tuberculed, Turgid, & Yellow-blossom Pearly Mussel	25-Jan-85
Pigtoe, fine-rayed	Fine-rayed Pigtoe Pearly Mussel	19-Sep-84
Pigtoe, rough	Rough Pigtoe Pearly Mussel	06-Aug-84
Pigtoe, shiny	Shiny Pigtoe Pearly Mussel	09-Jul-84
Pocketbook, fat	Fat Pocketbook Pearly Mussel	04-Oct-85
Riffle shell, tan	Tan Riffle Shell Mussel	22-Oct-84
Spiny mussel, Tar River	Tar River Spiny Mussel	16-Jan-87
<b>Crustaceans</b>		
Crayfish, cave ( <i>Cambarus zophonastes</i> )	<i>Cambarus zophonastes</i>	26-Sep-88
Crayfish, Nashville*	Nashville Crayfish*	08-Feb-89
Isopod, Socorro	Socorro Isopod	16-Feb-82
Shrimp, Kentucky cave	Kentucky Cave Shrimp	07-Oct-88
<b>Insects</b>		
Beetle, Delta green ground	Delta Green Ground Beetle/Solano Grass	11-Sep-85
Beetle, valley elderberry longhorn	Valley Elderberry Longhorn Beetle	28-Jun-84
Butterfly, El Segundo blue	El Segundo Blue Butterfly	22-Jan-86
Butterfly, Lange's metalmark*	Antioch Dunes (2 plants, 1 animal)*	25-Apr-84
Butterfly, lotis blue	Lotis Blue Butterfly	26-Dec-85
Butterfly, Mission blue	San Bruno Elfin & Mission Blue Butterflies	10-Oct-84
Butterfly, Oregon silverspot	Oregon Silverspot Butterfly	22-Sep-82
Butterfly, Palos Verdes blue	Palos Verdes Blue Butterfly	19-Jan-84
Butterfly, San Bruno elfin	San Bruno Elfin & Mission Blue Butterflies	10-Oct-84
Butterfly, Schaus swallowtail	Schaus Swallowtail Butterfly	17-Nov-82
Butterfly, Smith's blue	Smith's Blue Butterfly	09-Nov-84
Moth, Kern primrose sphinx	Kern Primrose Sphinx Moth	08-Feb-84

## SPECIES

## PLAN TITLE

DATE  
APPROVED

## Plants

Arrowhead, bunched	Bunched Arrowhead	08-Sep-83
Aster, Florida golden	Florida Golden Aster	29-Aug-88
Barberry, Truckee	Truckee Barberry	20-Jun-84
Bear-poppy, dwarf	Dwarf Bear-poppy	31-Dec-85
Beauty, Harper's	Harper's Beauty	14-Sep-83
Birch, Virginia round-leaf*	Virginia Round-leaf Birch*	30-Sep-85
Bird's-beak, salt marsh	Salt Marsh Bird's-beak	06-Dec-85
Bladder-pod, Missouri	Missouri Bladder-pod	07-Apr-88
Blazing Star, Heller's	Heller's Blazing Star	01-May-89
Blazing star, scrub	Florida Scrub Plants (11 spp.)	29-Jan-90
Bonamia, Florida	Florida Scrub Plants (11 spp.)	29-Jan-90
Boxwood, Vahl's	Vahl's Boxwood	28-Apr-87
Broom, San Clemente Island	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Buckwheat, gypsum wild	Gypsum Wild Buckwheat	30-Mar-84
Bush-clover, prairie	Prairie Bush-clover	06-Oct-88
Bush-mallow, San Clemente Island	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Cactus, black lace	Black Lace Cactus	18-Mar-87
Cactus, Brady pincushion	Brady Pincushion Cactus	28-Mar-85
Cactus, fragrant prickly-apple	Fragrant Prickly-apple Cactus	29-Aug-88
Cactus, key tree	Key Tree Cactus	09-Sep-86
Cactus, Knowlton hedgehog	Knowlton Hedgehog Cactus	29-Mar-85
Cactus, Kuenzler hedgehog	Kuenzler Hedgehog Cactus	28-Mar-85
Cactus, Lee pincushion	Sneed & Lee Pincushion Cacti	21-Mar-86
Cactus, Mesa Verde	Mesa Verde Cactus	30-Mar-84
Cactus, Nellie Cory	Nellie Cory Cactus	20-Sep-84
Cactus, Nichol's Turk's head	Nichol's Turk's Head Cactus	14-Apr-86
Cactus, Peebles Navajo	Peebles Navajo Cactus	30-Mar-84
Cactus, Siler pincushion	Siler Pincushion Cactus	14-Apr-86
Cactus, Sneed pincushion	Sneed & Lee Pincushion Cacti	21-Mar-86
Cactus, spineless hedgehog	Spineless Hedgehog Cactus	02-Apr-86
Cactus, Tobusch fishhook	Tobusch Fishhook Cactus	18-Mar-87
Cactus, Wright fishhook	Wright Fishhook Cactus	24-Dec-85
Cinquefoil, Robbin's	Robbins' Cinquefoil	22-Jul-83
Clover, running buffalo	Running Buffalo Clover	08-Jun-89
Coneflower, Tennessee purple	Tennessee Purple Coneflower	14-Feb-83
Dogweed, ashy	Ashy Dogweed	29-Jul-88
Dunegrass, Eureka Valley	Eureka Valley Dunes (2 plants)	13-Dec-82
Evening-primrose, Antioch Dunes*	Antioch Dunes (2 plants, 1 animal)*	25-Apr-84
Evening-primrose, Eureka Valley	Eureka Valley Dunes (2 plants)	13-Dec-82
Fleabane, Zuni (Rhizome)	Zuni Fleabane	30-Sep-88
Four-o'clock, MacFarlane's	MacFarlane's Four-o'clock	27-Mar-85
Frankenia, Johnston's	Johnston's Frankenia	24-May-88
Fringe tree, pygmy	Florida Scrub Plants (11 spp.)	29-Jan-90
Gerardia, sandplain	Sandplain Gerardia	20-Sep-89
Goetzea, beautiful	Beautiful Goetzea	28-Apr-87
Goldenrod, Blue Ridge	Blue Ridge Goldenrod	28-Oct-87
Goldenrod, Short's	Short's Goldenrod	25-May-88
Grass, Solano	Delta Green Ground Beetle/Solano Grass	11-Sep-85
Groundsel, San Francisco Peaks	San Francisco Peaks Groundsel	05-Oct-87
Heather, mountain golden	Mountain Golden Heather	14-Sep-83
Hypericum, highlands scrub	Florida Scrub Plants (11 spp.)	29-Jan-90
Ladies'-tresses, Navasota	Navasota Ladies'-tresses	21-Sep-84
Larkspur, San Clemente Island	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Lead-plant, crenulate	Pine Rockland Plants (5 spp.)	07-Oct-88
Leather flower, Alabama	Alabama Leather Flower	27-Dec-89
Live-forever, Santa Barbara Island	Santa Barbara Island Live-forever	27-Jun-85
Lousewort, Furbish	Furbish Lousewort	29-Jun-83
Lupine, scrub	Florida Scrub Plants (11 spp.)	29-Jan-90
Manzanita, Raven's	Raven's Manzanita	10-Jul-84
Milk-pea, Small's	Pine Rockland Plants (5 spp.)	07-Oct-88
Milk-vetch, Jessup's	Jessup's Milk-vetch	21-Nov-89
Mint, Lakela's	Florida Mints (3 spp.)	01-Jul-87
Mint, longspurred	Florida Mints (3 spp.)	01-Jul-87
Mint, San Diego mesa	San Diego Mesa Mint	10-Jul-84
Mint, scrub	Florida Mints (3 spp.)	01-Jul-87
Monkshood, northern	Northern Monkshood	23-Sep-83
Mustard, Carter's	Florida Scrub Plants (11 spp.)	29-Jan-90



SPECIES	PLAN TITLE	DATE APPROVED
Paintbrush, San Clemente Island Indian	California Channel Islands Species (4 plants, 3 animals)	26-Jan-84
Pawpaw, beautiful	Florida Pawpaws (3 spp.)	05-Apr-88
Pawpaw, four-petal	Florida Pawpaws (3 spp.)	05-Apr-88
Pawpaw, Rugel's	Florida Pawpaws (3 spp.)	05-Apr-88
Pea, slender rush	Slender Rush Pea	13-Sep-88
Pennyroyal, McKittrick	McKittrick Pennyroyal	12-Apr-85
Pennyroyal, Todsen's	Todsen's Pennyroyal	22-Mar-85
Phacelia, clay	Clay Phacelia	12-Apr-82
Phacelia, North Park	North Park Phacelia	21-Mar-86
Pitaya, Davis' green	Davis' Green Pitaya Cactus	20-Sep-84
Pitcher-plant, green*	Green Pitcher Plant*	05-Apr-85
Plum, scrub	Florida Scrub Plants (11 spp.)	29-Jan-90
Pogonia, small whorled	Small Whorled Pogonia	16-Jan-85
Polygala, tiny	Pine Rockland Plants (5 spp.)	07-Oct-88
<i>Polygonella basiramia</i> (a wireweed)	Florida Scrub Plants (11 spp.)	29-Jan-90
Poppy-mallow, Texas	Texas Poppy-Mallow	29-Mar-85
Prickly-ash, St. Thomas	St. Thomas Prickly-ash	05-Apr-88
Rattleweed, Hairy	Hairy Rattleweed (Wild Indigo)	19-Mar-84
Rhododendron, Chapman's	Chapman's Rhododendron	08-Sep-83
Rock-cress, McDonald's	McDonald's Rock-cress	28-Feb-84
Sedge, Navajo	Navajo Sedge	24-Sep-87
Snakeroot, scrub celery	Florida Scrub Plants (11 spp.)	29-Jan-90
Snowbells, Texas	Texas Snowbells	31-Jul-87
Spurge, deltoid	Pine Rockland Plants (5 spp.)	07-Oct-88
Spurge, Garber's	Pine Rockland Plants (5 spp.)	07-Oct-88
Torreya, Florida	Florida Torreya	09-Sep-86
Trillium, persistent	Persistent Trillium	27-Mar-84
Trout-lily, Minnesota	Minnesota Trout Lily	16-Dec-87
Vetch, Hawaiian	<i>Vicia menziesii</i> (Hawaiian Vetch)	18-May-84
Wallflower, Contra Costa*	Antioch Dunes (2 plants, 1 animal)*	25-Apr-84
Whitlow-wort, papery	Florida Scrub Plants (11 spp.)	29-Jan-90
Wild-buckwheat, clay-loving	Clay-loving Wild-buckwheat	10-Nov-88
Wild-rice, Texas	San Marcos River E/T Species (1 plant, 3 animals)	08-Apr-85
Ziziphus, Florida	Florida Scrub Plants (11 spp.)	29-Jan-90

\* revised plan

## Expenditures on Endangered Species

(continued from page 1)

The conclusion that 72 species receive most of the reasonably identifiable funding is not surprising. Most of these species are of high public interest. Congress singles out many of these species of concern in the appropriations bills. The high interest in these species also influences the decisions of State and Federal managers about which Endangered species recovery efforts to fund. In some cases, intensive research and management is needed in response to human impacts on the environment. For example, extensive population and habitat studies of the Tumamoc globe-berry plant were conducted in southern Arizona and northern Mexico in 1989, concurrent with the construction of a large aqueduct through the species' range in Arizona.

## Report Limitations

It is important to stress that the report on State and Federal expenditures does not portray a complete funding picture for the national effort to conserve Threatened and Endangered species. Only "reason-

ably identifiable" expenditures were required by Congress to be reported. A significant portion of State and Federal conservation activities are not easily or reasonably identified on a species-by-species basis, including law enforcement, interagency consultation, recovery coordination, staff salaries, and operational and maintenance costs, and are not reflected in the report. Thus, the reported \$18 million Service total does not reflect many expenditures associated with listing, Section 7 consultations, land acquisition, habitat conservation, refuge management, law enforcement, research, and fisheries activities.

The Service did not include its land acquisition expenditures in the report because these monies are separate from other funds and would grossly distort the expenditures tables. However, in 1989, the Service acquired 16,200 acres (6,500 hectares) specifically for Endangered species with \$13.3 million from the Land and Water Conservation Fund.

The report has several other limitations and caveats. For example, only listed species were included in the report; expenditures for species under review for possible listing (commonly called listing candidates) or other unlisted species were excluded. Expenditures for foreign

listed species also were not included. Of the 28 Federal agencies identified by the Service as likely to have made expenditures for the conservation of Threatened and Endangered species, 11 reported expenditures, 4 indicated that expenditures were not reasonably identifiable by species, and 13 did not report. There also was considerable variability among the various Federal agencies that did report. Therefore, comparisons of the figures in the 1989 report with other reports on Threatened and Endangered species expenditures will not be meaningful.

## Future Reports

The 1988 Endangered Species Act amendments require that an expenditure report be prepared annually. The 1989 report was prepared with little opportunity for advance planning and coordination. With better information collection procedures, future reports should provide a more complete picture of expenditures for the conservation of threatened and endangered species.

Copies of the 1989 report are available from the Division of Endangered Species and Habitat Conservation, U.S. Fish and Wildlife Service, Room 400 - ARLSQ, Washington, D.C. 20240.

## Proposed Listing Rules

(continued from page 3)

### Leafy Prairie-clover (*Dalea foliosa*)

The leafy prairie-clover, a perennial in the pea family (Fabaceae), grows in association with cedar glade habitats or in remnants of prairie that overlie limestone. This rare plant is currently known from one site in Alabama, seven sites in Tennessee, and four sites in Illinois. Most of these populations are small, and all but three are threatened by habitat alteration or destruction. On March 27, the Service proposed to list the leafy prairie-clover as an Endangered species.

A number of historical populations have been lost to residential, commercial, or industrial development; the conversion of habitat to cattle pastures; and the suppression of natural wildfires, which allows more competitive plants to encroach on *D. foliosa* sites. Only three populations receive some protection. Two sites in Illinois are being managed by the Will County Forest Preserve District, and most of the colony in Williamson County, Tennessee, is on land that has been donated to The Nature Conservancy. The protec-

tion of these three sites is important but will not ensure the species' survival.

The largest and healthiest Tennessee population is in Maury County within the authorized acquisition area for the Tennessee Valley Authority's (TVA) proposed Columbia Dam project on the Duck River. It is not yet certain whether or not the plants will be inundated if the flood pool is made as large as originally planned. The project has been delayed while TVA evaluates potential impacts of the reservoir on several Endangered mussel species in the Duck River. Among the project modifications under consideration are reduced floodpool levels. If the leafy prairie-clover is listed, TVA will become responsible for helping to conserve the species.

Both Tennessee and Illinois already list the leafy prairie-clover as endangered under State law. The Illinois Department of Conservation is using prescribed burning as a management tool to maintain the open prairie habitat needed by this and other rare plant species. In 1987 and 1988, Illinois biologists attempted to reestablish the leafy prairie-clover on an island in the Kankakee River from which the species was extirpated decades ago. So far, the experiment has not been successful, but the island was reseeded in the fall of 1989. The site will be examined again this year.



drawing by Sue Jackson

The leafy prairie-clover (*Dalea foliosa*) grows to about 1.5 feet (0.5 meter) tall from a hardened root crown. Its pinnately-compound leaves are arranged alternately along the stem, and are composed of 20 to 30 leaflets. Dense spikes of small purple flowers appear from late July through August.

## Conservation Measures

Among the conservation benefits authorized by the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any listed plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have their own more restrictive laws specifically against the take of State or federally listed plants and animals.

## Regional News

(continued from page 2)

Clarke, Director General of the Canadian Wildlife Service, signed a revised memorandum of understanding on whooping crane conservation at the recent North American Wildlife and Natural Resources Conference in Denver, Colorado. The agreement pledges to continue the cooperative efforts of the two nations to recover the Endangered whooping crane (*Grus americana*). The new agreement revises the 1985 memorandum of understanding and outlines cooperative recovery actions for the next 5 years. It sets a

(continued on next page)



## Regional News

(continued from previous page)

goal of establishing up to 3 captive flocks, each containing 5 to 15 pairs. There are already captive flocks in Maryland and Wisconsin, and a Canadian site for a third captive flock is under consideration. The revised agreement also recognizes plans to create a wild, non-migratory flock in Florida.

**Region 4** - The Springfield Plateau of northwest Arkansas, northeast Oklahoma, and southwest Missouri is an interesting karst area with caves that support at least three listed species: the Endangered gray bat (*Myotis grisescens*) and Ozark big-eared bat (*Plecotus townsendii ingens*) and the Threatened Ozark cavefish (*Amblyopsis rosae*). Federal and State agencies, private conservation organizations, colleges, and private individuals are working together to study the Ozark cavefish's range and recover the species. The cavefish was known to occur in 14 caves in the Springfield Plateau when it was listed in 1984. Subsequently, it has been discovered in 7 more caves. Of the 21 known caves that harbor the cavefish, 6 are owned by a government agency or a private conservation organization. The recharge area has been determined for 9 caves, with work continuing on at least 3 of the others. The 1989 recovery plan for this species calls for the protection of at least 9 caves and their recharge areas.

Several species that are candidates for listing also are restricted to the Springfield Plateau caves, including at least four species of cave crayfish. The Missouri Department of Wildlife Conservation is conducting electrophoretic analyses of cave crayfish from the area to clarify their taxonomic status. The Oklahoma Natural Heritage Inventory and the Arkansas Game and Fish Commission cooperated in collecting the crayfish samples for the Missouri study.

**Region 5** - On March 7, Regional Director Ron Lambertson presented an award to Edwin Clark, Secretary of the Delaware Department of Natural Resources and Environmental Control, for the Department's outstanding management of the Threatened piping plover (*Charadrius melodus*) in Delaware. Three piping plover nests were found in Delaware in 1989. Last summer, the Department's efforts to decrease human disturbance of nesting plovers resulted in seven out of eight chicks fledging from two of the nests. Unfortunately, grackles (*Quiscalus quiscula*) destroyed the entire clutch at the third nest.

The State's management actions included fencing off the sections of beach where the piping plovers established their nests and monitoring the birds' progress

on a daily basis. The program was successful in large part due to a cadre of volunteers who were stationed at the 300-foot (90-meter) restricted areas around the nests from dawn to dusk. They informed visitors about the plovers and ensured compliance with the "no-entry" rules. Surf fishermen in the area also were supportive in protecting the plovers. The plovers' success in 1989 contrasts sharply with that of 1988, when no chicks fledged, due at least partly to disturbance by pedestrians and vehicles.

The Endangered Indiana bat (*Myotis sodalis*) is declining in many parts of its range, but one West Virginia cave is proving an exception to the trend. This cave traditionally has harbored a very small population (about 9) of wintering Indiana bats. The largest population of Indiana bats recorded at this cave, dating back to the 1940s, was 41 bats. In August 1989, the Monongahela Power Company, which owns the cave, paid to install a bat-compatible gate at the entrance to the cave. In February of this year, 95 Indiana bats (as well as a sizeable population of more common bats) were counted in the winter survey. Although this dramatic increase cannot be attributed directly to the installation of the gate, the correlation is noteworthy.

The past several years also were banner ones for the two Endangered northern flying squirrel subspecies. In West Virginia, biologists from the State, Monongahela National Forest, and private contractors have captured and tagged a minimum of 186 Virginia northern flying squirrels (*Glaucomys sabrinus fuscus*) at 31 sites since 1985. In Virginia, 35 squirrels have been captured from 5 sites in 2 general locations. In North Carolina and Tennessee, 128 Carolina northern flying squirrels (*Glaucomys sabrinus coloratus*) have been captured and tagged from 12 major areas. Both subspecies inhabit high elevation areas with northern forest types (generally including spruce (*Picea* sp.)) in the southern Appalachians. Much of their limited habitat has been modified or destroyed by logging, mining, and recreational development. Spruce die-offs, which have been linked to acid precipitation, also pose a threat to these squirrels. While the numbers of squirrels recently captured provides reason for optimism about their future, it is clear that the key to the squirrels' recovery lies in the protection of their habitat.

**Region 6** - In Nebraska, a specimen of the American burying beetle (*Nicrophorus americanus*) was discovered recently in the collection of an entomologist from Chadron State College in Chadron, Nebraska. The specimen, collected during July 1988 in west-central Nebraska, is the first documented occurrence of the spe-

cies in the State since 1970. It also represents the most westward collection of the species. Additional surveys for the species will occur this summer. This insect, which once was distributed widely throughout North America, is known to survive at only two other places — a small island off the coast of New England and a site in eastern Oklahoma.

Experts from around the world who have been involved with reintroducing captive-raised animals into the wild met recently in Laramie, Wyoming. The Fish and Wildlife Service and Wyoming Game and Fish Department sponsored the 3-day workshop, which was designed to gather ideas and identify potential problems in preparation for reintroducing the black-footed ferret (*Mustela nigripes*). Proceedings of the workshop should be published by this fall.

The Colorado River Fishes Recovery Team met March 28 and 29 in Denver, Colorado. The importance of the San Juan River to the Colorado squawfish (*Ptychocheilus lucius*) was discussed at length. The team agreed that the San Juan is very important to the recovery of this Endangered fish and recommended that the river be included in the recovery plan objectives. The team also recommended high priority actions for the razor-back sucker (*Xyrauchen texanus*), a listing candidate.

**Region 8** - Dr. Paul Opler, from the Fish and Wildlife Service's Office of Information Transfer in Fort Collins, Colorado, has been appointed leader of the Oregon silverspot butterfly (*Speyeria zerene hippolyta*) recovery team. After holding its first meeting in late March, the team recommended that the species' known range be extended to include California. The team also recommended that the Service negotiate with the Department of Defense on managing butterfly habitat on the Clatsop Plains in Oregon. The team hopes to submit a draft recovery plan for the Oregon silverspot butterfly by the end of 1990.

**Region 9** - The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) has requested formal consultation with the Fish and Wildlife Service under Section 7 of the Endangered Species Act. The Service was asked to reevaluate the entire APHIS animal damage control program nationwide with regard to its effects on Threatened and Endangered species. The Service's original Biological Opinion on the animal damage control program was issued in 1979. A team of Service biologists will evaluate numerous target species and control techniques in developing the new Biological Opinion.

# Listing Approved for Dwarf Wedge Mussel

The dwarf wedge mussel (*Alasmodonta heterodon*) was listed by the Fish and Wildlife Service recently as an Endangered species. This mollusk rarely exceeds 1.5 inches (3.8 centimeters) in shell length and is the only North American freshwater mussel that consistently has two lateral teeth on the right valve but only one on the left. It lives on muddy sand and gravel creek and river bottoms within areas of slow to moderate current. The species once occurred in 15 major Atlantic slope drainages from New Brunswick, Canada, to North Carolina.

Today, the dwarf wedge mussel is thought to be extirpated from all but 10 small sites within 5 drainages in New Hampshire, Vermont, Maryland, and North Carolina. Agricultural, domestic, and industrial pollution, erosion and siltation, and the damming and channelization of rivers are thought to be largely responsible for the dramatic decline in the mussel's distribution. All remaining populations are small and are probably declining due to continued environmental degradation. The mussel's limited numbers and distribution also make it vulnerable to extinction from collecting and loss of genetic diversity.

The Service proposed to list the dwarf wedge mussel as Endangered in the April 17, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 5), and the final rule was published March 14, 1990.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	52	244	7	22	325	25
Birds	75	145	10	0	230	59
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	31	0	93	47
Snails	3	1	6	0	10	7
Clams	35	2	0	0	37	23
Crustaceans	8	0	1	0	9	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	169	1	53	2	225	102
<b>TOTAL</b>	<b>428</b>	<b>472</b>	<b>137</b>	<b>38</b>	<b>1075*</b>	<b>308 **</b>

Total U.S. Endangered **428** (259 animals, 169 plants)

Total U.S. Threatened **137** ( 84 animals, 53 plants)

Total U.S. Listed **565** (343 animals, 222 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 257 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

April 3, 1990

April 1990

Vol. XV No. 4

## ENDANGERED SPECIES

### Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

### Steller Sea Lion is Given Emergency Protection

Responding to a dramatic decline in the number of Steller or northern sea lions (*Eumetopias jubatus*) in Alaska, the National Marine Fisheries Service (NMFS) has taken emergency action to protect this species throughout its range under the Endangered Species Act.

The emergency action was prompted by a November 1989 petition from the Environmental Defense Fund and 17 other environmental organizations to list all populations of the Steller sea lion in Alaska as Endangered. NMFS, which has responsibility under the Endangered Species Act for most marine species, subsequently concluded that the species should be listed as Threatened on an emergency interim basis and published a determination in the April 5, 1990, *Federal*

*Register*. The Fish and Wildlife Service codified the determination, and on April 10, the Steller sea lion was added to the List of Endangered and Threatened Wildlife. The 240-day emergency rule is effective through December 3, 1990.

The Steller sea lion is a large seal, with males reaching up to 11 feet (350 centimeters) in total length and weighing over 1 ton (910 kilograms). Females are much smaller, averaging about 8 feet (240 cm) in total length and weighing about 605 pounds (275 kg). The species' diet consists mainly of various fishes (such as pollock, halibut, herring, salmon, cod, and flounder), octupi, and crustaceans.

The Steller sea lion's range extends from Japan through the Soviet Union's Kuril Islands, the Okhotak Sea, the

Aleutian Islands, the Bering Sea, the Gulf of Alaska, and along the Pacific coastline down to southern California. More than 50 breeding colonies or rookeries have been identified in the United States. Most of the rookeries are on isolated islands, free from human disturbance, in the Gulf of Alaska and southern Bering Sea.

#### Decline in Numbers

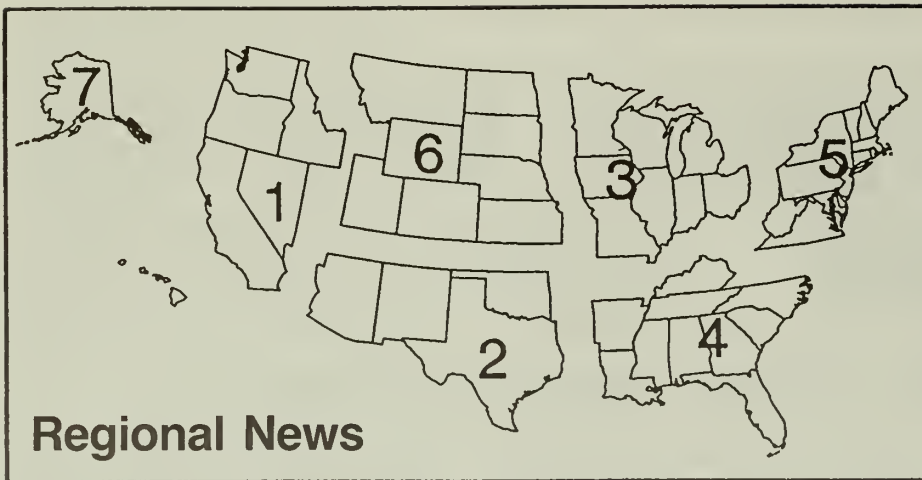
In the 1970's, the number of Steller sea lions in the eastern Aleutian Islands (which has one of the largest concentrations in the United States) began declining. The decline subsequently spread to the western Gulf of Alaska, the central

(continued on page 9)



photo by Craig Johnson

Steller sea lions hauled out on the Chiswell Islands, Alaska Maritime National Wildlife Refuge



## Regional News

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

**Region 1**—The latest survey of San Nicolas Island, conducted by the Fish and

Wildlife Service in April 1990, found 15 adult southern sea otters (*Enhydra lutris nereis*), including two adults that had not been observed since October 1989, and one new pup. The pup is the first sea

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**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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otter known to have been weaned at the island. Frequent mating behavior was observed among the sea otters, indicating that the otters' social behavior appears to be normal.

Preliminary indications from the 1990 population census of the least Bell's vireo (*Vireo bellii pusillus*) suggest that last year's significant population decline will not be repeated this year. At least three major areas (Prado Basin, Pilgrim Creek, and San Diego River) already support more birds than in 1989.

The Service's Ventura, California, Field Station staff recently met with Southern California Edison, Seneca Resources Corporation, and Santa Fe Petroleum Corporation to discuss the burial of transmission lines in the vicinity of the Andean condor (*Vultur gryphus*) experimental release site. Burying the transmission lines would reduce the possibility of the condors being electrocuted. The companies would like to cooperate with the Service and are exploring the economic feasibility of burying the transmission lines.

The 1990 California condor (*Gymnogyps californianus*) breeding season came to a close with the hatching of two more condors at the San Diego Wild Animal Park and Los Angeles Zoo. The captive condors produced a total of 15 eggs this season, of which 8 hatched. All 8 chicks are doing well. Biologists will not try to determine the sex of the condor chicks for another 6 to 7 months in order to avoid stress that could kill the birds. There are now 40 California condors, all of them in two captive breeding facilities. The number of condors has almost doubled since 1982, when there were 22 condors. The Service hopes to begin releasing condors into the wild as early as 1991.

Meanwhile, the Service is soliciting nominations for a third captive breeding facility for California condors. Readers with suggestions are invited to contact the Ventura Field Office, 2291-A Portola Road, Suite 300, Ventura, California 93003 (telephone: 805/644-1766; FTS 983-6039).

**Region 3**—The Fish and Wildlife Service's Marion, Illinois, Field Office has been working with the U.S. Forest Service's Shawnee National Forest to update its "Standards and Guides for the Management of Timber Harvests." One standard in this internal agency document has special significance for protecting the Endangered Indiana bat (*Myotis sodalis*) in southern Illinois. The Forest Service is considering changing the current standard that preserves wooded corridors along both sides of perennial streams in the Shawnee National Forest, expanding it to include intermittent streams. Expansion of

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# 1989 Amendments to CITES Strengthen Protection for Endangered Wildlife and Plants

Susan S. Lieberman  
Office of Management Authority  
Washington, D.C.

The international trade in plants and wildlife, including whole plants, animal skins, body parts, worked pieces, and live specimens, is both big business and a major factor affecting worldwide biodiversity. It is estimated that the international plant and animal trade is worth more than \$5 billion annually, of which up to 30 percent may be illegal. Public attention recently has focused on such issues as the slaughter of African elephants (*Loxodonta africana*) for the ivory trade, the illegal trade in chimpanzees (*Pan troglodytes*), and the near-extinction of the African black rhinoceros (*Diceros bicornis*) for its horn. But many little-known, ecologically significant species also have been seriously depleted by international commerce.

Twenty years ago, there was virtually no international regulation of the trade in plants and wildlife. In 1972, the United Nations Stockholm Conference on the Human Environment recommended worldwide controls over this market. In response, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was developed and signed at a 1973 conference in Washington, D.C. As of May 1990, 107 countries have become Parties (member countries) to CITES.

CITES has become the major international effort for global plant and wildlife protection and is probably the best known international conservation treaty. The trade in hundreds of species of vertebrates, invertebrates, and plants is regulated by CITES. However, the treaty only covers species that are affected by international trade. (Species threatened mainly by habitat loss, for example, are beyond the scope of CITES.) Because the international plant and wildlife trade is both monitored and regulated by the individual CITES Parties, the effectiveness of the treaty depends on the law enforcement and regulatory infrastructure of each country.

## Which Species are Covered?

CITES regulates the trade in plants and animals in varying degrees, depending on their biological status and vulnerability to commercial exploitation. Three appendices to the treaty identify how much protection is provided to each species. Appendix I lists species in danger of extinction that are, or may be, affected by international trade. Commercial trade in these species is prohibited. Appendix II includes species that may become endangered if their trade is not brought under control. Commercial trade in Appendix II

species is subject to regulation, and is allowed only if export permits are obtained stating that trade will not harm the species. Appendix III lists species that individual CITES Parties identify as subject to domestic regulations for the purpose of restricting or preventing exploitation. Permits also are required for trade in Appendix III species.

About every 2 years, the CITES Parties meet to review the international plant and wildlife trade, amend the appendices as needed (either placing species in the appendices or transferring them among the appendices), and adopt resolutions to further strengthen plant and wildlife protection.

## October 1989 Conference Resolutions

The seventh meeting of the CITES Conference of the Parties took place in Lausanne, Switzerland, October 9-20, 1989. The meeting attracted more press and world community attention than all of the previous conferences, largely due to the ivory trade and the crisis facing the African elephant. But the October meeting addressed many other important issues, including increased protection for several species and changes in implementing the treaty. Fifteen resolutions were passed at the meeting, which addressed a wide range of issues. Two of the resolutions addressed the shipment of live animals and captive breeding.

**Shipment of Live Animals:** CITES has been addressing the problems of shipping live animals since its inception. The welfare of individual animals in transit is specifically covered in the text of the Convention, which requires Parties to ensure that "any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment." Efforts to reduce transport-induced mortalities improve the welfare of individual animals and reduce the need to take additional animals from wild populations.

The resolution passed at the October meeting notes that "mortalities in transport remain of significant concern . . . and undermine the concept of sustainable trade." The resolution includes three recommendations:

- shipments should be cleared for export only if they have passed a health and welfare checklist;
- Parties should gather information on the level and causes of mortality during transport; and
- all shipments should comply with the International Air Transport Association's (IATA) Live Animals Regulations for air transport, or the CITES' Guidelines for Transport of Live Specimens for terrestrial and marine shipments.

(Stricter domestic measures for transporting live animals exist in many countries, including the United States. The domestic regulations for transporting live animals to the United States (50 CFR 14) are currently being revised.)

The Parties to CITES also established a Working Group on Transport of Live Specimens to monitor transport conditions and transport-induced mortalities and to assist the Parties in implementing pertinent resolutions.

**Captive Breeding:** Captive-bred animals of Appendix I species are treated as if they are on Appendix II. It is therefore critical to effectively control and regulate commercial operations that breed Appendix I animals. At the October meeting, the Parties established criteria for proposals to register the first commercial captive-breeding operation for an Appendix I animal species. Between now and the next conference in 1992, the United States will review this resolution, as well as any proposals submitted pursuant to it.

## Changes in the Appendices

The Parties considered many different proposals to amend the CITES Appendices (see F.R. 9/5/89 and F.R. 10/6/89) at the October meeting, most of which passed. They have been incorporated as a final rule in U.S. regulations. (See F.R. 12/15/89 for a list of the decisions of the October meeting, and F.R. 2/20/90 for a list of all of the changes to the CITES Appendices, as implemented in 50 CFR 23.23.)

**African Elephants:** After a long, contentious debate, the Parties agreed at the conclusion of the October meeting to place all African elephant populations on Appendix I. An accompanying resolution listed criteria that must be met for countries to request the transfer of populations back to Appendix II. A panel of experts also will be established to review these requests, examining scientific, trade, and law enforcement information. It is expected that some southern African countries will request the transfer of their populations back to Appendix II. In addition, China, South Africa, the United Kingdom (for Hong Kong), Botswana, Zimbabwe, Malawi, and Zambia have taken reservations and not accepted the inclusion of the African elephant on Appendix I. (A more detailed article on recent actions taken to protect the African elephant will be included in a future issue of the BULLETIN.)

**Bats:** Seven species of *Pteropus* (fruit bats or flying foxes) from the Pacific region were moved from Appendix II to Appendix I, and all other species of *Pteropus*, as well as all species in the

(continued on page 4)



# CITES Amendments

(continued from page 3)

genus *Acerodon* (flying foxes), were placed in Appendix II. CITES often includes an entire genus in Appendix II because of problems with similarity of appearance and identification. This is particularly true for flying fox species, many of which are being seriously depleted for human consumption.

**Cats:** Three species of New World spotted cats—the little spotted cat (*Felis tigrina*), ocelot (*Felis pardalis*), and margay (*Felis wiedii*)—were transferred from Appendix II to Appendix I. Some subspecies of each species were already listed on Appendix I, but Appendix I protection is now afforded to all subspecies. The main threat to these cats has been poaching and smuggling for the fur trade. Identification of skins from different subspecific populations has been difficult.

**Bears:** Sloth bears (*Melursus ursinus*) were transferred from Appendix II to I, due to seriously declining populations and the trade in bear gall bladders and other parts. There is also evidence that the capture of cubs for entertainment purposes is a threat to the species. The sloth bear, once common in most forests of its range in Sri Lanka, India and Nepal, is now rapidly disappearing in the wild.

The trade in brown bears (*Ursus arctos*), including skins, gall bladders for medicinal purposes, meat and paws for human consumption, claws for decorative purposes, and live animals for zoos and circuses, is a significant threat to the survival of many subspecies. In the past, the treatment of brown bear subspecies in CITES has been confusing, with some subspecies not on the appendices, some listed on Appendix II, and some on Appendix I. As a result of the October meeting, brown bear populations in Afghanistan, India, Mexico (the Mexican grizzly bear), Nepal, and Pakistan are listed on Appendix I, while all other populations in the world, except those in the Soviet Union, are on Appendix II. It is hoped that this increased regulation and protection will help stem the trade-induced decline of many bear populations.

**Birds:** The U.S. Fish and Wildlife Service is very concerned that psittacines (parrots) and other bird species are being traded at levels that their wild populations cannot sustain. Three species of psittacines were transferred from Appendix II to Appendix I at the October CITES meeting: Moluccan or salmon-crested cockatoo (*Cacatua moluccensis*), Illiger's macaw (*Ara maracana*), and Tucuman amazon (*Amazona tucumana*). CITES identified the Moluccan cockatoo as a "significantly traded species," which means that it is being detrimentally affected by international trade. The species was placed in Appendix II in 1981. From 1981-1987, 54,600 imports of the Moluccan cockatoo were reported to CITES, of

which 40,232 (74 percent) were imported into the United States, almost entirely for the commercial pet market. In proposing additional protection for the species at the October meeting, Switzerland noted "the only way to prevent the species from becoming extinct is to transfer it to Appendix I."

**Crocodiles:** All members of the families Alligatoridae and Crocodylidae are listed on either Appendix I or Appendix II. The discussions at the October meeting about the Nile crocodile (*Crocodylus niloticus*), including export quotas, "ranching" operations, and listing of geographic populations in the appendices, were contentious. Although commercial ranching of crocodiles can limit the pressure on wild populations to sustainable levels, concerns were expressed at the meeting regarding the effect of some ranching operations on the Nile crocodile. The Parties finally agreed to list wild populations of the Nile crocodile in Cameroon, Congo, Ethiopia, Kenya, Madagascar, Somalia, Sudan, and Tanzania on Appendix II, subject to export quotas; wild populations in Botswana, Malawi, Mozambique, Zambia and Zimbabwe were listed on Appendix II, under CITES ranching criteria. All other wild populations remain on Appendix I. The CITES Parties will continue to monitor the trade in the skins of all species of crocodiles.

**Lizards and Snakes:** The Caiman lizard (*Dracaena paraguayensis*), found in Paraguay, Brazil, and possibly Bolivia, was placed on Appendix II due to its similarity of appearance and taxonomic confusion with *Dracaena guianensis*, which is heavily traded for its skin. The Chinese crocodile lizard (*Shinisaurus crocodilorus*) was placed on Appendix II due to increasing demand for it in the European and American pet trade. (The wild population is estimated at approximately 2,500.)

Three snake species—the oriental rat snake (*Ptyas mucosus*), Asiatic cobra (*Naja naja*), and king cobra (*Ophiophagus hannah*)—were transferred from Appendix III to Appendix II. These species, found throughout Southeast Asia and the Indian subcontinent, are traded mostly for the exotic leather industry. The oriental rat snake is probably the most heavily traded snake in the world, with at least 1.8 million skins entering trade every year. The Appendix II listing will allow for more extensive monitoring of the trade in these ecologically important species.

**Fishes:** Of particular note, the Parties agreed to transfer the coelacanth (*Latimeria chalumnae*) to Appendix I. This species, found only in deep waters of the Comores Archipelago near Madagascar is a unique "living fossil" only recently discovered by science. The coelacanth was believed to have become extinct millions of years ago until it was rediscovered this century. It is ironic that this last remaining representative of a unique phase in vertebrate evolution is endangered due to the museum and aquarium trade.

**Corals:** Hard or reef-building corals are traded as souvenirs, aquarium decorations, jewelry, and for other decorative purposes. It is estimated that the world trade in raw ornamental corals is at least 2,000 tons (1,800 metric tons) a year, with the United States being the world's main importer. Black corals (order Antipatharia) are already in Appendix II.

As a result of the October meeting, all species in several taxa of hard corals have been added to Appendix II. They include all species in the orders Scleractinia and Coenothecalia, and all species in the families Tubiporidae (order Stolonifera), Milleporidae, and Systerasteridae (order Athecata). The export of these corals now requires permits stating that the trade will not harm wild populations. It is hoped that the Appendix II listing will provide improved trade information, stimulate improved management of coral reefs and coral populations, and stem the global loss of corals.

**Flower Bulbs:** Massive collection of snowdrops (*Galanthus* spp.) and sternbergia (*Sternbergia* spp.) flower bulbs from wild populations, mostly in Turkey (a non-Party), poses a serious threat to the survival of these plants in the wild. More than 49 million bulbs of snowdrops, an extremely popular spring-flowering garden bulb, are traded every year. At the October meeting, the Parties agreed to include all species and natural hybrids of *Galanthus* and *Sternbergia* in Appendix II. It is hoped that the Appendix II listing will provide improved trade information, encourage necessary scientific studies, and stimulate captive propagation of the flower bulbs.

**Succulents:** Several species of succulents were transferred from Appendix II to Appendix I. Three dwarf species of *Pachypodium* and their natural hybrids, as well as all dwarf species of the subgenus *Lacanthia* of the genus *Euphorbia* and their natural hybrids, are now listed on Appendix I. These unusual succulents, endemic to Madagascar, are particularly vulnerable to overcollection by commercial suppliers due to high collector interest. Although trading wild specimens of these succulents is now prohibited by CITES, artificially propagated specimens still can be traded with export permits. It is hoped that listing the plants will stimulate increased artificial propagation and reduce the pressure on diminishing wild populations.

**Orchids:** Two genera of slipper orchids, *Paphiopedilum* (from Southeast Asia) and *Phragmipedium* (from South America), were transferred to Appendix I. These orchids have increased in commercial popularity and have been depleted in the wild in many parts of their former range due to overcollection. As with other plants, it is hoped that this listing will stimulate increased artificial propagation and reduce the collection of wild specimens.

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Ten species of plants and animals were proposed by the Fish and Wildlife Service during April 1990 for listing as Threatened or Endangered. Four of these taxa—two plants and two animals—are native to the United States. The remaining six, all reptiles, are found only in other countries. If the proposed listings are approved, Endangered Species Act protection will be extended to the following:

## Prairie Mole Cricket (*Gryllotalpa major*)

As its name implies, this is a burrowing insect found in prairie habitat. Historically, it occurred widely throughout native tall-grass prairie in eastern Kansas and eastern Oklahoma, southwestern Missouri, and northwestern Arkansas. There are also records of disjunct populations in Illinois and Mississippi, but the species apparently is extirpated in these States.

Almost all of the native prairie in these areas has been converted to cropland and other uses. For example, D. S. Wilcove estimated in 1987 that only 0.5 percent of Missouri's presettlement prairie remains. As a result, the prairie mole cricket and many other species dependent on this type of habitat have declined dramatically. A range-wide survey from 1986 to 1989 revealed that the cricket's habitat has been reduced to scattered remnants of prairie in Oklahoma, Kansas, Missouri, and Arkansas. Most of the remaining populations are very small. To help in protecting the species and its last fragments of habitat, the Service has proposed to list the prairie mole cricket as Threatened (F.R. 4/25/90).

## Florida Saltmarsh Vole (*Microtus pennsylvanicus* *dukecampbelli*)

Although similar in appearance to the meadow vole (*Microtus pennsylvanicus pennsylvanicus*), its widespread relative, the Florida saltmarsh vole has a much more restrictive habitat. This small rodent exists only in a few grassy areas within the salt marsh of Waccasassa Bay on Florida's gulf coast. Having such a restrictive range makes the Florida saltmarsh vole vulnerable to extinction. The remaining population is very small. In recognition of this subspecies' precarious status, the Service has proposed to list it as Endangered (F.R. 4/11/90).

Fossil records indicate that the Florida saltmarsh vole had a much more extensive distribution throughout Florida during the Pleistocene when the sea level was lower than today. Its decline is probably due to natural causes. As the climate changed and the sea rose, most of the coastal grassland and prairie habitat



The prairie mole cricket (*Gryllotalpa major*) is a large insect, measuring up to 2.5 inches (6.0 centimeters) in total length. This species is characterized by forelegs that are highly adapted for digging in prairie soils. Male mole crickets dig specially designed burrow systems that contain a bulb-like resonation chamber to amplify their calls during the mating season. Calls at one Missouri prairie have been heard over a quarter of a mile away.

needed by this vole disappeared. The single known population apparently exists under marginal ecological conditions, and could be lost to a storm or any other event that alters the remaining habitat. Hurricane Elena's pass through the Waccasassa Bay area in 1985 apparently almost caused the subspecies' extinction. When biologists returned for surveys in 1987 and 1988, only one saltmarsh vole was captured despite intensive trapping.

## Lyrate Bladder-pod (*Lesquerella lyrata*)

The lyrate bladder-pod, a small annual plant in the mustard family (Brassicaceae), is native to cedar glades in the southeastern United States. This type of habitat is characterized by shallow-soiled open areas that are associated with limestone outcroppings and often surrounded by cedar (*Juniperus virginiana*) woods. Most cedar glades in the southeast have been modified or lost due to urban and agricultural development. Only widely scattered pockets remain. Two populations of *L. lyrata* are known to survive, both in northwestern Alabama (Colbert and Franklin Counties). Because of the species' low numbers and the vulnerability of its remaining habitat, the Service has proposed to list the lyrate bladder-pod as Threatened (F.R. 4/25/90).

The glades still inhabited by the plant have been at least partially disturbed by grazing, cultivation, and mowing. Some form of periodic disturbance probably is necessary in order to arrest invasions of competing plants and to stimulate seed germination. Thus, agriculture and the

survival of the lyrate bladder-pod are not necessarily incompatible. The species could be jeopardized, however, if the sites are heavily grazed or if the plants are plowed or sprayed with herbicides before the plants disperse seeds in mid-May.

## Terlingua Creek Cat's-eye (*Cryptantha crassipes*)

This perennial plant in the family Boraginaceae is silvery in color and covered with bristly hairs. Slender, erect stems up to 2 feet (60 centimeters) in height grow from a dense mound of narrow leaves, and small white flowers bloom from March to early June. The species occurs at a few sites in western Texas within the Terlingua Creek drainage, where it is restricted to dry, chalky, gypsum-bearing shale hills.

The 6 known populations consist of fewer than 3,800 mature plants, but no seedlings have been discovered. All are on privately owned land in Brewster County. Most of the sites are within an area that has been subdivided into lots and sold as resort property. Some of the roads constructed by the resort company cross *C. crassipes* population sites and probably destroyed an unknown number of plants. The species could be imperiled if landowners decide to develop the tracts occupied by the remaining populations. Other potential threats include habitat damage from livestock and off-road vehicles. Because of the species' restricted range and vulnerable habitat, the Service has proposed listing the Terlingua Creek cat's-eye as Endangered (F.R. 4/13/90).

(continued on page 6)



# Proposed Listings

(continued from page 5)

## Six Foreign Reptiles

On April 24, the Service proposed to list the following foreign reptiles as Endangered species:

• **Maria Island snake (*Liophis ornatus*)**—Originally found on the island of St. Lucia in the Caribbean, this snake was thought to have become extinct in the early 20th century until it was rediscovered on the nearby islet of Maria Major. Adults reach up to 3 feet (1 meter) in length and are black to olive-brown in color, broken by a zig-zag pattern of white/yellow spots. The current population is estimated to number 50 to 100 individuals.

• **Maria Island ground lizard (*Cnemidophorus vanzoi*)**—This species also probably occurred historically on St. Lucia but disappeared after non-native predators (mongooses and rats) became established on the island. It survives on Maria Major and Maria Minor. In 1973, both of these dry, rocky, volcanic islets were designated as a preserve for the protection of their unique wildlife. Mature Maria Island ground lizards can grow up to 15 inches (38 cm) long and are generally olive-green, with light striping down the back and lines of blue-gray spots along the sides. Fewer than 1,000 of the lizards are believed to remain.

• **Inagua Island turtle (*Trachemys stejnegeri malonei*)**—A subspecies of the central Antillean slider, *T. s. malonei* is endemic to Great Inagua Island in the Bahamas. Adult Inagua Island turtles have a green-brown, high-domed carapace up to 9.5 inches (24 cm) long and gray to olive-colored skin. These turtles inhabit freshwater ponds, streams, and swamps that have abundant vegetation. Part of the subspecies' habitat is within a preserve established for the native flamingos. Existing salt ponds on the island may be permitted to expand because, although parts of the preserve would be inundated, flooding is not expected to harm the flamingos. However, salt water is lethal to the Inagua Island turtle. The pumping of freshwater ponds for drinking water to supply the island's growing human population also could reduce the turtle's habitat. An introduced predator, the feral hog, is another threat. There are an estimated 200 to 500 turtles remaining.

• **Cat Island turtle (*Trachemys terapen felis*)**—This subspecies, another Bahamian turtle, occurs only on Cat Island. Adults are inconspicuous, having a carapace grayish-brown to yellowish-olive in color with few if any markings. They reach about 13 inches (32 cm) in carapace length. These turtles generally live around ephemeral ponds, and survive dry

periods by burrowing into the muck and leaf litter of former wet areas. Some turtles are taken for food and the local pet trade, but the greatest threat to this subspecies is habitat loss. Seven out of the eight known Cat Island turtle population sites have been damaged by conversion to agriculture and other uses. Land is frequently cleared for farming by burning off all natural vegetation, and charred turtle carcasses are usually found when the brush and debris are removed. Extensive surveys on Cat Island in 1987 located only 350 turtles.

• **Brazilian sideneck turtle (*Phrynops hoguei*)**—First described in 1967, the Brazilian sideneck turtle is a rare native of the Rio Paraiba and Rio Itapemirim drainages in southeastern Brazil. This species has a particularly narrow head and neck, and a domed, elongated carapace measuring up to 13 inches (34 cm) in length. Extensive deforestation and increasing development in the region have degraded the species' riverine habitat, making it silty and polluted. The banks and marshes along the river no longer support turtle reproduction, and no juvenile specimens have been found during periodic field collections.

• **South American red-lined turtle (*Trachemys scripta callirostris*)**—Also referred to as the Colombian slider, this colorful subspecies once was common in the river drainages of northern Colombia and northwestern Venezuela. Much of its known habitat, however, has been heavily damaged by erosion and industrial pollution. Petroleum facilities now occupy virtually all of the turtle's former habitat in Venezuela, and many of the remaining wetlands throughout the species' range are being drained and burned. Named for the bright red extending back from its eye, this attractive turtle also has a relatively large (24-inch or 60-cm) carapace that is highly patterned with yellow bars and black and green concentric circles. It has appeared regularly in the European pet trade for many years. Hatchlings are a bright emerald-green. The color and patterning of these juveniles inspire some local people to gather large numbers of them for eventual sale as dried trinkets. Large numbers of eggs and adult turtles also are gathered.

\* \* \*

## Conservation Measures

Among the conservation benefits authorized by the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater

recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have their own more restrictive laws specifically against the take of State or federally listed plants and animals.

## CITES Amendments

(continued from page 4)

## CITES and The Fish and Wildlife Service

The opening sentence of CITES states: "... wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth which must be protected for this and the generations to come." The Service firmly supports this goal, and is committed to the full implementation of CITES.

For many species, CITES is a success. Without the treaty, many populations in existence today might have been driven to extinction by uncontrolled trade. The October 1989 CITES biennial meeting accomplished a great deal, but much more work needs to be done to bring trade down to sustainable levels for many species.

For more information on CITES and the United States' involvement in the treaty, and to obtain copies of the CITES appendices, contact the Fish and Wildlife Service, Office of Management Authority, Room 432-ARLSQ, 1849 C Street, N.W., Washington, D.C. 20240.



# Final Listing Rules Approved for the Desert Tortoise and Seven Other Species

During April of 1990, final listing rules were published for the desert tortoise, one mussel species, and six plant species. Endangered Species Act protection is now available to the following:

## Desert Tortoise (*Gopherus agassizii*)

The desert tortoise has received much attention since the Fish and Wildlife Service took emergency action to list the Mojave population as Endangered on August 4, 1989 (see BULLETIN Vol. XIV, Nos. 9-10). During the 240-day life of the emergency rule, the Service studied the tortoise and its habitat, sought public input, and prepared a proposal to provide long-term Endangered Species Act protection to the population.

On April 2, 1990, a final rule was published in the *Federal Register* listing the Mojave population of the desert tortoise as Threatened. The Beaver Dam Slope subpopulation in Utah, which was listed as Threatened with Critical Habitat in 1980 (see BULLETIN Vol. V, No. 9), is included as part of the greater Mojave population under this rule and is not treated separately; the area designated as Critical Habitat in 1980 will remain in effect. The rule also treats all desert tortoises from the Sonoran population (south and east of the Colorado River) found outside their native range as Threatened due to their similarity in appearance to the Mojave tortoises. (The Service will continue to study the status of the Sonoran population and will make a determination early in 1991 on whether or not to prepare a listing proposal.)

The desert tortoise is a long-lived reptile that inhabits the Mojave, Colorado, Sonoran, and Sinaloan Deserts in the southwestern United States and Mexico. The Mojave population covers tortoises north and west of the Colorado River in California, southern Nevada, southwestern Utah, and northwestern Arizona. At least 50 percent of the Mojave population's occupied habitat is managed by the Bureau of Land Management.

The Mojave population has been declining for many years, primarily due to increasing human activity. Urbanization, energy development, mining, conversion of land to agriculture, livestock grazing, off-road vehicle recreation, and military activities have destroyed or degraded tortoise habitat. The growth of Las Vegas and other communities in the western Mojave is expected to continue, which will further reduce the tortoise's available habitat. Roads are fragmenting the remaining tortoise habitat, making the tortoise subpopulations more vulnerable to extirpation. Other threats to the survival of the



Desert tortoises in the Mojave population, such as this one in southern Nevada, are now listed as Threatened.

photo by E.P. Haddon

Mojave population include illegal collection, vandalism (including shooting and the crushing of tortoises under vehicles), the spread of a fatal upper respiratory disease syndrome, and increasing predation of juvenile tortoises by common ravens (*Corvus corax*) and other species.

The Service received more than 1,900 written and oral comments on its proposal to list the Mojave population of the desert tortoise. After considering the best biological information available, the Service changed its classification of the Mojave population from Endangered to Threatened. At the time the Service issued its emergency rule listing the Mojave population as Endangered, the Service believed that the presence of an upper respiratory disease syndrome could cause the extinction of the population. The Service subsequently learned that although the disease syndrome is widespread, some areas appear to be unaffected or affected to a limited degree. Although the Mojave population in the eastern part of its range is facing many other threats, particularly near urban centers, tortoise populations had not been clearly documented as declining throughout the eastern Mojave at the time of listing. Since the final rule was published, however, the Service has identified apparently high tortoise mortality in some locations in the eastern Mojave. The Service is closely monitoring

the tortoise and its habitat, and may have to consider other options to maintain the Mojave population.

There is normally little difference in the protection given to an Endangered versus a Threatened species under the Endangered Species Act. Anyone taking, attempting to take, or otherwise illegally possessing a desert tortoise without a permit will be subject to the same penalties as if the population were listed as Endangered. Section 7 of the Act also will continue to protect the species from Federal actions that could jeopardize its survival. (Because the Bureau of Land Management, Department of Defense, and National Park Service manage large areas within the tortoise's range, extensive Section 7 consultations will be required between the Service and these agencies.) The Service will use available funding to determine the causes of, and possible treatments for, the upper respiratory disease syndrome infecting the tortoise; identify and isolate healthy populations; investigate predator control to reduce the loss of immature tortoises; educate the public to discourage relocating and releasing captive tortoises; and address habitat issues such as land acquisition, fencing, and habitat improvement.

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## Final Listing Rules

(continued from page 7)

### Cobana negra (*Stahlia monosperma*)

This medium-sized evergreen tree in the pea family (Fabaceae) can reach up to 50 feet (16 meters) in height. It has pinnately compound, alternately arranged leaves and yellow flowers. The tree is endemic to Puerto Rico, the adjacent island of Vieques, and the Dominican Republic. The species was once common on the edges of salt flats and shallow lagoons bordering mangrove forests; however, extensive filling and draining of these areas for coastal development and grazing, along with cutting of the trees for furniture and fenceposts, has reduced the species' distribution to a few small, scattered populations. The largest remaining population (23 mature trees and 35 seedlings) occurs along the extreme southeastern coast of Puerto Rico, an area under intense pressure for residential and tourist development. Other mature trees are found on the northeast coast and on U.S. Navy property on the island of Vieques. These trees also are threatened by development of the wetlands and by cutting. The Service proposed listing *S. monosperma* as a Threatened species on May 12, 1989 (see BULLETIN Vol. XIV, No. 6), and the final rule was published in the April 5, 1990, *Federal Register*.

### Palo de Rosa (*Ottoschulzia rhodoxylon*)

The palo de rosa is another evergreen tree that is endemic to Puerto Rico and the island of Hispaniola. This tree in the family Icacinaceae grows up to 15 feet high (5 meters) and has thick, leathery leaves. Only nine of the trees are known to exist in three areas in Puerto Rico: one tree grows on the limestone hills on the north coast, seven grow in dry, limestone forests on the south coast, and one grows on the serpentine soils of the western mountains. Urban, residential, and industrial expansion has greatly reduced the forested area of Puerto Rico. Because so few trees remain, the species is extremely vulnerable to continuing development, changes in forest management practices, and natural disturbances (such as flash flooding). The Service proposed to list the palo de rosa as Endangered in the July 27, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 8); the final rule was published April 10, 1990.

### Cassia mirabilis

This shrub, a member of the family Fabaceae, grows up to 30 inches (1 meter) in height and has solitary, yellow flowers. It was once distributed

throughout the silica sands of the northern coast of Puerto Rico, but extensive urban, industrial, and agricultural development has reduced its range to three privately owned sites. Only 150 to 200 plants are known to occur in these areas. The largest population is threatened by sand extraction, squatters, and trash dumping. Road construction and a proposed office building complex could eliminate the other two populations, although there are plans to attempt a relocation of one population. The Service proposed listing *C. mirabilis* as an Endangered species April 14, 1989 (see BULLETIN Vol. XIV, No. 5), and the final rule was published April 5, 1990.

### Two Southern Appalachian Plants

**Spreading avens (*Geum radiatum*)** and **Roan Mountain bluet (*Hedyotis purpurea* var. *montana*)** are two small perennial herbs endemic to a few scattered mountaintops and cliff faces in western North Carolina and eastern Tennessee. The spreading avens, a member of the rose family (Rosaceae), has a basal rosette of leaves and stems that grow up to 20 inches (50 centimeters) tall, topped with bright yellow flowers. Of the 16 populations that have been reported historically, 11 survive: 6 populations on privately owned lands, 4 on U.S. Forest Service and National Park Service lands, and 1 on park land managed by the State of North Carolina. Seven of the populations have fewer than 50 plants remaining.

Roan Mountain bluet is a low-growing perennial in the coffee family (Rubiaceae) that forms loose tufts up to 6 inches (15 cm) tall with bright purple flowers. Six of the seven recorded populations of this species remain, but two of these occupy a total of less than 108 square feet (10 square meters). Five populations are on privately owned lands, and one is partially on lands in Forest Service ownership.

Although the reasons for the declines of these species are not completely understood, habitat damage and loss probably have been major factors. The greatest problem in the past probably was development on the open mountain summits inhabited by these species. Such activity included the construction of trails, parking lots, roads, buildings, observation platforms, suspension bridges, and other recreational, residential, and commercial facilities. All of the surviving populations are threatened by residential and recreational development, habitat disturbance due to heavy use by hikers and climbers, collection of the plants, and natural succession. The Service proposed on July 21, 1989, that the spreading avens and Roan Mountain bluet be listed as Endangered (see BULLETIN Vol. XIV, No. 8); the final rule for both species was published April 5, 1990.

### Kral's Water-plantain (*Sagittaria secundifolia*)

*S. secundifolia* is an aquatic perennial plant in the water-plantain family (Alismaceae). Its distinguishing characteristics include a stout, elongated rhizome, hairy filaments, and deep-green linear leaves. The species is only known to occur in the Little River system in northeast Alabama and northwest Georgia. A dozen or more local populations are scattered over approximately 25 river miles (40 kilometers). The plant typically occurs on frequently exposed shoals or rooted among loose boulders in quiet pools up to 3 feet (1 meter) in depth.

Due to its restricted range, *S. secundifolia* is extremely vulnerable to any catastrophic event, such as flooding. The clearing of the river banks for agriculture, silviculture, residential/recreational development, and surface mining contribute to water quality degradation, a major threat to the survival of this species. Other threats include garbage dumping and leaking sewage systems (which increase the growth of filamentous algae and decrease the amount of light available to *S. secundifolia* for growth and flowering), off-road vehicles that ford the river, unstable impoundments that could break, and a proposed hydroelectric impoundment. The Service proposed that *S. secundifolia* be listed as Threatened in the October 18, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12), and the final rule was published April 13, 1990.

### Arkansas Fatmucket (*Lampsilis powelli*)

This medium-sized, freshwater mussel prefers deep pools and backwater areas in the Ouachita, Saline, and Caddo River systems of central Arkansas. Water quality degradation is believed responsible for the decline of this species. Silt and sediment from the construction of impoundments, runoff from small gravel operations and mines, timber harvest operations, road construction, and agriculture affect all three river basins. The probable range of the Arkansas fatmucket has been reduced by over 40 percent (138 river miles; 222 kilometers). There are optimum habitat and good populations in only about 20 percent (62 river miles; 100 km) of the total estimated historical range. The mussel continues to be threatened by impoundment construction, channel alteration, gravel dredging, and other activities in the watershed that degrade water quality. The Service proposed to list the Arkansas fatmucket as a Threatened species on July 27, 1989 (see BULLETIN Vol. XIV, No. 8), and the final rule was published April 5, 1990.



# Dusky Seaside Sparrow Proposed for Removal From Endangered Species List

The Fish and Wildlife Service has proposed to formally remove the dusky seaside sparrow (*Ammodramus maritimus nigrescens*), a small, dark songbird, from the List of Endangered and Threatened Wildlife and Plants (F.R. 4/25/90). This subspecies became extinct on June 16, 1987, when the last dusky, an old male referred by his keepers as Orange Band, died at a captive breeding facility in Florida (see BULLETIN Vol. XII, Nos. 5-6).

Historically, duskies occurred only in a small area near Titusville in Brevard County, Florida. The salt marsh habitat to which this bird was restricted was destroyed or changed by impoundments (a means of mosquito control), drainage, development, and fire. By 1980, when the last few duskies were collected for a captive breeding program, only six of the birds remained—all of them males. After repeated searches failed to locate any female duskies, an attempt was made to cross the males with females of the

Scott's seaside sparrow (*Ammodramus maritimus peninsulae*). Unfortunately, the advanced age of the captive dusky males created difficulties for the cross-breeding program, and none of the hybrid offspring have survived.

The proposed delisting of the dusky also would revoke the bird's designated Critical Habitat. In the meantime, the Service is reevaluating management options for the St. Johns National Wildlife Refuge, which had been established for the conservation of the dusky.

## Steller Sea Lion

(continued from page 1)

Aleutian Islands, and the Kuril Islands of the Soviet Union. In 1989, 25,000 animals were counted in Alaska rookeries from the Kenai Peninsula to Kiska Island, compared to 140,000 in 1956-60. This is a drop of about 82 percent since 1960. The rate of decline is accelerating.

The causes of the decrease have not been determined, but several factors are suspected. Commercial fishing for pollock, herring, cod, salmon, and flatfishes may be reducing important prey populations for Steller sea lions. Sea lions are also taken incidentally during commercial fishing operations in the Gulf of Alaska and Bering Sea. It is estimated that foreign and joint-venture commercial trawl fisheries incidentally killed 14,000 Steller sea lions between 1973 and 1988. An unknown number of sea lions also may be shot by fishermen at rookeries, haul out sites, and in the water near boats.

Between 1963 and 1972, over 45,000 Steller sea lion pups were killed for the commercial fur trade in the eastern Aleutians and Gulf of Alaska, which may explain the initial decline in this area. (With the passage of the Marine Mammal Protection Act of 1972, the commercial take and trade of the Steller sea lion ceased. A small number of sea lions are still legally taken for subsistence purposes in Alaska.)

Other factors that may be contributing to the decline include entanglement of sea lions in marine debris, disease, predation by killer whales or sharks, and disturbance of the rookeries.

## Effects of the Rule

Throughout the 240-day life of the emergency rule, the Steller sea lion will receive all of the protection authorized

under the Endangered Species Act. This reinforces the Marine Mammal Protection Act restrictions on commercial take and trade, although Alaska natives still will be permitted to take animals for subsistence purposes. In addition, under Section 7 of the Endangered Species Act, Federal agencies must ensure that any activities they authorize, fund, or carry out are not likely to jeopardize the survival of the population. If an agency finds that one of its activities may affect the sea lion, it is required to consult with NMFS on ways to avoid jeopardy.

To expedite the recovery of the Steller sea lion, NMFS is taking several emergency conservation measures:

- NMFS will use data collected from observers on commercial fishing vessels to make monthly estimates of the level of incidental kill of Steller sea lions by certain fisheries. Additional observer programs may be established in other fisheries in order for NMFS to monitor the incidental take.

- Although the Marine Mammal Protection Act prohibits the intentional lethal take of Steller sea lions in the course of commercial fishing, fishermen have not been prohibited from harassing sea lions that are interfering with their gear or catch by shooting at or near the animals. NMFS now prohibits such shooting.

- A buffer zone of 3 miles (5 kilometers) has been established around the principal Steller sea lion rookeries in the Gulf of Alaska and the Aleutian Islands. No vessels are allowed to operate within the buffer zones during the period of the emergency rule. Similarly, no person may approach on land closer than one-half mile (0.8 km) or within sight of 32 Steller sea lion rookeries. On Marmot Island, traditionally the most important Steller sea lion rookery in Alaska, no person may approach closer than 1½ miles (2.4 km) of the eastern shore. The purposes of these restrictions

are to stop individuals from shooting at sea lions, minimize disturbance of the animals, reduce incidental take in areas where high concentrations of the sea lions are expected, and facilitate enforcement. (Exceptions are provided for emergency situations, navigational transit of certain passages, scientific research permitted under the Marine Mammal Protection Act, and Alaska Natives taking animals for subsistence purposes.)

- NMFS believes that the most serious declines in sea lion numbers have occurred in Alaskan waters and adjacent areas of the U.S. Exclusive Economic Zone west of 141° W longitude. If NMFS determines that more than 675 sea lions have been killed incidentally as a result of commercial fishing operations during 1990, it will publish a notice to prohibit the kill of any additional sea lions in this area. NMFS may issue other emergency rules to allocate the number of sea lions incidentally taken among the various fisheries, close areas to fishing, or take additional actions to ensure that commercial fishing operations do not exceed the 675-animal quota.

- NMFS intends to aggressively enforce the above regulations, provide resources to cover areas where Steller sea lions are most vulnerable, initiate a TIP/Reward Program, and promote public awareness.

- NMFS has established a team to prepare a recovery plan and develop recommendations for further conservation measures. Members of the North Pacific Fishery Management Council, Marine Mammal Commission, State agencies, and other prominent scientists and environmentalists will be invited to participate in developing and implementing a recovery program.

During the life of the emergency listing rule, NMFS will proceed with consideration of a rule to give the Steller sea lion long-term protection.

# New Manatee Sanctuary Established at Merritt Island National Wildlife Refuge

Robert O. Turner  
Manatee Coordinator  
Region 4

On March 1, the Fish and Wildlife Service established a new sanctuary for the West Indian manatee (*Trichechus manatus*) on Merritt Island National Wildlife Refuge in Brevard County, Florida. This sanctuary is the fourth one established by the Service in Florida; the first three are small sanctuaries within Crystal River National Wildlife Refuge on Florida's gulf coast.

Often called the sea cow, the manatee has an immense, grey-brown, walrus-like body, a flat, rounded tail, and paddle-like flippers. The average adult manatee is 9 feet (3 meters) long and weighs approximately 1,200 pounds (540 kilograms). Manatees eat 4 to 11 percent of their body weight daily, feeding on aquatic plants 5 to 8 hours a day. The species has a low reproductive rate; manatees do not reproduce until they are 7 to 9 years old, and then usually produce one calf every 3 to 5 years.

Manatees occur in scattered areas along the Atlantic and gulf coasts of the southeastern United States, the southern Gulf of Mexico, various Caribbean islands, and the northeastern coast of South America, but cold winter temperatures keep the United States' population concentrated in Florida's shallow coastal waters, rivers, and springs. There is no exact figure on the total number of manatees, but aerial surveys of warm-water refugia during the winter have documented approximately 1,200 animals in Florida.

## Concern Over Manatee Deaths

The Fish and Wildlife Service listed the manatee as Endangered in 1967. Human activities are the major threat to this species and its habitat. Nearly half of the known manatee deaths in Florida today are due directly to human activities and

structures. Boat-related incidents account for 80 percent of the human-caused manatee mortalities in Florida. The number of deaths continues to increase as the number of boats in Florida increases. Water-control structures and locks, fishing gear, poachers, and vandals also kill manatees.

In 1989, 166 manatees died from all causes in Florida—a 25 percent increase over the total 1988 mortality. Fifty of the 1989 deaths resulted from collisions with boats. The high mortality rate is continuing in 1990, with 73 deaths in January alone. The Service is concerned that the manatee population cannot sustain this level of mortality.

## Merritt Island National Wildlife Refuge and Manatee Sanctuary

The Merritt Island National Wildlife Refuge, part of the John F. Kennedy Space Center, is managed by the Service under a cooperative agreement with the National Aeronautics and Space Administration (NASA). The refuge encompasses a large area of important manatee habitat. Aerial surveys conducted during the last decade indicate that the upper Banana River portion of the refuge has the largest warm-water concentration of manatees anywhere in the United States. Peak populations occur during the spring and fall when up to 300 manatees are found in these waters. However, the Banana River also has the highest number of manatee mortalities of any waters in the State of Florida. Between 1975 and 1989, the bodies of 33 manatees that had been killed by boats or barges were recovered from the Banana River. (Boats probably were responsible for the fatalities of other manatees in the river, but biologists could not confirm the cause of death in all cases.)

To reduce the number of manatee deaths, the Fish and Wildlife Service established a new sanctuary within the refuge. The sanctuary, approximately

15 square miles (39 square kilometers) in size, is located between Cape Canaveral Air Force Station and the Kennedy Space Center, and encompasses the upper Banana River from the NASA causeway south to State Road 528. (The new sanctuary is adjacent to another portion of the upper Banana River, approximately 15 square miles in size, that NASA closed to all public access in 1962 for security reasons. This area also effectively serves as a manatee sanctuary.)

The sanctuary strengthens the protection of manatees on the refuge and restricts some forms of public use that formerly were available. No boats are allowed in the sanctuary with a gas or electric motor on board (even if the motor is not in use) at any time of the year. However, non-motorized craft, such as canoes, rowboats, sailboards, sailboats, and other human or wind-powered vessels, are permitted. The area has been posted to alert refuge visitors.

Research has demonstrated that manatees respond positively to sanctuaries. The new sanctuary will provide a large area where manatees can feed, rest, calve, and cavort without being harassed by powerboats. Habitat quality also should improve in this area. Powerboats operating in shallow water can dredge or scour grass beds and increase turbidity, thereby reducing light penetration and sea grass production. In addition, the powerboat closure will reduce the number of anglers in the area, which may allow the Banana River's fish populations to increase. Such an increase could benefit fishing in the waters surrounding the sanctuary.

The Service plans to restrict the use of motors within the sanctuary for 5 years. During this time, data concerning the effectiveness of the closure on manatees will be gathered. At the end of this 5-year period, the Service will decide whether to continue, modify, or eliminate the sanctuary.

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## Emergency Protection Extended for Winter-Run Chinook Salmon in the Sacramento River

The National Marine Fisheries Service (NMFS) published a new emergency interim rule in the April 2, 1990, *Federal Register* to continue providing Endangered Species Act protection to the winter run of chinook salmon (*Oncorhynchus tshawytscha*) in the Sacramento River, California. NMFS first listed this run as Threatened under a 240-day emergency rule on August 4, 1989, in

response to a major decline (see BULLETIN Vol. XV, No. 1). Since that time, NMFS has published a proposed rule to give the run long-term protection as a Threatened species (F.R. 3/20/90).

The emergency rule continues the Critical Habitat designation of the Sacramento River channel and adjacent riparian zones from the Red Bluff Diversion Dam to the Keswick Dam. NMFS

also will continue its coordination with the State of California in managing the run and the salmon's habitat, and will participate in the State's review of sport and commercial fishing regulations. The new emergency rule is effective through November 28, 1990, by which time a decision on long-term protection should be made.



## Regional News

(continued from page 2)

the standard appears to be justified as a result of recent western Illinois field studies of Indiana bat movements and habitat use. If the Forest Service adopts this expanded standard, it should aid in the recovery of the bat.

**Region 4**—Three manatees (*Trichechus manatus*) held by Sea World of Florida for rehabilitation have been released back into the wild. One manatee had been rescued after suffering cold stress, one after being struck by a motorboat, and one after being caught in a crab trap. Hutch, a 10-foot (3-meter) long male, was released April 10 at Jensen Beach, Florida, near the spot where he had been rescued. Mel, a 7.9-foot (2.4-m) long male, and Liberty, a 7.3-foot (2.2-m) long female, were released May 2 within the new Banana River Manatee Sanctuary, which is part of Merritt Island National Wildlife Refuge. (See the accompanying story in this issue of the BULLETIN.) All three manatees were marked for future identification, and radio transmitters were attached to their tails to monitor their movements.

Seventy-three manatee deaths were reported in Florida in January, the largest monthly total since surveys began in 1974. (Another 8 deaths were reported from other States.) Most of the deaths (45) were attributed to extremely cold weather in Florida in late December 1989. Seven of the remaining deaths were from boat and barge collisions, seven were from natural causes, and fourteen were from undetermined causes. Four of the fourteen manatees that had died from undetermined causes were dependent calves.

Another 14 manatee deaths were reported in Florida during February, of which 9 were from undetermined causes (one of which was a dependent calf), 4 were from watercraft collisions, and 1 was from natural causes.

The National Wildlife Federation, with the financial assistance of Patagonia Inc., the Mary Reynolds Babcock Foundation, and the George Bullard Foundation, brought 24 experts near Live Oak, Florida, on March 28-30 to discuss the biology and management of the red-cockaded woodpecker (*Picoides borealis*). Approximately 100 organizations were contacted for recommendations on meeting participants and agenda items. The participants reached a consensus on many key points during the course of the meeting, which was managed by a team of mediators from the Southeast Negotiation Network of Georgia Tech. University. Of particular interest was the fact that none of the current recovery plan recommendations were refuted. However, the need for additional recovery measures and further specification of the existing

recommendations was identified, based on new research findings or group consensus. The final report from the summit should be available soon from the National Wildlife Federation.

Due to interest generated by a petition to list the Louisiana black bear (*Ursus americanus luteolus*) and the Fish and Wildlife Service's consideration of a listing proposal, the State of Mississippi has recommended using Pittman-Robertson funds to conduct research on black bear populations and their habitat. The Louisiana black bear historically occurred in the southern half of Mississippi, but now occurs in small numbers in the Mississippi Delta and in the loess bluffs bordering the Mississippi River floodplain.

The Fish and Wildlife Service has received the final report on a 2-year status survey of sea-beach amaranth (*Amaranthus pumilus*), conducted by the North Carolina Plant Conservation Program (see the Region 4 news in BULLETIN Vol. XIV, No. 5). This sand-binding plant, a Category 2 listing candidate, once grew on Atlantic beaches from Nantucket, Massachusetts, to South Carolina, but now survives on only a few sites in North and South Carolina. Seawalls, riprap, and other beach stabilization techniques are believed to threaten this plant by altering its habitat. Hurricane Hugo reportedly devastated many of the beaches where large populations of seabeach amaranth occurred, but the effect this natural event may have on the species' long-term survival is unknown.

New populations of two plant species, bunched arrowhead (*Sagittaria fasciculata*) and Cain's reedgrass (*Calamagrostis cainii*), have been discovered. The Endangered bunched arrowhead site was discovered in Henderson County, North Carolina, by biologists from the Fish and Wildlife Service's Asheville Field Office and a North Carolina Natural Heritage Program contractor. The new population of Cain's reedgrass, a Category 2 listing candidate, was discovered on Blue Ridge Parkway land in the Craggy Mountains of North Carolina. This species previously was known only from Tennessee. The Asheville Field Office is working with the National Park Service to redesign a planned visitor facility so that the rare grass and its habitat are maintained.

**Region 5**—The 1990 midwinter bald eagle (*Haliaeetus leucocephalus*) survey in New Jersey yielded encouraging results. Seventy bald eagles were recorded during the 2-day event—a significant increase from 1989 when 48 eagles were recorded. Also of special note, the number of nesting bald eagle pairs in the State increased this year to 4—the first time since the early 1970's that New Jersey has had more than 1 breeding pair. The increase in eagle activity can be attributed to the joint

efforts of the Fish and Wildlife Service, Canada, and northeastern States.

The State of New Jersey recently proposed over 300 plant species, including all federally listed species and listing candidates, for inclusion in its own endangered plant list. Although the State list itself does not afford additional protection, State regulatory agencies will take measures to conserve these plants through their respective program authorities.

Professional biologists and volunteers from Maine to North Carolina have begun the annual piping plover (*Charadrius melodus*) survey along the Atlantic coast. Last year's survey results from the Atlantic coast States showed that the number of plovers increased to 709 birds, up from 644 in 1988. The increases in the number of breeding pairs throughout the region indicates that the intense cooperative management and education effort being conducted by Federal, State, and private conservation agencies is working.

**Region 6**—On April 16, the Woundfin Recovery Team met in St. George, Utah, and was asked by the Service to include another Endangered fish, the Virgin River chub (*Gila robusta semidnuda*), in the recovery effort. The new Virgin River Endangered Fishes Recovery Team is now working on an ecosystem recovery plan that will include both the Virgin River chub and the woundfin (*Plagopterus argentissimus*).

Following the meeting, the recovery team members monitored several stations within portions of the Virgin River drainage that were chemically treated in late 1988 and 1989 to eliminate red shiners (*Notropis lutrensis*). (See BULLETIN Vol. XIV, Nos. 1-2.) The red shiner, a species not native to the Virgin River, competes with the woundfin and is one of the primary reasons for the species' decline. The monitoring showed that several red shiners were present. The persistence of the red shiner is a setback to recovery of the woundfin in the Virgin River.

**Region 7**—Researchers at the University of Alaska in Fairbanks were successful recently in producing the first sporophyte (i.e., the spore-producing phase of a plant) of the Endangered Aleutian shield fern (*Polystichum aleuticum*). Two previous attempts to propagate the plant in vitro were unsuccessful. One of the rarest plants in Alaska, the Aleutian shield fern was listed in 1988 as Endangered. Further studies of the fern's life history and reproductive biology have been recommended to help identify the possible causes of the plant's rarity.

**Region 9**—The Fish and Wildlife Service has increased its efforts to foster African elephant (*Loxodonta africana*) conservation by assisting African nations in anti-poaching efforts. The Service's Office of Management Authority represented the United States at an interna-

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## Regional News

(continued from page 11)

tional conference of potential elephant assistance donors in Paris on April 5-6, with delegations from 20 other nations and 6 major conservation groups. The conference produced a declaration of support for African nations and a commitment to consider increased financial assistance. The U.S. already has provided more assistance for the elephant this year than any other nation, with the Service dedicating \$500,000 of its funds to anti-poaching efforts and the Agency for International Development's biodiversity program dedicating another \$2 million for general elephant conservation. The Service's funds will be used to assist the anti-poaching efforts of nations with significant regional elephant populations (such as Zambia and Gabon), for holding a law enforcement seminar in Tanzania for African game rangers, and for preparing master conservation plans for elephants in key nations.

The Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has been strengthened by two recent appointments. The Fish and Wildlife Service has assigned law enforcement special agent John Gavitt to serve as the CITES enforcement officer for the next 2 years, and the government of the Netherlands has assigned Mr. Ger Van Vliet to serve as the CITES plants officer. Mr. Van Vliet is the first full-time biologist working on plants for CITES. The U.S. and the Netherlands are paying their expenses.

The annual U.S. contribution to CITES, which comes through the Department of State, has regularly been supplemented by special contributions from the Service earmarked for specific purposes. For example, the Office of Management Authority contributes to paying the expenses of delegates from developing nations for travelling to CITES meetings and helps pay for studies on such topics as the effects of the parrot and ivory trades on wild populations.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	52	244	8	22	326	25
Birds	76	145	9	1	231	59
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	33	0	95	47
Snails	3	1	6	0	10	7
Clams	35	2	1	0	38	23
Crustaceans	8	0	1	0	9	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	173	1	56	2	232	105
<b>TOTAL</b>	<b>433</b>	<b>472</b>	<b>143</b>	<b>39</b>	<b>1087*</b>	<b>311 **</b>

Total U.S. Endangered **433** (260 animals, 173 plants)

Total U.S. Threatened **143** ( 87 animals, 56 plants)

Total U.S. Listed **576** (347 animals, 229 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 260 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

May 31, 1990

May 1990

Vol. XV No. 5

# ENDANGERED SPECIES

## Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

### Emergency Action is Taken to Protect the Golden-cheeked Warbler

Under the emergency listing provision of the Endangered Species Act, the Fish and Wildlife Service has classified the golden-cheeked warbler (*Dendroica chrysoparia*) as Endangered. This small, insectivorous songbird breeds only in parts of central Texas, where its woodland nesting habitat is rapidly being cleared for urbanization and range management. The emergency listing rule, published in the May 4, 1990, *Federal Register*, took effect immediately and will protect the warbler and its habitat for 240 days. A separate proposal to give the species long-term protection accompanied the rule.

#### Habitat Requirements

Golden-cheeked warblers winter in Guatemala, Honduras, Nicaragua, Mex-

ico, and possibly Belize. In mid-March, they arrive at their breeding range in Texas, which extends from Palo Pinto and Bosque Counties southward through the eastern and south-central portions of the Edwards Plateau. This region coincides closely with the range of the Ashe juniper (*Juniperus ashei*), a tree the warbler depends upon for its survival.

Golden-cheeked warblers have very specific habitat requirements. Fairly large areas of mature Ashe juniper and oak (*Quercus* spp.) woodlands are needed to support a population. The male birds, which arrive in Texas first, establish territories ranging in size from 3 to 10 acres (1.2 to 4.0 hectares). Ashe junipers not only provide nesting sites but also the material from which the nests are constructed. Warblers take strips of juniper bark, which the trees shed when mature,

and bind them with cobwebs to form a compact cup. Even nests built in other species of trees contain long strips of Ashe juniper bark. Deciduous oaks of various species also are critical; they are another source of nesting and perching sites, and they provide essential habitat for the insects upon which warblers feed.

#### Threats to the Habitat

In 1948, a juniper eradication program was launched in Texas. From the 1950's to the 1970's, approximately 50 percent of the juniper acreage in mid-Texas was developed for pasture and urbanization. At one time, most of the wood was used for fence posts, fuel, and aromatic oils, but now much of it is burned at the

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photo by Don Bleitz

In breeding plumage, the male golden-cheeked warbler has yellow cheeks outlined in black with a black stripe extending through the eye to the side of the nape. Its crown, upperparts, throat, neck, upper breast, and streaking along the flanks are jet black. The wings are black with two distinct white bars, and the tail is blackish.



## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1** - The International Wolf Pack Conference, held April 28, 1990, at Boise State University, was attended by over 70

people, including representatives from the Defenders of Wildlife, National Wildlife Federation, Greater Yellowstone Coalition, Idaho Conservation League, Idaho Hunters Association, Sierra Club, Idaho Wool Growers, Independent Miners Asso-

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#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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ciation, Nez Perce Tribe, Boise State University, and Senator McClure's office. The Fish and Wildlife Service served as an advisor and consultant for this conference, which focused on gray wolf (*Canis lupus*) ecology in general. Considerable discussion centered on wolf recovery funding and legislative proposals by Congressman Owens and Senator McClure regarding wolf reintroduction in Yellowstone National Park. The conference was videotaped for later use by agencies and public television. The videotapes are now being edited and should be available in the fall from the Wolf Recovery Foundation, P.O. Box 793, Boise, Idaho 83701 (telephone: 208/939-4290).

Two of the woodland caribou (*Rangifer tarandus caribou*) in the Endangered southern Selkirk Mountain herd on the British Columbia/Idaho border were reported by the Idaho Department of Fish and Game to have died during the week of May 11. Both caribou were radio-collared cows. One of the cows, which was in the area before the effort to augment the herd began, was hit by a car on Canada Highway 3 at Salmo Pass. The remains of this animal will be placed in the Paleontology Museum at Idaho State University, Pocatello, for educational purposes. The other caribou, which had been moved to the herd in 1988, was found partially consumed by a bear at the base of a steep hillside. The cow may have been fatally injured while coming down the hillside or killed by the bear. The current population of the herd is conservatively estimated at 60 to 70.

The Service's Laguna Niguel, California, Field Station recently established a working group to promote conservation of the California gnatcatcher (*Poliophtila californica*), a Category 2 listing candidate. This bird, which is endemic to coastal sage scrub habitat, is declining in both distribution and abundance due to widespread destruction of its specialized habitat. The field station has initiated a status review to determine if this species should be proposed for listing as Endangered or Threatened.

**Region 2** - The 1990 spring count of Attwater's greater prairie-chickens (*Tympanuchus cupido attwateri*) in Texas indicated that the population has increased from last year, although the overall trend for these Endangered birds over the past several years has been downward. The 1990 increase is probably the result of a more intensive count than in previous years. Traditionally, a single helicopter is

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# Investigating the Potential for Reintroducing Red Wolves Into the Great Smoky Mountains National Park

Warren Parker

Red Wolf Coordinator

Asheville, North Carolina, Field Office

The Fish and Wildlife Service has been working for the past 18 months with National Park Service personnel on investigations that may lead to a reintroduction of the red wolf (*Canis rufus*) in the Great Smoky Mountains National Park. Straddling the North Carolina/Tennessee border, this 500,000-acre (200,000-hectare) park is surrounded by approximately 1.5 million acres (600,000 ha) of National Forest lands. It is the most heavily visited unit in the National Park System.

The red wolf was extinct in the wild until 1987, when the Fish and Wildlife Service began reintroducing captive-bred stock onto Alligator River National Wildlife Refuge in northeastern North Carolina. Establishing a second wild population would be an important step toward the eventual recovery of this seriously Endangered species.

## Wolf/Coyote Problems

One of the most difficult problems associated with the red wolf recovery effort relates to the decline of the last wild population. By the 1970's, years of predator control and habitat conversion had reduced the species' range from much of the southeastern United States to a small area near the Texas/Louisiana border. The few remaining red wolves were in generally poor shape, plagued by disease and a host of parasites. With its low numbers and weakened condition, the population then faced an invasion of its habitat by coyotes (*Canis latrans*), which are generally more resistant to predator control efforts and more adaptable to habitat alteration. When red wolves found it difficult to find mates during the breeding season, social barriers that had separated the two species apparently broke down, and interbreeding became a serious problem. In the mid-1970's, biologists captured the last few red wolves for captive breeding before the species was lost to hybridization.

Recent attempts to reintroduce captive-bred red wolves into the wild have met with initial success in coastal North Carolina. (See BULLETIN Vol. XIV, Nos. 1-2 and 11-12.) It is important to note that this area is currently free of coyotes. On the other hand, about 90 percent of the red wolf's historical range, including the Great Smoky Mountains National Park, is now occupied by coyotes in varying densities.



Fish and Wildlife Service photo

**Great Smoky Mountains National Park could be the second permanent reintroduction site for the red wolf.**

There is currently a low to moderate population of coyotes in the park.

Investigations indicate that a hierarchy exists among various canid species in the wild. Where gray wolves (*Canis lupus*) survive in North America, resident coyote populations tend to avoid the wolves' home range. Canadian researchers report the killing of intruding coyotes by gray wolves. Although little is known about red wolf interactions with other canids, it is thought that a small but stable population of red wolves would effectively replace an existing coyote population or possibly establish a sympatric relationship. If this can be demonstrated through carefully conducted field experiments, then the site may be biologically suitable for permanent reintroduction, and the recovery potential for the red wolf would be significantly enhanced.

## Can Wolves Survive in the Park?

The first phase of the project at the Great Smoky Mountains National Park began in March of 1990. Dr. Michael Peltion, a noted black bear (*Ursus americanus*) researcher at the University of Tennessee, was awarded a contract to investigate coyotes in the southwestern quadrant of the park. As many coyotes as possible will be radio-collared and tracked. Although this study was designed to provide basic biological information about this recent immigrant into the park, it is specifically geared at defining home ranges.

This initial stage of the project will end in March of 1991. Prior to that time, several adult pairs of red wolves will be brought to the park and acclimated in holding pens within the coyote study area. After 5 or 6 months, the wolves will be fitted with radio collars and released.

Intensive telemetry monitoring will last for several months; it will then probably be scaled back as the animals become more predictable in their movements. It is presumed that interactions between the two species will begin shortly after the wolves are released. Experiences with red wolves at Alligator River indicate that there could be severe strife between individual red wolf pairs as they quickly attempt to stake out their respective home ranges.

Upon completion of this project phase (about March 1991), efforts to recapture all of the released wolves will begin. If a careful assessment of telemetry and field observational data indicates that the released red wolves did replace resident coyotes, then a permanent reintroduction phase will be developed. However, if the study results are not clear and the wolf/coyote issue is not resolved, then some difficult decisions will have to be made about the program.

The probable future recovery direction for the red wolf hinges on this project. If it is determined that the species cannot cope with resident coyote populations, it may have to be restricted essentially to small island populations with heavy dependence on the continued release of captive-bred wolves.

Four species—two fishes, a bird, and a plant—were proposed by the Fish and Wildlife Service during May 1990 for listing as Endangered or Threatened. If the listing proposals are approved, Endangered Species Act protection will be extended to the following:

## Razorback Sucker (*Xyrauchen texanus*)

The razorback sucker, also known as the humpback sucker, is endemic to the Colorado River Basin from Wyoming to Mexico. It is one of the oddest-looking freshwater fishes in North America. Adult razorback suckers are easily identified by a bony, sharp-edged hump or dorsal keel that rises at a steep angle behind a flat, sloping head and by their large, fleshy mouths. The distinctive dorsal keel stabilizes the fish in turbulent waters and strong currents. Adults often exceed 6 pounds (2.7 kilograms) in weight and 24 inches (60 centimeters) in length, and can live more than 30 years. Their preferred habitat is warm, flowing water over sand, gravel, or rocky bottoms, where they feed on algae, plankton, insects, and decaying organic matter. Adult fish may migrate considerable distances to specific areas to spawn.

This species once was abundant throughout the 3,500 miles (5,635 kilometers) of the basin, occurring primarily in the mainstem and major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, and the Mexican States of Sonora and Baja California Norte. There was a significant commercial fishery for razorbacks in southern Arizona in the early 1900's. As recently as 1949, one fisherman caught 12,000 pounds (5,450 kg) of razorback suckers in one season from Saguaro Lake below the Roosevelt Dam on the Salt River.

Since 1910, 15 dams have been built on the lower Colorado River and major tributaries, greatly altering the razorback sucker's habitat. The dams and their reservoirs reduced high spring flows (essential for maintaining side-stream habitats used by the razorback suckers), changed the daily flow regimes and water temperatures that are necessary for the fish at all life stages, and obstructed migration. Other less direct effects of the dams, such as decreased flows, alteration of stream hydrology, and increased concentrations of dissolved solids, also may be adversely affecting the razorback sucker.

