

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service  
Endangered Species Program, Washington, D.C. 20240

### Listing Protection Proposed for Two Plants and Three Animals

Five taxa were proposed by the Fish and Wildlife Service during January 1987 for listing as Threatened or Endangered. If final listings are approved, protection under the Endangered Species Act will be available to the following:

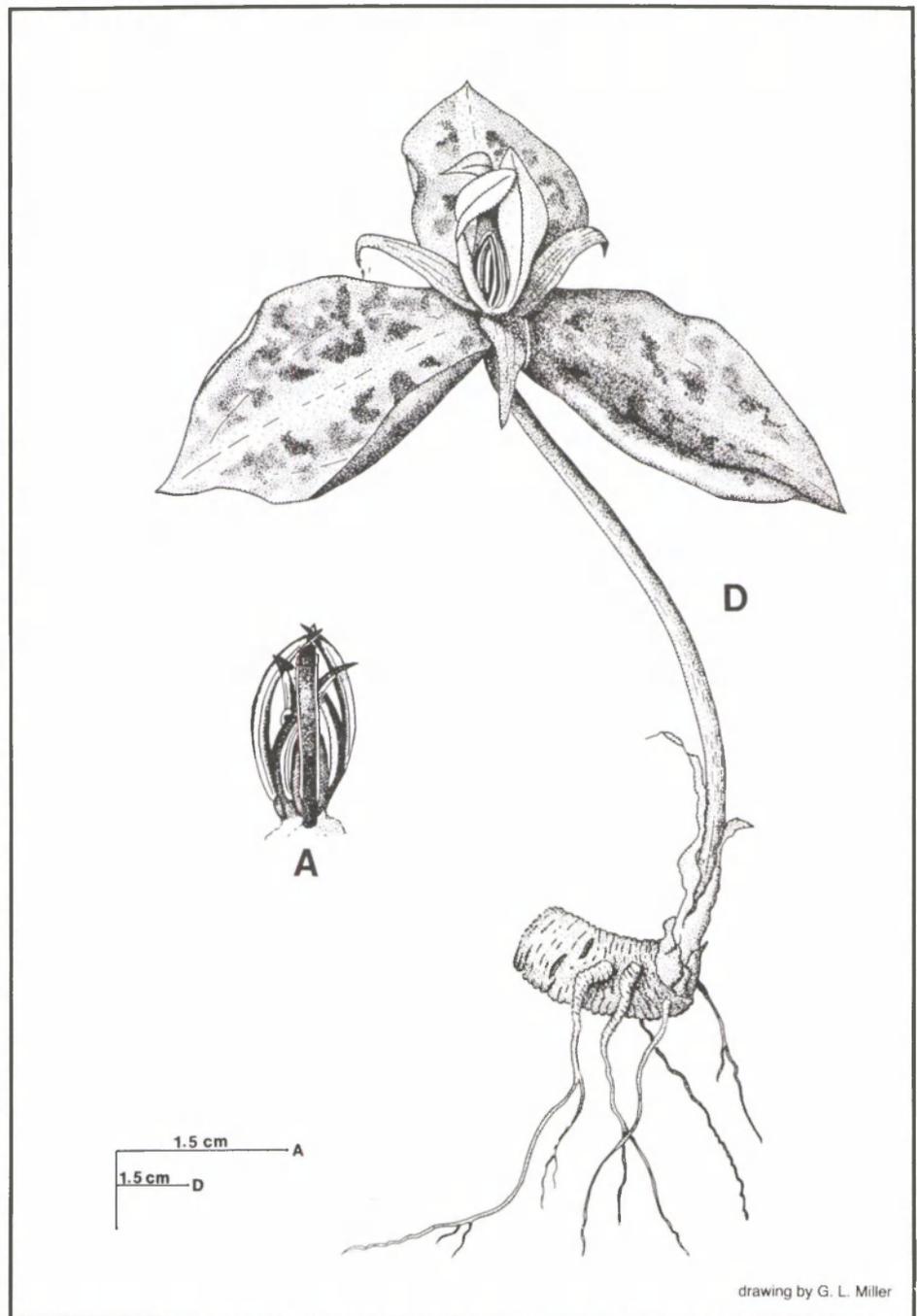
#### Relict Trillium (*Trillium reliquum*)

The relict trillium, a rare herbaceous member of the lily family (Liliaceae), can be distinguished from other trillium species by its decumbent (s-curved) stems, distinctively shaped anthers, and the color and shape of its leaves. Its flowers, which appear in early spring, are greenish to brownish-purple (or occasionally pure yellow) in color. A perennial, it dies back to a tuberous rhizome after the fruit matures. *T. reliquum* is found only in moist hardwood forests that have experienced little or no disturbance within the recent past.