Alteration of historical flow regimes and construction of reservoirs created favorable conditions for the spread of nonnative fishes. Introduced species such as carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), red shiner (*Notropis lutrensis*), largemouth bass (*Micropterus salmoides*), walleye (*Stizostedion*



The razorback sucker's main distinguishing characteristic is its sharp-edged hump or dorsal keel.

*vitreum*), and northern pike (*Esox lucius*) prey on razorback sucker eggs and larvae or compete with razorbacks for food and space. The introduction of nonnative fishes into the Colorado River Basin is believed to be a major cause for the lack of young razorback suckers throughout the basin for the past 30 years. There is considerable evidence that the remaining razorback populations are composed primarily of old individuals that are slowly dying off.

As a result of these environmental changes, the razorback sucker apparently inhabits less than 35 percent of its original range and is considered by most researchers to be one of the rarest endemic species in the Colorado River Basin. The fish is now distributed unevenly within about 750 miles (1,200 km) of the upper basin and 400 miles (640 km) of the lower basin. The largest remaining population is probably in Lake Mohave (Arizona and Nevada).

The loss and alteration of habitat continues to threaten the razorback's survival. Several major reservoirs and water diversion projects are in the planning process or under construction, including the Animas-La Plata Project, Muddy Creek Reservoir, Sandstone Reservoir, and Central Utah Project. The introduction and spread of nonnative species also continues.

The Sierra Club, National Audubon Society, Wilderness Society, and several other environmental groups submitted a petition to the Service on March 15, 1989, requesting that the razorback sucker be listed as an Endangered species. After assessing the best available information

regarding the threats to the razorback sucker, the Service proposed that the species be listed as Endangered (F.R. 5/22/90).

The Service is already taking action aimed at conserving the razorback. For example, the Service's Southwest Region has entered into memoranda of understanding with the States of Arizona and New Mexico for stocking razorbacks into a variety of habitats in the lower basin. Although 9.5 million larvae and juvenile fish have been released so far, it is not clear that this effort has successfully reestablished the fish. Under Section 7 of the Act, the Service also is consulting with other Federal agencies on the effects that water development projects may have on three listed fishes that share the razorback sucker's habitat. Measures taken to conserve habitat of the Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and bonytail chub (*Gila elegans*) could benefit the razorback.

## Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)

This large fish, a subspecies of the Atlantic sturgeon, is native to the northern Gulf of Mexico from Lake Ponchartrain, Louisiana, to Tampa Bay, Florida. Although it is an anadromous fish, the Gulf sturgeon spends most of its life in fresh water and depends on unimpeded rivers for spawning habitat. Due to dam construction and overfishing, breeding populations have declined or even disap-

(continued on next page)



## Proposed Listings

(continued from previous page)

peared in much of the fish's historical range. The Service has proposed to list this subspecies as Threatened (F.R. 5/2/90).

Although the Gulf sturgeon is still reported, at least occasionally, from scattered parts of its former habitat, the largest known remaining populations are in the panhandle and northwest coasts of Florida. The Suwannee River is believed to support the healthiest population. Important habitat in other major river systems — the Pearl in Mississippi, the Alabama in Alabama, and the Apalachicola in Florida — is now blocked by dams. Gulf sturgeon apparently are unable to pass through dam and lock systems. Dredging and spoil deposition in connection with channel maintenance threaten some of the limited spawning habitat that does remain. Because the fish probably return to their natal river to breed, a river's entire sturgeon population can be lost if the spawning habitat is blocked or degraded.

The Gulf sturgeon historically has been of commercial importance, with the eggs used for caviar, the flesh for smoked fish, and the swim bladder for making isinglass (a gelatin used in food products and glues). Recorded catches peaked around the turn of the century and have declined drastically since then. Although there is no longer a fishery directed at the Gulf sturgeon, incidental take by shrimpers and gill netters may be significant. The

use of turtle excluder devices (TEDs) on shrimp trawls may help to reduce the incidental catch of large finfish such as the sturgeon as well as sea turtles. Take of Gulf sturgeon is prohibited under State law in Florida, Louisiana, and Mississippi.

Work to conserve the Gulf sturgeon already is being done by the Service's Panama City (Florida) Fisheries Assistance Office; the Service's Gainesville (Florida) National Fisheries Research Center; and the private Caribbean Conservation Corporation (funded by the Phipps Florida Foundation). A management plan will be prepared next year by the Gulf States Marine Fisheries Commission. Future recovery activities for the Gulf sturgeon, if it is listed, could include development of hatchery propagation facilities and protection of the remaining spawning habitat.

### Texas Trailing Phlox (*Phlox nivalis* ssp. *texensis*)

This plant, a member of the family Polemoniaceae, is a clump-forming perennial with spreading or trailing shoots. Its attractive flowers are purple-lavender, deep rose, pink, or white in color, and appear from late March to early April. The species is endemic to the Big Thicket Forest region of eastern Texas.

The Texas trailing phlox was known historically from 17 locations, but a 1989 survey by the Texas Natural Heritage Program found plants at only 2 sites. The largest population occurs on a Hardin County preserve owned by The Nature Conservancy, where several hundred phlox are scattered across a fire-main-

tained pine savanna. A second population consisting of only six clumps of flowering plants was found at the edge of a pine plantation in Tyler County. Continuing threats to the remaining plants have prompted a proposal to list the Texas trailing phlox as an Endangered species (F.R. 5/29/90).

Urbanization and large-scale land clearing for pine plantations have claimed large portions of native habitat in eastern Texas and are responsible for much of the species' decline. Recently, pipeline construction also destroyed a once thriving population. Even the plants on the Conservancy's property could be affected by aerial drift from herbicides applied by airplane to nearby timber lands. The suppression of wildfires also has reduced the amount of suitable habitat. Openings in the forest, needed by the phlox, historically were created or maintained by fire. In the absence of burning, some former sites have been overwhelmed by competing vegetation. On the Conservancy tract, however, a prescribed burning and slash pine removal program has enhanced phlox habitat.

### Golden-cheeked Warbler (*Dendroica chrysoparia*)

Concurrent with the May 4 emergency rule giving the golden-cheeked warbler immediate but temporary protection as an Endangered species (see BULLETIN page 1), the Service published a proposal to grant this small songbird long-term coverage under the Act.



Gulf sturgeon are large fish that can attain total lengths of 8 feet (2.4 meters) or more. Their skin is scaleless, brown above and pale below, and imbedded with five rows of bony plates.

photo by Noel Burkhead



# Two Gray Wolf Packs Discovered in Northern Washington

Biologists recently located two active gray wolf (*Canis lupus*) packs with pups in the North Cascades area of Washington, the first ones known within the State in recent times. Once relatively common, the wolf was essentially extirpated from the State by the early 1900's as a result of trapping for pelts and predator control. In recent years, however, there have been reports of wolf sightings in the Cascades and northeastern Washington, and wolf tracks were confirmed in the North Cascades last year.

On May 23, 1990, biologists with the National Park Service and Washington Department of Wildlife discovered a den within the Hozomeen section of the Ross Lake National Recreation Area near the Canadian border. Although the biologists

kept away from the den to avoid disturbing the wolves, howls coming from the site indicated the presence of pups and adults. Another possible wolf den or rendezvous site was discovered by biologists with the State and the U.S. Fish and Wildlife Service on June 18 while they were conducting a survey for wolves in the Okanogan National Forest of northcentral Washington. The biologists elicited howls from pups and adults near the Pasayten Wilderness, northwest of Winthrop. Both packs have moved since they were discovered and have not been relocated. When the pups are weaned, it is normal for wolf packs to move to a rendezvous site in July or August. The pups will be mature by late fall, when the packs begin moving into winter home ranges.

The discovery of these wolf packs is exciting news for the gray wolf recovery effort. To protect the pups in the Ross Lake National Recreation Area, the National Park Service closed the Hozomeen area to public use through June. The Park Service also has closed the Hozomeen backcountry to all dogs to reduce the possibility of spreading canine parvo virus to the wolf pups. (Many domestic dogs carry the disease, which is transmitted through urine or feces. Canine parvo virus usually leads to death by dehydration.) As a result of the evidence that wolves are present in northern Washington, the Fish and Wildlife Service has prepared a contingency plan to address wolf depredation, similar to plans already developed in Idaho and Montana.

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## Golden-cheeked Warbler

(continued from page 1)

cleared sites. Widespread losses of juniper/oak woodlands continue, especially in the eastern section of the Edwards Plateau. This rapidly urbanizing area, which reaches from Austin to San Antonio, contains much of the warbler's best remaining habitat.

According to a recent status survey, 15 to 45 percent of the warbler's nesting habitat has been lost over the past 10 years. If current trends continue, the estimated maximum carrying capacity of the remaining warbler habitat will fall more than 50 percent by the year 2000. Because of the species' narrow ecological requirements and its habit of returning to the same area every year, habitat destruction can lead to the elimination of entire populations.

As the breeding range shrinks and becomes fragmented, the golden-cheeked warblers become increasingly vulnerable to predators and nest parasitism by brown-headed cowbirds (*Molothrus ater*). An adaptable species, the cowbird frequently expands in range and numbers as people alter native habitat. Cowbirds lay their eggs in the nests of other bird species for them to incubate, and young cowbirds usually out-compete other nestlings for food and space.

## Effects of the Rule

All protective measures authorized by the Endangered Species Act now apply to the golden-cheeked warbler and its habitat. Among the conservation benefits authorized by the Act for listed species are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service

to develop and implement recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of listed species. If any agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. Included within the definitions of "take," as described in the Code of Federal Regulations (50 CFR 17.1), are actions that kill or injure wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, and sheltering. Thus, the removal of trees in Ashe juniper/oak woodlands could be prohibited in some circumstances. However, developed areas and small tracts may not contain suitable golden-cheeked warbler habitat, and therefore may not be affected by the rule. Landowners and managers are being encouraged to contact the Service (711

Stadium Drive East, Suite 252, Arlington, Texas 76011; telephone 817/885-7830) to see what restrictions apply.

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## Final Rule Published for the Neosho Madtom

The Neosho madtom (*Noturus placidus*) is a small catfish, averaging less than 3 inches (7.5 centimeters) long, with mottled skin. It is restricted to the Neosho River and two tributaries, the Cottonwood and Spring Rivers, in southeastern Kansas, southwestern Missouri, and northeastern Oklahoma. This species is almost always found in riffle areas within free-flowing stretches of these rivers. Habitat destruction and modification, primarily the result of impoundments, water withdrawals, and dredging for sand and gravel, have reduced the madtom's distribution and abundance, and have isolated the remaining stock into three populations. The construction of new dams, additional water withdrawals, and water pollution are potential threats to the remaining populations.

The Service proposed listing the Neosho madtom as a Threatened species in the May 19, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 6), and the final rule was published May 22, 1990.



## Regional News

(continued from page 2)

used to count the prairie-chickens on their booming grounds. This year, however, the helicopter flight was combined with an intensive ground count. A total of 494 birds were counted, which is a 14-percent increase from 1989 (432 birds). Since the 1989 count probably missed some birds, it seems likely that the overall prairie-chicken population has increased only slightly. There continued to be localized fluctuations; colonies in some counties declined considerably since last year, while others unexpectedly increased.

The Service is trying to purchase two areas of suitable habitat to manage for prairie-chickens, and is also working with the Texas Parks and Wildlife Department to encourage private landowners to maintain and improve prairie-chicken habitat on their lands. Virtually all habitat outside of the Attwater Prairie-chicken National Wildlife Refuge is privately held. Endangered Species Act/Section 6 funds, as well as private and corporate donations, will be used to map and count colonies in the State, assess habitat, and establish priorities for providing technical assistance to landowners. Section 6 funds are also being used to develop translocation techniques.

\* \* \*

**Region 4** - Using Section 6 funding, the Mississippi Museum of Natural Science, a division of the Mississippi Department of Wildlife, Fisheries, and Parks, has completed 2 years of research on the ringed sawback turtle (*Graptemys oculifera*). This Threatened species occurs only in the Pearl River drainage of southwestern Mississippi and southeastern Louisiana. Using innovative mark and recapture techniques, museum researchers documented that although ringed sawback turtle abundance can exceed 300 turtles per kilometer of river in optimal habitat, the density is far less in most areas. The research also highlighted two natural factors that limit the species' abundance: females are probably 9 to 11 years old before they attain sexual maturity, and their reproductive potential is low. The study documents that the major threats to the turtle include habitat loss (sandbars for nesting and snags for basking), killing by humans, and probably water pollution.

\* \* \*

In mid-January, the Service moved an adult pair of Endangered red wolves (*Canis rufus*) from the Tallahassee Junior Museum to St. Vincent National Wildlife Refuge in Apalachicola, Florida, to establish another island propagation site (see BULLETIN Vol. XIV, Nos. 11-12). (Four wolf pups from this adult pair, born in April 1989, are still on display at the outdoor

museum.) In April 1990, the adult pair gave birth to two pups while they were being acclimated in an enclosure on the island. The entire family is reported to be healthy and doing fine. This summer, a veterinarian will surgically implant radio transmitters in the pups, the two adults will receive new radio collars, and all of the wolves will be released on the island. Eventually, the pups will be recaptured and taken to a mainland release site.

The St. Vincent site is one of three island propagation sites established by the Service to provide stock for permanent red wolf reintroductions on the mainland. Other propagation projects are on Bull's Island, South Carolina (a component of Cape Romain National Wildlife Refuge), and Horn Island, Mississippi (part of the National Park Service's Gulf Islands National Seashore). Several island-reared pups have been released successfully at Alligator River National Wildlife Refuge in North Carolina. The Service is also considering the Great Smoky Mountains National Park on the North Carolina/Tennessee border as another release site. (See related story in this edition.)

\* \* \*

**Region 5** - New England supported a growing population of wintering bald eagles (*Haliaeetus leucocephalus*) in 1989-90. Observers reported 56 eagles overwintering in Massachusetts (12 more than last year), an estimated 30 eagles in New Hampshire, and about 90 eagles in Connecticut. In Maine, the majority of bald eagles are coastal birds that do not migrate in the traditional sense. Some do fly down from Canada to Maine for the winter, while others, particularly immature birds, leave Maine to winter in Connecticut and Massachusetts. It is estimated that a total of 200-300 eagles overwinter in Maine.

\* \* \*

Concern for the Karner blue butterfly (*Lycaeides melissa samuelis*), a Category 2 listing candidate, heightened recently with reports that its numbers are apparently declining throughout most of its range in the Northeast. The New Hampshire population fell from an estimated 2,000 to 3,000 pairs in 1983 to 600 to 700 pairs in 1990. New York reports a decline of 85 to 98 percent in most of its populations since 1979.

Staff from the Service's New England Field Office in Concord, New Hampshire, met several times with representatives of the New Hampshire Natural Heritage Inventory and The Nature Conservancy to identify ways of protecting remnants of pine barren habitat in the Concord area, the last foothold for the Karner blue in New England.

Other populations of this butterfly occur in Region 3, where it is known from Minnesota, Wisconsin, Ohio, Michigan, and Indiana. Populations of the Karner blue in these States are being resurveyed this year.

\* \* \*

The peregrine falcon (*Falco peregrinus*) breeding season in the Northeast is well under way. As of the end of May, there were seven pairs in New Hampshire, two pairs in Massachusetts, and about five pairs in both Vermont and Maine. Particularly cool and wet weather in May, however, is suspected to have contributed to at least two nest failures in New Hampshire.

\* \* \*

**Region 8** - The Service's Southwest Research Group in Ventura, California, reported that all of the Andean condors (*Vultur gryphus*) released in 1989 in southern California have been successfully recaptured and returned to captivity (see BULLETIN Vol. XV, No. 3). The six Andean condors released in 1990 are all doing well, and are roosting, soaring, and feeding together.

\* \* \*

The Patuxent Wildlife Research Center's Hawaii Research Group has begun monitoring nesting success of the palila (*Loxioides bailleui*), an Endangered bird that lives only on the island of Hawai'i (the "Big Island"). As of May 1990, 15 active nests had been located in the Pu'u La'au study area on the upper slope of Mauna Kea. Many of the nests are being used by previously banded adults.

\* \* \*

**Region 9** - The U.S. Department of Agriculture recently requested reinitiation of formal consultation under Section 7 of the Endangered Species Act on its nationwide Animal Damage Control Program. In response, the Fish and Wildlife Service has appointed a national consultation team consisting of knowledgeable biologists from each of the Service's affected Regions. The team is evaluating the effects of all animal damage control activities on listed species.

## New Publication

Beacham Publishing, Inc., and the World Wildlife Fund have jointly produced *The Official World Wildlife Fund Guide to Endangered Species of North America*. Three years in the making, this reference describes the appearance, behavior, habitat, population, range, threats to survival, and recovery efforts for 547 federally listed Threatened and Endangered species — all of the species listed through November 1989. The 1,258-page guide is divided into two volumes: Volume I covers plants and mammals; Volume II covers birds, reptiles, amphibians, fishes, mussels, crustaceans, snails, insects, and arachnids. A bibliography is included for each species, and photographs are included for almost all of the species. Appendices list the species state-by-state, and locator maps provide geographic data.

A companion book, the *Endangered Species Photo Locator*, lists all of the sources used for the photographs appearing in the guide. This 73-page softcover book is divided into two sections: the first lists species with the names of people who have photographed them, and the second lists the photographers with a composite list of the photographs they provided to the publisher. Addresses of the photographers are included in the book.

The *Official World Wildlife Fund Guide to Endangered Species of North America* is available for \$195.00 from Beacham Publishing, Inc., 2100 S Street, N.W., Washington, D.C. 20008. In the interest of making this reference available to a wider community, however, the publisher has established a special purchase program: those purchasing one set at full list price may purchase additional sets at half price (\$95.00). The *Photo Locator* is available for \$12.00. Add 5 percent of your total order to cover shipping.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	244	8	22	327	25
Birds	76	145	11	0	232	61
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	33	0	95	47
Snails	3	1	6	0	10	7
Clams	36	2	1	0	39	28
Crustaceans	8	0	2	0	10	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	173	1	57	2	233	106
<b>TOTAL</b>	<b>435</b>	<b>472</b>	<b>147</b>	<b>38</b>	<b>1092*</b>	<b>319 **</b>

Total U.S. Endangered **435** (262 animals, 173 plants)

Total U.S. Threatened **147** (90 animals, 57 plants)

Total U.S. Listed **582** (352 animals, 230 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 264 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife  
36 plants

June 30, 1990

June 1990

Vol. XV No. 6

# ENDANGERED SPECIES

## Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

### Listing Action Completed for Spotted Owl and Five Other Species

SEP 26 1990

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During June 1990, the U.S. Fish and Wildlife Service completed actions to list four animals and two plants as Threatened or Endangered species. The protection authorized by the Endangered Species Act is now available to the following taxa:

#### Northern Spotted Owl (*Strix occidentalis caurina*)

On June 22, the Service announced the decision to list the northern spotted owl as Threatened throughout its range. One of three spotted owl (*Strix occidentalis*) subspecies, this bird is found from southwestern British Columbia, Canada, through western Washington, western Oregon, and the Coast Range area of northwestern California south to San Francisco Bay. Approximately 2,000 breeding pairs have been located, although the total population is believed to number 3,000 to 5,000 pairs.

In making its listing decision, the Service found that the northern spotted owl is threatened by the degradation or loss of its habitat and the resulting decline in owl populations. Northern spotted owls occur primarily in old growth and mature forest habitats, but may also be found in younger forests that have the appropriate characteristics, such as: high canopy closure, large overstory trees, sufficient open space under the forest canopy for owls to fly, large accumulations of fallen trees and other woody debris on the ground, and numerous large snags or trees that have large cavities, broken tops, or other deformities. These characteristics provide nesting and perching sites for the owls, and support the animals upon which they feed. Most remaining northern spotted owl habitat is on public land managed by the U.S. Forest Service, Bureau of Land Management, and National Park Service.

Radio telemetry studies indicate that northern spotted owls have relatively large home ranges. The extent varies with

ecological conditions; for example, the median size of a pair's home range is about 3,000 acres in the Oregon Cascades but almost 10,000 acres on Washington's Olympic Peninsula. Although there are no reliable estimates of the subspecies' historical population size and distribution, spotted owls are believed to have inhabited most older forests throughout the Pacific Northwest prior to modern settlement. However, most of these older forests no longer exist. Timber harvest is the primary factor responsible for the loss of habitat, but such natural events as fire, volcanic eruption, and wind storms have contributed to the decline. Details on the status of the northern spotted owl and the threats it faces are available in the June 26, 1990, final listing rule; for a copy, write the U.S. Fish and Wildlife Service, Portland Regional Office, Eastside Federal Complex, 911 N.E. 11th Avenue, Portland, Oregon, 97232-4181, or call 503/231-6730.

In January 1987, the Service was petitioned by Greenworld to list the northern spotted owl as Endangered. Another listing petition was received in August of that year from the Sierra Club Legal Defense Fund, Inc., on behalf of 29 conservation organizations. The Service's initial finding that listing was not warranted at the time was challenged in court, and the court ruled against the Service. As a result, the Service reconsidered its decision. After additional information was received, a supplemental status review was completed, resulting in the Service's June 23, 1989, proposal to list the northern spotted owl as Threatened.

Due to controversy surrounding the management of old-growth forests in the Northwest, the Service conducted another status review that was unprecedented in scope and depth to ensure that the final decision on listing would be scientifically well-founded. According to the special Listing Review Team that was established to address the northern spotted owl issue, "Never before has so much been known



photo by Randy Wilk

(continued on page 4)



## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1** — Seven adult California least terns (*Sterna antillarum browni*) have been found dead and another was

found moribund in colonies on the U.S. Marine Corps Base at Camp Pendleton. These terns are among at least 40 adult and young least terns that were found dead in southern California breeding colonies in 1989 and 1990. The apparent

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#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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**Region 6**, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

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**Region 8** (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sherk, *Endangered Species Specialist* (703-358-1710).

magnitude of the problem has prompted a concerted effort to determine the cause or causes of death. The birds have been sent to the Fish and Wildlife Service's National Wildlife Health Research Center in Madison, Wisconsin, for necropsy.

\* \* \*

**Region 2** — In July of 1989, a forest fire in the headwaters of Main Diamond Creek in the Gila National Forest prompted the Fish and Wildlife Service to remove 566 Endangered Gila trout (*Oncorhynchus gilae*) from the stream and place them in the Mescalero National Fish Hatchery near Alamogordo, New Mexico. Last May, the stream was surveyed to determine if any fish that were left behind had survived the aftermath of the fire, which included deposition of large amounts of ash, silt, and debris in the stream channel. No fish were found; however, the team will continue to monitor the condition of the stream. When it is determined that the stream has recovered from the effects of the fire, it will be restocked with either offspring of the fish that were removed or the original adults.

The Gila Trout/Chihuahua Chub Recovery Team transplanted 40 Gila trout from Iron Creek to Sacaton Creek, about 10 miles (16 kilometers) to the southwest. The June transplant was done in an attempt to duplicate the Iron Creek population. If the fish survive in Sacaton Creek, 60 more will be transplanted next year. Prior to the transplant, Sacaton Creek was without fish.

During March, the recovery team conducted an inventory of Chihuahua chub (*Gila nigrescens*) populations and habitat in the State of Chihuahua, Mexico. Although its status there is not as critical as it is in the United States, this fish is at risk in Mexico. Chihuahua chubs were captured at 30 of 55 locations the team sampled. A total of 10,149 fish were captured, identified, and released. Large chubs were weighed and measured. The inventory, which covered 28 days in the backcountry, would have not been possible without the assistance of Pablo Dominguez Gonzales, biologist for the Mexican Government's Secretariat of Urban Development and Ecology, Chihuahua, Mexico.

\* \* \*

Canadian and U.S. biologists picked up 12 eggs from 20 whooping crane (*Grus americana*) nests in Wood Buffalo National Park, Canada, on May 30. Eleven eggs were fertile and all hatched after delivery to the International Crane Foundation in Baraboo, Wisconsin. A total of 30 nests had been found in Canada prior to the egg pickup. An estimated six more eggs could have been picked up in the wild and transferred to the Patuxent Wildlife Research Center captive flock in Laurel, Maryland, but this action did not occur

(continued on page 3)



# Endangered Species and Habitat Conservation Staff in Washington is Reorganized

In order to give greater emphasis to two of the Fish and Wildlife Service's highest conservation priorities, endangered species and wetlands, separate divisions have been created for both programs. Formerly, these offices were combined as the Division of Endangered Species and Habitat Conservation. The reorganization applies only to the Washington, D.C., office, which provides staff support to the Director. Regional and field operations are not significantly affected.

## Division of Endangered Species

The Chief of the new Division of Endangered Species (DES) is Dr. Larry R. Shannon, who joined the Service from the Minnesota Department of Natural Resources, where he served as director of the Division of Fish and Wildlife. Among the responsibilities of the DES are developing policy and guidelines for Federal listing actions, recovery planning, Habitat Conservation Plans, grants to the States, and economic analyses of Critical Habitat;

tracking of listing actions, petitions, and recovery plans during their review in Washington; compiling regional selections of listing candidates; coordinating the development of briefing material; and serving as a liaison to other agencies and organizations. The development of proposed and final listing rules, identification of listing candidates, evaluation of listing petitions, and preparation and implementation of recovery plans will remain the responsibilities of the appropriate regional and field offices. Listings of foreign species will continue to be developed in the Service's Office of Scientific Authority.

## Division of Habitat Conservation

Mr. William E. Knapp serves as Chief of the new Division of Habitat Conservation (DHC). This division has a wide range of responsibilities, including (but not limited to) wetlands conservation. The DHC provides Washington Office support for the regional and field offices to fulfill the Service's responsibilities under the Food

Security Act ("Farm Bill"), Emergency Wetlands Act, Fish and Wildlife Coordination Act, National Environmental Policy Act, Clean Water Act, and other laws that give the Service specific authority and mandates to coordinate with other Federal agencies. It works with such Federal agencies as the Army Corps of Engineers, Bureau of Reclamation, Soil Conservation Service, Federal Energy Regulatory Commission, and the Minerals Management Service to help them avoid or mitigate losses of wildlife habitat resulting from their activities. Because of these interagency responsibilities, DHC retains authority for developing guidance on implementing Section 7 of the Endangered Species Act. (However, most Section 7 consultations and Biological Opinions, permit evaluations, and reviews of environmental impact statements take place in the Service's regional and field offices.) Among the other important DHC responsibilities is conducting the National Wetlands Inventory.

## Regional News

(continued from page 2)

because of insufficient pen space to house the cranes. Overcrowding of the birds could create a health hazard for all of the resident cranes. Consequently, fewer eggs were transferred this year. The chicks transferred to the International Crane Foundation have filled all of its pen space.

Aerial surveys in June indicated 22 to 27 live chicks in Wood Buffalo National Park, including 2 sets of twins. The flights also located two additional nests in Alberta, Canada. This represents a nesting expansion into an area containing large amounts of unoccupied and apparently suitable habitat. Over the entire nesting area, however, habitat quality has declined this year because water levels are dropping.

\* \* \*

**Region 4** — In recent years, the Fish and Wildlife Service, National Park Service, Tennessee Wildlife Resources Agency, and North Carolina Wildlife Resources Commission have been involved in a project to reintroduce three federally listed fishes into Abrams Creek in Blount County, Tennessee. These three fish species are the Endangered smoky madtom (*Noturus baileyi*), the Threatened yellowfin madtom (*Noturus*

*flavipinnis*), and the Threatened spotfin chub (*Cyprinella monacha*). Last spring, biologists under contract to the Tennessee Wildlife Resources Agency found a male smoky madtom guarding a nest site in Abrams Creek. Although no reproduction has been observed as yet, this is the first sighting of any of the released fish. More searches are under way, and the reintroduction effort continues.

\* \* \*

In February, the Kentucky Department of Fish and Wildlife Resources hosted a meeting in Frankfort, Kentucky, on Indiana bat (*Myotis sodalis*) summer habitat. Representatives from Fish and Wildlife Service Regions 2, 3, 4, and 5 and from many of the States within the species' range attended the meeting. Recent information, gathered primarily by researchers in Illinois and Missouri, indicates that the Indiana bat's summer habitat requirements are more complex than previously thought. The current guidelines for habitat evaluation are thus inadequate and do not address many of the habitat types that the species is now known to use. The Indiana/Gray Bat Recovery Team agreed to develop new habitat evaluation guidelines by fall of 1990. These new guidelines may help the Fish and Wildlife Service provide better protection to the Indiana bat during the summer, and may also help reverse the species' population decline.

\* \* \*

In June, field work was initiated on the summer habitat requirements of Kentucky's population of the Endangered Virginia big-eared bat (*Plecotus townsendii virginianus*). This 2-year study will examine the caves, rock shelters, and other sites used by maternity and bachelor colonies during the summer. Foraging habitat preferences will be determined through the use of radio-tracking techniques. Funds for the project are being provided by the Fish and Wildlife Service under Section 6 of the Endangered Species Act, by the U.S. Forest Service, and by the University of Kentucky.

\* \* \*

The Service's Jackson, Mississippi, Field Office has received status reports from the Tennessee Heritage Program on four plant species that are Category 2 candidates for listing: the Tennessee milkvetch (*Astragalus tennesseensis*), Guthrie's ground plum (*Astragalus bibullatus*), glade-cress (*Leavenworthia exigua* var. *lutea*), and *Leavenworthia exigua* var. *exigua*. With the exception of Guthrie's ground plum, most populations of these species are found in Tennessee, with disjunct populations in adjoining States. (Guthrie's ground plum is found only in Tennessee.) The four species are endemic to cedar glade systems, which are often destroyed or modified by urban development and agricultural activities.

(continued on page 7)



# Listing Proposals — June 1990

A subspecies of black bear and three species of plants were proposed by the Fish and Wildlife Service during June 1990 for listing as Threatened or Endangered. If the proposals are approved, the following taxa will be eligible for Endangered Species Act protection:

## Louisiana Black Bear (*Ursus americanus luteolus*)

The American black bear (*Ursus americanus*) once was widespread in North America, from Alaska south to central Mexico, but its range has been fragmented and its numbers reduced by habitat loss and shooting. One generally recognized subspecies, the Louisiana black bear (*U. a. luteolus*), historically occurred in bottomland forests from eastern Texas through all of Louisiana to southern Mississippi. It is distinguished from other subspecies by a skull that is relatively long, narrow, and flat.

The Louisiana black bear has a unique place in American culture, providing the inspiration for the first "Teddy Bear" in the early 1900's. It is said that President Theodore Roosevelt, while on a hunting trip in Mississippi, refused to shoot a Louisiana black bear that had been captured and bound for him. This incident received national attention when it was used in a satirical newspaper cartoon, prompting an enterprising merchant to begin marketing stuffed toy bears with Roosevelt's nickname. The subspecies gained prominence of another sort in "The Bear," William Faulkner's famous short story about an adolescent boy coming of age during a hunt in the Mississippi backwoods.

By 1980, more than 80 percent of the Louisiana black bear's bottomland forest habitat in the lower Mississippi River Valley had disappeared, with another 165,000 acres being cleared every year. Much of the habitat that remains is reduced in quality. Currently, bear populations are concentrated in two core areas, the Tensas and Atchafalaya River basins in Louisiana. Small numbers also still occur in adjacent parts of Mississippi.

On June 21, the Service proposed to list the Louisiana black bear as Threatened. If the listing is approved, Federal agencies such as the U.S. Army Corps of Engineers and the Soil Conservation Service will be required to ensure that none of their activities are likely to jeopardize the subspecies' survival. The proposal contains a special rule that also would list black bears of any other subspecies that may now occur within the Louisiana black bear's historical range as Threatened under the "Similarity of Appearance" provision of the Endangered Species Act. This measure is intended to

facilitate law enforcement, in effect giving the benefit of the doubt to all black bears in the area in order to protect those of the vulnerable subspecies *U. a. luteolus*. Black bears of another subspecies, *U. a. americanus*, were introduced from Minnesota in the mid-1960's for hunting purposes, and there is a possibility that a few remain.

## Santa Rosa Plants

Three species of plants that occur primarily in the Santa Rosa Plains area of the Cotati Valley in Sonoma County, California, have been proposed for listing as Endangered (F.R. 6/6/90). All three are annuals and are adapted to growing in seasonal wetlands, including vernal pools. Due to habitat alteration, along with other factors, these species are believed to be in danger of extinction:

• **Baker's sticky seed (*Blennosperma bakeri*)** — An herb in the aster family (Asteraceae), this plant bears yellow, daisy-like flowers from March through April and grows to a height of about 12 inches (30 centimeters). This species is known from 30 sites in the Cotati Valley and 4 in the adjacent Sonoma Valley.

• **Burke's goldfields (*Lasthenia burkei*)** — Another member of the aster family, *L. burkei* is a small, branched herb that produces bright yellow flowers from April through June. It is known from 33 locations in the Cotati Valley, and has been reported from Mendocino and Lake Counties.

• **Sebastopol meadowfoam (*Limnanthes vinculans*)** — A small, multi-stemmed herb in the false mermaid family (Limnathaceae), this plant grows to a height of only 2 to 12 inches (5 to 30 cm). Its white flowers are borne singly at the ends of the stems. *Limnanthes vinculans* has never been recorded outside of the Cotati Valley, where it is known from 19 sites.

All three species are restricted to vernal pools and interconnecting swales. These shallow depressions fill with water during fall and winter rains, and downward percolation is blocked by an impervious subsurface layer. The temporary inundations make the basins too wet for nearby upland plants, while the seasonal drying makes them unsuitable for species that require a permanent source of water. Vernal pool plants, however, have adapted to this type of habitat; they germinate when the ground is inundated and flower as the pool dries.

These seasonal wetlands are particularly vulnerable to modification or destruction by human-related activities. About 40 percent of the Santa Rosa area already has been urbanized, and another 50 percent has been developed for agri-

culture. Proximity to San Francisco and the relative affordability of housing in the Santa Rosa area are expected to increase the rate of habitat loss. The Service estimates that development could reduce the remaining ranges of the recently proposed species by 50 to 70 percent. Additionally, indirect impacts on the vernal pools could result from projects that alter the natural hydrology of these areas and promote the invasion of competing vegetation. A proposed sewage treatment plant could flood some habitat with treated wastewater and favor flood-tolerant grasses.

Under Section 404 of the Clean Water Act, the Army Corps of Engineers is responsible for regulating the discharge of fill material into wetlands, including vernal pools. Permits for activities that would result in the filling of wetlands are available from the Corps under certain circumstances. If the Santa Rosa plants are listed, the Corps will be required by the Endangered Species Act to ensure that any activity it grants a permit for is not likely to jeopardize the plants' survival.

## Final Listing Rules

(continued from page 1)

about a species considered for threatened or endangered status." (Copies of this status review, which provides the biological basis for the listing decision, are available from the Service's Portland Regional Office.) In addition to the scientific reviews, four major public hearings were held and the public comment period was extended to more than 6 months. The Service received more than 23,000 comments on the listing proposal; a summary of these comments and the Service's responses are included in the final listing rule.

In 1989, while the listing proposal was still under consideration, an Interagency Scientific Committee was established to address the conservation of the northern spotted owl. The committee consisted of scientists from the Fish and Wildlife Service, Forest Service, and Bureau of Land Management, with representatives of the involved States, the timber industry, and conservation organizations serving as advisors. On April 2, 1990, the committee issued its report, "A Conservation Strategy for the Northern Spotted Owl." The 458-page scientific document is popularly known as the "Jack Ward Thomas Report" after the committee's chairman (a Forest Service research biologist).

The report stated that current management strategies are inadequate to ensure the viability of the northern spotted owl. In

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# Final Listing Rules

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reponse, the committee proposed a new conservation strategy centered around the establishment of a network of "habitat conservation areas" throughout the owl's range. Wherever possible, each of these areas would be large enough to support a minimum of 20 owl pairs, and the areas would be located within 12 miles of each other.

The conservation strategy was based on five widely accepted concepts of reserve design: 1) species that are well-distributed across their ranges are less vulnerable to extinction than species confined to small portions of their ranges; 2) large blocks of habitat containing multiple pairs of a species are better than small ones containing one to a few pairs; 3) blocks of habitat close together are better than blocks far apart; 4) contiguous habitat is better than fragmented habitat; and 5) animals are better able to disperse among blocks of habitat when connecting areas have suitable habitat characteristics.

The strategy detailed in the report would not protect all of the northern spotted owl's remaining habitat, but it is designed to conserve enough to give the owl a high probability of survival for the next 100 years. The Fish and Wildlife Service believes that the committee's strategy is the most scientifically credible plan yet advanced for managing the owl, and it will receive close consideration as the Service develops a recovery plan for the subspecies. Copies of the Interagency Scientific Committee's report are available by writing the Bureau of Land Management (OR 912), P.O. Box 2965, Portland, Oregon 97208; or calling 503/280-7027 (FTS 392-7027).

Because of concern that implementing the Interagency Scientific Committee's strategy would significantly reduce the logging of old-growth forests in the Northwest, thereby adding to unemployment in the region's timber industry, Secretary of Agriculture Clayton Yeutter and Secretary of the Interior Manuel Lujan have put forward an alternative approach to owl management. Their plan, announced on June 26, incorporates five major points:

(1) The Bureau of Land Management (BLM) will develop its own management strategy aimed at conserving the owl on its lands while resulting in higher timber harvest levels. BLM will investigate whether such measures as supplemental feeding, setting out nesting boxes, and propagating owls for release can effectively mitigate loss of owl habitat.

(2) Forest Service and BLM timber sales will follow the provisions of Section 318 of the 1990 Interior and Related Agencies Appropriation Act. Both agencies have been directed to minimize delay of timber sales and to achieve the congressionally mandated timber level for fis-

## Spotted Owls by Subspecies

-  Northern Spotted Owl
-  California Spotted Owl
-  Mexican Spotted Owl

Based on FWS Status Review 4/89  
(Estimated Habitat Capability) and FSEIS 7/88.



cal year 1990 while providing for the conservation of the northern spotted owl and significant tracts of old-growth forest.

(3) The Administration has established a new high-level interagency task force, chaired by the Secretary of Agriculture, to begin work immediately on devising a forest management plan for the Forest Service in fiscal year 1991. The task force report is scheduled to be submitted to President Bush by September 1.

(4) The Administration will seek to convene the Endangered Species Committee, under Section 7 of the Endangered Species Act, if a Federal agency receives a Biological Opinion from the Fish and Wildlife Service that a proposed timber sale or harvest plan would be likely to jeopardize the northern spotted owl. Section 7 of the Act requires Federal agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of listed species. The Endangered Species Committee, however, is authorized, under certain limited circumstances, to exempt a Federal activity from the provisions of the Act. The Administration also will seek legislation to expand the mandate of the Committee to allow it to develop a long-range forest management plan for federally-managed forests.

(5) The Administration announced support for provisions of the pending Customs and Trade Act of 1990 that would ban the export of raw logs taken from State lands. According to Forest Service estimates, enactment of these provisions would protect 6,000 jobs in the Pacific Northwest by the year 2000.

The activities of the high-level task force established under this approach

have been initiated, and a report of its findings is due by September 1, 1990. In addition, the Forest Service and Bureau of Land Management are to report to Congress by September 30, 1990 (under Section 318 of the Fiscal Year 1990 Appropriations Act) on their intentions for the management of the northern spotted owl. There have also been a number of bills introduced into Congress regarding timber/wildlife issues in the Northwest. These pieces of proposed legislation range in their emphasis from the protection of owls to the protection of jobs and timber supplies. Some congressional hearings have been held, and further action is expected this fall.

Whichever strategies are adopted, the Fish and Wildlife Service's goal is to conserve and recover the northern spotted owl while minimizing impacts on the activities of other agencies and local communities. In announcing the listing decision, John Turner, Director of the Fish and Wildlife Service, said: "I believe there is room in the world for both owls and loggers, if all those affected by this decision will work together to find creative solutions."

Because of the high visibility of this issue and the degree of public uncertainty over the effects of the Endangered Species Act, the Service has published a procedural manual that describes its legal responsibilities for the owl. This document, "Procedures Leading to Endangered Species Act Compliance for the Northern Spotted Owl," describes the steps that Federal, non-Federal, and private entities must follow to comply with

(continued on page 6)

## Final Listing Rules

(continued from page 5)

the Act. The Service has expedited Section 7 interagency consultations, habitat conservation planning, and recovery planning under these guidelines. For a copy of the procedural manual, or for further information on the Service's activities relating to the northern spotted owl, write the Portland Regional Office or call 503/231-6730.

Meanwhile, the Service is reviewing the status of the Mexican spotted owl (*Strix occidentalis lucida*), a second subspecies, which was petitioned for listing in December 1989. The Service will make a decision by December 1990 on whether or not listing the Mexican spotted owl as Threatened or Endangered is warranted. (See notice in the March 28, 1990, *Federal Register*.) This subspecies occurs in scattered mountain forests within Mexico and the southwestern United States. In the U.S., it is now found predominantly in old-growth forests or in remote wooded canyons of mountain drainage systems. All three subspecies, including the California spotted owl (*Strix occidentalis occidentalis*), also were included in the Service's January 6, 1989, Animal Notice of Review as Category 2 potential listing candidates.

### Lower Keys Rabbit (*Sylvilagus palustris hefneri*)

This small, brown subspecies of marsh rabbit is known only from the lower Florida Keys, where it occurs primarily in salt and freshwater marshes. Although the rabbit may once have been common throughout the larger Keys, there are now believed to be only 200-300 remaining on 13 sites, and only 6 of these sites are protected. The lower Keys rabbit has declined primarily because of the filling of wetlands for residential, commercial, and military purposes. Continuing urbanization and predation by feral house cats are potential threats to the subspecies' survival. The Service proposed listing the lower keys rabbit as Endangered on August 30, 1989 (see BULLETIN Vol. XIV, Nos. 9-10), and the final rule was published June 21, 1990.

### Squirrel Chimney Cave Shrimp (*Palaemonetes cummingsi*)

This small (1.2 inches or 30 millimeters), freshwater crustacean occurs at only one site, a sinkhole named Squirrel Chimney near Gainesville, Florida. The site is privately owned and is threatened by potential residential development. Any detrimental change to the sinkhole or the underlying aquifer could adversely affect the species. The use of septic tanks,

pesticides, and herbicides associated with residential development have the potential to degrade the aquifer's water quality. Certain forestry practices in the area also could damage the sinkhole through erosion or the use of pesticides. On August 30, 1989, the Service proposed that the Squirrel Chimney cave shrimp be listed as an Endangered species; the final listing rule was published June 21, 1990.

### Fanshell Mussel (*Cyprogenia stegaria* (= *C. irrorata*))

The fanshell is a medium to large freshwater mussel that once was widely distributed in the Ohio, Wabash, Cumberland, and Tennessee Rivers and their larger tributaries in Pennsylvania, Ohio, West Virginia, Illinois, Indiana, Kentucky, Tennessee, Alabama, and Virginia. Most of these historical populations evidently were lost when construction of impoundments and navigation projects, pollution, and habitat alterations (such as gravel and sand dredging) diminished the species' preferred riverine gravel/sand habitat and eliminated or reduced the mussel's fish host. As a result, the fanshell is now believed to be reproducing in only three rivers: the Green and Licking Rivers in Kentucky and the Clinch River in Tennessee and Virginia. Small, apparently non-reproducing populations also may still occur in the Muskingham River in Ohio, the Kanawha River in West Virginia, the Wabash River system in Illinois and Indiana, Tygarts Creek in Kentucky, and the Tennessee and Cumberland Rivers in Tennessee. The mussel faces potential threats from runoff from oil and gas exploration and production sites, and coal mines, toxic spills, water development projects, and collectors in the three rivers where it is still reproducing.

Due to the species' history of population losses and the vulnerability of the remaining populations, the Service proposed listing the fanshell as an Endangered species in the October 2, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12); the final rule was published June 21, 1990.

### Michigan Monkey-flower (*Mimulus glabratus* var. *michiganensis*)

This semi-aquatic, perennial herb, a member of the snapdragon family (Scrophulariaceae), has yellow flowers and grows in clumps of up to several hundred clonal stems. Each stem is about 14 inches (36 centimeters) in length and has evenly distributed, round, coarsely-toothed leaves. The plant is restricted to five counties in the Mackinac Straits and Grand Traverse regions of northern Michigan, where it grows primarily along streams and lakeshores.

The Michigan monkey-flower no longer can be found at 3 of its 16 historically

known sites. (One of the surviving populations, located on Mackinac Island, Michigan, was just reported in June 1990.) Eight of the existing populations consist of fewer than 10 individual plants, and 2 sites contain only 1 or 2 plants. Almost two-thirds of the known populations are on private lands. The major threat to their survival is habitat loss or modification due to recreational and residential development. The Service proposed to list the Michigan monkey-flower as Endangered in the October 2, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12), and the final rule was published June 21, 1990.

### Virginia Spiraea (*Spiraea virginiana*)

This shrub, a member of the rose family (Rosaceae), has cream-colored flowers and grows in dense clumps that are up to 10 feet (3 meters) tall. Although the Virginia spiraea is widespread geographically, it occurs in a narrowly defined habitat: along scoured banks of high gradient streams or braided features of lower stream reaches. The plant is known from 1 wet meadow and 23 stream systems in Georgia, North Carolina, Tennessee, Virginia, West Virginia, and Kentucky. (Six populations were discovered after the Service published the proposed rule to list the species as Threatened in the July 21, 1989, *Federal Register* [see BULLETIN Vol. XIV, No. 8]. Five of these populations consist of fewer than four clumps.) Historically, the species is also known to have occurred in Pennsylvania. Only three of the 24 known populations are abundant (greater than 50 clumps).

The Virginia spiraea is threatened by a combination of human and natural factors. Brush cutting along rivers and reservoir construction have eliminated or adversely affected the plant throughout its range. Proposed hydroelectric facilities potentially threaten two of the surviving populations. Large scouring floods could eliminate most of the remaining populations, and heavy competition from other native and introduced woody species is occurring at most locations. Mature seeds have been observed at only a few populations, and no seedlings have been reported. Field observations suggest that only 24 different genotypes exist, and that opportunities for colonization and establishment of new populations are very limited. Based on these threats, the Service listed the Virginia spiraea on June 15, 1990, as Threatened.



## Regional News

(continued from page 3)

After an extensive survey of cedar glade systems, the Tennessee Heritage Program concluded that Tennessee milkvetch and *Leavenworthia exigua* var. *exigua* do not appear to be threatened with extinction. Both species were located at over 100 sites, many of which support a large number of plants. In addition, several of these species' populations are found on public land and have potential for protection. In contrast, Guthrie's ground plum and *Leavenworthia exigua* var. *lutea* were located at only three sites. Additional information is being gathered to determine their eligibility for listing under the Endangered Species Act.

The Service's Southeast Region has distributed a draft environmental assessment on a proposed plan to remove a limited number of Florida panthers (*Felis concolor coryi*) from the wild and establish a captive breeding population. Currently, this critically endangered subspecies is restricted to the Big Cypress Swamp/Everglades area in south Florida. Inbreeding, coupled with a low remaining population (30 to 50 animals), has left the panther vulnerable to extinction within the next 25 to 40 years. Under the plan, the Service would establish a captive population over a 3 to 6-year period. Up to 6 kittens (new-born through 12 months of age) could be taken from the wild per year. The kittens would be selected for the greatest degree of genetic variability possible. Older animals (up to four the first year and one pair per year for following years) would be used to fill the genetic gaps. Thus, the captive breeding population would be genetically representative of the existing wild panther population.

Public meetings were held on the environmental assessment in July to provide public input on the proposed plan. A decision should be made this fall on what course of action to follow. Copies of the draft environmental assessment are available from Dennis Jordan, Florida Panther Recovery Coordinator, U.S. Fish and Wildlife Service, 117 Newins-Ziegler Hall, University of Florida, Gainesville, Florida 32611-0307 (telephone: 904/392-1861).

A 10-month-old, male, uncollared Florida panther was killed by a car June 18. The subadult was apparently travelling with its mother when it was struck while crossing a road about 6 miles (10 kilometers) north of the Big Cypress Seminole Indian Reservation in the Everglades. The accident was unusual because it occurred on a remote secondary road; most panther road kills occur on busy highways. Deaths resulting from collisions with automobiles is the greatest cause of mortality for the Florida panther. This is the thir-

teenth known panther killed by cars since July 1984.

**Region 5** — During June, Fish and Wildlife Service, National Park Service, and State biologists worked with contract beach cleaners to remove tar balls that threatened more than 100 pairs of nesting piping plovers (*Charadrius melodus*), along with their eggs and chicks, on beaches at Breezy Point, New York, and along the New Jersey coast. The tar balls, believed to have come from the B.T. Nautilus oil spill in Kill Van Kull, New York, collected in the wrackline (i.e., the area where debris from the ocean accumulates on a beach), a preferred plover feeding area. As of late June, two dead oiled plovers had been sent to the Service's National Wildlife Health Research Center for necropsy. Biologists were monitoring more than 15 partially oiled plovers and several nests that may fail to hatch because they were being incubated by adults with oil on their breast feathers.

Since 1986, the Parker River National Wildlife Refuge in Newburyport, Massachusetts, has been closing parts of its approximately 6.5-mile-long (10-km) beach to public use to protect nesting piping plovers. The closures are necessary to protect the plover chicks from disturbance until they reach flight stage and leave the area. In April of this year, about 2.25 miles (3.6 km) were closed in the southern half of the refuge. Three additional miles (5 km) of beach in the northern half of the refuge were closed to public use from June 21 through August 31. Four parking lots with beach access also were closed, reducing by about 40 percent the number of available parking spaces for refuge visitors. The refuge has placed additional signs identifying the closed areas and will increase its patrols to enforce the closures.

More than 24 piping plovers have been observed on the beach so far this year, including 9 active nests and 3 pairs exhibiting nesting behavior. Last year, eight plovers and four nests were observed at the refuge, and three nests were seen in 1988. In 1989, the Threatened piping plover population on the U.S. Atlantic Coast was estimated at about 700 pairs, with 137 pairs nesting in Massachusetts.

The Service's New York Field Office and the Army Corps of Engineers have been conducting surveys of piping plovers and least terns (*Sterna antillarum*) along the beaches adjacent to Shinnecock Inlet, on the south shore of Long Island. The surveys are part of a 3-year program, begun last year by the Service's New Jersey Field Office, to monitor construction conditions associated with an inlet dredging and beach nourishment project. This year, three piping plover nests failed in May. As of late June,

however, the plovers were incubating five nests and an egg had hatched at another nest. All but one of these nests are within a large colony of least terns. The terns' aggressive defense of the nesting area against predators should benefit the plovers.

The Pennsylvania Department of Environmental Resources has been declared eligible to enter into a cooperative agreement under Section 6 of the Endangered Species Act to conserve Threatened and Endangered plants, and thus can apply for Federal grants. Once this agreement is signed, all of the States in Region 5 will have both plant and wildlife cooperative agreements.

The Service's New England Field Office has initiated numerous recovery activities for the recently listed dwarf wedge mussel (*Alasmidonta heterodon*) in New England. To inform the public about this mussel and the threats to its existence, Service personnel have met in New Hampshire with the City of Keene's conservation commission, completed a "Dwarf Wedge Mussel Fact Sheet," and mailed information packets to all communities along the river reaches where the mussel has been found. New England Field Office biologists are investigating possible contaminant-related causes as well as possible physical disturbances to the Ashuelot River system, such as extreme water fluctuations, that may be responsible for the mussel's decline. Volunteers are also being organized to undertake additional water quality and ecological studies.

The Service's West Virginia Field Office, in cooperation with the Water Resources Division of the West Virginia Department of Natural Resources, identified a new site in the Ohio River, bordering West Virginia, that supports the Endangered pink mucket pearly mussel (*Lampsilis orbiculata*). The new site is approximately 8 miles (13 km) above a site where Service biologists found the mussel in 1986. This discovery definitely establishes that the pink mucket pearly mussel exists in an approximately 9-mile (14 km) reach of the Ohio River in the upper Greenup navigation pool. The future development of hydropower, navigation and related activities associated with renovation of the Gallipolis Locks and Dam, and a large proposed paper mill may adversely impact the 9-mile reach where the mussel occurs.

The New York State Department of Environmental Conservation reports three new nesting pairs of bald eagles (*Haliaeetus leucocephalus*) this year in the southeastern part of the State. This brings the statewide number of nesting pairs to 12.

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## Regional News

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**Region 8** — The captive flock of Puerto Rican parrots (*Amazona vittata*) at the Luquillo Aviary in Puerto Rico produced 39 eggs this year, but only 2 are definitely fertile with viable embryos. At least two pairs of parrots in the wild nested, but one of the nests failed. A dead chick and two non-viable eggs were sent to the Service's National Wildlife Health Research Center at Madison, Wisconsin, for analysis.

**Region 9** — The Government of Mexico has announced that it is prohibiting the take of sea turtles in its waters and the destruction of turtle nests. Accompanying this decision, the government is: initiating a program to study the magnitude of incidental take of sea turtles during fishery activities; extending offshore and beach refuge zones; increasing scientific studies and other programs aimed at the protection and conservation of sea turtles; and registering all existing stockpiles of sea turtle products. The Fish and Wildlife Service has been working very closely with Mexico for many years on sea turtle conservation projects, and is very supportive of Mexico's efforts to protect its sea turtles and other endangered wildlife.

The President of Mexico also has announced Mexico's decision to join the 109 Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It is through the cooperation of the CITES Parties that the international wildlife trade is both monitored and regulated (see BULLETIN Vol. XV, No. 5). At the request of the Mexican government, staff from the Fish and Wildlife Service's Offices of Management Authority, Scientific Authority, and Law Enforcement will be meeting with the Ministry of Urban Development and Ecology (SEDUE) in Mexico City this summer to provide technical assistance in the implementation of CITES.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	244	8	22	327	25
Birds	76	145	11	0	232	61
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	33	0	95	47
Snails	3	1	6	0	10	7
Clams	37	2	1	0	40	28
Crustaceans	8	0	2	0	10	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	177	1	58	2	238	107
<b>TOTAL</b>	<b>440</b>	<b>472</b>	<b>148</b>	<b>38</b>	<b>1098*</b>	<b>320**</b>

Total U.S. Endangered **440** (263 animals, 177 plants)

Total U.S. Threatened **148** (90 animals, 58 plants)

Total U.S. Listed **588** (353 animals, 235 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 265 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

July 31, 1990

July 1990

Vol. XV No. 7

# ENDANGERED SPECIES

## Technical Bulletin

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

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# ENDANGERED SPECIES

## Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20260

PUBLIC DOCUMENTS  
DEPOSITORY ITEM

### Listing Protection Proposed for Six Species

OCT 17 1990

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Six species—three plants, a turtle, a snail, and a mussel—were proposed by the Fish and Wildlife Service during July for listing as Threatened or Endangered. If the proposals are approved, the following taxa will be eligible for Endangered Species Act protection:

#### *Cyanea superba*

This Hawaiian plant, a perennial in the bellflower family (Campanulaceae), has a palm-like appearance. Its unbranched trunk grows to 20 feet (6 meters) tall and is topped by a terminal rosette of large leaves. Numerous white or cream-colored flowers are borne on pendent inflorescences.

Endemic to the island of O'ahu, *Cyanea superba* currently is known from two small sites in the Waianae Mountains. Fewer than 20 individuals remain. One site is within a State forest reserve and the other is on the federally managed Makua Military Reservation. The species is adapted to growing on sloping terrain with a heavily shaded but open understory.

Both populations face serious threats relating to the introduction of non-native species. Aggressive, exotic, weedy plants are overcrowding the sites and may be preventing the establishment of *Cyanea* seedlings. Feral pigs in the area threaten this species by uprooting, and possibly even eating, the plants. The Makua population, which occurs near the fringe of an artillery range impact area, also may be at risk from wildfires ignited by exploding shells.

On July 17, 1990, the Service proposed to list *Cyanea superba* as an Endangered species. If the proposal is approved, the Department of Defense will be required to ensure that none of its activities are likely to jeopardize the species' survival.

#### Fringed Campion (*Silene polypetala*)

The fringed campion, an attractive perennial herb in the carnation or pink family (Caryophyllaceae), grows in hardwood forests, usually on moist slopes and along creek bottoms. It is known from 15 sites within 2 distinct areas: a 4-county

section of central Georgia at the south end of the piedmont region and a 2-county area near the confluence of the Flint and Apalachicola Rivers on each side of the Georgia/Florida border.

This plant apparently has been extirpated from at least one site, and most of the remaining populations are vulnerable. A recent status survey found that most fringed campion sites are subject to logging and subsequent management of the land for pulpwood production. Other threats include residential development and encroachment by an aggressive, non-native weed, the Japanese honeysuckle (*Lonicera japonica*). Accordingly, the Service has proposed to list the fringed campion as an Endangered species (F.R. 7/11/90).

Most of the fringed campion sites are on privately owned land. At least some important habitat, however, is on property at Lake Seminole on the Georgia/Florida border that is administered by the Army Corps of Engineers. The Corps is managing the area to conserve this and other rare plants. Listing the fringed campion as Endangered would reinforce Federal conservation measures and supplement the protection now given this species by Georgia and Florida under State law.

#### Schweinitz's Sunflower (*Helianthus schweinitzii*)

Schweinitz's sunflower, a perennial herb in the aster family (Asteraceae), is native to the piedmont region of North and South Carolina. Like most sunflowers, this species is a plant of full sun or the light shade of open woodlands. Historically, its prairie-like habitat was maintained by natural disturbances, such as wildfires and grazing by herds of elk and bison. With the elimination of these herbivores and the suppression of fire, shrubs and trees have overtaken many formerly open areas.

In addition to the problems with vegetational succession, Schweinitz's sunflower habitat has been degraded by highway construction and urbanization. Five of the species' 21 recorded populations have disappeared, and most surviving colonies are reduced in size and range. One, for example, has declined 89 percent over

(continued on page 4)



photo by Robert Gustafson

With its solitary, unbranched trunk and terminal rosette of large leaves, *Cyanea superba* has a palm-like appearance.



## Regional News

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

**Region 1** - On July 19, the Department of Justice and the Fish and Wildlife Service announced that the Gentry-Pierce

Business Park near Suisun City, California, had agreed to plead guilty to violating Section 9 of the Endangered Species Act and pay a \$50,000 fine. The violation occurred when the developers disked a 157-acre (64-hectare) site known to sup-

port the Endangered salt marsh harvest mouse (*Reithrodontomys raviventris*). Although no dead mice were found on the site, the developers were charged with the unauthorized take of a listed species based on the loss of habitat. According to the Justice Department, this is the first prosecution of an Endangered Species Act violation in California that involves a significant modification or degradation of endangered species habitat.

\* \* \*

On July 10, the Fish and Wildlife Service, U.S. Forest Service, and Bureau of Reclamation completed a bald eagle (*Haliaeetus leucocephalus*) management plan for southwestern Idaho. This is the second comprehensive plan directing interagency efforts for bald eagle recovery and management in the State. (The first comprehensive plan was completed for the Yellowstone area.) The plan emphasizes management for foraging areas and several nest sites, and directs the Bureau of Reclamation to establish 6 wildlife management areas totaling 8,170 acres (3,306 hectares).

\* \* \*

**Region 2** - Walker's manioc (*Manihot walkerae*), a Category 1 candidate for Federal protection under the Endangered Species Act, is a small shrub native to the lower Rio Grande Valley of southern Texas and northern Mexico. It was described from a specimen collected in Hidalgo County, Texas, by Mrs. E. J. Walker in 1940. Botanists have searched for it since that time, and many believed it to be extirpated in Texas. In May 1990, however, Philip Clayton, a botanist with the Service's Corpus Christi, Texas, Ecological Services Field Office, rediscovered Walker's manioc near La Joya, Texas.

This species occurs at a relatively undisturbed site in the dense, thorny brush that once was widespread in the river valley. Extensive habitat alteration has eliminated most of these brushlands, which also provided habitat for such Endangered animals as the ocelot (*Felis pardalis*) and jaguarundi (*Felis yagouaroundi*). Some remnant tracts are being protected by the Service as units of the Lower Rio Grande Valley National Wildlife Refuge. The Service is now investigating the possibility of establishing colonies of Walker's manioc on nearby refuge lands.

\* \* \*

**Region 4** - The seclusive water scavenger beetle (*Paracymus seclusus*), a small, black, aquatic beetle, has been considered a Category 2 candidate for listing action. Until 1988, only three specimens, taken in 1968 from a light trap in Harrison County, Mississippi, were known to exist. Mr. Sam Testa and Dr. Paul Lago

(continued on page 3)

### U.S. Fish and Wildlife Service Washington, D.C. 20240

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photo by Philip Clayton

A second active bald eagle nest was documented this year in Hodgeman County in western Kansas. The pair at this nest, located within a stand of cottonwood trees on private agricultural land, fledged one eaglet in 1990. (The nest was rumored to contain one eaglet last year, but this was not confirmed.)

\* \* \*

Curiosity kills more than just cats. In June, an 11-year-old Nebraska boy entered an interior least tern (*Sterna antillarum*) and piping plover (*Charadrius melodus*) colony on an all-terrain vehicle to see if any eggs had hatched. He inadvertently destroyed one nest of each species. Under the Endangered Species Act, his actions could have resulted in penalties of up to a \$100,000 fine and/or 1 year in jail. Service biologists and law enforcement agents instead proposed a compassionate alternative, which all parties accepted: the boy and his mother will contribute 40 hours of community service, alerting Platte River recreationists to the presence of the birds. When school starts in the fall, the boy will make presentations to fellow students in the 5th and 6th grades, telling them of his mistake and explaining the need to protect endangered species habitat on the Platte River.

\* \* \*

Walker's manioc can be distinguished from similar plants by its lobed leaves. It contains chemical compounds that exude an aroma of almonds when the plant is injured. This species is closely related to the cassava (*Manihot esculenta*), an important food crop in many tropical parts of the world. Walker's manioc is relatively tolerant of drought and cold temperatures, and it may contain genes that could be used to develop commercial cassava that can be grown over a wider range.

## Regional News

(continued from page 2)

from the University of Mississippi conducted a study in the spring and summer of 1988 to determine the range and status of the beetle in Mississippi, and found a total of 43 scavenger beetles at 15 sites in 15 counties. The beetle's preferred habitat was identified as emergent spike rush (*Eleocharis* sp.) growing in shallow, sandy areas along the margins of lakes. This habitat type is not uncommon, and has actually expanded in recent years with the construction and maintenance of recreational and flood control reservoirs throughout the Southeast.

Although Testa and Lago found this minute beetle to be uncommon and localized, it was widely distributed in Mississippi. In fact, brief side trips to similar habitat outside of the study area revealed beetle populations in Tuscaloosa County, Alabama, and Lake County, Florida. No threats have been identified for the species or its habitat. Biologists now believe that this species was considered rare because its small size made it difficult to see or collect. As a result of this new information, the Service anticipates that the seclusive water scavenger beetle will no longer be considered a candidate for listing.

\* \* \*

**Region 5** - A pair of bald eagles produced two eaglets in New Hampshire this summer, the first time this has occurred since the cooperative recovery program

began in the State in 1979. In July, a Fish and Wildlife Service biologist climbed the nest tree and photographed and banded both 6-week-old eaglets. They appeared to be healthy and free of parasites.

\* \* \*

The peregrine falcon (*Falco peregrinus*) breeding season in the Northeast has ended for this year with mixed results. Seven breeding pairs in New Hampshire produced 11 fledglings, the best record to date. Massachusetts had two successful pairs of urban nesting peregrines again this year in Boston and Springfield, fledging five young. On the other hand, seven pairs of peregrines in Vermont produced only six chicks, a relatively low success rate. In Maine, only one of the five pairs attempting to nest was successful, producing two chicks. However, two additional peregrine chicks were obtained from the Peregrine Fund and were hatched at the National Audubon Society's Boarstone Mountain Sanctuary near Greenville.

\* \* \*

**Region 6** - After last year's first known successful nesting of bald eagles in Kansas, the pair returned to the nest in 1990. This year, the pair raised and fledged three eaglets (compared to two last season). The eaglets were banded and fitted with tail-mounted radio transmitters. Federal and State biologists hope to track the birds and identify the habitats most important to them.

**Region 8** - The Patuxent Wildlife Research Center's Southeast Research Group reports that this year's count of singing male Kirtland's warblers (*Dendroica kirtlandii*) on Michigan's lower peninsula was 265. This count is 20 percent higher than the 1989 census and is the highest since 1961.

## Subscriptions

The BULLETIN is distributed by the U.S. Fish and Wildlife Service to Federal, State, and local resource management agencies, cooperating organizations, and other official contacts of the endangered species program. It also is available to all interested individuals on a subscription basis from the University of Michigan, which reprints the BULLETIN in its *Endangered Species UPDATE*. In addition to the BULLETIN reprint, the *UPDATE* contains related items such as a separate feature article, essay, and "bulletin board" column of notices and news briefs. For a yearly subscription of approximately 10 issues, send a check or money order for \$23 to: Endangered Species UPDATE, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115. There is a \$5 student and senior citizen discount (please enclose advisor's signature or proof of age). Add \$5 for postage outside of the U.S.





photo by Nora Murdock

Schweinitz's sunflower produces solitary stems up to 6.5 feet (2 meters) tall from a cluster of carrot-like roots. The yellow flowers are about 2.2 inches (5.5 centimeters) in diameter.

## Listing Proposals

(continued from page 1)

the last 3 years. Additionally, four of the populations are very small, containing fewer than 40 plants each.

The dependence of Schweinitz's sunflower on sunny locations is illustrated by the fact that 11 of the 15 remaining populations occur along roadsides or in utility line rights-of-way. Although highway and right-of-way maintenance activities tend to control encroaching vegetation, they could threaten the sunflower colonies if herbicides are used or if the sites are mowed during the species' growing season. In response, the North Carolina Natural Heritage Program has worked with the North Carolina Department of Transportation to mark *H. schweinitzii* sites to prevent unintended damage from road-side maintenance. Utility companies also have been contacted and have agreed to alter their mowing schedules in order to protect the species. However, the small populations remain vulnerable to accidents or potential changes in management.

On July 2, 1990, the Service proposed to list Schweinitz's sunflower as Endangered. If this action is approved, it would reinforce and strengthen the protection already afforded *H. schweinitzii* under North Carolina law.

## Yellow-blotched Map Turtle (*Graptemys flavimaculata*)

Also known as the yellow-blotched sawback, this medium-sized aquatic turtle is characterized by a shell or carapace with a solid yellow or orange spot in each scute and a ridge of conspicuous dorsal spines. It is endemic to the Pascagoula River system in southeastern Mississippi, including the Leaf and Chickasawhay Rivers and other tributaries. This species faces a number of threats, the most

serious of which are habitat modification and deteriorating water quality. On July 11, 1990, the Service proposed to list *G. flavimaculata* as a Threatened species.

The yellow-blotched map turtle requires riverine habitat with a moderate current, sand or clay substrate, sand bars or beaches for nesting, and snags or other debris for basking and shelter from predators. Navigation and flood control projects have removed basking structures and nesting beaches in order to deepen the channel and promote faster water flows. Dredging river bottoms for gravel also has destroyed nesting sites and increased turbidity, which has led to declines in populations of the snails and insects upon which the turtle feeds. Erosion from certain logging and agricultural practices is contributing to stream sedimentation. Water quality is being degraded even further by municipal effluents, dioxin contamination, releases of brine wastes from oil fields, and the permitted discharges of a variety of chemicals.

The turtle's practice of basking on logs and snags gives it refuge from most predators but makes it vulnerable to humans. Some basking turtles are shot by people who use them for target practice. A more serious threat is posed by the pet trade. This very attractive species of turtle has been advertised for retail sale at \$65.00 each, and knowledgeable commercial collectors can seriously deplete a local population in a short time. Mississippi lists the yellow-blotched map turtle under State law as endangered and prohibits collecting without a permit, but this restriction is difficult to enforce. The impacts from shooting and collecting grow more serious as the species declines.

If the yellow-blotched map turtle is listed by the Service as Threatened, Federal agencies will be required to ensure that none of their activities are likely to jeopardize the species' survival. Involved Federal agencies could include the U.S. Army Corps of Engineers through its flood control and navigation projects and the Environmental Protection Agency through the Clean Water Act provisions for pesticide registration, wastewater treatment, and effluent discharge permits.

## Tulotoma Snail (*Tulotoma magnifica*)

The only species in its genus, *T. magnifica* can be distinguished from other freshwater snails by its ornamentation and large adult size. Its shell is round, somewhat larger than a golf ball, and typically decorated by spiral lines of knob-like structures. As a gill-breathing, filter-feeding mollusk, it needs free-flowing river habitat that is clean and well-oxygenated.

Historically, the tulotoma snail was known from the main channels of the Alabama and Coosa Rivers and the lower reaches of some large tributaries. These rivers, however, have been extensively altered by dredging and impoundments

for navigation and hydropower. Further, water quality has been degraded by siltation and by the discharge of municipal and industrial wastes. As a result, the tulotoma snail has been extirpated from the Alabama River, and its range in the Coosa River system has declined at least 98 percent in the main channel (and about 50 percent in the tributaries). Believing the species to be in danger of extinction, the Service has proposed to list *T. magnifica* as Endangered (F.R. 7/11/90).

The only tulotoma snail population known to remain in the Coosa River is on a 3-mile (5-kilometer) reach below Jordan Dam. Water quality problems associated with discharges from the dam, including low levels of dissolved oxygen and altered water temperatures, could affect this population. The Federal Energy Regulatory Commission, which is responsible for the periodic relicensing of dams, will be required to evaluate the impacts of Jordan Dam on the tulotoma snail if the species is listed under the Endangered Species Act. Other Federal agencies whose activities could affect the snail include the Environmental Protection Agency and the Army Corps of Engineers.

## Ouachita Rock-pocketbook (*Arcidens (= Arcidens) wheeleri*)

This freshwater mollusk, previously known as Wheeler's pearly mussel, also is a member of a monotypic genus. Its appearance is characterized by thick, moderately inflated, subovate shells that are chestnut brown to black on the outer surface. Very little is known about the habitat requirements or life history of this species.

The Ouachita rock-pocketbook once was found in the Kiamichi River in Oklahoma, the Little River in southwestern Arkansas, and the Ouachita River in central Arkansas. Like the tulotoma snail, this filter-feeding mollusk declined sharply as its riverine habitat was impounded, dredged, and polluted. A recent status survey located two surviving populations. Approximately 1,000 of the mussels are estimated to occur in an 80-mile (130-km) reach of the Kiamichi River, and a population of fewer than 100 exists within a 5-mile (8-km) segment of the Little River. The species apparently is extirpated from its namesake, the Ouachita River.

Because any further habitat damage could eliminate these low-density populations, the Service has proposed to list the Ouachita rock-pocketbook as Endangered (F.R. 7/23/90). If the proposal is approved, Federal agencies such as the Environmental Protection Agency, Army Corps of Engineers, and Federal Energy Regulatory Commission will be required to plan for the well-being of the mussel during their activities.





photo by Patricia Mehlich

**Ouachita rock-pocketbook**

## Final Listing Rules Approved for Six Species

During July of 1990, listing rules for six species — five plants and one mussel — were made final. Endangered Species Act protection is now available to the following:

### **Purple Cat's Paw Pearly Mussel (*Epioblasma (Dysnomia) obliquata obliquata* (= *E. sulcata sulcata*))**

This 3- to 4-inch (7.5- to 10.0-centimeter) freshwater mussel has fine, wavy, green rays on its shell. Historically, this subspecies occurred throughout the Ohio River and its large tributaries in Ohio, Indiana, Illinois, Kentucky, Tennessee, and Alabama. The construction of large impoundments on the rivers, however, reduced the mussel's preferred riverine gravel/sand habitat and likely affected the distribution and availability of the mussel's fish host. Today, only two relic, apparently nonreproducing populations exist, one in a reach of the Cumberland River in Tennessee and one in a reach of the Green River in Kentucky. Unless undiscovered reproducing populations exist or methods

can be developed to maintain the known populations, the species will probably soon become extinct. The Green River population is threatened by water pollution from oil and gas activities, by altered stream flows from upstream reservoirs, and by commercial fishing for other mussels. The Cumberland River population is potentially threatened by river channel maintenance, navigation projects, gravel dredging, and incidental commercial take. The Fish and Wildlife Service proposed listing the purple cat's paw pearly mussel as Endangered in the July 27, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 8), and the final rule was published July 10, 1990.

### **Five San Joaquin Valley Plants**

A final rule to list four herbs and one cactus endemic to grasslands and adjacent plant communities in the southern San Joaquin Valley and neighboring areas of California was published in the July 19, 1990, *Federal Register*. About 96 percent of the native habitat in which these plants once occurred has been lost,

primarily due to urbanization and agricultural conversion. Four species were listed as Endangered:

**California jewelflower (*Caulanthus californicus*)** - This annual herb, a member of the mustard family (Brassicaceae), grows to about 1 foot (30 centimeters) in height and has translucent white flowers with purple to green tips. It once was known from 47 sites, but only 9 natural populations and one introduced population of the plant now exist.

**Kern mallow (*Eremalche kernensis*)** - This annual herb in the mallow family (Malvaceae) grows up to 4 inches (10 cm) high and has white to rose-pink or lavender flowers. Only four populations remain. Maintenance of transmission lines, telecommunication and electrical line construction, oil and gas development, and livestock grazing are potential threats to the species.

**San Joaquin wooly-threads (*Lemneria congdonii*)** - A member of the sunflower family (Asteraceae), this annual herb has white-wooly stems that grow to about 10 inches (25 cm) in length and often trail on the ground. Only 9 sites still support populations of this plant. (Another 10 sites do not have plants but still have apparently suitable habitat.) These populations are threatened by livestock grazing, agricultural conversion, urbanization, sand and gravel extraction, oil and gas development, a proposed flood control project, and off-road vehicle use.

**Bakersfield cactus (*Opuntia treleasei*)** - This low-growing cactus has large magenta flowers and occasionally spreads to form extensive thickets. Once abundant, the Bakersfield cactus now occurs in small, isolated colonies in five general areas. Threats to these colonies include urbanization, oil and gas development, off-road vehicle use, sand mining, livestock grazing, a proposed flood control project, agricultural conversion, aqueduct and transmission line maintenance, road widening, collecting, and illegal dumping.

Another San Joaquin Valley plant species was listed as Threatened:

**Hoover's wooly-star (*Eriastrum hooveri*)** - An annual herb in the phlox family (Polemoniaceae), this plant grows up to 3 inches (7.5 cm) high and has white flowers. The species is known to occur on 118 sites, including 80 that were located after the proposed rule was published. Livestock grazing, a proposed reservoir, oil and gas development, agricultural conversion, and urbanization are among the potential threats facing the remaining populations.

The Service first published a proposal to list the California jewelflower, Kern mallow, San Joaquin wooly-threads, and Bakersfield cactus as Endangered and Hoover's wooly-star as Threatened in the July 27, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 8).

# Research Continues on Augmentation of the Southern Selkirk Mountain Caribou Herd

Eric Rominger  
National Ecology Research Center  
Fort Collins, Colorado

Woodland caribou (*Rangifer tarandus caribou*) once occurred widely in forested regions from southeastern Alaska, through much of Canada, to the northern conterminous States. Due to extensive habitat alteration and unrestricted shooting, however, only one population still naturally occurs in the conterminous United States. In 1983, this remnant herd, which occurs in the Selkirk Mountains of northern Idaho, northeastern Washington, and southeastern British Columbia, was estimated at 25-30 individuals. The animals in this herd were rarely seen in the United States because most of their seasonal habitats were in Canada. The potential threats to the survival of the southern Selkirk Mountain caribou herd while in the United States, including poaching, habitat loss, collisions with motor vehicles, and genetic problems from inbreeding, led the Fish and Wildlife Service to list the population as Endangered in February 1984 (see BULLETIN Vol. IX, No. 3).

To reduce the danger of extinction, the Fish and Wildlife Service, Idaho Department of Fish and Game, Washington Department of Wildlife, and British Colum-

bia Wildlife Branch undertook a 3-year effort to augment the southern Selkirk Mountain herd with caribou from larger herds in British Columbia. The translocations began in 1987, with 12 caribou taken from a herd near Revelstoke and 12 from a herd near Anahim Lake. They were released in the United States in the Selkirk Mountains near Bonners Ferry, Idaho. During 1988, 24 more animals were captured from these populations and added to the southern Selkirk Mountain herd. The augmentation effort ended in 1990, with 12 more woodland caribou being added to the Selkirk herd from a third Canadian population near Wells-Gray Provincial Park. Prior to their release in Idaho, all of the captured woodland caribou were tested and found free of tuberculosis and brucellosis. Additionally, all were radio-collared to enable biologists to monitor the animals.

During the first year of the augmentation effort, several of the caribou released in Idaho were located at different times in Washington, Montana, and British Columbia. Three of the caribou emigrated to a herd east of Creston, British Columbia, a

distance of approximately 34 miles (55 kilometers). Caribou released in 1989 and 1990 were more sedentary; most of them joined extant groups of previously transplanted caribou in the Selkirk Mountains.

The mortality rate for adult caribou released in Idaho has been higher than that reported for stable populations, with 21 radio-collared caribou known to have died since 1987. Causes of mortality include predation (by bears and mountain lions) and accidents, including collisions with motor vehicles along British Columbia Highway 3 (which bisects the Canadian portion of the caribou herd's range). There was one known poaching incident involving a young bull taken in Washington in 1988, which is under investigation by State and Federal authorities. Biologists hope that adult mortality rates will stabilize as the caribou become more familiar with their new habitat.

Since the beginning of the southern Selkirk Mountain caribou herd augmentation effort, the Service's National Ecology Research Center, U.S. Forest Service, Idaho Department of Fish and Game, University of Idaho, and other State and Provincial agencies have been conducting research on the herd, in collaboration with the International Mountain Caribou Technical Committee. The Service's research has focused on early-winter habitat requirements of the caribou herd. It is during this season that woodland caribou begin to switch from a diet of vascular plants to a late-winter diet comprised almost exclusively of arboreal lichens and conifer needles. During early winter, caribou primarily use mature old-growth stands of western red cedar/western hemlock and subalpine fir/Engelmann spruce, along with the ecotone between these communities. Timber harvesting operations within the Selkirk caribou range have reduced the availability of this habitat. The Forest Service has imposed a moratorium on cutting old-growth cedar/hemlock stands within early winter habitat while the relationship between caribou habitat needs and current stand conditions are assessed.

Today, the southern Selkirk Mountain caribou herd is estimated to number at least 60 to 70 animals, excluding calves born this past June. Radio-collared caribou have been observed in rutting groups, both in the United States and with resident animals in Canada. Although the caribou herd is now larger and appears to be more secure than when it was listed, biologists will continue to monitor the population and its habitat to ensure the herd's recovery.



photo by Idaho Fish and Game



# Florida Adopts New Manatee Protection Law

Robert O. Turner  
Manatee Coordinator  
Jacksonville, Florida, Field Office

Boat collisions are the primary human-related cause of manatee (*Trichechus manatus*) injuries and deaths in Florida. Last year, collisions accounted for 51 of the 166 manatee deaths in the State (see BULLETIN Vol. XV, No. 5). Most of the approximately 1,200 remaining manatees in the State's waters have scars from boat collisions. To address the growing problem, the Florida legislature has strengthened the Florida Manatee Sanctuary Act. Many organizations and agencies, including the Save the Manatee Club, the Florida Department of Natural Resource's Division of Marine Resources, and the Fish and Wildlife Service's Jacksonville and Vero Beach, Florida, Field Offices, worked together to help enact the bill. Such legislation was recognized as an important priority in the revised Florida Manatee Recovery Plan.

The new State law expands Florida's authority to protect manatee habitat, adopt rules to protect manatees from harassment, and designate areas as manatee sanctuaries. Navigational signs to prevent collisions with boats can now be placed on State bottomlands without State land leases. Another highlight of the statute is an increase in revenues dedicated to the Save the Manatee Trust Fund. Over \$730,000 will now be earmarked for the fund each year from boat registration revenues—a large increase over the \$250,000 formerly allocated for this purpose. In addition, all of Florida's counties now have the option to increase their own boat registration fees by 50 percent and to use the funds for manatee protection. Previously, only counties with a population of at least 100,000 people were authorized to increase these fees.



Sirenia Project, U.S. Fish and Wildlife Service

...what Florida's new manatee protection law is intended to prevent. Motorboat propeller wounds caused this manatee's death. Most surviving adult manatees in Florida waters carry scars from similar encounters with speeding boaters.

Under the new legislation, local governments are authorized (once they receive State approval) to regulate motor boat speed and operation for manatee protection in waters within their jurisdiction. Also, the Florida Department of Natural Resources is now authorized to establish speed zones around power plant warm-water discharge ponds during any time of the year. Previously, the time limit set for these restrictions was from November 15 to March 31.

The manatee population in Florida has been declining for many years, due in large part to boat collisions. As Florida's human population continues to grow, the number of powerboats will increase along with the potential for manatee injury, mortality, and harassment. It is hoped that Florida's new law will help reverse the decline of the manatee population.

## New Publications

The Stanford Environmental Law Society has published *The Endangered Species Act: A Guide to Its Protections and Implementation*. This handbook provides a comprehensive analysis of the Act, from its origins through the passage of the 1988 amendments, and includes discussions of legislative history and judicial opinions. Chapters in the handbook address such topics as listing and critical habitat designation, takings and other prohibited acts, recovery plans, Section 7 interagency consultations and constraints on Federal activities, and international aspects of the Act. The handbook is available for \$12.00 plus \$1.50 shipping from the Stanford Environmental Law

Society, Stanford Law School, Stanford, California 94305-8610.

"Mammals of the La Selva-Braulio Carrillo Complex, Cost Rica," by Robert M. Timm, Don E. Wilson, Barbara L. Clauson, Richard K. LaVal, and Christopher S. Vaughan was published in 1989 in the Fish and Wildlife Service's research publication series as *North American Fauna* Number 75. The publication discusses 142 mammal species occurring in the 128,000-acre (52,000-hectare) complex, including several listed Endangered species and other species on the CITES list. This issue marks the centennial of *North American Fauna*, which was first

published in 1889. Copies may be requested from the Service's Publications Unit, Room 130 - ARLSQ, 1849 C Street, N.W., Washington, D.C. 20240.

"Habitat use and streamflow needs of rare and endangered fishes, Yampa River, Colorado," by Harold M. Tyus and Catherine A. Karp, was published by the Service in 1989 as *Biological Report* 89(14). It discusses conservation needs of the Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail chub (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*) in the Yampa River. This report also is available from the Service's Publications Unit.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	244	8	22	327	25
Birds	76	145	11	0	232	61
Reptiles	15	59	17	14	105	24
Amphibians	6	8	5	0	19	5
Fishes	51	11	33	0	95	47
Snails	3	1	6	0	10	7
Clams	37	2	1	0	40	28
Crustaceans	8	0	2	0	10	4
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	178	1	59	2	240	108
<b>TOTAL</b>	<b>441</b>	<b>472</b>	<b>151</b>	<b>38</b>	<b>1102*</b>	<b>321**</b>

Total U.S. Endangered **441** (263 animals, 178 plants)

Total U.S. Threatened **151** ( 92 animals, 59 plants)

Total U.S. Listed **592** (355 animals, 237 plants)

\*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\*There are 266 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

August 31, 1990

August 1990

Vol. XV No. 8

# ENDANGERED SPECIES

## Technical Bulletin

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

FIRST CLASS  
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PERMIT NO. G-77





# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

### Five Species Proposed During August 1990 for Listing Protection

Four species of plants and one mussel species were proposed by the U.S. Fish and Wildlife Service during August 1990 for listing as Endangered or Threatened. If the listings are made final, Endangered Species Act protection will be extended to the following:

#### Three Hawaiian Plants

The changes in the natural environment of the Hawaiian Islands that began with the arrival of the earliest explorers accelerated dramatically after westerners brought their livestock to the archipelago. Feral goats, pigs, and cattle, along with mouflon sheep that were introduced for sport hunting purposes, had devastating effects on the native flora, which had never evolved defenses against herbivores. Grazing and associated impacts from these animals are largely responsible for the high number of rare and extinct plants in Hawaii. As part of an effort to give greater attention to Hawaiian listing candidates, the Service has proposed Endangered classification for the following:

• **Ka'u silversword** (*Argyroxiphium kauense*) — This unusual plant, a rosette shrub of silvery, sword-shaped leaves, is endemic to the island of Hawai'i ("the Big Island"), where it currently is found in the Ka'u and South Hilo Districts. The species' former range is thought to have extended in a band around the southern and eastern flanks of Mauna Loa. (It may also have occurred around Hualalai, one of the island's other volcanoes.) Only 3 small populations, totalling about 400 plants, are known to remain. Although two of these populations are at least partially within forest reserves, most of the plants are threatened by feral livestock. When rooting, pigs disrupt silverword seedlings and uproot or knock

(continued on page 3)



The K'a'u silversword is a rosette shrub in the aster family (Asteraceae). Its leaves, which grow up to 16 inches (40 centimeters) long, are narrowly sword-shaped and nearly covered with silvery-gray hairs. This species blooms once in its lifetime, producing a single, highly branched inflorescence up to 8 feet (2.5 meters) in height with numerous white or yellow to wine-red flowers. Cross-pollination with another plant is necessary for this species to produce seed. Therefore, if the few remaining mature plants do not flower at the same time, or if the plants are spaced too widely apart for pollination, the plants will not reproduce. Standing next to this specimen in a 1974 photograph is the late Otto Degener, a noted botanist who, with his wife Isa, elevated the K'a'u silverword to species rank.

photo by Kaoru Sumada



## Regional News

### Regional endangered species staffers have reported the following news:

**Region 1** - The spring 1990 count of southern sea otters (*Enhydra lutris nereis*)

along the California coast was 1,678, 10 percent lower than the spring 1989 count (1,864). It has been expected that the population would increase by 7 percent, which was the average annual increase between 1983

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#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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and 1989. The significance of this apparent decline in sea otter numbers is uncertain. The fall 1990 and spring 1991 counts should help clarify the status of the population.

\* \* \*

In cooperation with the Wolf Recovery Foundation, Inc., the U.S. Fish and Wildlife Service organized volunteers in August to survey two locations in central Idaho where there have been numerous reports of gray wolves (*Canis lupus*) by the public. Approximately 30 trained volunteers participated in surveying the Bear Valley area of the Boise National Forest and the Red River-Dixie area of the Nez Perce National Forest. In response to the volunteers' calls, wolf howls were heard in the Red River and Lowman Ranger Districts. These are the first confirmations of wolves in Idaho since the early 1980's.

\* \* \*

All six Andean condors (*Vultur gryphus*) released early in 1990 in southern California have continued to expand their range to the west and northwest. They travel as far as the San Marcos Pass and Cachuma Lake to the west and toward Figueroa Mountain to the northwest. This experimental release group appears to be less attracted to human activity than the two groups that were released in 1988 and 1989 (see BULLETIN Vol. XV, No. 3). All of the condors routinely return to the Sespe Condor Sanctuary release site for feeding and occasional roosting.

\* \* \*

The Service's Sacramento, California, Field Station reports that an adult female Kern primrose sphinx moth (*Euproserpinus euterpe*) was observed this spring in eastern Kern County, California. This Threatened species has not been observed in the wild for several years. A male may also have been present, but the entomologist was not able to get close enough to make a positive identification.

\* \* \*

**Region 2** - The 22 sub-adult and adult whooping cranes (*Grus americana*) that were moved from the Service's Patuxent Wildlife Research Center in Laurel, Maryland, to the International Crane Foundation in Baraboo, Wisconsin, in November and December of 1989 produced no eggs this year. Although the flock included two experienced breeding pairs, apparently the females were not yet at ease with their new territory and the artificial insemination crew. A similar breeding delay was experienced when whooping cranes were moved to new pens at Patuxent.

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## Five Species Proposed

(continued from page 1)

over larger plants. Heavy browsing of Ka'u silverswords by pigs, goats, and sheep also has been documented. In addition, lava flows and the wildfires they ignite pose a serious threat. The Ka'u silversword was proposed in the August 6 *Federal Register* for listing as Endangered.

Two other Hawaiian plants from the island of Kaua'i were proposed for the same status on August 3. Both are found only along the Na Pali coast, a rugged area of high cliffs and narrow valleys on the island's northwest side.

- **Na Pali beach hedyotis (*Hedyotis st.-johnii*)** — Since this species was first collected in 1947, it has been seen only along a 4.5-mile (7-kilometer) stretch of Na Pali Coast State Park. The vegetation of this area has been heavily browsed by feral goats that are managed as game for hunting. Almost all of the remaining Na Pali beach hedyotis (about 250 individuals as of 1989) are found growing only in crevices and on outcrops that are inaccessible to the goats, leading botanists to believe that *H. st.-johnii* may once have occurred over a wider area. Competition from aggressive introduced plants is now the main threat to the species' survival.

- **ma'oli'oli (*Schiedea apokremnos*)** — This plant has oblong, somewhat fleshy leaves that are arranged oppositely along the stems. Its small flowers, which lack petals, are borne in clusters with green (and often purple-tinged) bracts and sepals. Like the Na Pali beach hedyotis, *S. apokremnos* grows along near-vertical cliff faces, but it also grows in a few places that remain vulnerable to feral goats. In addition to browsing the plants, goats erode the fragile soil layer, thus reducing habitat, disrupting seedlings, and creating openings for the invasion of exotic shrubs. A total of only about 100 individuals of ma'oli'oli (the species' Hawaiian name) have been seen.

Fire is another threat to both species. All populations of *H. st.-johnii* and all but one population of *S. apokremnos* occur within Na Pali State Park. Although it is illegal to remove or destroy any plants in State parks and reserve lands, the growing popularity of Na Pali State Park could increase the likelihood of accidental fires during dry seasons.

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*Hedyotis st.-johnii* is named for botanist Harold St. John, a student of the Hawaiian flora for the past 60 years, who was one of several people who first collected the species in 1947. This plant, also known as the Na Pali beach hedyotis, is a succulent perennial herb in the coffee family (Rubiaceae). The woody, slightly trailing main stems grow up to 1 foot (30 cm) long. Separate flowering stems reach up to 6 inches (15 cm) in length and produce clusters of small green flowers.



*Schiedea apokremnos*, a low, branching shrub in the pink family (Caryophyllaceae), grows to a height of about 20 inches (50 cm). This plant has oblong, somewhat fleshy leaves that are arranged oppositely along the stems. Its small flowers, which lack petals, are borne in clusters with green (and often purple-tinged) bracts and sepals.

drawing by Yvonn Wilson-Ramsey, reprinted from *Manual of the Flowering Plants of Hawaii*, courtesy of University of Hawaii Press

photo by David Lorence

## Five Species Proposed

(continued from page 3)

### Knieskern's beaked-rush (*Rhynchospora knieskernii*)

An annual plant in the sedge family (Cyperaceae), this species grows to about 23 inches (60 cm) high, has short, narrow leaves, and produces clusters of small brown flowers along the length of its stem. It is believed to be endemic to the Pinelands area of southern New Jersey, where it grows in open or early successional wetland habitat. Historically, *R. knieskernii* was known from 38 sites, but now it can be found at only 22 sites in Atlantic, Burlington, Ocean, and Monmouth Counties. The species apparently is extirpated in Camden County. Because of continuing threats to the habitat, the Service has proposed to list *R. knieskernii* as Threatened (F.R. 8/8/90).

The New Jersey Pinelands are a region of predominately oak/pitch pine forest stands. Because it requires open habitat, Knieskern's beaked-rush is restricted to clearings and disturbed areas. Most of the wildfires that once maintained these openings are now suppressed. As a result, vegetational succession threatens many *R. knieskernii* sites. Some human activities in the Pinelands have created openings that support small populations of the beaked-rush, but disturbances of the wrong kind (e.g., hydrological changes) or frequency can eliminate the species from a given site. Other threats include urbanization, water pollution, trash dumping, off-road vehicles, and sand and gravel mining.

Most of the remaining *R. knieskernii* sites are on private property, but eight are on State lands and two are federally managed. One of these sites, a Federal Aviation Administration tract in Ocean and Burlington Counties, has been proposed as a location for new aircraft communications facility. Another Federal agency whose activities could affect the species' habitat is the Army Corps of Engineers, which is responsible for regulating wetlands under Section 404 of the Clean Water Act. If *R. knieskernii* is listed as Threatened, these and all other Federal agencies will be required to ensure that none of their actions are likely to jeopardize the plant's survival.

Conservation and recovery of Knieskern's beaked-rush will probably involve not only site protection but also habitat manipulation to maintain early successional vegetation.

### Winged Mapleleaf Freshwater Mussel (*Quadrula fragosa*)

The rich freshwater mussel fauna of North America has declined significantly in numbers, range, and composition over the past century as its riverine habitat has been altered and degraded. In the United States alone, 38 species of mussels are now listed as Endangered or Threatened, and others are being considered for listing action. On August 6, 1990, the Service proposed to classify another species, the winged mapleleaf freshwater mussel, as Endangered. This mollusk is similar in general appearance to the mapleleaf mussel (*Quadrula quadrula*), which is still widespread, but there are differences in the shape of the shells. The two species also can be distinguished by their habitat needs; while *Q. fragosa* seems to prefer clean riffle areas, *Q. quadrula* can exploit impoundments and a muddy substrate.

The winged mapleleaf historically occurred throughout the Mississippi, Ohio, Tennessee, and Cumberland River drainages in at least 12 States (Minnesota, Wisconsin, Iowa, Illinois, Missouri, Kentucky, Tennessee, Nebraska, Kansas, Oklahoma, Indiana, and Ohio). Approximately 99 percent of its habitat has been lost, however, due to impoundments, channelization, pollution, and sedimentation resulting from soil erosion. The single known remaining population occurs along fewer than 5 miles (8 km) of the St. Croix River on the Minnesota/Wisconsin border. This population's small size and restricted range makes the population vulnerable to extinction from any additional habitat degradation, including a single, catastrophic chemical spill or other accident. Threats of a more indirect nature could include problems with the species of host fish (so far unknown) the winged mapleleaf needs to parasitize during its larval stage.

An apparent lack of reproduction in the winged mapleleaf population is a major concern. During surveys in 1988 and 1989, no gravid females were located, and no individuals younger than 4 years of age could be found. Other mussel species in the same area did not show such reproductive failures.

\* \* \*

### Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Fed-

eral activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.



# Desert Tortoise Conservation Center Begins Work

The Desert Tortoise Conservation Center near Las Vegas, Nevada, opened June 16, 1990. The 240-acre (97-hectare) Center was established as a provision of the settlement of a court suit that was filed over the emergency listing of the Mojave population of the desert tortoise (*Gopherus agassizii*) (see BULLETIN Vol. XIV, Nos. 9-10). It is the first large-scale research facility established to receive tortoises salvaged from private lands under development. The Bureau of Land Management (BLM), which is in charge of the Center, has contracted the Tort Group of Las Vegas to feed and care for tortoises at the Center. (The Tort Group has long been active in caring for desert tortoises.) There is also a part-time veterinarian on the Center's staff. Although the Center is not open to the public, an adjacent interpretive center and educational facility may be built in the future.

Under the terms of the settlement, tortoises from 11 different tracts of private land under development in Las Vegas Valley, totaling 7,200 acres (2,900 ha), could be transferred to the Center. The Fish and Wildlife Service issued the BLM, the Nevada Department of Wildlife, and The Nature Conservancy (which provided funds for the transfer) a scientific collection permit for this purpose under Section 10(a) of the Endangered Species Act. Under the terms of the permit, up to 871 tortoises can be moved from the private lands, with an incidental loss of 10 tortoises allowed.

Progress has been slow in the tortoise roundup, which is being conducted by contractors under the Nevada Department of Wildlife's supervision, because of the time required for processing each tortoise (i.e., weighing, measuring, taking blood samples)

and the high ambient temperatures in Las Vegas. These high temperatures, combined with the handling, increase stress to the animals. The first tortoise roundup occurred in early June on 500 acres (200 ha) in the western part of the valley. The State set a minimum standard of three sweeps of each property to ensure that the maximum number of tortoises were found; additional sweeps can be required if necessary. As of October 3, 667 tortoises had been transferred to the Center from 4,360 acres (1,760 ha) of private land. Although many tortoises have been handled in the roundup and in the construction of the Center, there have been only three tortoise deaths (as of October 3).

The transplanted tortoises are first kept isolated on the Center's grounds for a mini-

mum of 30 days to determine if they carry the upper respiratory disease syndrome, which is a major threat to the species. The Center has 200 quarantine pens for this purpose. As of October 3, 94 tortoises, or about 14 percent of those captured, have displayed signs of the syndrome. Several will be sent to universities for study of the disease. Healthy tortoises are transferred from the quarantine pens to 10- to 20-acre (4- to 8-ha) fenced areas where they will take part in nutrition, reproduction, physiological, and behavioral studies. The studies are expected to begin at the Desert Tortoise Conservation Center in the spring of 1991 under the supervision of the Nevada Department of Wildlife.



photo by Mike Donahue

**Captured tortoises are kept in quarantine pens for at least 30 days to assure that they do not carry upper respiratory disease syndrome to the captive population.**

## Regional News

(continued from page 2)

The Service weighed the risk of skipping one breeding season against the risk of disease when it was considering whether or not to split up the Patuxent flock last fall (see BULLETIN Vol. XIV, Nos. 9-10). The birds are expected to be in a normal breeding cycle by the spring of 1991. Meanwhile, the 11 fertile eggs that were shipped this spring from Wood Buffalo National Park, Canada, to Baraboo hatched and eight chicks fledged (see BUL-

LETIN Vol. XV, No. 7). These birds will be kept to increase the captive breeding population. The Baraboo whooping crane flock now stands at 30 birds.

\* \* \*

All 13 surviving birds of the Grays Lake whooping crane flock were confirmed in the San Luis Valley of Colorado in April. In an effort to promote pairing, several attempts were made to capture some individuals in Colorado. It was hoped that if individual birds could be brought together in a controlled situation, they would form pair bonds,

but the efforts to capture the birds were unsuccessful.

One wild 4-year-old whooper female was later captured in Idaho and released near wild males on their territories. However, she moved to the north end of Grays Lake National Wildlife Refuge where she remained distant from the other whooping cranes.

Another wild female and a male were captured in Idaho and confined in a pen. They were compatible and began acting like a pair, but no breeding activities were noted.

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# Final Listing Rules Approved for Four Species

During August of 1990, final listing rules were published for two tiger beetles and two Caribbean plant species. Endangered Species Act protection is now available to the following:

## **Pelos del Diablo (*Aristida portoricensis*)**

This tufted grass, a member of the family Poaceae, grows up to 20 inches (50 centimeters) high. It is endemic to serpentine slopes and red clay soils in southwestern Puerto Rico. Urbanization, land clearing, and the introduction of competing grasses for cattle grazing have altered or destroyed most former *A. portoricensis* habitat. Today, *A. portoricensis* is known to occur only in two privately owned areas. Residential development has eliminated most of the plants at one of the sites and threatens the plants in the other area. In addition, the larger population is potentially threatened by proposed copper and gold mining. The Fish and Wildlife Service proposed *A. portoricensis* for listing as an Endangered species in the October 10, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12), and the final rule was published August 7, 1990.

## **Higo Chumbo (*Harrisia portoricensis*)**

Another plant endemic to the Caribbean, the higo chumbo is a slender, columnar species in the family Cactaceae. This cactus grows up to 6 feet (2 meters) high and has

greenish-white, funnel-shaped flowers that open at night. Historically, the higo chumbo was known to grow in one area of Puerto Rico and on the nearby islands of Mona, Monito, and Desecheo. Urban development and agriculture have eliminated the Puerto Rico population. The populations on Mona Island (which has most of the cactus' remaining habitat) are threatened by potential development projects and by feral goats and pigs. The pigs uproot the cactus while searching for edible roots, while the goats are believed to be changing the island's vegetational composition. Feral goats also threaten the Desecheo population. The Service proposed the higo chumbo for listing as a Threatened species on October 18, 1989 (see BULLETIN Vol. XIV, Nos. 11-12), and the final rule was published August 8, 1990.

## **Two Tiger Beetles**

The **northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*)** and **Puritan tiger beetle (*Cicindela puritana*)** are two small predatory insects that occur on beach habitats in the northeastern United States. The northeastern beach tiger beetle was once common along coastal beaches from the southern coast of Massachusetts to central New Jersey and along the central and southern shorelines of Chesapeake Bay. Today, the beetle is known to occur at 1 site in Massachusetts, 4 sites on the Maryland coast of Chesapeake Bay, and 40 sites on Virginia's Chesapeake Bay shoreline. The Puritan tiger beetle historically occurred along the Con-

necticut River in Vermont, New Hampshire, Massachusetts, and Connecticut, and along the Chesapeake Bay in Maryland. The beetle is now known to occur at 2 sites along the Connecticut River, and at 11 sites (only 6 of which have sizeable populations) on Maryland's Chesapeake Bay coastline.

Both tiger beetles are threatened by increasing development and alteration of the beaches they occupy. The northeastern beach tiger beetle is threatened by pedestrian and recreational vehicular traffic on the intertidal beaches, which damage the beetles' larval habitat, and potentially by oil spills and other pollutants. The Puritan tiger beetle is also threatened by pedestrian and recreational vehicular traffic and by cliff stabilization activities. Populations of both species potentially could be affected by collectors of rare insects, many of whom prize tiger beetles very highly.

On October 2, 1989, the Service proposed to list the northeastern beach tiger beetle as Endangered and the Puritan tiger beetle as Threatened (see BULLETIN Vol. XIV, Nos. 11-12). However, the Service has obtained new information since the proposed rule was published that indicates the northeastern beach tiger beetle is somewhat more abundant along Virginia's Chesapeake Bay shoreline than previously believed. The Service therefore concluded that this beetle should be listed as Threatened instead of Endangered. The final rule for both tiger beetles was published August 8, 1990.

## **Regional News**

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In an effort to strengthen the pair bond and promote breeding next spring, a sandhill crane (*Grus canadensis*) chick was placed in the pen. Chick adoption has been successfully used in captive breeding situations to strengthen whooping crane pair bonds. Although the female seemed to develop a parental-type bond with the chick, the chick apparently died of exposure. Another sandhill crane chick was placed in the pen but was killed by a predator. A third chick was introduced, and again the female whooping crane showed evidence of bonding with the chick. The family unit was then released at Grays Lake Refuge. At last observation, the whooping crane pair was still together but

the fledged sandhill crane chick seemed to be alone.

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**Region 4** - The Alabama cave shrimp (*Palaemonias alabamiae*) is a small, nearly transparent freshwater crustacean that is restricted to two sites, Bobcat Cave and Shelta Cave, in north Alabama. The Service listed the shrimp as Endangered in 1988 because of its limited distribution and the threat of water quality degradation in the caves' aquifers (see BULLETIN Vol. XIII, Nos. 9-10). No cave shrimp have been observed in Shelta Cave, the type locality, since the mid-1970's. A water quality analysis, conducted prior to listing, indicated that the Shelta Cave aquifer had become contaminated by pesticides and cadmium.

Only three Alabama cave shrimp have been observed in Bobcat Cave during the past decade. Although no detectable levels of pesticides and only traces of cadmium have been detected in Bobcat Cave, the viability of the Bobcat Cave population was questionable until recently because so few cave shrimp had been observed in its waters. On July 25, however, a biologist with the Service's Jackson, Mississippi, Field Office found 22 cave shrimp in just a small portion of Bobcat Cave's waters near the entrance. This indicates that a viable population may exist in the aquifer, and it increases the species' recovery potential.

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**Regional News**  
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**Region 5** - Since 1985, the Chatham Police Department in Massachusetts has played an important role in the recovery of the Atlantic Coast population of the piping plover (*Charadrius melodus*). Each summer, the officers have volunteered to post the birds' nesting areas at Harding Beach on Cape Cod. This beach has been the most consistently productive piping plover nesting area on the East Coast. Thirty-nine chicks have been fledged from this site since 1985. This August, in recognition of the officers' time and effort, the Fish and Wildlife Service's New England Field Office in Concord, New Hampshire, presented the police department with Certificates of Appreciation.

Seabeach amaranth (*Amaranthus pumilus*), a Category 2 candidate for listing, has been rediscovered on the south coast of Long Island, New York. This plant is found on overwash flats at the accreting ends of barrier islands and on the lower foredunes of non-eroding beaches. Its historic range was from Massachusetts to South Carolina, but until now it was believed extirpated north of Virginia. The last known record of the plant occurring in New York was in 1955. Biologists conducted extensive searches for seabeach amaranth in the State from 1984 to 1987 but failed to find the plant. The newly located population consists of approximately 100 plants on three beaches.

The Endangered dwarf wedge mussel (*Alasmodonta heterodon*) was thought to be extirpated from all but 10 sites in New Hampshire, Vermont, Maryland, and North Carolina until this summer. Biologists from the New York and Virginia Natural Heritage Programs rediscovered the mussel on two sites. Like most of the other 10 sites known to support the species, the New York and Virginia sites appear to have small, relict populations.

**Region 6** - The female gray wolf from the Marion Pack that had moved into an area northwest of Missoula, Montana, about 40 miles (64 kilometers) east of the Idaho border had a litter of pups this spring (see BULLETIN Vol. XV, No. 3). Unfortunately, the female was killed, probably illegally, in early June. While fishing, a woman found the wolf's smashed radio-collar in a stream and

turned it in to the Service's Helena, Montana, Field Office. Service biologists monitored the den area and, through howling calls and sightings, were able to ascertain that the adult male wolf and six pups were still present. Then, on September 1, the adult male was struck and killed by a car on Interstate 90, leaving the pups orphaned. The Service is working closely with the private landowners on whose property the wolves are staying, and is temporarily feeding the pups road-killed deer until they can survive on their own.

The third annual census of Wyoming toads (*Bufo hemiophrys baxteri*) has been completed in the 2 square miles (5 square km) of its known range by Fish and Wildlife Service, Wyoming Game and Fish Department, Wyoming Cooperative Fish and Wildlife Research Unit, and Nature Conservancy biologists. (See BULLETIN Vol. XIV, Nos. 9-10 for information on the previous census.) Two surveys were conducted in early and late summer. These surveys incorporated new mark-recapture techniques that identify individual toads by photographing coloration patterns on the animals' backs. The late summer survey recorded 50 adult toads and 100 young-of-the-year, down from 300 young-of-the-year in the first survey. Researchers hypothesize that the decline is due to dispersal of the young. The number of toads observed this year was probably influenced by the very heavy grass cover and high temperatures. Biologists believe that the Wyoming toad population is about 33 percent larger than what was actually counted during the surveys, bringing the total number to about 465.

The first Colorado squawfish (*Ptychocheilus lucius*) reported from Wyoming in nearly 30 years was captured, identified, and released unharmed in August by a zoology professor from Arizona State University. The adult squawfish was found in the Little Snake River a few miles north of the Colorado-Wyoming border. Although this report is significant and is likely to prompt new sampling in the Wyoming section of the Upper Colorado River Basin, biologists are cautious about drawing premature conclusions. Adult squawfish have been known to migrate long distances during spawning periods. This fish could be a member of an unknown Wyoming population, but it also could have been far upstream from its normal range.

**Region 8** - Dr. Paul Opler from the Service's Office of Information Transfer in Fort Collins, Colorado, led a combination field trip and recovery meeting in August to review the status of the Threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*). Butterfly numbers have dropped to dangerously low levels on Oregon's Clatsop Plains due to development pressures, the introduction of exotic plants, and plant succession. Near Crescent City, California, the team found a healthy population in the Lake Earl area, which is managed by the California Department of Fish and Game and Parks.

The recovery team also inspected management efforts at four other sites. Populations at Mount Hebo, Rock Creek, and Cascade Head, Oregon, continue to improve under the management of the U.S. Forest Service and The Nature Conservancy. An Oregon silverspot population historically occurred in the Long Beach, Washington, area but it was extirpated due to vegetational succession. Plans are being made by the Washington Department of Wildlife to improve habitat for the butterfly in this area.

The Patuxent Wildlife Research Center's captive whooping crane flock now stands at 35 birds. This spring, three experienced breeders produced 10 eggs and a new breeder laid 4 eggs. Six of the 14 eggs were fertile, and four of them hatched. Two of these chicks survive.

The flock's younger, inexperienced female cranes are being used in an experiment in natural breeding. These birds are not being artificially inseminated, and consequently are expected to have lower fertility.

Dr. David Ellis from the Service's Patuxent Wildlife Research Center and Dr. George Archibald from the International Crane Foundation worked with a team of Soviet scientists in Siberia to place radio transmitters on three common cranes (*Grus grus*). The project is designed to learn more about the migration routes of the common crane and to test satellite tracking techniques that can be used on the Endangered Siberian white crane (*Grus leucogeranus*).

Patuxent's Captive Propagation Research Group and Animal Husbandry Section report the highest egg production on record (86) for captive Mississippi sandhill cranes (*Grus canadensis pulla*). Fifty chicks are now

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## Regional News

(continued from page 7)

being reared at Patuxent, Maryland. It is anticipated that the number of chicks released into the wild this winter will surpass the record 29 that were released in 1989.

Half of the Mississippi sandhill crane chicks that die at hatching have a severe skin disease. Research conducted at the Service's National Wildlife Health Research Center in Madison, Wisconsin, indicates that bacteria are the agent responsible for this disease, although viruses have not been eliminated as possible cause.

\* \* \*

Mortality of adult California least terns (*Sterna antillarum browni*) increased precipitously in 1990 at the Camp Pendleton Marine Corp Base in California. Camp Pendleton is one of the major nesting areas for the tern. Necropsies conducted by the National Wildlife Health Research Center indicate that the terns died from a variety of causes.

\* \* \*

**Region 9** - The two newest Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are Brunei Darussalam (effective August 2) and Guinea-Bissau (effective August 14). This brings the total number of CITES Parties up to 108.

The Fish and Wildlife Service participated in an emergency meeting of the CITES Standing Committee (which oversees the treaty) on August 8-11 in Nairobi, Kenya. The main topics of the meeting were coordination of the search for a new Secretary General for CITES (the position will be vacant as of November 1) and other staffing issues.

The CITES Secretariat has several publi-

cations available to the public, including a subscription to the Notifications to the Parties, CITES Directory, and proceedings of the first six meetings of the Conference of the

Parties. To obtain a price list and order form, contact the Office of Management Authority, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	248	8	22	331	29
Birds	74	153	11	0	238	69
Reptiles	16	58	17	14	105	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	44
Snails	3	1	6	0	10	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	179	1	60	2	242	120
<b>TOTAL</b>	<b>443</b>	<b>483</b>	<b>153</b>	<b>38</b>	<b>1117*</b>	<b>351**</b>
Total U.S. Endangered	443	(264 animals, 179 plants)				
Total U.S. Threatened	153	(93 animals, 60 plants)				
Total U.S. Listed	596	(357 animals, 239 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

October 31, 1990

September 1990

Vol. XV No. 9

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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## ENDANGERED SPECIES

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## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240Forty-six Plants and Animals Proposed  
During September for Endangered Species Act Protection

Forty-six plants and animals were proposed by the Fish and Wildlife Service in September 1990 for listing as Endangered or Threatened species. These taxa—43 Hawaiian plants, 1 Puerto Rico plant, and 2 New Mexico snails—will receive Endangered Species Act protection if the following proposals are approved:

## 43 Hawaiian Plants

Under the terms of a settlement agreement reached with the Sierra Club Legal Defense Fund, which acted on behalf of the Conservation Council for Hawaii and other conservation groups, the Service announced in July that it would propose 186 Hawaiian plant taxa for addition to the Federal List of Endangered and Threatened Species during fiscal years 1990-1992, including at least 50 by September 30, 1990. These 186 taxa are all of the Hawaiian plants identified as Category 1 listing candidates in the Service's February 21, 1990, Notice of Review for Plants (see BULLETIN Vol. XV, No. 3). Because the Service now believes that 30 of these taxa are extinct, the number ultimately listed may be reduced to 156, in accordance with the terms of the agreement.

The settlement resulted from a December 1989 lawsuit charging that delays in the listing of these plants constituted a violation of the Endangered Species Act. With the publication this year of the *Manual of the Flowering Plants of Hawai'i* (see New Publications notice in this BULLETIN), which placed the

*Hesperomannia lydgatei*

list of candidate species on a firmer biological foundation, the Service agreed to hire more botanists and provide more funding to accelerate the listing program. In May 1990, the legal settlement was approved by the U.S. District Court in Hawaii.

Fifty-two Hawaiian plants were proposed for listing in fiscal year 1990, 43 of them in September. The latest proposals have been grouped by geographic area:

**Wahiawa Drainage Basin, Island of Kaua'i (5 plants)** - These plants are known only from the Wahiawa drainage basin, an area of high floristic endemism that includes bogs, permanent streams, ridge summits, and one of the most diverse montane wet forests in the Hawaiian Islands. On September 17, the Service proposed to list these species as Endangered:

- *Cyanea undulata* is an unbranched shrub in the bellflower family (Campanulaceae) that grows up to 12 feet (3.6 meters) tall with narrowly elliptic leaves and yellowish, hairy flowers. This species is currently known from a single population of three or four plants.

- *Dubautia pauciflora* is a sprawling to erect shrub in the aster family (Asteraceae) that reaches about 10 feet (3 m) in height and has narrow leaves clustered at the ends of the branches. It produces open inflorescences that bear up to 500 flowering heads, each containing 2 to 4 yellow florets. Only three populations are known, totalling 30 to 40 plants.

- *Hesperomannia lydgatei*, another member of the aster family, is a small tree that rarely grows over 10 feet tall. Its nodding flower heads are composed of yellow, lobed florets enclosed by circles of overlapping bracts (the outer ones brown or purplish, the inner ones silver).

(continued on page 4)



## Regional News

**Region 1** - On August 3, the Fish and Wildlife Service issued a 2-year incidental take permit under Section 10(a) of the Endangered Species Act to Riverside

County, California, and 5 other cities in the county as part of a Habitat Conservation Plan. The permit allows development and other lawful activities to occur

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#### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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in habitat occupied by the Endangered Stephens' kangaroo rat (*Dipodomys stephensi*) outside of proposed reserves for the species. The reserves will be financed by the county through a development tax on new home construction in the area.

\* \* \*

**Region 2** - Biologists have been concerned for some time about the effect of shoreline erosion along the Gulf Intracoastal Waterway in Texas on whooping crane (*Grus americana*) habitat. About a 30-mile (48-kilometer) stretch of the Waterway crosses designated Critical Habitat, including the Aransas National Wildlife Refuge. Freshwater ponds and marshes in this area provide a rich supply of invertebrates, frogs, clams, and crustaceans for the whooping cranes. However, traffic on the Waterway, wind-generated waves, and dredged material disposal operations are eroding the crane's habitat at an average rate of 2 acres (0.8 hectares) per year. Erosion of the shoreline also has enabled salt water to enter some freshwater ponds, which in turn have become less productive habitat for the cranes.

In 1989, 7,800 bags of concrete were placed along the shoreline of the Gulf Intracoastal Waterway to protect 800 linear feet (240 meters) of shoreline in the crane's Critical Habitat. On August 18-19, 1990, an additional 1,600 linear feet (490 m) of critical whooping crane habitat was protected through the use of 10,000 sacks of concrete. The concrete was unloaded from several barges at designated sites and then carried by about 125 volunteers to the Waterway. Steel reinforcing rods were then driven through the bags to anchor them to the shoreline.

Many groups have assisted in the Aransas shoreline preservation effort over the past 2 years. The Service's Corpus Christi, Texas, Ecological Services Field Office, Aransas National Wildlife Refuge, State resource agencies, and conservation groups provided personnel and equipment. All of the concrete, as well as lunches, supplies, barges, tugs, cranes, work barges, gloves, and other items,

(continued on page 12)



# Reintroducing the American Burying Beetle

Michael Amaral and Linda Morse  
New England Field Office

Since the American burying beetle (*Nicrophorus americanus*) was listed as Endangered (see BULLETIN Vol. XIV, No. 8 and BULLETIN Vol. XIII, Nos. 11-12), interest in reversing the catastrophic decline of this species has been growing.

Once inhabiting 32 States, the District of Columbia, and 3 Canadian provinces, the American burying beetle now survives in only 2 locations: a small island off the coast of New England and a site in eastern Oklahoma. Much research needs to be done to understand the reasons for its widespread decline and the reasons why the species survives in these last two sites.

Much of what is known about the life history of this curious insect stems from field and laboratory studies by Andrea Kozol, a doctoral candidate at Boston University. Individual beetles are attracted to carrion, and a single male and female will roll it into a ball and bury it below ground by gradually excavating soil out from under the dead animal. Then they work in unison to prepare the carcass. First, the fur or feathers are removed and the carcass is cleaned of any fly larvae or other organisms. Next, the beetles coat the carrion with secretions that slow decomposition and preserve the carcass in a semi-mummified state. The beetle eggs are then laid in a tunnel adjacent to the embalmed carrion, and their larvae hatch with ready access to food. Brood size appears to be directly related to carcass size, with a maximum number of young raised on carcasses from about 5.3 to 7.7 ounces (150 to 220 grams).

While researching the causes for its decline, concerned biologists have also been considering the feasibility of reintroducing the beetle on an Atlantic Coast island that was one of its historic locations. Because the species is known to exist at only two sites, successfully rees-

tablishing another population would afford the species a significant measure of security. It would also provide scientists an opportunity to closely monitor the beetle's life cycle and help to identify the factors influencing its survival.

A captive population of *N. americanus* that has been maintained at Boston University for several years provided a source of beetles for the reintroduction. Using laboratory-produced specimens has been an important consideration; if the reintroduction attempt fails, there will be no loss to the species in the wild.

During the week of June 25, 1990, biologists from five different private and public agencies visited the islands of Nashawena, Cuttyhunk, and Penikese in the Elizabeth Islands of Buzzards Bay, Massachusetts, to determine if any remnant populations of the American burying beetle existed there. Five days of beetle trapping resulted in the capture of over 3,300 carrion beetles of 8 different species, but no *N. americanus* were found. A similar trapping effort conducted by Dr. Tom French of the Massachusetts Division of Fisheries and Wildlife on Penikese during 1989 also demonstrated the apparent absence of *N. americanus* on the island. Thus, the stage was set for releasing laboratory-raised pairs of American burying beetles on Penikese. This island was chosen not only because it formerly supported the species but also because it is owned by the Massachusetts Division of Fisheries and Wildlife and is managed as a bird sanctuary. Furthermore, Penikese's relative accessibility would make monitoring the beetles' activity easier.

On July 3-4, Andrea Kozol, along with Anne Hecht of the Fish and Wildlife Service's Region 5 Office, journeyed to Penikese to release 25 pairs of *N. americanus* from the lab population. Pairs of beetles were placed on carrion of suitable size and covered with an inverted flower

pot. By the following day, the beetles had completely buried 15 of the 25 carcasses and had partially buried 9 of the remaining 10. If things were going well under the soil, the female would have laid eggs and small larvae would be visible within a few days. After feeding on the carcass for several days, the larvae would crawl off into the soil to pupate. From 45 to 60 days after burial of the carcass, the transformed larvae emerge as adult members of the largest carrion beetle species in North America.

On July 13, Andrea Kozol and Michael Amaral of the Service's New England Field Office returned to Penikese Island to monitor the reproduction attempt by exhuming some of the carcasses. Healthy larvae were found on 65 percent of the 17 carrion checked. (The eight carcasses not exhumed had been deeply buried.) Although these preliminary results are very promising, proof of success will come only when we can determine that enough young beetles are produced and survive the winter to reemerge and repeat the cycle in future summers.



American burying beetle (*Nicrophorus americanus*)

photo by Andrea Kozol

## 46 Plants and Animals

(continued from page 1)

Between 150 and 190 individuals are known to exist in 4 populations.



*Hesperomannia lydgatei*

• *Labordia lydgatei* is a highly branched shrub or small tree in the strychnine family (Loganiaceae) with elliptical, finely haired leaves and small, funnel-shaped, yellow flowers. Its Hawaiian name is *kamakahala*. This species currently is known from a single population of about three plants.



*Labordia lydgatei*

drawings by Yevonn Wilson-Ramsey, reprinted from Manual of the Flowering Plants of Hawaii, courtesy of the University of Hawaii Press

• *Viola helenae* is an erect, unbranched shrub in the violet family (Violaceae). This plant, which reaches only 2.5 feet (80 centimeters) in height, has small, pale lavender or white flowers and can be distinguished from similar species by its lance-shaped leaves. About 13 individuals are known from 2 populations.

Habitat degradation and competition from introduced species are the main threats to these plants. Most of the Wahiawa drainage basin is owned by a sugar company, with a small section belonging to the State. Although there has been relatively little disturbance to the basin in the past, several aggressive species of exotic plants have invaded the area. Their spread is being aided by feral pigs (*Sus scrofa*), which root up native plants and distribute the seeds of exotic species, and by typhoons that open up the habitat. Other non-native animals, such as rats, may threaten the rare plants by eating seeds and vegetative parts.

**Koke'e Region, Island of Kaua'i (6 Plants)** - Koke'e refers to a region of northwestern Kaua'i roughly 15 square miles (40 square kilometers) in size. It lies just above the northern reaches of Waimea Canyon, with the Alaka'i Swamp to the east, the high cliffs of the Na Pali coast to the north, and drier leeward ridges to the west. Because of the Koke'e region's abrupt topography and climatic gradients, the native vegetation of this area—primarily mesic to wet forests—is quite diverse with a high proportion of locally endemic species.

Six plant species restricted to the Koke'e region were proposed on September 26 for listing as Endangered:

• *Chamaesyce halemanui* is a climbing shrub in the spurge family (Euphorbiaceae) with stems up to 13 feet (4 m) in length, oval- to lance-shaped leaves, and compact, nearly spherical flower clusters. The 3 known populations of this species total fewer than 25 plants.



*Chamaesyce halemanui*

• *Dubautia latifolia* is a highly branched, woody vine in the aster family with stems up to 26 feet (8 m) long and 3 inches (7 cm) in diameter. It has oval, net-veined leaves and produces clusters of small, yellow flowered heads. An estimated 40 individuals of this species are known from 6 populations.



*Dubautia latifolia*

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# 46 Plants and Animals

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- *Poa sandvicensis*, also called Hawaiian bluegrass, is a perennial grass in the family Poaceae with densely tufted stems growing to a height of 3.3 feet (1 m). Currently, this species is known to number 40 plants in 4 populations.
- *Poa siphonoglossa*, another perennial grass, grows taller, producing masses of stems up to 13 feet (4 m) long. Two populations of fewer than 30 individuals are known.



*Poa siphonoglossa*

- *Stenogyne campanulata* is a hairy vine in the mint family (Lamiaceae). Its flowers have a straight, white tube about 0.5 inch (13 millimeters) long with short, purple lobes. This species is known from only a single population growing on a cliff at the upper rim of Kalalau Valley.
- *Xylosma crenatum* is a tree in the family Flacourtiaceae that grows up to 46 feet (14 m) tall and has coarsely toothed, oval leaves. A dioecious (unisexual) species, this tree bears male and female flowers on separate plants. The three known historical populations have been reduced to one female individual, which poses obvious reproductive problems. Botanists hope that future searches will reveal

additional plants, including some males. Feral cattle (*Bos taurus*), pigs, and goats (*Capra hircus*) have degraded the vegetation and habitats of the Koke'e region for over a century. Goats (which are managed by the State as a game species) and pigs are believed to pose continuing threats by eating the plants, eroding their fragile habitat, and promoting the spread of aggressive, non-native plants. Black-tailed deer (*Odocoileus hemionus columbianus*), which were introduced to the forests of western Kaua'i in 1961, are adding to these problems. Although the remaining populations of the rare Koke'e plants are on lands designated as State forest reserves, parks, and wilderness preserves, their habitat remains vulnerable to damage.

**Lana'ihale Area, Island of Lana'i (6 Plants)** - Lana'ihale, the highest point on Lana'i, gives its name to a ridge built by volcanic eruptions along the island's principal rift zone. On September 17, the Service proposed to list six plants endemic to Lana'i as Endangered. The only remaining populations of these species known are found on the summit, slopes, or valleys of Lana'ihale on private land.

- *Abutilon eremitopetalum* is a shrub in the mallow family (Malvaceae) with densely hairy, grayish-green, heart-shaped leaves. It produces flowers with bright green petals that are enclosed within the calyx (the leaves at the base of the flower). The distribution of this plant, which historically was widely scattered on the island, has been reduced to a single population of 30 to 70 individuals.
- *Cyanea macrostegia* var. *gibsonii* is a small, palm-like tree in the bellflower family with a single, unbranched trunk up to 23 feet (7 m) in height. This variety has elliptical or oblong leaves that grow to 31 inches (80 cm) long, and it bears inflorescences of 5 to 15 flowers that are blackish-purple externally and white or pale lilac inside. It is restricted to three gulches on Lana'ihale.

- *Gabnia lanaiensis* is a tall (up to 10 feet, or 3 meter), tufted, perennial, grass-

like plant in the sedge family (Cyperaceae). This species is known from a single population of 15 or 16 individual clumps.

- *Phyllostegia glabra* var. *lanaiensis* is a large, robust, perennial herb in the mint family. This plant has narrow, lance-shaped leaves that often have red veins or are otherwise tinged with red. Its flowers, borne in clusters of 6 to 10 per leaf axil, are white (occasionally with a touch of purple). The last sighting of this plant was that of a single individual in the late 1980's.

- *Tetramolopium remyi*, a small, densely branched shrub in the aster family, grows only to about 15 inches (40 cm) tall. The single flower produced per branch has yellow ray and white disk florets. One population of this species is known; it consists of only 35 plants within an area about 50 feet (15 m) square. It once also grew on west Maui but is believed to be extirpated from that island.

- *Viola lanaiensis*, another small shrub, is a sparingly branched plant in the violet family. It has lance-shaped leaves and small white flowers that are tinged with purple. Two small populations of this species are known, but their total numbers are uncertain.

Most of the native vegetation of Lana'i, which was once covered by forests and shrublands, has been destroyed by cattle and sheep ranching, feral livestock, the clearing of land for pineapple cultivation, and the introduction of exotic ungulates for recreational hunting. Over the years, the feral livestock have been removed, but the State still manages axis deer (*Axis axis*) and mouflon sheep (*Ovis musimon*) as game animals. Both threaten the island's rare plants by browsing and erosion. Invasions of exotic plants are another serious threat to native species on Lana'i, as well as those on the other Hawaiian Islands.

Almost the entire island of Lana'i, including all of Lana'ihale, is owned by a private company. The economic base of Lana'i is being converted from pineapple production to tourism, and it is antici-

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## 46 Plants and Animals

(continued from page 5)

pated that increased development will further modify the remaining natural habitat.

**Wai'anae Mountain Range, O'ahu (26 species)** - The island of O'ahu was created by two large shield volcanoes, the Wai'anae volcano and the younger Ko'olau volcano to the east. Their original shape has been lost as a result of extensive erosion. Today, the remains of these volcanoes form mountain ranges characterized by long, narrow ridges.

All 26 of the Hawaiian plant species proposed on September 28 for listing as Endangered are either endemic to, or have their largest or best populations in, the Wai'anae Mountains. Several also have restricted distributions in the Ko'olau Mountains of O'ahu and on the islands of Maui, Moloka'i, and Kaua'i. If approved, the Endangered listings would apply to these species throughout their ranges:

- *Abutilon sandwicense*, a member of the mallow family, is a shrub that grows up to 10 feet (3 m) tall with heart-shaped leaves and greenish, pendulous flowers. This species once occurred along almost

the entire length of the Wai'anae Mountains, but today only 7 populations with a total of 300 to 400 plants are known to remain.



*Abutilon sandwicense*

- *Alsinidendron obovatum*, a small shrub in the pink family (Caryophyllaceae) that reaches 3 feet (1 m) in height, has somewhat fleshy leaves and produces congested clusters of 7 to 12 white and green flowers. The two known populations total approximately 100 individual plants.

- *Alsinidendron trinerve* is similar in appearance to *A. obovatum* but grows in wetter habitat and has leaves with three prominent veins. *Alsinidendron trinerve*

is known to survive at only 2 locations containing a total of about 13 plants.



*Alsinidendron obovatum*

- *Centaurium sebaeoides*, known in Hawaiian as 'awiwi, is an annual herb in the gentian family (Gentianaceae). It grows to about 8 inches (20 cm) tall with small, rather fleshy leaves and white or pale pink flowers. Five populations, totalling fewer than 1,000 plants, are known to exist on 4 islands: Kaua'i (2), O'ahu (1), Maui (1), and Moloka'i (1).

- *Chamaesyce celastroides* var. *kaenana*, also called 'akoko, is a shrub in the spurge family (Euphorbiaceae). This plant, which can reach 5 feet (1.5 m) in height, drops its leaves in the dry season to conserve water. The 5 known populations that remain contain fewer than 300 individuals.

- *Chamaesyce kuwaleana*, another 'akoko, is smaller, growing only 36 inches (90 cm) tall. Its known range has been reduced to one site containing several hundred plants.

- *Cyanea pinnatifida*, known in Hawaiian as *haha*, is a member of the bellflower family. Its stem, usually unbranched, grows to about 10 feet (3 m) high and bears long, deeply lobed leaves. Clusters of 8 to 15 greenish-white flowers with purple stripes arise from the leaf axils. The single population known to remain consists of only three individuals.

- *Diellia falcata* is a fern in the family Polypodiaceae. Its fronds, which are up to 40 inches (100 cm) long by 3.5 inches (9 cm) wide, have as many as 45 divisions per side. Historically known from almost



*Viola lanaiensis*

photo by Derral Herbst

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## 46 Plants and Animals

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the entire length of the Wai'anae Mountains, this species has been reduced to 7 populations with an estimated 3,000 individuals.



*Cyanea pinnatifida*

- *Dubautia herbstobatae*, or *na'ena'e*, is a spreading shrub in the aster family that grows to about 20 inches (50 cm) tall. Its leaves are shiny and leathery. There are as many as 15 flower heads in an inflorescence, each composed of up to 20 yellowish-orange, tubular florets. Currently, there are 8 known populations with a total of fewer than 100 individuals.

- *Gouania meyenii*, a shrub in the buckhorn family (Rhamnaceae), reaches approximately 7 feet (2.2 m) in height. Its broadly oval leaves are smooth and papery in texture, and the flowers may be functionally unisexual, with male and female flowers on the same plant. The 4 known populations of this species contain about 75 individuals.

- *Hedyotis degeneri*, a member of the coffee family (Rubiaceae), is a prostrate shrub with peeling, corky bark, clusters of small, trumpet-shaped flowers, and leaves that are quite variable in shape. The single known population of this species contains about six plants.

- *Hedyotis parvula*, a related species, is a heavily branched shrub that grows either upright or sprawling. It has small,

leathery leaves that are uniform in shape and clusters of tubular white flowers. Once known from the central and southern Wai'anae Mountains, this plant has not been seen for several years; however, because this species inhabits inaccessible cliffs, the chances that it survives somewhere in the area are considered good.

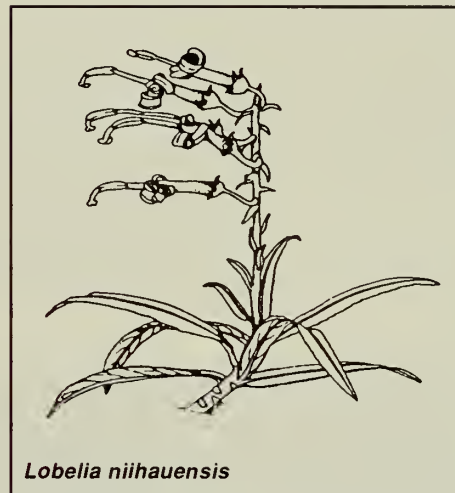
- *Hesperomannia arbuscula*, a small, shrubby tree in the aster family, grows to about 11 feet (3.3 m) in height. It bears clusters of erect flowering heads, each made up of many yellow to yellow-brown florets. There are 2 known populations on O'ahu and one on Maui, with a total of about 50 individuals.

- *Lipochaeta lobata* var. *leptophylla*, another member of the aster family, is a low and somewhat woody perennial herb with arched or nearly prostrate stems that can be up to 59 inches (150 cm) long. Its lance-shaped leaves are closely spaced along the stem. This plant, called *nehe* in Hawaiian, produces flower heads with many yellow disk and ray florets. The two known populations contain 25 to 50 individuals.

- *Lipochaeta tenuifolia*, also called *nehe*, is another low-growing perennial herb. Its oppositely arranged leaves are divided into three lobes so deeply that they appear to be six leaves, and each lobe is further divided to the midrib into fine segments. This species also bears

flowering heads with numerous yellow disk and ray florets. The 400 to 600 known individuals are distributed over 7 populations.

- *Lobelia niihauensis*, as its name implies, was described from a specimen collected on the privately-owned island of Ni'ihau, where it is no longer known to occur. This member of the bellflower family is a low shrub that produces clusters of magenta flowers. Currently, 19 populations are known to survive on O'ahu and Kaua'i.



*Lobelia niihauensis*

- *Neraudia angulata*, a member of the nettle family (Urticaceae), is an erect shrub up to 10 feet (3 m) tall with separate male and female flowers growing on different plants. Once occurring along almost the entire length of the Wai'anae

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*Gouania meyenii*

photo by John Obata



*Hedyotis parvula*



*Hesperomannia arbuscula*

## 46 Plants and Animals

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Mountains, the known range of this plant has been reduced to 5 populations, which total fewer than 15 individuals.

- *Nototrichium humile*, or *kulu'i* in Hawaiian, is an upright to trailing shrub

in the amaranth family (Amaranthaceae). The stems and young leaves of this plant are covered with short hairs, and its stalkless flowers are arranged in a spike at the ends of the stems. Historically, this species was found along the entire length of the Wai'anale Mountains and in east Maui. Eleven populations remain, one

on Maui and the others on O'ahu. They total 1,500 to 3,000 plants.

- *Phyllostegia mollis* is a densely hairy, non-aromatic, perennial herb in the mint family. It produces small, white flowers with fused sepals. This species once was found in both the Wai'anale and Ko'olau ranges on O'ahu, and on the islands of Moloka'i and Maui. Two populations are known to remain, both of them in the Wai'anale Mountains. They contain a total of fewer than 50 individuals.

- *Sanicula mariversa*, an herb in the parsley family (Apiaceae), produces a single, branched stem up to 28 inches (70 cm) tall. Its numerous leaves are leathery and have heart or kidney shapes. Each inflorescence contains a cluster of up to 20 yellow flowers. The two known populations contain fewer than 100 plants.

- *Schiedea kaalae* is a short-stemmed perennial in the pink family. It can be distinguished from related species by its stems and by its thick leaves, which have one conspicuous vein. The 7 known populations — 5 in the Wai'anale Mountains and 2 in the Ko'olau Mountains — contain a total of fewer than 100 individuals.



*Schiedea kaalae*

- *Silene perlmanii*, another perennial in the pink family, is heavily branched from its base and often forms clumps. Its stems are up to 20 inches (50 cm) long,

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the leaves are in the shape of a narrow ellipse, and the few white flowers are arranged in clusters at the ends of the stems. This species was not discovered until 1987. One population of 10 to 20 plants is known.

- *Tetramolopium filiforme*, a dwarf shrub in the aster family, grows to only 6 inches (15 cm) high. Its flower heads are composed of as many as 52 white or pale lavender ray florets in a circle around up to 30 maroon (or occasionally yellow) disk florets. The ray florets are female, while the disk florets function as male flowers. These separate male and female flowers on the same plant are one of this species' distinguishing features. The 5 known populations are estimated to contain fewer than 500 individuals.

- *Tetramolopium lepidotum* ssp. *lepidotum*, a related plant, is a larger shrub, reaching 14 inches (36 cm) in height. The florets of this subspecies are either female or bisexual, with both occurring on the same plant. Each flower head contains up to 40 white to pinkish-lavender ray florets and 11 maroon to salmon disk florets. Once found along almost the entire length of the Wai'anae Mountains, this taxon has been reduced in known range to 3 sites with a total of fewer than 100 individuals.



- *Ureia kaalae*, a member of the nettle family, is known in Hawaiian as *opuhe*.



*Silene perlmanii*

It is a small tree, growing up to 23 feet (7 m) tall with pale green, thin, heart-shaped leaves. The flowers, which are either male or female, may grow on the same or different plants. This species has been reduced to 3 known populations with no more than 19 plants.

- *Viola chamissoniana* ssp. *chamissoniana*, or *pamakani* in Hawaiian, is a shrub in the violet family. This plant is distinguished by its small, triangular-oval to heart-shaped leaves and its white, purple-tinged flowers. The 3 known populations contain only about 16 individuals.

The native vegetation of the Wai'anae Mountains and adjacent areas has undergone extreme alteration as a result of certain land management practices, some of which continue. Among those most harmful to the native flora (and fauna) have been the deliberate introductions of non-native plants and animals, large-scale agricultural development, and military activities. At present, the greatest threats to the rare Wai'anae plants are the degradation of habitat by introduced animals (feral pigs and goats, free-roaming domestic cattle) and competition from aggressive exotic plants. The land inhabited by the recently proposed plants is a mixture of Federal (military), City and County of Honolulu, State, and private

property.

Like all species with severely reduced numbers and ranges, these native plants are vulnerable to rapid extinction from various natural events (e.g., typhoons, fires) as well as human-related activities. Those with a single population—such as *Cyanea pinnatifida* (3 plants), *Hedyotis degeneri* (6 plants), *Silene perlmanii* (10 to 20 plants), and *Chamaesyce kuwaleana* (several hundred plants)—are particularly at risk. A diminished gene pool also may depress their reproductive vigor.

### *Schoepfia arenaria*

This small evergreen tree, a member of the olax family (Olacaceae), is endemic to the coastal forests of northern Puerto Rico. It grows up to 20 feet (7 meters) tall and has several trunks up to 4 inches (10 centimeters) in diameter that arise from the base. Industrial and urban development has eliminated the species from most of its former range, and it survives only at a few sites in low elevation evergreen and semi-evergreen forests on limestone hills. The tree is known to occur in the Isabela area (about 100 individuals), Pinones Commonwealth Forest (about 30 mature plants and numerous saplings and seedlings), and the Fajardo area (about 50 trees). One plant

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was also reported in the Rio Abajo Commonwealth Forest in 1985.

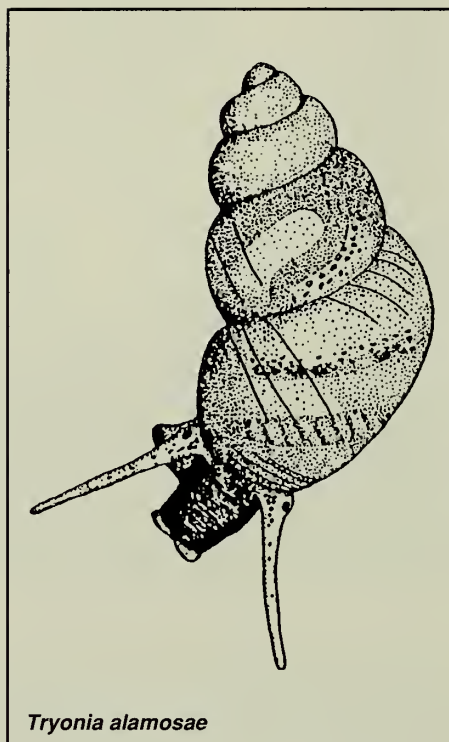
Loss of native habitat threatens the remaining *S. arenaria* populations. The Isabela site is in an area under intense pressure for tourism, urban, and rural development. Illegal acquisition of land for residential development also threatens the Pinones Commonwealth Forest population. Because plants of all sizes and ages have been observed and natural reproduction of the plant appears to be offsetting some losses, the Service has proposed that *S. arenaria* be listed as Threatened rather than Endangered (F.R. 9/17/90).

### Two Springsnails

The Alamosa springsnail (*Tryonia alamosae*) and Socorro springsnail (*Pyrgulopsis neomexicana*) are two small aquatic mollusks that are known only from within Socorro County in central New Mexico. Both of these gill-breathing species are found in the slow-moving outflows of thermal springs. The Alamosa springsnail has a thin, translucent, broadly conical shell up to 0.1 inches (3.0 millimeters) long. It is known only from one thermal spring complex, which consists of five individual springs that flow together. The largest thermal spring is about 6 by 10 feet (2 by 3 meters) across and 1 to 2 feet (0.3 to 0.6 m) deep. The species occurs in all of the springs and in the outflows, close to the source.

The Socorro springsnail has an elongate-ovate shell that is light tan in color, short-spined, and up to 0.1 inch (2.5 mm) long. Currently, the species is known to occur in only one thermal spring system, where it was found in 1979. Although the principal source of the spring has been impounded, the Socorro springsnail continues to survive in another small source for the spring. Its

occupied habitat is a tiny spring less than 11 square feet (1 square meter) in size and about 8 feet (2.5 m) of an outflow ditch. The total number of Socorro springsnails is estimated to be 5,000.



*Tryonia alamosae*

drawing courtesy of New Mexico Bureau of Mines and Mineral Resources

Both springsnails are extremely vulnerable to loss or alteration of their habitat. Any reductions in water flow resulting from impoundments, pumping, or water diversions, or other changes in the stream environments (e.g., water pollution, channel modifications), could cause either species to become extinct. The Service therefore has proposed that the Alamosa and Socorro springsnails be listed as Endangered (F.R. 9/18/90).

### Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop

and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.



# Final Listing Rules Approved for 14 Species

During September 1990, the Fish and Wildlife Service published final listing rules for 14 species—2 plants, 1 mussel, 1 fish, 4 monkeys, and 6 birds. Endangered Species Act protection is now available to the following:

## Barneby Ridge-cress (*Lepidium barnebyanum*)

This perennial herb, a member of the mustard family (Brassicaceae), is endemic to three ridgelines in northeastern Utah. It grows up to 6 inches (15 centimeters) tall, usually forms raised clumps or cushions up to 8 inches (20 cm) wide, and has cream-colored flowers. The species' total population, estimated at about 5,000 individuals, occupies fewer than 500 acres (200 hectares). Motorcycles and other off-road vehicles are damaging the habitat in which the Barneby ridge-cress occurs. Continued off-road vehicle use and development of oil and gas resources threaten the species' survival. The Service proposed to list the Barneby ridge-cress as Endangered in the November 27, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12), and the final rule was published September 28, 1990.

## Lyrate Bladder-pod (*Lesquerella lyrata*)

Another member of the mustard family, the lyrate bladder-pod is an annual that grows up to 12 inches (30 cm) high and has yellow flowers. Two populations of the plant are known to occur within disturbed cedar glades in northwest Alabama. Much of the habitat suitable for lyrate bladder-pod has been lost due to urban and agricultural development. Both of the remaining populations are on privately owned lands and have declined in recent years due to plant succession. (The species requires periodic disturbance of its surroundings, such as light grazing, to perpetuate the open habitat it needs.) The Service proposed on April 25, 1990, that the lyrate blad-

der-pod be listed as Threatened (see BULLETIN Vol. XV, No. 5), and the final rule was published September 28.

## Inflated Heelsplitter (*Potamilus inflatus*)

The inflated heelsplitter is a medium-sized, freshwater mussel with a distinctive wing-like ridge where the two shells join. Historically, the mussel occurred in the Amite and Tangipahoa Rivers in Louisiana, the Pearl River in Mississippi, and the Tombigbee, Black Warrior, Alabama, and Coosa Rivers in Alabama. The construction of flood control levees and impoundments, river channelization, dredging, water pollution, and sedimentation from surface mining have extirpated the inflated heelsplitter from all but short stretches of the Amite, Tombigbee, and Black Warrior Rivers. Gravel mining, proposed flood control improvements, navigation dredging, and water pollution continue to threaten the species and its habitat. The Service proposed that the inflated heelsplitter be listed as a Threatened species in the October 27, 1989, *Federal Register* (see BULLETIN Vol. XIV, Nos. 11-12); the final rule was published September 28, 1990.

## Pallid Sturgeon (*Scaphirhynchus albus*)

The pallid sturgeon is one of the largest fish found in the Missouri, Mississippi, and lower Yellowstone Rivers. This bottom-dwelling fish has a distinctive flattened, shovel-shaped snout. The species has experienced a dramatic decline throughout its approximately 3,550-mile (5,725-kilometer) range over the past 20 years. Almost all of the pallid sturgeon's habitat has been modified through river channelization, construction of impoundments, and related changes in flow regimes. These changes have blocked the pallid sturgeon's movements, destroyed or altered its spawning areas, reduced its food sources or its ability to obtain food, and altered water tempera-

tures and other environmental conditions necessary for the fish's survival. Commercial fishing also has probably played a role in the decline. Another threat to the species' survival is an apparent lack of reproduction. Potential threats include water pollution, interbasin transfers of water, hybridization of the species with the more abundant shovelnose sturgeon (*Scaphirhynchus platorhynchus*), and continuing alteration of remaining spawning or nursery areas. The Service proposed the pallid sturgeon for listing as an Endangered species on August 30, 1989 (see BULLETIN Vol. XIV, Nos. 9-10), and the final rule was published September 6, 1990.

## Six Foreign Birds

The Service proposed the following six foreign bird species as Endangered on January 16, 1990 (see BULLETIN Vol. XV, No. 2), and the final rule was published September 28. These species have all experienced significant declines in numbers and/or habitat in recent years, and are vulnerable to human exploitation and disturbance. They are all listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

- The northern bald ibis (*Geronticus eremita*) originally occurred across much of southern Europe, southwestern Asia, and northern Africa. However, climatic changes, hunting, disturbance of the ibis' nesting sites, habitat modification, and widespread applications of toxic pesticides have reduced its numbers to only a few small breeding populations in Morocco (which support a total of about 180 individuals) and possibly one breeding population each in Algeria and Turkey. Pesticide use is a primary threat to the remaining birds. Poaching and nest predation by ravens also are adversely affecting the species.

- The white-winged guan (*Penelope albipennis*) is endemic to a small part of northwestern Peru. This species' forest

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## Final Listing Rules

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habitat is rapidly being destroyed for charcoal production. Hunting also is responsible for the guan's decline. The species was said to be locally common in the mid-19th century, but today only an estimated 300 individuals remain.

- Originally found in the Himalayan foothills of Pakistan, India, and Nepal, the cheer pheasant (*Catreus wallichii*) today occurs only in small, fragmented populations. Its decline has resulted in part from agricultural activity and other human modifications of the forests and meadows on which the bird depends. The pheasant has also been relentlessly hunted.

- The red-tailed parrot (*Amazona brasiliensis*) occurs only in the coastal forests of southeastern Brazil. Most of these forests have been destroyed in recent decades by human development. Today, no more than 4,000 individuals survive. The remaining birds are threatened by illegal collection for the pet trade.

- The Norfolk Island parakeet (*Cyanoramphus novaeseelandiae cookii*) is endemic to a 14-square mile (35-square kilometer) island between New Zealand

and New Caledonia in the southwestern Pacific. Once very common locally, it is now among the world's most critically endangered birds: there are only about 30 individuals in the wild and 10 in captivity. Its decline is due to destruction of forest habitat; competition with the crimson rosella (*Platycercus elegans*), an introduced bird species, for nest sites; avian disease; killing for agricultural pest control; and predation by introduced cats and rats.

- Only a few specimens have been collected of the Madagascar red owl (*Tyto soumagnei*), which inhabits the eastern rainforests of Madagascar. This area is being cleared for agriculture and is subject to other human disturbance.

### Four Snub-nosed Monkeys

Four mammals native to China and Viet Nam have been listed as Endangered. The Sichuan or golden snub-nosed monkey (*Rhinopithecus roxellana*), Yunnan or black snub-nosed monkey (*R. bieti*), Guizhou or gray snub-nosed monkey (*R. brelichi*), and Tonkin snub-nosed monkey (*R. avunculus*) are among the most critically endangered primates

in the world. All four are on Appendix I of CITES. The Tonkin snub-nosed monkey is endemic to the mountain forests of northern Viet Nam, and the others are endemic to China's high mountain forests. The range and numbers of all four species have declined substantially in recent years, primarily due to habitat loss and modification. Slash-and-burn agriculture in particular has destroyed much of the forests where the monkeys occur. Hunting of the monkeys for food, pelts, and medicinal purposes also has contributed to their decline. Only about 10,000 to 15,000 Sichuan snub-nosed monkeys, 600 to 800 Yunnan snub-nosed monkeys, 200 to 670 Guizhou snub-nosed monkeys, and 880 Tonkin snub-nosed monkeys are thought to survive. The Service proposed to list the four snub-nosed monkey species as Endangered on January 16, 1990 (see BULLETIN Vol. XV, No. 2). (The Tonkin snub-nosed monkey was listed by the Service as Threatened in 1976, but was proposed for reclassification to Endangered, which more accurately reflects its current status.) The final rule was published in the September 27, 1990, *Federal Register*.

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were donated, primarily by Conoco Incorporated, Hollywood Marine Incorporated, Texas Waterways Operator's Association, Raymond Dugat Company, and Mr. Harry Sloat and the "Lucky Day." This year, Mr. Ted Appell's boat and facilities at the Sand Dollar Pavilion Marina in Fulton Beach were also used. Mr. Tom Serota from the Service's Corpus Christi Field Office coordinated the project.

\* \* \*

Increased efforts to protect the Endangered Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*) began recently. Conoco, Inc., and the National Fish and Wildlife Foundation have established an Attwater's Prairie-chicken Recovery Fund. Each has offered \$5,000 to match the first \$10,000 in contributions from individuals and corporations.

The new funds will be used to finance recovery actions such as habitat reclamation and a public awareness campaign. The idea for the fund was initiated by Conoco, which made \$5,000 contributions to the recovery program in 1988 and 1989. Those wishing to contribute may send checks payable to the National Fish and Wildlife Foundation/APC Recovery Fund to the APC Recovery Fund, P.O. Box 519, Eagle Lake, Texas 77434. All contributions are tax-deductible to the extent allowed by law.

The Texas Parks and Wildlife Department has signed management agreements with ranchers in Victoria and Austin Counties to remove cattle from two sites in order to restore Attwater's greater prairie-chicken habitat. The State is using Endangered Species Act (Section 6) funds to acquire limited grazing rights in these areas. Cattle were taken off the severely overgrazed Victoria County site

in July and by mid-September native prairie grasses had returned, which should increase the small population of prairie-chickens at this site. The other site, which is adjacent to Attwater's Prairie Chicken National Wildlife Refuge, is covered with McIntyre rose (*Rosa bracteata*), an introduced plant that has invaded the area. The State will treat this site with herbicides, which should restore the prairie-chicken's habitat and increase the potential for grazing. Restoration of habitat on this site will link several disjunct prairie-chicken populations.

The Fossil Rim Wildlife Center in Glen Rose, Texas, has begun an Attwater's greater prairie-chicken propagation project. To identify appropriate propagation techniques, the Center will use greater prairie-chickens of a different, non-Endangered subspecies, *Tympanu-*

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*chus cupido pinnatus*, as a surrogate for the Attwater's greater prairie-chicken. Dr. Nova Silvy from Texas A & M University is also using Section 6 funds to work on reintroduction techniques. It is hoped that these techniques eventually will be used to release the Center's captive-raised birds on unoccupied habitat.

An annual brood count conducted on the Attwater's Prairie-chicken National Wildlife Refuge from June 27 to July 10 suggests that production of young birds is down in spite of relatively favorable habitat conditions. Twenty-four adult birds and 8 young were flushed, indicating an average brood size of 2.7 birds. The reason for the poor production is not known, although rainfall patterns or fire ants (*Solenopsis invicta*) may be responsible. Smaller and fewer broods this summer probably mean that the Attwater's greater prairie-chicken population will be lower in 1991. The statewide estimated population for adult birds in the spring of 1990 was also revised downward from 494 to 470 birds.

\* \* \*

**Region 3** - Although the use of organochlorine pesticides was banned at least a decade ago, a recent study by the Missouri Department of Conservation confirmed that the pesticides are continuing to affect Endangered gray bats (*Myotis grisescens*) and their insect prey base in central and east-central Missouri. Gray bats do much of their foraging here in agricultural areas and are ingesting organochlorine pesticides and their by-products. Pesticide-induced mortality of gray bats has been documented in the past at several caves in Missouri. In the 1990 study, which was funded by the Fish and Wildlife Service's endangered species and contaminant programs, insects, gray bat guano, and bat carcasses were collected from five caves and the vicinity of a sixth cave in three counties. Two dead juvenile bats had levels of organochlorines that were high enough to cause their deaths. All of the guano samples contained detectable levels of at least two organochlorines, and several

had levels greater than one-half the concentration shown to be associated with mortality in an earlier study. Most aquatic and terrestrial insect samples also were contaminated with organochlorines.

\* \* \*

**Region 4** - During the Labor Day weekend, the Service's Asheville, North Carolina, Field Office, in cooperation with The Nature Conservancy and volunteers from the American Cave Conservation Association, built a gate at the entrance to Tennessee's Tabaccoport Cave to protect a population of gray bats. This cave is an hibernation site for the species and supports a bachelor colony of approximately 30,000 gray bats during the summer. The Nature Conservancy obtained permission from the landowner to build the gate and provided funds for construction. The Service provided equipment and miscellaneous material for the project, and reimbursed the Association's volunteers for their expenses.

The cave gate incorporates two large doors that can be left open during the summer while the bachelor colony is present. The doors will be closed during the winter to protect the hibernation colony from human disturbance. The doors were required because gray bats will not use summer caves with entrances that are completely covered by a gate.

\* \* \*

**Region 5** - Thirteen captive-bred peregrine falcons (*Falco peregrinus*) were released in West Virginia this summer at a hack site in the New River Gorge. Since 1987, 54 peregrine falcons have been released in West Virginia. Although no breeding pairs were documented in the State this year, biologists expect at least one breeding pair to be present by 1991.

\* \* \*

West Virginia's two active bald eagle (*Haliaeetus leucocephalus*) nests produced a total of five eaglets this season. One of the nests, in Hampshire County, had not been used for several years.

\* \* \*

The nine known colonies of Virginia big-eared bats (*Plecotus townsendii virginianus*) in West Virginia were censused

this summer using night-scoping techniques. For unknown reasons, the populations in these caves were down 1.7 percent from 1989 levels.

\* \* \*

Over the past 3 years, the West Virginia Division of Natural Resources and the U.S. Forest Service have been building nest boxes for the Endangered northern flying squirrel (*Glaucomys sabrinus fuscus*) in the Monongahela National Forest. From July 1, 1989, to June 30, 1990, personnel from these agencies and students from West Virginia University captured, measured, tagged, and released 106 squirrels. The squirrels were captured at 21 sites, including 9 new localities for the subspecies.

\* \* \*

Botanists from the West Virginia Natural Heritage Program surveyed the State's harperella (*Ptilimnium nodosum*) populations this summer. Funds for the survey were provided by the Fish and Wildlife Service under Section 6 of the Endangered Species Act. The only known populations of this Endangered biennial in the State occur along Sleepy Creek and the Cacapon River in Morgan County. The 1990 survey found that the Sleepy Creek population contained as many as one million individuals scattered along 20 miles (32 kilometers). The Cacapon River population contained approximately 100,000 individuals in 20 subpopulations distributed over 20 river miles. Both populations were as viable and vigorous as they were in 1988 when they were last surveyed. Twenty miles of potential habitat along the Cacapon River were searched for new populations, but none were found. The most serious threats to the harperella continue to be the loss of habitat due to siltation, changes in water level fluctuation patterns, and development.

\* \* \*

Five new populations of running buffalo clover (*Trifolium stoloniferum*), an Endangered perennial, were discovered in West Virginia in June and July. This plant is believed to have been dependent to some extent on the buffalo (*Bison bison*)

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bison) herds that once migrated along trails in the eastern U.S. With Section 6 funding, the West Virginia Natural Heritage Program created a map of historic bison trails in the State in 1989 using historical references to bison, elk, and large mammal trails. With the map and ecological information, six botanists were sent out in search of the plant. All of the populations discovered this summer were along old roads on ridges or sides of mountains in Randolph County. The largest population contained 209 plants, none of which were found in flower; the other populations varied in size from 1 to 50 individuals. Despite extensive searches, no new populations were found in the Ohio, Little Kanawha, and Kanawha River valleys, or near Lewisburg where savannas were once reported. These areas have been heavily farmed since the 18th century, which may explain the absence of the plant.

\* \* \*

Since the final rule listing the shale barren rock-cress (*Arabis serotina*) as Endangered was published in August 1989, five more populations have been discovered in shale barrens of West Virginia and Virginia. Thirty-one populations of this herb are now known, several of which have fewer than 10 plants. Botanists with the West Virginia Natural Heritage Program, who have been monitoring the shale barren rock-cress populations for 6 years, began two 5-year research projects in 1990. In cooperation with the Department of Defense and the Fish and Wildlife Service, the Heritage Program botanists are studying a population at the U.S. Naval Radio Station at Sugar Grove, West Virginia, to learn more about the species' life history. This population, one of the largest known, was discovered in 1989 after the final rule was published. A permanent 19,700 square yard (16,500 square meter) grid was erected to carry out this study. The other study is being conducted in cooperation with the West Virginia Division of Natural Resources, the Virginia Division of Natural Heritage, and the Service

on six shale barrens throughout the species' range. Its purpose is to examine the population dynamics of the shale barren rock-cress and assess the effects of deer browsing.

\* \* \*

The Service's New England Field Office in Concord, New Hampshire, organized a meeting of nongame biologists involved with peregrine falcon and bald eagle recovery programs in Massachusetts, New York, New Hampshire, Vermont, and Maine early in September. This was the first time in recent years that biologists from all of these States have met to discuss problems and successes in the recovery efforts. The departure of the Peregrine Fund from the East and the need for the northeastern States to assume even greater responsibility in their peregrine recovery programs were noted. Although the number of territorial peregrine pairs in the Northeast continues to slowly increase (now up to 41 pairs), the productivity of the birds was only 1.1 young per pair—a level below that observed in many other recovering peregrine populations.

The results of the 1990 bald eagle breeding season were also discussed at the meeting. The bald eagle population in the Northeast is continuing to make progress toward recovery. In Maine, 123 pairs of eagles produced 98 young, a modest increase over 1989. However, Maine biologists suspect a contaminant problem may be lowering the productivity of the eagles. New Hampshire's single pair of eagles produced 2 chicks this year (see BULLETIN Vol. XV, No. 8), New York's 14 territorial pairs produced 15 chicks, and Massachusetts's 4 pairs produced 3 chicks.

\* \* \*

Because of the number of inquiries regarding the dwarf wedge mussel (*Alasmodonta heterodon*), New England Field Office endangered species biologists hosted a "Meet the Mussel" educational field day on September 8 for the general public. This was an "in the river" presentation on the various fresh water mussel species of New England. Two sessions were held, one in the Connecti-

cut River in Vermont and the other in the Ashuelot River in New Hampshire. Chris Fichtel of the Vermont Natural Heritage Program and Larry Master of The Nature Conservancy led discussions on the natural history of the dwarf wedge mussel and other fresh water mussel fauna in New England.

\* \* \*

**Region 6** - Although over 1,000 bald eagles winter in Utah, only 4 birds are known to nest in the State at 2 sites along the Colorado River. One eaglet survived in one of the nests this summer. Wildlife enthusiasts and river expedition companies, under the supervision of the Utah Division of Wildlife Resources, helped the other pair of nesting eagles raise their three eaglets by bringing carp to the nest. Unfortunately, only one eaglet in this nest survived.

The Service's Salt Lake City, Utah, Fish and Wildlife Enhancement and Law Enforcement Offices, along with the Utah Division of Wildlife Resources, also worked with the private landowner to minimize disturbance of the second nest. The landowner had planned to dig a ditch line underneath the nest tree to prepare the land for cultivation, but agreed to delay construction until after the crucial egg hatching period. The landowner also has agreed to consider the eagles' presence when conducting future operations. In addition, the landowner has permitted the State to build an alternate nest for the eagles in a stronger tree. This nest is shaded, which will better protect the eaglets from the intense summer heat.

\* \* \*

At least 14 Endangered least tern (*Sterna antillarum*) and Threatened piping plover (*Charadrius melodus*) nests on a sand bar in the Missouri River near Running Water, South Dakota, were destroyed by vandals this summer. Two research technicians from the South Dakota Cooperative Fish and Wildlife Research Unit discovered the devastation on July 16 during a routine check of the site. Although the island was posted to prevent public access, the technicians found signs of two people and a dog on

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the island. The dog's tracks, which showed it was in pursuit of small birds, and the presence of new-born birds buried in the sand near the nests indicated that the nests had been intentionally destroyed. (Rising water levels in the river later removed this evidence.) A \$1,000 reward for information leading to the identity and conviction of the vandals was announced on local radio and TV stations.

\* \* \*

**Region 7** - The Aleutian Canada goose (*Branta canadensis leucopareia*) is continuing to expand its range in the western Aleutian Islands as a result of recovery activities. Surveys this past summer indicate that the Endangered goose now nests on eight islands in the Aleutian chain, up from three at the start of recovery efforts. An intensive translocation program has successfully reestablished nesting on islands formerly occupied by Aleutian geese prior to the fox farming era. Reestab-

lished nesting populations range from 2 pairs on the most recent translocation site at Little Kiska Island to over 50 pairs on Agattu Island. The results of the nesting survey support the Service's proposal to reclassify the Aleutian Canada goose from Endangered to Threatened (see BULLETIN Vol. XIV, Nos. 11-12).

\* \* \*

**Region 8** - In July, carcasses of three Endangered species, the Hawaiian coot or 'alae-ke'oke'o (*Fulica americana alai*), Hawaiian stilt or ae'o (*Himantopus mexicanus knudseni*), and Hawaiian duck or koloa (*Anas wyvilliana*), were found at Hanalei National Wildlife Refuge on the island of Kaua'i. Forty dead birds were found in the refuge, the majority of which were koloas. Carcasses of the dead birds and serum samples from the koloas were sent to the National Wildlife Health Research Center in Madison, Wisconsin. The koloas were determined to be positive for avian botulism. The cause of death of the other birds had not been determined as of October 19.

\* \* \*

**Region 9** - In September, the Fish and Wildlife Service published its Wetlands Action Plan. The Action Plan, which was prepared in response to President Bush's call for no net loss of the Nation's wetlands, provides a working definition of what "no net loss of wetlands" means and how the Service is going to pursue this goal. "No net loss" is defined as meaning that wetlands losses must be offset by wetlands gains in terms of actual acreage and, to the extent possible, ecosystem function. Drawing on the Service's existing legislative authorities, regulations, and directives, the Action Plan identifies the Service's current and future strategies for wetlands protection, restoration, enhancement, management, research, information, and education. Twenty-three appendices to the Action Plan address specific wetlands issues and Service wetland programs.

Copies of the Wetlands Action Plan can be requested from the Service's Publications Unit, Room 130 - ARLSQ, Washington, D.C. 20240.

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## New Publications

*Manual of the Flowering Plants of Hawai'i*, co-authored by Warren L. Wagner, Derral R. Herbst (a botanist with the Fish and Wildlife Service), and S.H. Sohmer, with the collaboration of more than 50 specialists, is the first complete manual of the flowering plants of Hawaii produced since 1888. This 2-volume, 1,853-page work contains detailed information on the archipelago's native and naturalized plants, including: keys and physical descriptions; statements of geographical and ecological range; an evaluation of extinct

and rare species; literature citations; and nomenclatural and taxonomic synonyms. The 246 pages of plates illustrate all genera of flowering plants in Hawaii and more than half of the species. The *Manual* also contains chapters on the project history and methods, geography and climate, and endangered and threatened plants (including an accurate census of all protected plants). The *Manual* is available for \$85.00 from the University of Hawaii Press, Order Department, 2840 Kolowalu Street, Honolulu, Hawaii 96822.

*Indexed Bibliography on the Flowering Plants of Hawai'i*, by Susan W. Mill, Donald P. Gowing, Derral R. Herbst, and Warren L. Wagner, was published in conjunction with the *Manual*. It is a comprehensive bibliography of the subject, covering worldwide publications from the 1784 accounts of Captain Cook's voyages through 1986. The *Index* is available from the University of Hawaii Press for \$25.00.

Include \$3.00 for shipping the first *Manual* or *Index*, and \$1.00 for each additional book or set.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	248	8	22	331	29
Birds	74	153	11	0	238	69
Reptiles	16	58	17	14	105	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	44
Snails	3	1	6	0	10	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	179	1	60	2	242	120
<b>TOTAL</b>	<b>443</b>	<b>483</b>	<b>153</b>	<b>38</b>	<b>1117*</b>	<b>351**</b>
Total U.S. Endangered	443	(264 animals, 179 plants)				
Total U.S. Threatened	153	(93 animals, 60 plants)				
Total U.S. Listed	596	(357 animals, 239 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

October 31, 1990

October 1990

Vol. XV No. 10

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

PUBLIC DOCUMENTS  
DEPOSIT ITEM

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## Listing Action Proposed During October 1990 for Nine Species

Four animals and five plants were proposed by the Fish and Wildlife Service during October 1990 for listing as Endangered or Threatened species. If the proposals are approved, the following taxa will receive Endangered Species Act protection:

### Argali (*Ovis ammon*)

An Asian animal related to the North American bighorn sheep (*Ovis canadensis*), the argali is the largest species of wild sheep in the world. An adult male argali can weigh up to 310 pounds (140 kilograms) and stand 49 inches (125 centimeters) high at the shoulder. Its massive spiral horns are up to 75 inches (190 cm) long and 20 inches (50 cm) in circumference. His-

torically, the argali's range included parts of Soviet Central Asia, southern Siberia, Mongolia, Nepal, north-central and western China (including Tibet), and the Himalayan sections of Afghanistan, Pakistan, and India. Argali generally forage in broad valleys, high pastures, or cold deserts, although they sometimes seek refuge in adjacent mountains.

In 1976, most taxa on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) were listed by the Service under the Endangered Species Act as Endangered. Among these was one subspecies of the argali, *O. a. hodgsoni*. Accordingly, the importation of *O. a. hodgsoni* (including live animals, parts, and trophies) into

the United States is prohibited except by Federal permit for certain conservation purposes.

In 1988, a legal dispute arose when trophies of argali killed in the Gansu Province of China were confiscated by U.S. Fish and Wildlife Service law enforcement agents at the San Francisco port of entry on the grounds that they were from the protected subspecies *O. a. hodgsoni*. This charge was challenged by the importers, who stated that the animals had belonged to a different, non-endangered subspecies. Although the importers ultimately regained the trophies, the Service published a notice in the November 24, 1989, *Federal Register* stating that the specimens had been correctly identified as *O. a. hodgsoni*. At the same time, the Service published another notice that it was initiating a review of the taxonomy, distribution, and status of all argali subspecies.

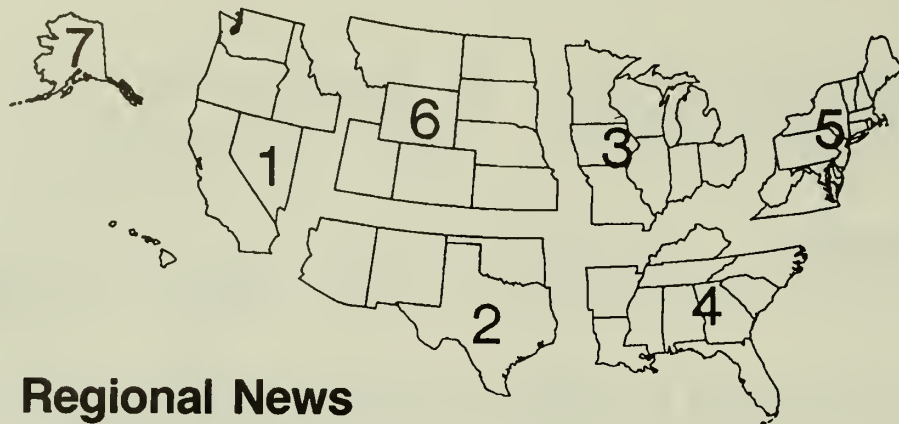
Despite some disagreement, most comments received during the review indicated 1) that the species *O. ammon* has experienced a general decline, 2) that some, if not all, populations are in serious jeopardy, and 3) that the argali is vulnerable to a number of problems, notably hunting and competition with rapidly expanding herds of livestock for the habitat's limited forage and water. Some comments indicated declines even in the heart of the species' range, within regions that were once considered too remote for significant human impacts. As a re-

(continued on page 8)



© Galen Rowell/Mountain Light

argali



## Regional News

**Region 1** - On October 2, one of the free-flying female Andean condors (*Vultur gryphus*) temporarily reintroduced into southern California was re-

captured by Fish and Wildlife Service biologists after she was discovered to be acting abnormally. The biologists found that she was bleeding from the

mouth, and had numerous lacerations and several broken secondary feathers. The cause of her injuries was not determined. After the bird was treated and had recovered, she was released back into the backcountry of Ventura, California, in late October. Although she now appears to be healthy and is acting normally, her position in the condor social order has changed. Before she was captured, this bird held the dominant position of the six Andean condors that were released earlier this year, but now she is subordinate to all of the other birds.

\* \* \*

A collared 3 1/2-year-old female grizzly bear (*Ursus arctos horribilis*) from the Threatened Selkirk, Idaho, population was illegally killed by British Columbia hunters in September. The bear was killed about 2 miles (3 kilometers) north of the U.S./Canada border along Maryland Creek. British Columbia officers apprehended the hunters along with photos of the dead bear.

\* \* \*

The Service and the Smithsonian Institution's National Zoological Park in Washington, D.C., signed a cooperative agreement on September 25 to transfer captive Morro Bay kangaroo rats (*Dipodomys heermanni morroensis*) from the Service's San Simeon, California, Field Station (part of the National Ecology Research Center) to the zoo. This agreement will enable the zoo to conduct research on developing a captive breeding program for this Endangered kangaroo rat. The animals were transferred on November 19.

\* \* \*

Service and California Department of Fish and Game biologists cooperated in a survey for the Endangered light-footed clapper rail (*Rallus longirostris levipes*) at Seal Beach Naval Weapons Station in southern California. The high tide count was conducted from canoes on November 2 and yielded a total of 69 birds — the

(continued on page 12)

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### U.S. Fish and Wildlife Service Regions

**Region 1**: California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5**: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska. **Region 8**: Research and Development nationwide. **Region 9**: Washington, D.C., Office.

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# The Exotic Zebra Mussel — A New Threat to Endangered Freshwater Mussels

John R. P. French III  
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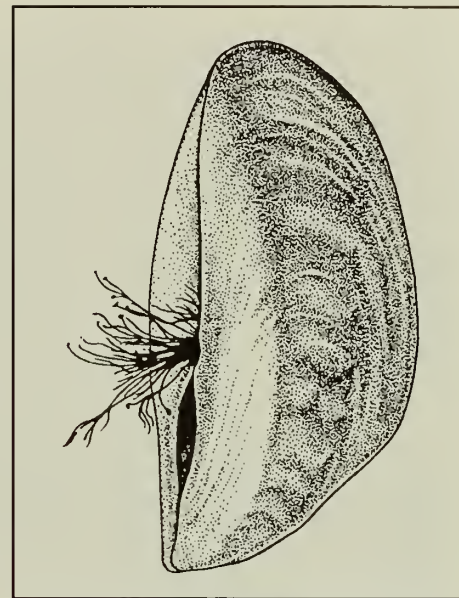
Accidental or deliberate introductions of exotic species can have devastating impacts on native ecosystems. One of the latest biological invaders to arrive in the United States is the zebra mussel (*Dreissena polymorpha*). This small, freshwater mollusk has the potential to spread throughout much of North America and create serious problems for various aquatic organisms, particularly native endangered mussels.

The problem most likely began in 1986 with the accidental discharge of free-swimming zebra mussel larvae, known as veligers, into southern Lake St. Clair (a Great Lakes interconnecting channel) in ballast water from European freighters. By June 1988, zebra mussels were found encrusted on native mussels collected from Lake St. Clair. High densities of zebra mussels are now found attached to a variety of firm surfaces from Lake St. Clair through Lake Erie.

Zebra mussels have since been discovered encrusting the shells of a vari-

ety of native mussels, including the federally-listed white cat's paw (*Epioblasma sulcata delicata*) and the State-listed northern riffleshell (*Epioblasma torulosa rangiana*), club-shell (*Pleurobema clava*), salamander mussel (*Simpsonaias ambigua*), rayed bean (*Villosa fabalis*), and purple lilliput (*Toxolasma lividus*), possibly threatening their survival in the Great Lakes. Effective dispersal capabilities may enable the zebra mussel to invade other drainage basins and imperil rare native mussels throughout the United States.

The zebra mussel is native to freshwater drainages of the Black, Caspian, and Azov Seas. It invaded northern Europe after canals connecting rivers in the watersheds of the Baltic Sea and Black-Caspian-Azov Seas were constructed in the early eighteenth century. This species is sensitive to salinity of over 6 parts per thousand. Shells of the zebra mussel are similar to those of the marine blue mussel (*Mytilus edulis*), but smaller: less than



drawing by Margaret Vanbolt

**zebra mussel showing byssal threads used for attachment to native mollusks and other firm substrates**

40 mm long, 20 mm high, and 25 mm wide. They typically are marked with zebra-like patterns of white to cream background and green to dark brown rays. Because zebra mussels are filter feeders with voracious appetites, they remove a great deal of phytoplankton from the water, thereby affecting food web dynamics and competing with herbivorous zooplankton, certain fish, and native mussels for food.

Zebra mussels disperse at larval, juvenile, and adult stages of their life cycle. A female has a relatively high fecundity of about 35,000 eggs per year. After being fertilized externally, eggs develop into veligers that drift freely in water for 10 to 15 days. This method enables the species to disperse downstream and throughout lakes.

The veligers develop quickly into the settled (post-veliger) stage and produce numerous filaments (byssal threads) to attach themselves to any firm surface on which they settle. Al-

(continued on page 4)



photo by Donald Schloesser

**native mussel encrusted with zebra mussels**

## Zebra Mussell

(continued from page 3)

though calcareous materials, such as limestone, concrete, and the shells of other mussels, are preferred substrates, they can also encrust other surfaces, including hulls of fishing boats and ships. In this manner, juvenile and adult zebra mussels can be carried upstream into other parts of the Great Lakes and into major tributaries of the Mississippi and Hudson River systems by way of connecting channels. They can also survive out of water for several days, and thus potentially can be transported to inland lakes and other river systems on trailered boats and even on the feet of waterfowl.

Since their accidental introduction into North America, zebra mussels have colonized the waters between Lake St. Clair and western Lake Ontario. Populations have also been found in eastern Lake Ontario, the St. Lawrence River, the westernmost portion of Lake Superior, and at several locations in Lakes Michigan and Huron. Further, the zebra mussel is now established in the Erie Canal from Buffalo, New York, as far east as Palmyra. In addition, small dead zebra mussels have been found attached to a boat hull with an Ohio license in Dale Hollow Reservoir, Tennessee.

Fish and Wildlife Service biologists have collected both live and freshly dead native mussels encrusted with ze-



Distribution of zebra mussels in the Great Lakes.

bra mussels. Zebra mussels form successive layers 3-5 cm thick at an average of 6,500 individuals per individual native mussel. The thickest portions of these layers occur on the posterior ends of the native mussel shells, close to the incurrent siphons where water is drawn in for filter feeding. The zebra mussels appear to remove particles from water currents being drawn into native mussels, thus depriving them of food. All 38 freshwater mussels in the United States listed by the Service as Endangered or Threatened face possible extinction if zebra mussels successfully invade their habitats and colonize in high densities.

Zebra mussels have been found encrusted on crayfish, snails, and submerged aquatic plants. The Service recommends that firm surfaces of endangered aquatic organisms, such as mollusks, arthropods, turtles, and plants be checked for the presence of zebra mussels. Please report any geographic range extensions of the zebra mussel to the U.S. Fish and Wildlife Service, National Fisheries Research Center—Great Lakes, 1451 Green Road, Ann Arbor, Michigan 48105 (telephone 313/994-3331 or FTS 378-1331).

## Leaders Named for Northern Spotted Owl Recovery Team

The Department of the Interior recently took the first step toward development of a recovery plan for the northern spotted owl (*Strix occidentalis caurina*), which was listed June 26, 1990, as Threatened (see feature in BULLETIN Vol. XV, No. 7). On November 21, Secretary of the Interior Manuel Lujan named Marvin Plenert, the Fish and Wildlife Service's Portland Regional Director, as Team Leader for the Northern Spotted Owl Recovery Team, and Donald Knowles, Deputy Under Secretary of the Inte-

rior, as Team Coordinator. The team will be directed to develop a plan to restore the northern spotted owl to a secure status.

As Team Leader, Mr. Plenert will have the primary responsibility for managing the team, preparing a work plan, coordinating staffing and administration, drafting the recovery plan, and ensuring public participation. Mr. Knowles, as Team Coordinator, will be Secretary Lujan's representative and provide policy guidance to the team.

Secretary Lujan has invited the Governors of California, Oregon, and Washington to each nominate a representative to serve on the recovery team. Similar requests went to the Secretary of Agriculture; the Assistant Secretaries of the Interior for Fish and Wildlife and Parks, Land and Minerals Management, and Policy Management and Budget; the Interior Department's Office of the Solicitor; and the Directors of the Fish and Wildlife Service, National Park Ser-

(continued on page 12)



# Research on the Okaloosa Darter

## Focuses on Competition and Habitat Use

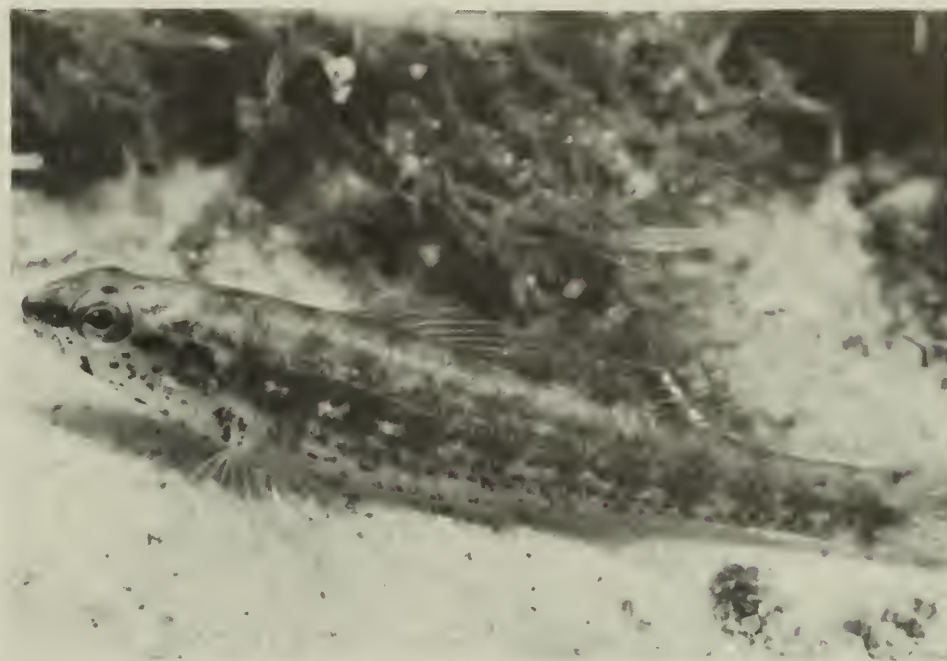
Noel M. Burkhead and James D. Williams  
National Fisheries Research Center  
Gainesville, Florida

Okaloosa darters (*Etheostoma okaloosae*) are small, freshwater fish that are found only in six small stream systems that empty into Choctawatchee Bay in the western part of the Florida panhandle. Because of threats to this restricted habitat from the effects of siltation and small impoundments, the Okaloosa darter was listed in 1973 as an Endangered species.

These small fish, members of the family Percidae, grow only 1.2 to 1.6 inches (30 to 40 millimeters) in total length and live no more than 2 years. They are not as spectacularly colored as many other darters. Adults usually have brown blotches and flecks on their sides, sometimes with reddish or greenish tints. Their diet consists primarily of immature aquatic insects, notably midge fly larva.

Streams inhabited by the Okaloosa darter are 4 to 40 feet (1.2 to 12.2 meters) wide with sandy bottoms, low to moderate gradients, persistent groundwater discharge, and clear to slightly tea-colored water. Because of strong, consistent groundwater discharges, most of the streams are cool, fluctuate relatively little in water temperature, and have moderate current. Sunlit stream reaches usually have beds of aquatic macrophytes (submerged aquatic plants), making these areas better Okaloosa darter habitat. Shaded reaches lack macrophytes, although they often have detritus and woody debris along stream margins. The darters require habitat with cover (macrophytes and detritus), shallow depths, and moderate current.

Studies of the Okaloosa darter are an important part of the endangered species research program at the U.S. Fish and Wildlife Service's National Fisheries Research Center in Gainesville, Florida. Current studies are con-



*Etheostoma okaloosae*

centrating on distribution patterns, spawning, and interactions with the introduced brown darter (*Etheostoma edwini*).

### Competition

In the 1950's and early 1960's, the blackbanded darter (*Percina nigrofasciata*) was the only other darter known to exist in the range of the Okaloosa darter. (Native to this area, the blackbanded darter poses no threat to the Okaloosa darter.) In 1964, however, the brown darter was discovered there for the first time. This species was probably introduced to the range of the Okaloosa darter in the early 1960's by anglers releasing bait fish from buckets. Since that time, competition from the brown darter has become one of the main threats to the survival of the Okaloosa darter.

The brown darter has spread throughout the lower reaches of the

Rocky Bayou tributaries and gradually displaced the Okaloosa darter. Collection records of both darters at some stream sites revealed that displacement occurred over 3 to 4 years. The elimination of Okaloosa darters from the lower Rocky Bayou drainage is the species' most significant loss of habitat. The ways by which Okaloosa darters are displaced by brown darters have not yet been identified, nor have the reasons that this displacement has so far been confined to the lower reaches of the Rocky Bayou drainage.

The two most likely hypotheses for the displacement are (1) ecological competition (i.e., competition for spawning sites, living space, food) and (2) habitat degradation that is intolerable to the Okaloosa darter but not to the brown darter. The first hypothesis is supported by the finding that most of the available habitat where the Okaloosa darter has been displaced by the brown darter, as well as where the

(continued on page 6)

photo by Noel M. Burkhead

## Okaloosa Darter

(continued from page 5)

darters coexist, is of good to moderate quality. It is further reinforced by the absence of both darters from one moderately degraded stream reach and by a seemingly high overlap of the darters in microhabitats.

The threat by the introduced brown darter to the Okaloosa darter is compounded by the absence of techniques to selectively eradicate one fish species without harming others.