There currently are nine known *T. reliquum* populations: two in Alabama (Henry and Lee Counties); four in Georgia (Clay, Columbia, and Early Counties); and three in South Carolina (Aiken and Edgefield Counties). The Henry County population, which consists of approximately 150 plants on one-third of an acre, is on land managed by the U.S. Army Corps of Engineers (COE) as a recreation area. Part of the largest population, located in Aiken and Edgefield Counties, has been purchased by the South Carolina Department of Marine Resources for protection as a nature preserve, and another small segment is within a State highway right-of-way owned by South Carolina. The remainder of this population is privately owned, as are the six populations.

Because most relict trillium populations are adjacent to rapidly expanding urban areas, the most serious threat to the species' survival is the loss of habitat resulting from residential development. Logging of lands occupied by the trillium, clearing of native habitat for agricultural purposes, and fires are other significant threats. All *T. reliquum* populations have been damaged

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Relict trillium showing distinctive anthers (A) and mature flowering plant (D)



## Regional News

### Endangered Species Program regional staff members have reported the following activities for the month of January:

**Region 2**—In December 1986, 71 caves were surveyed for Ozark big-eared

bats (*Plecotus townsendii ingens*). Of the 71 caves, only five (four in Oklahoma and one in Arkansas) contained these bats. A total of 258 Ozark big-eared bats were found in the five caves. Most of the bats occurred in one cave in Oklahoma, where

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

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, and 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 Virgin Islands. **Region 5:** Connecticut, Delaware, 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.

The ENDANGERED SPECIES TECHNICAL BULLETIN is published monthly by the U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

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the count increased from 216 bats in 1985 to 242 bats in 1986.

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In January, a radio-collared ocelot (*Felis pardalis*) was killed when struck by a vehicle on a road south of Laguna Atascosa National Wildlife Refuge in southern Texas. The cat was an adult male that was originally collared in February 1984. The remains were found by a passerby and were turned over to the State game warden.

The Sonoran pronghorn (*Antilocapra americana sonoriensis*) recovery team met in January. The major topics of discussion included the Draft Final Report on Sonoran Pronghorn Status in Arizona, future research needs and recovery actions, and the Draft Master Plan for Buenos Aires National Wildlife Refuge. One of the objectives in the latter document is the re-introduction of pronghorn on the refuge. The subspecies to be used in such a re-introduction is undecided. It is not entirely clear which pronghorn subspecies is native to the refuge; the area may be within the historical range of *A. a. mexicana*, a non-endangered subspecies.

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**Region 3**—Gene Gardner, of the Illinois Natural History Survey, has submitted the following note that corrects and slightly expands upon a Regional News item in BULLETIN Vol. XI No. 10-11:

Radio-tracking equipment and techniques were successfully applied to a juvenile female Indiana bat (*Myotis sodalis*) captured over a permanent stream in Pike County, Illinois. This juvenile was only one of 16 Indiana bats captured within the same 1.75 kilometer segment of the creek. The juvenile, weighing 8.05 grams, exhibited some abnormal behavior during the first night of a four-night tracking period. The bat was tracked on four mornings to a dead cottonwood in a small area of bottomland woods bordering the stream. The juvenile, along with nine other bats (undoubtedly Indiana bats), emerged from beneath the same small area of loose bark on the tree during one night of observation. Preliminary data for the second, third, and fourth nights indicate movements over a larger range than previously reported for the species. In addition to foraging over the creek, the juvenile foraged in the canopy of mature trees in an upland, intermittent side hollow of the permanent stream. The bat flew across the corner of a nearby soybean field, apparently to reach the upland foraging area. Although she foraged along the edges of the soybean field and a nearby cornfield, she did not forage over the open fields themselves. A long-term cooperative research project among the Illinois Natural History Survey, Illinois De-