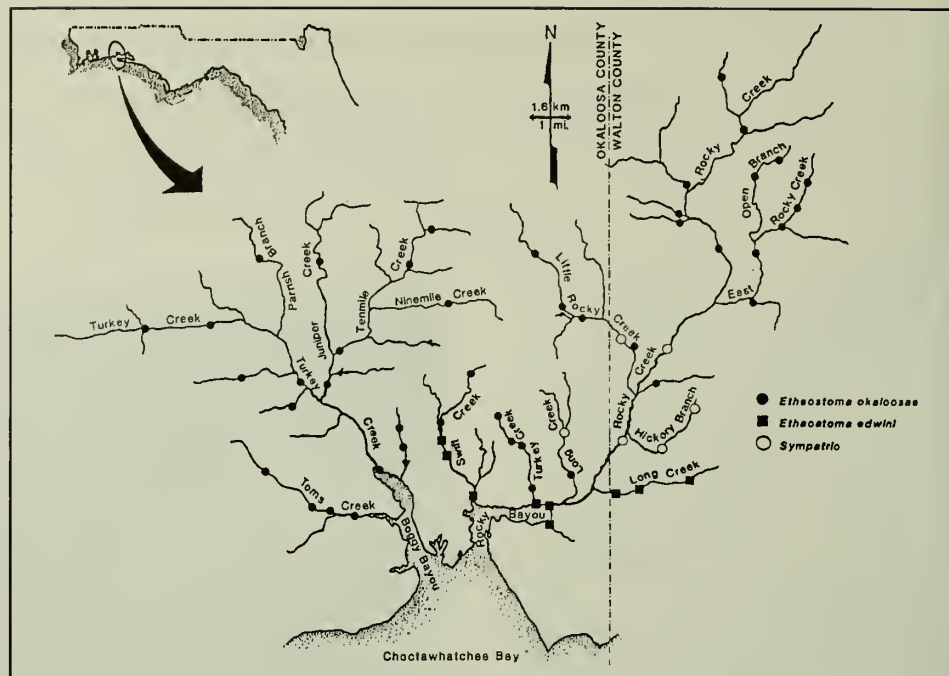
## Habitat Degradation

Almost all of the Okaloosa darter's range is on Eglin Air Force Base. The base encompasses most of Okaloosa and Walton Counties. Soil erosion from borrow pits, road crossings, old railroad beds, and denuded areas on the base has degraded Okaloosa darter habitat. At some sites, heavy rainfall washes large amounts of silt into streams. Eglin Air Force Base is one of the largest non-nuclear weapons-testing facilities in the world, and portions of several streams inhabited by Okaloosa darters are in weapons-testing areas. Chemicals from spent explosives may periodically contaminate the streams. Runoff from insecticides and herbicides, and the application of liquified sewage on sprayfields in the headwaters of several streams within the Okaloosa darter's range, also may degrade the aquatic habitat.

The Services' Panama City, Florida, Field Office and the Gainesville National Fisheries Research Center have assisted the Air Force in identifying and mitigating some of the habitat loss in streams that are inhabited by the Okaloosa darter.

## Research Activities

Research on Okaloosa darters is taking place in both the field and the laboratory. Because of good water clarity, biologists can use snorkeling equipment to observe spawning in the streams. Spawning has been recorded on videotape, and preliminary com-



parisons indicate no differences between reproductive behaviors in the field and in a 4' x 8' tank in the lab. The habitat the Okaloosa darter uses for spawning is the same it uses for feeding and shelter. The reproductive behavior of the brown darter and its comparison with the reproductive behavior of the Okaloosa darter are still under investigation.

Future research will examine the microhabitats of both species in stream reaches where they occur separately and where they coexist. In particular, we will be looking for shifts by one of the darters in the use of one or more specific habitat features where the darters occur together. The detec-

tion of such a shift is expected to disclose a specific feature of competition. Displacement of the Okaloosa darter may not be a function of competition over habitat. However, the habitat overlap and fluctuating ratios of the two species in sympatry suggest the importance of examining habitat preference.

Data gathered in these research programs will provide a vital baseline for evaluating future population trends and for developing plans to address the continuing threats to the Okaloosa darter. The ultimate goal of the research is to improve the status of this fish and bring about its recovery.

## Final Rule Published for the Cahaba Shiner

The Cahaba shiner (*Notropis cahabae*) is a small, silvery fish about 2.5 inches (6.4 centimeters) long. It is known to occur only in the Cahaba River in central Alabama, where it is found in large shoal areas of the main channel. Small, scattered populations of the shiner are found along 60 miles (97 kilometers) of the river, with the greatest number of fish surviving in a 15-mile (24-km) stretch. Water pollution has reduced the historic range of the Cahaba shiner by over 20 percent and continues to threaten the

survival of the species. The shiner and its habitat have been adversely affected by sewage flows from water treatment plants; runoff from surface mining and limestone quarries; siltation from construction, agriculture, and forestry activities; and wastewater discharges from methane gas wells. The Service proposed to list the Cahaba shiner as Endangered in the March 19, 1990, *Federal Register* (see BULLETIN Vol. XV, No. 4), and the final rule was published October 25.



## Artist Donates Prints For Red Wolf Recovery



In an effort to assist the Fish and Wildlife Service's red wolf (*Canis rufus*) recovery effort, nationally recognized wildlife artist Steve Jackson recently donated 500 signed and numbered prints from his original painting of this Endangered animal. This is a limited edition color print, measuring 20 by 26 inches (51 by 74 centimeters). The first 500 of the 1,000 prints in the limited edition are being made available to the red wolf recovery program. Proceeds from the sale of the prints, expected to net \$50,000, will be matched by a \$40,000 challenge grant from the National Fish and Wildlife Foundation. The funds will be dedicated solely to the red wolf recovery effort.

Secretary of the Interior Manuel Lujan accepted print number one from the artist on October 16 at the

National Zoological Park in Washington, D.C. The presentation coincided with the opening of the zoo's red wolf exhibit. (The National Zoological Park is the 19th zoo to participate in the red wolf captive breeding program.) In accepting the print, Secretary Lujan said, "The red wolf recovery program is an excellent example of what can be accomplished when Federal, State, and local governments, private organizations, and the public pitch in to restore one of our Nation's Endangered wildlife species. By making these generous contributions to the program, Mr. Jackson and the Foundation are displaying the American spirit of stewardship so vital in meeting the many environmental challenges facing us today."

An information packet and brochure on the red wolf painting and

recovery effort can be obtained by contacting the Red Wolf Recovery Project, Alligator River National Wildlife Refuge, P.O. Box 1969, Manteo, North Carolina 27954 (telephone: 919/473-1131). Individuals interested in purchasing the red wolf print should send a check for \$110 (which includes \$10 for postage and tax) to the same address. The check should be made out to the Coastal Wildlife Refuge Society and should note on the left corner that it is for the red wolf print.

\* \* \*

The red wolf recovery effort continues to progress. (For the last general update of the recovery effort, see BULLETIN Vol. XIV, Nos. 11-12). As of November 8, there were a total of 130 red wolves in the world. Six-

(continued on page 8)



## Red Wolf Recovery

(continued from page 7)

teen red wolves are in the wild at Alligator River National Wildlife Refuge, of which 15 have radio collars or implanted radio transmitters. The signs of another pup have been observed at the refuge, although it has not actually been seen. Of particular significance, 6 of the wolves are extensively using private lands adjacent to the refuge on which the Service has conservation easements. No problems have been reported by the private landowners. Nine more wolves are being acclimated in pens at the refuge's captive breeding facility.

The red wolf captive propagation program is also continuing to expand. With the addition of the Knoxville,

Tennessee, Zoo and the Tennessee Valley Authority's (TVA) Land-Between-the-Lakes National Recreation Area, by the end of the winter there will be 21 red wolf captive breeding facilities in the country. The wolves on most of the island propagation sites are doing well. There are two free-ranging wolves on Bulls Island, South Carolina, four on Horn Island, Mississippi, and four on St. Vincent National Wildlife Refuge, Florida.

In October, all of the red wolves from the Durant Island, North Carolina, propagation site died or left the island. This privately owned island is off the coast of the Alligator River National Wildlife Refuge. The adult male attempted to swim to the mainland and drowned. The following

week, the adult female successfully swam across to Alligator River National Wildlife Refuge, where she is now. Her three pups then attempted to leave the island, but two of the pups drowned and the third is presumed dead. Biologists do not know why the wolves left the island. Another attempt will be made to place wolves there next year.

Acclimation pens are now being built in Great Smoky Mountains National Park in North Carolina for the second mainland release of red wolves. Two pairs of red wolves are expected to be brought into the park at the end of January 1991 (see BULLETIN Vol. XV, No. 6). One of those pairs and their pups should be released into the wild by the end of the summer.

## Listing Proposals

(continued from page 1)

sult, the Service has proposed to change and expand its classification of the argali under the Endangered Species Act (E.R. 10/5/90). Instead of one subspecies, *O. a. hodgsoni*, being listed as Endangered, the entire species would be classified rangewide as Threatened. However, alternative classifications are being considered, including designation of several populations, or the entire species, as Endangered.

Excessive commercial and subsistence hunting of argali for meat has been blamed by some people for much of the species' decline. There have also been reports of uncontrolled killing of argali by military forces after the Chinese occupation of Tibet. However, the Service recognized in the listing proposal that there is a reasonable argument for the proposition that regulated sport hunting may provide economic incentives for conserving certain wildlife populations. These incentives may be direct, by generating funding for essential conservation measures through licensing fees, or indirect, by focusing governmental attention on the need to protect species of economic value. In its

October 5, 1990, listing proposal, the Service issued a call for information on how, and to what extent, countries within the argali's range could use managed sport hunting programs to benefit the species. Any suggestions on the advisability and enforceability of a special rule to allow the importation of argali are welcome as well. If the data indicate that regulated sport hunting benefits the species as a whole, a special rule permitting the importation of trophies may be published. On the other hand, the Service emphasizes that further review of the situation may lead to a final rule that lists the entire species *O. ammon* as Endangered and places a total ban on importation.

Comments and information regarding the argali proposal should be sent to the U.S. Fish and Wildlife Service, Office of Scientific Authority, ARLSQ 725, Washington, D.C. 20240, by February 4, 1991.

## Silver Rice Rat

The lower Florida Keys population of the rice rat (*Oryzomys palustris natator*) was proposed by the Service on October 25, 1990, for listing as Endangered. This population is

known popularly as the silver rice rat and is considered by some zoologists to be a distinct species, *Oryzomys argentatus*. The small rodent has a generalized rat-like appearance but can be distinguished by its silver-colored fur and elongated nasal bones. Unlike the common rats (*Rattus* spp.) found in urban areas, the silver rice rat requires undeveloped mangrove forests and salt marsh habitat.

The ancestors of the silver rice rat may have colonized the Florida Keys during the Pleistocene, when sea levels were lower than at present. Later, rising seas isolated these and other animals on small islands, where natural selection resulted in a number of distinct taxa. In recent decades, extensive commercial and residential development in the Florida Keys has sharply reduced the already limited amount of wildlife habitat. Among the vulnerable animals on these islands that are already listed as Endangered are the Key deer (*Odocoileus virginianus clavium*) and the Lower Keys rabbit (*Sylvilagus palustris hefneri*).

Federal protection for the silver rice rat first became an issue in 1980,

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## Listing Proposals

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when the Service was petitioned by the Center for Action on Endangered Species to list the animal as Endangered. From 1982 through 1988, the Service published annual findings that a listing proposal for the silver rice rat was "warranted but precluded" by other listing actions of higher priority. At that time, the Service treated the animal as a full species. However, after receiving a report questioning the specific identity of the silver rice rat, the Service announced in 1989 that it was no longer considering the animal for Endangered Species Act protection. Later that year, the Sierra Club Legal Defense Fund, Inc., filed a suit challenging the Service's decision and charging that the option of listing the silver rice rat as a "distinct vertebrate population" had not been adequately addressed. As a result, the Service agreed to reconsider its earlier decision. Although there is continuing disagreement as to whether or not the silver rice rat is a valid species or subspecies, the Service now believes that it does qualify for a listing proposal as a distinct population.

The silver rice rat is already listed by Florida as endangered, but its habitat does not receive protection under State law. If the Service's listing proposal is approved, the animal and its habitat will be protected from jeopardy by any action funded, approved, or carried out by a Federal agency.

### Uncompahgre Fritillary Butterfly (*Boloria acrocnema*)

Discovered on Mount Uncompahgre, Colorado, in 1978, this insect has the smallest known range of any North American butterfly species. It has been verified from only two sites in the San Juan Mountains of southwestern Colorado. The type locality on Mount Uncompahgre is managed by the U.S. Forest Service (USFS), and the other colony (whose location is not widely known) is administered



*Uncompahgre fritillary butterfly*

by the Bureau of Land Management (BLM). Reports of two other colonies have not been confirmed.

The Uncompahgre fritillary is a small butterfly, with a wingspan of only 1 inch (2.5 centimeters). Males have rusty brown wings criss-crossed with black bars, and the females are somewhat lighter in color. These butterflies inhabit sites above 13,200 feet (4,040 meters) in elevation, and all known colonies are associated with large patches of snow willow (*Salix nivalis*), the species' larval food plant. The butterflies apparently have a 2-year life cycle.

Field surveys during 1987 and 1988 indicate that the species' numbers have declined precipitously since 1978. The current population is estimated to total well under 1,000 individuals. Both the USFS and BLM have eliminated livestock grazing on the two known sites, and there are no logging or mining operations in these areas. Collecting is the main threat.

Because it is rare and one of the few butterfly species discovered in the past half-century, the Uncompahgre fritillary is very attractive to many collectors. Specimens of *B. acrocnema* have been offered for sale at prices of over \$100 for males and even more for fe-

males. This butterfly's sedentary nature, weak flying ability, and tendency to fly low to the ground make it easy to collect. Biologists monitoring the species estimate that up to 20 percent of the Mount Uncompahgre population was taken by collectors in 1981 alone.

The Uncompahgre fritillary butterfly faces several other potential dangers, including climatic change. This species, which exists only on the northeast-facing slopes of the highest, wettest peaks in southwestern Colorado, apparently requires a cool, moist microhabitat. Results of 1987-1988 surveys indicate that several recent years of drought have stressed the overall population. When a species is reduced to such low numbers, long-term genetic viability is yet another concern.

In 1984, the USFS and BLM signed an interagency agreement to conserve the Uncompahgre fritillary butterfly, but funding for its implementation has been limited. Although the Fish and Wildlife Service has been working with both agencies since 1987 on research and monitoring, these efforts have not removed threats to the butterfly's survival. Accordingly, the

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## Listing Proposals

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Service has proposed to list the Uncompahgre fritillary as an Endangered species (F.R. 10/15/90).

### Cumberland Pigtoe Mussel (*Pleurobema gibberum*)

This small freshwater mussel, which rarely exceeds 2.4 inches (60 millimeters) in length, has a shell that is a dark mahogany color on the outer surface and peach to orange on the inside. Like many mussels, little is known about the Cumberland pigtoe mussel's life history. It is endemic to the Caney Fork River system, a tributary of the Cumberland River, in central Tennessee. The mussel is found primarily in riffle areas with sand and gravel, where it filters food from the flowing water.

The Service has proposed that the Cumberland pigtoe mussel be listed as Endangered because of its restricted range and the vulnerability of the remaining populations (F.R.10/15/90). Although the species may once have been widely distributed in the Caney Fork system, it is now known to occur in short reaches of only four tributaries of the Caney Fork: the Barren Fork in Warren County, Calfkiller River in White County, Cane Creek in Van Buren County, and Collins River in Warren and Grundy Counties. The mollusk's decline is due to the construction of impoundments, and to siltation and water pollution caused by coal mining, poor land use practices, and waste discharges. The remaining populations are vulnerable to continuing declines in water quality.

### Two Puerto Rico Orchids

Two species of orchids native to the island of Puerto Rico were proposed on October 10 for listing as Endangered:

- *Lepanthes eltoensis* is a small epiphytic orchid. It grows on moss-covered tree trunks in the very rainy, hu-

mid, and shady forests of the Luquillo Mountains. This plant, which reaches only 1.5 inches (4 centimeters) in height, has reddish flowers and slender, sheathed stems that are terminated by a single leaf. The species has been reported from only three sites. Although this is an inconspicuous orchid, illegal collectors have apparently extirpated one colony. The two known remaining populations are believed to number about 140 individuals. All three sites are within the Caribbean National Forest (managed by the USFS), where collecting is not permitted, but these remote areas are difficult to monitor.

- *Cranichis ricartii*, a terrestrial orchid, grows in the moist serpentine scrub forests of Maricao National Forest in the mountains of western Puerto Rico. This species reaches up to 10.5 inches (27 cm) in height, with small basal leaves and an inflorescence bearing numerous tiny, green flowers. Plants have been reported from three locations but are not seen at every site every year. A total of only 30 plants have been observed. The forest habitat was damaged in 1989 by Hurricane Hugo.

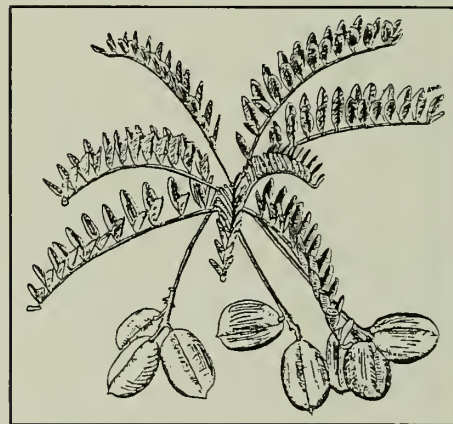
Although both species are found in protected areas, certain forest management practices (e.g., the establishment and maintenance of tree plantations) could affect their habitat. Their low numbers and restricted ranges make the loss of any individuals critical.

### Guthrie's Ground-plum (*Astragalus bibullatus*)

This perennial plant, a member of the pea family (Fabaceae), was named after Milo J. Guthrie of the Tennessee Department of Conservation, who rediscovered the species' type locality in 1980. It has stems that rise up to 6 inches (6 cm) high from a taproot, compound leaves composed of about 24 small leaflets, and an inflorescence with up to 16 purple flowers.

Guthrie's ground-plum is endemic to Tennessee's central basin. All sites

are associated with thin-bedded limestone outcrops that support cedar glade plant communities. The three currently known populations are in Rutherford County. A fourth Rutherford County population, and another in Davidson County, are believed to be extirpated. All three of the surviving populations are near the rapidly growing city of Murfreesboro. Residential, commercial, and industrial development in the area could threaten the species' remaining habitat. Competition by encroaching plants for light and the limited water and nutrients available in cedar glades is another problem at all three sites. Livestock grazing and off-road vehicles also are potential threats to the habitat.



Guthrie's ground-plum

### Walker's Manioc (*Manihot walkerae*)

This perennial herb, a member of the family Euphorbiaceae, is related to cassava (*Manihot esculenta*), a staple food crop in many parts of the tropics. Because Walker's manioc may contain genes that provide resistance to salt, drought, cold, or plant disease, and compounds that are useful for treating human diseases, it is of special interest to botanists, plant breeders, and drug companies. If Walker's manioc and cassava can be interbred, it may be possible to expand the range over which cassava can be grown, which would help feed more people. Unfortunately, however, Walker's manioc appears to be in danger of extinction.

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## Listing Proposals

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*Manihot walkerae* is profusely branched, grows up to 1.6 feet (0.5 meters) tall, and has five-lobed alternate leaves and tubular-shaped white flowers. It is endemic to Tamaulipan brushland, a unique ecosystem found only in the Rio Grande Plains of southern Texas and northeastern Mexico. Other Endangered species found in this brushland community include the ocelot (*Felis pardalis*), jaguarundi (*Felis yagouaroundi*), ashy dogweed (*Thymophylla tephroleuca*), and Johnston's frankenia (*Frankenia johnstonii*).

Walker's manioc has been collected from only seven localities, in Starr and Hidalgo Counties, Texas, and the State of Tamaulipas, Mexico. The species is nearly extinct because of extensive habitat loss. Since the early 1900's, 95 percent of native Tamaulipan brushland in the United States has been cleared for cultivation, grazing, urban development, and recreation. Much of the land that remains in native vegetation is used for cattle grazing and is often severely overgrazed. The species was believed to be extirpated in this country until it was recently rediscovered near La Joya, Texas (see BULLETIN Vol. XV, No. 8). At present, this remains the only known population of the species in the wild. Plants are being cultivated at the University of Texas, Austin, and the San Antonio Botanical Gardens in Texas. Other natural populations may survive along the Rio Grande in suitable brush habitat, particularly on the lands of the Lower Rio Grande Valley and Santa Ana National Wildlife Refuges. Natural populations also may still exist in Mexico, but their presence has not been verified. Any existing Mexican populations are under severe threat because the region is heavily grazed and cultivated.

Because of this species' limited distribution and its vulnerability to human threats, the Service has proposed

that Walker's manioc be listed as Endangered (F.R. 10/01/90).

### Penland Alpine Fen Mustard (*Eutrema penlandii*)



Penland alpine fen mustard

The Penland alpine fen mustard is the only representative of this primarily Asiatic genus in the conterminous 48 States. A small, herbaceous perennial in the family Brassicaceae, this plant grows up to 7.0 inches (17.8 centimeters) tall, has shiny green, heart-shaped basal leaves on stems, and bears clusters of small, white flowers. The taxon is closely related to *Eutrema edwardsii*, which occurs throughout the Arctic but is separated from *E. penlandii* by more than 1,000 miles (1,600 kilometers).

As its name implies, the Penland alpine fen mustard only grows at elevations above 12,500 feet (3,810 meters) on small, moss-covered, peat fens (wetland) over calcareous bedrock with constantly flowing water. The species is known from a 25-mile (40-km) stretch of the Continental Divide in the Mosquito Range of central Colorado. Its habitat contains persistent snowfields, which are necessary to maintain the water flows feeding the high-altitude fens. There are an estimated 5,200 plants distributed in 8 small populations over a total of 62 acres (25 hectares).

Different theories have been offered

to explain why the Penland alpine fen mustard is separated by such long distances from its nearest relatives. One theory is that the plant migrated south from the Arctic in front of advancing ice sheets during the Pleistocene epoch, and was left stranded in small pockets of alpine habitat when the ice sheets retreated. Another is that the plant is a relic of a more widespread northern hemisphere interior flora present in the Tertiary period, over 5 million years ago, which moved northward into the Arctic with the retreating ice sheets.

Most of the remaining populations are on Federal land managed by the U.S. Forest Service and Bureau of Land Management. The Forest Service has proposed the Hooser Ridge site, which is the type locality and accounts for about half the species' total population, as a Research Natural Area. Nearly all the other populations, however, are threatened by recreational and mining activities. Ditches and ruts, formed by off-road vehicles and mining activity, can dry up or alter the water flows that maintain the Penland alpine fen mustard's fragile habitat. Drainage from mine tailings also can acidify the fens, resulting in a loss of plants. Ditching and acid mine drainage are believed responsible for the loss of two small subpopulations of the species, which have not been seen since 1980. Because of the limited range of this species and the vulnerability of its fragile wetland habitat, the Fish and Wildlife Service has proposed that the Penland alpine fen mustard be listed as Threatened (F.R. 10/15/90).

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### Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and traf-

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## Listing Proposal

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ficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.

## Spotted Owl Recovery

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vice, Bureau of Land Management, and U.S. Forest Service. Nominations are expected soon.

The intent is to establish a team that has the ability and time to handle this complex and controversial resource issue. Nominations have been requested for individuals that have established experience and credentials in such areas as wildlife and population ecology, forest ecology, and forestry. Team membership will be important to the success of this effort. The team is also expected to consider related resource issues and other listing candidates with the intent of investigating an ecosystem approach to resolving future problems in Northwest forests. It is expected that the initial phase of the recovery planning process will require a full-time commitment of 6 to 9 months.

The Endangered Species Act makes the Secretary responsible for develop-

ing and implementing plans for the recovery of Endangered and Threatened species. In carrying out this duty for the northern spotted owl, Secretary Lujan said that a number of factors will be taken into account, including potential community and regional socioeconomic impacts; fiscal effects at the local, State, and Federal levels; compatibility with other legal mandates; concerns related to other Endangered, Threatened, and potentially vulnerable species; and broader ecological considerations.

At this point, the Secretary estimates that a draft recovery plan will be completed and issued for public comment by December 31, 1991, and that a final version will be available for approval and implementation by June 30, 1992. These dates, however, are subject to change once the assembled team fully determines the scope of work needed to accomplish its assignment.

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## Regional News

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highest number of rails recorded at this site since 1975, when formal counts began.

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Of the 193 bald eagle (*Haliaeetus leucocephalus*) breeding territories surveyed by the Service in Oregon in 1990, 175 were occupied. The eagles had an average of 0.91 young per site, higher than the 5-year average of 0.87. The bald eagle recovery goal for Oregon is 206 occupied breeding territories with a 5-year average of 1.0 young per territory.

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The Desert Tortoise Recovery Team held its first meeting October 16 and 17 in Ventura, California. Team members got acquainted and discussed team objectives and recovery timeframes. Dr. Peter Brussard, from the University of Nevada-Reno, is the team leader. People wishing to contact the team should contact Ms. Judy Hohman, the team secretary and Ser-

vice representative, at the Service's Ventura Field Station, 2291-A Portola Road, Ventura, California 93003 (telephone: 805/644-1766; FTS 983-6040).

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The Service is continuing to work with the Army Corps of Engineers' Regulatory Branch to stop unauthorized activities in wetlands occupied by the Endangered least Bell's vireo (*Vireo bellii pusillus*) in the Prado Basin of southern California. The installation of a pipeline in willow woodland along Chino Creek this September, in violation of the terms of the utility's permit, destroyed at least 2 to 3 acres (0.8 to 1.2 hectares) of wetland vegetation and at least one nesting locale used by a pair of vireos during the 1990 breeding season. Unfortunately, this is the sixth incident in the past 5 years involving the destruction of occupied least Bell's vireo habitat within the Prado Basin.

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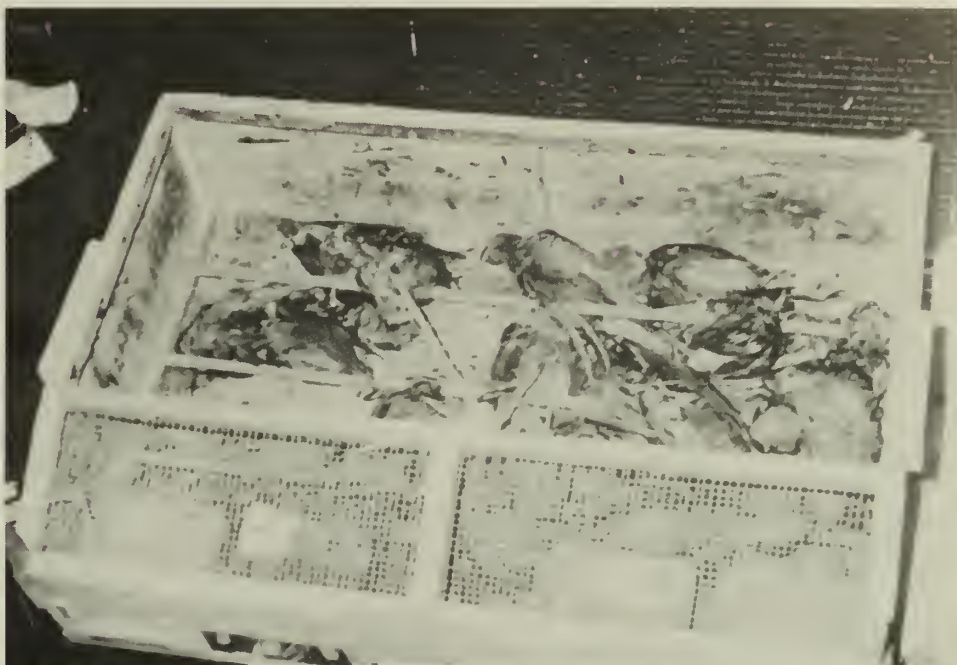
# Awareness Grows on the Problems of Trading Live Birds and Other Live Wildlife

Susan S. Lieberman  
Office of Management Authority  
Washington, D.C.

Although few Americans are aware of it, millions of live wild birds, reptiles, and mammals are imported into the United States every year for commercial purposes.<sup>1</sup> The U.S. imports more live wildlife than any other country. Approximately 700,000 wild birds, 25 million aquarium fish, 1.2 million live reptiles, and 15,000 primates are imported into this country every year. Taking these animals from the wild threatens the survival of some of these species, and the conditions under which they are shipped are all too often cruel and inhumane, with thousands of animals dying in transit.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates the international trade of species that are or may be threatened with extinction. Species listed in Appendix I of the treaty, which are threatened with extinction, cannot be traded for primarily commercial purposes. Species listed in Appendix II, which could become threatened with extinction if their trade is not brought under control, may be traded for commercial purposes only if export permits are obtained stating that trade will not be detrimental to the species in the wild.

The CITES Parties (member countries) have been addressing the problems of the shipment of live animals since the inception of the treaty. The welfare of individual animals in transit is specifically covered in the CITES text, which requires Parties to ensure that "any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment." At the last CITES meeting, in October of 1989, the Parties again recognized the problem of transport-induced deaths, and recommended that more be done to collect



*When birds and other animals are shipped in improper or inhumane conditions, disease or even death is often the result. These Indian ring-necked parakeets (*Psittacula krameri*) were found dead upon arrival.*

mortality data and improve transport conditions. (For more information on the October 1989 CITES Conference, see BULLETIN Vol. XV, No. 5.)

## Wild Bird Trade

From 1986 to 1988, more than 1.9 million wild birds were legally imported into the United States, of which approximately 850,000 were parrots (psittacines) and other species listed in the CITES appendices. In 1988, the most recent year for which there are complete statistics, four countries—Argentina, Senegal, Tanzania, and Indonesia, in order of export volumes—each legally exported more than 30,000 wild birds to the United States. An additional tens of thousands of birds (particularly parrots) were smuggled into this country, but it is difficult to accurately quantify or even estimate this illegal trade. Psittacine species dominated the legal

trade: 33 species accounted for more than 5,000 birds apiece, and 10 of these species accounted for more than 25,000 birds apiece. Virtually all of the wild birds imported into this country are for the commercial pet trade.

The Fish and Wildlife Service is very concerned that high levels of trade in psittacines may be detrimental to the survival of some species in the wild, in spite of apparently valid export documents that state otherwise. Many exporting countries are unable to undertake the critical scientific studies necessary to address the effects of trade on wild populations and to appropriately manage commercially valuable species. At the urging of the Service, the CITES Parties now recognize "significant trade species"—those species traded in large quantities about which there is insufficient biological information available and for

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## Bird Trade Problems

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which trade may indeed be detrimental. The Service is funding several studies dealing with significant trade species, including a project on Indonesian psittacines, and will be discussing issues pertaining to significant trade species at a meeting of the CITES Animals Committee. The International Union for the Conservation of Nature and Natural Resources (IUCN) has also made a commitment to study these significant trade species.

Mortality and morbidity in the transport of wild birds continues to be a problem. For example, from 1986 to 1988, 16.4 percent of the birds shipped (more than 324,000 birds) were either dead on arrival in this country or dead within the required 30-day quarantine period (not all of which may have been transport-related). Much of the death and illness during transport is due to improper or inhumane preparation and shipping of the birds.

## CITES Transport Working Group

Both governmental and non-governmental organizations are concerned with the conservation problems associated with the transport of live animals. Two groups have been formed to address these problems: the CITES Transport Working Group and the non-governmental Cooperative Working Group on Bird Trade.

The CITES Working Group was created to improve international transport and shipment guidelines and regulations, reduce transport-associated mortalities, and help the CITES Parties comply with existing requirements and resolutions. In September 1990, the Service attended the first international meeting of the CITES Working Group in London. Other attendees included representatives of five countries, the CITES Secretariat in Switzerland, the European Com-

munity Commission, and eight non-governmental organizations. The meeting focused attention on the pet trade in live wild birds. The CITES Working Group agreed that the enforcement of existing trade regulations and resolutions, and the training of people involved in the export of live wildlife (particularly in Africa and Latin America), are high priorities. It also agreed to consider adopting remedial measures for those species particularly sensitive to injury and death during transport.

## Cooperative Working Group on Bird Trade

In 1988, the World Wildlife Fund began sponsoring a Cooperative Working Group on Bird Trade. Representatives of various non-governmental organizations, including conservation, zoological, veterinary, ornithological, humane, avicultural, and trade groups, have participated in its discussions. After studying the international trade of wild birds for pets, the non-governmental Cooperative Working Group concluded this year that the pet trade is contributing to the decline of some species in the wild, and that mortality remains unacceptably high for many species. The group recommended that the United States encourage captive breeding of birds for the pet trade and phase out the trade of wild birds within 5 years. The Cooperative Working Group is now trying to translate its recommendations into legislation.

The Service, along with the Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), recently accepted the World Wildlife Fund's invitation to attend the cooperative group meetings as an observer. The Service is still studying the group's findings and has not yet taken a position on the recommendations. However, we look forward to working with this organization with the goal of ensuring that the trade of

wild birds does not harm populations in the wild.

## Humane Transport Regulations

In addition to the requirements in the CITES treaty and recommendations in the CITES resolutions, the United States has its own strict regulations concerning the transport of live animals. The Lacey Act Amendments of 1981 (P.L. 87-79, 95 Stat. 1073) required the Secretary of the Interior to prescribe requirements for the humane and healthful transport of wild animals to the United States. A final rule for the transport of wild mammals and birds, published in the November 10, 1987, *Federal Register*, took effect February 8, 1988. On October 15, 1990, the Service proposed amendments to these regulations to further promote the humane transport of live animals into this country, clarify the regulations, and strengthen enforcement efforts. The Service still is analyzing public comments on these proposals. This is the first of several regulatory changes anticipated by the Service in order to reduce transport-associated deaths.

Working together with the CITES Parties, the CITES Transport Working Group, the Cooperative Working Group on Bird Trade, and other interested organizations, the Service is acting to ensure the humane transport of live animals into the United States and throughout the world. We are also committed to controlling the trade of live animals that are or may be threatened with extinction and to reducing the transport-induced mortalities of all animals that are brought into this country. In these ways, we hope to ensure the conservation of wildlife populations in their native habitat.

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<sup>1</sup> Sources of data: Fish and Wildlife Service (CITES Annual Report, Law Enforcement information, 3-177 forms, CITES permits), U.S. Department of Agriculture, WWF/TRAFFIC (U.S.), Animal Welfare Institute.



Regional News

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Region 2 - The Yuma clapper rail (*Rallus longirostris yumanensis*) nests in dense cattail and reed stands in fresh-water marshes, where it feeds primarily on crayfish. In the U.S., this Endangered bird is found primarily in early successional cattail marshes along the banks of the Colorado River and associated tributaries in Arizona and California.

For over 17 years, an annual spring calling count survey has been conducted during the rail's nesting and breeding season. This year, the Service, Bureau of Land Management, Bureau of Reclamation, Arizona Game and Fish Department, California Department of Fish and Game, and local National Audubon Society chapters participated in the calling count survey along the Colorado River and in the other isolated areas where the rail is known to occur. The number of responses to taped calls was approximately twice the figure for the 3 previous years (673 compared to 272-350 in 1987-1989). The population may be increasing due to stabilizing habitat conditions. The increase also is attributed to additional areas being surveyed and more time being invested in the survey. The Service hopes the increase indicates that the Yuma clapper rail's status is improving.

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Region 4 - The Alabama Department of Conservation and Natural Resources and the Louisiana Department of Wildlife and Fisheries recently signed Cooperative Agreements with the Service under Section 6 of the Endangered Species Act. Their respective agreements cover 56 federally listed animal species in Alabama and 26 animal species in Louisiana. Federal matching funds can now be provided to the two States for their efforts to monitor, study, and recover these species. With the signing of these cooperative agreements, every State in the Southeast Region now has

a Section 6 agreement with the Service covering animals, plants, or both.

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Region 5 - The Service's New York Field Office is working with the Town of Brookhaven, New York, to protect sandplain gerardia (*Agalinis acuta*) on a site owned by the town. Although this site has been disturbed by activities related to a pipeline project, several of the Endangered plants are still growing in the area. A highway that would cross the area has been proposed by the town, but the town has agreed to sign a cooperative agreement that protects the plants and provides for The Nature Conservancy to manage the site.

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The number of nesting bald eagles continues to increase in Region 5. This year, 380 pairs nested in the region, up from 232 pairs in 1986, and they produced 452 young.

\* \* \*

Last spring, the death of hundreds of songbirds and waterfowl in the Delmarva Peninsula area was attributed to the use of granular carbofuran, a pesticide primarily used to control insects in corn fields. During the past several years, a number of bald eagles in the Chesapeake Bay area have been known to have been poisoned by this pesticide. The Service has urged the Virginia Pesticide Control Board to prohibit the use of granular carbofuran within the State, and has repeatedly urged the Environmental Protection Agency to cancel the registration of this pesticide.

\* \* \*

Based on the opposition of the Service, State agencies, and conservation groups, Charles City County, Virginia, has withdrawn its request for a permit from the Army Corps of Engineers to build a public boat ramp at Wilcox Wharf on the James River. This boat ramp would have been in the middle of the largest summer bald eagle concentration area in the eastern United States. Although the county

has withdrawn its application, a private citizen recently announced plans for another public boat ramp on the south side of the James River, immediately adjacent to the area that the Service is planning to buy from The Nature Conservancy as a new national wildlife refuge. This proposed boat ramp also could affect the eagle roosting area.

\* \* \*

Region 8 - In late September, the Patuxent Wildlife Research Center's Minnesota Research Group conducted a field demonstration of a remote-controlled wolf capture collar for a delegation of scientists from the Soviet Union. The gray wolf (*Canis lupus*) had been wearing the collar in the wild for one month. After the wolf was successfully captured, the radio-triggered tranquilizer syringes in the collar were refilled and the wolf was released.

\* \* \*

Region 9 - In fiscal year 1990, the Fish and Wildlife Service obligated \$350,000 from the African Elephant Conservation Fund to seven projects. The involved nations and non-governmental conservation organizations are also contributing to the funding of these African elephant (*Loxodonta africana*) conservation projects, bringing the total to over \$800,000. The grants are being used for anti-poaching activities in Burkina Faso, the Central African Republic, Gabon, Tanzania, and Zambia; overall planning and coordination work by the international African Elephant Conservation Coordinating Group; and establishing a TRAFFIC/World Wildlife Fund office for east and southern Africa.

\* \* \*

The Secretariat of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) has informed the 108 Parties to the treaty that China has withdrawn its reservation on the African elephant, effective January 11, 1991.

(continued on page 16)

## Regional News

(continued from page 15)

After that date, China will comply with the decision of the CITES Parties to place the African elephant on Appendix I, which prohibits commercial trade of species threatened with extinction. The United Kingdom withdrew its reservation for Hong Kong on July 18, 1990. Only five southern African countries still have reservations on the African elephant. In addition, Singapore withdrew its reservations on two Appendix I species, the saltwater crocodile (*Crocodylus porosus*) and the New Guinea crocodile (*Crocodylus novaeguineae*).

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	248	8	22	331	29
Birds	74	153	11	0	238	69
Reptiles	16	58	17	14	105	25
Amphibians	6	8	5	0	19	6
Fishes	54	11	33	0	98	44
Snails	3	1	6	0	10	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	179	1	60	2	242	120
<b>TOTAL</b>	<b>444</b>	<b>483</b>	<b>153</b>	<b>38</b>	<b>1118*</b>	<b>351**</b>
Total U.S. Endangered	444	(265 animals, 179 plants)				
Total U.S. Threatened	153	(93 animals, 60 plants)				
Total U.S. Listed	597	(358 animals, 239 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

November 30, 1990

November 1990

Vol. XV No. 11

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

### Advances in the Endangered Species/Pesticide Labeling Program

Ralph G. Swanson  
Division of Habitat Conservation  
Washington, D.C.

According to the Environmental Protection Agency (EPA), approximately 1.2 billion pounds (540 million kilograms) of pesticides are sold each year in the United States, about 70 percent of which is used in agriculture. Just as many people are becoming more concerned about the public health aspects of pesticides, the Fish and Wildlife Service is increasingly attentive to the effects of these chemicals on fish and wildlife, particularly Endangered and Threatened species.

The January/February 1989 *Bulletin* Vol. XIV, No. 1-2) outlined the potential threats posed by pesticides to the survival and recovery of listed species and reviewed the expanding role of the EPA in protecting Endangered and Threatened species from the harmful effects of pesticides. Since that time, the EPA, with the assistance of the Service and the U.S. Department of Agriculture (USDA), has made significant progress in developing its Endangered Species Protection Program for pesticide labeling, although an enforceable program is not expected before 1992. The new EPA program is intended to fill the gap in both information about, and the regulation of, pesticides that may adversely affect the survival, reproduction, and food supply of listed species. Once fully implemented, the program will improve interagency capabilities to review impacts of pesticides, focus government efforts on the significant problem areas, and provide meaning-



photo by Robert Thomas

*The Houston toad (Bufo houstonensis) is jeopardized by exposure to pesticides within its forest and rangeland habitats. It is also at risk from the application of mosquito larvicides due to increasing urbanization of its occupied range.*

ful protection to listed species without unduly constraining pesticide users or agricultural production.

Under authority of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the EPA must register (or exempt from registration) any pesticide before it can be marketed or used in the United States. It may limit the use of any pesticide to pre-

vent unreasonable adverse effects to the environment. Public health and safety warnings, or other environmental cautions, are stated on a label affixed to, or accompanying, the product from the point of manufacture. Once registered, pesticides may only be legally used in accordance with the label directions.

(continued on page 8)



## Regional News

Regional endangered species staffers have reported the following news:

**Region 1** - A yearling, uncollared woodland caribou (*Rangifer tarandus*

*caribou*) was killed west of Sandpoint, Idaho, in an area not formerly known to support this Endangered animal. Approximately 50 to 65 woodland

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

The *Endangered Species Technical Bulletin* is published on recyclable paper consisting of at least 50% recycled wastepaper. People who do not keep back issues are urged to recycle the paper, pass them along to an interested person, or donate them to a local school or library.

**Region 3**, Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); James C. Gritman, *Regional Director*; Gerald R. Lowry, *Assistant Regional Director*; William F. Harrison, *Acting Endangered Species Specialist*.

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**Region 5**, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director*; Ralph Pisapia, *Assistant Regional Director*; Paul Nickerson, *Endangered Species Specialist*.

**Region 6**, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

**Region 7**, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Rowan Gould, *Assistant Regional Director*; Ron Garrett, *Endangered Species Specialist*.

**Region 8**, (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sherk, *Endangered Species Specialist* (703-358-1710).

caribou are known to reside within Idaho. The people who shot and killed the woodland caribou have turned themselves in to authorities, and the Fish and Wildlife Service and Idaho Department of Fish and Game are investigating the incident.

\* \* \*

The Service has signed a cooperative agreement with The Nature Conservancy and the Air Force that will lead to restoration and expansion of occupied habitat for the Stephens' kangaroo rat (*Dipodomys stephensi*) on March Air Force Base in southern California. The occupied habitat on March Air Force Base will eventually expand from its current size of several hundred acres to 600 acres (250 hectares), and eventually may expand to over 1,000 acres (400 ha). The California Transportation District is contributing \$1.5 million to fund the habitat restoration in compensation for habitat loss from the development of a Federal highway on the base. The interest from this money will be used for managing this Endangered species.

\* \* \*

**Region 2** - There have been only a few sightings of the Eskimo curlew (*Numenius borealis*) in North America over the past several decades. In December 1989, the Fish and Wildlife Service organized an Eskimo curlew advisory group, consisting of biologists from Regions 2, 6, and 7, and representatives from Argentina, the Canadian Wildlife Service, and the private sector, to determine the status of this bird and identify possible recovery measures. To promote reports of bird sightings, the advisory group has developed a brochure that describes the Eskimo curlew, its history, biology, and historical distribution. The brochure includes artwork showing how to distinguish this curlew from the whimbrel (*Numenius phaeopus*), which is similar in appearance. The Service recently published 60,000 copies of the brochure, 15,000 of them in Spanish. The Spanish versions have been mailed to cooperators

(continued on page 5)



# **"Suitcase for Survival": A New Education Effort For Protected Wildlife**



photo by Tami Heilmann

**Wildlife Education Kit containing protected animal products commonly traded illegally**

An innovative project has begun to show young people ways in which they can help save endangered species by being environmentally educated consumers. Dubbed "Suitcase for Survival," the program is sponsored by the Fish and Wildlife Service, World Wildlife Fund, National Fish and Wildlife Foundation, and American Association of Zoological Parks & Aquariums (AAZPA). American Tourister, Inc., donated 40 large suitcases to hold the materials.

The suitcases are filled with educational material, slides, and confiscated wildlife products, such as elephant tusks, stuffed sea turtles, spotted cat skins, leather goods made from the hides of snakes, crocodiles, and lizards, and a startling array of tourist souvenirs fashioned from other wildlife parts. These wildlife products pri-

marily came from tourists returning to the U.S. from abroad, commercial shipments destined for department stores, and would-be smugglers.

The 40 suitcases will be loaned to zoos across the Nation, with each zoo receiving 2-3 suitcases. Initially, suitcases will be sent to the National Zoo in Washington, D.C., and eleven other zoos across the country in early 1991. The zoos will conduct workshops for local teachers, who may then borrow a "Suitcase for Survival" for classroom use in their schools. Students will have the opportunity to see wildlife products firsthand and learn how trade can endanger certain vulnerable species.

Excessive and illegal wildlife trade plays an important part in the extinction of wildlife and the loss of biological diversity. Globally, trade in wild-

life products is a \$5 billion a year industry. The United States is a major importer of wildlife goods from around the world. Although most of these products enter the country legally, thousands of wildlife products are seized at U.S. ports of entry every year for violation of endangered species or other wildlife protection laws.

In kicking off this new education effort, Secretary of the Interior Manuel Lujan said, "The Fish and Wildlife Service has storage rooms and warehouses across the country filled with confiscated illegal wildlife products. It is hoped that by putting a representative sample of these goods on the road and into the classroom, we will help students appreciate wildlife laws and how trade in certain wildlife products may lead to extinction of a species."

# Listing Proposals — November 1990

Two species of plants were proposed during November 1990 for protection under the Endangered Species Act:

## **Ute Ladies'-tresses (*Spiranthes diluvialis*)**

A terrestrial orchid, this species is endemic to moist, relatively open areas near springs, lakes, or streams in parts of the western United States. Historically, there were three known



photo by Charles Sheviak, reprinted by permission from Brittonia, © The New York Botanical Garden

*The Ute ladies'-tresses (Spiranthes diluvialis) is a perennial orchid with stems up to 20 inches (50 centimeters) high, narrow leaves about 11 inches (28 cm) long, and an inflorescence (shown above) of 3 to 15 small white or ivory-colored flowers.*

population centers: central Colorado near the greater Denver metropolitan area; the Colorado River drainage of eastern Utah; and the eastern Great Basin region of western Utah and adjacent Nevada. Unfortunately, extensive alteration of native riparian habitat apparently has eliminated the species from the Great Basin. Seven small, relict populations totalling fewer than 3,000 individual plants are known to remain in Colorado and eastern Utah. Due to the potential for continuing habitat modification and loss, the Service has proposed to list the Ute ladies'-tresses as a Threatened species (F.R. 11/13/90).

Most of the Utah populations are found on sites administered by two Federal agencies, the National Park Service (Dinosaur National Monument, Capitol Reef National Park) and the Bureau of Land Management. These lands currently are subject to livestock grazing, which may be the main threat to the species' survival. The orchids are highly palatable and preferentially grazed. In Colorado, most populations of the Ute ladies'-tresses occur on city park and greenbelt areas owned by the cities of Boulder and Wheat Ridge.

## **Northeastern Bulrush (*Scirpus ancistrochaetus*)**

A perennial herb in the sedge family (Cyperaceae), the northeastern bulrush is a tall, leafy plant that is distinguished by the arching rays of its inflorescence and the barbed bristles on its flowers. It is found at the edge of small, naturally occurring ponds, sinkholes, and other shallow wetland sites in low-lying areas of hilly country in Virginia, West Virginia, Maryland, Pennsylvania, Massachusetts, and Vermont. The species apparently has been extirpated from historical sites in New York.

At present, 13 *S. ancistrochaetus* colonies (most of them very small) are

known to remain. The species was reported historically from nine other sites, four of which have since been destroyed. Its habitat is highly vulnerable to disturbance. Nine of the existing populations are on privately owned wetlands that are subject to dredging and filling for urban, agricultural, and recreational development. Other threats to the habitat include siltation and water pollution, human activities that alter the hydrology, and the effects of recreational vehicles. For these reasons, the Service has proposed to list the northeastern bulrush as an Endangered species (F.R. 11/8/90).

\* \* \*

## **Available Conservation Measures**

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it

(continued on next page)



## Listing Proposals

(continued from previous page)



drawing by C. Kuhn, reprinted by permission from Rare Plants of New York State, New York State Museum

**The northeastern bulrush (*Scirpus ancistrochaetus*) grows up to 47 inches (120 cm) high from a short, woody rhizome. One of the distinctive characteristics of this species is the arching rays of its inflorescence. The flowers have six rigid perianth bristles, each covered with tiny, downward-facing barbs.**

is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally bind-

ing. Both of the plants discussed above occur in wetlands that are subject to regulation by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. If they are listed, the Corps will be required to ensure their welfare when evaluating applications for dredge and fill permits.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to collect or maliciously dam-

### Regional News

(continued from page 2)

in the curlew's Argentine wintering grounds. The English versions are being distributed throughout historic nesting and migration areas in North America. The advisory group is also promoting status surveys in both the wintering habitat in Argentina and the nesting grounds in Alaska.

\* \* \*

**Region 3** - The Farm Bureau Federations of Idaho, Wyoming, and Montana petitioned the Fish and Wildlife Service in July of 1990 to remove the gray wolf (*Canis lupus*) from the Federal List of Endangered and Threatened Wildlife and Plants. The petitioners argued that gray wolves in the United States are hybridizing with coyotes (*Canis latrans*) to such an extent that 1) wolves may not represent a true species and therefore are not subject to protection under the Endangered Species Act, and 2) the Service is unable to mount an effective recovery program due to its inability to distinguish "pure" wolves from wolf-coyote hybrids.

After carefully examining the data referenced by the petitioners, evaluating other available data, and conferring with experts on canid biology and biochemical genetic methodology, the Service found that the petition did not present substantial information to justify delisting the gray wolf. Although there are data showing that wolf-coyote hybridization in the Great

Lakes region may have occurred at low frequencies in the past, there are no data that indicate current, frequent, and/or widespread hybridization in U.S. wolves. Furthermore, the only evidence of past wolf/coyote crossing is in the mitochondrial DNA of some animals. There is no indication that any coyote nuclear DNA or morphological traits have been incorporated into the gray wolf population in the U.S. A detailed discussion of this issue was published in the November 30, 1990, *Federal Register*.

\* \* \*

**Region 5** - The only population of the Karner blue butterfly (*Lycaeides melissa samuelis*) in New England occurs on a 2- to 3-acre (0.8- to 1.2-hectare) remnant of pine barren habitat managed by the Public Service Company of New Hampshire (an electrical utility). In the absence of natural fires, scrub oak and pine would quickly crowd out the wild lupine (*Lupinus perennis*) and other nectar plants essential for the survival of this Category 2 listing candidate. (The Service is considering reclassifying the species to Category 1.) To protect the butterfly population, The Nature Conservancy's New Hampshire field office and the Public Service Company signed a management agreement in 1986 to maintain the site's early successional habitat. At a recent work party, representatives from the Service's New England Field

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# Expanding the Range of The Endangered Species Technical Bulletin

In 1981, cuts in the U.S. Fish & Wildlife Service budget forced the Office of Endangered Species to limit distribution of the Endangered Species Technical Bulletin. Prior to the cutbacks the bulletin was sent free of charge to anyone who wished to receive it. Since 1981, however, the Service has been able to distribute the bulletin to only federal and state agencies and official contacts of the Endangered Species Program.

The Endangered Species Update fills the gap left by this budget crunch. Published by the School of Natural Resources at The University of Michigan, the Update is part of a reprint program initiated in 1983. Since its inception, the program has established itself as an important forum for information exchange on endangered species issues. In addition to providing a reprint of the latest issue of the ESTB, the Update includes:

**A Feature Article** - concerning research, management activities, and policy issues for endangered species protection. (Upcoming topics include the Alaskan oil spill and the EPA's proposed endangered species and pesticides program.)

**A Book Review** - covering a recent publication in the field of species conservation.

**Opinion Page** - containing editorials and essays about endangered species protection issues.

**Bulletin Board** - listing upcoming meetings, current announcements, and news items.

## NEW RATES

From its inception, the UPDATE has been subsidized by the School of Natural Resources. Unfortunately, due to rising publication costs, the School can no longer afford to supply this support. Thus revenues from the UPDATE must now cover all printing and postage costs. Consequently, as of December 1, 1989, subscription rates for the UPDATE were increased. The new rates are \$18 for students and senior citizens, and \$23 for others (add \$5 for postage outside the US).

While we regret the increase, it is necessary in order to keep this unique source of information available to all of those working in species conservation. Obviously, we will need your support to make this happen. If you know of anyone who might be interested in receiving the Endangered Species UPDATE, please pass on the subscription information. Every subscription is vitally important to the continued operation and improvement of the reprint program.

## Endangered Species UPDATE

Including a Reprint of the latest USFWS  
Endangered Species Technical Bulletin

February 1986 Vol 2 No 4

THE UNIVERSITY OF MICHIGAN  
School of Natural Resources



### In this Issue:

Birth Boosts Captive  
Rhino Population

Recent Advances in  
California Condor  
Research and  
Recovery Program

Illegal Striped Bass  
Commerce

To receive the UPDATE (approximately 10 issues/year), the rates are \$18 for students & senior citizens (please enclose advisor's signature or proof of age), and \$23 for others. (Add \$5 for postage outside of the US.) Send check or money order (payable to The University of Michigan) to: The Endangered Species UPDATE  
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# Final Listing Rules Approved for Gentian Pinkroot and Winter Run of Chinook Salmon

During November of 1990, final listing rules were published to provide Endangered Species Act protection to one plant species and long-term protection to one fish population:

## **Gentian Pinkroot (*Spigelia gentianoides*)**

This perennial herb, a member of the logania family (Loganiaceae), has a single, sharply ridged stem that grows up to 12 inches (30 centimeters) high. Its pink, tubular flowers tend to remain closed, like those of some true gentians, and this accounts for the common name. The gentian pinkroot historically was known to occur in five counties of northwest Florida but apparently was never widespread. Conversion of forests to farmland and pulpwood plantations probably extirpated some populations. Recent evidence also indicates that the suppression of fires may have contributed to the species' decline. Today, only three populations are known from mixed pine/hardwood forest and an upland pineland. One site has about 30 plants and another has no more than 10. Logging and replanting practices could affect the largest known population by modifying the plant's habitat, although the landowner has been attempting to minimize site disturbance. All of the populations also are vulnerable to collecting by botanists or those interested in medicinal plants. (Other species in the genus *Spigelia* have been in demand for their medicinal and/or poisonous properties.) The Fish and Wildlife Service proposed in the March 14, 1990, *Federal Register* that the gentian pinkroot be listed as an Endangered species (see *Bulletin* Vol. XV, No.4), and the final rule was published November 26.

## **Chinook Salmon (*Oncorhynchus tshawytscha*)**

On November 5, 1990, the National Marine Fisheries Service (NMFS), an agency of the U.S. Department of Commerce that has direct Endangered Species Act responsibility for most marine life, published a final rule to list the winter run of chinook salmon in the Sacramento River, California, as Threatened. The Fish and Wildlife Service, which is responsible for maintaining the Federal List of Endangered and Threatened Wildlife and Plants, then formally added the winter run to the list on November 30, 1990.

The Sacramento River winter run of chinook salmon is distinguishable from other runs in the river based on the timing of its upstream migration and spawning season. This run has declined from 84,414 fish in 1968 to 550 fish in 1989, and the preliminary estimate for the 1990 run is 441 fish.

The primary factors thought responsible for the decline of the winter run are the Red Bluff Diversion Dam, other human activities that have modified and eliminated spawning and rearing habitat, and drought conditions in northern California. The Red Bluff Diversion Dam has prevented most fish from swimming upstream to spawn, increased physiological stress on the few fish that do make it past the dam (which may contribute to reduced fecundity of fish that spawn), altered river temperatures that are necessary for successful spawning downstream, and killed juvenile salmon attempting to return to the ocean. Other dams on the river have resulted in the incidental take of fish and further degraded the salmon's spawning habitat by increasing water temperatures to levels lethal for egg incubation and development, decreas-

ing the replenishment of gravel suitable for salmon spawning, and reducing water flows that are necessary to aerate the eggs. Gravel mining in the tributary streams also has slowed the addition of new gravel into the Sacramento River.

The persistent drought conditions in northern California have further affected the salmon run by increasing the demand for water withdrawals from the river and increasing water temperatures of the spawning grounds. Other factors that are probably degrading salmon habitat include runoff from an inactive mining operation (which pollutes the water with heavy metals) and bank stabilization projects (which may affect the quality of salmon rearing habitat). In addition, two proposed hydroelectric projects, the Lake Redding and Lake Red Bluff dams, would eliminate more winter-run chinook habitat and aggravate fish passage problems. Although commercial and recreational salmon fisheries have not substantially contributed to the decline of the run, these fisheries may be affecting the recovery of the run.

On August 4, 1989, NMFS took emergency action to protect the winter run of chinook salmon in the Sacramento River under a 240-day listing rule (see *Bulletin* Vol. XV, No. 1). On March 20, 1990, NMFS published a proposed rule to list the run as Threatened and give it long-term protection. To ensure that there would be no break in the protection of the run while the final rule was developed, NMFS extended the emergency rule through November 28, 1990 (see *Bulletin* Vol. XV, No. 5).

Both of the emergency rules designated portions of the Sacramento River as Critical Habitat for the win-

(continued on page 8)

## Final Listing Rules

(continued from page 7)

ter run of chinook salmon. However, NMFS did not designate Critical Habitat in the final rule because it had not completed the required economic impact analysis. Within 1 year, NMFS will propose a rule to designate Critical Habitat for the winter run.

## Endangered Species/Pesticides

(continued from page 1)

Pesticide use limitations to protect endangered species have arisen from the interagency consultations under Section 7 of the Endangered Species Act conducted since the early 1980's between the Fish and Wildlife Service and the EPA. Measures necessary to avoid jeopardy and minimize incidental take of listed species constitute the restrictions that will appear on product labels. FIFRA requires the periodic re-registration of pesticides and revision of limitations when new information warrants label improvement.

## Biological Opinion

On June 19, 1989, the Service completed a 677-page Biological Opinion that evaluated the effects of 113 chemicals on 165 listed species, primarily aquatic species. All of the chemicals had been evaluated in previous Section 7 consultations. However, new information regarding effects to aquatic species, and a refined risk assessment procedure, led the EPA to reinstitute consultation. In response, the Service assembled a team of biologists composed of Regional representatives, assisted by specialists from the Division of Environmental Contaminants, to analyze the exposure threats to listed species. The team enjoyed an unprecedented level of assistance from the EPA, agencies of the USDA, and the Interior Department's Office of the Solicitor in conducting the consultation.

In about 25 percent of situations where a species was affected by the use

The November 5, 1990, final rule also differs from earlier rulemaking actions in that it does not include an exemption for fishermen who incidentally take salmon from the winter run while fishing legally under applicable State and Federal regulations. However, NMFS is currently consulting with the Pacific Fishery Management

of a pesticide, the Service team concluded that the exposure threat jeopardized that species' survival. In such cases, "reasonable and prudent alternatives" were developed, in the form of pesticide use limitations, that would eliminate the jeopardy threat. Although an outright prohibition on use was required in some buffer areas around the habitats of listed species, alternative limitations were suggested when possible. These alternatives included the use of a granular formulation or application of pesticides at a reduced rate.

For example, applicators must conduct field surveys for red-cockaded woodpeckers (*Picoides borealis*) and their colonies prior to using certain pesticides in forests within the species' range that contain certain minimal woodpecker habitat characteristics. Although this places the responsibility

Council on the effect of fishing on the run. This consultation should be completed soon. If the results of the consultation indicate that the level of incidental take will not jeopardize the run, NMFS will issue a statement that allows fishermen to incidentally take winter-run chinook salmon while legally fishing for other salmon stocks.

for conducting surveys on the prospective applicators, it also provides for an assessment of impacts prior to pesticide applications and avoids pesticide use restrictions when they are not needed for protection of the species. The Service believes this alternative is preferable to a general prohibition of pesticide use within the range of the woodpecker.

The June 19, 1989, Biological Opinion replaces all prior opinions that addressed the same chemicals and is intended as a valuable reference for Service personnel, and others, in the review of pesticides and their effects on listed species. Despite its size and scope, the Biological Opinion covered only a portion of pesticides considered by the EPA to affect listed species. The remaining pesticides will be addressed in future consultations.

(continued on next page)



Unregulated application of rangeland herbicides such as atrazine and 2-4,D is likely to jeopardize the Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*) on its highly restricted range in the San Joaquin River delta region of central California.

photo © Norden H. (Dan) Cheatham



## Endangered Species/Pesticides

(continued from previous page)

### EPA's Endangered Species Program

On July 3, 1989, the EPA published its proposed Endangered Species Protection Program in the *Federal Register* for public review and comment. The proposed program provides a framework for integrating the results of formal Section 7 consultations into the overall evaluation of pesticide effects and the development of label provisions. The program also reflects the concerns of the agricultural industry regarding the impact of pesticide use limitations on the production of food and fiber. Public comments on the proposed program have been evaluated by the EPA, and publication of the final program in the *Federal Register* is pending.

An Interagency Task Force, comprised of Fish and Wildlife Service Director John Turner and high-level officials of the EPA and USDA, coordinates the new program. This task force is assisted by three staff-level working groups. The Service has been most active on the Technical Advisory Work Group, which has reviewed program options suggested by the EPA and the public, provided technical information on the effects of pesticides on listed species, and advised on research needs.

Economic impacts of use limitations on the agricultural industry are being examined by the Impacts and Alternatives Work Group, which also will assist during interagency consultations to suggest other pest control methods.

The Outreach and Education Work Group develops public information pamphlets and the means for distributing them, and it assists with publication of EPA's program newsletter, "Endangered Species Update." (This newsletter should not be confused with the University of Michigan's publication of the same name.)



photo by Herbert Clarke

*The least Bell's vireo (Vireo belli pusillus), an insectivorous bird in riparian areas of southern California, is exposed to both direct and secondary (via food supply) contamination by pesticides such as carbofuran, endrin, and parathion.*

The following are the basic elements of EPA's proposed program:

- **Species Approach to Consultation:** The EPA will initially evaluate those pesticides used within the range of listed species that the Technical Advisory Work Group has ranked as most vulnerable to pesticide exposure and toxicity. This will allow the EPA to bring forward for immediate consultation those pesticides considered to pose the greatest risk to the most susceptible listed species. Once a pesticide has been identified as a potential threat, the EPA will initiate formal consultation on all of its uses. In turn, the Service will evaluate the chemicals for all uses and all listed

species that may be affected. This represents a departure from the earlier "cluster" approach to consultation that considered only a single use of a chemical (or group of chemicals). The species approach to Section 7 consultation is intended to avoid the inequities arising from different use patterns of the same chemical within the range of a listed species.

- **Threshold Level Screening of Pesticides:** After estimating the expected environmental concentration of a pesticide, the EPA will identify the lowest application rate that could affect listed species. Only proposed uses of a chemical exceeding that threshold would be submitted to the Service



photo by W. L. Pfleger

*The Niangua darter (Etheostoma nianguae), a highly restricted fish of the Osage River system in west-central Missouri, is likely to be jeopardized by reductions in its food supply (nymphs and stoneflies) due to runoff of the pesticide chlorpyrifos. Strategically selected buffer zones, where the use of chlorpyrifos would be restricted, should protect the species from this chemical.*

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## Endangered Species/Pesticides

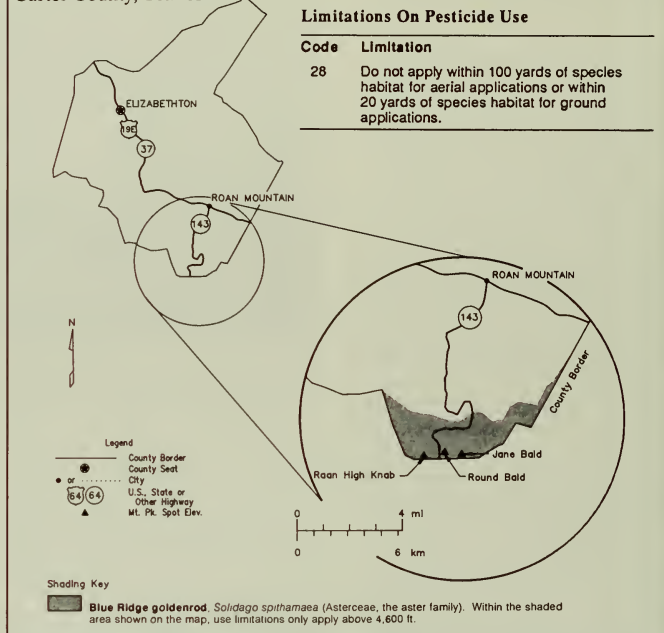
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for consultation. Proposed uses below the threshold would not require limitations to protect listed species and therefore would not need to be reviewed by the Service. Threshold screening should reduce the consultation workload and may encourage a trend toward lower application rates for pesticides that may be a problem for listed species.

• **Product Labels and County Bulletins:** Product labels will alert users to secure the appropriate bulletin for each affected county describing any applicable restrictions. These bulletin restrictions, which will be fully enforceable under FIFRA, will be the primary vehicle to protect listed species from exposure to harmful pesticides. Each bulletin will include a county map showing the affected geographic area and a list of affected pesticides. Bulletins will be freely available to users and subject to periodic revision as species and product information changes. There will be bulletins for only about one-third of the approximately 3,100 counties in the United States; most counties do not support Endangered or Threatened species that are affected by pesticides. Bulletins will not necessarily depict the entire range of a listed species because a species may not be exposed to pesticides throughout its entire range. Thus, the bulletins should not be interpreted as range maps for listed species, but only as use-limitation maps for pesticides.

The production and distribution of county bulletins will be the most expensive element of the program. Therefore, the Service will recommend bulletins and pesticide restrictions only for species (and geographic locations) that cannot be protected in other ways. Alternative protective measures that avoid the need for bulletins, and thereby reduce program costs, will be considered when possible.

### Carter County, Tennessee



**Typical example of an EPA bulletin map, illustrating limitations on pesticides that jeopardize the Blue Ridge goldenrod.**

The EPA has been preparing county bulletins for voluntary use in an interim program, with priority going to those chemicals and species addressed in the June 1989 Biological Opinion. Field and Regional Offices of the Service have provided maps of the occupied habitats of listed species, and the EPA is developing the bulletins and use-limitation maps. Where a map is not practical, a description of the habitat characteristics that would allow a user to recognize and avoid sensitive areas may be substituted. Final bulletins may contain a map, a habitat description, or both, along with the use limitations specified in the Biological Opinion. For particularly sensitive species that could be harmed by revealing location information, alternate methods may be warranted.

• **Public Participation:** The EPA

will encourage involvement by the public, the States, and the agricultural and pesticide industries in all facets of the program, including the preparation of county bulletins, evaluations of pesticide effects, and reviews of use limitations. A series of public meetings in 1988 and the public responses to the July 3, 1989, *Federal Register* notice have already stimulated considerable public participation.

• **Options for State-Initiated Plans:** In lieu of the Federal EPA program, States will have the option to implement individual plans that are more responsive to their agricultural circumstances and the needs of listed species within their borders.

A number of States, including Florida, Hawaii, Iowa, Louisiana, New Mexico, North Dakota, and South Carolina, have already declared

(continued on next page)



# Listing Proposal for Bartram's Ixia is Withdrawn

Bartram's ixia (*Salpingostylis coelestina*), a perennial herb in the iris family (Iridaceae), occurs in seven counties within northeastern Florida. On May 19, 1989, the Fish and Wildlife Service published a proposal to list this plant as Threatened (see summary in *Bulletin* Vol. XIV, No. 6). At the time, the species' survival was believed to be threatened by habitat modifica-

tion. Data received since the listing proposal was published, however, indicate that the species does not currently warrant Endangered Species Act protection, and on November 9, 1990, the proposal was withdrawn. Bartram's ixia has been found to be more abundant and widely distributed than previously known. The main reason for the decision to withdraw the

listing proposal, however, is the species' persistence in pine plantations.

The Service will continue to monitor the status of Bartram's ixia. It is possible that continued urbanization of its habitat, if not accompanied by appropriate conservation measures, may require reproposing the species for listing within the foreseeable future.

## Endangered Species/Pesticides

(continued from previous page)

an intent to develop their own plans to protect listed species from pesticides. If the Service concurs that a State-initiated plan complies with an applicable Federal Opinion, the EPA may accept it in lieu of the Federal program. Some options being considered by the States include individual landowner agreements for species with very restricted ranges (Iowa), multi-agency task forces to evaluate applications for special use permits for pesticide application in sensitive areas (New Mexico), and individual plans that would implement a separate protection program for each species (Florida). Most State plans will rely to some extent on the county bulletins being developed by the EPA. No State-initiated plans have received final approval thus far, but the North Dakota State-initiated plan has received interim approval.

The States, and even individual pesticide manufacturers, have been urged by the EPA to be more attentive to the protection of listed species in contexts other than pesticide registration. For example, under Section 18 of FIFRA, the States may seek an exemption for the limited use of an unregistered product to combat an emergency pest outbreak. Prior to granting such exemptions, the EPA requires the States to present evidence of coordination with the Service regarding the potential for effects on listed species.

In a separate but related area of pesticide use, manufacturers typically ap-

ply for an Experimental Use Permit (under FIFRA Section 5) to test the effectiveness of a pesticide, often a newly developed chemical or a new use of a currently-registered product. Experiments are usually conducted for a limited period of time within small, confined areas. Such conditions should make effects on Endangered and Threatened species easy to avoid. The EPA will seek a review by the Service prior to final processing of the permit application if there is a potential to affect listed species. EPA may condition an Experimental Use Permit based on the technical assistance provided by the Service.

The EPA, States, manufacturers, and individual pesticide users are turning increasingly to the Service for assistance in determining whether or not their proposed uses of pesticides are likely to adversely affect listed species. It is important to understand, however, that the Service does not have authority to approve, restrict, or deny the use of any pesticide. That responsibility rests solely with the EPA under the authority of FIFRA.

A free microfiche copy of the June 19, 1989, "U.S. Fish and Wildlife Service Biological Opinion on Selected Pesticides" may be obtained from the Environmental Protection Agency, Room 246, CM #2, 1921 Jefferson Davis Highway, Arlington, Virginia 22202 (telephone 703/557-2805). Printed copies of the document can be purchased for \$77.00 from the National Technical Information Service,

Attn: Order Desk, 5285 Port Royal Road, Springfield, Virginia 22161; 703/487-4650.

Readers may receive the EPA's program newsletter, "Endangered Species Update," free of charge by writing the Environmental Protection Agency, Endangered Species Protection Program, FOD (H7506C), 401 M Street, S.W., Washington, D.C. 20460.

## Regional News

(continued from page 5)

Office, The Nature Conservancy, the New Hampshire Natural Heritage Inventory, and loggers contracted by the Public Service Company cleared 50 to 75 percent of the encroaching woody vegetation from the site, in what the loggers referred to as their first lupine/butterfly release thinning.

\* \* \*

Recent surveys have revealed that the eastern woodrat (*Neotoma floridana magister*), a Category 2 listing candidate, has declined markedly in Maryland, reflecting a similar decline in States north of the Mason-Dixon line. In an attempt to establish a captive breeding population, several woodrats were captured in Maryland by Maryland Natural Heritage Program staff and transferred to the Baltimore Zoo. The zoo also houses the sole surviving eastern woodrat from New York and one from Indiana, where the species is also declining.

\* \* \*

Maryland's sole Canby's dropwort (*Oxypolis canbyi*) population declined

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## Regional News

(continued from page 11)

from over 200 plants several years ago to only 3 plants in 1989, likely because of the record droughts in 1987 and 1988. In an attempt to save the Maryland genotypes, two of the three remaining Endangered plants were removed from the wild in October 1989 and transferred to the North Carolina Botanical Gardens. This year, both plants flowered and set seed in late summer. Four plants also were observed this year at Maryland's natural site, which is protected by The Nature Conservancy.

\* \* \*

Using funds from the Maryland Heritage Conservation Fund, the Maryland Department of Natural Resources and The Nature Conservancy have acquired over 1,000 acres (400 ha) along Sideling Hill Creek in western Maryland to protect the harperella (*Ptilimnium nodosum*), an Endangered biennial plant. This tract includes most of the remaining harperella stands growing on private property within the State.

\* \* \*

Region 8 - In mid-November, 38 young Mississippi sandhill cranes (*Grus canadensis pulla*) were shipped from the Service's Patuxent Wildlife Research Center in Maryland to the Mississippi Sandhill Crane National Wildlife Refuge in southern Mississippi, where they were placed in pre-release pens. This is the second year

BOX SCORE LISTINGS AND RECOVERY PLANS						
Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	53	248	8	22	331	29
Birds	74	153	11	0	238	69
Reptiles	16	58	17	14	105	25
Amphibians	6	8	5	0	19	6
Fishes	54	11	34	0	98	44
Snails	3	1	6	0	10	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	180	1	60	2	243	120
TOTAL	444	483	154	38	1119*	351**
Total U.S. Endangered	444		(264 animals, 180 plants)			
Total U.S. Threatened	154		(94 animals, 60 plants)			
Total U.S. Listed	598		(358 animals, 240 plants)			

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

November 30, 1990

of a study that compares survival of hand-reared and foster parent-reared cranes. Surprisingly, 100 percent of the hand-reared birds released nearly a year ago are still alive. This high sur-

vival rate is unusual for animal releases. Birds reared at Patuxent now comprise almost 75 percent of the refuge's Mississippi sandhill crane population.

December 1990

Vol. XV No. 12

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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# ENDANGERED SPECIES

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Vol. XV

# ENDANGERED SPECIES

**Technical Bulletin**

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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Endangered Species, Vol. 16...

ENDANGERED

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**Technical Bulletin**Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240**Black-footed Ferret Recovery Effort Progresses  
Toward Reintroduction**

Many encouraging events have occurred since our last update on the black-footed ferret recovery program (see *Bulletin* Vol. XIV, No. 7). Efforts of the Fish and Wildlife Service, Wyoming Game and Fish Department, other Federal, State, and Native American agencies, and private groups to restore the Endangered black-footed ferret (*Mustela nigripes*) in the wild are gathering steam. Captive breeding, research, and investigations of possible reintroduction sites are proceeding in a number of areas. As a result of these recovery activities, the Service now anticipates that black-footed ferrets will be reintroduced into the wild in the fall of 1991.

**Captive Breeding**

All known black-footed ferrets are now in captivity. The world's black-footed ferret population reached 180 animals this fall, up from 118 animals in 1989, through captive breeding efforts at the Sybille Wildlife Research and Conservation Unit near Wheatland, Wyoming, the National Zoological Park's Conservation and Research Center at Front Royal, Virginia, and the Henry Doorly Zoo in Omaha, Nebraska. A total of 63 kits were added to the three captive populations, of which 50 were added to the Sybille population, 2 to the Omaha population, and 11 to the Front Royal population. The total captive population is rapidly approaching the level in the recovery plan when ferrets can begin to be reintroduced into the wild.



photo by Dean Biggins

*The last known population of black-footed ferrets (Mustela nigripes) in the wild was discovered in 1981 in a white-tailed prairie dog (Cynomys leucurus) complex near Meteetse, Wyoming. In 1986, after disease struck the colony, the last survivors were taken for captive breeding. The entire captive population of 180 ferrets (fall 1990) descends from 18 of the Meteetse animals.*

At the Sybille Unit, several other noteworthy events have been recorded in the captive breeding effort. Siberian polecats (*Mustela eversmanni*) played an important role in the survival of several black-footed ferret kits. In 1989 and 1990, surrogate polecat mothers, bred at the same time as the ferrets, nursed the ferret kits when the black-footed ferret mothers failed to lactate. In 1990, for the first time at Sybille, a black-footed ferret kit successfully nursed from a black-footed ferret that was not its mother. Older female ferrets that failed to breed and viable females that refused to accept males were also artificially inseminated in 1990, but this effort was unsuccessful.

The Henry Doorly Zoo had a successful breeding season in 1990, unlike 1989 when the ferrets did not whelp as expected. Successful breeding resulted from a better understanding of the life and reproductive cycles of these animals, the introduction of new and better diets (including the addition of vitamin E), and the application of new techniques, including light-cycle manipulation to induce early estrus in black-footed ferret females. Also in 1990, two black-footed ferrets at the zoo were successfully subjected to root canal surgery after breaking the tips off their canine teeth.

Two more facilities are now partici-  
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## Regional News

Regional endangered species staffers have reported the following news:

Region 1 - The Fish and Wildlife Service's Olympia, Washington, Field

Station staff met in late November with Fort Lewis Military Reservation biologists and foresters to discuss the possible designation of the Reserva-

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tion as a Habitat Conservation Area for the northern spotted owl (*Strix occidentalis caurina*). This action was recommended in the Interagency Scientific Committee's 1990 report, "A Conservation Strategy for the Northern Spotted Owl," popularly known as the "Jack Ward Thomas Report" (see *Bulletin* Vol. XV, No. 7). The Reservation could provide a key link, connecting suitable spotted owl habitat between Washington's Cascades physiographic province and the Olympic Peninsula. The Service has offered to assist the Army in conducting habitat inventories and owl surveys.

\* \* \*

The Boise, Idaho, Field Station is providing technical assistance to nature film producer Jim Dutcher, who plans to produce a feature film on gray wolves (*Canis lupus*) for the ABC television network. The film is scheduled for broadcast in 1994. Mr. Dutcher's film should aid wolf recovery by providing accurate information to millions of television viewers.

\* \* \*

In November and December, biologists from the Service's Sacramento, California, Field Station, San Francisco Bay National Wildlife Refuge, and California Department of Fish and Game conducted a winter population census of the Endangered California clapper rail (*Rallus longirostris obsoletus*) in major marshes of South San Francisco Bay. Although California clapper rail populations still appear stable along the western shoreline, with red foxes (*Vulpes vulpes*) apparently not yet established there, populations along the eastern shoreline within the Refuge continue to decline. No more than 30 California clapper rails were observed in Dumbarton Point Marsh and 50 were observed in Mowry Slough. Historically, these marshes respectively supported over 200 and over 150 rails.

\* \* \*

On December 11, the U.S. Forest Service, Idaho Department of Lands, and Washington-Idaho Forest Indus-

(continued on page 5)



# Northern Spotted Owl Recovery Team is Announced

Secretary of the Interior Manuel Lujan has announced the creation of a 16-member Northern Spotted Owl Recovery Team, which has the challenging task of writing a plan to secure the owl's long-term future. The Team includes representatives of the affected States, all involved Federal land management agencies, and academia. In his directive to the Team, Secretary Lujan said, "The development of a recovery plan for the northern spotted owl may be the most important effort of its kind since the passage of the Endangered Species Act."

The northern spotted owl (*Strix occidentalis caurina*) was listed on June 26, 1990, as Threatened (see *Bulletin* Vol. XV, No. 7). Under the Act, the Secretary of the Interior has the responsibility to develop a plan for its recovery. As the first step in this process, Secretary Lujan named Marvin Plenert, the U.S. Fish and Wildlife Service's Portland Regional Director, to serve as Team Leader and Donald

Knowles, Deputy Under Secretary, as Team Coordinator (*Bulletin* Vol. XV, No. 11). The Team will be under the authority of the Secretary's Office.

The newly announced Team members are:

- Martha Pagel (Governor's Representative, State of Oregon)
- Christine Sproul (Governor's Representative, State of California)
- Richard Nafziger (Governor's Representative, State of Washington)
- John Tappeiner (Silviculturalist & Forest Ecologist, Oregon State University)
- Ralph Gutierrez (Wildlife Biologist, Humboldt State University, California)
- John Fay (Biologist, Division of Endangered Species, U.S. Fish and Wildlife Service)
- Jonathan Bart (Wildlife Biologist, U.S. Fish and Wildlife Service)
- Robert Anthony (Wildlife Biologist, U.S. Fish and Wildlife Service)
- Kent Mays (Program Manager

for the Northern Spotted Owl, U.S. Forest Service)

- Richard Holthausen (Forest & Wildlife Biologist, U.S. Forest Service)
  - John Beuter (Deputy Assistant Secretary for Natural Resources and the Environment, Department of Agriculture)
  - Melvin Berg (Forester, Bureau of Land Management)
  - Wayne Elmore (Wildlife & Fisheries Biologist, Bureau of Land Management)
  - Edward Starkey (Research Biologist, National Park Service)
  - Kenneth Lathrop (Forester, Bureau of Indian Affairs)
  - Ted Heintz (Economist, Office of the Assistant Secretary for Policy, Management and Budget, Department of the Interior)
- The Team should begin its work in March, and a draft recovery plan is expected by fall of 1991. Upon completion of the draft, it will be released for public comment.

## Ferret Recovery Progresses

(continued from page 1)

participating in the captive breeding program, bringing the total to five. The Louisville, Kentucky, Zoological Park and Cheyenne Mountain Zoo in Colorado Springs, Colorado, received ferret breeding pairs in December 1990. (The Kentucky Fried Chicken Corporation flew the black-footed ferrets down to the Louisville Zoological Park in its corporate jet.) Another two facilities, the Phoenix, Arizona, Zoo and Toronto, Ontario, Zoo have been selected to participate in the captive breeding program and should receive breeding pairs in late 1991.

## Research

A variety of black-footed ferret studies are being conducted around the country. Much of the research is focused on improving the ability of captive-reared black-footed ferrets to survive in the wild when they are re-

leased. Research on disease control is taking place in all of the captive breeding facilities. Cancer continues to be the primary medical problem with aging black-footed ferrets. Coccidiosis, a disease caused by a parasitic protozoan that infects the inner lining of the digestive tract, has caused the deaths of several kits in the past and is being studied so it can be controlled (but not totally eradicated). Black-footed ferrets need to be exposed to some level of the disease to build up the natural immunity necessary to survive any outbreak of coccidiosis once they are reintroduced into the wild.

At the Sybille Unit, Fish and Wildlife Service and Wyoming Game and Fish Department-sponsored researchers are conducting studies on predator avoidance, hunting-prey behavior, and imprinting of different types of diets for captive-reared black-footed ferrets. Results of these investigations are ex-

pected to yield important information for training black-footed ferrets and designing cages to stimulate hunting instincts. To assist the work being done at the Sybille Unit, one full-time veterinary technician and a doctoral candidate researching black-footed ferret behavior, sponsored by the Service, have been assigned to work with the Wyoming Game and Fish Department.

The Service and the National Fish and Wildlife Foundation have sponsored a study at the University of Wyoming's Department of Veterinary Sciences, where a canine distemper vaccine is being tested on Siberian polecats with very promising results. Two black-footed ferrets were inoculated with a modified live virus vaccine in early January 1991 to test its safety and effectiveness. Seven more ferrets will be inoculated with the vaccine in the near future.

(continued on page 4)

## Ferret Recovery Progresses

(continued from page 3)

Black-footed ferrets prey almost exclusively on prairie dogs. In the fall of 1989, the Service sponsored a Prairie Dog Ecosystem Workshop at Estes Park, Colorado. This workshop brought together about 25 experts and scientists knowledgeable in the soil, range, food chain, and disease relationships of prairie dogs. They met to identify management problems in prairie dog ecosystems and examine how these problems could affect black-footed ferret reintroduction efforts. The biologists discussed such topics as prairie dog diseases (including sylvatic plague, a flea-carried virus that is deadly to prairie dogs), the effects of cattle grazing on the prairie dog ecosystem (and vice versa), and the effects of recreational shooting of prairie dogs on the ferret's prey base. (The workshop proceedings eventually will be published by the Service and the Wyoming Game and Fish Department.) A brochure designed to educate people on the values of prairie dog ecosystems subsequently was prepared by the Service and distributed to people living within the historical range of the black-footed ferret.

Studies on predator diseases are being conducted at probable reintroduction sites in South Dakota in cooperation with the State of South Dakota, National Park Service, and the Forest Service. The Fish and Wildlife Service and Bureau of Land Management are sponsoring studies on the recreational shooting of prairie dogs and its potential impact on black-footed ferret reintroduction plans. Other Service studies are gauging the socio-economic consequences and public attitudes regarding the possible reintroduction of ferrets in Montana. Within Wyoming, Chevron USA, Inc., the Wyoming Game and Fish Department, and the Service have jointly sponsored predator studies in the Shirley Basin/Medicine Bow area.

Research is also being conducted on training captive-bred ferrets for even-



Wyoming Game and Fish Department photo

*The Wyoming Game and Fish Department's Sybille Wildlife Research and Conservation Education Unit near Wheatland is one of five facilities where black-footed ferrets are being bred in captivity. Two more facilities should begin participating in the program later this year.*

tual release. In the fall of 1989, the first three conditioning cages for black-footed ferret "hunter training" were finished by the Wyoming Game and Fish Department at the Sybille Unit, and they have been stocked with prairie dogs. Biologists from the Service's National Ecology Research Center and the National Zoological Park are using Siberian polecats (also called steppe polecats) to study techniques for training black-footed ferrets to hunt and avoid predators. (See the Regional News in this issue for additional details.)

### Preparing for Reintroduction

The process of evaluating potential reintroduction sites for black-footed ferrets has accelerated due to the success of the captive breeding program. Probably one of the highlights of 1990 was the Black-Footed Ferret Reintroduction Workshop, sponsored in March by the Wyoming Game and Fish Department and the Service in Laramie, Wyoming. About 20 biologists and researchers gathered at the

workshop to learn how to take advantage of experiences with mammalian and avian reintroductions. The participants discussed a variety of topics, including possible threats to reintroduced animals, minimum population sizes, and release techniques. Several important conclusions and recommendations came out of the workshop. For example, the participants found that most successful reintroductions use young-of-the-year rather than older animals. The participants also recommended that 50 captive animals be released in the fall of 1991, provided this release does not jeopardize the captive population.

Service biologists are establishing guidelines for removing Environmental Protection Agency rodenticide labeling restrictions on less suitable prairie dog complexes. The Service also is working with the Interstate Coordinating Committee's state working groups (which include State, Federal, and private owners of possible reintroduction sites) and other interested parties to map prairie dog towns within most of the black-footed ferret's historical range (i.e., within Colorado, Montana, North Dakota, South Dakota, Utah, Kansas, Nebraska, Arizona, and Wyoming).

Representatives of the Bureau of Indian Affairs and the Service are evaluating possible reintroduction sites on Tribal lands in Montana and South Dakota, although progress is very slow. In western New Mexico and eastern Arizona, Navajo Nation biologists are surveying and identifying sites for restoring black-footed ferret on their lands. Such reintroductions could be significant for helping to conserve the lands and cultures of Native Americans.

### The Shirley Basin Reintroduction

In December 1989, the Interstate Coordinating Committee's state working groups ranked potential black-footed ferret reintroduction sites in

(continued on next page)



## Ferret Recovery Progresses

(continued from previous page)

three States. On November 20, 1990, the Service's Denver Regional Director and the Director of the Wyoming Game and Fish Department decided that the Shirley Basin in Wyoming was biologically the best and would be the first reintroduction site. This high prairie area, south of Casper, was selected because it supports a 39,000-acre (16,000-hectare) white-tailed prairie dog (*Cynomys leucurus*) complex, it contains large blocks of public land (primarily Bureau of Land Management-administered lands), and private landowners and cattle grazing interests are agreeable to the reintroduction. The Service and State of Wyoming are preparing a draft environmental assessment and manage-

ment plan for the Shirley Basin reintroduction, with Meeteetse, Wyoming, as a back-up site. (Similar documents are also being prepared for possible reintroduction sites in Montana.)

Initially, biologists are planning to release about 50 black-footed ferrets into the Shirley Basin. (The exact number and sex of the ferrets will be determined by the captive breeding population.) Successive releases will likely be necessary to establish a viable population. All of these ferrets will be marked, radio-tagged, and released in litter or social groups established in captivity to increase their chances of survival. Prior to their release in the Shirley Basin, the ferrets will be kept and fed for about 10 days near a high density prairie dog town in acclima-

tion pens with artificial burrows. Then, if all goes well, the ferrets will be allowed to move freely in and out of the pens, which can serve as shelters until the ferrets adapt to life on the outside. The radio-collared animals will be monitored until their dispersal and survival are well documented. Biologists are cautioning everyone to expect high mortality of released animals, possibly exceeding 90 percent.

If all goes according to plan, black-footed ferrets will once again be living in the wild this fall. With the cooperation and assistance of State and Federal agencies, private landowners, ranchers, corporations, zoos, Native Americans, and other interested parties, the future of the black-footed ferret recovery effort looks promising.

## Regional News

(continued from page 2)

tries reached a tentative agreement to manage roads in the Grouse Creek Grizzly Bear Management Unit of the Cabinet-Yaak ecosystem. This agreement will help secure 70 square miles (180 square kilometers) of grizzly bear (*Ursus arctos horribilis*) habitat in Idaho. In this heavily roaded area, 56 locations were identified as needing access restriction gates or barricades. The agencies identified responsibilities for management of each location and agreed upon actions to place and maintain gates or barriers. Using funds provided under Section 6 of the Endangered Species Act, up to 12 gates will be installed on private or State land to aid law enforcement and help provide grizzly bear security. After the three parties sign the cooperative agreement, which should be this winter, gates and barriers will be installed in 1991 and 1992.

\* \* \*

The Woodland Caribou Recovery Team met in Spokane, Washington, to revise the current recovery plan for the Endangered Selkirk Mountain herd. A draft revision should be ready by the spring of 1991. Woodland cari-

bou (*Rangifer tarandus caribou*) across North America are in decline from unknown causes. Most likely, a combination of poaching, wolf/bear predation, and road building, together with the naturally low reproductive rates of caribou, are having a cumulative effect on the herds.

\* \* \*

**Region 2** - The status of the Endangered Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*) is being assessed by the Arizona Game and Fish Department under a Fish and Wildlife Service contract. The vole has been known to occur recently in four areas. However, surveys of three of the areas by the Bureau of Land Management and the Service in late September revealed no sign of voles. One of the areas (Grapevine Spring) appeared to have been destroyed by a flood earlier in 1990. The drought of 1988-1989 eliminated vegetative cover at the other two sites. The State extensively surveyed all four known areas in the fall of 1990 and evaluated other sites that once supported populations. Only one site (Pine Peak Canyon) shows signs of vole activity. Further exploration of the canyon and surrounding areas is

contemplated for this summer.

The Hualapai Mexican Vole Recovery Plan is expected to be completed this winter.

\* \* \*

The U.S. Forest Service, Fish and Wildlife Service, University of Arizona, Arizona Game & Fish Department, and volunteers completed the fall 1990 survey of the Endangered Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) in late October. The total fall population, including juveniles, was estimated to be between 250 and 300 animals. It is difficult to tell, however, whether this represents a real increase in the squirrel's population from last year. Conifer cone crops were good this year, especially for Englemann spruce (*Picea engelmannii*), in contrast to previous years. Both adult and juvenile red squirrels were storing conifer cones in middens (i.e., food storage areas). Some animals appeared to be developing new middens, with cones being stored on the ground in small hollows, along fallen trees, and inside logs. The success of these new ventures will be examined in the spring surveys.

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# Listing Proposals — December 1990

Nine species — five Idaho snails, three Florida plants, and one North Carolina plant — were proposed by the Fish and Wildlife Service during December 1990 for listing as Endangered or Threatened. If the listing proposals become final, the following taxa will receive Endangered Species Act protection.

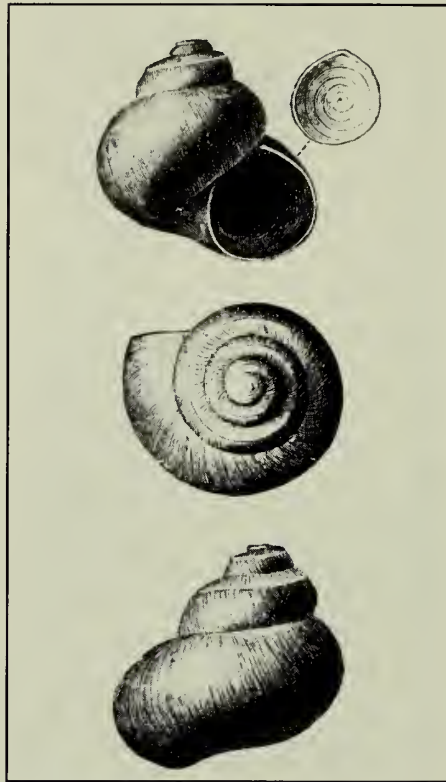
## Idaho Snails

Five species of small aquatic snails restricted to the Snake River system were proposed December 18 for listing as Endangered:

- Bliss Rapids snail, an undescribed, monotypic genus in the family Hydrobiidae;
- Utah valvata snail (*Valvata utahensis*), which despite its name is now known only from Idaho;
- Snake River Physa snail (*Physa natricina*);
- Idaho springsnail (*Fonticella idahoensis*); and
- Banbury Springs limpet, an undescribed species in the genus *Lanx*.

All five species occur only at a few sites in south-central Idaho within the main channel of the Snake River and several tributaries. None of these snails can survive in reservoirs. They apparently require clean, well-oxygenated water and a rapid, free-flowing river or large spring habitat. As reaches of the Snake River have been impounded for irrigation and hydro-power facilities, the amount of suitable habitat available for the snails has been reduced substantially. Only 11 known sites support remnant populations of one or more species.

Hydroelectric projects have been proposed for construction in several of the remaining sections of free-flowing habitat on the Snake River. If these facilities are approved and built as planned, the population of all five rare snails will be reduced, and two species — the Banbury Springs limpet and



*Valvata utahensis*

Snake River Physa snail — will likely become extinct. Even existing dams may be causing additional damage to the habitat by the practice of “peak loading,” which requires the artificial raising and lowering of water levels for generating power at times of peak demand. Oxygen depletion, water pollution from agricultural runoff, and competition from a recently introduced snail (*Potomapyrgus antipodarum*) are other potential threats.

Federal agencies whose activities could have an impact on the habitat of the Idaho snails include the Federal Energy Regulatory Commission, which has jurisdiction over licenses for hydroelectric projects, and the U.S. Army Corps of Engineers, which has authority under Section 404 of the Clean Water Act to regulate the filling of navigable waters and other wetlands. If the Idaho snails are listed under the Endangered Species Act, all Federal agencies will be required to ensure that their activities are not likely to jeopardize the survival of these species.

## Florida Plants

Three plant species native to the Apalachicola region of the Florida panhandle were proposed by the Service for listing as Threatened (F.R. 12/18/91):

- Telephus spurge (*Euphorbia telephioides*) — An herbaceous perennial, this plant has a highly branched, bushy appearance and grows to about one foot (30 centimeters) tall. Its broad leaves are maroon at the edges. The inflorescence is a cyathium (a structure resembling a flower, containing several male flowers, each reduced to a single stamen, plus a single stalked female flower). This species is known from only 22 sites, all within 4 miles (6.4 kilometers) of the coast.

- white birds-in-a-nest (*Macbridea alba*) — This perennial, a member of the mint family (Lamiaceae), is an upright, usually single-stemmed herb that grows up to approximately one foot in height. Its large, brilliant green and white flowers resemble snapdragons and are clustered among bracts at the top of the plant. Forty-one of this species' 63 known sites are within Apalachicola National Forest.

- Florida skullcap (*Scutellaria floridana*) — Another perennial mint, *S. floridana* is sparsely branched and has short, narrow leaves with purplish tips. Its flowers are bright lavender-blue and white, and have a cap or “scutellum” on the calyx. This species is known from 11 sites, 5 of which are in the Apalachicola National Forest.

All three species are restricted to lowlands along the Gulf of Mexico coast, where they grow primarily in wet savannas, seepage bogs, and other open, poorly drained areas. Many of these native habitats are being converted to pine plantations or improved pastures. The suppression of naturally occurring wildfires also affects the sun-dependent plants by allowing the encroachment of competing vegetation. Power line rights-of-way provide

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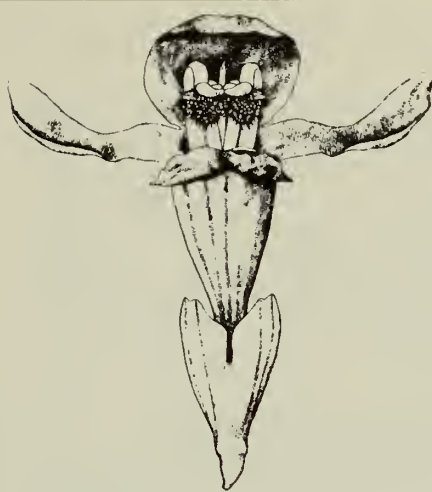


## Listing Proposals

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Some open habitat for the plants, especially *E. telephioides*, but the use of herbicides for clearing the corridors (instead of mowing or other mechanical means) could constitute another threat. Because the entire distribution of *E. telephioides* is within 4 miles of the coast, this species also is vulnerable to habitat loss from residential and resort development.

These plants are already listed as endangered species under Florida State



white birds-in-a-nest (*Macbridea alba*)

law, which regulates taking, transport, and sale but does not provide habitat protection. Populations of *M. alba* and *S. floridana* in Apalachicola National Forest are managed with the intention of benefitting these and other sensitive species. If the Service's listing proposal is approved, the habitat of all three plants will receive protection from any adverse effects of Federal activities.

## White Irisette (*Sisyrinchium dichotomum*)

As indicated by its common name, this plant is a member of the iris family (Iridaceae). The white irisette is a perennial herb growing to about 7.5 inches (20 cm) in height, with pale to bluish green basal leaves and tiny white flowers borne in clusters at the ends of winged stems. It is endemic to the upper piedmont region of North Carolina. In 1942, this species was reported to be "fairly common," but today it is known from only three locations in Polk, Henderson, and Rutherford Counties. All three populations have been at least partially damaged by residential and industrial development, road maintenance activities, suppression of natural disturbance, and exotic plants. Because of imminent threats to its survival, *S. dichotomum* has been proposed for listing as Endangered (F.R. 12/20/90).

The white irisette grows only in

clearings and along the edges of upland woods where the canopy is thin. Therefore, it depends on some form of periodic disturbance to maintain the open quality of its habitat. Some of the openings once produced by wildfires and native grazing animals are now being maintained by artificial disturbances (e.g., certain power line and road right-of-way maintenance activities). Being concentrated on such intensively managed areas, however, exposes the plants to risk from herbicides, trampling, and mowing during their reproductive cycle.

With proper management, the two populations that are located within highway rights-of-way may survive. The third, however, is in an area recently subdivided for residential development. Other threats to the white irisette include encroachment by aggressive, non-native plants such as kudzu (*Pueraria lobata*) and Japanese honeysuckle (*Lonicera japonica*).

North Carolina already lists the white irisette as endangered, but the restrictions on take and trade provided by State law do not extend to habitat. If the Service's listing proposal is approved, the species will gain protection from any adverse effects of Federal activities.

\* \* \*

## Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent

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# Final Listing Rules Published for Three Species

During December 1990, final rules were published listing three taxa — a plant, a bird, and a mammal — as Endangered or Threatened species.

## Sentry Milk-vetch (*Astragalus cremnophylax* var. *cremnophylax*)

This dwarf plant, a member of the pea family (Fabaceae), usually grows in a mat no more than 10 inches (25 centimeters) in diameter and less than 1 inch (2.5 cm) high. It produces small white or pale purple flowers. The sentry milk-vetch is endemic to a single site on the South Rim of Grand Canyon National Park, where it occurs in crevices and depressions on Kaibab limestone. The entire population consists of fewer than 500 individual plants. Park visitors walking to view the canyon rim have trampled the sentry milk-vetch and degraded its habitat, causing the population to decline. From May 1989 to May 1990, subpopulations experienced from 19 to 63 percent mortality, depending on the degree of human visitation. Although the National Park Service has rerouted foot traffic to restrict access to this site, plant vigor is so low from past trampling that the species is still in danger of extinction. The number of seedlings annually produced also seems to be small with a high mortality, possibly due to poor seed dispersal

and to hard frosts and freezes during the flowering/fruitletting period. The Fish and Wildlife Service proposed that the sentry milk-vetch be listed as Endangered in the October 18, 1989, *Federal Register* (see *Bulletin* Vol. XIV, Nos. 11-12), and the final rule was published December 5, 1990.

## Golden-cheeked Warbler (*Dendroica chrysoparia*)

The golden-cheeked warbler is a small, insectivorous bird that breeds only in parts of central Texas. It has very specific ecological requirements, occurring only in mature Ashe juniper (*Juniperus ashei*) and oak woodlands. Habitat destruction is the primary reason this species is threatened. Urban development and widespread clearing of juniper for range management have occurred throughout the warbler's range. In 1990, it was estimated that no more than 263,750 acres (106,750 hectares) of suitable habitat remained.

The golden-cheeked warbler and its habitat continue to be threatened by juniper clearing and the construction of highways, water reservoirs and delivery systems, and private developments. Habitat fragmentation also may be promoting the spread of the brown-headed cowbird (*Molothrus ater*), a more adaptable bird that para-

sitizes the warbler's nests. Long-term successional changes in the forests also may be reducing the amount of suitable habitat for the warbler. If current trends continue, it is estimated that the golden-cheeked warbler population will decline more than 50 percent by the year 2000. The warbler's wintering habitat in the pine-oak forest highlands of southern Mexico, Guatemala, Honduras, and Nicaragua is also being destroyed and degraded.

The Service conducted an extensive review of the status of the golden-cheeked warbler and determined that emergency action was needed to protect the species. An emergency rule listing the species as Endangered and a proposal to provide long-term Endangered Species Act protection was published in the May 4, 1990, *Federal Register* (see *Bulletin* Vol. XV, No. 6). After considering the best scientific information available and the threats facing this species, the Service determined the species should be listed as Endangered. The final rule was published December 27, 1990. The Service found that Critical Habitat for the warbler cannot be determined at this time, but additional information on habitat requirements is being collected. Critical Habitat for the warbler must be designated by the Service.

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## Listing Proposals

(continued from page 7)

organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it

is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regard-

ing "take" are different. It is unlawful to collect or maliciously damage an Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws on their own specifically against the taking of State or federally listed plants and animals.



## Final Listings

(continued from previous page)

by May 4, 1992, unless such a designation is found not to be prudent.

### Steller Sea Lion (*Eumetopias jubatus*)

On November 26, 1990, the National Marine Fisheries Service (NMFS), an agency of the U.S. Department of Commerce that has Endangered Species Act responsibility for most marine wildlife, published a finding that the Steller sea lion should be listed as Threatened. The Fish and Wildlife Service, which is responsible for maintaining the Federal List of Endangered and Threatened Wildlife and Plants, then formally added the species to the list on December 4, 1990.

The Steller sea lion ranges from Japan through the Soviet Union's Kuril Islands, the Okhotsk Sea, the

Bering Sea, the Gulf of Alaska, and along North America's west coast down to southern California. Preliminary 1990 data indicate that Alaska rookeries from the Kenai Peninsula to Kiska Island supported about 25,000 Steller sea lions, compared to about 140,000 in 1956-60, for a drop of about 82 percent. The decline has spread from the eastern Aleutian Islands, where it began in the 1970's, east to the Gulf of Alaska and west to the central Aleutian Islands and Kuril Islands. The reasons for the decline are not known but may be due to reductions in the availability of pollock and other prey species, incidental take of seals during commercial fishing operations, disturbance of rookeries and haulout sites, or a combination of factors. (Steller sea lion pups were taken commercially up through 1972, which may explain the declines in the eastern Aleutian Islands and Gulf of Alaska through the 1970's.)

In response to the decline of the Steller sea lion, NMFS took emergency action to list this species as Threatened throughout its range. A 240-day emergency rule was published in the April 5, 1990, *Federal Register* (see *Bulletin* Vol. XV, No. 5). On July 20, NMFS published a proposal to give the species long-term listing protection. The November 26 final rule contains protective measures similar to those in the emergency rule regarding the discharge of firearms, the establishment of buffer zones around 35 sea lion rookeries, and a quota for the incidental take of sea lions by commercial fishermen.

In March 1990, NMFS established a Steller sea lion recovery team, which is in the process of preparing a recovery plan and developing recommendations on necessary protective regulations. The draft recovery plan should be available for public review later this year.

## Regional News

(continued from page 5)

\* \* \*

The number one known cause of death for fledged whooping cranes (*Grus americana*) is powerline collisions. Forty percent of the known losses in the Rocky Mountain flock and 25 percent of the Canadian/U.S. flock are due to birds colliding with powerlines. Consequently, the Service began evaluating line marker devices in cooperation with utility companies in Colorado and Nebraska in 1988. The Colorado study, which is examining yellow markers that increase powerline visibility, is continuing.

The Wyoming Cooperative Fish and Wildlife Research Unit in Laramie, with the support of Service Regions 2 and 8 and utility companies, recently completed a 3-year study that examined whether or not yellow airplane marker balls on powerlines diminished collisions in Nebraska's Platte River Valley. This area is used by sandhill cranes (*Grus canadensis*) as a spring staging area and

is bordered by many high electrical transmission lines. There was no significant difference in the number of sandhill cranes flying over marked and unmarked lines. However, the collision rate on unmarked line segments was more than twice as high as on marked line segments. The birds' response to the markers indicated they saw the markers at a distance and adjusted their flight path. In contrast, birds approaching the unmarked lines more frequently flared at the last moment as they attempted to avoid the lines.

Copies of the final report on the results of the Nebraska study are available from Dr. Jim Lewis, Fish and Wildlife Service, P.O. Box 1306, Albuquerque, New Mexico 87103 (telephone: 505/766-3972; FTS 474-3972).

\* \* \*

**Region 4** - Late last summer, biologists from the Service's Asheville, North Carolina, Field Office and the Tennessee Cooperative Fishery Research Unit discovered a new popu-

lation of the Endangered little-wing pearly mussel (*Pegias fabula*) in a short reach of the Little Tennessee River in North Carolina. At the time of this discovery, the only known little-wing pearly mussel population in North Carolina had been lost. Only seven other populations of this mussel are known. Historically, the species was widespread in the Tennessee and Cumberland River Systems. However, in recent years the species' distribution has been severely reduced due to degradation of water and substrate quality. The discovery of this new population in the Little Tennessee River will assist in the species' recovery.

\* \* \*

**Region 5** - After 5 years of lobbying by a broad coalition of conservation groups, the Massachusetts Legislature enacted a strong endangered species protection law on December 17, 1990. Once the legislation is fully implemented in January 1992, Massachusetts will have one of the most

(continued on page 11)

# Aleutian Canada Goose Reclassified From Endangered to Threatened

After a 22-year effort to restore the Aleutian Canada goose (*Branta canadensis leucopareia*), the Fish and Wildlife Service has determined that this subspecies is no longer in imminent danger of extinction and that enough progress has been made to reclassify the subspecies from Endangered to the less critical category of Threatened. The Service proposed the subspecies for reclassification in the September 29, 1989, *Federal Register* (see *Bulletin* Vol. XIV, Nos. 11-12), and the final rule was published December 12, 1990.

Aleutian Canada geese probably once bred on islands from the western Gulf of Alaska to the Commander and Kuril Islands of the Soviet Union. They are thought to have wintered in Japan and in North America from British Columbia to California. The decline in the subspecies' numbers and breeding range is attributed largely to predation by the arctic fox (*Alopex lagopus*), a non-native species that was introduced onto many of Alaska's Aleutian Islands years ago in an attempt to establish a fur trade. Sport hunting and loss of the goose's wintering habitat also probably contributed to the decline of the subspecies. It is generally recognized that hunting during migration and on the goose's wintering areas kept their numbers depressed.

After the Service listed the Aleutian Canada goose as Endangered in 1967, an intensive effort was launched to protect the subspecies on its breeding and wintering grounds. Even before the subspecies was listed, the Service had begun to eliminate arctic foxes from the Aleutians. The Service subsequently reintroduced geese on fox-free islands and worked with the States of California and Oregon to acquire or protect key wintering habitat. Selected areas in California were also



**The Aleutian Canada goose is the only subspecies of *Branta canadensis* whose range once included both the North American and Asian continents.**

closed to hunting for all Canada geese beginning in 1975 and in Oregon in 1982. As a result of these actions, the wild population has increased an average of 16 percent annually since 1975, when there were 790 birds, and now exceeds 6,000 birds. In the U.S., Aleutian Canada geese currently nest on Buldir, Little Kiska, Agattu, Nizki, Alaid, Chagulak, and Amukta Islands in the Aleutians, and on Kiliktagik Island in the Semidi Island Group, south of the Alaska Peninsula. All of these islands are within the boundaries of the Alaska Maritime National Wildlife Refuge.

Although the Aleutian Canada goose is no longer in imminent danger of extinction, it still requires protection under the Endangered Species Act. The small, isolated breeding populations are vulnerable to storms and disease. Less than 15 percent of the habitat that was once used by nesting geese has been cleared of arctic foxes. One of the greatest threats to

the full recovery of the goose is the loss of wintering and migration habitat. Wintering habitat in California is being lost to urban development, changing agricultural practices, and pollution. The threat of large losses to disease, such as avian cholera, which also grow as increasing numbers of geese concentrate in the remaining wintering grounds.

The change in classification of the Aleutian Canada goose to Threatened does not significantly alter the protection of this species under the Endangered Species Act. Anyone taking, attempting to take, or otherwise illegally possessing an Aleutian Canada goose without a permit would be in violation of the Act. Section 7 of the Act also continues to protect this subspecies from Federal actions that could jeopardize its survival. The Service will proceed to work with Federal and State agencies and private groups to seek full recovery of the Aleutian Canada goose.



## Regional News

(continued from page 9)

progressive endangered species laws in the country.

The most significant component of the new law is the protection provided to habitat for endangered species. Habitat loss is the single greatest threat to native plants and animals in Massachusetts and elsewhere. According to Henry Woolsey, Coordinator of the Division's Natural Heritage & Endangered Species Program (who has been working on this bill for 5 years), "the passage of this bill is a major milestone for wildlife conservation in the Commonwealth."

\* \* \*

**Region 6** - A bacterial disease commonly referred to as "redleg" has been confirmed as a factor in the death of at least five Endangered Wyoming toads (*Bufo hemiophrys baxteri*). This disease is considered to be stress-related. The outbreak occurred in cold weather, when the toads were going into hibernation, which is considered to be a stressful time for the toads. Biological censusing techniques, including photography, were not considered to be significant stress factors contributing to the disease. Ninety-two Wyoming toads were individually identified through photographs in 1990. The current adult population is believed to be around 100 individuals.

\* \* \*

A Regional News item in the May 1989 *Bulletin* (Vol. XIV, No. 5) reported on a "fine example of inter-agency cooperation for protecting listed species while accommodating project goals." It described an Endangered Species Act/Section 7 consultation between the Service and the Federal Highway Administration over two Threatened plants, Mead's milkweed (*Asclepias meadii*) and the western prairie fringed orchid (*Platanthera praecleara*). Since that time, unfortunately, the consultation has turned out to be a better example of the lack of

protection afforded to listed plants that occur on private land.

The Federal Highway Administration and Kansas Department of Transportation altered the original alignment for a proposed northeast Kansas highway to avoid the 80-acre (32-hectare) Elkins Prairie, a remnant of virgin tall grass prairie known to contain both listed plants. The Douglas County Zoning Board provided additional safeguards against the threat of development along the new highway by agreeing to maintain the agricultural zoning classification of the prairie. This classification makes it impossible to commercially develop the area. Because the owner is not a crop farmer, it was believed that this action would protect the plants' habitat.

However, before dawn on Sunday, November 18, the landowner began plowing the prairie. Local environmentalists and county officials persuaded him to stop after about a third of the tract had been plowed. The county called an emergency board meeting and negotiated late into Sunday night, finally offering the landowner his originally requested \$6,000 per acre selling price for the prairie. His demands apparently increased, however, and negotiations broke down around 3:00 a.m. Monday morning. Shortly thereafter, the landowner resumed his plowing, turning under all but a small strip of the 80 acres.

This was not illegal under the Endangered Species Act. The rules for listed plants do not prohibit individuals from doing whatever they want on their land, as long as no other laws are violated. At the time the Section 7 consultation was conducted on this highway project, Elkins Prairie contained the world's largest known population of Mead's milkweed. Larger populations have since been discovered, tempering this loss somewhat. But the destruction of two populations of threatened species highlights the lack of protection provided under the Endangered Species Act for listed plants on private land.

\* \* \*

**Region 8** - The Service's National Wildlife Health Research Center in Madison, Wisconsin, has received funds to investigate the role of disease in limiting the distribution and abundance of native Hawaiian forest birds. Working with the Patuxent Wildlife Research Center, the Center will conduct integrated studies of this problem, examining free-flying birds and carcasses for the prevalence of diseases, and using sentinel birds (i.e., susceptible caged birds) to detect the presence of diseases.

\* \* \*

Biologists from the Service's National Ecology Research Center in Fort Collins, Colorado, and the National Zoological Park in Washington, D.C., have been conducting experimental releases of Siberian polecats (*Mustela eversmanni*) for the past 2 years to test release techniques for the Endangered black-footed ferret (*Mustela nigripes*). (See the story in this issue for an update on the black-footed ferret recovery effort.) The Siberian polecat, also called the steppe polecat, is widely distributed through the grasslands of Asia, and has physical and behavioral characteristics similar to those of the black-footed ferret. In the fall of 1989, 13 captive-reared, sterile polecats were radio-tagged with newly designed transmitters and released in an area near Wheatland, Wyoming. The new radio collars, which did not accumulate mud or cause ulcerations in the polecats, were a success and will be used when black-footed ferrets are released.

In the fall of 1990, 5 wild-caught and 38 captive-reared, sterile, radio-collared Siberian polecats were released into black-tailed prairie dog (*Cynomys ludovicianus*) colonies in Colorado and Wyoming. Four test groups were released: 1) the wild-caught Siberian polecats; 2) captive-reared Siberian polecats, raised from 3 months of age in a 2,000-square-foot (190-square-meter) training enclosure

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## Regional News

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containing prairie dogs and their burrows; 3) captive-reared polecats raised in a training enclosure with prairie dogs and frequent exposure to a dog (which served as a surrogate predator); and 4) captive-reared polecats raised in small cages and released gradually from the cages.

As with the 1989 release, most of the polecats released in 1990 were killed by coyotes (*Canis latrans*) or American badgers (*Taxidea taxus*). In Colorado, the predator population was about 3 times greater than in Wyoming and all of the captive-raised polecats were killed within 2 days of their release. In Wyoming, one captive-raised polecat lived over 34 days and successfully killed prey but finally died of starvation. Cage-reared polecats survived an average of less than 4 days at the Wyoming site, whereas animals raised in the training enclosures survived an average of 9 days. Only one of the cage-reared polecats immediately left the cage, and it survived for 19 days before dying of starvation. The wild-caught Siberian polecats survived longest at both sites. All of these polecats also eventually died, except for one animal that was recaptured in good condition 6 weeks after it was released. Although reintroduced black-footed ferrets may be more adept at hunting prey and avoiding predators than their Asian cousins,

which have been bred in captivity for many generations, it does appear that the methods used to raise and release ferrets will affect their survival. Thus,

the enclosure-training facilities may play a very important role in black-footed ferret behavioral conditioning and reintroductions in the future.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	54	249	8	22	333	29
Birds	72	153	12	0	237	69
Reptiles	16	58	18	14	106	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	186	1	60	2	249	120
<b>TOTAL</b>	<b>450</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1127*</b>	<b>351**</b>
Total U.S. Endangered	450		(264 animals, 186 plants)			
Total U.S. Threatened	155		(95 animals, 60 plants)			
Total U.S. Listed	605		(359 animals, 246 plants)			

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

January 31, 1991

January 1991

Vol. XVI No. 1

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240



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# ENDANGERED SPECIES

## Technical Bulletin

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

### The California Clapper Rail: A Beleaguered Bird Faces New Threats

For over 20 years, California's three clapper rail subspecies—California, light-footed, and Yuma—have been listed by the U.S. Fish and Wildlife Service as Endangered. Fewer than 500 California clapper rails (*Rallus longirostris obsoletus*) may remain, primarily in the salt marshes of South San Francisco Bay. About 380 light-footed clapper rails (*Rallus longirostris levipes*) remain in southern California, and there are as many or more in Mexico. About 550 Yuma clapper rails (*Rallus longirostris yumanensis*) survive in the fresh and brackish marshes of the lower Colorado River in the United States and 200 in Mexico. All three subspecies have suffered extensive habitat loss.

The California clapper rail is a secretive bird, slightly smaller than a crow, with a long bill and cinnamon-buff breast. It once was found in tidal salt marshes along half the State's coast, from Humboldt Bay possibly as far south as Morro Bay. The bird feeds mostly on clams, spiders, mussels, and crabs.

#### Early Declines

The California clapper rail once was locally abundant. Early this century, however, market hunting sharply reduced its numbers. In the San Francisco Bay area, many market hunters would each shoot 50 rails a day for restaurants in the city. Boasts of up to 200 birds shot per day were not uncommon. One 1897 account in the *San Mateo Leader* referred to 5,000



*Palo Alto Baylands Park, on the western side of San Francisco Bay, is one of the few places where California clapper rail numbers have remained relatively stable.*

rails of various species being killed in one week in the Bay area alone.

With the passage of the Migratory Bird Treaty Act in 1918, this slaughter was brought under control and rail numbers temporarily increased in areas with suitable habitat. However, the overall decline resumed with the destruction of the rail's marsh habitat. Marshes were diked for salt production, drained and plowed for agriculture, and filled in for commercial development. The tidal marshes in the San Francisco Bay ecosystem alone shrank from about 290 square miles (730 square kilometers) 200 years ago to 50 square miles (150 square km)

today. By the mid-1960's, only about 10 percent of the California clapper rail's original wetland habitat remained, most of it around the south end of San Francisco Bay. Much of this habitat is now protected within the San Francisco Bay National Wildlife Refuge.

The rail's population was estimated at between 4,000 and 6,000 birds by the mid-1970's, the bulk of it residing in the refuge. However, intensive winter surveys later failed to confirm this earlier estimate. In the early to mid-1980's, the Fish and Wildlife Service and California Department of

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## Regional News

Regional endangered species staffers have reported the following news:

**Region 1** - Clark County and the cities of Henderson, Las Vegas, Boul-

der City, and North Las Vegas, Nevada, have proposed an interim habitat conservation plan for the Threatened desert tortoise (*Gopherus*

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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*agassizii*) in the Las Vegas Valley. This area has been experiencing a rapid increase in human population, which is affecting desert tortoise habitat. The habitat conservation plan is designed to accommodate both economic development and the needs of the desert tortoise. The county and cities have prepared a draft environmental assessment on the plan and submitted an incidental take permit application under Section 10(a)(1)(B) of the Endangered Species Act to the Fish and Wildlife Service. The permit, if approved, would allow development and other lawful activities to occur in habitat occupied by the desert tortoise.

\* \* \*

As of February 19, 8 California condor (*Gymnogyps californianus*) eggs have been laid this year and more are expected. The first egg was laid at the San Diego Wild Animal Park on January 19, and the second was laid about an hour later at the Los Angeles Zoo. These eggs are early in the condor breeding season, which gives biologists hope that these pairs can be induced to produce two or even three eggs this year. This level of early egg production raises hopes that the California condor population will grow fast enough that birds can be released back into the wild later this year. Forty California condors survive in captivity, 19 at the Los Angeles Zoo and 21 at the San Diego Wild Animal Park.

\* \* \*

Service biologists conservatively estimate that over 1,000 acres (400 hectares) of habitat occupied by the Endangered Stephens' kangaroo rat (*Dipodomys stephensi*) in southern California have apparently been destroyed or degraded by grading or diking, primarily by developers. This habitat loss occurred after the species was listed on October 31, 1988, and prior to the issuance of an incidental take permit under Section 10 of the Endangered Species Act. Many of these incidents have been forwarded

(continued on page 6)



# Listing Proposals — January 1991

Three species of plants were proposed by the Fish and Wildlife Service during January 1991 for listing as Endangered or Threatened. If the listing proposals are made final, the following plants will receive Endangered Species Act protection:

## Hawaiian Red-flowered

### Geranium (*Geranium arboreum*)

A rare species in the family Geraniaceae, the Hawaiian red-flowered geranium is found only on the northern and western slopes of Haleakala Crater on the island of Maui. Botanists know of about 300 remaining plants, 240 of which are on the State-owned Kula Forest Reserve. The others are within Haleakala National Park and on privately-owned lands.

Historically, *G. arboreum* had a wider range that included the mountain's southern slope. Its decline may have been caused by habitat damage from cattle grazing, feral pigs, invasions of non-native plants, and fire. Isolated populations of this species



photo by Derral Herbst

*Stenogyne kanehoana*, a vine in the mint family (Lamiaceae), produces stems up to 6 feet (2 m) in length with densely hairy, oppositely arranged leaves. Its flowers are borne in clusters of three to six per leaf axil. The petals are fused into a sickle-shaped tube up to 1.5 inches (42 millimeters) long, and are white or pale yellow with short, pink corolla lobes.

can still be found in steep, narrow canyons, where the plants "comb" moisture out of the drifting fog.

Competition from naturalized exotic plants now poses the greatest danger to the Hawaiian red-flowered geranium. The spread of these non-native species is promoted by feral pigs (*Sus scrofa*), which root up native plants and distribute the seed of exotics. Introduced grasses invading geranium habitat form dense sod-like mats that prevent the seedlings of *G. arboreum* and other native plants from becoming established. Pine trees that were established for a forestry operation in the Polipoli area are having an impact of a different kind. The windborne pine pollen covers the stigmas of nearby geranium flowers, which blocks the reception of geranium pollen and thus reduces the species' annual reproduction. Because of these and other threats, the Service has proposed to list *G. arboreum* as Endangered (E.R. 1/23/91).

of only two to four individual plants.

Like the Hawaiian red-flowered geranium, *S. kanehoana* (which has no common name) is threatened by encroachment and competition from naturalized, exotic plants. Koster's curse (*Clidemia hirta*), a rapidly spreading bush, has recently invaded the *S. kanehoana* habitat. Two other non-native species, lantana (*Lantana camara*) and Christmas berry (*Schinus terebinthifolius*), also have become established in the area. Much of the unique Hawaiian flora already has been reduced or even eliminated by these and other aggressive, introduced plants. Because of the species' extremely low numbers and the imminent threats, the Service has proposed *S. kanehoana* for listing as Endangered (E.R. 1/23/91).

## Cumberland Rosemary (*Conradina verticillata*)

Named for the Cumberland Plateau region of the eastern U.S., this small shrub is known only from short reaches of three river systems — the Obed, Caney Fork, and South Fork Cumberland Rivers — in north-central Tennessee and adjacent Kentucky. Specific areas supporting the Cum-

(continued on page 4)

## *Stenogyne kanehoana*

Another Hawaiian plant, *S. kanehoana* is endemic to the island of O'ahu, where it is found on a single ridge in the Wai'anae Mountains. One population is known, consisting



photo by Joan E. Camfield

*Geranium arboreum* is a densely branched, woody shrub growing up to 12 feet (3.7 meters) tall. Its attractive red flowers are non-symmetrical, a characteristic that distinguishes *G. arboreum* from related species. Botanists believe that this plant is the only member of its genus that is adapted to bird pollination.

## Listing Proposals

(continued from page 3)

berland rosemary include gravel and sand bars, sandy river bank terraces, and pockets of sand among large boulders on islands and stream banks. All sites are open or only slightly shaded, a condition that apparently is maintained by periodic scouring during floods.

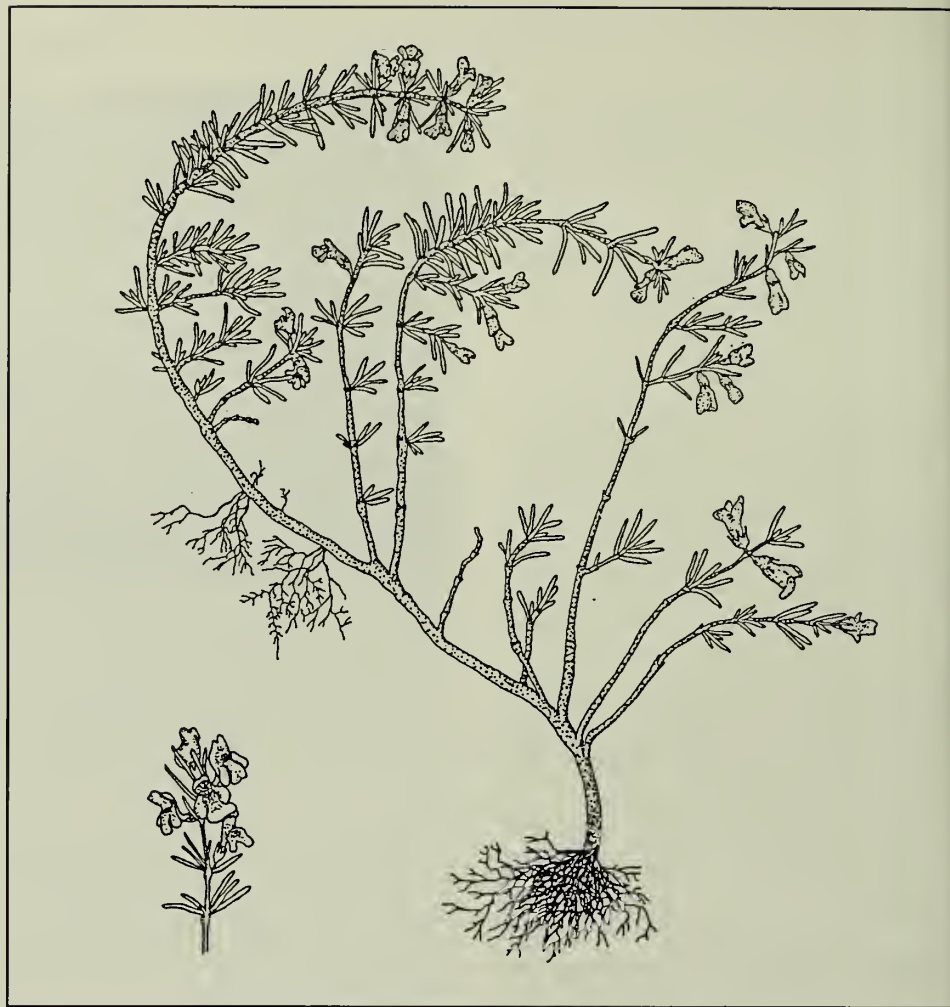
Botanists studying the Cumberland rosemary believe that the distribution of this plant has been reduced by dam construction and general deterioration of water quality. Pollution resulting from coal mining, poor land use practices, and waste discharges continues to degrade the species' habitat, and chemical spills are a potential threat. Intensive recreational use of the fragile riparian habitat by hikers, campers, white-water enthusiasts, and off-road vehicle users is having increasingly destructive impacts. This is especially true for the Big South Fork National River and Recreational Area, where visitation grew from 120,000 in 1986 to 730,000 in 1989. The area superintendent expects this trend to continue.

The Cumberland rosemary already is listed by the State of Tennessee as endangered, and the Service proposed on January 18, 1991, to give the species additional protection by listing it federally as Threatened.

\* \* \*

### Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encour-



**Cumberland rosemary (*Conradina verticillata*), a perennial shrub in the mint family, grows to about 18 inches (45 cm) tall. Its reclining branches bear small, narrow leaves arranged in tight bunches that appear as whorls around the stems. The small but attractive flowers are purple, lavender, or occasionally white in color.**

ages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a

conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.



# California Clapper Rail

(continued from page 1)

Fish and Game estimated the count at 1,000 birds, mostly confined to about 8 marshes in the south bay.

## Spread of the Red Fox

The California clapper rail population continued to decline in the late 1980's. By 1988, it had plummeted to less than 700 birds—more than a 30 percent decline in 2 years. One of the primary causes of this drop is the spread of red foxes (*Vulpes vulpes*) into the area.

The red fox is a versatile, highly efficient lowland predator, one of the most widely distributed carnivores in the world. Hunters and commercial fox breeders first brought the red fox from the upper Midwest to California's Central Valley and coastal counties in the early 1900's. A hunt club in southern California, for example, imported and released 30 foxes in 1919, although only 2 were ever caught. Before 1986, red foxes had never been seen at San Francisco Bay National Wildlife Refuge. Although it is not clear how they arrived in the Bay area, foxes had spread through the wetlands of south San Francisco Bay by 1987. Refuge biologists noted red foxes actively foraging for small mammals and birds in salt marshes and along salt ponds and levees during all tides and seasons. Circumstantial evidence indicated that foxes were preying on clapper rails and their eggs. In April 1990, refuge biologists uncovered the remains of three dead clapper rails around the entrances of two active fox dens, providing further evidence that foxes are feeding on rails.

"The clapper rail has declined severely," refuge biologists Kevin Foerster, Jean Takekawa, and Joy Albertson wrote in 1990 of four salt marsh sites they studied in south San Francisco Bay the previous year. "New terrestrial predators were found in all marshes and nest predation was high. We believe the red fox poses a

severe threat to clapper rails and other ground-nesting species in the San Francisco Bay area."

## Other Threats

Predation by other species, marsh erosion, and water pollution also threaten the remaining California clapper rails in south San Francisco Bay. Of 155 eggs from 24 rail clutches surveyed by the 3 refuge biologists in 1989, 56 percent were lost to predation or flooding, or failed to hatch. In addition to the red fox, feral house cats (*Felis catus*), raccoons (*Procyon lotor*), Norway rats (*Rattus norvegicus*), and northern harriers (*Circus cyaneus*) were implicated in the rail's decline during the study. Other known predators of the rail include common ravens (*Corvus corax*), red-tailed hawks (*Buteo lineatus*), and peregrine falcons (*Falco peregrinus*).

Many San Francisco Bay tidal wetlands have been eroding an average of 3 to 6 feet (1 to 2 meters) per year for many decades due to wave action. The reasons why this is occurring are not fully understood, but there appear to be several factors involved. Tidal wetlands used by the rails may be lost if the trend continues.

Most of the marshes that still support rails have been degraded to some extent due to water pollution. For example, there are indications that bioaccumulation of heavy metals is occurring in the South Bay. Elevated levels of mercury and selenium have been detected in rail eggs. The effect of these metals on the rails is unknown, but the detected mercury concentrations approach the level known to affect reproduction in waterfowl. High mercury levels could affect embryos, egg hatching, the development of young chicks, and adult rail behavior. At low levels, mercury can also affect the birds' sense of hearing. Rails depend on this sense for locating other rails during the breeding season and for avoiding some predators.

Predation, habitat loss, and environmental degradation continue to affect

the California clapper rail's numbers. Winter surveys in 1989 in the Bay estimated between 400 and 500 birds. A 1990 winter census by the Service and the California Department of Fish and Game indicated that although the rail populations appeared more stable along the western shoreline of south San Francisco Bay (where the red fox apparently has not yet become well-established), populations along the eastern shoreline within the refuge are continuing to decline (see *Bulletin* Vol. XVI, No.1). Several populations in important marshes averaged only 50 percent of the 1989 count.

## Recovery Efforts

The Fish and Wildlife Service, California Department of Fish and Game, and local governments are taking actions to stop the decline of the California clapper rail. The Service is in the early stages of forming the Western Rail Recovery Team, which will cover both the California and light-footed clapper rails. Efforts are also under way to restore and expand rail habitat and to control the spread of non-native predators.

The Service is attempting to expand San Francisco Bay National Wildlife Refuge by some 20,000 acres (8,100 hectares). Tidal marshes and areas that can be restored to tidal marsh, which would provide additional habitat for the clapper rail, are among the key acquisition priorities. The California Department of Fish and Game and local governments, such as the East Bay Regional Parks District, are also acquiring habitat for the rail.

This past summer, the Service published a draft predator management plan and environmental assessment for the refuge, which is currently being revised. Control of non-native predators such as the red fox is one of the options that is being examined to protect the California clapper rail within the refuge. No decision has yet been reached on this controversial action.

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## California Clapper Rail

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The California Department of Fish and Game recently received funds under Section 6 of the Endangered Species Act to control red foxes and other predators throughout the range of the California clapper rail. The State will focus its efforts outside of the refuge. In addition, the State has received Section 6 funds to begin a captive propagation program for the light-footed clapper rail. It may be possible to use

propagation techniques that are developed in this program to breed the California clapper rail.

The Service is continuing to closely monitor the remaining California clapper rails and their habitat. This year, the Service is beginning a 2-3 year study on the effects of contaminants on the California rails and their embryos. As part of this study, nest sites will be identified, abandoned eggs collected, and birds banded with radios to monitor nesting activity, an-

nual movements, and other behavior.

The California clapper rail clearly has been losing ground to habitat loss, non-native predators, and environmental pollution. If the species' current decline in south San Francisco Bay continues, it could eventually become extinct. The efforts of the Service, State, local governments, conservation groups, and the public will likely determine the fate of this subspecies in the next few years.

## Regional News

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to the Service's law enforcement office in Gardena, California.

\* \* \*

**Region 2** - Tom Stehn, a Service biologist at Aransas National Wildlife Refuge, Texas, confirmed that 146 whooping cranes (*Grus americana*), including 13 young, are wintering on the refuge. One of the chicks was not accompanied by its parents. A total of 142 birds migrated north from Aransas last April, 9 of which are unaccounted for and presumed dead. A Spiritwood, Saskatchewan, resident reportedly killed one of the birds in Canada in April and was charged with the violation.

The present whooper population on the refuge is equal to the peak population of last winter. However, the production of young is down from the period 1984 to 1989, when the annual number of young birds reaching the refuge was 15, 16, 21, 25, 19, and 20, respectively. The decline in nesting success is due to drought in the crane's nesting grounds in Wood Buffalo National Park, Canada.

One of the family groups at Aransas is comprised of two adult whooping cranes and a sandhill crane (*Grus canadensis*) chick. These birds behave like a normal family group. The source of the sandhill chick is believed to be "dump nesting," in which a sandhill crane placed an egg in a whooping crane nest. Such an in-

stance was documented in 1988 when two whooping crane eggs and a sandhill crane egg were found in a nest in Wood Buffalo National Park.

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**Region 4** - Last summer, a graduate student from the University of Michigan conducted a survey of the sedge *Carex impressinervia* in conjunction with his thesis work. This plant is a Category 2 listing candidate. Two populations were found in Alabama and one in North Carolina. Other populations that previously had been reported in Mississippi were not verified. This plant may be a relict species, with disjunct populations in the Southeast. It occurs locally in vegetatively diverse ravines, with population estimates ranging from several hundred to thousands. The areas near two of the populations have been clearcut, which may threaten the species' survival. The student will complete additional studies on this species shortly, after which the Service will review the plant's status to assess its eligibility for listing.

\* \* \*

On January 28, two breeding pairs of Endangered red wolves (*Canis rufus*) were brought into the Cades Cove area of Great Smoky Mountains National Park in North Carolina and Tennessee and placed in large acclimation pens. This is the first time red wolves have been in this area since the turn of the century. It is hoped that the wolves will eventually breed. One pair of these wolves and their pups,

which should be born in late April or early May if all goes well, will be selected for experimental release into the park in August. The pair that is not released will be returned to the captive breeding program.

\* \* \*

The Service is moving forward on a plan to remove a limited number of Endangered Florida panthers (*Felis concolor coryi*) from the wild to establish a possible captive breeding program. An environmental assessment on the proposed plan was completed recently (see *Bulletin* Vol. XV, No. 7). However, under the terms of an out-of-court settlement of a lawsuit brought by the Fund for Animals and Holly Jensen, the Service has agreed to prepare a supplement to the environmental assessment. This supplement, which will be completed by November 30, 1991, will focus on the genetic enrichment of the Florida panther population with other cougar subspecies and the reintroduction of captive-bred panthers into the wild. It will also contain a discussion of the feasibility of captive breeding and reconditioning techniques employed before the animals are released to the wild, and public attitudes toward the reintroduction of Florida panthers.

The settlement allows the Service to take the first steps in establishing a possible captive breeding program. The Service issued two subpermits on February 15 to the State and the

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# Final Listing Rules Approved for Nine Species

During January 1991, the Fish and Wildlife Service published final listing rules for nine species—five plants, one snail, one reptile, and two mammals. Endangered Species Act protection is now available to the following:

## *Remya* spp.

All three plants in this genus are endemic to the Hawaiian Islands: *R. kauaiensis* and *R. montgomeryi* are known only from Kaua'i, and *R. mauiensis* occurs only on Maui. These members of the aster family (Asteraceae) are small, perennial shrubs. They grow about 3 feet (90 centimeters) tall, and have many slender, sprawling branches and dark yellow flowers. The plants grow chiefly on steep, north or northeast-facing slopes between 2,800 and 4,100 feet (850 to 1,250 meters) in elevation.

The introduction of non-native animals, including cattle, goats, pigs, and deer, destroyed or degraded much of the *Remya* habitat. Most of the remaining populations are now found growing only in areas relatively inaccessible to these animals. There are seven populations of *R. kauaiensis* left in the Koke'e area of Kaua'i, totalling fewer than 200 individuals distributed over an area of less than 2 acres (1 hectare). (One of these populations was discovered in 1990.) Two populations of *R. mauiensis*, totalling 9 plants on less than 2 acres (1 ha), remain on west Maui. Only one population of *R. montgomeryi*, believed to consist of fewer than 50 plants, exists on 0.5 acre (0.2 ha) on the rim of the Kalalau Valley, Kaua'i. The primary threats to all three species continue to be browsing and grazing by feral and domestic animals, erosion and degradation of habitat by these animals, and competition from non-native plant species. The Service proposed in the October 2, 1989, *Federal Register* to list all three species in the genus *Remya* as Endangered (see *Bulletin*

Vol. XIV, Nos. 11-12), and the final rule was published January 14, 1991.

## *Aupaka (Isodendron hosakae)*

This small, erect shrub, a member of the violet family (Violaceae), is endemic to the island of Hawai'i (the "Big Island"). It grows to about 30 inches (76 cm) tall, has narrow, lance-shaped leaves, and yellowish-green to white colored flowers. Like much of the native Hawaiian vegetation, the *aupaka*'s numbers have been reduced and its habitat modified by domestic cattle. Today, an estimated 275 plants are known, distributed over less than 2 acres (0.8 ha) on three privately-owned cinder cones in the Waikoloa area.

Browsing and habitat disturbance by domestic cattle continue to threaten the *aupaka*'s survival. Although the State and one landowner recently fenced off the largest population to protect one cinder cone from grazing cattle, it is too soon to tell how effective this measure will be in protecting the species. Potential threats to the species include range fires during the dry season, rooting by feral pigs, and disturbance by U.S. Army training activities. The Service proposed on October 10, 1989, to list the *aupaka* as Endangered (see *Bulletin* Vol. XIV, Nos. 11-12), and the final rule was published January 14, 1991.

## *Fringed Campion (Silene polypetala)*

The fringed campion is a perennial herb, a member of the pink or carnation family (Caryophyllaceae), that grows in rosette-clusters and has large, pink flowers. It is found within hardwood forests in four counties in central Georgia, one county in southwest Georgia, and two counties in adjoining northwestern Florida. Fifteen natural populations of the fringed campion are known, most of which

are in private ownership. (Recently, the Georgia Department of Natural Resources and the University of Georgia successfully established two new populations.) Most populations are threatened by habitat disturbance from logging, encroachment by non-native Japanese honeysuckle (*Lonicera japonica*), and residential development. The Service proposed listing the fringed campion as an Endangered species on July 11, 1990 (see *Bulletin* Vol. XV, No. 8); the final rule was published January 18, 1991.

## *Tulotoma Snail (Tulotoma magnifica)*

This large, gill-breathing, freshwater snail has a distinctively ornamented shell. Historically, the tulotoma snail was locally abundant in the main channels of the Coosa and Alabama Rivers and the lower reaches of some of their tributaries in Alabama. However, extensive dredging and construction of impoundments for navigation and hydropower have eliminated at least 98 percent of the snail's main channel habitat and 50 percent of its known tributary habitat. Today, the snail is known to occur in approximately 3 miles (5 kilometers) of the main channel of the Coosa River and in localized portions of four tributaries. Water pollution and siltation continue to threaten the remaining populations. The Service proposed on July 11, 1990, to list the tulotoma snail as an Endangered species (see *Bulletin* Vol. XV, No. 8), and the final rule was published in the January 9, 1991, *Federal Register*.

## *Yellow-blotched Map Turtle (Graptemys flavimaculata)*

This medium-sized aquatic turtle has irregular yellow or orange spots on its shell. It is found only in the Pascagoula River system, including the

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## Final Listings

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Leaf, Chickasawhay, and Escatawpa Rivers and other tributaries in southeast Mississippi. The turtle's riverine habitat has been reduced due to the construction of navigation and flood control projects, gravel dredging, and sedimentation from gravel mining, timber harvesting, and agricultural activities. Several flood control and channel modification projects that have been proposed could affect the turtle's remaining habitat. Other serious threats include water pollution from municipal and oil field runoff, commercial collectors who capture the turtles for the pet trade (the turtles are considered very attractive), and people shooting the turtles for target practice. The Service proposed in the July 11, 1990, *Federal Register* that the yellow-blotched turtle be listed as a Threatened species (see *Bulletin* Vol. XV, No. 8), and the final rule was published January 14, 1991.

## Regional News

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White Oak Plantation (a private facility in Yulee, Florida, that specializes in breeding animals that are difficult to propagate in captivity) to capture and care for up to six panther kittens in 1991. As of February 27, four kittens (3 males and 1 female) had been captured and sent to White Oak Plantation for possible future captive breeding. Upon completion of the supplemental environmental assessment, the Service will determine whether or not to proceed with a long-term captive breeding program. The goal of such a program would be to increase the number of Florida panthers in captivity for eventual release to augment the critically low wild population and to reestablish new populations in the panther's historic range.

Efforts are also under way to continue protecting the panther's habitat and reducing known risk factors. Recent legislation authorizing expansions

## Florida Salt Marsh Vole (*Microtus pennsylvanicus duke-campbelli*)

This small, short-tailed rodent is known from only one salt marsh of Waccasassa Bay on Florida's gulf coast. The subspecies has declined in numbers apparently due to natural climatic changes and an associated rise in sea level that has altered its habitat. The remaining population, believed to be a small remnant of a formerly wide-ranging population, could easily be extirpated by a single storm. The Service proposed that the Florida salt marsh vole be listed as Endangered on April 11, 1990 (see *Bulletin* Vol. XV, No. 5), and the final rule was published January 14, 1991.

## Indus River Dolphin (*Platanista minor*)

The National Marine Fisheries Service (NMFS), an agency in the Department of Commerce that has the lead Endangered Species Act responsi-

bility for all dolphins, proposed to list this freshwater dolphin as Endangered on November 9, 1989 (see *Bulletin* Vol. XV, No. 1). An estimated 500 survive, mainly in the lower Indus River in Pakistan. The species has declined primarily due to the construction of irrigation dams, which have modified the dolphin's habitat, and overharvesting by local fishermen (who use the animals' meat and oil). NMFS published a final rule designating the Indus River dolphin as Endangered on December 11, 1990. The Fish and Wildlife Service, which is responsible for maintaining the Federal List of Endangered and Threatened Wildlife and Plants, then formally added the species to the list on January 14, 1991.



*This male Florida panther, a 5- to 6-month-old cub, was darted and captured in southern Florida for the captive breeding effort. An examination showed that he weighed 34.5 pounds (15.7 kilograms) and is healthy.*

for Big Cypress National Preserve and Everglades National Park will add approximately 146,000 acres (59,100 hectares) and 108,000 acres (43,700 ha) respectively. Additional land is

being added to the Florida Panther National Wildlife Refuge, which will total approximately 30,000 acres (12,100 ha) when completed. The

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## Regional News

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Florida Department of Natural Resources is also in the process of acquiring about 40,000 acres (16,200 ha) within the southern Golden Gate Estate development in southwest Florida, adjacent to the Fakahatchee Strand State Preserve. Finally, the Florida Panther Interagency Committee (which consists of the National Park Service, Fish and Wildlife Service, Florida Game and Fresh Water Fish Commission, and Florida Department of Natural Resources) is developing a program designed to work directly with private landowners to protect panther habitat. Of the 2.2 million acres (890,000 ha) currently used by Florida panthers, approximately 1.2 million acres (486,000 ha) are publicly owned and 1 million acres (405,000 ha) are in private ownership.

Results of a recent study on the genetic makeup of Florida panthers suggest that the remaining 30 to 50 free-ranging panthers contain genetic material traceable to two distinct stocks, one of North American origin and one that may be from Central or South America. Available data indicate that the "outside" genetic material was already in the Florida panther population when it was listed in 1967 as Endangered. Biologists studying the Florida panther believe that this genetic material does not threaten the Florida panther genetic makeup. Indeed, it may have benefited the Florida panther by increasing the genetic variability of the remaining animals.

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**Region 5** - The Atlantic coast population of the Threatened piping plover (*Charadrius melodus*) increased slightly from 724 pairs in 1989 to 738 pairs in 1990. However, average productivity dropped from 1.29 fledged chicks per nesting pair to 1.06 chicks per pair. Biologists involved in collecting this data report that the intensity of the 1990 survey effort was very similar to that of the 1989 survey. Al-

though the efforts of resource agencies and organizations in 1990 to protect the species was deemed equal to or slightly greater than in 1989, wind and storm-driven high tides washed out nests. This is believed to be the major reason why the bird's 1990 productivity levels were lower than the 1989 level. In addition, predators and human disturbance continued to result in nest loss and chick mortality. The Service believes that several more years of population monitoring will be needed before any solid conclusions about the trend for the Atlantic coast piping plover population can be reached.

The Atlantic coast portion of the 1991 international piping plover breeding census will take place June 1-9. Final guidelines for the interior portion of the census will be issued by the Great Lakes/Northern Great Plains Recovery Team in March but are not anticipated to vary significantly from the draft guidelines provided last year.

The Service is requesting the public to report incidents of piping plover mortality (chicks or adults) and crushed nests. Anyone who has evidence of such an incident is requested to contact the nearest Service law enforcement office. A brief summary of the incident, including the date, location, description of what was observed, and any information about possible cause should also be sent to the Service's Region 5 Endangered Species Office, One Gateway Center, Newton Corner, Massachusetts 02158, and to your State wildlife agency.

The Service has almost completed work on a draft proposal to designate critical habitat for the Atlantic coast population of the piping plover. On November 29, 1990, staff from Region 5 met with managers of federally administered lands under consideration for designation as critical habitat. Meeting attendees included biologists and managers from 16 national seashores, national recreation

areas, and national wildlife refuges; Regional and Washington Office representatives of the National Park Service; and Fish and Wildlife Service endangered species biologists from field offices in Regions 4 and 5. The critical habitat designation process and the economic analysis of the proposed designation were discussed.

Some additional educational material on piping plovers will be available this year. A 17-minute video entitled "Before It's Too Late - Restoring the Atlantic Coast's Piping Plover" has been produced by the National Fish and Wildlife Foundation and should be available soon. The Service also has produced and distributed 10- and 30-second television spots and a 60-second radio spot entitled "Beaches are for Plovers." These public service announcements were used in 1990 and will be made available again this year. Finally, the Connecticut Department of Environmental Protection has prepared a Spanish translation of the Service's brochure "You Can Help Protect the Piping Plover." The Service will be distributing the brochure, which should be available for the 1991 plover nesting season.

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In December 1990, Dr. Arthur Clark of Ecosearch, Inc., discovered a healthy, 8-year-old specimen of the Endangered ring pink mussel (*Obovaria retusa*) on the upper Kanawha River in West Virginia. This is the only recent evidence of *O. retusa* reproduction throughout its range. Dr. Clarke made this find while conducting a study to document the importance of the upper 5 miles (8 kilometers) of the Kanawha River as a reproduction site for the Endangered pink mucket pearly mussel (*Lampsilis orbiculata*). This stretch of the river supports over 35 other native mussel species and a diverse warm-water fish and benthic community. The Endangered tubercled-blossom pearly mussel (*Epioblasma torulosa torulosa*) was recorded in this area 22

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years ago and the Endangered fanshell (*Cyprogenia stegaria*) was recorded there 9 years ago. Efforts will be made in 1991 to reconfirm the presence of both mussels. The major threats to the river's freshwater mussels are associated with siltation from coal mining and the discharge of sewage.

\* \* \*

One of eleven known populations of the sandplain gerardia (*Agalinis acuta*), which is located along a highway on Long Island, New York, has been protected by a fence erected by the Town of Brookhaven. The Service's New York Field Office has been working with town officials and The Nature Conservancy to protect this extremely vulnerable site, which has undergone repeated disturbance and is threatened by development. Efforts are under way to conclude a cooperative agreement between the town, the Conservancy, and the Service to manage the site and ensure long-term protection.

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The State of New York recently completed the purchase of over 6,400 acres (2,600 hectares) and obtained perpetual conservation easements on over 5,500 acres (2,200 ha) in the Mongaup River basin, a major roosting and feeding area for about 80 bald eagles (*Haliaeetus leucocephalus*) that overwinter in the Catskill region in southeastern New York. This area is one of two major eagle wintering areas in the State. (The other is along the St. Lawrence River on the State's northern border, where up to 20 eagles overwinter.) The acquisition will enable the State to manage this important habit and reduce human disturbance.

\* \* \*

The Pennsylvania Department of Transportation has included special restrictions in a contract for maintenance work on a Delaware River bridge to protect nesting peregrine fal-

cons (*Falco peregrinus*). Falcons nested on the bridge in 1989 and 1990. On the advice of the Service and the Pennsylvania Game Commission, bridge repairs will be scheduled to avoid the peregrine falcon nesting season, which runs from March 1 to July 1.

\* \* \*

**Region 6** - In the fiscal year 1991 appropriation bill for the Department of the Interior, Congress established a Wolf Management Committee to develop a gray wolf (*Canis lupus*) reintroduction and management plan for central Idaho and Yellowstone National Park. The plan is to be submitted to the Secretary of the Interior and Congress by May 15, 1991. The Committee consists of 10 members appointed by Secretary of the Interior Manuel Lujan: the Service's Region 6 director (who serves as chairman); the National Park Service's Rocky Mountains regional director; the U.S. Forest Service's Region 1 (Northern Rockies) director; the Wyoming, Montana, and Idaho fish and game directors; 2 representatives of conservation organizations; a representative of the hunting community; and one from the livestock industry.

The first meeting of the Wolf Management Committee was held January 23-24, in Denver, Colorado. About 12 major issues were identified at the meeting, including livestock depredation and potential land use restrictions. Major discussions focused on using the "experimental population" provisions of Section 10(j) of the Endangered Species Act as a vehicle for wolf reintroduction. The Idaho Department of Fish and Game recommends wolf recovery via natural recolonization in Idaho; the State's current policy opposes reintroduction.

A technical staff committee was developed to support the Management Committee, with Wayne Brewster, National Park Service, as chair and Dr. Steve Fritts as the Fish and Wildlife Service representative. Jay Gore, from the Service's Boise, Idaho, Field

Office, is assisting the technical committee in an *ad hoc* position. Together with the Idaho Fish and Game representative, he is coordinating State and Federal information on wolves pertaining to central Idaho. At the January meeting, he gave a briefing on the status of wolves in central Idaho and presented three reports detailing Idaho wolf survey information for the past 15 years.

The Wolf Management Committee recently held workshops in Cheyenne, Wyoming, Boise, Idaho, and Helena, Montana, to give the public an opportunity to comment on wolf reintroduction issues.

\* \* \*

To facilitate local development, the Washington County Commission in Utah has initiated work on a Habitat Conservation Plan proposal covering 7 listed species and 27 listing candidates. The plan will place emphasis on conservation measures for the desert tortoise in an area immediately north of St. George. The highest known densities of desert tortoise in the United States have been documented in this area. The plan will also address several other listed species, including the bald eagle, American peregrine falcon (*Falco peregrinus anatum*), dwarf bear-poppy (*Arctomecon humilis*), and Siler pincushion cactus (*Pediocactus sileri*). The County is expected to seek a Section 10(a) incidental take permit from the Service.

\* \* \*

Work is proceeding on revising the recovery plan for the Threatened grizzly bear (*Ursus arctos*). The original recovery plan, approved in 1982, is being revised in cooperation with State and Federal agencies involved with the Interagency Grizzly Bear Committee. A draft revised plan was distributed to the public in October 1990. Eleven public workshops were held in various cities throughout the West and in Washington, D.C., to inform the public about the proposed revisions to the plan. An estimated

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## Regional News

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600 people attended these workshops, demonstrating the public's interest in the plan. As a result of the workshops and news releases about the plan, the Service received over 1,700 individual written letters by the close of the public comment period, which was extended to February 4, 1991.

\* \* \*

The only known habitat of the Endangered Wyoming toad (*Bufo hemiophrys baxteri*) was acquired by The Nature Conservancy in late January. Wyoming toads once were abundant throughout the Laramie Basin in Wyoming, but they experienced a rapid decline in the mid-1970's. The causes of this decline are still unknown. The toad population on the property acquired by the Conservancy is apparently stable, and annual monitoring continues. Plans for habitat enhancement will be developed. Meanwhile, the Service, State of Wyoming, and University of Wyoming will continue conducting surveys in other potential habitats to locate any additional toad populations.

\* \* \*

Regions 6 and 1 have begun cooperative efforts to identify and document threats to the mountain plover (*Charadrius montanus*), a Category 2 listing candidate. This bird winters from California to southern Texas and nests in the grasslands of Colorado, Wyoming, Montana, Nebraska, Kansas, Oklahoma, New Mexico, and northern Texas. Wintering birds from California and eggs from the Plains States will be analyzed in the upcoming year for evidence of pesticide contamination.

\* \* \*

**Region 8** - In Puerto Rico, biologists from the Patuxent Wildlife Research Center are investigating the feasibility of conducting a mark-recapture study of the Endangered Puerto Rican parrot (*Amazona vittata*). Radio-tagged orange-fronted parakeets (*Aratinga canicularis*) and red-crowned

parrots (*Amazona viribigenalis*) are serving as surrogates for the Puerto Rican parrot to test the feasibility of the mark-recapture method and to train staff in this technique. If this method can be used, biologists will be able to recognize individual parrots and follow their movements outside of the breeding season.

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In mid-January, Patuxent Wildlife Research Center Director Hal O'Connor transferred a female sandhill crane from the Center to the Soviet Union's Oskiy State Nature Reserve, 130 miles (210 kilometers) south of Moscow. It is hoped that this crane will pair up with a male sandhill crane already at the Reserve, and that the pair will then serve as foster parents for Endangered Siberian white crane (*Grus leucogeranus*) chicks. If successful, the sandhill cranes will help the Soviets increase their efforts to propagate the Siberian white crane. The sandhill crane pair also will give the Soviets a surrogate species with which they can practice crane propagation techniques. This donation is a continuation of a multi-year cooperative program between American and Soviet scientists.

\* \* \*

Patuxent's Minnesota Research Group reports that a male gray wolf radio-tagged in Superior National Forest, Minnesota, in August 1989 was killed in Canada, 170 miles (270 kilometers) northwest of the original capture site. Another wolf captured 11 years earlier in the same vicinity also dispersed to the same area. This suggests a possible genetic basis for the distance and direction wolves disperse, although details of this relationship are unknown.

\* \* \*

The Florida Department of Natural Resources and other cooperators found a record 216 dead West Indian manatees (*Trichechus manatus*) in the southeastern United States' coastal waters in 1990. The majority (206) were recovered in Florida waters. Fifty of

the deaths were due to collisions with boats, close to the record 51 that were killed by boats in 1989. Other human-related factors, such as crushing in water control structures and entanglement in fishing nets, accounted for seven deaths in 1990. A period of unusually severe winter weather, which led to the loss of at least 49 manatees due to cold stress, contributed substantially to the increase over the 174 deaths reported in 1989. Other identifiable natural causes accounted for 20 deaths in 1990. The cause of death for 45 manatees was undetermined and an additional 45 were perinatal deaths (i.e., dependent calves that had died for unknown reasons).

Working closely with Region 4, the Florida Department of Natural Resources, and other cooperators, the Service's National Ecology Research Center will expand its manatee research in 1991 to assist in preventing mortality and to better understand the implications of this mortality for manatee population dynamics. The State estimates that a minimum of 1,500 manatees remain in Florida's waters.

\* \* \*

In December, the diagnostic virology laboratory at the Service's National Wildlife Health Research Center in Madison, Wisconsin, evaluated the results of a serology test for antibodies to eastern equine encephalitis (EEE) virus among 123 sandhill and whooping cranes housed at the Patuxent Wildlife Research Center in Maryland. EEE has killed a number of whooping cranes at Patuxent in the past. Thirty-five of the serum samples tested were from whooping cranes taken in July 1990. Thirty-two of the whoopers, which had hatched prior to 1990 and were previously vaccinated against the virus, had a positive antibody response. The remaining three whoopers, which had hatched in 1990 and were not vaccinated, tested negative for the antibody.

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## Regional News

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Fifty-nine dead Aleutian Canada geese (*Branta canadensis leucopareia*) were picked up in January during an avian cholera outbreak in the San Joaquin Valley, California. Ducks began dying on one of the Aleutian Canada goose roosting ponds at a water treatment plant near Modesto in mid-December 1990.

\* \* \*

**Region 9** - Two more countries have joined the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), bringing the total number of Parties to 110. The two newest CITES Parties are Namibia, an African country that recently gained its independence, and Bulgaria in eastern Europe. Bulgaria's membership is effective April 16, 1991. Namibia's membership is effective March 18, and includes reservations to the African elephant (*Loxodonta africana*) and the cheetah (*Acinonyx jubatus*), both of which are listed in Appendix I of CITES. These reservations mean that Namibia does not accept the Appendix I listing of the species and therefore is not required by CITES to abide by the Appendix I trade prohibitions. Namibia joins Botswana, Malawi, South Africa, Zambia, and Zimbabwe with reservations to the African elephant listing. The largest population

BOX SCORE						
LISTINGS AND RECOVERY PLANS						
Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	54	249	8	22	333	29
Birds	72	153	12	0	237	67
Reptiles	16	58	18	14	106	24
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	186	1	60	2	249	120
<b>TOTAL</b>	<b>450</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1127*</b>	<b>348**</b>
Total U.S. Endangered	450	(264 animals, 186 plants)				
Total U.S. Threatened	155	(95 animals, 60 plants)				
Total U.S. Listed	605	(359 animals, 246 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act: 7

Number of CITES Party Nations: 110

February 28, 1991

of the Endangered cheetah in Africa is in Namibia, and this is the only CITES Party with a reservation to the species.

February 1991

Vol. XVI No. 2

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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PERMIT NO. G-77





# ENDANGERED SPECIES

## Technical Bulletin

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

### Third Year of Sea Otter Translocation Completed in California

Galen B. Rathbun<sup>1</sup> and Carl T. Benz<sup>2</sup>

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photo by Richard Bucich



By the end of the 19th century, commercial fur hunters had largely exterminated sea otters along the California coast. In 1938, however, a small population of survivors was discovered off the Big Sur coast. It has been slowly growing, and now numbers about 1,800 animals between Point Ano Nuevo and the Santa Maria River.

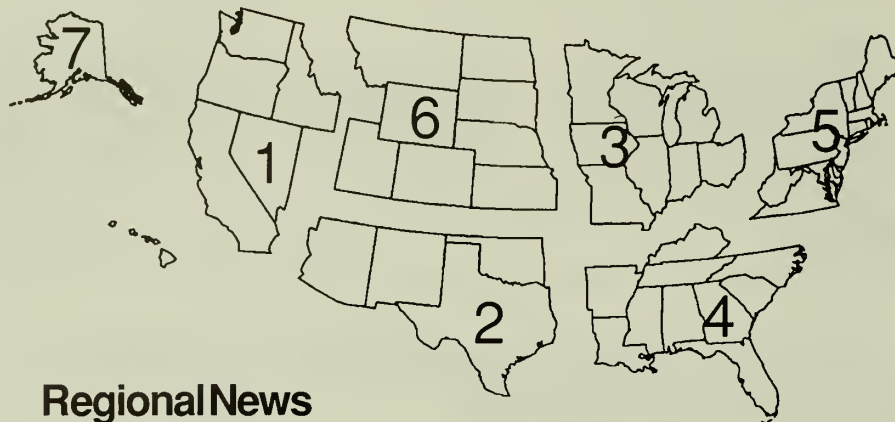
For the past 3 years, the U.S. Fish and Wildlife Service and California Department of Fish and Game have been attempting to establish an experimental population of southern sea otters (*Enhydra lutris nereis*) at San Nicolas Island, one of the Channel Islands off southern California. The objectives of the reintroduction effort are to: 1) help restore this Threatened animal; 2) obtain data for assessing sea otter capture, transport, reintro-

duction, and containment techniques; 3) gather data on sea otter population dynamics and ecological interactions with the near-shore community; and 4) study the effects on the mainland California donor population from removing animals for the translocation. (For background on the reintroduction program, see *Bulletin* Vol. XIII, No. 4.)

All sea otters taken to San Nicolas Island have been marked on the rear

flippers with a unique combination of colored tags that enable each individual to be identified visually. Most of the sea otters have also been fitted with flipper-tag radio transmitters, with a battery life of about 60 days, to enable the Service to gather information on their movements, feeding behavior, and dispersal abilities. Service biologists have done preliminary analyses of the data to gain a better

(continued on page 6)



## Regional News

Regional endangered species staffers have reported the following news:

**Region 1** - In unrelated incidents, three Threatened northern spotted

owls (*Strix occidentalis caurina*) were found dead in northern California and Washington. All three birds were emaciated, but a necropsy examina-

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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tion by biologists at the Fish and Wildlife Service's National Wildlife Health Research Center in Madison, Wisconsin, revealed no explanation for their condition. The cases were referred to Service contaminant specialists for further investigation.

Another mutilated, dead spotted owl was found nailed to an information sign in December at the entrance to Olympic National Park near Port Angeles, Washington. A note also was found in which the perpetrators threatened to burn down the old growth forest in retaliation for efforts to protect the owl. The Service is investigating the incident.

\* \* \*

The Napa County Resource Conservation District recently was awarded \$75,000 by the California Coastal Conservancy to partially fund several demonstration plots of alternative farming and viticulture (i.e., grape growing) practices in the Huichica Creek watershed. These practices will benefit the Endangered California freshwater shrimp (*Syncaris pacifica*). As part of the project, up to seven different cover crop plots will be tested and monitored in vineyards along Huichica Creek; an irrigation and drainwater study will be conducted in the Robert Mondavi Winery vineyards; streambank stabilization and revegetation compatible with California freshwater shrimp habitat needs will be engineered; and a resource database will be developed.

California's impending fifth year of drought threatens the California freshwater shrimp population of Lagunitas Creek in Marin County. Without substantial late season rainfall, the Marin Municipal Water District may drain all of the water from its reservoir (which supplies the bulk of the water for Lagunitas Creek) by late 1991. If the reservoir is drained, the species will depend entirely on Samuel Taylor State Park's San Geronimo Creek, which may maintain 0.5 cubic feet per second (0.1 cubic meters per second)

(continued on page 5)



# Listing Proposals — February 1991

One animal and three plants were proposed by the Fish and Wildlife Service on February 15, 1991, for listing as Endangered species. If the listing proposals are made final, Endangered Species Act protection will be extended to the following:

## **Point Arena Mountain Beaver** *(Aplodontia rufa nigra)*

Despite its name, the mountain beaver (*Aplodontia rufa*) is not a particularly mountain-loving animal, nor is it similar in appearance to the flat-tailed rodent most people think of as the "true" beaver (*Castor canadensis*). Mountain beavers are much smaller and have only a cylindrical stump of a tail. The Point Arena form (*A. r. nigra*) can be distinguished from others by its broad, laterally compressed head, stocky body shape, and black fur.

Eight subspecies of *A. rufa* are distributed from British Columbia to central California. The Point Arena mountain beaver is the most restricted, and is known only from coastal Mendocino County, California. Because it requires cool, moist habitat, *A. r. nigra* usually occurs in gulches or on north-facing slopes within narrow coastal valleys. Although there are no reliable estimates of the subspecies' historical range, the amount of land in the region that has been converted to agricultural and urban uses makes it likely that substantial habitat has been lost.

Only 9 populations of the Point Arena mountain beaver, totalling 51-65 animals on about 100 acres (40 hectares), are known to survive. The land is in a patchwork of private, State, county, and city ownership. Livestock grazing and brush clearing already have eliminated much coastal scrub habitat in the area, and five of



photo by Jim Jokers

**Butte County meadowfoam** (*Limnanthes floccosa* ssp. *californica*)

the remaining populations are on sites that are subject to continued impacts from these activities. Road construction, housing development, water diversion, the spread of exotic plants, and predation by free-roaming cats and dogs are among the other threats facing the Point Arena mountain beaver.

## **Butte County Meadowfoam** *(Limnanthes floccosa* ssp. *californica*)

As its name suggests, this plant — a winter annual herb in the family Limnanthaceae — is known from Butte County, California. Its distri-

(continued on page 4)

## Listing Proposals

(continued from page 3)

bution is limited to a narrow, 25-mile (40-kilometer) strip along the eastern flank of the Sacramento Valley from central Butte County to the northern section of the City of Chico.

The Butte County meadowfoam is restricted to vernal pools and ephemeral drainage habitat. Such seasonal wetlands are formed when an impervious subsurface layer prevents the downward percolation of fall and winter rains. Plant species found in these "amphibious ecosystems" are adapted to cycles of very wet and very dry conditions. When vernal pools and ephemeral drainages are drained or filled, their unique vegetation cannot survive.

Development in the Chico area, which is one of the two Butte County meadowfoam population centers, is the main threat to the subspecies. Two populations already have been lost to urbanization, and 11 of the remaining 14 are vulnerable. In other areas, essentially unaltered meadowfoam habitat is being turned into cropland. Twelve of the remaining populations are on privately owned lands that are subject to development or agricultural conversion. Other potential threats include overgrazing by livestock, garbage dumping, off-road vehicle use, competition from introduced plants, and poor air quality.

California already recognizes the Butte County meadowfoam as endangered according to State law. Listing it federally under the Endangered Species Act would reinforce and supplement this existing protection. For example, the Army Corp of Engineers, which is responsible under section 404 of the Clean Water Act for regulating the filling of wetlands, is required to ensure that permitted actions are not likely to jeopardize listed species.

### 'Ihi'ihi (*Marsilea villosa*)

The 'ihi'ihi, a Hawaiian fern, is an aquatic to semi-aquatic plant in the



'ihi'ihi (*Marsilea villosa*)

pepperwort family (Marsileaceae). Periodic changes in habitat moisture are necessary for the plant to complete its life cycle. Spore cases are produced as the habitat begins to dry and do not ripen until the plant is drought-stressed. When enough water is present, the species reproduces vegetatively on creeping rhizomes.

Historically found on three islands, the 'ihi'ihi is now apparently extirpated from Ni'ihau. Two populations are known on the island of O'ahu, where the species was once widespread, and a small colony was discovered several years ago on Moloka'i. Many of the other sites that supported the species are now sugar cane fields, industrial parks, housing developments, and pastures. Naturalized exotic plants, which can out-compete native species for sunlight and water, are the main threat to the remaining 'ihi'ihi populations. The spread of these non-native plants is promoted by habitat disturbance from cattle grazing and off-road vehicles.

All three of the known populations are small and restricted in range. On Moloka'i, for example, the species occupies a site approximately 7 by 25 feet (2.1 by 7.6 meters) in size on privately owned land. These plants may be vulnerable to the effects of axis deer (*Axis axis*), which have been introduced onto the island for sport hunting. The species' largest population, which is on O'ahu at the Lualualei Naval Reservation, occurs in clumps scattered over an area of about 6 acres (2.5 hectares). This land has been leased to a private concern for cattle grazing. The third known population, also on O'ahu, is at Koko Head on parkland owned by the City and County of Honolulu. Although this 0.5-acre (0.2-ha) site has been partially fenced through a management agreement with The Nature Conservancy of Hawaii, it remains threatened by off-road vehicles.

If *M. villosa* is listed by the Service as Endangered, the Army Corps of Engineers will be required to consider

(continued on next page)



Listing Proposals

(continued from previous page)

the species when processing applications for Clean Water Act permits, and the Department of Defense will need to evaluate the potential for jeopardy resulting from its grazing program.

Tennessee Yellow-eyed Grass  
(*Xyris tennesseensis*)

This herbaceous perennial, a member of the family Xyridaceae, grows in clumps that arise from a fleshy, bulb-like base. It is found in seeps or gravelly shallows along small, clean streams where soils are moist to wet year-round. Like all members of its genus, the Tennessee yellow-eyed grass inhabits sites that are thinly wooded or completely open.

Of the 10 historically known *X. tennesseensis* populations, 3 have been

lost. At least four of those that remain are declining from habitat damage associated with road construction and maintenance, logging, agricultural development, and the encroachment of woody plants. Botanists know of five populations in Tennessee and one each in Alabama and Georgia. Each site is small, encompassing less than one acre (0.4 ha), and most contain only a few hundred individuals. Except for some colonies that extend onto a State highway right-of-way in Alabama and National Park Service property (Natchez Trace Parkway) in Tennessee, all populations are on privately owned land.

Tennessee already lists the species as endangered under State law, which protects the plants but not their habitat.

\* \* \*

Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species.

If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.

Regional News

(continued from page 2)

summer flows to Lagunitas Creek. The California freshwater shrimp is adapted for such low stream flows. However, should Lagunitas Creek surface flows be reduced to the point where they become subgravel flows, the Service may need to take action to ensure that isolated stream pools remain habitable for the shrimp. It may also consider removing surviving shrimp to California Department of Fish and Game fish hatchery ponds until the drought breaks and stream conditions improve. Because the Golden Gate National Recreation Area is traversed by Lagunitas Creek, the Service's Sacramento Field Office and the National Park Service are investigating the prospects for water purchase to protect the California freshwater shrimp in this creek.

(continued on page 8)



drawing by Robert Kral

Tennessee yellow-eyed grass (*Xyris tennesseensis*)

## Sea Otters

(continued from page 1)

understanding of translocation processes, which they hope will improve future success in reintroducing sea otters.

### Results to Date

During the first 3 years of the translocation project, from August 1987 to August 1990, 139 sea otters were released at San Nicolas Island. Of the 139, 14 sea otters (10 percent), not including dependent pups, were sighted at the island in January 1991 and were behaving normally. Forty-four of the translocated sea otters (32 percent) are not at the island, but can be accounted for: 30 returned to the mainland population, 11 are known or suspected to have died, and 3 were recaptured in the no-otter management zone in southern California and returned to their original capture sites within the mainland population.

The fate of the other 81 otters (58 percent) is unknown. Some of these "missing" sea otters have probably returned to the mainland population but have not yet been sighted. Others may have returned but may never be reidentified because they lost their flipper tags. Some of the missing sea otters also probably died due to intentional and incidental take.

Clearly, these data indicate that the 5-year translocation project has not gone as well as expected. The research associated with the translocation effort, however, has helped us understand why some of the early expectations have not been realized.

### Sea Otter Foraging Behavior and Movements

The foraging behavior and movements of sea otters at San Nicolas Island have been closely monitored by Service biologists. Data on foraging behavior were recorded when the animals were close enough to shore to observe. This information includes sea otter identity, dive times, prey



**Although sea otter numbers have been increasing, the population is still highly vulnerable to the threat of oil spills. Otters also continue to die from drowning in gill and trammel nets.**

identification and number, and surface interval times. Twenty-nine sea otters observed between fall 1987 and spring 1989 successfully obtained prey on 58 percent of 586 dives. During this period, 40 percent of the sea otters' diet consisted of sea urchins (*Strongylocentrotus* spp.). Other prey included mole crabs (*Blepharipoda* spp.; 14 percent), other crabs (9 percent), abalones (*Haliotis* spp.; 4 percent), snails (3 percent), and spiny lobster (*Panulirus interruptus*; 1 percent). Some prey items were unidentified (28 percent). This information indicates that there is a suitable prey base for sea otters at the island.

To ascertain sea otter movements, biologists radio-located 42 individual otters 3 to 4 times per day between February 25, 1988, and February 2, 1989. Locations were determined to the nearest 1/4 mile (0.4 kilometer). Minimum daily distances travelled were calculated for 24 sea otters that remained at the island for 50 days after their release. The average daily distance travelled for the 24 animals was greatest during the first 10-15 days after release as they swam around the 24-mile (39-km) perimeter of the

island. The average daily distance travelled then decreased as the otters established themselves in an area used by previously-introduced otters near the west end of the island. Females moved greater distances immediately after their release and decreased their movements later than the males. No difference was found between movements of small subadults (<30 pounds or 14 kilograms) and large subadults (>30 lbs).

Sixteen of the 42 sea otters disappeared between 1 and 83 days after they were released. Seven moved erratically between the time of their release and the time of their disappearance, while nine appeared to stay in one area before suddenly disappearing. Although these data have not given any definitive answers as to what might be done to improve translocation methods, the information is still important in understanding the behavior of translocated sea otters.

A better understanding of the dispersal behavior of translocated sea otters can be achieved by looking at the fate of 100 sea otters that were successfully released at San Nicolas Island

(continued on next page)



Sea Otters

(continued from previous page)

between August 1987 and June 1989. Nineteen of these were adult (>40 lbs; 18 kg) females, one was an adult male (>55 lbs; 25 kg), 21 were subadult (<40 lbs) males, and 59 were subadult females. As of August 1989, 37 percent of the adult females were known to have returned to the mainland population area (as did the single adult male) and 21 percent returned elsewhere along the mainland. Fourteen percent of the subadult males and 15 percent of the subadult females are also known to have returned to the mainland population. Adults remained at the island for an average of 41 days before dispersing; subadults averaged 80 days. Adults returned significantly closer to their original capture site (average = 6.3 miles; 10.1 km) than did subadults (average = 63.1 miles; 101.4 km).

These results indicate that dispersal and homing in sea otters is a major problem in maintaining the new colony at San Nicolas Island. Unfortunately, the Service has not yet been able to reduce the effects of homing

by altering translocation methods or the age-class ratios of sea otters taken to the island. The Service plans to continue its investigations of this problem.

Sea otters that disperse from San Nicolas Island must cross the "management" or "no-otter" zone that surrounds the island. When sea otters are found within this zone, the conditions of the translocation plan require that they must be removed, using non-lethal methods. Those that enter the zone from the mainland population also must be removed. Sea otters have been observed in the management zone from near the northern boundary at Point Conception, throughout most of the Channel Islands, and south to San Diego Bay. Since the translocation program began, 39 sightings of sea otters have been verified in the management zone. Thirty of these animals were alive and 9 were found dead or were reported dead but never recovered (8 of the 9 were from San Nicolas Island). Of the 30 live sea otters reported in the management zone, 7 were caught and returned to the main-

land population (3 of the 7 had left the island), while the remaining 23 were never resighted after their initial verification. Presumably, these 23 otters were mostly individuals moving through the management zone in an attempt to return home from the island. In most wildlife translocations, some dispersal from the release site is expected.

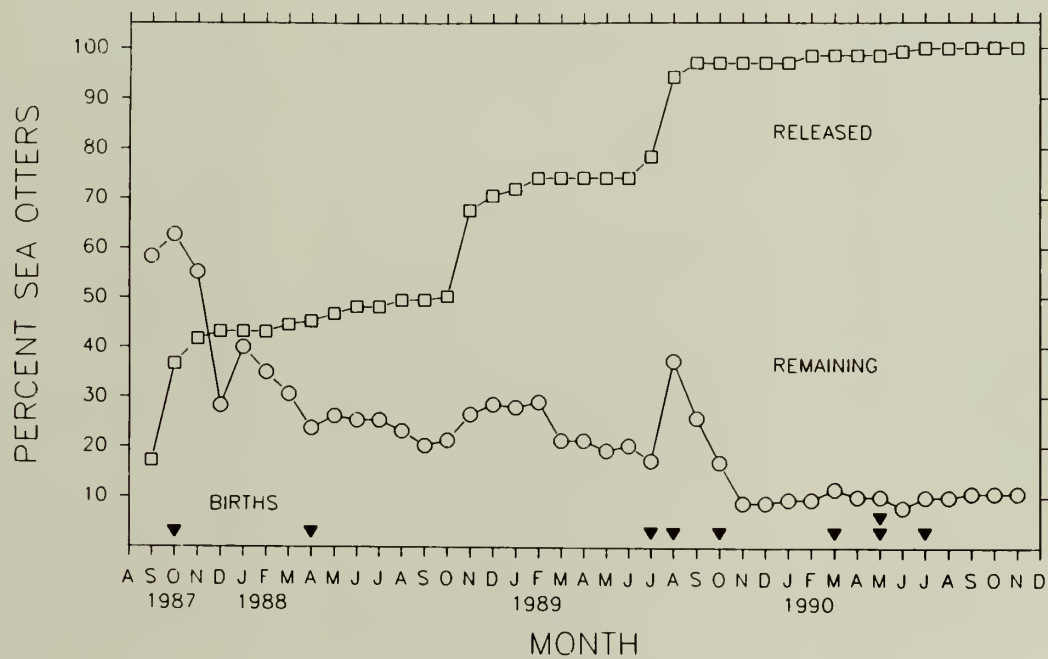
Mortality is a problem with most translocation efforts, and our experience with sea otters has been no exception. Dispersing individuals have been killed by people, accidentally drowned in fishing gear, and died due to complications caused by stress.

Promising Developments

There are two factors that give us hope for the eventual success of the translocation effort. First, the number of sea otters at San Nicolas Island has apparently stabilized. Since November 1989, monthly totals of sea otters identified or counted (not including dependent pups) at the island have ranged between 11 and 15 (see Figure 1). During this time, only four new

(continued on page 8)

Figure 1 SEA OTTERS TRANSLOCATED TO SAN NICOLAS ISLAND



## Sea Otters

(continued from page 7)

sea otters have been released at the island. (Two of these disappeared almost immediately, while the other two have remained in the area.)

The second promising development is the recent number of births (see Figure 1). Of the nine pups born at the island since the translocation effort began, seven were born since July 1989. Six of the nine pups were likely conceived at the island. Four pups had been successfully weaned as of December 31, 1990. Biologists are not certain what happened to the other five pups, but it is likely that they died.

These demographic patterns are consistent with what is known about

other successfully translocated sea otter populations, where numbers initially declined precipitously, then stabilized and eventually began to grow as reproduction increased. The same pattern, for example, was seen in the population translocated from Alaska to the coast of Washington in 1969 and 1970. It is believed that this sea otter population decreased from 59 to less than 10 at one point. However, 212 sea otters were counted in a 1990 survey of this population.

## Future of the Translocation Project

The Service will continue to monitor the translocated and mainland sea otter populations in its efforts to fulfill the objectives of the translocation

project. In addition, the Service plans to take up to 18 additional sea otters to the island during 1991-1992. These animals will be fitted with intraperitoneal radio transmitters (i.e., transmitters surgically placed within the animals' abdominal body cavity) that have an estimated battery life of 700 days. These units will allow the Service to gather additional information on the behavioral ecology of the sea otters that stay at San Nicolas Island, as well as those that disperse. The Service continues to hope that this colony will become self-sustaining.

<sup>1</sup>National Ecology Research Center, San Simeon, California

<sup>2</sup>Fish and Wildlife Enhancement, Ventura, California

## Regional News

(continued from page 5)

\* \* \*

Staff from the Service's Ventura, California, Field Office, the Bureau of Land Management, the Army's Fort Irwin, and the California Department of Fish and Game met to discuss the Army's proposal to take approximately 150,000 acres (61,000 hectares) of high quality desert tortoise (*Gopherus agassizii*) habitat in California's western Mojave Desert. This area is also free of the upper respiratory disease syndrome, which threatens most of the tortoise's western Mojave population. The Army is proposing that the land be used for ground training of troops using tanks and artillery. Representatives from the four agencies, plus the Army Corps of Engineers and the Navy, are developing a biological assessment for the proposed land withdrawal, which will include measures to mitigate the impacts of the troops' training exercises.

\* \* \*

**Region 2** - The Service held two public meetings in February at Oatmeal and Austin, Texas, to discuss the establishment of a Balcones Canyonlands National Wildlife Ref-

uge in the Post Oak Ridge area northwest of Austin. Its purpose would be to protect approximately 35,000 acres (14,000 hectares) of high quality wildlife habitat and aid in the recovery of two Endangered birds: the black-capped vireo (*Vireo atricapillus*) and golden-cheeked warbler (*Dendroica chrysoparia*).

About 250 people showed up at the two meetings. The public comments will be used to identify issues for evaluation in an environmental assessment on establishing the refuge. The Service hopes to have a draft assessment ready for public review by the end of spring 1991.

\* \* \*

Cowboys inspecting a fence along an Osage County, Oklahoma, ranch found the remains of 14 slaughtered bald eagles (*Haliaeetus leucocephalus*) on January 28—the largest recorded bald eagle kill in Oklahoma's history. Four bald eagle carcasses and 28 bald eagle feet, most of which were missing two talons, were found in a ditch. These birds probably were from northern States and were wintering here. About 2,000 eagles spend their winters at Oklahoma's northern streams and lakes. The Federal Gov-

ernment and several wildlife groups have offered a reward totaling \$16,500 for information leading to the arrest of those responsible for this incident. Service law enforcement agents, the Federal Bureau of Investigation, and the Oklahoma Department of Wildlife are working with the U.S. Attorney's office on the case.

\* \* \*

**Region 3** - On February 22, Dr. Ulysses S. Seal, Chairman of the Captive Breeding Specialist Group of the International Union for the Conservation of Nature and Natural Resources (IUCN), conducted a workshop at the Minnesota Zoological Garden, in Apple Valley, on a new technique for analyzing the extinction risks to small populations. Dr. Seal's approach allows biologists to rapidly evaluate critical factors for small populations in the wild, through the use of computer simulations that combine life history, distribution, and population data with estimates of disease and catastrophic events. This approach allows management agencies to identify and focus on activities that will increase the probability of a species' survival. Region 3 biologists plan to work with Dr. Seal

(continued on page 10)



# Distribution and Life History of the James Spiny mussel

Mark Hove<sup>1</sup> and Richard Neves<sup>2</sup>

photo by Richard Neves



*James spiny mussel*

The James spiny mussel (*Pleurobema collina*) is one of three species of freshwater mussels in the United States with prominently spined shells. Its historic range, endemic to the James River, is believed to have extended from Richmond, Virginia, upstream throughout the larger tributaries of the upper watershed. However, a status survey on this species in 1984 documented its survival in only 5 small tributaries, an approximate 90 percent reduction in range. As a result of this decline, the James spiny mussel was listed by the Fish and Wildlife Service in 1988 as Endangered (see *Bulletin* Vol. XIII, No. 8).

The Virginia Cooperative Fish and Wildlife Research Unit at Virginia Polytechnic Institute and State University recently completed studies on the distribution of the James spiny mussel and aspects of its life history to describe reproduction, population structure, and habitat use. Much of the upper James River drainage was surveyed in the hope of discovering new populations. Qualitative mussel surveys conducted at 243 sites in 20 counties found 11 of 14 species of bivalves known to inhabit the James River drainage, including the non-native Asian clam (*Corbicula fluminea*). The James spiny mussel was found in three additional streams, and is now

known to occupy five sub-drainages in the upper watershed of the James River. The mussel resides in a variety of substrata, ranging from unconsolidated sand and silt mixtures to larger particle sizes in stable river bottoms. Flow regimes at these sites range from near stagnancy in some pools to swift water in riffles and runs.