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# Listings Approved for 12 Plants and One Animal

During January 1987, the Fish and Wildlife Service (FWS) added the following taxa to the U.S. list of Endangered and Threatened plants and animals:

## Seven Florida Scrub Plants

The sand pine/evergreen oak scrub ecosystem occupying the central Florida sand ridge includes a number of plants and animals that are found nowhere else. These endemic species are imperiled by conversion of native habitat to citrus groves, residential developments, and other uses. (See the story in this BULLETIN on the recent proposal to list two Florida lizards.) As part of a continuing effort to conserve these species and their habitat, the FWS proposed April 10, 1986, to give listing protection to seven Florida scrub plants. (See story in BULLETIN Vol. XI No. 5.) The January 21, 1987, final rule

listed six scrub plants as Endangered—*Eryngium cuneifolium* (snake root), *Chionanthus pygmaeus* (pygmy fringe tree), *Hypericum cumulicola* (highlands scrub hypericum), *Polygonella basiramia* (wire weed), *Prunus geniculata* (scrub plum), and *Warea carteri* (Carter's mustard)—and one as Threatened, *Paronychia chartacea* (papery whitlow-wort).

## Two Puerto Rico Plants

*Peperomia wheeleri* (Wheeler's peperomia) is an evergreen herb found on the slopes of Monte Resaca on Culebra Island. Deforestation and feral livestock have eliminated the plant from most of its former range. Most of the remaining population occurs within Culebra National Wildlife Refuge; however, until the continuing feral livestock problem is solved, the spe-

cies will remain vulnerable. *Banara vanderbiltii* (known locally as Palo de Ramon), is an evergreen shrub or small tree that apparently survives at a single site in the karst region of northern Puerto Rico. Only six individuals of this species currently are known. Some historical populations were lost to urbanization, and the remaining habitat is subject to continued development. Both species were proposed April 10, 1986, for listing as Endangered (see summary in BULLETIN Vol. XI No. 5), and the final rule was published in the January 14, 1987, *Federal Register*.

## *Lesquerella filiformis* (Missouri Bladderpod)

This annual, endemic to the unglaciated prairie region of southwestern Missouri, is

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## Regional News

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partment of Conservation, and Illinois Department of Transportation will include the use of 0.82-g superminiature transmitters in a telemetry study of an Indiana bat maternity colony in this area during 1987.

**Region 4**—Two Endangered plant species have been found on a protected site in Miami, Florida. *Euphorbia deltoidea* ssp. *deltoidea* (deltoid spurge) and *Polygala smalli* (tiny polygala) were located on the Deering Estate, a 300-acre tract recently acquired by Florida's Conservation and Recreation Lands Program and the Metropolitan Dade County Park and Recreation Department. The Deering Estate includes about 75 acres of pine rockland, a habitat type to which both species are restricted. Only one plant of *E. d.* ssp. *deltoidea* and four plants of *P. smalli* were found; however, if controlled burning (a habitat management technique to remedy overvegetation) can be implemented, it is likely that the populations of both species will increase.

Three male and three female (two pregnant) Perdido Key beach mice (*Peromyscus polionotus trissyllepsis*) have been trapped at Gulf State Park in Baldwin County, Alabama, and translocated approximately 10 miles east to an enclosure on Gulf Islands National Seashore in Escambia County, Florida. The enclosure is designed to exclude mammalian and avian predators and to initially confine the beach mice to a selected dune. Construction of the enclosure consisted of sheet aluminum 4 feet wide and in lengths of 35-50 feet

buried 18 inches in the sand encircling a dune. Poultry mesh was attached to the top of each aluminum sheet, resulting in an enclosure wall extending approximately 5 feet above ground. Plastic bird mesh was used to construct a roof over the enclosure.

Future recovery actions include periodic monitoring of the translocated beach mice and release of additional mice as necessary. This recovery action is a cooperative effort among the FWS, the National Park Service and the States of Alabama and Florida to reestablish the Perdido Key beach mouse to an area from which it was extirpated following Hurricane Frederick in 1979. A captive breeding colony also will be established at Auburn University.