Spawning occurs in May, and the period of gravidity in female mussels runs from late May through early August. Drift samples were collected, along with water temperature and discharge data, to determine the period when glochidia (mussel larvae) were released by females into the water. Densities of glochidia peaked from late June to mid-July, as stream discharge dropped to mean summer levels. Water temperatures increased until late June, and then stabilized near 75°F (24°C).

Suitable fish species for James spiny mussel glochidia to parasitize were identified through field sampling and laboratory experiments. Fish collected from field sites and examined for glochidia suggested that minnows, sunfish, and darters may serve as suitable hosts for this species. In the laboratory, 11 of 18 fish families found in tributaries of the upper James River were tested for suitability as fish hosts. Of the species tested, only the following cyprinids served as host: bluehead chub, rosyside dace, satinfin shiner, rosefin shiner, central stoneroller, blacknose dace, and mountain redbelly dace.

Survival and growth of juvenile mussels were compared between two groups in a laboratory experiment. One group was housed in a container with silt, and the other was placed in an identical container without silt. Juveniles of both groups were fed by giving them continuous access to a culture containing three species of

green algae, and the mussels were measured every 5 days. Growth and mortality rates of the two groups differed. Juveniles in silt grew significantly faster than those without silt. After day 18, however, the mortality rate of juveniles in the silt chamber was higher than that of the mussels in the chamber without silt. Juveniles in both containers lived about 45 days in the test and roughly doubled in length.

Valves (shells) of the James spiny mussel were collected from muskrat middens in 1987, sectioned with a jewelers saw, and examined under a microscope to determine their age at the time of death. The ages of 100 specimens ranged from 3 to 19 years, with a mean of approximately 8 years. As judged by cohort structure in the population, the mean annual mortality rate was approximately 10 percent.

Although the reasons for the decline of the James spiny mussel are unidentified, we believe that industrial and agricultural development in the James River watershed and resultant run-off have contributed to its decline. The future of the James spiny mussel likely will depend on future land use practices and water quality in these small headwater drainages. This species has relatively nonrestrictive substratum and flow requirements, and its fish hosts are common throughout the James River basin. Therefore, with improvements in water quality, we believe that remnant populations of the James spiny mussel could expand and possibly recolonize some historical habitat, and thus help to ensure the survival of this unusual species.

<sup>1</sup>Department of Fisheries and Wildlife, University of Minnesota, St. Paul, Minnesota 55108

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## Regional News

(continued from page 8)

to apply the techniques he is developing to many of the Threatened and Endangered species in the Region. For more information on this technique, contact the Captive Breeding Specialist Group at 12101 Johnny Cake Ridge Road, Apple Valley, Minnesota 55124 (telephone: 612/431-9325).

\* \* \*

**Region 5** - In February, a recovery group for the Endangered Peter's Mountain mallow (*Iliamna corei*) met in Blacksburg, Virginia, near the only known site where this plant occurs. Only three clones of the species remain in the wild. This summer, carefully controlled experimental burns will be conducted at the site to determine whether or not seed germination can be stimulated *in situ*. Recent laboratory work indicated that fire may be necessary to stimulate seed germination.

\* \* \*

A day-long census of a previously unsurveyed graphite mine in New York, spearheaded by the New York Department of Conservation, revealed a surprising bonanza of bats. Nearly 120,000 hibernating bats were counted, making this mine the largest known concentration of hibernating bats in the East. About 100 Endangered Indiana bats (*Myotis sodalis*) were among those found at the site.

The second-largest Indiana bat hibernaculum in Region 5 is Hellhole Cave in West Virginia. (The largest for this species is another mine in New York State.) This year, 5,470 Indiana bats were counted at Hellhole Cave, the highest count since monitoring at this site was initiated.

\* \* \*

On February 22, Certificates of Special Commendation were presented by New England Field Office and Regional Office staff to four Maine businesses in appreciation of their cooperative efforts to educate the public about Maine's endangered plants. Led by the International Paper

Company, these businesses worked closely with the State of Maine's Critical Areas Program to produce a poster entitled "Conserve Maine's Endangered Plants." The poster features the Endangered small whorled pogonia (*Isotria medeoloides*) and contains sketches of other rare plants found in Maine. This cooperative effort between government and private industry resulted in the production of 15,000 posters, a portion of which have been distributed to all of the State's junior and senior high schools. To obtain a copy of this poster, contact the Maine Critical Areas Program, SPO, State House Station 38, Augusta, Maine 04333 (telephone: 207/289-6041).

\* \* \*

The Furbish lousewort (*Pedicularis furbishiae*), a member of the snapdragon family, was first collected in Van Buren, Maine, by Kate Furbish in 1880. It is found only on the banks of the St. John River at sites with suitable soil moisture and exposure characteristics. Due to its extremely localized distribution, its vulnerability to natural succession, human impacts, and the lack of habitat protection, the plant was listed in 1978 as Endangered. Currently, the major threats to the species appear to be physical alteration of its habitat by landowners and the potential development of hydroelectric facilities on the St. John River in Canada.

The New England Field Office recently completed a draft revised recovery plan for the Furbish lousewort. The public comment period on the draft ended March 1, and the Service expects to complete the final revised plan by June 1991. The plan calls for monitoring and managing the Furbish lousewort population, permanently protecting half of its essential habitat (through voluntary cooperation and conservation easements), and developing educational activities concerning the conservation of the species. Copies of the draft plan can be obtained from the New England Field Office,

22 Bridge Street, Concord, New Hampshire 03301-4901 (telephone: 603/225-1411; FTS 834-4411).

\* \* \*

The New Jersey Field Office is currently investigating a clay mining operation that illegally deposited fill material on a site containing a Threatened wetland plant, the swamp pink (*Helonias bullata*), nearly destroying the population. A cease and desist order was issued by the Army Corps of Engineers for the 8 to 12 acre (3 to 5 hectare) site, but it is unknown whether or not the site can be restored to support the species. Other freshwater wetlands in New Jersey are also being degraded by siltation, changes in hydrology, and the deposition of fill materials. Consequently, the remaining swamp pink populations, almost all of which are on private land, are vulnerable.

\* \* \*

The New York Field Office has submitted a final report on the results of a 3-year contaminant monitoring project at the Iroquois National Wildlife Refuge in western New York State. The results indicate that there are no contaminants present in either sediments or biological tissues at levels that would pose a significant threat to bald eagles breeding at the refuge. A breeding pair has successfully fledged 2 eaglets in 4 of the past 5 years.

\* \* \*

A new site for the Endangered sandplain gerardia (*Agalinis acuta*) was discovered in Connecticut in 1990, bringing the rangewide total to 11 populations. Surveys of the other populations in 1990 indicated increases at five locations over the previous year. Decreases were noted at five of the six known locations on Long Island, New York. The Nature Conservancy and the Service's New York Field Office are planning habitat management and protective measures for several of the New York sites.

\* \* \*

(continued on next page)



## Regional News

(continued from previous page)

**Region 6** - At least four of the six "orphaned" gray wolf (*Canis lupus*) pups in the Ninemile Valley north of Missoula, Montana, have survived for 7 months without their parents (see *Bulletin* Vol. XV, Nos. 3 and 9). The Service initially fed the pups with white-tailed deer (*Odocoileus virginianus*) carcasses. Later, during the hunting season, they apparently lived on deer that had been killed by hunters but not retrieved. Around Christmas, the wolves made their first documented kill of a deer fawn. Since that time, they have made several other deer kills and found the carcass of an elk (*Cervus elaphus*) cow that had been killed by hunters but not retrieved. While tracking the wolves, a scent mark was found and blood was seen in the urine from one of the pups. These signal that one of the pups is coming into estrus and that mating will probably occur. While pups have bred in captivity, it has never been reported in the wild. If pups are born in late April, there probably will only be 1 or 2 and their chances for survival in the wild may not be good. However, these wolves have surprised biologists on other occasions.

The Service is working closely with ranchers in the area to emphasize the importance of proper livestock carcass disposal and quickly informing the Service of any suspected problems. If the wolves kill livestock, which are common throughout the area, the wolves will be translocated.

\* \* \*

The second annual Montana Wolf Working Group meeting was held January 3-4 in Missoula. This group was established to coordinate wolf recovery activities in Montana, including monitoring, wolf control, research, and education and information programs. It consists of representatives of the Fish and Wildlife Service, National Park Service, Bureau of Land Management, Forest Service, Animal and Plant

Health Inspection Service, and the Blackfeet and Flathead Indian Nations. Biologists from the State of Montana, University of Montana, Idaho Fish and Game Department, and Parks Canada also attended the Missoula meeting. It was noted at the session that wolves normally will not cause a change in the movements of ungulate populations; there is no evidence that ungulates will move out of important habitats to avoid wolves. Biologists also reviewed and coordinated research techniques and methods. The Working Group is now developing a protocol for capturing and handling wolves to ensure they receive humane treatment.

\* \* \*

Ungulate research being conducted by University of Montana graduate students has revealed some interesting preliminary findings. About 33 moose (*Alces alces*), 30 elk, and 38 white-tailed deer have been radio-tagged since fall of 1989 near Glacier National Park in the same area where several wolf packs are being monitored. As of March 1, two moose have been killed by grizzly bears (*Ursus arctos*). Three elk have been killed by mountain lions (*Felis concolor*), one by a hunter, and another by a wolf. Two deer have been killed by wolves, two by humans, one by a coyote (*Canis latrans*), one by a mountain lion, and one by a bear. These data indicate the diversity of predators in the area and the complexity of trying to sort out all the factors that may affect ungulate populations in Montana.

\* \* \*

**Region 8** - Activity patterns provide important information about animals' behavior. However, because gray wolves travel several kilometers per day, a study of their daily activity patterns has not been possible. Even radio collars that transmit activity data have not been very useful for investigations of wolf activity. The requirement that an operator or a receiving station remain near the wolf for the entire period while the animal's activ-

ity is monitored has been an insurmountable obstacle.

Dr. L. David Mech, of the Patuxent Wildlife Research Center's Minnesota Research Group, successfully tested a new type of radio collar that overcomes this problem. Ten wolves in the Superior National Forest, Minnesota, were fitted with Wildlink Recapture and Data Acquisition System collars, which can record and constantly update their activity in hourly intervals for a 24-hour period. (Mention of this trade name does not constitute endorsement by the U.S. Government.) The collar carries an activity switch and a tiny computer, which stores the activity data in the collar and transmits the most recent 24 hours of activity data to an operator upon command. The collars can transmit up to 2 miles (3 kilometers) to an operator on the ground or up to 28 miles (45 km) to an aircraft. The same collars also carry anesthetic darts that can be triggered by remote control to recapture the animal. Recapture allows the batteries in the collar to be changed, thus extending the period over which the wolf can be studied.

More comprehensive information about wolf movements may reveal whether or not wolves adjust their activity patterns to minimize contact with humans (which is often fatal to wolves), whether diseased or underweight wolves reduce activity to conserve energy, and whether wolf activity is influenced by inclement weather. For reintroduced wolves, the computerized collars allow biologists to monitor the animals' adaptation to their new surroundings.

\* \* \*

A Threatened Aleutian Canada goose (*Branta canadensis leucopareia*), found dead in California's Sacramento Valley on November 16, 1990, was discovered by National Wildlife Health Research Center diagnosticians to have severe necrotic enterocolitis (i.e., inflammation of the colon).

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## Regional News

(continued from page 11)

This is the first apparent case of salmonellosis in an Aleutian Canada goose.

\* \* \*

The Offices of Scientific Authority (OSA) and Management Authority (OMA) are beginning their preliminary preparations for the eighth meeting of the Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which will be held March 2-13, 1992, in Kyoto, Japan. The Service published a notice in the February 7, 1991, *Federal Register* requesting submission of species proposals to amend the CITES Appendices. For further information, please contact OSA at 4401 North Fairfax Drive, Room 725, Arlington, Virginia 22203 (telephone: 703/358-1708; FTS 921-1708).

\* \* \*

**Region 9** - In an internal reorganization, the Service's Washington Office has transferred all responsibilities for Section 7 of the Endangered Species Act from the Division of Habitat Conservation to the Division of Endangered Species. (This does not affect Regional and Field Office organization.) The Division of Endangered Species will now be handling all Section 7 policy oversight questions, major consultation issues, and nationwide consultations. It already has responsibility for implementing the pro-

visions of Section 4 (listing and recovery), Section 6 (cooperative agreements and grants to States), and part of Section 10 (habitat conservation

plans for incidental take permits). The Office of Management Authority continues to have authority for issuing Section 10 permits.

March 1991

Vol. XVI No. 3

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240



## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	54	249	8	22	333	29
Birds	73	153	12	0	238	67
Reptiles	16	58	18	14	106	24
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	37	2	2	0	41	29
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	186	1	60	2	249	121
<b>TOTAL</b>	<b>451</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1128*</b>	<b>349**</b>
Total U.S. Endangered	451		(265 animals, 186 plants)			
Total U.S. Threatened	155		(95 animals, 60 plants)			
Total U.S. Listed	606		(360 animals, 246 plants)			

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 276 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories:	53 fish & wildlife 39 plants
Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act:	7
Number of CITES Party Nations:	110

March 31, 1991

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# ENDANGERED SPECIES

## Technical Bulletin

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

### Ash Meadows and Recovery Efforts for its Endangered Aquatic Species

Linda L. Hallock

National Fisheries Research Center-Seattle  
Reno, Nevada, Substation

JUN 19 1991

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Ash Meadows is a wetland ecosystem in an unlikely setting, the otherwise parched Mojave Desert, about 90 miles (144 kilometers) northwest of Las Vegas, Nevada. Within a region where the annual rainfall averages less than 2.75 inches (7 centimeters) and the evaporation rate exceeds 98 inches (249 cm) annually, Ash Meadows contains approximately 30 seeps and springs with associated streambeds and terminal marshes, formed where an extensive aquifer surfaces.

This unusual ecosystem is a remnant of wetter times in the early Pleistocene Epoch, when the region was crossed by an interconnecting system of lakes and rivers. Many of the unique species and subspecies now found at Ash Meadows evolved from relict populations that became isolated as the area turned drier. Because of their restricted range and threats to their habitat, 12 plants and animals in this area have been listed as Endangered or Threatened (see *Bulletin* Vol. VII, No. 6; Vol. VIII, No. 9; Vol. X, No. 6), and another 20 are candidates for listing. All of these, except for four plants, are found only at Ash Meadows, giving this ecosystem the highest known concentration of endemic taxa in the continental United States. Endangered aquatic fauna include the Ash Meadows naucorid (*Ambrysus amargosus*), an insect, and four fishes: the Ash Meadows Amar-

(continued on page 4)

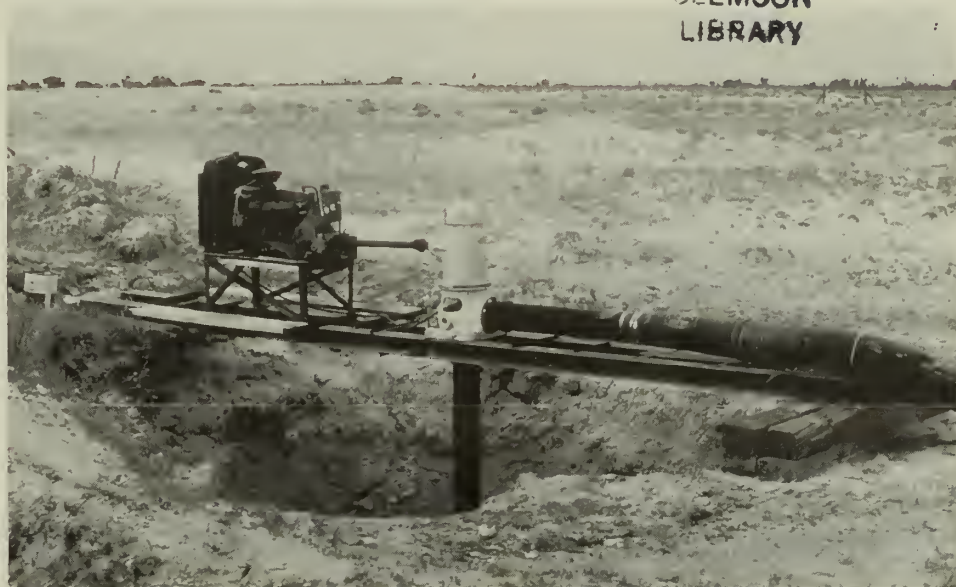


photo by James Yoakum



photo by Donald W. Sada

Two views of Jack Rabbit Spring in Ash Meadows. The top photo, taken in the 1970's, illustrates the results of over-pumping, which had obvious effects on the spring's aquatic wildlife. The bottom photo, taken in 1983 from a different angle, shows that some aquatic systems can be rehabilitated even after serious environmental damage.



## Regional News

Regional endangered species staffers have reported the following news:

**Region 2** - The masked bobwhite (*Colinus virginianus ridgwayi*), an En-

dangered subspecies of quail, is only known to survive on Arizona's Buenos Aires National Wildlife Refuge, which supports a minimum of 300 birds,

### U.S. Fish and Wildlife Service Washington, D.C. 20240

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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**Region 6**, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, Regional Director; Robert E. Jacobsen, Assistant Regional Director; Larry Shanks, Endangered Species Specialist.

**Region 7**, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, Regional Director; Rowan Gould, Assistant Regional Director; Ron Garrett, Endangered Species Specialist.

**Region 8**, (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, Regional Director; Al Sherk, Endangered Species Specialist (703-358-1710).

and in northern Mexico, where no more than 500 birds are believed to survive. Major threats to the Mexican population include overgrazing by livestock and the replacement of native grasses with a South African grass called buffelgrass (*Cenchrus ciliaris*). This non-native grass, which is being planted for livestock grazing, outcompetes the native Sonoran savanna grasses that the masked bobwhite depends on for food and cover.

In February, Service biologist Steve Dobrott and volunteer Michael Schroff surveyed masked bobwhite habitat on two ranches in Sonora, Mexico, in cooperation with The Nature Conservancy and El Centro Ecologico de Sonora. Five coveys, ranging in size from 7 to 14 birds, were located. A total of about 50 birds were counted, all of which were found in dense cover with ample food-bearing legumes and "maravilla" grass. Eighteen permanent vegetation transects were established within active masked bobwhite summer and winter ranges on the two ranches. This information will characterize habitats being used by the last known remaining masked bobwhites in Mexico. Biologists will use these and similar data being collected on Buenos Aires Refuge to develop a better model of the quail's habitat requirements.

\* \* \*

**Region 2** held a meeting in December 1990 with representatives from The Peregrine Fund, Texas Parks and Wildlife, Texas A&M University, and the National Audubon Society on reestablishing the Endangered northern aplomado falcon (*Falco femoralis septentrionalis*) in the United States. This bird disappeared from most of its U.S. range by 1940 and is believed to be declining in Mexico.

At the meeting, staff from The Peregrine Fund summarized its falcon propagation and hacking activities. Thirty-seven northern aplomado falcons have been produced since the

(continued on page 7)



# Seven California Species Proposed for Listing During March 1991

California's coastal sand dune systems support several fragile, dynamic plant and animal communities. The introduction of non-native, aggressive plants to stabilize the dunes, urban and industrial development, and off-road vehicle use, have destroyed or significantly altered many of the State's coastal dune ecosystems. As a result, many of the unique plant and insect species that depend on this habitat have declined in abundance and distribution.

The Fish and Wildlife Service has proposed that seven taxa—six plants and one butterfly—native to the coastal dunes of northern and central California be listed as Endangered (F.R. 3/22/91). These species are restricted to 13 dune systems found from the mouth of the Little River in Humboldt County to near the town of Surf in Santa Barbara County. They generally persist as small, isolated populations within the coastal fore-dune and dune scrub communities, and in adjacent sandy habitats:

- **Howell's spineflower** (*Chorizanthe howellii*), a member of the buckwheat family (Polygonaceae), is a shaggy-haired, short (less than 4 inches or 10 centimeters), annual herb with white to rose-colored flowers. It is endemic to one dune system in MacKerricher State Park.

- **Sonoma spineflower** (*Chorizanthe valida*), a closely related plant, grows up to 12 inches (30 cm) tall and has flowers that are white, lavender, or rose in color. This species is found in a single dune system within the Point Reyes National Seashore. The National Park Service has fenced most of the remaining population to protect it from cattle grazing, which is allowed on the Seashore.

- **Menzies' wallflower** (*Erysimum menziesii*) was first collected by Archibald Menzies in the Monterey area during the Vancouver expedition



**With the exception of one Nature Conservancy preserve, all populations of Menzies' wallflower on private land are vulnerable to residential and urban development.**

of 1792-94. Today, the species occurs in scattered populations within four dune systems: Humboldt Bay in Humboldt County; Tenmile River in Mendocino County; and Monterey Bay and Monterey Peninsula in Monterey County. A member of the mustard family (Brassicaceae), this perennial herb is a low (less than 12 inches tall) succulent with basal rosette leaves. It produces dense clusters of bright yellow flowers. Although three of the four dune systems supporting Menzies' wallflower are partially owned by the State or Federal governments, this amounts to less than 10 percent of the species' habitat.

- **Monterey gilia** (*Gilia tenuiflora* ssp. *arenaria*) is an erect annual herb less than 7 inches (17 cm) tall. A member of the phlox family (Polemoniaceae), this plant forms basal rosette leaves and has a funnel-shaped, purple flower. It is restricted to isolated sites within two coastal dune scrub communities along Monterey Bay and the Monterey Peninsula. A portion of perhaps the largest population occurs on Salinas River State Beach.

- **Beach layia** (*Layia carnosa*), a member of the sunflower family

(Asteraceae), is a succulent, winter annual. It grows up to 6 inches (15 cm) tall and has white flowers. Scattered populations of this plant are found in six dune systems between Humboldt Bay and near the town of Surf in Santa Barbara County.

- **Clover lupine** (*Lupinus tides-tromii*) is a silky, creeping (less than 12 inches tall), perennial herb in the pea family (Fabaceae). It produces whorls of blue to lavender-colored flowers. Restricted to coastal fore-dunes, the species is found in scattered populations within three dune systems on the mouth of the Russian River and on the Point Reyes and Monterey Peninsulas.



**The Myrtle's silverspot butterfly population at Point Reyes National Seashore has dropped in comparison to previous years, although the cause for this decline is unknown.**

- **Myrtle's silverspot butterfly** (*Speyeria zerene myrtleae*) is a medium-sized butterfly with a wingspan of about 2 inches (55 millimeters). The upper surfaces of the wings are golden brown with numerous black spots and lines, while the undersides are brown, orange-brown, and tan with black lines and distinctive silver and black spots. The historical range of the Myrtle's silverspot butterfly ex-

(continued on page 4)

photo by Ken Berg, courtesy of the California Native Plant Society

photo by Gary M. Fellers

## Proposed Listings

(continued from page 3)

tends from San Mateo County north to the mouth of the Russian River in Sonoma County. Today, six populations are known in three dune systems from Sonoma State Beach to Point Reyes National Seashore (which has the largest population).

Although many of the remaining populations of these coastal dune species are on land owned by Federal, State, and local governments, all seven are threatened by one or more factors, including: residential and commercial development; off-road vehicle use; trampling by livestock, hikers, and horseback riders; overcollection; sand mining; and disposal of dredged materials from adjacent bays and waterways. In addition, numerous exotic plant species, such as European beachgrass (*Ammophila arenaria*) and sea-rocket (*Cakile* spp.), have invaded the dunes and are outcompeting the native plants (including the food plants of the Myrtle's silverspot butterfly). Without control programs, these exotic plants eventually will eliminate many of the remaining native plant populations.

California already lists four of the plant species as endangered and the other two plant species as threatened.

Although the take of these species is prohibited under State law, there is no requirement for habitat protection. The National Park Service and Bureau of Land Management, which manage areas in which five of the taxa are found, will work with the Service to develop strategies to protect the species and their habitat.

## Available Conservation Measures

If these species are listed as Endangered, the measures authorized under the Endangered Species Act for their conservation include: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs

for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.

## Ash Meadows

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gosa pupfish (*Cyprinodon nevadensis mionectes*), Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*), Devils Hole pupfish (*Cyprinodon diabolis*), and Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*). A fifth fish, the Ash Meadows poolfish (*Empetrichthys merriami*), became extinct within the past 40 years.

## Threats to the Habitat

Ash Meadows has been used by humans since prehistoric times. The water, food, and shelter attracted Indians to this otherwise harsh area. With

statehood in 1864, some springs and streamside land passed into private ownership; however, the agricultural use at that time was mainly at a subsistence level and had limited effects on the environment. The first significant impact occurred in the 1960's when Carson Slough, the largest marsh in southern Nevada, was mined for peat. Approximately 2,000 acres (810 hectares) of emergent wetland fish and migratory bird habitat were destroyed.

In the late 1960's, Spring Meadows Ranch, Inc., started raising cattle, alfalfa, and various other crops on 18,000 acres (7,290 ha) in the Ash Meadows area. Thousands of acres

were cleared, leveled, planted, and irrigated. Springheads were excavated and streambeds channelized, some lined with concrete. Extensive pumping of the aquifer lowered the water table and reduced spring discharge, thus disrupting or even eliminating some spring ecosystems. Much vital aquatic habitat was destroyed, and native fishes were eliminated from some spring systems. For example, the speckled dace is now estimated to survive in only 1 acre (0.4 ha) of habitat compared with the nearly 600 acres (243 ha) it occupied before 1950.

These problems were compounded when a number of exotic species re-

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## Ash Meadows

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leased in Ash Meadows began competing with, and preying upon, native species. Mosquitofish (*Gambusia affinis*) and sailfin mollies (*Poecilia latipinna*) are now common throughout the area. Non-native crayfish (*Procambarus clarkii*), bullfrogs (*Rana catesbeiana*), and largemouth bass (*Micropterus salmoides*) also are present in various systems.

By 1969, the water level in Devil's Hole had fallen to a point threatening its most well-known resident, the Devils Hole pupfish, with imminent extinction. Negotiations over water use failed and the ensuing litigation went to the U.S. Supreme Court, resulting in a landmark decision in 1976 limiting the amount of water that could be pumped from the basin supplying Devil's Hole. The species' entire habitat is now restricted to a 180 square foot (16.7 square meter) submerged rock shelf.

After the Supreme Court decision, Spring Meadows Ranch determined that the amount of water it could legally remove was insufficient for its plans and offered to sell the land to the U.S. Fish and Wildlife Service. The Service declined the offer, and between 1977 and 1980 the land was purchased by Preferred Equities Corporation, a real estate development company.

Preferred Equities planned to develop the area as Calvada Lakes, a residential, recreational, and industrial complex with an anticipated population of more than 50,000. Further alteration of the springs and outflows to facilitate irrigation and/or construct municipal parks destroyed additional aquatic habitat and led to an emergency rule to list the Ash Meadows speckled dace and Ash Meadows Amargosa pupfish as Endangered (see *Bulletin* Vol. VII, No. 6). Due to the protection extended by the Endangered Species Act, the developer was then prohibited from taking actions that would harm the listed fish.

## The Ash Meadows National Wildlife Refuge

In 1984, Preferred Equities sold 12,654 acres (5,125 ha) in the heart of Ash Meadows to The Nature Conservancy (see *Bulletin* Vol. IX, No. 3). The Conservancy promptly resold this land to the Fish and Wildlife Service, which used it to establish the Ash Meadows National Wildlife Refuge. With the inclusion of adjacent public lands administered by the Bureau of Land Management and future acquisitions of private lands as they become available, an Area of Management Concern of some 23,000 acres (9,315 ha) is envisioned. Devil's Hole, though within the Ash Meadows ecosystem, is not part of the refuge. This submerged limestone cavern entrance and the surrounding 40 acres (16.2 ha) have been managed by the National Park Service as an isolated segment of Death Valley National Monument since 1952.

The refuge is being managed in accordance with the Ash Meadows Species Recovery Plan, which was approved by the Fish and Wildlife Service in September 1990. Ultimately, the goal is to restore the ecosystem to the point that all of its native plants and animals, including the Endangered, Threatened, and listing candidate species, are secure and self-sustaining. Work toward this goal has already begun. For example, natural flows have been restored at some habitats, such as Jack Rabbit Spring, where the Ash Meadows speckled dace and Ash Meadows Amargosa pupfish are now reestablished. The Bureau of Land Management fenced this spring to allow recovery of vegetation and promote natural channel development.

However, very little is known about the habitat requirements and preferences of the native species or of the competing exotics. Additional information is needed to guide further rehabilitation efforts. At this time, management is focusing on preventing further habitat degradation. After

more research, efforts at restoration can be safely undertaken. A research team of biologists from the Reno Field Station of the National Fisheries Research Center-Seattle, Ash Meadows National Wildlife Refuge, and the Nevada Department of Wildlife has been assembled to conduct habitat restoration studies for the area's aquatic wildlife.

The currently available fish habitat includes barren concrete ditches, irrigation ditches with gravel bottoms and straight earthen sides, dense bulrush marshes, overgrown stream beds, a few remaining natural springs, and open pools. Stream size varies from barely 6 inches (15 cm) wide and 3 inches (8 cm) deep to more than 15 feet (5 m) wide and 3 feet (1 m) deep. The springheads vary from springs with no pool and outflows of less than 1 gallon per minute (5 liters per minute) to large excavated pools 40 feet (12 m) in diameter with outflows of more than 3,500 gpm (13,265 lpm). Water temperatures vary seasonally from freezing (in distal outflows, during winter) up to 88°F (31°C) at springheads. Current research includes investigations into population dynamics to determine seasonal use of the available habitats by species and age class.

Studies on the aquatic wildlife of Ash Meadows are not limited to fishes. The Ash Meadows naucorid is an insect about one-quarter of an inch (0.5 millimeters) long found in the gravel of riffles. Its distribution, life history, and habitat requirements are virtually unknown. Recent work by the research team has shown the naucorid to be more widely spread than previously believed. Investigation into its distribution, life history, and habitat requirements continues.

Once the habitat requirements and preferences of Ash Meadows' native aquatic animals are known, restoration efforts can accelerate. These efforts may incorporate habitat rehabilitation and management strategies

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# African Elephant Proposed for Reclassification to Endangered



photo by Mimi Westervelt

**African elephant bulls sparring**

A proposed rule to reclassify the African elephant (*Loxodonta africana*) under the Endangered Species Act from Threatened to the more critical category of Endangered was published March 18 by the U.S. Fish and Wildlife Service. If the rule is approved as proposed, it will apply to all populations except those in Botswana, Zimbabwe, and South Africa, where the species will retain its current classification of Threatened.

African elephant numbers are believed to have fallen more than 50 percent over the past decade, and the rate of loss continues at about 8 percent per year. In 1979, the total elephant population in Africa was approximately 1.3 million, but it is estimated that fewer than 600,000 remain. The intensive illegal killing of elephants to supply the ivory market is the most immediate threat. Over the long term, however, the species also faces habitat destruction and fragmentation due to agricultural development, urbanization, and desertification.

Concern for the African elephant has been building for some time. It

was first given Endangered Species Act protection in 1978, when the species was listed as Threatened. This action, along with placing the elephant on Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), regulated the importation of ivory into the U.S. but did not result in a reversal of the elephant's decline. In 1988, Congress passed the African Elephant Conservation Act, which provided a mechanism for funding major elephant conservation projects (see related story in this edition) and authorized the President to place a ban on ivory imports. Such a ban was announced in June 1989 (see

*Bulletin* Vol. XIV, No. 6). The U.S. then reinforced this action by voting with the majority of CITES Parties to transfer the African elephant to CITES Appendix I, thereby prohibiting commercial ivory trade among signatory countries. In fact, the U.S. was one of the countries that proposed the transfer of the African elephant from Appendix II, which allows for a regulated trade, to Appendix I.

The March reclassification proposal was in response to a petition from several animal protection and conservation organizations to list the African elephant rangewide as an Endangered species. After conducting a status review, the Service decided to propose reclassifying all populations as Endangered except those in Botswana, Zimbabwe, and South Africa, which would remain listed as Threatened. The Service believes that populations in these countries are being managed under effective conservation programs and that their numbers are stable or increasing.

Permits for the import of Endangered species are available only for scientific and/or conservation purposes. For Threatened species or populations, import permits also are available for zoological exhibition, other educational purposes, and — under certain circumstances — regulated sport hunting trophies. The rationale for trophy imports is that the money

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to favor native species over the unwanted exotic species. We anticipate that through a combination of habitat manipulation, trapping, and (possibly) chemical treatment, exotic species can be extirpated from many, if not all, of the spring systems and that self-sustaining populations of the native

fishes can be successfully reestablished.

\* \* \*

Copies of the Ash Meadows Species Recovery Plan can be purchased by writing the Fish and Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814; or call toll-free at 1-800-582-3421. (In Maryland, call 1-301-492-6403.)



## African Elephant

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spent for licenses and other fees provides a source of funds for conserving the species as a whole. Regulated sport hunting is not considered to be a significant factor in the decline of the African elephant. Trophy imports would only be permitted from countries with sound elephant management programs.

The reclassification proposal, which was published in the March 18, 1991, *Federal Register*, contains details and background information. Comments on the proposed rule are welcome, and should be sent to the U.S. Fish and Wildlife Service, Office of Scientific Authority, 725 Arlington Square, Washington, D.C. 20240, by July 16, 1991.

The decision on reclassification may follow the terms of the proposal, but

the Service emphasizes that new data received during the comment period could lead to a final rule that is substantively different. In particular, the final rule could retain the current Threatened classification over a larger region, or it could extend the proposed Endangered classification to additional populations. Substantive changes would require the Service to propose the rule again.

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propagation effort began in 1983. Thirteen were retained for breeding stock and 24 were released at hack sites in south Texas. Seventeen of the falcons were successfully reared to fledging age at the sites. Northern aplomado falcons have been seen in south Texas on 22 occasions since January 1989. No nesting has been confirmed, but the initial release efforts were designed primarily to test hacking techniques for this bird.

The Peregrine Fund's total breeding flock, which is housed outside Boise, Idaho, stands at 35 birds. The Fund is attempting to "double-clutch" these birds, which involves removing the eggs to induce the female to lay another set. Using this method, a female in captivity can be induced to lay up to 8 eggs per year. The goal is to attain hacking levels of 50 birds per year as quickly as possible and to release 500 birds by the year 2000. Recovery efforts in the near future will concentrate on building the breeding flock and hacking birds in Matamoros, Mexico, and at the Laguna Atascosa National Wildlife Refuge in Texas.

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**Region 3** - Region 3's Divisions of Wildlife Resources and Endangered Species cooperated in providing \$10,000 to the Indiana Department

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## Grant to Combat Elephant Poaching in Zimbabwe is Announced

A grant of \$104,500 to help equip wildlife rangers in Zimbabwe's Zambezi Valley, where organized poachers killed 100 African elephants (*Loxodonta africana*) in 1990, was announced recently by the U.S. Department of the Interior. The grant will be made to the African Safari Club of Washington, D.C., under authority of the African Elephant Conservation Act of 1988. The African Safari Club is contributing another \$61,600 to the project. Motorola, Inc., Xerox Corporation, and Jason Empire, Inc., also are contributing products to the project at reduced cost.

Poachers crossing the Zambezi River from Zambia have already virtually eliminated the black rhinoceros (*Diceros bicornis*) from the Zambezi Valley. Armed with automatic weapons, they are now turning to elephants. About 11,000 elephants live in the Zambezi Valley; there are about 65,000 elephants in all of Zimbabwe.

Zimbabwe's wildlife rangers are well trained but lack basic equipment needed to carry out extended patrols in the bush. For example, the two-channel, hand-held radios used by rangers to communicate with each other and their headquarters are not secure from monitoring by poachers. The new grant will replace these with 24 state-of-the-art six-channel programmable units, which will allow se-

curity-coded transmissions. Motorola's International Markets Division is providing the units in cooperation with the African Safari Club. Xerox Corporation is cooperating with the African Safari Club to supply facsimile and copying equipment urgently needed by the Zimbabwe Department of National Parks and Wild Life Management. Jason Empire, Inc., of Overland Park, Kansas, will provide 40 wide-angle binoculars for presentation to Zimbabwe anti-poaching personnel under an African Safari Club award program.

The grant will also provide basic field equipment for Zimbabwe's wildlife rangers including flashlights, batteries, tents, sleeping bags, compasses, and other items needed for extended operations in remote areas.

The grant is the second to be made in 1991 under the African Elephant Conservation Act. Altogether, \$770,000 in Congressionally appropriated funds, plus matching grants from the private sector and foreign governments, will be made available to support elephant conservation projects in Africa this year. In 1990, the Department of the Interior provided \$350,000; matching grants brought the total to more than \$800,000 in funding for conservation projects in five African nations.

# Forest Service and The Nature Conservancy Join Forces to Conserve Biological Diversity

Christopher Topik  
National Endangered Plant Program Manager  
U.S. Forest Service

On January 15, 1991, the U.S. Department of Agriculture's Forest Service and The Nature Conservancy signed a memorandum of understanding to work together to inventory, maintain, and improve biological diversity on national forests and other lands, including lands owned or managed by the Conservancy. This agreement serves to strengthen both organizations' ability to conserve and enhance the Nation's biological diversity. John Sawhill, president of the Conservancy said, "The effectiveness of the agreement lies in its scope. Conservancy and Forest Service personnel will be working together at all levels to protect plant and animal diversity throughout the United States." The Conservancy has similar general agreements with the Department of the Interior's Bureau of Land Management and the Department of Defense.

The Forest Service manages 191 million acres (77 million hectares) of forests and grasslands, an area larger than Texas, from subarctic Alaska to tropical Puerto Rico. These lands provide habitat for at least 194 Threatened or Endangered species, along with another 2,254 species designated by the Forest Service as "sensitive" (i.e., listing candidates and other species of special concern that are receiving priority attention from the Forest Service).

The Nature Conservancy, a private international organization committed to preserving biological diversity, protects 5.12 million acres (2.07 million ha) throughout the United States, Canada, Latin America, and the Caribbean. The Forest Service's lands and the Conservancy's preserves are among the Nation's most important reservoirs of biodiversity. The Conservancy also provides extensive data and scientific support through a net-

work of natural heritage programs. (For more details on these heritage programs, see *Bulletin* Vol. XV, No. 3.)

Many of the cooperative activities will focus on protecting Threatened, Endangered, and sensitive plant and animal species. Among the projects planned under the agreement are: inventorying and surveying fish, wildlife and plant species on the national forests and grasslands; identifying specific areas for research; monitoring ecological change; conserving and restoring important habitats; developing environmental education programs; and developing and implementing management plans for individual national forests.

Many cooperative projects are already under way. One such project is in the San Bernardino National Forest near Los Angeles, California. Forest Service and Conservancy biologists have developed a habitat management guide for at least nine areas with pebble plains—a rare, fragile, "cushion-plant" dominated habitat type with unstable soils that supports eight sensitive plant species. In the past, this habitat type has been damaged by off-road vehicles and urban development. The management guide, using an ecosystem approach, will help conserve these areas.

The first national forest conservation data center was jointly established by the two organizations at the Forest Service's Tallahassee office, which administers three national forests in Florida. This center, under the direction of plant ecologist Dr. Joan Walker, uses natural heritage program methodology and computer systems to monitor Threatened, Endangered, and sensitive species, and their occurrences and management.

Another cooperative effort is taking place at the Shawnee National Forest

in Illinois. Both organizations are working with the Illinois Department of Conservation's Division of Natural Heritage and the Morton Arboretum to restore prairie habitat through the use of prescribed burning. An environmental education program is informing local residents about prairie flora and fauna and is explaining successional changes. This project will help restore the Threatened Mead's milkweed (*Asclepias meadii*), among other prairie plants in this area.

Working together, the Conservancy and the Forest Service hope to enhance their conservation efforts. Both agencies look forward to expanding their partnership for maintaining America's biodiversity.



Three of the four known remaining populations of Mead's milkweed (*Asclepias meadii*) east of the Mississippi River are within Shawnee National Forest in southern Illinois, where the U.S. Forest Service, The Nature Conservancy, U.S. Fish and Wildlife Service, Illinois Department of Conservation (Division of Natural Heritage), and Morton Arboretum are involved in a large-scale restoration and recovery effort. This project includes genetic research, tissue culture, cross-pollination trials, and 700 acres (280 hectares) of habitat restoration.



## Regional News

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of Natural Resources in response to a challenge grant proposal by The Nature Conservancy. The proposal was for a survey of the proposed Patoka River National Wildlife Refuge in Pike and Gibson Counties, Indiana. Survey costs are being shared by the Conservancy, State, and Service. The Patoka River valley has a unique geological history but it has not had a detailed survey for rare plants or unique plant communities that botanists believe may be present. The information from this survey also will assist in the preparation of an environmental impact statement for establishing the Patoka River Refuge.

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**Region 4** - An experimental gate has been installed in Collier's Cave, a Tennessee Valley Authority (TVA)-owned cave in northwestern Alabama, to protect habitat of the Endangered gray bat (*Myotis grisescens*). These bats historically used Collier's Cave as a maternity site, but they have virtually abandoned it due to severe vandalism. The gate, about 20 feet (6 meters) wide and 11 feet (3 m) high, was designed by Roy Powers of the American Cave Conservation Association and built by individuals from the Association, Auburn University, TVA, and the Fish and Wildlife Service, along with private citizens. It differs from other bat cave gates by not having large windows for the bats to fly through and by being located totally within the dark zone of the cave. However, the angle iron gate does not impede air flow and should not affect passage of the bats.

Construction of the gate required nearly a week of dawn-to-dark labor by 7 to 10 individuals. If the bats accept a full gate in the dark zone, the range of management options for protecting gray bat populations will be increased. If the bats have not returned to the cave after a few years, the gate will be modified, probably by

installing hinged panels, and the situation will be reassessed.

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Taxonomic and population status information is being gathered on the longnose darter (*Percina nasuta*), a Category 2 listing candidate that occurs in Arkansas, Oklahoma, and Missouri. This fish is morphologically variable and may actually represent a group (complex) of up to four closely related taxa. Some form of this fish occurs in the Ouachita, Arkansas, Little Red, and White River Systems of Arkansas; in Lee Creek in Arkansas and Oklahoma; and in the St. Francis River in Missouri. The U.S. Forest Service has funded a study to determine the taxonomic and population status of this species complex in river systems within the Ouachita and Ozark National Forests, and the Fish and Wildlife Service has funded a similar taxonomic study of the form occurring in the Spring and Strawberry Rivers (which are both tributaries of the White River). The Arkansas Game and Fish Commission also is making a special effort to determine the population status of this species in selected streams while conducting other fishery assessment work. The results of all of these independent studies are expected in 1992, and should enable the Fish and Wildlife Service to make a determination on the need for protection of any or all forms in the longnose darter complex.

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The paleback darter (*Etheostoma pallididorsum*), listed as a Category 3C species in the Service's latest (January 6, 1989) Animal Notice of Review, is known from headwater streams of the Caddo River System and from Mayberry Creek, a tributary of the Ouachita River in Arkansas. (The Service assigns Category 3C to taxa that were once considered for listing but are now believed to be more abundant and/or widespread, and are therefore not in need of listing.) This fish has been under review by the Ser-

vice for a number of years. Loss of spawning areas is the major threat facing the species. A small fish, the paleback darter spawns in small springs and spring seeps that are frequently found in pastures and only flow during the wet months.

With one exception, all of the darter's known spawning sites are on private land. One of the better spawning sites is in a roadside ditch at Caddo Hills High School, north of Glenwood, Arkansas. Darters swim from Collier Creek into the ditch and a spring seep when there are heavy rains. However, the site is potentially threatened by ditch maintenance and by culverts, which seem to block water flow and darter movement.

To determine the extent of use of the spring seep and the ditch by the paleback darter, and to gather additional information on the species, Dr. John Harris (a biologist from Little Rock, Arkansas), Dr. Henry Robison (from Southern Arkansas University), and Ms. Betty Cochran (from the U.S. Forest Service in Glenwood, Arkansas) initiated a study of the area in October 1990. To assist their study, the researchers enlisted volunteers from the Caddo Hills High School biology class. The students are using traps that capture darters as they move up the seep. Over 700 darters have been collected since November 1990 and information has been gathered on size and spawning condition. A limited number of darters have been taken for food habit studies by the primary investigators, and seven have been placed in an aquarium for observation of breeding behavior. The remainder of those captured have been released in the seep run. Larval darters have been observed in the spring seep as early as February.

This study will continue in an effort to document movement of the darters out of the spring seep and to determine the impact of the culverts on that movement. A side benefit is

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## New Publications

*Balancing on the Brink of Extinction: The Endangered Species Act and Lessons for the Future*, edited by Kathryn A. Kohm (former editor of the University of Michigan's *Endangered Species UPDATE*), is a collection of essays that focus on two basic questions: What have we learned about conserving rare plants and animals since passage of the Endangered Species Act of 1973, and where should we direct future efforts? The book's 21 essays are grouped into four sections: an overarching look at the Federal endangered species program, examinations of program components (e.g., interagency consultation, recovery), challenging areas of implementation (e.g., water rights, pesticide regulation, predator control), and the broader approaches to conserving eco-

systems and bio-diversity. Contributors include Congressman John D. Dingell, Lynn A. Greenwalt (former Director of the Fish and Wildlife Service, now with the National Wildlife Federation), Michael J. Bean (Environmental Defense Fund), William Reffalt (Wilderness Society), and Faith Campbell (Natural Resources Defense Council). The 316-page book is available for \$34.95 (cloth) or \$22.95 (paper), plus \$3.00 shipping, by writing Island Press, Box 7, Covelo, California 95428; or order toll-free at 1-800-828-1302.

*Reptiles and Amphibians of the Cimarron National Grasslands, Morton County, Kansas*, by Joseph T. Collins and Suzanne L. Collins of the University of Kansas, was published recently

by the U.S. Forest Service, which is responsible for managing this area of public land in the southwestern corner of the State. The 60-page booklet contains a species account for 31 reptiles and amphibians known from the Cimarron Grasslands (including 6 taxa listed by the State of Kansas as threatened species), along with a bibliography and 40 color photographs. This publication was funded and co-sponsored by the U.S. Forest Service, Kansas Department of Wildlife & Parks, Kansas Herpetological Society, and KPL Gas Service. It is available for \$7.00 (postpaid) from the U.S. Forest Service, Cimarron National Grasslands, P.O. Box J, Elkhart, Kansas 67950.

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the involvement of the students and the awareness they have gained about a rare species.

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The Service's Asheville, North Carolina, Field Office staff met with biologists from the Virginia Cooperative Fish and Wildlife Research Unit and the North Carolina Wildlife Resources Commission in March to discuss a 2-year study of the dwarf wedge mussel's (*Alasmidonta heterodon*) life history on the upper Tar River in north-central North Carolina. One of the best remaining populations of this Endangered mussel exists in the upper Tar River. The study's primary objectives are to determine the dwarf wedge mussel's fish host, its spawning period, and its habitat preferences. The life history of the other mussels that coexist with the dwarf wedge will also be studied. This information is essential to managing and conserving the species.

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**Region 5** - The Service has prepared a fact sheet on the Endangered

dwarf wedge mussel, with emphasis on New England populations. The fact sheet summarizes the mussel's life history and population status, provides general information on recovery efforts, and notes what the public can do to help. Copies may be obtained by writing the Fish and Wildlife Service, New England Field Office, 22 Bridge Street, Concord, NH 03301, or by calling (603) 225-1411 or FTS 834-4411.

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New Jersey's bald eagle (*Haliaeetus leucocephalus*) population appears to be well on its way to recovery. Results of the 1990 nesting season indicate that the recovery goal of 10 nests is attainable within the next 5 years. In the 1990 season there were at least six pairs on territories, possibly as many as eight, with five pairs building nests. Five young successfully fledged. This was the first time since 1959 that New Jersey had more than one productive eagle nest. Two possible factors that may hinder future growth in the eagle population are unintentional human disturbance of nesting pairs and contamination of eagles by DDE and

PCB's. Peregrine falcons (*Falco peregrinus*) and ospreys (*Pandion haliaetus*) in New Jersey are showing high levels of DDE, PCB's, and several heavy metals. The peregrine's eggshells have experienced an average 14 percent reduction in thickness from the norm, while the osprey's eggshells have averaged a 10 percent reduction. Nesting failure is known to occur when eggshell thickness is reduced by 17 percent. Although there are no data for the bald eagle, environmental contamination and shell thinning are serious concerns since the bird has proven to be susceptible in the past.

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New England Field Office and Region 5 staff attended an eastern peregrine falcon recovery meeting in Roanoke, Virginia, the first held in 2 years. The biggest challenge facing the recovery effort is for each of the involved States to assume greater responsibility for the recovery effort, following the withdrawal of The Peregrine Fund from the east. This in turn presents a challenge to the Ser-

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Regional News

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vice to provide more coordination among the States to help maintain consistency in their recovery programs.

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The New England Field Office organized the first meeting of botanists from all of the New England States and New York to review Federal listing candidates. The meeting took place March 20-21 in Amherst, Massachusetts, and included participants from Federal and State agencies, The Nature Conservancy and other private environmental groups, and consultants. The group evaluated the status of 70 plant species and discussed additions to the Service's Plant Notice of Review (published February 21, 1990). Recommendations from the meeting will be used when a revised Notice is published next year. In addition, the status of the Endangered small whorled pogonia (*Isotria medeoloides*) was discussed; the group recommended that the recovery plan for this species be revised.

\* \* \*

The tiger beetle recovery group met in March to discuss and revise the draft recovery plan for the two tiger beetles that were listed as Threatened in October 1990. The plans, which should be ready by the fall of 1991, will likely focus on habitat protection for both the northeastern beach beetle (*Cicindela dorsalis*) and the Puritan tiger beetle (*Cicindela puritana*) and on reintroduction for the northeastern beach beetle.

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This spring, surveys were conducted for the Endangered Delmarva fox squirrel (*Sciurus niger cinereus*) by the Service on several national wildlife refuges on the eastern shore of Chesapeake Bay and by the Maryland Department of Natural Resources on State-owned land. Nest boxes have been, or are being, installed at several selected sites that have been designated by the Delmarva fox squirrel re-

covery team as "benchmarks." At Chincoteague Refuge, where nest boxes have been installed for some time, a record total of 51 fox squirrels were observed in the boxes, including 3 litters totalling 5 young-of-the-year. At Eastern Neck Refuge, where nest boxes have not yet been installed, a total of 329 trap days yielded only 4 fox squirrels. However, two of these were immature, indicating that fox squirrels reproduced last year and the young successfully survived the winter. Trapping at Blackwater Refuge and on State wildlife management areas is still underway and results are not yet available, but recently installed nest boxes at one State-owned site yielded two adult females and three young-of-the-year. A full report will be available soon.

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**Region 6** - The public review periods for the Wyoming toad and autumn buttercup draft recovery plans recently ended. Only one population is known for each of these species and both are on land owned by The Nature Conservancy. The Endangered Wyoming toad (*Bufo hemiophrys baxteri*) historically inhabited a 30 square mile (78 square kilometer) area around Laramie, Wyoming, but now occupies only about 2 square miles (5 square km). The reasons for the precipitous decline of the Wyoming toad are unknown, but may be the result of insecticide spraying, changes in agricultural practices, increased predation, disease, or climatic changes. Recovery efforts will emphasize protecting and expanding the toad's existing habitat, conducting research on the toad's biology and limiting factors, captive propagation, and reintroduction. The Service is preparing a draft environmental assessment for a proposed 2,500-acre (1,000-ha) national wildlife refuge that would encompass all of the toad's known habitat.

The Endangered autumn buttercup's (*Ranunculus acriformis* var. *aestivalis*) distribution is limited to perennially moist soils along the Sevier

River in Utah. This plant is primarily threatened by grazing and trampling by livestock, although changes in the area's hydrology due to agricultural development also may be a potential threat. The recovery plan calls for the protection of current populations and potential habitats from livestock grazing, surveys to locate additional plants, and research on the plant's biology and ecological requirements.

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**Region 8** - Biologists from the National Ecology Research Center (NERC) and California Department of Fish and Game have conducted spring and fall counts of the Threatened southern sea otter (*Enhydra lutris nereis*) population annually since 1982. Fall counts have been consistently lower than spring counts, probably because the larger and thicker distribution of kelp canopies in the fall makes it more difficult to locate sea otters.

The fall and spring counts both indicated that the sea otter's numbers were increasing until 1990. The spring 1989 count was 1,856 sea otters, but the following spring only 1,680 otters were counted—a decline of about 10 percent. Environmental conditions and survey methods were comparable between years and no cause for a population decline was identified. NERC biologists speculate that the count may have been low due to variability within the survey method and not to a population decline.

In the fall 1990, 1,636 sea otters were counted, an increase of 2.3 percent over the fall 1989 count. Although the rate of increase was down slightly from the rate in the previous fall, it was still positive. This supports the NERC biologists' hypothesis that the spring 1990 census was less accurate than previous counts. Biologists anxiously await the results of the spring 1991 census, which will start in mid-May.

\* \* \*

(continued on page 12)

**Region 9** - The Service has published a new report to Congress, "Wetland Losses in the United States 1780's to 1980's." The report documents historical wetland losses from colonial times to the 1980's using data compiled from a variety of sources. The report estimates that in the 1780's, the area that is now the United States contained 392 million acres (159 million ha) of wetlands, of which 221 million acres (89 million ha) were in the conterminous 48 States. It concludes that the conterminous 48 States have lost an estimated 53 percent of their original wetlands over the past 200 years. On average, this means that they have lost over 60 acres (24 ha) of wetlands every hour between the 1780's and the 1980's. California lost the largest percentage of its original wetlands (91 percent), while Florida lost the most acreage (9.3 million acres or 3.8 million ha).

Copies of "Wetlands Losses in the United States 1780's to 1980's" can be obtained from the Service's Publications Unit, Room 130 - ARLSQ, Washington, D.C. 20240.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	55	249	8	22	334	29
Birds	73	153	12	0	238	67
Reptiles	16	58	18	14	106	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	38	2	2	0	42	30
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	190	1	60	2	253	125
<b>TOTAL</b>	<b>457</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1134*</b>	<b>355**</b>
Total U.S. Endangered		457	(267 animals, 190 plants)			
Total U.S. Threatened		155	(95 animals, 60 plants)			
Total U.S. Listed		612	(362 animals, 250 plants)			

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 283 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories:	53 fish & wildlife 39 plants
Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act:	7
Number of CITES Party Nations:	110

April 30, 1991

April 1991

Vol. XVI No. 4

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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U.S. DEPARTMENT OF THE INTERIOR  
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# Technical Bulletin

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

## Ten Species Proposed During April for Listing Protection



photo © Ted Bailey

of the U.S. Department of Commerce, initiated a status review of the Snake River sockeye salmon stock. NMFS has Endangered Species Act responsibility for most marine life, including salmon.

Soon after initiating the review, NMFS received a petition from the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation to list the Snake River sockeye salmon as Endangered. After reviewing all available scientific information, NMFS published a notice in the April 5, 1991, *Federal Register* proposing that the Snake River sockeye salmon be listed as Endangered. In making the proposal, NMFS found that this stock is a distinct population and thus qualifies as a "species" as defined by the Endangered Species Act.

The Snake River sockeye salmon is one of three remaining stocks of sockeye salmon in the Columbia River system. Historically, Snake River sockeye salmon spawned in Idaho's Sawtooth Range in a region known as the Stanley Basin, which included Alturas, Pettit, Redfish, Yellowbelly and Stanley Lakes, and perhaps several other lakes. In 1881, prospectors at Alturas Lake, near Redfish Lake, were able to catch 2,600 pounds (1,180 kilograms) of sockeye salmon. However, the construction of dams, diversions of water for agricultural use, use of piscicides (chemicals used to kill fish), and operation of migration barriers (i.e., weirs) prevented salmon from spawning in or near these lakes by the late 1960's. Only Redfish Lake

(continued on page 6)

**Sockeye salmon, once found in abundance in Idaho's Redfish Lake, have virtually disappeared. These sockeye are spawning in Alaska's Kenai National Wildlife Refuge.**

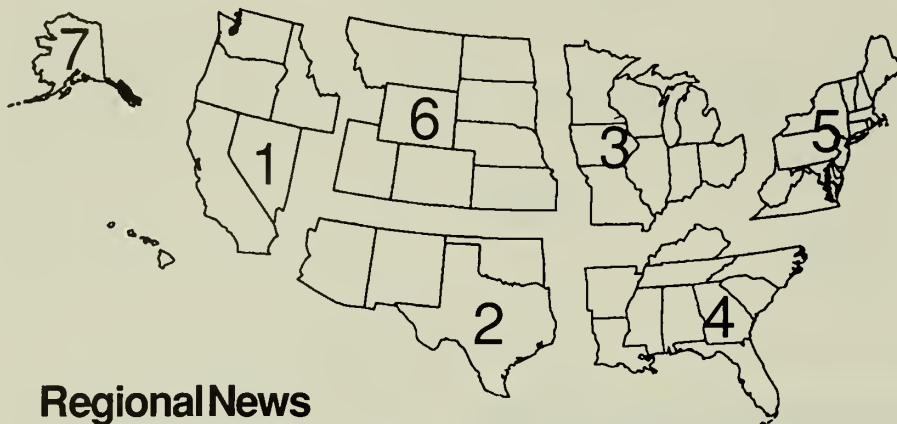
Two fishes and seven plants were proposed by the Fish and Wildlife Service during April 1991 for listing as Threatened or Endangered species. The National Marine Fisheries Service also proposed one salmon population for listing as Endangered. If the listings are made final, Endangered Species Act protection will be available to the following:

### **Snake River Sockeye Salmon** (*Oncorhynchus nerka*)

For millennia, sockeye salmon have returned in the spring from the Pacific Ocean to the Columbia River, swum upstream to the Snake River, and made their way up to Redfish Lake and small tributaries in Idaho's Rocky Mountains to spawn. On their epic

journey, these fish travel almost 900 miles (1,550 kilometers) to an elevation of 6,500 feet (1,200 meters) above sea level. No other sockeye salmon stock in the world swims as far or reaches such heights. At one time, the sockeye were so abundant that Native Americans and early miners depended on them for food. Redfish Lake derives its name from the spawning colors of these fish.

But now the Snake River sockeye salmon, like many of the Columbia River salmon stocks, is in serious trouble. Last year, no Snake River sockeye salmon were known to have succeeded in reaching the spawning areas, and in the preceding 2 years only two redds (salmon nests) were found. In 1990, the National Marine Fisheries Service (NMFS), an agency



## Regional News

Regional endangered species staffers have reported the following news:

Region 1 - Recent analyses of grain collected in Stephens' kangaroo rat

(*Dipodomys stephensi*) habitat by Fish and Wildlife Service personnel verified the presence of strychnine. Surface use of this rodenticide is prohib-

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Region 4, Richard B. Russell Federal Bldg., 75 Spring Street, S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, Regional Director; Tom Olds, Assistant Regional Director; David Flemming, Endangered Species Specialist.

Region 5, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, Regional Director; Ralph Nisapia, Assistant Regional Director; Paul Nickerson, Endangered Species Specialist.

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Region 7, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, Regional Director; Rowan Gould, Assistant Regional Director; Ron Garrett, Endangered Species Specialist.

Region 8, (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, Regional Director; Al Sherk, Endangered Species Specialist (703-358-1710).

### U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. Region 2: Arizona, New Mexico, Oklahoma, and Texas. Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. Region 5: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. Region 7: Alaska. Region 8: Research and Development nationwide. Region 9: Washington, D.C., Office.



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ited by Federal and State law. A red-tailed hawk (*Buteo jamaicensis*) found dead near the grain was positively diagnosed as strychnine-poisoned. The Fish and Wildlife Service's Gardena, California, law enforcement office is currently investigating the case.

\* \* \*

In April, the Fish and Wildlife Service released new guidelines for areas in which proposed activities may affect the Threatened northern spotted owl (*Strix occidentalis caurina*). These guidelines had extensive peer-review by biologists, other scientists, managers from Federal and State agencies, and private interests who work on various issues pertinent to the ecology and management of northern spotted owls.

The Service recommends that owl surveys in areas slated for timber harvest or other activities be undertaken between March 15 and August 31, when spotted owls are more active in defending their established territories during the nesting season and can be counted. The guidelines outline procedures by which owls can be "called" to determine whether or not they are present in particular areas, and they recommend procedures for determining whether owl pairs are actively nesting and rearing young. The guidelines should not only assist landowners in adequately assessing their areas for the presence of spotted owls, but also ensure a high probability of identifying spotted owls and owl territories that may be affected by proposed activities.

Copies of "Guidelines for Surveying Proposed Management Activities That May Impact Northern Spotted Owls" are available from the Service's Portland, Oregon (503/231-6179), Olympia, Washington (206/753-9440), and Sacramento, California (916/978-4866), offices.

\* \* \*

In March, staff from the Service's Olympia Field Office supported the Washington Department of Wildlife

(continued on page 11)



# Federal and State Endangered Species Expenditures in Fiscal Year 1990

The Fish and Wildlife Service has published its second annual report for Congress summarizing "reasonably identifiable" species-by-species expenditures by Federal agencies and States. Under Section 18 of the Endangered Species Act, Congress requested information on expenditures to assess claims that a disproportionate effort is being made to conserve a few, highly visible species at the expense of numerous, less well-known species that may have greater need for protection. As with the 1989 report, which was summarized in *Bulletin* Vol. XV, No. 4, many Federal agencies assisted in providing expenditures data for the 1990 report. The International Association of Fish and Wildlife Agencies again compiled the data on total State expenditures.

## Federal and State Expenditures in 1990

More than \$102.3 million was reported as being spent in fiscal year 1990 by Federal and State agencies specifically for the conservation of 477 Threatened and Endangered species – about 81 percent of all the listed animals and plants in the United States. The Fish and Wildlife Service accounted for \$35 million of the total expenditures, while 12 other Federal agencies (e.g., Bureau of Land Management, U.S. Forest Service, National Park Service, National Marine Fisheries Service) accounted for over \$61 million. State agency expenditures are included in the report because those that have cooperative agreements with the Fish and Wildlife Service are eligible for Federal funds under Section 6 of the Act. The States reported a total of about \$6 million.

The range of expenditures varied from a high of over \$9 million for the northern spotted owl (*Strix occidentalis caurina*) to a low of \$100 for the Lee pincushion cactus (*Coryphantha sneedii*

var. *leei*). Fifty-eight species (10 percent of the list) accounted for 90 percent of all reported expenditures. Twenty-four species had reported expenditures exceeding \$1 million each, accounting for over half of the total. The 10 species with the highest reported expenditures in fiscal year 1990 were: northern spotted owl (\$9.7 million); least Bell's vireo (*Vireo bellii pusillus*; \$9.2 million); grizzly bear (*Ursus arctos*; \$5.9 million); red-cockaded woodpecker (*Picoides borealis*; \$5.2 million); Florida panther (*Felis concolor coryi*; \$4.1 million); Mojave population of the desert tortoise (*Gopherus agassizii*; \$4.1 million); bald eagle (*Haliaeetus leucocephalus*; \$3.5 million); ocelot (*Felis pardalis*; \$3 million); jaguarundi (*Felis yagouaroundi*; \$2.9 million); and American peregrine falcon (*Falco peregrinus anatum*; \$2.9 million). The Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) was the highest ranked invertebrate in reported expenditures (#26 at \$952,000) and the Threatened northern wild monkshood (*Aconitum noveboracense*) was the highest ranked plant (#57 at \$226,000).

## Report Limitations

The 1990 report benefited greatly from better accounting and reporting from the agencies compared to the 1989 report. Thus, it cannot be directly compared with the 1989 report. Although it appears that expenditures more than doubled between 1989 and 1990, the Service estimates that almost all of the increase is from better reporting by the various agencies and not from any significant increase in spending on Endangered and Threatened species. This year's report includes land acquisitions that were made to protect listed species; such purchases were not always included in the previous report. These Federal expenditures greatly inflated the

amounts reported for many species and appear to constitute about one-quarter of the total amount. Many of the significant changes in spending rank between 1989 and 1990 are a result of land acquisitions (e.g., jaguarundi and ocelot).

Like the 1989 report, the information presented in the 1990 report does not reflect the total National effort to conserve Threatened and Endangered species. A significant portion of Threatened and Endangered species conservation activities includes law enforcement, consultation, recovery coordination, and other actions that cannot be easily or reasonably identified by species. Accounting procedures by all agencies for most staff salaries, operations, maintenance, and other support services are not recorded by species. Also, there is significant variability among the various Federal and State agency reports. Finally, the 1990 expenditures report does not include the extensive monetary contributions and time that individuals, corporations, and private groups have provided for conserving listed species.

It should also be noted that annual variations in the amounts reported on individual species may reflect high cost expenditures that are not normally a part of ongoing conservation efforts. For example, the Bureau of Reclamation undertook a major land acquisition effort in 1989 to conserve the Endangered Tumamoc globe-berry (*Tumamoca macdougalii*). As a result, in 1989 this species was ranked ninth out of 554 species in expenditures (\$1,167,300). In the 1990 report, however, the plant had a rank of 60th out of 591 species, with a total of \$214,440.

Copies of the 1990 expenditures report are available from the Publications Unit, U.S. Fish and Wildlife Service, Room 130-ARLSQ, Washington, D.C. 20240.

# Research Center Analyzes Health Problems of Endangered Species

Ron Windingstad  
National Wildlife Health Research Center

Each year, wildlife managers across the United States are confronted with animals that are sick or dead from a variety of causes. Such health problems assume a special importance when the species are already Threatened or Endangered. Diseases, including environmental contaminant poisoning, can reduce the health, genetic variability, and reproductive potential of animal populations, and even push rare species over the edge into extinction. Minimizing such wildlife losses requires immediate and effective technical support to field personnel who find sick and dead animals; timely and accurate diagnoses of the causes; research on ways to control and treat diseases; and the cooperation and coordination of experts working throughout the country on the science of wildlife diseases.

Established in 1975, the Fish and Wildlife Service's National Wildlife Health Research Center in Madison, Wisconsin, has been working on a variety of wildlife health problems. The Center's staff of over 50 scientists and support personnel offer a variety of services, ranging from diagnostic examinations to training of senior veterinary students, wildlife biologists, and foreign scientists interested in wildlife diseases. The Center's physical facilities, including necropsy facilities and bacteriology, chemistry, microbiology, virology, and parasitology labs, are the most advanced in the world for the study of wildlife disease. A "tight" isolation wing in the Center's research building is available for working on highly contagious diseases. In addition to its primary role in preventing and controlling wildlife diseases, since 1983 the Center has been restoring 15 acres (6 hectares) of tall-grass prairie on the Center's 23-acre (9-ha) site.

## Health Problems in Endangered Species

As part of its mission, the Center monitors the causes of illness and death in Threatened and Endangered species and responds to early warnings of health problems. The staff specialists identify recurring causes of mortality, new and emerging diseases, and potential catastrophic losses from established pathogens. From October 1988 through 1990, Center personnel examined more than 1,900 specimens of a wide variety of Endangered and Threatened wildlife throughout the country (see table). The Center's diagnostic findings are directly applicable to the protection and management of rare species.

One example of the Center's work involves the study of avian tuberculosis in whooping cranes (*Grus americana*) and tumors in Mississippi sandhill cranes (*Grus canadensis pulla*). Avian tuberculosis is an infectious dis-

ease in birds that can be fatal. It is caused by the bacterium *Mycobacterium avium*, which can persist for at least 2 years in soils contaminated by infected birds. Avian tuberculosis has been confirmed in 5 (and suspected in 2) of 22 whooping cranes carcasses sent to the Center from the Gray's Lake foster parent flock (16) and the Wood Buffalo/Aransas population (6). The prevalence of avian tuberculosis in these birds was much higher than the reported 0.3 to 0.7 percent typical for free-living birds. Researchers at the Center are seeking an understanding of the epizootiology, or natural history, of avian tuberculosis in these flocks. With this information, the crane populations can be managed to control losses.

Tumors of unknown etiology, or cause, have been found in carcasses of 5 of 18 Mississippi sandhill cranes from the Mississippi Sandhill Crane National Wildlife Refuge in southern



Dr. Nancy Thomas, Endangered Species Disease Specialist, begins a necropsy on a red wolf (*Canis rufus*). She is assisted by technician Mike Coffey.

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## Research Center

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Mississippi. This prevalence is also in excess of the normal rate of less than one percent for birds in the wild. Viruses, mycotoxins (toxins produced by mold), parasites, and a wide array of environmental contaminants cause tumors and are being evaluated for their role in the high incidence of tumors among birds from the Mississippi Sandhill Crane Refuge.

The Service's decision to capture and confine the remaining California condors (*Gymnogyps californianus*) in a protected environment was greatly influenced by the diagnosis of lead poisoning in the carcasses of the last three free-flying condors. Elevated levels of lead in golden eagle (*Aquila chrysaetos*) carcasses in the California condor's habitat confirmed the potential danger of lead poisoning from a prey population similar to that of the remaining condors.

Efforts to restore Threatened and Endangered species often involve the reintroduction of captive-reared animals into parts of their historical range. For such efforts to be successful, healthy captive animals must survive in the wild at least until they have produced viable young. After the reintroduction of the red wolf (*Canis rufus*) to a portion of its former range in eastern North Carolina, Dr. Nancy Thomas, the Center's endangered species pathologist, conducted meticulous necropsies of individuals that died after release. She and her colleagues in virology, microbiology, parasitology, and analytical chemistry sought to identify the causes of death and contributing factors to help guide managers in the recovery of this species.

## The Resource Health Team

Investigations of mortality in endangered species are usually carried out by the Center's Resource Health Team. For example, between October and December 1987, an estimated 350 dead California brown pelicans

Endangered and Threatened species from which carcasses (755) or tissue samples (1216)\*\* were submitted for diagnostic work at the National Wildlife Health Research Center from October 1988 through December 1990.

### BIRDS

Aleutian Canada goose	( <i>Branta canadensis leucopareia</i> )
Andean condor	( <i>Vultur gryphus</i> )
Bald eagle	( <i>Haliaeetus leucocephalus</i> )
Black-necked crane	( <i>Grus nigricollis</i> )
Brown pelican	( <i>Pelecanus occidentalis</i> )
California least tern	( <i>Sterna antillarum browni</i> )
Hawaiian coot	( <i>Fulica americana alai</i> )
Hawaiian crow	( <i>Corvus hawaiiensis</i> )
Hawaiian dark-rumped petrel	( <i>Pterodroma phaeopygia sandwichensis</i> )
Hawaiian duck	( <i>Anas wyvilliana</i> )
Hawaiian goose	( <i>Nesochen sandvicensis</i> )
Hawaiian stilt	( <i>Himantopus mexicanus knudseni</i> )
Hooded crane	( <i>Grus monacha</i> )
Interior least tern	( <i>Sterna antillarum athalassos</i> )
Japanese crane	( <i>Grus japonensis</i> )
Kirtland's warbler	( <i>Dendroica kirtlandii</i> )
Laysan duck	( <i>Anas laysanensis</i> )
Laysan finch	( <i>Telespyza cantans</i> )
Masked bobwhite	( <i>Colinus virginianus ridgwayi</i> )
Mississippi sandhill crane	( <i>Grus canadensis pulla</i> )
Peregrine falcon	( <i>Falco peregrinus</i> )
Piping plover	( <i>Charadrius melodus</i> )
Puerto Rican parrot	( <i>Amazona vittata</i> )
Northern spotted owl	( <i>Strix occidentalis caurina</i> )
Red-cockaded woodpecker	( <i>Picoides borealis</i> )
Siberian white crane	( <i>Grus leucogeranus</i> )
White-naped crane	( <i>Grus vipio</i> )
Whooping crane	( <i>Grus americana</i> )
Wood stork	( <i>Mycteria americana</i> )

### MAMMALS

Delmarva Peninsula fox squirrel	( <i>Sciurus niger cinereus</i> )
Gray wolf	( <i>Canis lupus</i> )
Hawaiian hoary bat	( <i>Lasiurus cinereus semotus</i> )
Mount Graham red squirrel	( <i>Tamiasciurus hudsonicus grahamensis</i> )
Red wolf	( <i>Canis rufus</i> )
San Joaquin kit fox	( <i>Vulpes macrotis mutica</i> )
Southern sea otter	( <i>Enhydra lutris nereis</i> )

\*\* tissue samples and organs other than intact carcasses

(*Pelecanus occidentalis*) were found scattered around Monterey Bay and San Luis Obispo Bay. The team, along with biologists from the Califor-

nia Fish and Wildlife Investigations Laboratory in Rancho Cordova and the University of California-Davis, in-

(continued on page 6)

## Research Center

(continued from page 5)

vestigated the deaths. With support from the Center's diagnostic section, the disease erysipelas, caused by the bacterium *Erysipelothrix rhusiopathiae*, was identified as the cause of death. Pelicans were feeding on parts of fish that were discarded by restaurants and commercial fisherman near the wharfs. This bacterium is common in dead fish. Live pelicans infected with the bacterium were treated with antibiotics, dead birds were collected and incinerated, and the practice of discarding fish remains where pelicans fed was halted.

Cooperation among Center personnel, scientists from other agencies, and law enforcement agents is paramount in conducting investigations into the intentional killing of endangered spe-

cies and other wildlife. Rapid, accurate determination of perpetrators can reduce additional losses of Endangered species. For example, in early 1990, a bald eagle (*Haliaeetus leucocephalus*), three golden eagles, and a coyote (*Canis latrans*) were found dead from poisoning in New Mexico. In order to obtain a warrant to search the ranch where the alleged poisoning occurred, the Service's special agent investigating the case needed justification.

The bald and golden eagles were submitted to the Center on February 7, 1990, and within 2 days the carcasses were necropsied, assays of appropriate brain enzyme activity were completed, and a provisional diagnosis of carbamate poisoning was relayed to law enforcement agents. On February 12, the search warrant was served and

evidence was obtained from the ranch where the carcasses had been found. The Patuxent Analytical Control Facility, part of the Patuxent Wildlife Research Center in Laurel, Maryland, identified carbofuran, a carbamate pesticide, in stomach contents of the birds, confirming the diagnosis of carbamate poisoning. The evidence obtained with the search warrant was used to prosecute the rancher who poisoned the animals.

\* \* \*

For more information on the Center's activities and specific questions on the mortality of Threatened or Endangered species, contact Ron Windingstad or Dr. Nancy Thomas at the National Wildlife Health Research Center, 6006 Schroeder Rd., Madison, Wisconsin 53711 (telephone: 608/271-4640 or FTS 364-5411).

## Listing Proposals

(continued from page 1)

continued to support a run—the world's southernmost natural sockeye salmon population. However, the viability of this stock is now uncertain due to the apparent lack of fish returning from the ocean for the past several years. Because of the sockeye's 4- to 5-year spawning cycle, biologists will not know until 1994 if the Snake River sockeye still exists.

Historically, Snake River sockeye salmon entered the Columbia River primarily during June and July. The peak of the run used to reach Redfish Lake in August, and spawning occurred near shoals along the lake's shoreline, primarily in October. After hatching the following spring, the juvenile fish remained in the lake up to 2 years before migrating to the ocean. The fish usually spent 2 years in the ocean and returned to spawn in their fourth or fifth year of life. Only about 1 percent of the salmon that migrated from the lake survived natural forces (e.g., predators, disease) and human-caused environmental changes, and made it back to spawn.

The construction and operation of dams is the primary cause for the decline of the Snake River sockeye salmon. The first dam that seriously impeded access of salmon to the Stanley Basin lakes, the Sunbeam Dam, was built in 1910. Between 1938 and 1975, eight major Federal hydroelectric dams were built on the Columbia and Snake Rivers, including the Bonneville, McNary, and Lower Granite Dams. Although the specific effects of the dams on the Snake River sockeye salmon run are not quantified, the Northwest Power Planning Council estimates that the hydropower dams reduced overall annual salmon and steelhead (*Oncorhynchus gairdneri*) production in the Columbia River Basin by 8 million fish—a 50 percent decline. Approximately half of the losses were due to the blockage of habitat by the Chief Joseph Dam on the upper Columbia River and the Hells Canyon Dam on the Snake River. The other losses are attributed to the eight mainstem dams below the Chief Joseph and Hells Canyon Dams. In addition, the dams' fish passage facilities, powerhouse and

spillway operations, and reduced water flows can delay the salmon. Because sockeye salmon do not feed during their upstream migration, delays during migration may deplete the salmon's limited energy reserves and increase pre-spawning mortality.

The hydroelectric dams primarily affect the Snake River juvenile sockeye salmon. The juvenile fish are killed, injured, lost, and delayed as they pass through reservoirs, turbines, spillways, sluiceways, and bypass systems. While the fish are in the reservoirs they are subjected to increased predation by such species as the northern squawfish (*Ptychocheilus oregonensis*), a native fish, and the non-native walleye (*Stizostedion vitreum*). Some salmon also lose the urge to migrate and remain in the reservoirs, while others are delayed and arrive at the ocean unable to undergo the physiological changes necessary to adapt to salt water. Although no studies have been conducted specifically on sockeye salmon, an estimated 93 percent of juvenile chinook salmon (*Oncorhynchus tshawytscha*) and steelhead are lost an-

(continued on next page)



## Listing Proposals

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nually due to the eight mainstem dams. This percentage can approach 100 percent in low flow years.

Water diversion from the Columbia River and Salmon River for agricultural irrigation has contributed to the salmon's decline. Agricultural diversions have removed all of the water from Alturas Lake Creek, preventing the salmon from entering the lake they once used. Other unscreened water diversions allow juvenile fish to move into irrigation systems and become lost. Water withdrawals from the Columbia River Basin also reduce the flows during the time the juvenile salmon are migrating to the ocean, which in turn decreases the survival of the fish.

Several other factors have contributed to the decline of the salmon run. Commercial fisheries have been harvesting the Snake River sockeye salmon since 1889. In 1898, more than 4.5 million pounds (2.05 million kilograms) of sockeye salmon, including Snake River fish, was taken from the lower Columbia River. From 1960 to 1973, commercial and tribal sockeye salmon fisheries in the Columbia River downstream from the Snake River averaged 35,956 fish. These fisheries may have harvested a disproportionately high number of Redfish Lake sockeye because the Redfish Lake sockeye are relatively large compared to the Columbia River sockeye salmon. The stocking of freshwater gamefish in the reservoirs and at the spawning grounds has resulted in increased predation of the sockeye's eggs, fry, and smolt. The Snake River Basin also has been experiencing drought conditions. This has resulted in lower flows, which in turn delay the return of juvenile fish downstream and may preclude fish from moving through the dams.

If Endangered Species Act protection is extended to the Snake River sockeye salmon, the operation of the mainstem dams for power generation,

irrigation, flood control, and navigation could be affected. In particular, flows in the rivers could be modified to improve the passage of migrating juvenile sockeye. Other Federal actions that could be affected include permits issued by the Army Corps of Engineers under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, and Federal Energy Regulatory Commission licenses for non-Federal development and operation of hydropower dams.

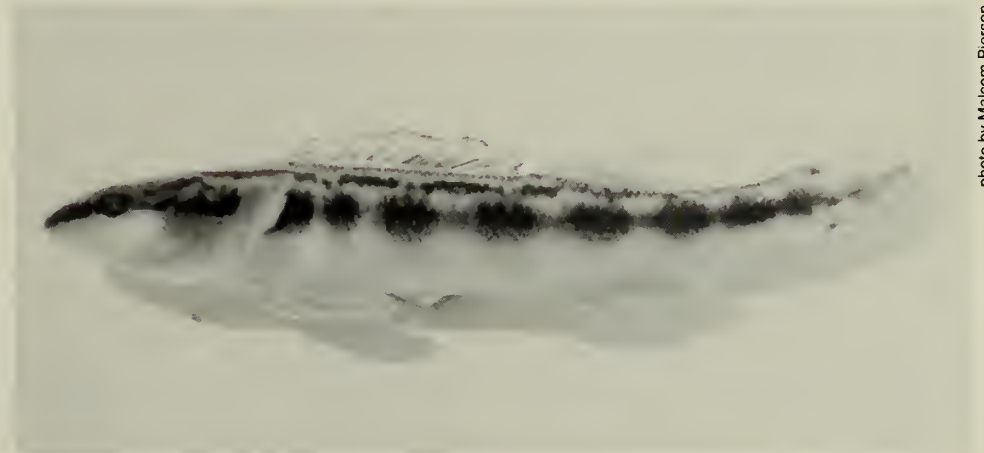
NMFS and the other involved Federal and State agencies could take several measures to help conserve the species. These include: capturing adult sockeye returning to Redfish Lake to spawn and using their offspring to rebuild the population; improving adult fish passage facilities at dams; eliminating the catch of sockeye salmon in all Columbia River fisheries; placing screens across all water diversions to prevent the loss of migrating juvenile

sockeye; and controlling predators and competing species in the Stanley Basin lakes.

## Goldline Darter and Blue Shiner

These two fish species may have once occupied most of the Cahaba River system in Alabama and the upper Coosa and Alabama River systems in Alabama, Georgia, and Tennessee. The goldline darter (*Percina aurolineata*) is a slender fish, about 3 inches (8 centimeters) long, with brownish-red and amber stripes along its upper back. It historically occurred in 49 miles (79 kilometers) of the Cahaba River, almost 7 miles (11 km) of the Little Cahaba River, and in the Coosawattee River system (part of the upper Coosa River system). Today, it survives in fragmented populations in the Coosawattee River, in about 7 miles of the Little Cahaba River, and

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**The goldline darter (*Percina aurolineata*) seems to have declined throughout the Cahaba River system. It continues to survive in about 7 miles of the Little Cahaba River, Alabama, where this specimen was found.**



**This male blue shiner (*Cyprinella caerulea*) was found in the Little River, a tributary of the Coosa River, in Alabama.**

photo by Malcom Pierson

photo by Malcom Pierson

## Listing Proposals

(continued from page 7)

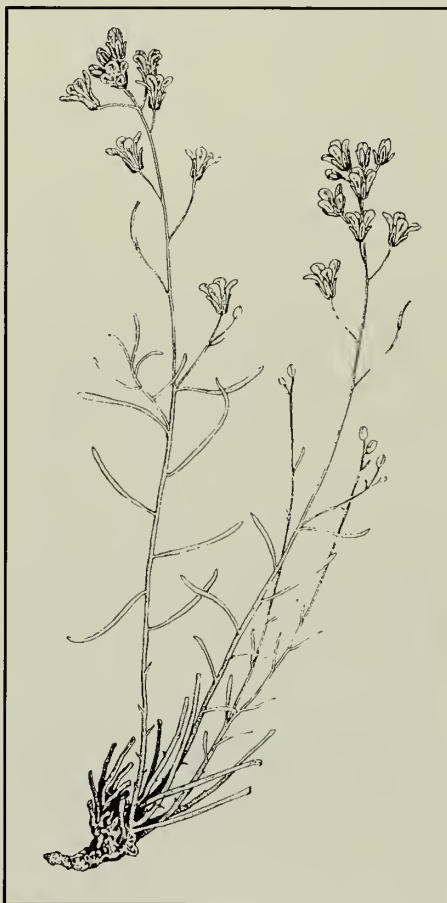
in 27 miles (43 km) of the Cahaba River.

The blue shiner (*Cyprinella caerulea*) is a medium-sized minnow that may grow up to 4 inches (10 cm) long and often appears to be dusky blue with pale yellow fins. This fish historically occurred in the Cahaba River in Alabama and the upper Coosa River system in Alabama, Georgia, and Tennessee. It has been extirpated from the Cahaba River, but continues to survive in fragmented populations in the upper Coosa River system.

The ranges of both fishes have declined due to water pollution and the construction of reservoirs. Water pollution is responsible for eliminating the blue shiner and reducing the goldline darter populations in the Cahaba River system. In this basin, there are 10 municipal wastewater treatment plants, 35 surface mining areas, and 67 other permitted discharges. During low flows, virtually all of the water in some stretches of the river is treated sewage effluent. Although some of the wastewater treatment plants have been upgraded, nutrients in the sewage are still contributing to eutrophication of the river, which adversely affects the fish by removing oxygen from the water. Increased siltation that results from surface mining, the operation of limestone quarries and cement plants, road construction, and site preparation for gas drilling operations also has degraded water quality and affected both species. Methane gas extraction in the basin also could occur in the future, which has the potential to affect water quality and the fish.

Impoundments for hydropower, navigation, and flood control probably wiped out all of the goldline darter and blue shiner populations in the upper Alabama and Coosa Rivers, along with isolated populations in the tributaries of the upper Coosa River. These reservoirs also have fragmented and isolated the goldline darter popu-

lations in the Cahaba River system from the upper Coosa River tributary populations. Because these fragmented populations are apparently reproducing, the Fish and Wildlife Service has proposed that the goldline darter and blue shiner be listed as Threatened rather than Endangered (F.R. 4/19/91).



drawing by K. H. Thorne

**The Barneby reed-mustard (*Schoenocrambe argillaceae*) grows up to 12 inches (30 cm) from a woody root crown. Its inflorescence contains as many as 20 small flowers that are whitish to pale lavender in color with prominent purple veins.**

### Two Utah Plants

The clay reed-mustard (*Schoenocrambe argillaceae*) and Barneby reed-mustard (*Schoenocrambe barnebyi*), small perennial herbs in the family Brassicaceae, were proposed for listing in the April 12 *Federal Register*. Both species are endemic to desert shrub-lands, and each has specific soil requirements. Their low numbers and restricted distribution make them particularly vulnerable to extinction as a result of habitat disturbance.

All known populations of *S. argillaceae* are on Federal lands in southwestern Uintah County that are leased for oil and gas reserves. In addition, the species' entire range is underlain by oil shale, which could be mined when economic conditions favor it. The Bureau of Land Management (BLM) is responsible for administering energy development in this area. A total of approximately 2,000 individuals of *S. argillaceae* are known to exist at seven sites.

About the same number of *S. barnebyi* are known to remain in two small populations. One is within Capitol Reef National Park in central Wayne County. The other is on BLM-administered land on the San Rafael Swell, a large anticline or geological upwarp, in southern Emery County. This population is threatened by habitat damage associated with the potential for uranium mining. The single hillside where it occurs already has been bisected by an access road leading to nearby mining claims. Even before a mine is developed, the annual assessment work required to maintain the claims could degrade the habitat.

If the proposal to list *S. argillaceae* and *S. barnebyi* is approved, Federal agencies will be required to ensure that none of their activities (including mineral leasing) are likely to jeopardize the survival of these species.

### Five Puerto Rico Plants

Five species of rare evergreen trees and shrubs endemic to the island of Puerto Rico were proposed April 19 for listing as Endangered:

- *Callicarpa ampla*, or capa rosa — A species in the family Verbenaceae, this tree grows up to 50 feet (15 meters) tall. Its branched inflorescence bears numerous small, whitish flowers. Only seven trees at four sites are known.

- *Styrax portoricensis*, or palo de jazmin — A taller tree, this member

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*Callicarpa ampla*



*Styrax portoricensis*



*Ternstroemia luquillensis*



*Ternstroemia subsessilis*

## Listing Proposals

(continued from page 8)

of the family *Styracaceae* can reach 66 feet (20 m) in height. The inflorescence is a 3- to 6-flowered raceme, each flower being borne on a curved pedicel. Only one individual tree is known, and it was damaged in 1989 by Hurricane Hugo.

• *Ternstroemia luquillensis* or palo colorado — The third tree in this listing package, *T. luquillensis*, belongs to the tea family (*Theaceae*). It grows as tall as 60 feet (18 m) and produces showy, white or cream-colored flowers. Only two trees of this species have been reported in recent years.

• *Ternstroemia subsessilis* — A related species, this plant is a shrub or small tree that grows to about 17 feet (5 m) in height. Its small, white flowers are solitary and borne at the ends of the branches. A total of 24 individuals in 3 populations are known.

• *Ilex sintenisii* — The fifth species, *I. sintenisii*, is a shrub or small tree in the holly family (*Aquifoliaceae*). No specimens taller than 15 feet (4.5 m) tall have been recorded. It is restricted to the dwarf or elfin forest of the Luquillo Mountains.

All five of these species have been reduced in range and numbers, and are now believed to occur only in the Luquillo Mountains of northeastern Puerto Rico. Although the surviving

populations are within the Caribbean National Forest, road construction, expansion of communication facilities, and certain forestry management activities could threaten some of the plants. Because these species are so extremely rare, the loss of any one individual could be critical. If the listing proposal is approved, the U.S. Forest Service will be responsible under the Act for ensuring that these plants and their habitat are protected.

\* \* \*

## Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities

to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take or to engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.

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## Final Listing Rules Published for Three Species

During April 1991, the Fish and Wildlife Service published final rules listing three taxa—a plant, a bird, and a mammal—as Threatened or Endangered species. Endangered Species Act protection is now available to the following:

### *Schoepfia arenaria*

This small evergreen tree, a member of the family *Olacaceae*, is endemic to the coastal forests and limestone hills of northern Puerto Rico. It grows up

to 20 feet (6 meters) tall and may have several trunks up to 4 inches (10 centimeters) in diameter. Urban, industrial, and tourist development has extirpated the species from most of its range. Today, this plant is known to occur in the Isabela area (about 100 individuals), on private land near the Pinones Commonwealth Forest (about 30 mature plants and numerous saplings and seedlings), and on limestone hills in Fajardo (an estimated 50 individuals). One tree was

reported in the Rio Abajo Commonwealth Forest in 1985, and the species may also exist in the Tortuguero Lagoon Natural Reserve. Residential development threatens the population near the Pinones Commonwealth Forest. One landowner in Isabela recently proposed to donate the cliffs on which some trees grow to the Puerto Rico Department of Natural Resources. The other populations, however, are under intense development

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## Final Listings

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pressure. The Fish and Wildlife Service proposed that *Schoepfia arenaria* be listed as Threatened in the September 17, 1990, *Federal Register* (see *Bulletin* Vol. XV, No. 10), and the final rule was published April 19, 1991.

### White-necked Crow (*Corvus leucognaphalus*)

This bird resembles the crows of the mainland United States but is distinguished by the pure white base of the feathers of the hind neck. It originally occurred in the Dominican Republic, Haiti, Puerto Rico, and St. Croix in the U.S. Virgin Islands. The white-necked crow seems to thrive only where there are extensive stands of natural forest. With the clearing of the forests and extensive hunting of the bird for its meat, the crow has disappeared from St. Croix and Puerto Rico.

Today, the white-necked crow only occurs in limited parts of the Dominican Republic and Haiti, which share

the island of Hispaniola. However, the bird's remaining forest habitat is being cleared for agriculture, housing, and tourist development. It is estimated that less than 7 percent of Haiti and less than 15 percent of the Dominican Republic remains forested. In addition, the crow continues to be hunted in the Dominican Republic. The Service proposed that the white-necked crow be listed as Endangered in the December 27, 1989, *Federal Register* (see *Bulletin* Vol. XV, No. 1), and the final rule was published April 3, 1991.

### Silver Rice Rat (*Oryzomys palustris natator*)

The Lower Keys population of the rice rat, or the silver rice rat, is a small rodent endemic to the wetlands of Florida's Lower Keys. Rice rats occur from the southeastern United States and Mexico to northern South America. There are varying interpretations regarding the taxonomic status of those in the Lower Keys. However, the Service has determined that they do constitute a distinct vertebrate

population and therefore are eligible for Endangered Species Act protection.

The silver rice rat requires undeveloped mangrove forests and salt marsh habitat, unlike the common rats (*Rattus* spp.) found in urban areas. Most of this natural habitat in the lower Florida Keys has been lost during the past few decades because of commercial and residential development. The silver rice rat is currently known to occur at very low densities on eight keys. It is believed extirpated from one key and possibly from two others. The silver rice rat's remaining habitat continues to be threatened by residential and commercial development. In addition, predation by raccoons (*Procyon lotor*) and competition with introduced black rats (*Rattus rattus*) threaten the survival of the silver rice rat. The Service proposed in the October 20, 1990, *Federal Register* that the lower Florida Keys population of the rice rat be listed as Endangered (see *Bulletin* Vol. XV, No. 11), and the final rule was published April 30, 1991.

## Regional News

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in recommending that areas known to be used by breeding gray wolves (*Canis lupus*) be closed to coyote (*Canis latrans*) hunting during the big game hunting season, and that baiting and the use of hounds to hunt black bear (*Ursus americanus*) in the Selkirk Grizzly Bear Recovery Zone be prohibited. The Service supported the recommendation to temporarily restrict coyote hunting because it believes there is the potential for hunters to mistake young wolves for coyotes. The Washington Department of Wildlife will implement the recommendations in the State's regulations for the next three hunting seasons.

\* \* \*

On March 20, a Service biologist found tracks of two wolves and an elk (*Cervus elaphus*) carcass the wolves had

recently killed in Idaho's upper St. Joe River drainage. The area is about 7 miles (11 kilometers) from the Montana-Idaho line and has had frequent gray wolf sightings for the past 10 years. This reconfirms that wolves are present in this portion of Idaho.

\* \* \*

The Threatened Warner sucker (*Catostomus warnerensis*) occurs only in a few lakes and streams in Oregon's Warner Valley. The survival of this fish may now be imperiled as water conditions in the valley decline due to a continuing drought. A recent fish kill in Crump Lake included nearly 100 Warner suckers. This summer, Hart Lake is expected to dry up. In light of these conditions, personnel from the Oregon Department of Fish and Wildlife, the Bureau of Land Management, The Nature Conservancy, and the Service began to capture the remaining lake-dwelling fish

in April, when the species is most easily captured. Tentative arrangements have been made to move the fish to Dexter National Fish Hatchery, New Mexico, where they will be temporarily held until conditions improve in Warner Valley.

\* \* \*

Since 1980, the Institute for Wildlife Studies in Arcata, California, in cooperation with the California Department of Fish and Game, has been conducting a program to reintroduce bald eagles (*Haliaeetus leucocephalus*) on Santa Catalina Island, California. However, the reintroduced eagles' eggs have not been successfully hatching due to residual DDE contamination.

To help increase the Santa Catalina Island population, biologists from the Service's Sacramento Field Office and the California Department of Fish and

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## Regional News

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Game removed two bald eagle eggs from a mainland nest at Frenchman Reservoir (Plumas County) and escorted the eggs on a commercial flight from Reno, Nevada, to Long Beach. The following day, the eggs were placed into two nests on Santa Catalina Island. They successfully hatched in mid-April.

The California Department of Fish and Game intends to treat Frenchman Reservoir with a fish poison to destroy an illegally introduced population of northern pike (*Esox lucius*), which poses a serious threat to the entire Sacramento/San Joaquin Valley fishery should the pike escape or be transported from the reservoir. Translocating the bald eagle eggs prevented possible mortality of juvenile eagles due to loss of their food supply, while helping restore the Santa Catalina Island eagle population.

\* \* \*

The Service released a draft environmental assessment on April 15 for proposed additions to the Julia Butler Hansen National Wildlife Refuge in the Westport, Oregon, area. This refuge protects important habitat for two subpopulations of the Endangered Columbian white-tailed deer (*Odocoileus virginianus leucurus*). Securing habitat to protect a third viable population in the Westport area is one of the key remaining steps in the species' recovery plan. In the draft environmental assessment, the Service is proposing to purchase title to approximately 1,600 acres (650 hectares) of key habitat and obtain conservation easements and cooperative agreements for an additional 2,900 acres (1,200 ha).

\* \* \*

The Service also has begun preparing a draft environmental assessment to establish a refuge in the southernmost end of San Diego Bay, California. The San Diego Bay National Wildlife Refuge would protect habitat for a variety of endangered wildlife,

including the California least tern (*Sterna antillarum browni*), light-footed clapper rail (*Rallus longirostris levipes*), brown pelican (*Pelecanus occidentalis californicus*), peregrine falcon (*Falco peregrinus*), and bald eagle. The study area consists of approximately 2,500 acres (1,000 ha) owned by the Port of San Diego, State of California, San Diego Gas and Electric, and Western Salt Company. Over 80 percent of the original tidal wetlands of this bay have already been lost to development, and commercial and recreational development is a threat to the remaining habitat. Numerous environmental organizations and public agencies have indicated support for the refuge.

\* \* \*

**Region 2** - The Calgary Zoo in Alberta, Canada, is completing plans for its whooping crane (*Grus americana*) rearing facility. The zoo, which is scheduled to receive its first whooping crane eggs in 1992, is eventually expected to contain up to 10 breeding pairs of whoopers. Young birds that are produced and reared at the Calgary Zoo will be used to help establish new populations in the wild. To help ensure successful propagation of the cranes, two zoo employees will receive one month of special avicultural training at the International Crane Foundation in Baraboo, Wisconsin. Later, they will visit the Service's Patuxent Wildlife Research Center in Laurel, Maryland, for further orientation. The zoo also expects to raise other crane species this year in order to gain experience in caring for and breeding cranes.

Nine whooping cranes — five juveniles, one subadult, two adult females, and an adult male — disappeared from the Aransas National Wildlife Refuge in Texas this winter and are presumed dead. The loss of nine birds represents 6.1 percent of the population and is the worst winter loss since 1962 when 12.5 percent of the population was lost. Nine other adult and subadult birds disappeared

between the spring of 1990, when the birds departed for Canada's Wood Buffalo National Park, and the fall, when they arrived back at Aransas. With only 13 juvenile whoopers reaching the refuge in 1991, the Aransas/Wood Buffalo population's total losses exceeded production in 1990—the first time since 1981 that the population has declined.

Six of this winter's losses likely occurred in a 4-mile (6-km) stretch of the refuge in late December and early January. Although the remnants of only one carcass have been found, predation is suspected in some of the losses. Three of the juveniles had winter territories adjacent to the 4-mile stretch and all five juveniles fed in the area. The female parent of one of the juveniles is also among those presumed dead.

Two other subadults are also missing. Subadults move about more frequently than adults during the winter months and do not maintain a territory. The two cranes were last seen together in February and may have moved outside of the area being surveyed.

As the 1991 spring migration began, a whooper was shot and killed near Bend, Texas. A suspect signed a confession and charges are pending. The maximum population in the Wood Buffalo/Aransas flock is now 136 birds, compared to 142 birds at this time in 1990.

\* \* \*

**Region 3** - Since 1980, the Service has been providing Endangered Species Act grants for surveys, land acquisition, and other conservation activities intended to protect "algific talus slopes" in the Driftless Area of Iowa, Minnesota, Wisconsin, and Illinois. This area was not glaciated during the last ice age, unlike the surrounding region where glacial deposits (drift) are common, and it has unique topographic and biological features such as the algific talus slopes. These steep slopes, underlain with fissures and

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caves, are covered with talus or rock rubble. Cold, moist air flows out of the fissures and percolates through the rubble, providing unique habitat conditions. The Endangered Iowa Pleistocene snail (*Discus macclintocki*), the Threatened northern wild monkshood (*Aconitum noveboracense*), and at least eight plant and invertebrate listing candidate species are found on these slopes.

The Service has been working closely with the four States, The Nature Conservancy, several Iowa County conservation boards, numerous biologists, and cooperative landowners to identify and protect these fragile areas and their rare species. As a result of the exceptional cooperative efforts of these organizations and individuals, a substantial number of important algific slopes are now owned and protected by The Nature Conservancy, the States of Minnesota, Iowa, and Wisconsin, and the Service.

To monitor the rare species' populations and habitat conditions on the algific slopes in Iowa, including some still in private ownership, the Service's Region 3 biologists are developing a cooperative monitoring program. Funding for this effort is being provided by The Nature Conservancy, the Iowa Department of Natural Resources, and the Service (using both Section 6 grants and plant recovery funding). Each of the organizations will contribute one or more individuals to the monitoring team to ensure that data are collected consistently. The team will be trained by experienced algific slope researchers in the proper techniques to safely sample these species. After the team works as a unit to sample a few algific slopes, it will separate and its members will monitor several areas spread across a seven-county region in northeastern Iowa. Some sites will be simply monitored using photographs, while others will undergo detailed demographic analysis or mark-recapture

studies. Eventually, the Service hopes to expand this monitoring program into all important algific slopes throughout the Driftless Area.

\* \* \*

**Region 4** - For 5 years, Aquatic Specialists, a private company in Knoxville, Tennessee, that breeds and rears tropical fishes, has been conducting a captive-rearing project for the Endangered smoky madtom (*Noturus baileyi*) and Threatened yellowfin madtom (*Noturus flavipinnis*) in cooperation with the University of Tennessee's Department of Zoology. The Tennessee Wildlife Resources Agency has funded the project using Endangered Species Act grants from the Service. The project involves collecting eggs and larvae of both species from Citico Creek in the Cherokee National Forest, Tennessee, rearing them in captivity, returning captive-reared juveniles to Citico Creek to augment that population, and reintroducing fish into Abrams Creek in Great Smoky Mountains National Park. Captive populations of the fishes have also been established for breeding purposes.

To date, 1,191 smoky madtom and 1,288 yellowfin madtom eggs and larvae have been collected. Some mortality has occurred, but 535 smoky madtom and 378 yellowfin madtom juveniles have been reintroduced into Abrams Creek; 37 smoky madtoms and 80 yellowfin madtoms have been returned to Citico Creek; and 37 smoky madtoms and 12 yellowfin madtoms have been kept for captive breeding. Last spring, an adult smoky madtom was seen guarding a nest cavity in Abrams Creek—the first sign that the madtom reintroduction effort may be succeeding. Fish in the captive population are healthy, but breeding has not yet occurred.

In April, the University of Tennessee's Zoology Department hosted the annual recovery meeting for the two listed fishes. Some attendees expressed concern that the yellowfin madtom population in

Citico Creek may have declined significantly because of droughts and floods in recent years. Fortunately, however, no decline in the smoky madtom population has been evident. The U.S. Forest Service is funding a survey to assess the population levels of both species before any additional eggs or larvae are taken. Abrams Creek also will be surveyed this spring for spawning madtoms. In addition, the Forest Service is seeking funding to survey other streams for potential reintroduction sites, primarily in the Little Tennessee drainage.

\* \* \*

**Region 5** - The Nature Conservancy, the town of Brookhaven, New York, and the Service have set up a cooperative agreement for the protection and management of a sandplain gerardia (*Agalinis acuta*) population on Long Island. This highly vulnerable site has been threatened by a road widening project and was disturbed during the installation of a pipeline. With support from the Service's New York Field Office, the town has fenced the area where the plants are located to protect them from further disturbance.

\* \* \*

For the past several months, the Service's Virginia Field Office has been sponsoring meetings with local, State, and Federal agencies, along with private interests, to increase the understanding and protection of jeopardized mussel and fish species occurring in the Upper Tennessee River Basin of southwestern Virginia. Several ad hoc interagency work groups, comprised of 16 private groups and governmental agencies, are now developing mechanisms to protect the listed species and improve water quality in the river basin.

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Over 60 volunteers participated in West Virginia Cliffwatch 1991, an effort to monitor returning peregrine falcons in the State. Two breeding pairs were located in 1991, both in

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the Monongahela National Forest. Additional peregrines have been observed, but no other pairs have been confirmed. As of April 16, one of the two pairs appeared to be incubating eggs. This is the first documented nesting of peregrine falcons in West Virginia since 1949.

\* \* \*

**Region 6** - Ten new nesting islands for the Endangered interior least tern (*Sterna antillarum*) and the Threatened piping plover (*Charadrius melodus*) are being created in the Platte River in Nebraska. The Platte River Whooping Crane Habitat Maintenance Trust, the National Audubon Society's Lillian Annette Rowe Sanctuary, and the Fish and Wildlife Service cooperated to construct two of the islands last summer. These islands will be available for shorebirds returning to nest in 1991. Another eight nesting islands will be built in the river this summer by the Nebraska Public Power District. The utility is doing this work to satisfy a Federal Energy Regulatory Commission condition in its annual license to operate Kingsley Dam.

The Lyman-Richey Corporation of Omaha, Nebraska, also announced a \$24,000 donation to the Nebraska Game and Parks Commission's nongame and endangered wildlife conservation fund to increase efforts to protect the least tern and piping plover. The National Fish and Wildlife Foundation will provide additional funds to match the company's donation. The contributions will be used by the State to hire personnel to monitor the birds while they are nesting at the company's sand and gravel mining sites along the Loup and Platte Rivers, to increase public awareness, and to provide advice to the sand and gravel operators to protect the birds.

Historically, interior least terns and piping plovers were common breeding birds along the rivers of the northern

Great Plains. The barren to sparsely vegetated sand and gravel pits closely resemble the river sandbars where the birds nest and raise their young. However, much of the birds' breeding habitat has been eliminated through the damming, channelization, and diversion of the Platte River. Efforts are now under way to protect the remaining riverine habitat and to curtail human disturbance during the breeding season.

Through its donation, the Lyman-Richey Corporation hopes to serve as a catalyst for conservation elsewhere along the two rivers. The company plans to work closely with other sand and gravel operations through the Nebraska Concrete Aggregates Association, a nonprofit organization of the sand and gravel industries, to promote conservation of terns and plovers.

\* \* \*

The Utah Division of Wildlife Resources has succeeded in breeding Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) in a small reservoir in Utah's Pilot Mountains. The Threatened Lahontan cutthroat trout is native to the Humboldt River drainage in Nevada. Water diversions are primarily responsible for the decline of the species and its habitat.

To propagate the species, State and Service biologists captured Lahontan cutthroat trout in a small stream north of Wendover, Utah, and released the trout into the reservoir in the Pilot Mountains in 1986 and 1987. The fish have exhibited phenomenal growth in this reservoir. This spring, two ripe females and one male weighing between 5 and 6 pounds (2.3 - 2.7 kilograms) were caught and artificially spawned. Seven thousand eggs from the females are being incubated. The fry will be placed in a small nursery pond to optimize their growth and development. Some of the juvenile fish will then be put back into the reservoir to augment that population, while others may be released into other suitable habitat in Utah.

\* \* \*

The Utah Division of Wildlife Resources has stocked Endangered June suckers (*Chasmistes liorus*) in Camp Creek Reservoir. Recently, 15 to 20 immature June suckers were found, indicating that there may be natural reproduction and some recruitment occurring in the reservoir.

In addition to the Camp Creek Reservoir project, the State is planning to launch a major effort to breed June suckers from Utah Lake. There is no documented recent survival of young suckers in the lake because it is full of introduced, predacious fish. Adult fish will be taken out of the Provo River, which they enter to spawn, between mid-May and mid-June. Progeny from these fish will be maintained at the Utah Division of Wildlife Resources' Fisheries Experimental Station at Logan and the Fish and Wildlife Service's Ouray National Wildlife Refuge. These fish will be maintained as broodstock for future research and reintroduction programs.

To provide an alternative food source for the large population of predatory fish in Utah Lake, the State is considering the possibility of introducing gizzard shad (*Dorosoma cepedianum*). However, the State first will study the potential for competition between the gizzard shad and the June sucker before introducing any shad into the lake.

\* \* \*

The fate of four "orphaned" gray wolf pups in the Nine-mile Valley in Montana continues to be of special interest to many people (see *Bulletin* Vol. XVI, No. 3). The Service had hoped that the pups would stay away from livestock. Ranchers in the area cooperated with the Service and wrote a letter to all livestock producers requesting that they properly dispose of livestock carcasses in order to avoid wolf depredations.

However, in late March the wolves left the Nine-mile Valley and killed two yearling steers. Due to the likeli-

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hood for continued depredation on livestock, Service biologists believed it was necessary to capture the wolves and transfer them to Glacier National Park. The biologists were successful in capturing only three of the pups, one male and two females, because one of the pups recovered from the tranquilizer before it could be restrained. This pup has not returned to the Nine-mile area. However, another unrelated female wolf moved from Glacier National Park into the Nine-mile Valley in March.

The three pups were temporarily held at a veterinary clinic in Kalispell, Montana. One of the captured females was confirmed as being pregnant. This is the first documented pregnancy of an 11-month-old wolf in the wild.

On April 13, the pups were released into Glacier National Park. The pups did not stay together after they were released. The non-pregnant female left the park, and on May 25 killed two sheep in the adjacent Blackfoot Indian Reservation. She was recaptured that same day and will be transferred to the Wolf Haven in Tenino, Washington, which will permanently care for her. The male pup remains near the release site. The pregnant wolf has left the park and is now in the Bob Marshall Wilderness Area. As of May 30, there was no indication that she had settled at a den site or given birth. The Service will continue to monitor the status of the two wolves.

\* \* \*

**Region 8** - Six pairs of Endangered Puerto Rican parrots (*Amazona vittata*) have nested at five sites in the wild this year—a record. Two nests in one area have two young each, which at last report were ready to fledge. A third pair of parrots in the same valley successfully hatched two eggs but the chicks subsequently developed health problems. One of the chicks became sick with an unknown illness and was

taken to the Luquillo Aviary where it subsequently died. The other chick fledged prematurely, injured itself, and was taken to the aviary. This chick is now doing well with the captive flock.

A fourth pair of parrots nested in a new area and is believed to have one chick. This nesting area had been modified by the Forest Service to attract Puerto Rican parrots. The fifth nesting site has 3 eggs, of which at least one has hatched (at last report) and is believed to be doing well. The sixth nesting area, which is also a new nest area, is believed to have a female incubating eggs.

If these parrots are successful in fledging their young, significant progress will have been made in the recovery effort. The presence of two new nesting areas in the wild is of special significance. Biologists from the Fish and Wildlife Service and the Forest Service have been trying to establish new nesting areas for over 10 years. There are now at least 20 parrots in the wild and 56 in captivity.

\* \* \*

Intensive trapping this past winter at Buenos Aires National Wildlife Refuge in Arizona documented the presence of 28 coveys of Endangered masked bobwhites (*Colinus virginianus ridgwayi*), totaling more than 200 birds. Biologists actually trapped about 90 of the birds, of which 9 percent were estimated to have been produced on the refuge based on the absence of leg bands.

\* \* \*

**Region 9** - On April 15, the Environmental Protection Agency requested formal consultation with the Service on the effects of 31 pesticides (15 wildlife control agents, 15 insecticides, 1 herbicide) on listed species, as required under section 7 of the Endangered Species Act. The pesticides will be reviewed for possible impacts to every potentially affected Threatened and Endangered species in the United States (approximately 600). This program is designed to bring

EPA's pesticide registration activities into compliance with the environmental protection provisions of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). A National Consultation Team, comprised of biologists from each of the Service's seven regions, is handling the consultation. A final biological opinion is anticipated by mid-December.

\* \* \*

Staff from the Service's Office of Management Authority represented the United States at the April 8-11 meeting of the Standing Committee of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Standing Committee is CITES' governing body between biennial meetings of the Conference of the Parties. It is composed of representatives of North America, Latin America and the Caribbean, Asia, Oceania, Africa, and Europe, along with Switzerland (where the CITES Secretariat is located) and Japan (the host of the next CITES meeting in 1992). Canada is the current North American representative to the Standing Committee; the United States attended the meeting as an observer.

The Standing Committee discussed several issues at the April meeting. South Africa requested that its African elephant (*Loxodonta africana*) population be transferred from Appendix I to Appendix II of CITES. (Appendix I prohibits trade for primarily commercial purposes, while Appendix II allows for regulated trade.) At the seventh meeting of the CITES Conference of Parties in 1989, the Parties agreed to a special mechanism for transferring some populations of the African elephant back to Appendix II if a series of criteria are satisfied (see *Bulletin* Vol. XV, No.5). In response to South Africa's request, the CITES Standing Committee established a panel of six experts to review the proposal, including its biological, trade, and law enforcement implications.

(continued on page 16)

The panel's report will be considered at the March 1992 Conference of Parties in Kyoto, Japan.

Another topic the CITES Standing Committee addressed was Thailand's trade in fauna and flora. There is concern that Thailand is involved in a significant amount of illegal trade, which is undermining CITES and posing a serious threat to many endangered species. The Standing Committee subsequently decided to recommend that the CITES Parties prohibit any trade with Thailand in fauna and flora covered by CITES. The Service is evaluating options for addressing this Standing Committee recommendation.

The Standing Committee also examined a report on illegal trade from Grenada, particularly its trade in psittacine birds from Guyana and Brazil. The Standing Committee will monitor the situation in Grenada, which is not a CITES Party, before making any additional recommendations. The Service has offered to assist the CITES Secretariat in providing assistance to Grenada so it can join and implement the treaty.

In addition, the Standing Committee agreed, at the request of the Ser-

vice, to place the issues of trade in sea turtles and wild birds on the provi-

sional agenda for the 1992 CITES meeting.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	55	249	8	22	334	31
Birds	73	153	12	0	238	67
Reptiles	16	58	18	14	106	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	38	2	2	0	42	30
Crustaceans	8	0	2	0	10	5
Insects	11	1	9	0	21	12
Arachnids	3	0	0	0	3	0
Plants	190	1	60	2	253	126
<b>TOTAL</b>	<b>457</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1134*</b>	<b>358**</b>
Total U.S. Endangered 457 (267 animals, 190 plants)						
Total U.S. Threatened 155 (95 animals, 60 plants)						
Total U.S. Listed 612 (362 animals, 250 plants)						

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 286 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories:	53 fish & wildlife 39 plants
Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act:	7
Number of CITES Party Nations:	110

May 31, 1991

May 1991

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# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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## Technical Bulletin

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

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### Fifteen Hawaiian Plants Proposed in May for Endangered Species Act Protection

SEP 10 1991

Fifteen taxa of plants native to the Hawaiian Islands were proposed by the Fish and Wildlife Service on May 24, 1991, for listing as Endangered or Threatened. Fourteen of the 15 are endemic to, or have their largest or best known populations on, the island of Maui. The other species has two recognized varieties, one that is endemic to Maui and one that occurs primarily on O'ahu. All 15 taxa face a variety of threats, the most serious of which are competition with alien plants and habitat damage caused by feral animals.

Maui is formed from the remnants of two large shield volcanoes, the older West Maui volcano and the larger but much younger Haleakala on the east. These mountains and the connecting isthmus formed by lava flows comprise an island 729 square miles (1,888 square kilometers) in area. The highest point on West Maui, Pu'u Kukui, is 5,787 feet (1,764 meters) in elevation. Its average rainfall of 400 inches (1,020 centimeters) per year makes this deeply eroded peak the second wettest spot in Hawaii, and possibly the world. Having erupted as recently as about 200 years ago, Haleakala is much taller (10,023 feet, or 3,055 m) and retains its classic shield shape. Rainfall on Haleakala can be as high as 350 inches (890 cm) per year, but most is received by the windward slope; the crater area, sheltered from moisture-laden winds, is a cinder desert.

These unusual topographical and

(continued on page 5)



*The Haleakala silversword grows primarily on barren cinder cones and young lava flows within the volcano's crater at an elevation of 7,200 to 9,800 feet (2,200 to 3,000 meters). Standing next to this specimen is Dr. Robert Robichaux of the University of Arizona, who is studying the evolution and ecology of the Hawaiian silversword alliance.*

photo by Joan Canfield



## Regional News

Regional endangered species staffers have reported the following news:

**Region 1** - On May 8, the Fish and Wildlife Service's Sacramento, Cali-

fornia, Field Office completed a formal interagency consultation with the Farmers Home Administration (FmHA) under Section 7 of the En-

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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dangered Species Act. The consultation regarded a FmHA-funded 13-mile (21-kilometer) water pipeline in Kern County that was proposed by the Lost Hills Utility District. A key issue was the indirect effects of the pipeline on an Endangered plant, the San Joaquin wooly-threads (*Lembertia congdonii*). A population of this species exists in the utility district's service area, where urban development is expected as a result of the new pipeline. The FmHA agreed to include conditions in its grant deed to the utility district that require reinitiation of formal consultation for any waterline hookups in parcels containing the San Joaquin wooly-threads population. The FmHA also agreed to conduct status surveys for the plant within 5 miles (8 kilometers) of the project vicinity. As a result, the Service determined in its biological opinion that the pipeline would not jeopardize the species' survival.

\* \* \*

The Service's Sacramento Field Office is assisting the National Marine Fisheries Service (NMFS) in its Section 7 consultation with the Bureau of Reclamation on the Sacramento River's Threatened winter run of chinook salmon (*Oncorhynchus tshawytscha*). The Service recommended to NMFS that it request the Bureau of Reclamation to ensure that river water temperatures do not exceed 56°F (13°C) from June through September between the Keswick Dam and the mouth of Cottonwood Creek in northern California. The Bureau can keep the river water temperatures in the salmon's spawning habitat below the levels that are lethal to salmon eggs by selectively releasing water from Shasta Dam, coordinating Trinity River diversions, or modifying its water deliveries to users downstream on the Sacramento River.

The prognosis for the winter run of chinook salmon in the Sacramento River is poor. As of June 5, only an estimated 150 to 200 adult salmon had returned to spawn.

(continued on page 4)



# Critical Habitat Designation Proposed for the Northern Spotted Owl

The Fish and Wildlife Service proposed in the May 6, 1991, *Federal Register* to designate Critical Habitat for the northern spotted owl (*Strix occidentalis caurina*), which was listed in 1990 as Threatened (see *Bulletin* Vol. XV, No. 7). Over 11 million acres of forest habitat were identified as potential Critical Habitat on all landownerships within the range of the owl. Written comments on the proposal were collected until June 5, and public hearings were held in each of the affected States. Because of the complexity of this issue (designating Critical Habitat for a wide-ranging species and completing an accurate economic assessment for a species that inhabits major timber-producing forests), the Service had decided to repropose designation after review of the initial comments.

Identifying what habitat to include within Critical Habitat boundaries was not an easy task and required considerable judgement on the part of the Service. Such issues as the role of Critical Habitat designations in species recovery, the role of different landownerships in the conservation of the owl, and the economic costs of protecting Critical Habitat are being considered. Upon completion of its review of the comments and an evaluation of potential economic impacts, the Service will publish a revised proposal. There will be a new 60-day comment period with an opportunity for additional public comment, prior to a final decision in December.

Critical Habitat is sometimes an important tool in the conservation of listed species. The term Critical Habitat refers to the specific areas in which the physical and biological features essential to the conservation of a species are found. Critical Habitat designations help to highlight areas that are important to a species, iden-

tify important features, and provide guidance for meeting Federal habitat conservation responsibilities under the Endangered Species Act. Although the Act does not specify restrictions on non-Federal lands designated as Critical Habitat, it does place an obligation on Federal agencies. Section 7 of the Act requires Federal agencies to ensure that activities they fund, authorize, or carry out are not likely to jeopardize the survival of a listed species or to destroy or adversely modify its Critical Habitat.

In drafting the Critical Habitat proposal for the northern spotted owl, the Fish and Wildlife Service began with the Habitat Conservation Areas (HCAs) identified by the Interagency Scientific Committee (ISC) authorized by Congress in 1989. Last year, the ISC issued a report (popularly known as the "Jack Ward Thomas report" after the committee's chairman, a Forest Service research biologist). The ISC recommended establishing a system of HCAs totalling almost 8 million acres, within which no harvest was recommended. In addition, the ISC proposal included certain timber management requirements outside its recommended HCA system in order to provide forest conditions that would allow owl movement among the protected zones. This dispersal habitat is provided for under the ISC's "50-11-40 rule," which would require that 50 percent of the forest matrix outside of the HCA's be maintained in stands with trees averaging 11 inches or more in diameter and with at least 40 percent canopy closure.

Using the most current habitat maps available, the Service also identified as potential Critical Habitat other areas within the range of the owl that contain essential features. The Service believes that these new areas, including additions to the HCAs, are needed to address problems in habitat defi-

ciencies or with linkage among owl populations.

Unlike the ISC plan, the proposed Critical Habitat is not a plan for managing the northern spotted owl. A Critical Habitat designation would help to focus attention on areas that need additional protection and that may be important to the recovery of the owl; however, it would not prescribe specific management actions, nor would it identify the management or protection necessary for lands outside of Critical Habitat boundaries that are important for recovery of the owl. Management of such other lands is more appropriately described through the recovery process or other processes.

There is a widespread misconception that a Critical Habitat designation prohibits all activities within specified areas, but that is not the case. It applies only to activities on Federal land or those in which there is some Federal involvement, not activities of a purely private nature. When a proposed Federal action may affect a listed species, the appropriate agency consults with the Fish and Wildlife Service to determine if the activity would be likely to jeopardize the species or adversely modify its Critical Habitat. In the great majority of cases, there is no conflict. For example, if an activity such as precommercial forest thinning or selective logging were found not to adversely modify Critical Habitat, it would not be prohibited under this designation. Critical Habitat differs from the ISC plan in this sense. In cases where there may be problems with a proposed Federal action, the Service works with the involved agency to find "reasonable and prudent alternatives" that would avoid jeopardy or adverse modification while allowing a project to go forward.

(continued on page 4)

## Spotted Owls

(continued from page 3)

In addition to its team of Service experts on biology, the Service assembled a team of economic analysts to examine the effects of any Critical Habitat designation for the northern spotted owl. In the process of determining Critical Habitat, the Act requires the Service to consider the economic and other impacts resulting from such an action. Areas may be excluded from designation if the costs outweigh the benefits and if the exclusion does not result in the extinction of the listed species. The economic analysis team for the northern spotted owl Critical Habitat proposal includes specialists in forestry and natural resource topics from the Fish and Wildlife Service, Forest Service, Bureau of Land Management, Bureau of Mines, Council of Economic Advisors, and Office of Management and Budget. Their findings are being considered by the Fish and Wildlife Service as it refines the Critical Habitat proposal to meet the intent of the Act.

The revised Critical Habitat proposal will be published in the *Federal Register* in early August 1991. Written

comments will then be accepted for 60 days and the Service will hold more public hearings. A final decision on whether or not to designate Critical Habitat, and what the boundaries should be, is due 60 days after the second public comment period closes.

\* \* \*

Meanwhile, under the direction of the Secretary of the Interior, a separate multi-agency team is developing a recovery plan for the northern spotted owl. (See *Bulletin* Vol. XVI, No. 1.) The recovery team is reviewing the ISC report and will address Critical Habitat, but the team has been given a wider responsibility. The ISC plan was prepared before the northern spotted owl was listed as Threatened, and it was not intended to address Critical Habitat or recovery. Under the original ISC recommendations, not all northern spotted owls and their habitat would be protected, only enough to give the owl a high probability for survival over the next 100 years. Under the Endangered Species Act, however, the Fish and Wildlife Service is responsible for not only the owl's survival, but for its recovery to a

secure status throughout its range. This team must address all facets of the owl's needs on all landownerships to ensure that recovery under the Act can be achieved.

At the same time, the Service has participated in a congressionally-directed effort to help Jack Ward Thomas and three other eminent scientists create a proposal for an old growth reserve system in the Pacific Northwest. This proposed system is intended to accommodate the needs of listed, proposed, candidate, and other species; preserve the features and processes associated with natural old growth forest ecosystems; and protect some of the remaining old growth forest in the Northwest. Although a Critical Habitat designation would not itself address these other species or forest processes, the Service believes that it will contribute to this goal by helping to focus on important habitat features and values important to natural ecosystems. Focusing on the ecosystem problem in the Northwest will help avoid future conflicts and focus on larger conservation issues.

## Regional News

(continued from page 2)

\* \* \*

Governor Bob Miller of Nevada approved legislation on May 10 authorizing Clark County to purchase and manage lands for the Threatened Mojave population of the desert tortoise (*Gopherus agassizii*). This legislation is a necessary component of the Clark County Habitat Conservation Plan for the desert tortoise because the county did not have the authority to purchase habitat for the conservation of a federally listed species.

\* \* \*

Bird strike incidents involving commercial passenger jets and private aircraft have increased dramatically over the past 2 years at the Lihue Airport on the island of Kaua'i. Most of these incidents have not involved listed spe-

cies, and no people have been injured to date. However, two Endangered Hawaiian ducks (*Anas wyvilliana*) were killed by collisions with aircraft in recent months, and the number of Hawaiian ducks within a half-mile (0.8-km) of the runways has increased. Although there have been no reports of nene (*Nesochen sandvicensis*) being hit, groups of this Endangered Hawaiian goose as large as 32 have been seen on and adjacent to the runways earlier in May. With perhaps half of the known Kaua'i population of the nene in the vicinity of the airport, the potential for a serious aircraft accident is growing.

\* \* \*

The California condor (*Gymnogyps californianus*) captive populations had another record breeding year in 1991. Eleven pairs of birds (6 pairs at the

Los Angeles Zoo and 5 pairs at the San Diego Wild Animal Park) laid 22 eggs, of which 13 successfully hatched—almost double the number of condors that successfully hatched last year (7). The total California condor population now stands at 53, which is almost twice the number of condors in 1987 (27) when the last free-flying bird was captured. With the increase in the population, biologists are optimistic that California condors can be released back into the wild by the end of this year.

\* \* \*

Located approximately 15 miles (24 km) southwest of Chico, California, the 18,000-acre (7,300-hectare) Parrott Ranch contains one of the largest privately owned wetland and riparian complexes still intact in the

(continued on page 9)



# Service Proposes to Reintroduce Black-footed Ferrets into the Wild as an Experimental Population

Black-footed ferrets (*Mustela nigripes*), small, weasel-like carnivores with a black mask, black legs, and a black-tipped tail, once occurred throughout at least 12 western States and two Canadian Provinces, but this species may now be extinct in the wild. Using captive-bred stock, the Fish and Wildlife Service is working with Wyoming biologists to reestablish a wild population of black-footed ferrets in the southeastern corner of the State, bringing this Endangered animal one step closer to recovery.

As proposed in the May 24, 1991, *Federal Register*, 20 or more captive-raised ferrets will be released in the fall of 1991, followed by another 50 or more annually for the next 2 to 4 years. Currently, the preferred release point is a site within the 2,068-square-mile (5,354-square-kilometer) Shirley Basin/Medicine Bow Management Area of southeastern Wyoming. The Meeteetse Management Area in the northeastern part of the State, site of the last known wild population, is being considered as a back-up release point. The initial goal is to reestablish a self-sustaining wild population within 5 years.

The reintroduced ferrets would be managed as a "non-essential, experimental population" under Section 10(j) of the Endangered Species Act. In effect, populations with such a classification basically are treated as if they were listed as Threatened rather than Endangered, although for the purposes of Section 7 they are treated as if they were *proposed* for listing (see details in *Bulletin* Vol. IX, No. 9). This protects them while allowing the Service additional management flexibility, thereby allaying the concerns of landowners who may fear that reintroducing Endangered species could result in restrictions on the use of their property. Approximately 55 percent of the Shirley Basin/Medicine Bow Management Area is privately owned. The voluntary cooperation of landowners in this area will be essential to the success of the reintroduction effort.

The last known wild population of black-footed ferrets was discovered on a ranch near Meeteetse, Wyoming, in 1981 (see feature in *Bulletin* Vol. VIII, No. 3). It suffered a severe decline in 1985-1986 due to canine distemper, a disease that is fatal to ferrets. The last

18 ferrets were collected in 1986-1987 to prevent extinction of the species and to establish a captive propagation program. With the cooperation of the Wyoming Game and Fish Department, efforts to breed and raise black-footed ferrets have been very successful. As of June 1991, the captive population had increased to over 300, and it is still growing. The ferrets are housed at 5 facilities throughout the country, and another two zoos are expected to join the program shortly. This rapidly growing population will provide the animals needed for reintroduction.

Meeteetse had been considered the preferred site for the first reintroduction, but in 1989 its prairie dog population declined more than 50 percent. Black-footed ferrets prey primarily on prairie dogs (*Cynomys* spp.) and use their burrows for shelter and denning. Because of the reduced prairie dog numbers, the carrying capacity for ferrets at Meeteetse also is reduced. Meeteetse will remain under consideration as a future reintroduction site when biological conditions there improve.

## Proposed Listings

(continued from page 1)

climatic features allow Maui to support a rich variety of plant and animal habitats. The 15 species proposed for listing occur in many different vegetation communities (shrublands, forests, bogs), elevational zones (lowland to alpine), and moisture regimes (dry to wet).

If the listing proposal becomes final, Endangered Species Act protection will apply to the following plants:

- *Argyroxiphium sandwicense* ssp. *macrocephalum*, known locally as the Haleakala silversword or 'ahinahina, is a single-stemmed shrub in the aster family (Asteraceae). This distinctive

plant forms a rosette of narrowly sword-shaped leaves that are up to 13 inches (33 cm) long and covered with a dense mat of silky, silvery hairs. The narrow, branched inflorescence can grow almost 5 feet (1.5 m) tall. Each of the 50-600 flowering heads contains up to 42 pinkish petal-like ray florets and as many as 600 central disk florets, which are pink to wine-red at the tip and yellowish at the base. After flowering once, each plant dies. This taxon occurs only in Haleakala National Park, mainly on barren cinder cones and lava flows within the volcano's crater.

- *Acaena exigua*, known in Hawaiian as liliwai, is a perennial herb in

the rose family (Rosaceae). This small, inconspicuous species reaches only 6 inches (15 cm) in height and produces short, dense spikes of flowers that lack petals. It was known historically from high-elevation bogs on Pu'u Kukui on West Maui and from Mount Wai'ale'ale (the wettest spot in the world) on the island of Kaua'i. Although it has not been observed since 1973, *A. exigua* is believed to survive at a small site on Pu'u Kukui.

- *Alectryon macrococcus*, also called mahoe, is a tree in the soapberry family (Sapindaceae). It grows to about 36 feet (11 m) tall, has reddish-brown branches, and bears clusters of flowers

(continued on page 6)

## Proposed Listings

(continued from page 5)

without petals. Two varieties of this species are known: *A. m.* var. *auwahiensis*, consisting of a single population of nine plants in East Maui, and *A. m.* var. *macrococcus*, which occurs on the islands of Maui, Moloka'i, Kaua'i, and O'ahu. The entire species is believed to number no more than about 500 individuals.

- *Bidens micrantha* ssp. *kalealaha*, or ko'oko'olau, is another member of the aster family. An erect perennial herb, it can reach almost 5 feet (1.5 m) in height, growing from sheer rock walls. The yellow flower heads are borne in clusters of up to 50, with each head containing 5 ray florets and 9 to 15 disk florets. Its subspecific name, *kalealaha*, is an anagram of Haleakala, one of the four areas on Maui where this plant still occurs. No more than 2,000 individuals are believed to remain. This plant once occurred on Lana'i, but is apparently extirpated on that island.

- *Clermontia oblongifolia* ssp. *mauiensis*, or 'oha wai, is a shrub or tree in the bellflower family (Campanulaceae) that can grow to 23 feet (7 m) tall. The flowers, grouped two or three to a stalk, form an arched tube that is greenish-white or purplish on the outside and white or cream-colored on the inside. Historically, this taxon was found on ridges within wet montane forests on Lana'i and Maui, but it is now apparently restricted to a single site on West Maui. Only one individual of this subspecies is known to remain.

- *Cyanea lobata*, another shrub in the bellflower family, is named for its distinctive leaves, which are 12 to 20 inches (30 to 50 cm) long with 12 to 25 irregular lobes along each side. Both *Cyanea lobata* and *Cyanea mceldowneyi* (see below) are in a group of plants known in Hawaiian as haha. The sparsely branched *C. lobata* grows to 7.5 feet (2.3 m) tall. Its flowers, clustered in groups of 5 to 12, have greenish-white or purplish petals fused

into a curved tube. This species once occurred on Lana'i and Maui, where it grew on steep stream banks in mesic lowland forests, but the last known population was destroyed recently by a landslide. Botanists hope that additional surveys will locate surviving colonies.

- *Cyanea mceldowneyi*, a similar species, is known only from East Maui. The two known populations total fewer than 30 individuals and occupy an area of about 100 square feet (9 sq m).

- *Cyrtandra munroi*, or ha'iwale, is a shrub in the African violet family (Gesneriaceae). This plant has elliptic to almost circular leaves, covered with velvety, rust-colored hairs underneath, and bears white, tube-shaped flowers in clusters of three. It once grew at scattered locations on Lana'i and West Maui, typically on rich, moist talus slopes in wet lowland forests. Although *C. munroi* was common in the Makamakaole area of West Maui as recently as 1971, it has not been sighted there since. The only known survivor of this species is an individual plant on private land at another West Maui site.

- *Geranium multiflorum*, a shrub in the family Geraniaceae, is known in Hawaiian as nohoanu. This species is 3.3 to 9.8 feet (1 to 3 m) tall, with

oval, toothed leaves, and it produces clusters of up to 50 white flowers that are marked with purple veins or bases. The 11 known populations, all on East Maui, are believed to total no more than 3,000 plants.

- *Hedyotis coriacea*, or kio'ele, is a small shrub in the coffee family (Rubiaceae) with leathery leaves. Its fleshy, tube-shaped flowers are arranged in small clusters at the ends of the branches. Historically, this species was known from the Wai'anae and Ko'olau Mountains on the island of O'ahu and from the U.S. Army's Pohakuloa Training Area on the island of Hawai'i (the "Big Island"). It typically was found on steep, rocky slopes in dry to mesic shrublands or forests. Considered extinct in recent years, this plant was rediscovered in 1990 on West Maui. One individual is known to remain.

- *Lipochaeta kamolensis*, or nehe, belongs to the aster family. This perennial herb has trailing or climbing stems that reach a length of up to 10 feet (3 m). Its flower heads, arranged singly or in pairs, are comprised of six yellow ray florets and about 15 disk florets. The only known population occurs in the Kamole Gulch area of Maui, along the bottom of rock ledges in dry to mesic scrub or dry lowland

(continued on next page)



*Geranium multiflorum*



## Proposed Listings

(continued from previous page)

forests. It contains an estimated several hundred individuals.



photo by Carmelle Crivellone

Among the distinguishing characteristics of *Lycopodium mannii* are the species' epiphytic habit and clusters of delicate red stems. This specimen is growing on a koa.

• *Lycopodium mannii*, or wawae-'iole, is a member of the clubmoss family (Lycopodiaceae). A pendent epiphyte (a hanging plant not rooted in the ground), *L. mannii* typically grows on trees such as 'ohi'a (*Metrosideros polymorpha*) or koa (*Acacia koa*) in mesic to wet montane forests. Its delicate red stems grow to 4 inches (10 cm) long and are lined with rows of tiny, lance-shaped leaves. Historically reported on three islands, this species apparently is extirpated on Kaua'i but remains on Hawai'i and Maui. The 6 known populations total about 35 individual plants.

• *Lysimachia lydgatei*, a sprawling shrub in the primrose family (Primulaceae), is distinguished from related species by the dense, rust-colored hairs that cover its leathery, elliptical leaves. Entire flowers of this species have not yet been seen. The only known surviving population was discovered in 1990 on West Maui. It consists of one to several plants on a steep ridge within lowland mesic shrubland.

• *Melicope mucronulata*, or alani, is a tree in the citrus family (Rutaceae). It grows to about 13 feet (4 m) tall and bears clusters of 3 to 9 flowers. This species typically occurs on steep, dry to mesic, forested lowland slopes. Two populations are known, one on Maui and one on Moloka'i, and they total only five plants.

• *Schiedea haleakalensis*, a member of the pink family (Caryophyllaceae), is a shrub 1 to 2 feet (30 to 60 cm) tall with slightly fleshy, narrow leaves. It produces clusters of flowers that have green sepals but lack petals. Named for the mountain on which it occurs, this species is known only from two locations within Haleakala National Park. Both populations, which total 100 to 200 individuals, grow on sheer, arid, subalpine cliffs.

The native vegetation of Maui and the other Hawaiian Islands has undergone extreme alteration as a result of past and continuing land management practices, including deliberate alien plant and animal introductions, agricultural development, and military activities. At this time, habitat degradation by feral animals and competition with exotic plants are the greatest threats to the 15 taxa proposed in May for listing.



photo by Art Medeiros

*Schiedea haleakalensis*

Feral goats (*Capra hircus*) and cattle (*Bos taurus*) are considered the most damaging non-native vertebrates to Hawaii's native ecosystems. They consume native vegetation, trample roots and seedlings, accelerate erosion, and promote the spread of alien

plants. One measure of their impact on plant populations is the response of native vegetation after these animals are brought under control. Until the 1920's, goats and cattle grazed in what is now Haleakala National Park. As a result of the park's feral animal control program, numbers of the Haleakala silversword have increased from a low of between 100 and 1,500 to the current estimate of 50,000 plants. Goats and cattle remain in many other areas, however, including reserves adjacent to the park. Feral pigs (*Sus scrofa*) are another major problem, especially in wet forests.

Six of the 15 recently proposed taxa also are threatened by competition with 1 or more alien plant species. Christmasberry (*Schinus terebinthifolius*), a fast-growing exotic tree that forms dense thickets, has had particularly harmful impacts. Strawberry guava (*Psidium cattleianum*), another pervasive alien tree, plagues the wet forests of Maui and other islands. In many areas, native forests were cut down and planted with introduced grasses for cattle pastures. These and many other alien species compete for growing space, light, water, and nutrients, and often prevent the establishment of native plant seedlings.

The small number of populations and of individual plants within each species increases the potential for extinction from a single natural or human-related event. Reduced gene pools also could reduce reproductive vigor. Three of these taxa have declined to only 1 known plant, and 4 others number fewer than 10 individuals.

Due to their severely reduced ranges and populations, 14 of the Maui plants were proposed for listing as Endangered. The Haleakala silversword, which is responding to the control of goats and cattle in Haleakala National Park, was proposed for listing under the less critical category of Threatened.

# Final Listing Rules Approved for Four Species

During May 1991, the Fish and Wildlife Service published final listing rules for four species: three plants and one mussel. Endangered Species Act protection is now available to the following:

## **Leafy Prairie-clover (*Dalea foliosa*)**

This rare perennial plant, a member of the pea family (Fabaceae), grows up to 1.5 feet (0.5 meters) tall, has pinnately-compound alternate leaves, and bears dense spikes of small purple flowers. It is known to occur in cedar glades in central Tennessee and northern Alabama, and in remnants of prairie habitat in Illinois. Currently, there are 14 known populations, all of which are relatively small: 2 in Alabama, 3 in Illinois (a fourth site was recently destroyed by a bulldozer), and 9 in Tennessee (2 of which were discovered after the species was proposed for listing; 2 additional sites are slated for development and the populations are expected to be destroyed).

Only four of the 14 populations are being protected by the States or The Nature Conservancy. The remaining sites are threatened by habitat loss or alteration due to residential, commercial, or industrial development; livestock grazing; the conversion of land to livestock pasture; intensive right-of-way maintenance activities; development of a proposed dam; and construction of a proposed highway. All of the populations are vulnerable to the encroachment of more competitive plants and will require long-term management to survive. Although the leafy prairie-clover is readily cultivated, attempts to reintroduce it into the wild have been unsuccessful.

The Service proposed that the leafy prairie-clover be listed as Endangered in the March 27, 1990, *Federal Register* (see *Bulletin* Vol. XV, No. 4), and the final rule was published May 1, 1991.

## **Northeastern Bulrush (*Scirpus ancistrochaetus*)**

A member of the sedge family (Cyperaceae), the northeastern bulrush is a tall perennial herb, growing up to 47 inches (120 centimeters) high, with distinctive arching rays in its inflorescence and barbed bristles on its flowers. It is found in wetlands in hilly country in Virginia, West Virginia, Maryland, Pennsylvania, Massachusetts, and Vermont. The plant also historically occurred in New York. Residential development has destroyed or modified much of the northeastern bulrush's habitat, particularly in the southern portion of its range.

Today, 13 populations remain: 4 in Virginia, 2 in West Virginia, 1 in Maryland, 3 in Pennsylvania (although recent surveys have been unable to reconfirm the plants' presence at 2 sites), 1 in Massachusetts, and 2 in Vermont (although no plants were observed in 1989 and 1990 at one site). Six of the 13 populations are extremely small, each consisting of fewer than 25 plants. Ten of the populations are on private lands and are potentially threatened by residential, agricultural, and recreational development.

The Service proposed the northeastern bulrush for listing as an Endangered species on November 8, 1990 (see *Bulletin* Vol. XV, No. 23), and the final rule was published May 7, 1991. The States of Virginia, Maryland, Massachusetts, and Pennsylvania also list the species as endangered under their own endangered species legislation, while the State of Vermont lists the plant as threatened.

## **Schweinitz's Sunflower (*Helianthus schweinitzii*)**

This perennial herb in the aster family (Asteraceae) grows up to 6.5

feet high (2 meters) and has yellow flowers. It is endemic to the piedmont region of North and South Carolina, where it occurs in clearings and edges of upland woods. Twenty-one populations were reported historically from 10 counties in the 2 States, but approximately one-third of the populations have been extirpated. (Two populations were destroyed between publication of the proposed rule and preparation of the final rule.)

Most of the 13 small populations that remain are in highway or powerline rights-of-way. Over the last 3 years, 6 of these populations have declined from 9 to 89 percent. Almost all of the populations are threatened by habitat alteration due to residential and industrial development, highway construction and improvements, mining, roadside and utility right-of-way maintenance, and the suppression of natural fires and grazing. (Schweinitz's sunflower depends on some form of periodic disturbance to maintain its prairie habitat.)

The Service proposed in the July 2, 1990, *Federal Register* that Schweinitz's sunflower be listed as an Endangered species (see *Bulletin* Vol. XV, No. 8), and the final rule was published May 7, 1991. The State of North Carolina also lists this species as endangered, while South Carolina recognizes it as "threatened and of national concern."

## **Cumberland Pigtoe Mussel (*Pleurobema gibberum*)**

This small freshwater mussel has a distinctive shell, with a dark mahogany outer surface and a peach to orange-colored inside surface. It is endemic to the Caney Fork River system, a tributary of the Cumberland River, in Tennessee. Although presumably once widely distributed within the Caney Fork system, the mussel now occurs in short reaches in only four of the river's tributaries:

(continued on next page)



## Final Listings

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Barren Fork, Calfkiller River, Cane Creek, and Collins River. The Cumberland pigtoe's distribution has been reduced primarily due to impoundments and the deterioration of water quality resulting from coal mining, poor land use practices, and waste discharges. The remaining populations are subject to these same problems.

The Service proposed that the Cumberland pigtoe mussel be listed as Endangered on October 15, 1990 (see *Bulletin* Vol. XV, No. 11), and the final rule was published May 7, 1991.

## Regional News

(continued from page 4)

Central Valley. The ranch includes a wide diversity of habitats, including sloughs, creeks, riparian habitat, oak woodlands, uplands, valley grasslands, and historic interior wetlands. Several federally listed species and listing candidates occur in the area, including the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), and California hibiscus (*Hibiscus californicus*). The ranch also contains important populations of non-listed waterfowl and the sandhill crane (*Grus canadensis*).

The Fish and Wildlife Service, The Nature Conservancy, and the California Department of Fish and Game are preserving a major portion of the Parrott Ranch through a combination of fee title acquisitions and conservation easements. This unique cooperative effort is the largest wetland/riparian conservation project involving Federal and State agencies and a private conservation group ever completed in California. The National Fish and Wildlife Foundation also played a major role in obtaining key funds from private and public sources for the effort.

The Service is acquiring fee title and easements to about 9,300 acres (3,800 ha), which will become part of

the Sacramento River National Wildlife Refuge. The Nature Conservancy will manage an additional 3,000 acres (1,200 ha) and the State about 1,600 acres (650 ha) for wildlife. (About 4,000 acres (1,600 ha) of the ranch will remain in private ownership.) With the restoration of the ranch's riparian forest and wetlands, the habitat available to the federally listed species should significantly increase.

\* \* \*

**Region 2** - Fish and Wildlife Service biologist Mike Morrow captured greater prairie-chickens (*Tympanuchus cupido*) in Kansas this winter to test facilities and rearing techniques for propagating Attwater's greater prairie-chickens (*Tympanuchus cupido attwateri*). This Endangered subspecies will be propagated at two new sites beginning in 1992. The first captive flock will be maintained at the Fossil Rim Wildlife Center near Glen Rose, Texas. The Center will develop avicultural techniques for maintaining a gene pool for the subspecies, and for propagating and releasing birds into the wild. The second flock will be kept at Hoskins Mound, a subunit of Brazoria National Wildlife Refuge, on the Texas Gulf Coast. Dr. Nova Silvy from Texas A&M University will be rearing birds up to 2 months of age for release on the refuge.

The 1991 population survey of Attwater's greater prairie-chickens indicated 482 birds in 4 areas in Texas—an increase of 3 percent over the 1990 count. (As expected, the small population in Fort Bend County disappeared when the habitat was converted to rice fields.) The largest population, with two-thirds of the total birds in the wild (318), is primarily on private land (O'Conner Ranch) in Aransas, Goliad, and Refugio Counties, with a few birds on the nearby Tatum Unit of Aransas National Wildlife Refuge. However, brush is invading private land between the ranch and the refuge, and will soon separate the refuge prairie-chickens from the other birds. Another population, in

Austin and Colorado Counties, contains 126 birds, including about 90 on Attwater's Prairie Chicken National Wildlife Refuge.

About 30 birds survive on a 300-acre (120-hectare) island of prairie habitat in Galveston County, with Galveston Bay on one side and petrochemical plants on the other three sides. Because of its precarious status, this population is viewed as a future source of eggs for building up the propagation flocks at Fossil Rim and Hoskins Mound. Service biologists plan to capture females from the Galveston population in late winter of 1991-1992 and attach small radio transmitters. This will allow biologists to locate nests the following spring and remove eggs early in the incubation period so the hens can renest.

The fourth population is in Victoria County, where about eight birds survive. This site, which is seriously overgrazed by cattle, could recover quickly if the cattle are removed and there is suitable rainfall. This site has been proposed as a second refuge for Attwater's greater prairie-chickens.

\* \* \*

**Region 3** - The Indiana/Gray Bat Recovery Team recently met in Columbia, Missouri, as guests of the Missouri Department of Conservation. Summaries were presented of the winter counts of hibernating bats across the range of both Endangered species. Gray bats (*Myotis grisescens*), which spend the summer and winter seasons in two different sets of caves, appear to have a stable, and perhaps growing, population rangewide. Apparently the efforts to protect these bats from human disturbance by placing gates and fences at the cave entrances are proving successful. If cave protection efforts continue and the populations continue to expand, gray bats could be reclassified to Threatened within the foreseeable future.

The picture is less clear for Indiana bats (*Myotis sodalis*), which spend only

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## Regional News

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the winter months in caves. Rangewide, the species continues to decline in numbers, although the downward slide appears to have dramatically slowed. In the seven "priority 1" hibernacula that are biennially censused by team leader Rick Clawson, a slight increase was noted in 1991. This is an encouraging sign, compared to the period between 1983 and 1989 when the populations were declining at an average annual rate of 7 percent. The number of Indiana bats is continuing to decline in Missouri, while the winter populations in Indiana and Kentucky appear to be increasing. However, the overall gain in Indiana is due to large increases at only two caves—there are roughly equal numbers of declining and increasing populations in the other Indiana caves.

Because cave protection efforts for the Indiana bat are not yielding the same dramatic increases shown for gray bat populations, the Service is investigating other possible threats to the species. Loss of summer habitat might be an important factor. The effects of environmental contaminants also are being investigated to learn the extent that heavy metals and pesticides are affecting Indiana bat survival and reproduction. There is also concern that small peripheral populations with unusual genetic material may not be receiving sufficient protection. The recovery team has recommended that genetic studies be initiated to determine if these populations warrant special protection.

\* \* \*

**Region 4** - The Service and the Geological Survey of Alabama are monitoring known populations and searching for additional populations of the Alabama cave shrimp (*Palaemonias alabamiae*). This Endangered species is a small, colorless, and nearly transparent freshwater shrimp known from the subterranean waters of only two caves in north Alabama.

Both caves, along with two other wet caves in the immediate vicinity, are being surveyed for aquatic fauna at least once every 3 months. During each visit, the numbers of cave shrimp and crayfish, as well as water levels and quality, are noted. These quarterly observations will continue for 2 years. The study will help determine the current status of the species and provide a baseline for developing a long-term monitoring program. The project is also expected to indicate whether or not additional populations or suitable habitat occur in the karst region surrounding the known Alabama cave shrimp populations. With the assistance of the National Speleological Society, the Geological Survey of Alabama has identified over 200 caves in the vicinity of the two known populations.

During the first 6 months of this study, 21 Alabama cave shrimp were observed on two occasions in one of the 2 caves known to support the shrimp. Twenty-four other caves have been evaluated and although no cave shrimp have been encountered, cave adapted aquatic organisms, including fish and crayfish, have been observed in four caves.

\* \* \*

Louisiana State biologists have been trying since 1968 to reestablish nesting sites for Endangered brown pelicans (*Pelecanus occidentalis carolinensis*) on the coast. One site was at the mouth of the Mississippi River in an area known as South Pass, where biologists were trying to encourage the pelicans to use "mud lumps"—small silt formations that naturally rise 6 to 8 feet (2 to 3 meters) above the surface of the water—for nesting. Last year, pelicans nested in this area for the first time since the early 1960's.

However, on May 30, 1990, 4 men from a commercial fishing vessel stole 83 eggs from all but one of the pelican nests and from numerous laughing gull (*Larus atricilla*) nests. A tip from a concerned citizen, and grants from the Izaak Walton League of America

and the National Fish and Wildlife Foundation (which funded necessary operational expenses), led to the arrest by Service law enforcement agents. Although the pelican eggs were recovered, they could not be successfully incubated. Consequently, no young were produced by this colony last year. In addition, the adult pelicans did not return this year to nest. Biologists are uncertain whether or not the pelicans will ever return to the area.

On May 15, 1991, the men were each sentenced to 4 months in prison and 200 hours in community service for violating the Endangered Species Act. (Under the Endangered Species Act, the men could each have been fined up to \$100,000 and received a 1-year prison sentence.)

\* \* \*

**Region 5** - On May 13, the Environmental Protection Agency (EPA) and the FMC Corporation signed an agreement to phase out the production of virtually all granular formulations of the pesticide carbofuran over the next 3 years. The Service (led by Region 5) and the Virginia Department of Game and Inland Fisheries have expressed concern since 1985 over numerous bird kills due to this pesticide. Service and State biologists documented mortality to bald eagles in Virginia in 1985 and 1986, which caused the EPA to reinstate Section 7 consultation with the Service under the Endangered Species Act. The resulting biological opinion recommended zones within the nesting area of the Chesapeake Bay bald eagle population within which granular carbofuran should be prohibited. In the meantime, Service Law Enforcement and Endangered Species staffs continued to document mortality to eagles and other migratory birds, and testified at hearings about carbofuran's harmful effects on birds in Maryland and Virginia. The Service's Regional Director also sent several strong letters to EPA urging cancellation of this notorious bird killer.

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## Regional News

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The State of Virginia took the first bold step in early May 1991, prohibiting use of the pesticide after June 1, and declaring that re-registration would not be possible. The EPA soon followed with the national restriction described above. Of particular significance to Region 5 is the fact that 9 of its 13 States, including Maryland, Virginia, and Delaware, are considered by the EPA to be "areas of sensitive geography." In these areas, the ban on the use of granular carbofuran will become effective September 1. As Agent Don Patterson from Richmond, Virginia, put it, "The birds are singing sweeter now."

\* \* \*

Recently, 12 pairs of Endangered American burying beetles (*Nicrophorus americanus*) from the laboratory population of Boston University's Biology Department were provided to the Insectarium at the Cincinnati Zoo and Botanical Garden to establish a second captive breeding program. The reintroduction of captive raised beetles into historical habitats is likely to play an important role in the recovery effort for this once wide-ranging species. The only known populations in the wild now occur in Latimer County, Oklahoma, and on Block Island, Rhode Island. Last year, biologists reestablished another population on Penikese Island, in Buzzards Bay, Massachusetts (see *Bulletin* Vol. XV, No. 10).

It was hoped that a second captive breeding program would provide beetles for reintroduction at other sites. However, initial breeding efforts at the Cincinnati Insectarium have been set back due to high beetle mortality. Additional founding stock from Boston University may be provided following a review of holding and breeding methods.

\* \* \*

The Service's New England Field Office, in partnership with the State of New Hampshire and The Nature

Conservancy, has been working to conserve the Karner blue butterfly (*Lycaeides melissa samuelis*), a Category 2 listing candidate that occurs in pine barrens. A small population in Concord, New Hampshire, is the only remaining occurrence of this species in New England. Other populations are found in New York and a few midwestern States.

Vegetation control measures implemented last fall at the Concord site opened habitat for the butterfly's obligate larval food plant, wild lupine (*Lupinus perennis*), and seeds collected last summer have been planted in several test plots. If these plantings are successful, the butterfly population should increase.

In March, the Service and conservation groups persuaded the New Hampshire Department of Environmental Services to deny the City of Concord's application to spread municipal sludge over 200 acres (81 ha) of remnant pine barren habitat at the city airport. However, the city failed to find an alternate site and has resubmitted its application to the State. By enriching the soil, the sludge would discourage the growth of pine barren plants and the occurrence of many rare invertebrate animals.

The Service's New England Field Office, the State, and The Nature Conservancy are also continuing to work with the City of Concord to set aside a large area in the airport as a pine barren preserve for the butterfly and other rare species.

\* \* \*

In late April, the U.S. Department of Justice and a private landowner in New York reached a settlement agreement for protecting breeding piping plovers (*Charadrius melodus*) on the landowner's beach. Protracted settlement negotiations took place after the Federal Government sought and obtained a preliminary injunction to protect unfledged chicks on the beach in July 1990. The settlement agreement includes provisions for posting and signing of the plover's nesting ar-

reas, institutes special restrictions on the use of vehicles on the beach, and permits access by Service or New York Department of Environmental Conservation biologists or their designated agents to monitor the birds.

\* \* \*

In May, 13 Endangered Delmarva fox squirrels (*Sciurus niger cinereus*) were released in Kent County, Maryland, in an attempt to establish a new population. The 7 male and 6 female squirrels were captured from sites in Dorchester and Queen Annes Counties, where the squirrels are known to be relatively abundant. Although this is the eleventh release of Delmarva fox squirrels in Maryland, it is considered to be an experimental release because the squirrels' movements will be intensively monitored by radio telemetry for several months. This should provide information that will be helpful in designing future releases.

\* \* \*

**Region 8** - Scientists at the Service's National Wildlife Health Research Center in Madison, Wisconsin, performed a necropsy on a radio-collared adult male wolf (*Canis lupus*) found dead at Isle Royale National Park, Michigan. The Isle Royale wolf population has been gradually declining in the last few years and has come under increased scrutiny. The primary necropsy finding was that the wolf was severely emaciated, and the condition of its teeth suggests that it was old.

\* \* \*

The first naturally-fertile egg from captive-reared whooping cranes (*Grus americana*) was laid March 7 at the Patuxent Wildlife Research Center in Laurel, Maryland. Although the chick died while hatching, this is still a milestone because the parents (hand-reared in 1985 and 1986) are the first pair in the current captive flock to produce fertile eggs without artificial insemination.

\* \* \*

(continued on page 12)

## Regional News

(continued from page 11)

Patuxent Wildlife Research Center biologists report that the palila (*Loxioides bailleui*) nesting season on the island of Hawai'i (the "Big Island") is continuing at a high level this year. To date, approximately 30 nests have been located, of which 25 are being used by these Endangered birds. This trend is expected to continue.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	55	249	8	22	334	31
Birds	73	153	12	0	238	69
Reptiles	16	58	18	14	106	25
Amphibians	6	8	5	0	19	6
Fishes	53	11	33	0	97	49
Snails	4	1	6	0	11	7
Clams	39	2	2	0	43	30
Crustaceans	8	0	2	0	10	5
Insects	13	1	9	0	23	12
Arachnids	3	0	0	0	3	0
Plants	190	1	60	2	256	127
<b>TOTAL</b>	<b>460</b>	<b>484</b>	<b>155</b>	<b>38</b>	<b>1137*</b>	<b>361**</b>
Total U.S. Endangered	460	(270 animals, 190 plants)				
Total U.S. Threatened	155	(95 animals, 60 plants)				
Total U.S. Listed	615	(365 animals, 250 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 287 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife  
39 plants

Number of Cooperative Grant Agreements  
signed for the African Elephant Conservation Act: 7

Number of CITES Party Nations: 110

June 30, 1991

June 1991

Vol. XVI No. 6

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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# ENDANGERED SPECIES

## Technical Bulletin

FEB 11 1992 U.S. Department of the Interior  
Fish and Wildlife Service

### Emergency Action is Taken to Protect Rare Midwestern Butterfly

The Mitchell's satyr (*Neonympha mitchellii mitchellii*), one of the most geographically restricted butterflies in North America, was listed on June 25, 1991, as Endangered under the emergency listing provision of the Endangered Species Act. New information about the growing threat to this subspecies from collectors made quick action necessary. During the 240-day life of the emergency listing, the Fish and Wildlife Service will proceed with consideration of a rule giving *N. m. mitchellii* long-term protection.

Currently, 15 populations of this non-migratory subspecies are known from southern Michigan and north-eastern Indiana. Fewer than a dozen, however, are considered large enough to remain viable. Biologists speculate that the butterfly's total numbers might not exceed 2,000 adults in good years and fall to fewer than 1,000 in bad years.

The decline of *N. m. mitchellii* from its historical distribution of 32 populations in 4 States is due to overcollecting and habitat loss. This butterfly occurs only in fens, an unusual wetland type characterized by calcareous soils that are fed by carbonate-rich water from seeps and springs. Some of these sites have been converted to agricultural or urban uses. Others have been altered by draining, which promotes the encroachment of brushy vegetation, or have been damaged by all-terrain vehicles. All but three of the surviving populations are on privately owned land.



The Mitchell's satyr is a brownish butterfly marked with a series of distinctive "eyespot" on the lower surfaces of both pairs of wings. These eyespots (or ocelli) are black with yellow rings and silvery centers. They are accented by two orange bands along the posterior wing edges, as well as two fainter orange bands across the central portion of each wing.

Mitchell's satyr has long been considered a prize by butterfly collectors. Several historical populations in New Jersey apparently were extirpated by over-collecting, and there is evidence of a continuing problem at other sites throughout the subspecies' range. Be-

cause of its relatively sedentary behavior and slow, very low flight, *N. m. mitchellii* is easily caught. The only other North American subspecies of *Neonympha mitchellii*, St. Francis' satyr (*N. m. francisci*), is believed to

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## Regional News

Regional endangered species staff have reported the following news:

**Region 1** — On July 16, the California Department of Fish and Game

alerted the Fish and Wildlife Service's Region 1 Environmental Contaminants staff of an oil-well blow-out in Ventura County near Rincon that

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**Region 3**, Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); James C. Gritman, *Regional Director*; John Blankenship, *Assistant Regional Director*; Craig Johnson, *Endangered Species Specialist*.

**Region 4**, Richard B. Russell Federal Bldg., 75 Spring Street, S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, *Regional Director*; Tom Olds, *Assistant Regional Director*; David Flemming, *Endangered Species Specialist*.

**Region 5**, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director*; Ralph Pisapia, *Assistant Regional Director*; Paul Nickerson, *Endangered Species Specialist*.

**Region 6**, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

**Region 7**, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Rowan Gould, *Assistant Regional Director*; Ron Garrett, *Endangered Species Specialist*.

**Region 8**, (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sher, *Endangered Species Specialist* (703-358-1710).

### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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threatened California sea otters (*Enhydra lutris nereis*) and the marine environment in general. While Contaminants staff dispersed to locate the spill, a quick-thinking oil-field worker on site, Mo Valencia, prevented significant damage to a nearby creek and beach by building up a berm of dirt to keep oil from entering the creek, and subsequently, the Pacific Ocean. The spill had the potential to exceed 200,000 gallons (760,000 liters), with significant environmental damage, but was limited to about 3,000 gallons (11,350 l) and minor damage.

\* \* \*

A capture team composed of biologists from the California Department of Fish and Game and the Fish and Wildlife Service traveled to Santa Catalina Island in search of an errant California sea otter, affectionately named Phokey. Meanwhile, at San Clemente Island, 22 miles from Santa Catalina Island, a biologist from the National Marine Fisheries Service reported seeing an otter which, from a description of the tags it was wearing and its unusual behavior in interacting with a group of harbor seals (*Phoca vitulina*), makes the team conclude that Phokey is now residing at San Clemente Island. Capture efforts continue as the animal explores the "no-otter" management zone.

\* \* \*

On July 14, 1991, a railroad tanker spilled about 14,000 gallons (53,000 l) of Vapam, a potent herbicide, into the Sacramento River above Shasta Dam. Vapam is highly toxic to aquatic animals and plants and moderately toxic to the nervous system of mammals and birds. No endangered species are known to have died following the spill, although there was considerable concern for the winter run chinook salmon (*Oncorhynchus tshawytscha*) in the Sacramento River below Keswick Dam.

The spill occurred in the Upper Sacramento River, specifically in the Cantara Loop, which is located ap-

(continued on next page)



## Regional News

(continued from previous page)

proximately 42 miles (67.5 kilometers) above Lake Shasta. This portion of the Sacramento River contained wild strains of several trout species and was highly prized by anglers.

Every macroscopic and probably nearly all microscopic organisms in the Sacramento River between the Cantara Loop and Lake Shasta were killed. Aquatic organisms in the Sacramento arm of Lake Shasta also died, but the full extent of the destruction has not been determined. Aquatic and riparian vegetation in the river is beginning to show signs of deterioration, but the extent of damage will not be known for some time, possibly several months. Preliminary field surveys suggest that the impact of the spill on birds and mammals may center primarily on starvation rather than direct mortality due to the chemical. However, no conclusions can be drawn until carefully controlled field studies have been completed.

The winter run chinook salmon, which is an Endangered population, is in the swim-up fry stage of development in the Sacramento River just below Keswick Dam. There was a concern that if methyl isothiocyanate (MITC), a breakdown product of Vapam, reaches the spawning area, mortality of the fry is very likely. Since data did not exist on the susceptibility of this life history stage to MITC, the California Department of Fish and Game (CDFG), the University of California, and the CDFG Rancho Cordova Pesticide Research Station conducted bioassay studies. In addition, an Environmental Protection Agency laboratory in Cincinnati and the Regional Water Quality Control Board (RWQCB) are conducting standard 3-species bioassays to establish general toxicological guidelines for this chemical.

Two bald eagle (*Haliaeetus leucocephalus*) nests are near the river, and approximately 20 additional birds

range over the lake area. Since bald eagles regularly obtain food by scavenging, CDFG personnel have removed readily accessible concentrations of dead fish. Areas near eagle nest sites have been provided with uncontaminated food. Although eagles have not been sighted actively scavenging, the potential for an adverse impact remains, and the CDFG is closely monitoring activities of eagles in this area. Limited data suggest that secondary bioaccumulation-biomagnification impacts from this chemical are likely to be minimal to birds and mammals.

Data collected by the California Central Valley RWQCB and the Bureau of Reclamation suggest that MITC concentrations are detectable now. The CDFG placed cages of live fish in several areas to monitor the toxicity of the water. Fish in the cages are surviving, and the water collected from the dam stations have non-detectable results for MITC.

\* \* \*

In response to concern about the California gnatcatcher (*Polioptila californica californica*) and a number of other taxa in southern California, the State has initiated a conservation planning effort to address the issue of preserving the coastal sage scrub community. The Service is cooperating in this program, and field staff met with Natural Heritage Program personnel and a scientific advisory panel that will guide the development of planning recommendations.

\* \* \*

An observant San Bernardino County deputy sheriff who stopped a car that did not have current registration discovered 14 desert tortoises (*Gopherus agassizii*) in the trunk. Collected in California's Stoddart Valley, the animals were most likely intended for food or for sale as pets. Deputy Sheriff Robert Woodrum contacted the Bureau of Land Management (BLM) and California Department of Fish and Game (CDFG). Three men in the car were convicted of violating

the State law that prohibits possessing or transporting threatened species of wildlife, fined \$2,000, and sentenced to jail—two for 120 days and one for 100 days. CDFG returned the tortoises to the wild.

\* \* \*

Four motorcycle riders who ran a Thanksgiving weekend Barstow, California, to Las Vegas, Nevada, off-road race in 1990 despite its closure by the Bureau of Land Management (BLM) were fined \$850 each on August 2, following a jury trial in Federal Court in Santa Ana, California. A fifth rider was acquitted. Two other riders pleaded guilty before a U.S. Magistrate and were fined \$250 apiece, while charges were dismissed against two others.

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## Subscriptions

The Fish and Wildlife Service is authorized to distribute the *Bulletin* to Federal and State resource management agencies, scientists and organizations we regularly work with, and major libraries. To make the *Bulletin* accessible to everyone else who is interested, the Service has arranged with the University of Michigan to reprint each edition within one of the University's not-for-profit publications, the *Endangered Species UPDATE*, which is available by subscription. In addition to a reprint of the *Bulletin*, each issue of the *UPDATE* contains several pages of related news and a separate feature article. For a 1-year subscription, send a \$23 check or money order (payable to the University of Michigan) to *Endangered Species UPDATE*, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109-1115. (The University offers a reduced rate of \$18 for students and senior citizens.)

# Japan Agrees to Phase Out Trade in Endangered Sea Turtles

Susan S. Lieberman  
CITES Policy Specialist  
Office of Management Authority

Japan has agreed to phase out its trade in endangered species of sea turtles by the end of 1992. This action came after Secretary of the Interior Manuel Lujan and Secretary of Commerce Robert Mosbacher certified to President Bush on March 20, 1991, that Japan was diminishing the effectiveness of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) by its continued trade in endangered sea turtles. The certification would have allowed the President, if he chose, to prohibit the importation into the United States of all wildlife products from Japan. Sea turtles throughout the world face many threats, but the most critical danger to many species is the commercial trade in their parts and products.

Six species of sea turtles are listed by the United States under the Endangered Species Act as Threatened or Endangered. The Act protects listed species in U.S. territory and prohibits their import without a permit. CITES, however, is the major international effort for wildlife conservation, with trade restrictions on species listed in different appendices to the treaty. Appendix I includes species in danger of extinction that are or may be affected by international trade. All sea turtles are listed on CITES Appendix I, which prohibits their trade for primarily commercial purposes.

## The Japanese Sea Turtle Trade

CITES Parties are allowed to take a reservation to a listing within 90 days of the date when a species is added to an Appendix, or when a country accedes to the treaty. When Japan acceded to CITES in 1980, it took reservations on several species, including hawksbill (*Eretmochelys imbricata*) and olive ridley (*Lepidochelys olivacea*) sea



*Hawksbills are endangered by the exploitation of their distinctively marked shell for the manufacture of jewelry, combs, eyeglass frames, and other decorative items.*

turtles. As the world's largest consumer of sea turtle parts and products, Japan continued to trade in hawksbills for their shell, known in Japanese as bekko, and in olive ridleys for their raw skin and tanned leather. Bekko is used in making eyeglass frames, jewelry, and decorative items; olive ridley leather is used to manufacture luxury leather goods.

Since 1981, when Japan joined CITES, it has imported the shells of more than 234,000 hawksbill sea turtles from more than 20 different countries. From 1984-1986, imports averaged 20,000-30,000 individuals per year. In 1990, Japan imported the shell of approximately 18,000 hawksbills. One hawksbill contains approximately 1.1 kilograms (2.5 lbs.) of bekko, and the price is now up to about \$225/kg (\$500/lb.). From 1981 to 1989, Japan's self-imposed domestic bekko quota was 30,000 kg (66,150 lbs.) per year, representing up to 30,000 hawksbills. Under the recent agreement, Japan will reduce its imports of hawksbill shell between August 1, 1991, and December 31,

1992, to 7,500 kg (16,500 lbs), an amount that represents nearly 7,500 turtles.

The hawksbill is considered by many scientists to be the most endangered of all sea turtles, with the exception of the Kemp's ridley (*Lepidochelys kemp*). Experts agree that the most significant factor endangering hawksbill populations is the Japanese commerce in tortoiseshell. While the total world population is not known, from 15,000 to 25,000 female hawksbills are believed to nest annually in more than 50 countries. Populations worldwide are depleted or in decline. Because the species is migratory, with marked individuals having been recorded moving thousands of kilometers, sea turtle trade threatens not only the populations in exporting countries, but all hawksbill populations, including those of the United States.

## Monitoring the Trade

The Office of Management Authority (OMA) of the U.S. Fish and Wild-

*(continued on next page)*



## Sea Turtle Trade

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life Service monitors the international trade in species protected by CITES to determine whether or not any nation is diminishing the treaty's effectiveness. As part of its ongoing responsibility to implement CITES, OMA has been assessing information on the sea turtle trade, with special attention to the high levels involving Japan. In addition, the Department of the Interior received two petitions in 1990 from conservation organizations (National Wildlife Federation, Center for Marine Conservation, National Audubon Society, Environmental Defense Fund, and Earth Island Institute) asking for certification of Mexico and Japan for trade in sea turtle parts and products.

Although Japan imports hawksbill shell from many countries, the only two reported sources of olive ridley sea turtle skin into Japan in recent years have been Mexico and Ecuador. Both countries, however, have recognized the serious threats of trade to sea turtles and have taken positive steps for their conservation. In May 1990, the government of Mexico banned the "removing, harvesting, pursuing, disturbing, or harming of any of the species and subspecies of sea turtles" in their waters and the destruction of their nests. Until that announcement, Mexico banned most commercial exploitation of sea turtles, except for the olive ridley fishery on the Pacific Coast. That fishery, probably the world's largest, is now closed. The decision was accompanied by a program to study the magnitude of the incidental take of sea turtles during other fishery activities, extension of offshore and beach sea turtle refuge zones, increased scientific studies and other programs aimed at the protection and conservation of sea turtles, and registration of all existing stockpiles of sea turtle products.

The Service has been working closely with Mexico for many years on sea turtle conservation projects, and



hawksbill sea turtle

supports Mexico's new efforts to protect its sea turtles and other endangered wildlife. The Service is very pleased that Mexico acceded to CITES, effective September 30, 1991, and looks forward to continuing to provide technical assistance to Mexico on CITES implementation. In addition, in July 1990, the government of Ecuador banned the capture, processing, and trade of all sea turtle species.

### Pelly Amendment Import Prohibitions

The Pelly Amendment to the Fishermen's Protective Act of 1967 states that when the Secretary of the Interior or the Secretary of Commerce finds that nationals of a foreign country, directly or indirectly, are engaging in trade or taking that diminishes the effectiveness of any international program for endangered or threatened species, the Secretary shall certify that finding to the President. The trade does not have to be in violation of an international convention or a country's domestic legislation in order to constitute "diminishing the effectiveness." The test is the actual trade or take.

Although maintaining a reservation to an Appendix I or II listing is allowed under the provisions of CITES,

when coupled with a continued high volume of trade it undermines the conservation goals of CITES. Japan was found to be engaging in trade with countries that have export bans on sea turtle products, thereby undermining both international and domestic conservation efforts. A critical factor as to whether or not the conservation goals of CITES are being undermined is the biological impact on the species. All biological and scientific data on this point are unequivocal: sea turtles are seriously threatened by continued trade.

Upon receipt of a Pelly Amendment certification, the President may direct the Secretary of the Treasury to prohibit the importation into the United States of wildlife products originating in the offending country. The President is required to notify Congress within 60 days of any action taken pursuant to a Pelly certification. The President has complete discretion over whether or not to impose any import prohibitions.

Seven different foreign countries (some more than once) have been certified under the Pelly Amendment in separate actions by the Department of Commerce, all for either diminishing the effectiveness of the International Convention for the Regulation of

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## Sea Turtle Trade

(continued from page 5)

Whaling, which created the International Whaling Commission, or for failing to enter into and implement adequate agreements required by the Driftnet Impact Monitoring, Assessment, and Control Act of 1987. In addition, Pelly certifications have been considered at other times in the past. Although sanctions have never been imposed by the President, Pelly certifications and the threat of import pro-

hibitions have proven to be effective negotiating and diplomatic tools.

Secretaries Lujan and Mosbacher notified President Bush on July 2, 1991, that they had received commitments from Japan that it will end all hawksbill imports by December 31, 1992, and will sharply reduce its imports until that time. Accordingly, no prohibitions against imports of Japanese wildlife products have been recommended to the President. It is worth noting, however, that Japan's

Pelly Amendment certification for diminishing the effectiveness of CITES will remain in place until Japan withdraws its CITES reservations. Japan is hosting the next meeting of the Conference of the Parties of CITES in March 1992. At the Service's request, the detrimental trade in sea turtles has been placed on the agenda for that meeting, where international attention will be focused on the trade in endangered species.

## Regional News

(continued from page 3)

The annual motorcycle race, which attracted large numbers in the late 1960's and early 1970's, was also held from 1983 to 1989, until BLM closed the area to the race because of the cumulative impact on Federal land and the threat to desert tortoises. BLM has authority under the Federal Land Policy and Management Act of 1976 to restrict activities on public land in order to protect resources, including areas under review for the national wilderness system.

The riders had alerted the media about their intention to proceed with the race. Television cameras recorded nine motorcyclists being arrested in the closed area.

\* \* \*

The Service's Reno, Nevada, Field Office issued BLM a no-jeopardy Biological Opinion for the Nevada 500 Off-Highway Vehicle Races that the High Desert Racing Association has proposed for 1991, 1992, and 1993 through desert tortoise habitat. Three-year take for the 500-mile (800 km) race in Nye and Esmerelda Counties through 85 miles (140 km) of disturbed tortoise habitat and 392 acres (160 hectares) of low-density tortoise habitat is expected to be 12 animals because of injury and mortality and 9 because of harassment.

\* \* \*

Camp Pendleton recently contacted the Service's Regional Environmental

Contaminants staff about a die-off of about 130 birds, including waterfowl and shorebirds, at one of the base's sewage treatment ponds. Contaminants biologists collected birds and blood samples for the National Wildlife Health Center for analysis to determine the cause of the outbreak, suspected to be avian botulism. Fortunately, there have been no signs so far of botulism in a nearby colony of California least terns (*Sterna antillarum browni*).

\* \* \*

**Region 2** — Recent recovery efforts for the masked bobwhite quail (*Colinus virginianus ridgwayi*) have focused on reestablishing and monitoring the population at the Buenos Aires National Wildlife Refuge in southern Arizona. Since 1985, the Service has released 9,400 pen-reared juveniles on the Refuge. The reintroduction goal is to establish a self-sustaining population of masked bobwhite quail on the refuge by 1998.

Steve Dobrott, refuge biologist, reports that masked bobwhites appear to be reacting positively to improved habitat conditions resulting from an above-normal amount of rain—27.9 inches (71 centimeters) between June 1990 and April 1991. For the first time, biologists at the refuge documented significant overwintering populations of the species, locating 31 coveys consisting of 333 birds. This is a dramatic increase from the 5 coveys with 50 birds located during the

winter survey of 1989-90.

Biologists who captured, marked, and released 78 masked bobwhite quail, including 8 wild-produced birds, are encouraged about the prospect of significant natural reproduction this summer.

\* \* \*

**Region 4** — The last two female Florida panthers (*Felis concolor coryi*) in the southeast portion of the Florida Everglades (including Everglades National Park) died recently. National Park Service staff retrieved the carcasses of Panther 14 on June 21 and Panther 22 on July 22. The causes of death have not yet been determined, but preliminary mercury analyses for Panther 14 were 35 parts per million (wet weight) in the liver and 15 ppm in the blood. This blood level is in the toxicosis range for domestic house cats. Additional samples are being analyzed. No data are available yet on Panther 22, which was in an advanced state of post-mortem degeneration. (*Bulletin* Vol. XV, No. 2, contained a feature on the problem of mercury poisoning in Florida panthers.)

Only two panthers, both male, remain in the southeast Everglades.

\* \* \*

In Cherokee County, Alabama, two Auburn University students have discovered a new population of the Alabama leather flower (*Clematis socialis*), bringing to three the total number of populations of this Endangered spe-

(continued on page 11)



# Listing Proposals — June/July 1991

Four taxa — a bird and three plants — were proposed by the Fish and Wildlife Service during June and July for listing as Threatened. If the proposals are approved, the following will receive the conservation benefits authorized by the Endangered Species Act:

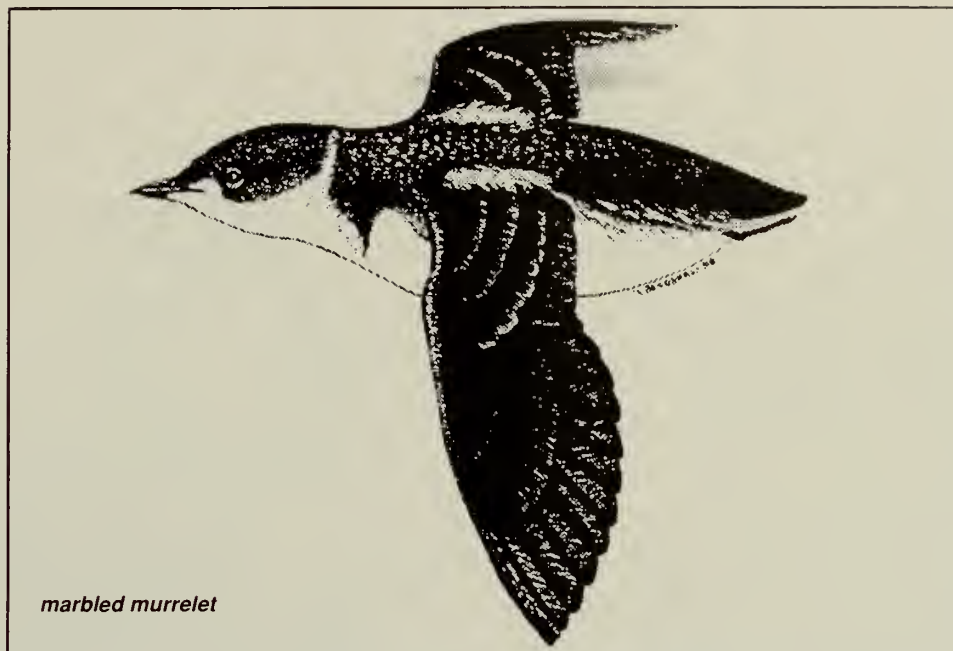
## Marbled Murrelet

(*Brachyramphus marmoratus*)

The marbled murrelet, a robin-sized seabird of the northern Pacific coast, was proposed June 20 for listing as Threatened in Washington, Oregon, and California. Modification or loss of its nesting habitat in coastal old-growth and mature forests was cited as the main reason for the bird's decline.

The North American subspecies of marbled murrelet nests from Alaska's Aleutian Islands, Kodiak Island, and Kenai Peninsula south through British Columbia to central California, with some birds wintering as far south as southern California. Current estimates put the number of adult murrelets at about 5,000 in Washington, 2,000 in Oregon, and 2,000 in California, and all three States recognize this bird as a species of special concern. Populations to the north are larger and are not included in the Service's listing proposal, although in 1990 the murrelet was listed in British Columbia as threatened.

Marbled murrelets employ two different nesting strategies: birds in the Aleutian archipelago are ground nesters, and those from southeastern Alaska southward primarily build their nests on large, moss-covered branches of mature or old-growth conifers. Logging of coniferous forests within the subspecies' range has been extensive. Most of the remaining nesting habitat is on Federal or State land. Numerous other species residing in the old-growth forests of the Northwest are candidates for listing as Endangered or Threatened, and effective



marbled murrelet

habitat conservation could benefit them as well as the marbled murrelet.

Other threats to the marbled murrelet include gill-net fishing and oil spills. One study conducted along Vancouver Island in British Columbia, for example, documented gill-netting as responsible for killing approximately 8 percent of the potential fall population. Although gill-net fishing takes place along the Washington coast, the mortality there is unknown. The vulnerability of murrelets to oil is exacerbated by the fact that they spend most of their time swimming on the ocean surface and feeding in local concentrations close to shore. There is substantial oil tanker traffic in coastal waters throughout the subspecies' range.

The marbled murrelet's low reproductive rate makes it unlikely that populations can recover quickly once depleted. Murrelets may not reproduce every year, and pairs lay only one egg in a nest.

## Nelson's Checker-mallow (*Sidalcea nelsoniana*)

This plant, a perennial herb in the mallow family (Malvaceae), is en-

demic to wetlands in the Willamette Valley and adjacent Coast Range of Oregon. Because of its restricted range and extensive habitat modification, *S. nelsoniana* has been proposed for listing as a Threatened species (E.R. 6/7/91).

The Nelson's checker-mallow grows in swales, in wet meadows, and along streams within remnants of prairie grassland habitat. It needs open areas and may not be able to tolerate encroachment by woody plants. Historically, there were six known population centers, but one was extirpated when the site was converted to agricultural use. Four of the five remaining centers are in the Willamette Valley and have been fragmented due to the same cause.

Logging and off-road motorcycling have damaged the single population center in the Coast Range. This center, which is still the species' largest, will be completely inundated if a dam proposed by McMinnville Water and Light is approved. At least part of the site is administered by the Bureau of Land Management, which is required to consult with the Service on activities such as land use permits that may affect listed species.

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drawing by Frank A. Lang

**The Nelson's checker-mallow produces clusters of small pinkish-lavender to pinkish-purple flowers at the tops of its 2.5-foot (75-centimeter) stems.**

## Listing Proposals

(continued from page 7)

### Leedy's Roseroot (*Sedum integrifolium* ssp. *leedyi*)

Leedy's roseroot, a perennial plant in the orpine family (Crassulaceae), is believed to have been widespread during the last ice age. Today, however, it is restricted to a few sites that provide a microclimate probably similar to the conditions that prevailed in much of North America during the Pleistocene. On June 18, this species was



Leedy's roseroot

proposed for listing as Threatened.

Leedy's roseroot depends on an unusual type of habitat: talus slopes or cliffs in which ground water seeping through cracks in the rock maintains a cool, wet environment throughout the summer. Only six populations are known to exist, two in Yates County, New York, and four in Fillmore and Olmsted Counties, Minnesota. Both States already consider the plant endangered.

One Leedy's roseroot site in Minnesota is owned by the State and a conservation easement protects another site in New York. All of the other populations, however, are privately

owned. This rare plant faces threats from groundwater contamination, livestock grazing, natural and human-related erosion, and vegetation clearing associated with residential development at one of the New York sites.

### Sensitive Joint-vetch (*Aeschynomene virginica*)

The sensitive joint-vetch, an annual plant in the bean family (Fabaceae), grows to about 6 feet (2 meters) in height, producing a single stem that is sometimes branched at the top. Its small, legume-type flowers are yellow

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## Listing Proposals

(continued from previous page)

with streaks of red and are borne on racemes (elongated inflorescences with stalked flowers). Because of widespread threats to its unique habitat, *A. virginica* was proposed on July 26 for listing as a Threatened species.

This plant occurs only in a rare and specialized ecological community type found a short distance upstream of where certain rivers in the coastal plain of the eastern United States meet the sea. Referred to as freshwater tidal marshes, these communities are close enough to the coast to be influenced by tidal fluctuations, yet far enough upstream to consist of fresh or only slightly brackish water. Plants that grow in this environment are subjected to a cycle of twice-daily flooding that most species cannot tolerate.

The number of *A. virginica* populations has declined significantly throughout the species' range, and this plant has been extirpated entirely

from Pennsylvania and Delaware. At present, there are two known populations in New Jersey, one in Maryland, six in Virginia, and two in North Carolina. Many of the sites where the sensitive joint-vetch once occurred have been dredged, filled, or bulkheaded. Those that remain are potentially threatened by a proposed highway expansion and electrical generating plant in New Jersey; by several proposed residential developments and water supply projects in Virginia; and by other factors associated with increased urbanization of coastal areas, including road construction, commercial development, water pollution, sedimentation, and bank erosion from high-speed motorboat traffic.

\* \* \*

### Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: pro-

tection from adverse effects of Federal activities; restrictions on take and trafficking; the requirement for the Service to develop and carry out recovery plans; the authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments that have approved cooperative agreements with the Service. Listing also lends greater recognition to a species' precarious status, which encourages other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species. If an agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy. For species that are proposed for listing and for which jeopardy is found, Federal agencies are required to "confer" with the Service, although the results of such a conference are not legally binding.

Additional protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals except by permit for certain conservation purposes. For plants, the rules regarding "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law or in the course of violating a State criminal trespass law also is illegal under the Act. In addition, some States have more restrictive laws of their own specifically against the take of State or federally listed plants and animals.



sensitive joint-vetch (*Aeschynomene virginica*)

drawing by Peggy Duke, reprinted from *Herbaceous Plants of Maryland* with permission

# Michigan Residents Strongly Support Wolf Restoration

by L. David Mech<sup>1</sup>

*"The wolf symbolizes to me the beauty and wonder of nature."*

Eighty percent of Michigan's deer hunters agree with this Yale University survey statement, according to a recent release by the International Wolf Center in Ely, Minnesota. "Michigan's hunters consistently and strongly expressed the greatest sympathy, concern, ecological appreciation and outdoor recreational interest in the wolf of any group examined," concluded Dr. Stephen R. Kellert, author of the study.

The most important finding of the survey was that a substantial majority of Michigan residents, including deer hunters who have traditionally been seen as anti-wolf, support the proposed restoration of 100 or more gray wolves (*Canis lupus*) to Michigan's Upper Peninsula. This support, moreover, was motivated primarily by the ecological and cultural values of the wolf, and only to a limited degree by its presumed harvest or consumptive-use benefits.

"It appears that the public is starting to learn the facts about the wolf," stated Nancy Gibson, chair of the International Wolf Center. The Wolf Center is a Minnesota non-profit organization that specializes in educating the public about wolves. It helped administer the survey of 900 Michigan residents.

The Kellert study, *Public Attitudes and Beliefs About the Wolf and Its Restoration in Michigan*, was funded by various agencies including the U.S. Fish and Wildlife Service, the U.S. Forest Service, the National Park Ser-



**Strong support for the restoration of gray wolves (such as this animal in northern Minnesota) to Michigan's Upper Peninsula was voiced by local residents during a recent survey.**

vice, and the Michigan Department of Natural Resources, as well as the Sigurd Olson Institute.

Michigan contains only a few lone wolves and little evidence of packs, except for Isle Royale in Lake Superior where there are 14 wolves. However, the Kellert survey revealed that 65 percent of the Upper Peninsula's residents favored reintroducing additional wolves to their area. Deer hunters as a group were even more favorable; 81 percent supported reestablishment.

Michigan wildlife agency officials are pleased with this support and believe that it indicates sensitivity to wildlife in general. They note the similarity of support for recent releases of moose (*Alces alces*) and peregrine falcons (*Falco peregrinus*) on the Upper Peninsula.

Plans have not yet been formulated for a reintroduction of wolves into Michigan. However, the strong public support would probably make a release far more successful than the experimental reintroduction of four Minnesota wolves to the Michigan Huron Mountain region in 1974. All 4 transplanted wolves were killed by people within 9 months after release.

The Eastern Timber Wolf Recovery Plan calls for reestablishing wolves in one region outside of Minnesota. The results of the Kellert survey indicate that the Michigan-Wisconsin area may be the prime candidate for this recovery action.

<sup>1</sup> U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, North Central Forest Experiment Station, 1992 Folwell Avenue, St.

## Midwestern Butterfly

*(continued from page 1)*

have been collected into extinction since it was discovered at Ft. Bragg, North Carolina, in 1983.

The emergency listing authorizes the Service to enforce prohibitions

against the unauthorized take or sale of *N. m. mitchellii*. In addition, the Service intends to propose long-term protection for the subspecies shortly and to make a final decision before the emergency rule expires. If the butterfly receives permanent protec-

tion, the Service will develop a plan for its recovery. Among the possible recovery actions are the negotiation of easements with landowners to conserve habitat and attempts to establish new populations or augment some of the smaller ones.



# Final Listing Action Approved for Four Species

During June and July of 1991, the following species—a mussel, a butterfly, and two plants—were listed for protection under the Endangered Species Act:

## Winged Mapleleaf Mussel (*Quadrula fragosa*)

A freshwater clam, this species once occurred extensively throughout the Mississippi, Tennessee, Ohio, and Cumberland River drainages in Ohio, Indiana, Missouri, Tennessee, Minnesota, Nebraska, Iowa, Illinois, Wisconsin, Oklahoma, and Kentucky. It was usually found in medium to large clearwater streams in riffles or on gravel bars. Extensive habitat damage or alteration from sedimentation, pollution, impoundments, and other projects that alter natural flow regimes apparently have eliminated the winged mapleleaf from about 99 percent of its historical range. It is now known only from one location within a 5-mile (8-kilometer) reach of the St. Croix River on the Minnesota/Wisconsin border. A survey by the Wisconsin Department of Natural Resources suggests that the mussel's population has not reproduced since 1983.

The winged mapleleaf mussel was proposed on August 6, 1990, for listing as an Endangered species (see summary in *Bulletin* Vol. XV, No. 9), and the final rule was published June 20, 1991.

## Uncompahgre Fritillary Butterfly (*Boloria acrocnema*)

The Uncompahgre fritillary, a small butterfly with black bars criss-crossing

its brownish wings, has the smallest total range of any North American butterfly species. It is restricted to only two known locations, and possibly another two small sites, in the San Juan and Sawatch Mountains of southwestern Colorado. Biologists estimate that fewer than 1,000 of the butterflies remain. Both of the confirmed sites are on land administered by the U.S. Forest Service and the Bureau of Land Management, and current land uses do not appear to be incompatible with the butterfly's habitat. Overcollecting is the main threat; this species has been the subject of intense sampling since it was discovered in 1978.

The Uncompahgre fritillary butterfly was proposed October 15, 1990, for listing as Endangered (see *Bulletin* Vol. XV, No. 11), and the final rule was published June 24, 1991.

## Knieskern's Beaked-rush (*Rhynchospora knieskernii*)

An annual plant in the sedge family (Cyperaceae), Knieskern's beaked-rush grows to about 23 inches (60 centimeters) high, has short, narrow leaves, and produces clusters of small brown flowers. Historically, it was found at 38 confirmed sites in New Jersey. Only 27 populations are known to remain, all but 1 of them in the New Jersey Pinelands. The species grows primarily in early successional wetlands within oak/pitch pine forest stands. Because *B. knieskernii* requires open habitat, it is restricted to clearings and disturbed areas. The suppression of naturally occurring wildfires has resulted in the encroachment

of woody vegetation at some sites, rendering them unsuitable for the beaked-rush. This species also is vulnerable to water pollution, activities that change the hydrologic conditions it needs, and the modification of its habitat for agriculture and development.

Knieskern's beaked-rush was proposed August 8, 1990, for listing as a Threatened species (see *Bulletin* Vol. XV, No. 9), and the final rule was published July 18, 1991.

## Tennessee Yellow-eyed Grass (*Xyris tennesseensis*)

The Tennessee yellow-eyed grass, a herbaceous perennial in the family Xyridaceae, grows in clumps from fleshy, bulbous bases. Its linear, deep-green leaves grow to about 18 inches (45 cm) high, and small, yellow flowers are borne singly at the tips of slender stalks. This wetland plant grows on seeps and along streams within open or thinly-wooded areas where calcareous rocks are present. Three of the species' 10 historically known sites have been destroyed. Disjunct populations remain in Alabama (1), Georgia (1), and Tennessee (5). Four of the existing populations have declined in recent years due to highway construction and roadside maintenance, over-collecting, logging, sedimentation, gravel quarrying, conversion of habitat to agricultural uses, and vegetational succession.

The Tennessee yellow-eyed grass was proposed February 15, 1991, for listing as Endangered (see *Bulletin* Vol. XVI, No. 3), and the final rule was published July 26, 1991.

## Regional News

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cies. Only about 80 of the plants are known to exist in the wild.

Located on private land, the new population of the Alabama leather flower consists of about a dozen

plants, complementing 15 and 50 at the two other sites in Cherokee County and St. Clair County, respectively.

Searches for new populations are only a part of the Alabama leather flower recovery activities conducted

under the direction of Dr. Robert Boyd of Auburn University. Through the Service's Auburn Cooperative Research Unit, Dr. Boyd and his students are involved in experiments to determine appropriate habitat man-

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## Regional News

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agement techniques and reproductive biology studies relating to the plant.

This is the first population of the Alabama leather flower found in the wild since the species was listed in January 1986. The two other populations occur on roadside rights-of-way, where maintenance practices such as herbicide application and mowing pose potential threats to the species' survival. Indirect effects of encroaching residential development are another threat.

\* \* \*

As mitigation for the loss of a diverse mussel bed caused by the construction and operation of a dam on the Ohio River, three power companies have given the Virginia Cooperative Fish and Wildlife Research Unit a \$25,000 grant for research into the feasibility of cryopreservation of freshwater mussel genetic material.

The grant came from a Mussel Trust Fund that the Cincinnati Gas and Electric Company, Columbus and Southern Ohio Electric, and the Dayton Power and Light Company established after the William H. Zimmer Generating Station on the Ohio River began operating.

Cryopreservation has been successfully used to preserve the genetic material of many species and may be the only means of preventing the extinction of some of our most endangered freshwater mussels. Some federally-listed mussels exist only as nonreproducing populations, and other species are so restricted in distribution that a single event, such as a toxic chemical spill, could eliminate them.

Juvenile mussels from artificial propagation projects may be available for transplants within a few years. Like seed banks for endangered plants, cryogenic preservation could maintain mussel genetic material until the habitat is ready for reestablishment. It could also guarantee a source for reintroduction in the event that an en-

vironmental accident eliminates the wild population.

Along with the power companies, the Ohio Department of Natural Resources and the Kentucky Department of Fish and Wildlife Resources administer the Mussel Trust Fund. The Service's Asheville, North Carolina, Field Office assisted with the grant.

\* \* \*

South Carolina biologists researching the effect of Hurricane Hugo on bald eagle breeding have cited what they call the "strong nest-site tenacity" of the species, which persists despite habitat disruption.

With 52 occupied territories prior to the hurricane, South Carolina had one of the largest nesting concentrations of eagles in the Southeast. Hurricane Hugo destroyed 25 of the State's bald eagle nests and downed more than 6 billion board feet of timber in 24 counties. Because few large trees were left standing, biologists were concerned about the fate of this nesting population.

Remarkably, in spite of drastically altered habitat, 18 of the 25 pairs affected by the storm nested successfully the following year in the few remaining trees, producing clutches as large as their counterparts in areas unaffected by the hurricane. Most of the eagles chose sites close to the places where their original nests had been destroyed. However, several pairs disturbed by timber salvage operations during the nesting period failed to produce young.

It appears that bald eagles are able to adapt to severe habitat alterations, provided that they are not disturbed during the nesting season. As a researcher commented, "A pair of eagles may persist in trying to nest in an area despite repeated failures. That is, eagles do not simply relocate in response to disturbance."

The South Carolina Wildlife and Marine Resources Department conducted the research, aided by funding from the Service.

\* \* \*

As part of the recovery effort for Michaux's sumac (*Rhus michauxii*), the North Carolina office of The Nature Conservancy collected leaf tissue for genetic analysis and demographic data from the 21 locations of this Endangered plant that remain in the sandhills and coastal plains of North Carolina and Georgia.

The results of this research will be used to plan the reintroduction of Michaux's sumac into its former range and to complement single-sex populations of the deciduous, rhizomatous shrub. Populations are extremely small, and most are made up of only one sex. When the species was listed in 1989, only 7 of the then-known 16 populations were comprised of 100 or more plants, and only two included representatives of both sexes.

Michaux's sumac is threatened by the conversion of native habitat for agriculture and forestry, residential and commercial development, and the suppression of wildfires. Intolerant of shade, the plant can be overtaken by vegetative succession. It prefers open habitat maintained by fire or mowing. Several populations are along roadsides, where they are vulnerable to highway widening and herbicide application.

The first reintroduction of Michaux's sumac is doing well. The Georgia Heritage Inventory and Woodlanders (an Aiken, South Carolina, commercial nursery that specializes in native plants) cooperated in the transplant effort.

The Service is continuing to work with The Nature Conservancy, State conservation agencies, and private landowners to develop and implement management plans for all sites. The Service's Asheville Office provided partial funding for the collection project.

\* \* \*

Along the South Carolina coast, the most important historical nesting area for the Bachman's warbler (*Vermivora bachmanii*), the Asheville Office is co-

(continued on next page)



## Regional News

(continued from previous page)

ordinating a survey for this elusive species.

Thought to be the rarest warbler in North America, this bird has a 150-year history of erratic appearances and disappearances within its known habitat. Although the Bachman's warbler has been sighted several times on the Cuban wintering grounds during the past decade, there have been no confirmed breeding records in the United States since the mid-1960's, when a singing male was photographed near Charleston.

The U.S. Forest Service, Citadel University, the South Carolina Wildlife and Marine Resources Department, and Westvaco Corporation are cooperating in the survey. They will try to confirm sightings reported near Charleston and check on whether Hurricane Hugo may actually have improved this species' habitat near the last known nesting sites by removing the forest canopy from many areas.

\* \* \*

The Asheville Office is working with National Park Service staff and University of Georgia researchers on genetic analysis of the spreading avens (*Geum radiatum*) in North Carolina and Tennessee. The team will develop propagation and transplantation techniques to reestablish this Endangered plant, a member of the rose family, in parts of its former range.

The spreading avens has large, bright yellow flowers that grow on 20 inch-long (50 cm) stems from a basal rosette of leaves. The attractive plant faces threats from illegal collecting and habitat degradation.

\* \* \*

In 1983, citing direct take of the alligator snapping turtle (*Macrochelys temminckii*), a conservation group petitioned the Service to list the species as Threatened. The Service's 1984 finding concluded that there were not enough data to list the turtle but advocated continuing the status review

through correspondence with agencies and experts.

The Service reviewed the status of the alligator snapping turtle again this year. Found in 14 States, the turtle inhabits river systems that flow into the north-central Gulf of Mexico. Rivers in Florida, Georgia, Alabama, Mississippi, Louisiana, and Arkansas probably contain most of the species' total population. Georgia, Louisiana, and Arkansas do not have laws that regulate the take of this turtle, and the effectiveness of regulations in the other States is unknown. The review presented evidence that the demand for alligator snapping turtle meat may be causing a continuing decline of the species. An international trade also exists.

The review concluded that if the States with the majority of the species' population had laws regulating take of the turtle, and if these laws were enforced, Federal listing would not be necessary. The Service will review the status of the turtle in 1995. If the demand for the turtle's meat still exists, and if the turtle's abundance continues to decline, Federal protection as a Threatened species will be needed. In the meantime, the Service will pursue protection for the turtle under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Service's Jackson Field Office (6578 Dogwood View Parkway, Jackson, Mississippi 39213) has copies of the review.

\* \* \*

**Region 5** - Susi von Oettingen, an Endangered Species Specialist with the Service's New England Field Office, participated in several informal consultations and field inspections for projects along the Connecticut River in Vermont and New Hampshire. Two of the visits resulted in the discovery of Endangered dwarf wedge mussels (*Alasmidonta heterodon*) in the project areas. Consultation will continue on both projects, which includes a proposal to stabilize 1,500 feet (460 meters) of river shoreline by the New

Hampshire Department of Transportation and repair and replacement of a collapsed sewer outfall pipe. Both projects could have on-site and downstream impacts on the dwarf wedge mussel.

\* \* \*

In June, biologists for the State of Connecticut found one dwarf wedge mussel at an historic location for the species on a tributary of the Connecticut River. The mussel was last observed at this site in 1961. Biologists discovered two mussel shells, but no living mussels, at another historic site along a different Connecticut River tributary. The mussels may have been dead one year or less. Mussels had last been collected at the second site in 1960.

\* \* \*

New England Field Office endangered species staff, in cooperation with the New Hampshire Nature Conservancy and Natural Heritage Inventory, surveyed a population of the small whorled pogonia (*Isotria medeoloides*) in southeastern New Hampshire. The site may contain the world's largest occurrence of this Endangered orchid. Field office staff also recently discovered a new population of this species in Merrimack County, New Hampshire.

\* \* \*

Michael Amaral, another Endangered Species Specialist with the New England Field Office, assisted biologists from the Rhode Island Division of Fish and Wildlife/Nongame, The Nature Conservancy, and Boston University in establishing an annual population monitoring program for the American burying beetle (*Nicrophorus americanus*) on Block Island, Rhode Island. Fifty non-lethal pitfall traps for this Endangered insect were established in three study areas. Beetles captured at these traps and at a black-light station were counted, sexed, measured, and marked prior to release. Nearly 300 captures were recorded during the 3-day effort, in-

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## Regional News

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cluding several recaptured (marked) animals. A population estimate is being developed.

\* \* \*

Two peregrine falcon (*Falco peregrinus*) chicks recently died after prematurely leaving their nest on the Girard Point Bridge over the Schuylkill River in Philadelphia. A survey team under contract to the Pennsylvania Department of Transportation was inspecting the bridges (in connection with planned maintenance) when the abandonment occurred. The incident is under investigation by law enforcement officials of the Service and the Pennsylvania Game Commission.

\* \* \*

The Endangered pink mucket pearly mussel (*Lampsilis abrupta* (=orbiculata)) was recently found to inhabit a reach of the lower Elk River near Blue Creek, West Virginia. The Elk River is a large drainage basin in West Virginia and a century-old historic site for the species. This mussel was found as the result of an informal Section 7 consultation. The Columbia Gas Company of West Virginia, because of its Federal Energy Regulatory Commission permit requirements, consulted with the Service on a routine natural gas pipeline crossing. The Service's West Virginia Field Office recommended that a mussel survey of the river crossing be accomplished. Two female pink muckets were found downstream of the crossing. This newly found population could be affected by increased suspended sediments from streambed disturbance, especially during the extreme low flows being experienced by West Virginia streams this year. Columbia Gas has agreed to "plow" the pipeline across the river, which will be quick and will greatly reduce suspended sediments. Also, great care will be taken to prevent runoff from disturbed areas or accidental spills.

\* \* \*

Plans are under way to establish a captive breeding colony of the Chittenango ovate amber snail (*Succinea ovalis chittenangoensis*). The work will be done by a contractor, through Section 6 funds provided by the Service to the New York State Department of Environmental Conservation. The Chittenango ovate amber snail, listed by the Service as Threatened, is known to occur in only one location worldwide. The population, which is in Madison County, New York, has declined to extremely low numbers despite habitat protection and recovery efforts. Competing snail species are believed to be limiting the Chittenango ovate amber snail population.

The captive breeding colony will provide additional opportunities to study the species, and will be a source of individuals for possible establishment at new sites or for reintroduction in case of a catastrophe at the existing site.

\* \* \*

The Service's New York Field Office has been working with the Federal Aviation Administration (FAA) through informal Section 7 consultation to ensure that needed habitat management work is conducted at a key site of the sandplain gerardia (*Agalinis acuta*), an Endangered plant. This Long Island property, which is now owned by the FAA, is slated for transfer to the National Wildlife Refuge System. As a result of decreasing site maintenance over past years by the FAA, the open grassland habitat that the sandplain gerardia requires is becoming overgrown with shrubby species. Habitat management is needed this year, but transfer of the site to the Service has been delayed. The Nature Conservancy recently signed an agreement with the FAA to conduct the habitat work, which will help ensure the continued survival of the sandplain gerardia at this site.

\* \* \*

Region 6 - This year, a citizens group is conducting a search for evi-

dence of grizzly bears (*Ursus arctos*) in the San Juan Mountains of southwestern Colorado, investigating recent unconfirmed sightings and signs reported since 1988. Although there have been several reports of grizzly bears since the last known grizzly in Colorado was killed in 1979, none of the reports have been verified and no conclusive evidence of the bear's continued presence has been found. The Citizens' Committee for the Colorado Grizzly will be in the San Juan Mountains from July through October, searching for physical evidence (scats, tracks, tree scratchings) of the grizzly.

\* \* \*

Successful bald eagle breeding continues in the Great Plains. The first documented successful bald eagle nesting in Nebraska for over 70 years occurred this year when two young were fledged from a nest along the Lower Platte River near Omaha. Some nesting attempts were made over the last several years, but none resulted in any young.

In another Great Plains State, the first documented successful breeding of bald eagles in Kansas occurred in 1989. Two young fledged from this nest in 1989, and three young in 1990. The third successful year for this nest was 1991 and again, three young fledged. The nest is located on Clinton Reservoir near Lawrence in eastern Kansas. The State's second nest site, confirmed last year in western Kansas near Ness City, fledged one young in 1990 and another this year.

In North Dakota, the nest site discovered 2 years ago on the Missouri River north of Bismarck is still active. This nest fledged two, or possibly three, young this year.

\* \* \*

Initial stages of the pallid sturgeon (*Scaphirhynchus albus*) captive propagation program have begun with the capture of six fish; three appear to be pure pallids and three are crosses with shovelnose sturgeon (*Scaphirhynchus*

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## Regional News

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*platorhynchus*). All the pure pallid sturgeon are males, and all the females are the pallid/shovelnose cross, so no captive breeding will be done this year.

Two of the pure pallids were captured near the mouth of the Platte River in Nebraska. The other four fish were captured on the Mississippi River in Missouri. Additional capture efforts will be conducted this fall and next spring. If pure pallid females are found, captive breeding can begin next year.

For the first time in over 20 years, the presence of the Endangered pallid sturgeon in the Mississippi River in Louisiana has been documented. A commercial fisherman caught seven pallid sturgeon and two pallid/shovelnose hybrids in the Mississippi River near its confluence with the Atchafalaya River in Louisiana. These fish later died as a result of stress incurred during the initial capture.

\* \* \*

Increased numbers of Colorado squawfish (*Ptychocheilus lucius*) were found in a recent survey of the mainstem Colorado River in western Colorado. Eighty-four of these Endangered fish were captured, more than in any other year of the recovery program. Thirty-six were young, indicating that some reproduction and survival of offspring are occurring. The survey clearly indicates that the 15-mile (24-km) stretch of river surveyed is important habitat for adult Colorado squawfish.

\* \* \*

Botanists with the Navajo Natural Heritage Program have reported finding the Navajo sedge (*Carex specuicola*) in Utah, the first time this Threatened plant has been located outside Arizona. The new site, within the Navajo Nation near Monument Valley in southern San Juan County, has encouraged researchers to plan surveys for any other Utah popula-

tions in San Juan, Kane, and Garfield Counties.

\* \* \*

Fishery biologists have captured an adult razorback sucker (*Xyrauchen texanus*) in the upper Colorado River near Rifle, Colorado, and transported the fish to the Dexter National Fish Hatchery in New Mexico to establish broodstock for captive propagation. This species is under consideration for listing as Endangered, which would make it the fourth listed fish in the Colorado River system. Because no young razorbacks have been found in the upper Colorado River in the past 26 years, biologists fear that only immediate action can prevent the species from becoming extinct in the wild. The Service plans to begin restocking razorback suckers into the Gunnison River and upper portions of the Colorado River in 1993.

\* \* \*

The Wolf Management Committee has submitted recommendations to the Secretary of the Interior and to Congress regarding gray wolf (*Canis lupus*) management and reintroduction in Yellowstone National Park and the Central Idaho Wilderness Area. The recommendations are that Congress should 1) designate the area of Idaho, Montana, and Wyoming (with the exception of an area surrounding Glacier National Park) as a "nonessential experimental area" for the purposes of wolf recovery until July 1, 1993; 2) declare that the primary management authority for wolves outside the defined Glacier National Park area, other national parks, and national wildlife refuges will go to the States, provided that they have adopted wolf management plans; and 3) declare that any such State wolf management plan include as basic components the right of the State to manage wolves in terms of their impact on livestock, big game resources, and multiple land uses and the responsibility of the State to pursue wolf recovery.

The Wolf Management Committee also provided a management plan that the Fish and Wildlife Service would utilize to manage wolves in the experimental population areas. It further recommended that the States use this plan as a guideline in developing their own plans. The goal of the plan is to maintain a minimum population of 30 breeding pairs of wolves distributed within the 3-State area. The Park Service and the Fish and Wildlife Service would reintroduce wolves into Yellowstone National Park and inventory wolf habitat in Idaho for 5 years. If a wolf population is not found in central Idaho after the study, the animals would be reintroduced there. All of these activities would require a Fish and Wildlife Service rulemaking and Environmental Impact Statement.

## BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	55	249	8	22	334	33
Birds	73	153	12	0	238	69
Reptiles	16	64	18	14	112	27
Amphibians	6	8	5	0	19	7
Fishes	53	11	34	0	98	51
Snails	7	1	6	0	14	7
Clams	39	2	2	0	43	33
Crustaceans	8	0	2	0	10	5
Insects	13	1	9	0	23	13
Arachnids	3	0	0	0	3	0
Plants	209	1	61	2	273	137
<b>TOTAL</b>	<b>482</b>	<b>490</b>	<b>157</b>	<b>38</b>	<b>1167*</b>	<b>382**</b>
Total U.S. Endangered	482	(273 animals, 209 plants)				
Total U.S. Threatened	157	(96 animals, 61 plants)				
Total U.S. Listed	639	(369 animals, 270 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 310 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories:	53 fish & wildlife 39 plants
Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act:	7
Number of CITES Party Nations:	112

September 30, 1991

July/August 1991

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# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, Fish and Wildlife Service  
Washington, D. C. 20240

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# ENDANGERED SPECIES

## Bulletin

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U.S. Fish and Wildlife Service

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Endangered Species, Vol....

JUN 2 1992

## Status of Endangered Species Recovery Program is Detailed in Report to Congress

The California condor (*Gymnogyps californianus*), southern sea otter (*Enhydra lutris nereis*), Lee pincushion cactus (*Coryphantha sneedii* var. *leei*), and Devil's Hole pupfish (*Cyprinodon diabolis*) are among the 41 percent of our nation's Endangered and Threatened species whose populations are now stable or increasing, according to a report to Congress recently released by the Fish and Wildlife Service.

The report, "Endangered and Threatened Species Recovery Program," summarizes the status of the 581 U.S. plants

and animals that were listed federally as Endangered or Threatened as of October 1, 1990. According to the report, 38 percent of these listed species are still declining, while the exact status of about 19 percent is unknown.

About two percent of the plants and animals listed are believed to be extinct. Determining whether or not a species is extinct can be difficult, and most in that category were probably extinct before passage of the Endangered Species Act. Such species are proposed for removal from the list when scientists believe there

is no longer any possibility of finding survivors in the wild.

The report shows that the majority of species considered improving are mammals, birds, or plants; bird and fish species are reported as most stable. Invertebrates, including snails, clams, insects, and crustaceans, are most prevalent among the species whose status is unknown. Freshwater mussels comprise 75 percent of the invertebrates known to be declining.

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## History on the Wing: California Condors Restored to Home Skies

Ann Haas

Following their October airlift to a temporary cliffside residence, an achievement that the *Los Angeles Times* termed "a momentous step toward the revival of an endangered species," two captive-bred California condors (*Gymnogyps californianus*) were released on January 14 to the "rugged wilderness of Ventura County to reclaim their prehistoric heritage."

The pair, Xewe, a 9-month-old female hatched at the Los Angeles Zoo, and Chocuyens, an 8-month-old male

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"How much longer?" young California condors Xewe and Chocuyens seemed to ask from inside the netted patio of their cliffside residence before their release January 14 less than 100 miles from Los Angeles. The two Andean condor companions also shown here will be recaptured prior to the next California condor release and sent to Colombia, South America, where they are native.

photo by David Clendenen



## Regional News

Regional endangered species specialists have reported the following news:

**Region 1** - After a consultation under Section 7 of the Endangered Species Act,

resulting in a "jeopardy" Biological Opinion to two Endangered fish species from the Bureau of Reclamation's Klamath Project, the Fish and Wildlife Service

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### U.S. Fish and Wildlife Service Regions

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.



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(Service) and Reclamation have developed "reasonable and prudent alternatives" which, if carried out, would relieve the jeopardizing situation. In order to protect the shortnose sucker (*Chasmistes brevirostris*) and the Lost River sucker (*Deltistes luxatus*), Reclamation has agreed to manage lake levels in recognition of the biological needs of the species, aerate Clear Lake to ensure adequate dissolved oxygen and open water during the winter, monitor water quality, and make structural changes to ensure enhanced survival and reproduction capabilities. As a result of implementing these alternatives, there will be no current reduction of irrigation flows from Upper Klamath or Clear Lake.

Both agencies expressed appreciation to water users in the Klamath Basin for the cooperation demonstrated through voluntary water conservation. These initiatives made a difference in the formulation of reasonable and prudent alternatives for protecting the fish species.

\* \* \*

The Oregon Military Department has obtained funds to monitor the Oregon silverspot butterfly (*Speyeria zerene hippolyta*) and its habitat on Camp Rilea from 1991 to 1993 and to develop a management plan for this Threatened insect on the base. One sighting has already been reported, confirming the continued presence of the Clatsop Plain population for 1991. The project is being accomplished under contract with Dr. Paul Hammond, who has been involved in a significant amount of work for the species.

\* \* \*

Staff biologists from the Fish and Wildlife Service's Sacramento, California, Field Office met with the Bureau of Reclamation, the National Marine Fisheries Service, and the California Department of Fish and Game to assist Reclamation in modifying a Central Valley Project to protect the estimated winter run of 191 chinook salmon (*Oncorhynchus tshawytscha*) in the upper Sacramento River. Reclamation will maintain 56.5° F (13.6° C) at the mouth of Cottonwood Creek

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## Regional News

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through mid-August, 58.5° F (14.7° C) in late August, and 59° F (15° C) in September. Because the winter-run chinook spawned earlier and farther upstream than usual, this objective should provide successful incubation and rearing conditions for winter-run salmon eggs and fry in the upper Sacramento River.

\* \* \*

With representatives from other affected agencies, biologists from the Service's Sacramento office participated in negotiating sessions about the Lower Mokelumne River Hydroelectric Project, with the goal of establishing interim and long-term measures to protect chinook salmon in the river. Because of continued habitat degradation and the decline of salmon runs to fewer than 300 fish during the past 2 years, the Federal Energy Regulatory Commission is moving to reopen the license for this project based in part on information that the Service provided. California Department of Fish and Game staff also participated in negotiations.

\* \* \*

The West Coast clapper rail recovery team met at San Francisco Bay National Wildlife Refuge to develop means to manage predators; protect, improve, and restore habitat; and develop a trial captive breeding program for the 470 light-footed clapper rails (*Rallus longirostris obsoletus*) and 400 California clapper rails (*Rallus longirostris levipes*) in the United States.

\* \* \*

Following the approval of a Mojave desert tortoise (*Gopherus agassizii*) habitat conservation plan, the Service issued a 3-year permit under Section 10 of the Endangered Species Act to Clark County, Nevada, and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City, to allow the taking of 3,710 tortoises incidental to development activities. Under the terms of the permit and habitat conservation plan, Clark County is authorized to license the development of 22,352 acres (9,045 ha) in Las Vegas Valley, in exchange for establishing

at least 400,000 acres (161,880 ha) of conserved desert tortoise habitat in outlying areas of Clark County. Developers will pay the County a fee of \$550 per acre to fund the mitigation program and "tortoise management areas." Elected officials applauded the plan for conserving desert tortoise habitat and enabling economic development in Las Vegas Valley.

The Nature Conservancy (TNC) plans to buy 5 or 6 ranches from willing sellers in southern Nevada and transfer the properties to Clark County at cost. The county will then lease the lands to TNC. Management will be accomplished by the National Park Service and the Bureau of Land Management primarily, along with a county-formed oversight group that includes TNC.

To date, TNC has bought the grazing privileges, water rights, and improvements on a 425,000-acre (172,000 ha) ranch that is entirely on public land administered by the Bureau of Land Management. Located in the Piute Valley, the ranch includes 160,000 acres (64,750 ha) of the highest quality desert tortoise habitat in the State.

Acting primarily as acquisition agent, TNC is purchasing and retiring the privileges for grazing these lands, an activity that has the widest-ranging impact on the tortoises in the Threatened Mojave Desert population. As a grazing entity, which counties are not, TNC can be granted the "non-use" of grazing allotments on public lands. James Moore, the organization's Desert Tortoise Habitat Conservation Plan Coordinator in Las Vegas, termed public and private sector cooperation in the long-term recovery goal a "conservation accomplishment" involving agency personnel and ranchers, miners, hunters, off-road vehicle users, developers, and environmentalists.

Negotiations are under way for two other properties that include approximately 310,000 acres (125,460 ha) of desert tortoise habitat. Once the southern tortoise preserve is established, TNC will begin work for a northern preserve, as part of the long-term Habitat Conservation Plan now under development. The goal is to encompass an entire eco-

## Notice

We regret that, due to a staffing shortage, production of the *Endangered Species Technical Bulletin* has been experiencing delays. Your patience while we deal with this difficult situation is appreciated.

\* \* \*

system. Jim Moore added, "These are envisioned as in-perpetuity acquisitions to preserve not only viable populations of desert tortoises, but all other Mojave Desert endemics as well."

The Service's Reno, Nevada, Field Office has issued a non-jeopardy biological opinion on the Bureau of Land Management's (BLM) proposed licensing of livestock use on public land in desert tortoise habitat in southern Nevada. BLM proposes to implement two ways of managing livestock grazing within tortoise habitat. Prescription 1 restricts grazing during the spring (March 1 to June 14) to reduce the trampling of desert tortoises by horses, cattle, and sheep, and reduce their competition for forage. Prescription 2 includes no seasonal restriction on grazing.

Grazing Prescription 1 will manage 1,798,000 acres (726,390 ha) of desert tortoise habitat to maintain or achieve viable tortoise populations. Prescription 2 will manage 1,376,000 acres (557,085 ha) of desert tortoise habitat for the purpose of ensuring that tortoise recruitment is sufficient to maintain stable tortoise populations. Although the incidental take of tortoises is unquantifiable, the opinion will allow the degradation of 3,174,000 acres (1,284,520 ha) of tortoise habitat.

\* \* \*

**Region 2** - A second year of drought in the Northwest Territories, Canada, has taken its toll on whooping crane (*Grus americana*) chick numbers, discouraging nesting even by experienced pairs and making eggs and hatchlings more accessible to predators.

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# Fifty-six Animals and Plants Proposed in August-October 1991 for Endangered Species Act Protection

Fifty-six species — 7 animals and 49 plants — were proposed by the Fish and Wildlife Service during August through October 1991 for listing as Endangered or Threatened. If these proposals become final, Endangered Species Act protection will be extended to the following:

## Coastal California Gnatcatcher (*Poliophtila californica californica*)

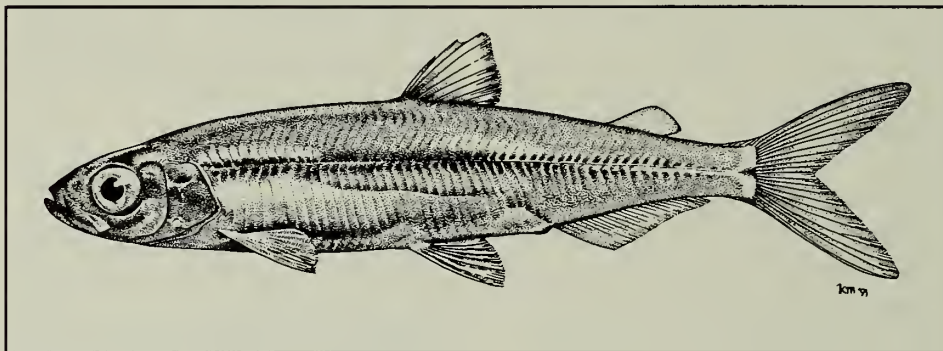
The coastal California gnatcatcher, an insectivorous, non-migratory songbird, occurs only in several distinctive subassociations of the coastal sage scrub plant community in southern California and northwestern Baja California, Mexico. As late as the 1940's, the California gnatcatcher was considered locally common, but by the 1960's biologists noted drastic population declines, due primarily to habitat loss. Today, fewer than 2,300 breeding pairs are estimated to remain in California, and the subspecies has been proposed by the Service for listing rangewide as Endangered (F.R. 9/17/91).

In the United States, published data indicate that up to 90 percent of the vegetation upon which the California gnatcatcher depends — low-growing, summer deciduous and succulent plants — has been lost to urban and agricultural development. In fact, the coastal sage scrub community is considered one of the most depleted habitat types in the United States, and its status is declining in Mexico as well. As a result, 1 animal associated with sage scrub, the Stephens' kangaroo rat (*Dipodomys stephensi*), was listed in 1988 as Endangered, and over 40 other animal and plant taxa dependent on this habitat are being considered for listing.

Several land-use planning efforts that address, in part, the issue of conserving coastal sage scrub habitat in California have been initiated at the State, county, and local levels. The Service is participating in these efforts and supports their conservation objectives; however, these plans are in the early stages of develop-



California gnatcatcher



Delta smelt

ment, and it is likely to be years before they are completed, funded, and implemented. In the meantime, habitat loss and fragmentation continue.

## Delta Smelt (*Hypomesus transpacificus*)

The Delta smelt, a small, nearly translucent fish with a 1-year life cycle, is restricted to Suisun Bay and the Sacramento/San Joaquin River estuary (the Delta) near San Francisco Bay. It is the only smelt endemic to California and the only true native estuarine fish found in the Delta. This species is adapted to the seawater/freshwater mixing zone within a salinity range of 2 to 12 parts per thousand.

As recently as the early 1970's, the delta smelt was one of the most common and abundant pelagic fish caught by California Department of Fish and Game trawl surveys in the Delta. Over the past 20 years, however, its population has plummeted nearly 90 percent, due primarily to extensive habitat modification and loss. Contributing to the decline are the diversion of freshwater from river systems that supply water to the Delta habitat, California's prolonged drought, the presence of non-native aquatic species that disrupt the smelt's food chain, and degradation of water quality.

The annual export of approximately 6 million acre-feet of fresh water away from

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## Listing Proposals

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the estuary by Federal and State projects, with an additional 2 to 3 million acre-feet diverted by private Delta water users, has allowed the intrusion of higher-salinity seawater into Delta marshes. This has restricted the delta smelt's spawning and nursery areas to less favorable river channel habitat. Additionally, the rates at which water is exported from the Delta by the Federal Central Valley Project and the State Water Project pumping stations actually cause some Delta channel waters to reverse direction and flow upstream, which can seriously disrupt fish migrations and cause larval and juvenile fish to die.

Because the factors that have reduced the delta smelt's habitat pose a continuing threat, the Service has proposed to list this fish as a Threatened species (F.R. 10/3/91). In addition, the Service proposed to designate the following areas as Critical Habitat for the delta smelt: all water and submerged lands below the high tide mark in Suisun Bay, the length of Montezuma Slough, portions of the Sacramento and San Joaquin Rivers, and portions of the Delta and adjacent waters. (See map of the proposed area in the October 3, 1991, *Federal Register*.) If the listing and Critical Habitat proposals are approved, Federal agencies will be required not only to avoid activities that might jeopardize the smelt's survival but also those that might adversely modify its Critical Habitat.

### Mitchell's Satyr (*Neonympha mitchellii mitchellii*)

Now one of the most geographically restricted butterflies in North America, the Mitchell's satyr once occurred at approximately 30 locations in 4 States. Overcollection and loss of its unusual fen habitat have reduced its range to 15 sites in southern Michigan and northern Indiana. Butterfly numbers at several sites are believed to be very low, and these populations may not be viable.

Due to the threat of imminent extinction from overcollection, Mitchell's satyr was temporarily listed (for 240 days) as

Endangered on June 25, 1991, under the emergency listing provisions of the Endangered Species Act. (See feature in *Bulletin* Vol. XVI, Nos. 7-8.) In the September 11, 1991, *Federal Register*, the Service proposed to give this butterfly long-term protection as Endangered. Surveillance of breeding sites during the butterfly's annual 3-week flight season to prevent unauthorized collecting began following the emergency listing and will be essential to the survival of the Mitchell's satyr. The Service also will begin working with private landowners to preserve existing fens used by this butterfly.

### Goliath Frog (*Conraua goliath*)

The aptly named Goliath frog of central Africa is the largest species of frog in the world. Specimens weighing up to 7.2 pounds (3.3 kilograms) with a total length of 32 inches (81 centimeters) have been recorded, and there are reports of even larger individuals. This species is avidly hunted by people who consider the meat a delicacy.

Goliath frogs are found along major rivers traversing dense tropical rainforest in parts of Equatorial Guinea and southwestern Cameroon. Within this range, the frogs reportedly are rare and have extremely selective ecological requirements: rapids and cascades with a sandy bottom and very clean, slightly tannic, oxygen-rich water. Deforestation in the region has degraded or reduced this type of habitat.

A new problem, and one that is causing much of the immediate concern, is the capture and export of live Goliath frogs. Because of its huge size, the frog is becoming increasingly popular as a curiosity for public exhibition and private collecting. Advertisements have shown an asking price of up to \$2,500 for adult Goliath frogs. One U.S. dealer reportedly imported 50 individuals and attempted to enter some in the well-known Frog Jump Jubilee in Calaveras County, California. Imports and exports of the Goliath frog are not regulated by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Due to its rare status, reduced habitat, and vulnerability to commercial overexploitation, the Goliath frog has been proposed for listing as Threatened (F.R. 9/12/91).

### Three Foreign Butterflies

On September 10, the Service proposed to list three foreign species of swallowtail butterflies as Endangered:

- **Homerus swallowtail (*Papilio homerus*)** - This butterfly has a wingspan of about 6 inches (150 millimeters). Its wings are black or dark brown, the upper surfaces having broad yellow bands and the lower surfaces having narrower yellow bands and blue spots. The species is known only from the island of Jamaica in the West Indies.

- **Corsican swallowtail (*Papilio hospiton*)** - This short-tailed species of butterfly is smaller, with a wingspan of about 3 inches (75 mm). It is primarily black and yellow in color, with blue and red markings. As indicated by its common name, the Corsican butterfly is found only on the Mediterranean islands of Corsica (France) and Sardinia (Italy).

- **Luzon peacock swallowtail (*Papilio chikae*)** - A long-tailed butterfly, beautifully marked in green-black, red, and purple, this species has a forewing length of about 2 inches (55 mm). It is known from the island of Luzon in the Philippines.

Habitat destruction is a problem affecting all three species. Excessive collection by butterfly enthusiasts and commercial dealers is another serious threat. For example, a female Homerus butterfly was advertised for sale several years ago for \$2,800. If these species are listed under the Endangered Species Act, it will be illegal to import them into the United States without a Federal permit.

### 16 Moloka'i Plants

Sixteen species of plants native to the island of Moloka'i in the Hawaiian Islands were proposed for listing protection in the September 20, 1991, *Federal Register*. All but one are found only on

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## Listing Proposals

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Moloka'i; the other species also occurs on the island of Hawai'i (the "Big Island").

The island of Moloka'i, fifth largest in the Hawaiian archipelago, consists mainly of the remnants of three shield volcanoes. Its gently sloping to very steep topography supports a variety of habitat types, and the 16 recently proposed taxa are found in areas ranging from coastal dunes and cliffs through dry shrublands to wet montane forests.

The unique native vegetation of the Hawaiian Islands has undergone extreme alteration as a result of ranching activities, deliberate and accidental introductions of non-native plants and animals, and agricultural development. Competition with alien plants and continuing habitat modification or destruction due to feral animals are currently the main threats facing the following taxa:

- *Bidens wiebkei*, known in the Hawaiian language as *ko'oko'olau* — a perennial herb in the aster family (Asteraceae). The 5 known populations of this species total no more than 60 individual plants.

- *Brighamia rockii*, or *pua 'ala* — a member of the bellflower family (Campanulaceae) with an unbranched, thickened, succulent stem and fleshy leaves.



**Brighamia rockii**

drawings by Yvonne Wilson-Ramsey, reprinted from Manual of the Flowering Plants of Hawai'i ©, courtesy of the University of Hawaii Press

- *Canavalia molokaiensis*, or 'awikiwiki — a perennial climbing herb in the pea family (Fabaceae) with 7 known populations totalling about 50 plants.

- *Clermontia oblongifolia* ssp. *brevipes*, or 'oha wai — a shrub or small tree in the bellflower family with a single known surviving individual.

- *Cyanea mannii*, or *haha* — a branched, woody shrub in the bellflower family with 6 known populations totalling approximately 40 individuals.

- *Cyanea procera* — an unbranched, palm-like tree with only two known surviving individuals.

- *Hedyotis mannii*, or *pilo* — a small perennial in the coffee family (Rubiaceae), also with only two known surviving plants.

- *Hibiscus arnottianus* ssp. *immaculatus*, or *koki'o ke'oke'o* — a small tree in the mallow family (Malvaceae) with 50 known individuals in 4 populations.

- *Melicope reflexa*, or *alani* — a sprawling shrub in the citrus family (Rutaceae).

- *Phyllostegia mannii* — a non-aromatic member of the mint family (Lamiaceae), growing as a climbing vine with a known population of four plants.

- *Pritchardia munroi*, or *loulou* — a tree in the palm family (Arecaceae) with a single known surviving specimen in the wild.

- *Schiedea lydgatei* — a low-growing perennial in the pink family (Caryophyllaceae).

- *Silene alexandri* — another perennial in the pink family, with a known population of 10 individuals.

- *Silene lanceolata* — a related perennial plant. It is the only species among the 16 proposed taxa in this group that is currently found on an island other than Moloka'i; 3 populations survive on the island of Hawai'i.

- *Stenogyne bifida* — a non-aromatic perennial herb in the mint family, now known from 3 populations containing only about 10 individuals.

The 15 taxa above were proposed for listing as Endangered. A somewhat less



**Silene lanceolata**

critical classification was proposed for the following:

- *Tetramalopium rockii* — a prostrate shrub in the aster family that forms complexly branching mats. Because the range and numbers of this species have not been reduced as much as those of the other 15 taxa, *T. rockii* was proposed for listing as Threatened rather than Endangered; however, the protection it would receive under this classification would be essentially the same.

## 23 Kaua'i Plants

The problems facing the above Moloka'i plants also threaten another 23 Hawaiian species that were proposed October 30 for listing as Endangered. Sixteen of this group are endemic to the island of Kaua'i; the other seven are or were found on Kaua'i and the islands of Ni'ihau, O'ahu, Moloka'i, Maui, and/or Hawai'i.

Kaua'i is the northernmost and oldest of the eight major Hawaiian Islands. This highly eroded island, characterized by deeply dissected canyons and steep ridges, was formed about 6 million years ago by a single shield volcano. Because of

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## Listing Proposals

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its age and relative isolation, levels of floristic diversity and endemism are higher on Kaua'i than on any other island in the Hawaiian archipelago. The following 23 species proposed for listing as Endangered are distributed throughout Kaua'i and grow in a variety of vegetation communities (grassland, shrubland, and forests), elevational zones (coastal to montane), and moisture regimes (dry to wet):

- *Brighamia insignis*, or 'olulu — an unbranched plant with a tapering, succulent stem topped by a rosette of fleshy leaves. This species was once found on the privately owned island of Ni'ihau but may now be extirpated there.

- *Cyanea assarifolia*, or haha — a sparsely branched shrub bearing heart-shaped leaves, with a sole known population of fewer than 20 individuals.

- *Cyrtandra limahuliensis*, or ha'i'wale — an unbranched to sparsely branched shrub in the African violet family (Gesneriaceae).

- *Delissea rhytidosperra* — a shrub in the bellflower family with one known population consisting of five plants.

- *Diellia laciniata* — a fern in the spleenwort family (Aspleniaceae) that grows in tufts of three or four light-green, lance-shaped fronds.

- *Exocarpos luteolus*, or heau — a shrub in the sandalwood family (Santalaceae).

- *Hedyotis cookiana*, or 'awiwi — a small, highly branched shrub that has apparently been extirpated from the islands of Hawai'i, Moloka'i, and O'ahu. One population is believed to survive on Kaua'i.

- *Hibiscus clayi* — a shrub or tree with dark red flowers borne singly at the ends of the branches.

- *Lipochaeta fauriei*, or nehe — a perennial herb in the aster family with fewer than 70 known individuals in 5 populations.

- *Lipochaeta micrantha* — a related plant that can be distinguished from the two other *Lipochaeta* species endemic to Kaua'i by the smaller number of disk florets.

- *Lipochaeta waimeaensis* — the third Kaua'i endemic in this genus, with fewer than 10 known plants scattered over a small site on the rim of Waimea Canyon.

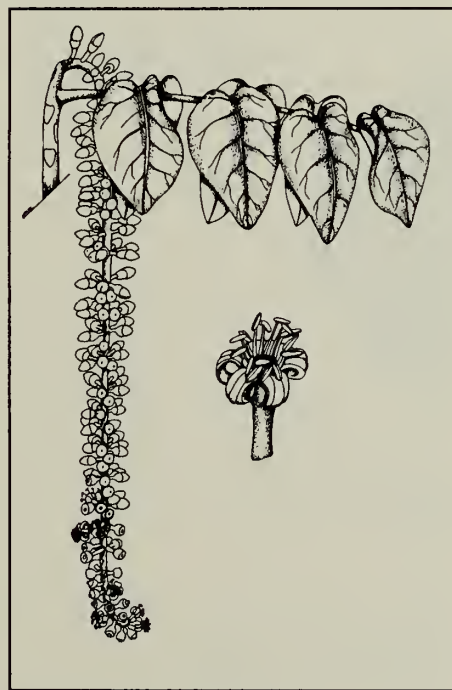
- *Lysimachia filifolia* — a small shrub in the primrose family (Primulaceae) that also occurs on the island of O'ahu.

- *Melicope haupuensis*, or alani — a tree in the citrus family with only two known surviving individuals.

- *Melicope knudsenii* — a related species that was considered "very common" in the 1920's but now numbers only 23 to 33 trees.

- *Melicope pallida* — another similar species, which also occurs on the island of O'ahu and totals about 75 known trees.

- *Melicope quadrangularis* — the fourth *Melicope* species from Kaua'i recently proposed for listing, *M. quadrangularis* was considered extinct until one adult plant and two seedlings were found in the Wahiawa Bog area of Kaua'i.



*Munroidendron racemosum*

- *Munroidendron racemosum* — a tree in the ginseng family (Araliaceae), this species is the only member of its genus, which is endemic to the island of Kaua'i.

- *Nothocestrum peltatum*, or 'aiea — a small tree in the nightshade family (Solanaceae) with 7 known populations totalling 12 individuals.

- *Peucedanum sandwicense*, or makou — an erect or sprawling herb in the parsley family (Apiaceae) with compound leaves and hollow stems that arise from a short, perennial stem. Small populations of this species are found on the islands of Kaua'i, Moloka'i, Maui, and O'ahu.

- *Phyllostegia waimeae* — a non-aromatic perennial in the mint family. One of the two historically known populations has not been seen in 40 years, and the other consists of a single plant.

- *Pteralyxia kauaiensis*, or kaulu — a tree in the dogbane family (Apocynaceae), one of only two species in this endemic Hawaiian genus.

- *Schiedea spergulina* — a tall subshrub with two recognized varieties (*S. s. var. spergulina* and *S. s. leiopoda*).

- *Solanum sandwicense*, or popolo'aiakeakua — a large, sprawling shrub in the nightshade family. This species once occurred on O'ahu but now apparently survives only on Kaua'i, where there are about 15 known individuals.

## Seven Coastal California Plants

Seven plant taxa from along the California coast were proposed for listing protection in two separate groups during September and October. Two of the plants are restricted to coastal freshwater marsh habitat:

- marsh sandwort (*Arenaria paludicola*) — a slender perennial herb in the pink family. Historically, this species occurred in four areas of California and in the State of Washington, but today there is only one known population of about 10 individuals at a site in San Luis Obispo County, California. Wells planned to provide drinking water for a proposed housing development could alter the hydrological conditions needed for this water-dependent plant.

- Gambel's watercress (*Rorippa gambellii*) — an herbaceous perennial in

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## Listing Proposals

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the mustard family (Brassicaceae) that produces dense inflorescences of white flowers. It was reported historically from about a dozen locations in southern California and from near Mexico City, but only three populations are known to remain, all within San Luis Obispo County. One of these populations occurs at the sole remaining *A. paludicola* site and faces the same threat. Another *R. gambellii* population is in danger of encroachment by nearby sand dunes that were eroded from off-road vehicle use. The third population depends on water that is used for agriculture.

Because of these threats, *A. paludicola* and *R. gambellii* were proposed on September 30 for listing as Endangered species.

A few weeks later, on October 24, the Service proposed to list another five coastal California plants for listing as Endangered. These taxa have been reduced in range to sedimentary deposits in Santa Cruz and Monterey Counties. Four of the five of the plants are spineflowers in the genus *Chorizanthe*, which is part of the buckwheat family (Polygonaceae):

- Ben Lomond spineflower (*C. pungens* var. *hartwegiana*);
- Monterey spineflower (*C. pungens* var. *pungens*);
- Scott's Valley spineflower (*C. robusta* var. *hartwegii*); and
- robust spineflower (*C. robusta* var. *robusta*).

The fifth plant, the Ben Lomond wall-flower (*Erysium teretifolium*), is a distinctly thread-leaved, yellow-flowered member of the mustard family (Brassicaceae).

Three of the five taxa (*C. pungens* var. *hartwegiana*, *C. robusta* var. *hartwegii*, and *E. teretifolium*) grow only on sandstone and mudstone soils in the Santa Cruz Mountains. Sand mining and residential development are the main threats to these plants. The other two (*C. pungens* var. *pungens* and *C. robusta* var. *robusta*) are restricted to sandy soils along the coast in southern Santa Cruz and northern Monterey Counties. Much of

their habitat has been destroyed or degraded by urbanization, agricultural development, introductions of non-native plants for dune stabilization, and military activity at Fort Ord.

### American Chaffseed (*Schwalbea americana*)

This plant, a tall herb in the figwort family (Scrophulariaceae), is the only species in its genus. It is distinguished by its large, showy, purplish-yellow flowers that are borne on a spike-like raceme. Once a widely distributed species, the American chaffseed was known historically from 78 sites in 15 States. Habitat modification, however, has reduced its known range to 18 sites in 6 States (North Carolina, South Carolina, Florida, Georgia, Mississippi, and New Jersey). The species is apparently extirpated in Massachusetts, Connecticut, New York, Delaware, Maryland, Virginia, Kentucky, Tennessee, and Alabama.

The American chaffseed grows in sandy, acidic soils within habitat generally described as open, moist pine flatwoods, savannas, and grasssedge systems. This shade-intolerant species depends on factors such as fire, mowing, or fluctuating water tables to maintain the crucial open to partly-open conditions it requires. Wildfire suppression has eliminated one of the most important natural means by which open habitat was maintained, and vegetational succession is overwhelming some populations. Other sites have been lost to urbanization and incompatible forestry or agricultural practices. Because of continuing threats to the species, the American chaffseed was proposed September 11 for listing as Endangered.

### Morefield's Leather Flower (*Clematis morefieldii*)

A perennial climbing vine in the buttercup family (Ranunculaceae), Morefield's leather flower can grow to a length of 16 feet (5 meters). This species is distinguished by its attractive pinkish, urn-shaped flowers. It is known only from a few small sites within rocky limestone woods on the south- and south-



Morefield's leather-flower

west-facing slopes of mountains in Madison County, Alabama.

Morefield's leather flower was first collected in the early 1980's. Since then, three of the eight reported populations have already been destroyed by road building, site clearing, and herbicide use associated with residential development. Only two of the remaining populations are considered to be of significant size. Additional development poses an imminent threat to several sites containing over half of the species' total numbers. For this reason, Morefield's leather flower was proposed October 21 for listing as Endangered.

### Louisiana Quillwort (*Isoetes louisianensis*)

A grass-like aquatic herb in the family Isoetaceae, the Louisiana quillwort is closely related to ferns and reproduces by spores. This species occurs in four small streams in the Bogue Chitto River drainage, Washington Parish, Louisiana. Two populations are known, one of which consists of only four individuals.

The slender, quill-like leaves of the Louisiana quillwort arise from a short, fleshy stem that is shallowly rooted in a

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Listing Proposals

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coarse sand or gravel substrate. Activities that affect the hydrology, water quality, or substrate stability of its stream habitat are the main threat to its survival. Such impacts could result from sand and gravel dredging, stream channelization, and erosion from clear-cut logging of adjacent forests, which are occurring within the species' range. Because of these threats, the Service has proposed to list the Louisiana quillwort as an Endangered species (F.R. 10/21/91).

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Regional News

(continued from page 3)

During spring nesting surveys at Wood Buffalo National Park, Canadian biologist Ernie Kuyt found 32 nests and reported that 6 experienced breeding pairs did not nest, apparently in response to the poor habitat conditions. Visiting 20 nests, Canadian and U.S. biologists checked eggs, collecting 16 and leaving at least one viable egg in each nest. This technique ensures a greater hatching success but results in fewer viable eggs for transfer to captivity. By the May 28 pick-up date, predators had destroyed 4 nests.

Of the 16 eggs collected, 6 were infertile or the embryo was dead at the time of pick-up. Of the 10 viable eggs, 6 hatched and 4 survived. Mid-June surveys at the Canadian nest sites indicated that 21 chicks survived, and one nest had 2 eggs yet to hatch. By mid-August, only 9 to 12 chicks survived, a decline characteristic of drought years when food is

scarce and predators find it easy to capture the young, flightless birds.

In the captive whooping crane flocks, one chick survived at the International Crane Foundation in Baraboo, Wisconsin, and two survived at the Patuxent Wildlife Research Center in Laurel, Maryland. Both projects are making efforts to promote natural copulation by young pairs. One of the Patuxent chicks is a product of such mating—a "first" at the Center.

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In the third consecutive year of a whooping crane habitat preservation effort, more than 300 volunteers constructed shoreline erosion protection at Aransas National Wildlife Refuge, Texas. Volunteers placed 11,300 bags of cement at 9 sites to protect 1,875 linear feet (570 meters) of shoreline from natural wave action and boat wakes, especially from barge traffic, in critical marsh habitat.

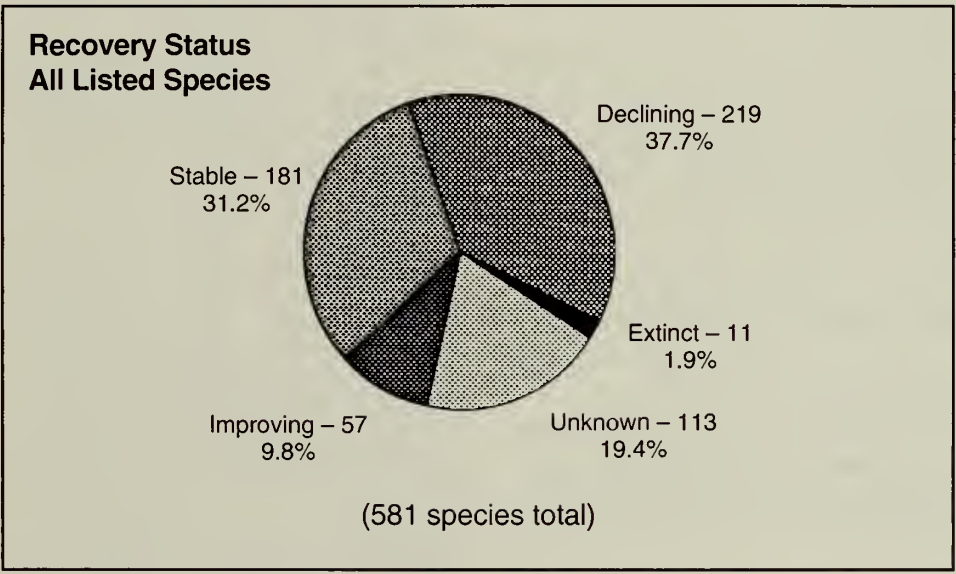
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Status of Recovery Program

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Once a plant or animal is listed, the Service's goal is to reverse the species' decline and neutralize the threats to its survival so that its long-term survival in nature is ensured. The first step is usually to develop a species recovery plan. Of the 581 species covered in the report, 352 have approved recovery plans, and plans are currently being developed for an additional 130 species. For the most part, species that have been on the list less than 3 years do not yet have approved recovery plans. The 40 species that warrant recovery plans but have been listed over 3 years without one (about 7 percent of the species covered in the report) constitute the actual recovery planning backlog. The Service is placing a high priority on developing plans for these species.

Recovery plans are practical, working guidelines that outline specific research and management tasks for species recovery. Although carrying no legal authority, they provide a blueprint for use by a variety of Federal and State agencies, private



organizations, and individuals in undertaking programs to enhance listed species.

The report, the first of its kind, is required under a 1988 amendment to the Endangered Species Act directing the Secretary of the Interior to report to Congress every 2 years on the status of endangered species and recovery plans. This 406-page illustrated document includes a list of approved recovery plans, a list of species occurrences by State, gen-

eral background information, and a synopsis for each species showing its current status and briefly describing past and planned recovery activities.

Copies of the report (stock number 024010-00691-9) are available for \$24.00 from the U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402. Credit card holders can order the report by telephone by calling 202-783-3238.

# Fifty-six Species Added to List of Threatened and Endangered Species in August-October 1991

By coincidence, just as 56 species were proposed in August-October 1991 for listing as Threatened or Endangered, final rules listing another 56 — 11 animals and 45 plants — were published in the *Federal Register* by the Fish and Wildlife Service during the same time period. Endangered Species Act protection now applies to the following:

## ANIMALS

- **razorback sucker** (*Xyrauchen texanus*) - a fish occurring in low numbers within parts of the Colorado River basin in Mexico, California, Arizona, Nevada, Utah, New Mexico, Colorado, and Wyoming; listed as Endangered (F.R. 10/23/91).

- **Gulf sturgeon** (*Acipenser oxyrinchus desotoi*) - a large, anadromous fish that occurs in scattered locations from Louisiana (east of the Mississippi River) to Tampa Bay, Florida; Threatened (F.R. 9/30/91).

- **Ouachita rock-pocketbook** (*Arkansia* (= *Arcidens*) *wheeleri*) - a freshwater mussel that has been reduced in range to segments of two rivers in Arkansas and Oklahoma; Endangered (F.R. 10/23/91).

## Two New Mexico Snails - both Endangered (F.R. 9/30/91)

- **Alamosa springsnail** (*Tryonia alamosae*) and

- **Socorro springsnail** (*Pyrgulopsis neomexicana*) - both species are small, aquatic snails restricted to several thermal spring systems.

## Six Foreign Reptiles - all Endangered (F.R. 9/30/91)

- **Maria Island ground lizard** (*Cnemidophorus vanzoi*) and

- **Maria Island snake** (*Liophis ornatus*) - both species once probably occurred on the island of St. Lucia in the Caribbean Ocean, but now are known only from several nearby islets.

- **Brazilian sideneck turtle** (*Phrynops hogei*) - known only from two river drainages in southeastern Brazil.

- **Cat Island turtle** (*Trachemys terrapen*) - known only from Cat Island in the Bahamas.

- **Inagua Island turtle** (*Trachemys stejnegeri malonei*) - known only from Great Inagua Island in the Bahamas.

- **South American red-lined turtle** (*Trachemys scripta callirostris*) - also known as the Colombian slider; occurs in Caribbean drainages of northern Colombia and northwestern Venezuela.

## PLANTS

- **Guthrie's ground-plum** (*Astragalus bibullatus*) - a perennial plant in the pea family (Fabaceae); known only from cedar glades of central Tennessee; Endangered (F.R. 9/26/91).

- **white irisette** (*Sisyrinchium dichotomum*) - a small, white-flowered perennial herb in the iris family (Iridaceae); endemic to piedmont of North Carolina; Endangered (F.R. 9/26/91).

- **Texas trailing phlox** (*Phlox nivalis* ssp. *texensis*) - a short, clump-forming perennial in the family Polemoniaceae; occurs in eastern Texas; Endangered (F.R. 9/30/91).

- **Terlingua Creek cat's-eye** (*Cryptantha crassipes*) - a silvery desert perennial in the family Boraginaceae; known only from Brewster County, west Texas; Endangered (F.R. 9/30/91).

- **alker's manioc** (*Manihot walkerae*) - a perennial herb in the spurge family (Euphorbiaceae); endemic to the Lower Rio Grande Valley of south Texas and northeastern Mexico; Endangered (F.R. 10/2/91).

## Hawaiian Plants (all Endangered)

**A. Island of O'ahu** - The following species are endemic to, or have their largest or best known populations in, the Waianae Mountain Range.

- **Cyanea superba** - an unbranched perennial in the bellflower family (Campanulaceae) with a terminal rosette of large leaves and pendent inflorescences of large, white flowers (F.R. 9/11/91).

- **Abutilon sandwicense** - a shrub in the mallow family (Malvaceae) with heart-shaped leaves and greenish flowers. This species and the following 25 O'ahu plants were listed October 29, 1991.

- **Alsinidendron obovatum** - a small shrub in the pink family (Caryophyllaceae).

- **Alsinidendron trinerve** - a related species distinguished by its less compact inflorescence.

- **Centaurium sebaeoides** - known in the Hawaiian language as 'awiwi; an annual herb in the gentian family (Gentianaceae).

- **Chamaesyce celastroides** var. *kaenana* - also known as 'akoko; a woody shrub in the spurge family.

- **Chamaesyce kuwaleana** - a species related to the above variety.

- **Cyanea pinnatifida** - known in Hawaiian as haha; a usually unbranched shrub in the bellflower family with deeply lobed leaves.

- **Diellia falcata** - a member of the fern family (Aspleniaceae).

- **Dubautia herbstobatae** - also known as na'ena'e; a small, spreading shrub in the aster family (Asteraceae).

- **Gouania meyenii** - a shrub belonging to the buckthorn family (Rhamnaceae).

- **Hedyotis degeneri** - a prostrate shrub in the coffee family (Rubiaceae) with four-sided stems and peeling, corky bark.

- **Hedyotis parvula** - a small, highly-branched shrub that can sprawl or grow upright.

- **Hesperomannia arbuscula** - a small, shrubby tree in the aster family.

- **Lipochaeta lobata** var. *leptophylla* - also known as nehe; a low-growing perennial herb in the aster family with lance-shaped leaves.

- **Lipochaeta tenuifolia** - a related plant that can be distinguished by its five-parted disk florets and deeply cut, stalkless leaves.

- **Lobelia niihauensis** - a low, branched shrub in the bellflower family.

(continued on next page)



# Determination of Factors Limiting the California Condor

Oliver H. Pattee

Patuxent Wildlife Research Center, Laurel, Maryland

The California condor is a member of the family Cathartidae, or New World vultures. They feed primarily on large carcasses that they locate visually. Historically (after 1800), California condors were reported as year-round residents from British Columbia south to Baja California, but they were rare north of California after 1850. All confirmed nest sites occurred south of San Francisco Bay and north of Baja California; however, historical records suggest California condors once nested as far north as British Columbia and south into Baja California. There were also reported sightings of condors in Utah, Arizona, New Mexico, and Texas.

Although localized concentrations occurred, the California condor has always been a rare bird with a relatively small population. The wild population has

been in apparent decline over the past 150 years. The causes of this decline are numerous and include climatic as well as human-related changes. Human activities, particularly wanton shootings, egg and specimen collecting, poisoning (both intentional and inadvertent), and habitat modifications (including the extirpation of most of the native ungulates), have undoubtedly contributed to the species' decline, upsetting the delicate balance between mortality and natality.

Until the January 14, 1992, release of two young California condors, the species survived only in two captive breeding flocks. The current (as of the release date) population consists of 52 birds, including 9 breeding pairs. From 1987, when the last wild bird was captured, until the end of 1991, 26 young were produced in captivity, including 13 in 1991.

Recovery efforts to establish a new wild population will concentrate in areas used by the remnant populations of the 1980's. However, the California Condor Recovery Plan is being revised to include consideration of additional release sites outside southern California (e.g., Grand Canyon, Pacific Northwest).

## Food Resources

Because condors feed primarily on the carcasses of large mammals located in fairly open terrain, domestic cattle are an important food source. Consequently, the survival of any new condor populations may be closely tied to the local cattle industry. Changes in ranch management practices that reduce or eliminate carcasses on open rangeland would

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## Threatened and Endangered Species

(continued from previous page)

- *Neraudia angulata* - an erect shrub in the nettle family (Urticaceae).
- *Nototrichium humile* - also known as kulu'i; an upright to trailing shrub in the family Amaranthaceae.
- *Phyllostegia mollis* - a densely hairy, non-aromatic, perennial herb in the mint family (Lamiaceae).
- *Sanicula mariversa* - an herb in the parsely family (Apiaceae) with leathery, lobed leaves.
- *Schiedea kaalae* - a perennial in the pink family that grows from a short, woody caudex.
- *Silene perlmanii* - a perennial in the pink family with white flowers and stems that are woody at the base.
- *Tetramolopium filiforme* - a dwarf shrub in the aster family.
- *Tetramolopium lepidotum* ssp. *lepidotum* - a related but larger plant.
- *Urera kaalae* - a shrub or small tree in the nettle family; also known as opuhe.

• *Viola chamissoniana* ssp. *chamissoniana* - also known as pamakani; a shrub in the violet family (Violaceae) with white, purple-tinged flowers.

B. Island of Kaua'i - The first two plants in this section are found along the rugged Na Pali coast, which is characterized by high cliffs and narrow valleys. The other five are endemic to the Wahiawa drainage basin, an area of bogs, streams, ridge summits, and diverse wet montane forests.

• *Hedyotis st. johnii* - a succulent perennial herb in the coffee family; listed September 30.

• *Schiedea apokremnos* - a low, branching shrub in the pink family; (E.R. 9/30/91).

• *Cyanea undulata* - an unbranched shrub in the bellflower family; this species and the following four Wahiawa basin plants were listed on September 20.

• *Dubautia pauciflora* - a somewhat sprawling to erect shrub in the family Asteraceae.

• *Hesperomannia lydgatei* - a small tree in the family Asteraceae with pendent

flower heads.

• *Labordia lydgatei* - also known as kamakahala; a shrub or small tree in the strychnine family (Loganiaceae).

• *Viola helenae* - a small, erect shrub in the violet family.

C. Island of Lana'i - The following were listed on September 20:

• *Abutilon eremitopetalum* - a shrub in the mallow family (Malvaceae) with densely hairy, heart-shaped leaves.

• *Cyanea macrostegia* ssp. *gibsonii* - a small, unbranched tree in the bellflower family.

• *Gahnia lanaiensis* - a tall, perennial, grass-like plant in the sedge family (Cyperaceae).

• *Phyllostegia glabra* var. *lanaiensis* - a robust perennial herb in the mint family.

• *Tetramolopium remyi* - a shrub in the family Asteraceae.

• *Viola lanaiensis* - a small, erect shrub in the violet family with white, purple-tinged flowers.

## California Condor

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affect the chances for survival of a released condor population. Such changes could reduce the available food base and necessitate foraging over a wider area or abandoning a portion of the range. Recent interest in reestablishing extirpated native ungulates on parts of the former range (e.g., Bitter Creek National Wildlife Refuge) and encouraging the maintenance of cattle on some public lands could significantly aid the recovery of the California condor.

## Habitat

Habitat loss continues to pose a major long-term problem. Because the condor requires large tracts of land in which to find food resources that are few in number but large in biomass, recent land use trends in the California condor's range tend to be detrimental. Conversion of rangelands to agriculture or home sites, gas and oil development, and other activities associated with an industrialized, urbanized human population result in less suitable habitat for the California condor. Condors ranged over 11 million acres (4.5 million hectares) during the 1970's, yet the most recent range encompassed only 6 million acres (2.5 million ha). The long-term outlook for condor habitat is not good.

## Contaminants

In addition to habitat loss, direct mortality and environmental contaminants continue to pose a hazard. Three of the last four adult California condor deaths were attributed to lead poisoning. Another condor died of presumed cyanide poisoning and five vanished due to unknown causes. High levels of DDE (a metabolite of the pesticide DDT) found in the shell membrane of an egg laid in 1986 suggest that localized "hot spots" of contamination may still pose hazards. Other contaminants, such as compound 1080 and organophosphate pesticides, represent theoretical hazards of unknown magnitude.

## Condor Releases

The reestablishment of a wild population of California condors depends on the continued success of the captive propagation program and the subsequent reintroduction of birds into the wild. Criteria established by the California Condor Recovery Team for release of condors require: three pairs of captive birds to be producing offspring; 96 percent of the genetic material of the founder lines represented by the released birds to be present in the captive population; and a reasonable probability for release in subsequent years following the initial releases. The current captive population met these conditions in 1991.

Considerable progress has been made on strategies to raise and release captive-reared birds. Successful releases of Andean condors in Peru were followed by temporary experimental releases of Andean condors in California, beginning in 1988. Releases of Andean condors in California enabled us to refine the techniques necessary for the reintroduction of California condors. These experimental releases provided information for use in improving release site selection criteria, descriptive information concerning behavioral differences associated with puppet-rearing and parent-rearing protocols, and data to assist in developing release protocols.

During the 4-year experimental project, 13 Andean condors were released in California. The last 4 of these 13 birds were captured before the January 14, 1992, release of two captive-bred California condors (along with 2 new Andean condor companions). Of the other Andean condors released during the experimental program, one died following a collision with a power line, two failed to develop behaviorally—that is, they refused to fly—and were removed for their own safety, two were removed from the wild for health reasons, and the other four were removed to prevent the transfer of unfavorable behavioral patterns to other birds. Inappropriate behavior included begging for food from people, soaring with hang gliders, visiting model

airplane parks, spending considerable periods of time over-flying urban areas (such as downtown Ventura), and inspecting oil well rigs and power lines as possible perching sites. Several people, including climbers, reported that the Andean condors flew over them at close range—as close as 20 meters (65 feet), demonstrating a lack of wariness that could contribute to the shooting problem. Condors are curious and may associate people with interesting activity, developing an acclimation that reduces their fear of humans. Before the next release of California condors, the two young Andean condors recently released in California will be captured for re-release in their native South American habitat.

## Future Releases

Contaminants such as lead, predacides, and rodenticides appear to present a continued hazard to future populations of California condors. The current California condor release plan is designed to address these problems but it does not eliminate the hazards. It involves protecting key nesting, roosting, and foraging areas, which would be connected by relatively hazard-free corridors. Extensive supplemental feeding would minimize hazards associated with foraging. If such a feeding program is needed indefinitely, however, the species will never be self-sustaining and truly recovered.

Habitat degradation promises to pose long-term threats to the recovery effort. There is no single agency that evaluates, tracks, and comments on the diverse human activities that affect condor habitat and, subsequently, the recovery effort. Such activities as oil and gas development, power line additions, wind generator farms, off-road vehicle traffic, real estate development, and public use could adversely affect the future suitability of condor habitat. Monitoring and managing these impacts will be critical if the California condor is to survive outside of captivity.



## Regional News

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Participants included staff from the Fish and Wildlife Service, U. S. Army Corps of Engineers, U.S. Coast Guard, and Texas resource agencies, as well as private citizens, representatives of conservation groups, and private sector businesses such as Conoco and Hollywood Marine.

\* \* \*

**Region 3** - In a case that has botanists concerned about disclosing the sites of protected plant species, the Shawnee National Forest in Illinois is offering a \$5,000 reward for information leading to the arrest and conviction of whoever stole the 6 specimens—one entire population—of Mead's milkweed (*Asclepias meadii*) in mid-June.

Calling the theft "exceptionally unusual" in that it involved federally protected plants taken from a remote area, Dr. Chris Topik, National Endangered Plant Program Manager for the U. S. Forest Service, commented, "Nobody dreamed this could happen—finding the Mead's milkweed was no mean task. This event emphasizes the dichotomy between the openness of discourse and the need for data security—protecting information about locations. We are showing and interpreting such species through partnerships and public education. At the same time, we have to be very careful about how we encourage public access to rare plants."

The population consisted of both wild specimens and young, introduced stock recently planted in a joint effort to reestablish Mead's milkweed in its historic range. One of only six places where the Threatened species was known to exist east of the Mississippi River, Shawnee National Forest was considered the premier site for reintroducing the plant into its native habitat.

The Forest Service has one of the largest endangered species conservation programs in the midwest, with involvement of virtually every National Forest. Dr. Larry Stritch, Chief Botanist at Shawnee National Forest, said he does not know why the plants were stolen, but he specu-

lated that it could have been vandalism, "a cheap, easy way to get plants for a private prairie garden," or a possible black market for Mead's milkweed just because the species is rare. Concentrated within a half-acre site, the plants were either carefully dug up or cut off with a razor blade. Monitoring the population weekly, botanists at the National Forest contacted the Fish and Wildlife Service's Division of Law Enforcement in the Twin Cities within 2 hours of discovering that the plants were gone.

Mead's milkweed is a remnant of the tallgrass prairie that was once prevalent in the midwest but has been lost through habitat conversion for urbanization and agriculture. With its latest loss, the plant is now restricted to 80 populations in 23 counties in Kansas, Missouri, Iowa, and Illinois. The small number of plants at each site and the species' poor reproductive success threaten its continued existence.

Mead's milkweed is one of 28 Endangered and Threatened plants and animals in the upper midwest targeted for recovery by the year 2000. The recovery initiative is a cooperative effort involving Federal and State agencies and private landowners, including the Forest Service, the Fish and Wildlife Service, the Morton Arboretum in Lisle, Illinois, and the Illinois Department of Conservation.

A perennial plant that grows as a solitary stalk up to 16 inches (40 centimeters) tall, the Mead's milkweed has broadly ovate opposite leaves with a whitish, waxy covering, topped by a cluster of greenish to cream-colored flowers. Anyone who has information about the theft should call Jim Schull, the Special Agent conducting the investigation, at Shawnee National Forest (618-253-7114).

\* \* \*

**Region 4** - During a July survey, divers from the Fish and Wildlife Service's Jackson, Mississippi, Field Office discovered several specimens of the inflated heelsplitter (*Potamilus inflatus*) in the main stem of the Black Warrior River in Alabama, only the third discovery of this Threatened freshwater mussel in the river since the mid-1970's. The number of

heelsplitters found—20 live and 15 dead—is encouraging, since only three had ever been collected in the area. Of the live mollusks, nearly all were juveniles, indicating that the species has a good local population.

Continuing the survey, divers confirmed a range extension for the heelsplitters about 25 miles (40 kilometers) downstream of Selden Dam when they found three more—two fresh dead and one live.

Until the 1991 discoveries, Service biologists had collected two shells of inflated heelsplitters in 1989 in the Black Warrior bendway downstream of Selden Dam and a single shell in the mid-1970's from the main stem just below the bendway. In 1980, a graduate student may have collected a specimen and misidentified it as *Leptodea laevisima*. During the most recent survey, biologists generally found the species in slow current areas with soft substrate at water depths of up to 40 feet (12 m).

Listed in 1990, the inflated heelsplitter is also known to occur in the Amite River in Louisiana and in the Tombigbee River in Alabama. Although the mussel once inhabited parts of seven rivers in Alabama, Louisiana, and Mississippi, extensive habitat alteration has eliminated the species from most of its historical range. Sand and gravel mining, along with channel maintenance, are the primary threats. The heelsplitter's best populations occur in the Amite River.

\* \* \*

The Jackson Field Office is working with major timberland owners in the South to develop habitat conservation plans to benefit federally listed species, an important initiative in view of the fact that 91 percent of timberland in the area is privately owned. These forests are home to a variety of rare wildlife including the red-cockaded woodpecker (*Picoides borealis*), Red Hills salamander (*Phaeognathus hubrichti*), and gopher tortoise (*Gopherus polyphemus*). Such habitat conservation plans are designed to benefit endangered species as well as meet the needs of timberland owners.

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## Regional News

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As a first step in developing silvicultural strategies to promote the conservation of the Red Hills salamander and the harvest and regeneration of timber, the International Paper Company is funding an assessment of population densities for this monotypic species in various timber types and slopes.

The Scott Paper Company is discussing a similar project, and Georgia Pacific's habitat conservation plans for the gopher tortoise and the red-cockaded woodpecker are almost ready for consideration of an incidental take permit. Georgia Pacific and Cavenham Companies, as well as the State of Mississippi, also are discussing habitat conservation plans for property occupied by gopher tortoises. Under the habitat conservation plan process, the Fish and Wildlife Service negotiates with major timberland owners who, once the plans are formulated and approved, have responsibility for implementing the timber management practices.

\* \* \*

**Region 5** - Fortunately, the roseate tern (*Sterna dougalii dougalii*) breeding season in New England ended in early August this year, avoiding the impact of Hurricane Bob. Altogether, 3,611 pairs nested at 18 colonies in 4 States. As in previous years, the roseate's reproductive success was good at the protected large colonies and poor or lacking at the smaller colonies. In general, roseate terns are maintaining their population levels, with the majority of the population in two or three large colonies. Massachusetts had 1,778 nesting pairs in 5 colonies, New York followed with 1,522 pairs in 6 colonies, Connecticut had 185 pairs in one colony, and Maine had 128 pairs in 6 colonies. Rhode Island had no nesting roseate terns this year.

\* \* \*

Biologists who took a census of 9 summer colonies of Virginia big-eared bats (*Plecotus townsendii virginianus*) in West Virginia caves tallied 4,455 bats, a 15 percent increase from the 1990 count and a 20 percent increase from 1984, the

first year all known colonies were surveyed. All the colonies are now protected by gates, fences, or landowner agreements.

\* \* \*

Radio-tracking of 4 Virginia big-eared bats in Pendleton County, West Virginia, for 2 weeks in May resulted in good information about their habits, including territorial foraging behavior. Bats foraged over both fields and woods. While telemetered bats foraged in various areas, individuals foraged in the same areas night after night, routinely traveling 3 to 5 miles from the cave to the chosen sites. For several consecutive nights, biologists followed a single bat from the time it left the cave in the evening until it returned the next morning. Although some of the 10 bats involved in the project lost their transmitters early in the tracking period, researchers recovered the transmitters and placed them on different bats.

\* \* \*

Biologists conducting freshwater mussel surveys at 21 sites on the Elk River in West Virginia during July and August located 1 of their 2 targeted species. *Pleurobema clava*, a Federal listing candidate, was found at 6 of 10 historic sites and at 3 new locations. The other candidate, *Epioblasma torulosa rangiana*, was not found at any site. Altogether, biologists identified 23 mussel species during the surveys.

\* \* \*

Researchers live-trapped, ear-tagged, and released eastern woodrats (*Neotoma floridana magister*) at 12 sites in West Virginia between June and September, collecting population data on this Federal listing candidate. In addition, 30 of the animals were supplied to the New York Department of Environmental Conservation in an effort to reestablish a population at one of the species' historic locations.

\* \* \*

Representatives from several Service offices created and staffed an "Extinction is Forever" exhibit at the New York State Fair, which attracts about 900,000 people each year. Focusing on endangered species, the display featured a living stream

provided by the Service's Leetown, West Virginia, facility complete with Atlantic salmon (*Salmo salar*) from Tunison Lab. Other Service staff members from the New York Field Office and Montezuma National Wildlife Refuge also attended.

\* \* \*

In what is believed to be the first successful nesting of peregrine falcons (*Falco peregrinus*) on Lake George in at least 25 years, the New York State Department of Environmental Conservation (NYSDEC) reported that 2 eyries each fledged 2 young. The total number of young peregrines hatched in the State during 1991 was 29, including 14 young from 8 pairs in the Adirondack Mountains and 15 young from 10 pairs in the New York City area. Three of the New York City fledglings are known to have died.

\* \* \*

The NYSDEC also reported 16 territorial bald eagle (*Haliaeetus leucocephalus*) pairs in the State during the 1991 season, an increase from 14 pairs in 1990. Eleven pairs produced 18 eagles, although 2 of the young died before fledging.

\* \* \*

**Region 6** - Because of the success of a 5-year captive-breeding program for black-footed ferrets (*Mustela nigripes*), the Fish and Wildlife Service and the Wyoming Game and Fish Department released 49 of the Endangered animals on the native grasslands of Shirley Basin, Wyoming, during September and October to begin establishing the first experimental population for the species. This event generated national news and focused favorable attention on the agencies. The first two ferrets freed from their cage after an acclimation period on the prairies scampered 3 miles and 5 miles before finding homes in a prairie dog town. Volunteers and State and Federal biologists have been monitoring the ferrets, which were outfitted with radio collars.

Some of the captive-bred ferrets have been confirmed as taking prairie dogs, indicating that they were adapting to the wild; others were not. As of January

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## Regional News

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1992, 6 ferrets are known dead—all as a result of predation by coyotes and badgers.

State and Federal biologists utilized excellent snow tracking conditions in November to estimate that about 10 animals have survived in the wild, although a few others could exist undetected because of the expanse of the range. After determining that most of the batteries on radio transmitters had been expended, biologists removed the telemetry collars from the remaining ferrets. The scientists will depend on snow-tracking and use lighting at night, when the animals are most active, to monitor the population through the winter months.

The agencies will analyze information from the release to prepare and refine a strategy for the fall. During the next 10 years, scientists will continue to identify sites in Wyoming and other western States suitable for releasing additional young produced by captive-breeding populations which, as of January 1992, total about 300 animals.

\* \* \*

The Denver Regional Director has approved a new recovery plan for the Colorado squawfish (*Ptychocheilus lucius*). This revision of the original 1978 plan incorporates new information on the status of the species, including its distribution and biological requirements. Two public reviews of the plan were completed after biologists found squawfish in the San Juan River and focused attention on the importance of this river to the species' recovery.

\* \* \*

Fish and Wildlife Service biologists are developing an Interim Gray Wolf (*Canis lupus*) Program for North Dakota, recognizing that expanding populations of wolves from Minnesota and Canada are dispersing the animals into the State. In North Dakota, the gray wolf is listed as Endangered.

In 1990, an aerial hunter shot what he thought was a coyote (*Canis latrans*) near Ashley, North Dakota, in the southeastern part of the State. A year later, a

rancher near Stanley, in northwestern North Dakota, also shot what he thought was a large coyote. Both animals were wolves; the first, probably from Minnesota, and the second, probably from Canada.

In addition to these shootings, unconfirmed wolf sightings have been increasing steadily, particularly in the north-central part of the State, where a large block of forest habitat supports a healthy deer population, and in the southeast corner of the State, which is characterized by rolling prairie and contains the Sheyenne National Grasslands.

The objectives of the program are to provide guidance to government personnel, protect non-problem wolves, develop a mechanism for removing problem wolves, monitor the species' population, predict its trend in North Dakota, and implement a public awareness strategy.

\* \* \*

The Service has hired a private contractor to collect data on the status of eight species of butterflies in North Dakota and South Dakota that are suspected of declining because of habitat fragmentation and degradation. They are the powesheik skipper (*Oarisma powesheik*), arogos skipper (*Atrytone arogos*), mulberry wing (*Poanes massasoit*), broad-winged skipper (*Poanes viator*), Dakota skipper (*Hesperia dacotae*), dion skipper (*Euphyes dion*), tawny crescent (*Phyciodes batesii*), and regal fritillary (*Speyeria idalia*).

The powesheik skipper, arogos skipper, Dakota skipper, and regal fritillary appear to require virgin mesic prairie. Most of their remaining habitat consists of small tracts of private land. The mulberry wing, broad-winged skipper, and dion skipper inhabit sedge marshes with shallow water. Oxbows provide the typical habitat in North Dakota. The tawny crescent inhabits open areas near woodlands.

All species except the regal fritillary appear to have senescent, stagnant distributions that are remnants of their former range. The remaining habitat is sensitive to the effects of land management, such as grazing and pesticides that eliminate nectar sources. Public land in southeastern North Dakota that supported high

densities of several of the species in the early 1980's now appears to be devoid of the butterflies.

\* \* \*

## History on the Wing

(continued from page 1)

hatched at the San Diego Wild Animal Park, flew to freedom from a holding pen in the Los Padres National Forest's Sespe Condor Sanctuary, about 75 miles north-east of Los Angeles.

Occurring 5 years after the last California condor was removed from the wild in an unprecedented effort to save the species from extinction, the release of the vultures marked the second success in a 10-year effort to reintroduce the birds into their historic range. The first success was breeding the condors in captivity, a challenge never undertaken before.

To learn about California condor habits, the Fish and Wildlife Service conducted a 4-year experimental project, releasing captive-produced Andean condor (*Vultur gryphus*) chicks into California skies. The goal of the Andean condor project was to develop release techniques for the related California condor by monitoring the daily movements and feeding behavior of the Andean species as a surrogate. All 13 of the Andean condors released as part of the experiment have been recaptured.

For three months, Xewe and Chocuyens and two Andean condor chicks were in a condor "halfway house," a large enclosure nestled into the side of a 150-foot (46-meter) cliff. This temporary residence featured a 30-foot by 30-foot (9 m by 9 m) patio with soft netting where they took short flights and practiced "hop-flaps," straight up-and-down take-offs and landings. The birds got a feel for the winds and acclimated themselves to their natural surroundings. The removal of the net completed the acclimation process. The Andean condors accompanying Xewe and Chocuyens helped create a group typical of wild populations. The South American birds will be recaptured before the next release of California condors.

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## History on the Wing

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When they are fully mature, Xewe and Chocuyens will weigh 20 pounds (9 kilograms) and have 10-foot (3-m) wingspans as representatives of North America's largest species of soaring birds.

The 50 California condors in the captive-breeding flocks live at the Los Angeles Zoo and the San Diego Wild Animal Park. These zoos are partners with the Fish and Wildlife Service in the recovery effort, along with the U.S. Forest Service and the California Department of Fish and Game. Biologists hope to release additional birds each year in the goal of reestablishing a viable wild population.

In prehistoric times, California condors ranged throughout the coastal regions of North America, from British Columbia to Baja California, east to Florida and north to New York. By 1967, however, they were reduced in range to a small region of California and were listed as Endangered. The Fish and Wildlife Service adopted a recovery plan in 1975. In 1980, the Service and the National Audubon Society established the Condor Research Center in Ventura, California, to coordinate field investigations in the condor's last remaining habitat in Kern and Ventura Counties.

By 1987, the loss of habitat, lead poisoning from ingesting bullet fragments from deer carrion, and illegal shooting had reduced the number of wild condors to 27. Biologists captured the remaining

BOX SCORE						
LISTINGS AND RECOVERY PLANS						
Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	56	249	9	22	336	33
Birds	73	153	12	0	238	69
Reptiles	16	64	18	14	112	27
Amphibians	6	8	5	0	19	7
Fishes	55	11	34	0	100	51
Snails	7	1	6	0	14	7
Clams	40	2	2	0	44	33
Crustaceans	8	0	2	0	10	5
Insects	13	1	9	0	23	13
Arachnids	3	0	0	0	3	0
Plants	243	1	64	2	310	137
TOTAL	520	490	161	38	1209*	382**
Total U.S. Endangered	520	(277 animals, 243 plants)				
Total U.S. Threatened	161	(97 animals, 64 plants)				
Total U.S. Listed	681	(374 animals, 307 plants)				

\* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

\*\* There are 311 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife 39 plants

Number of Cooperative Grant Agreements signed for the African Elephant Conservation Act: 7

Number of CITES Party Nations: 112

January 31, 1992

birds and began breeding them in captivity. The reintroduction effort follows similar successes involving bald eagles and

peregrine falcons and provides continuing evidence of the conservation benefits of the Endangered Species Act.

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