The automobile, the primary "predator" of the Florida panther (*Felis concolor coryi*), has claimed another victim. A female panther was killed on Alligator Alley (State Route 84) in Collier County at mile marker 16. This is the same location where two other panthers have been killed. As a result of an Endangered Species Act (ESA) Section 7 consultation with the Federal Highway Administration on upgrading Alligator Alley to Interstate 75, a number of underpasses will be constructed at mile marker 16. This area has been documented to be heavily used by panthers and is a primary travel corridor for these animals when crossing Alligator Alley. Since 1973, eleven panthers have been killed and two injured on south Florida roads.

In 1986, FWS personnel with the Jackson, Mississippi, and Annapolis, Maryland, field offices, in conjunction with State fish and game agencies, concluded a 4-year

bat population survey at 12 maternity colonies, 3 of the Endangered Ozark big-eared bat and 9 of the Virginia big-eared bat (*Plecotus townsendii virginianus*).

Over the study period, the Ozark big-eared bat population declined by 13.8 percent at the three study caves in Oklahoma and Arkansas. This loss is accounted for by the dramatic decline (79.8 percent) at the only known maternity colony site of this bat in Arkansas. On the other hand, the two study colonies in Oklahoma actually had substantial increases of 73.3 percent and 19.4 percent. The total 1986 maternity colony population, including the study colonies and additional colonies located since the survey began, was 459. (In previous years of the study, the counts were 1983—311; 1984—386; 1985—332).

The Virginia big-eared bat population has increased by 24.3 percent over 4 years at the eight study colonies in West Virginia and at the only study colony in Virginia. The total 1986 Virginia big-eared bat maternity colony population in West Virginia, Virginia, and Kentucky, including the study colonies and additional colonies located since the survey began, was 5,084 (1983—3,505; 1984—3,866; 1985—4,565).

The Florida Game and Fresh Water Fish Commission has completed its annual winter snail kite (*Rostrhamus sociabilis plumbeus*) survey. The survey spans territory from the central lakes region of Florida, past Lake Okeechobee, to the Everglades. The total number of kites observed in this year's survey was 563, representing an increase of 38.3 percent over last year. This year's total is greater than the average annual count of 383 kites for the 5-year period from 1981 to 1985.

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Most of the kites were found in Everglades Conservation Area 3A. This area has always been one of the kite's major strongholds; however, during drought years (such as 1985), kites are forced to move northward into the central lakes region. The snail kite is dependent on drought-related habitats, and development pressures in these areas may prove detrimental to the species' survival.

**Region 5**—Representatives from The Nature Conservancy, natural resource agencies of New Jersey, Maryland, and West Virginia, and the FWS Annapolis, Maryland, Endangered Species Field Office met in the regional office on January 28 to develop procedures for an inter-agency volunteer effort to assist the FWS in listing vulnerable plants. This experimental project could prove to be of tremendous assistance to the FWS and greatly expedite the listing of qualified candidate species.

A meeting of the New Hampshire Audubon Society, U.S. Forest Service, New Hampshire Fish and Game Department, and the FWS regional office and Concord, New Hampshire, field office staffs was held January 23 to discuss the 1987 peregrine falcon (*Falco peregrinus*) project field season. The highly successful use of trained volunteers at active and historic nesting sites was discussed, as was the subject of establishing contacts with the Appalachian Mountain Club, rockclimbers, State park personnel, and the public.

**Region 6**—All captive black-footed ferrets (*Mustela nigripes*), 6 males and 11 females, are now adapting to their new 6,912-square-foot holding facility at the Wyoming Game and Fish Department's Sybille Wildlife Research Unit near Wheatland, Wyoming. The facility, a pole barn construction with metal siding and roof, has been erected and enclosed, and about one-half of the interior has been finished. The building is divided into several rooms, including rooms for isolating ferrets, food production and preparation, ferret holding pens, and office activities.

Of the 17 ferrets being held at the facility, 13 are kept separately in 4- by 8-foot woven wire cages. In addition, there are four large 8- by 16-foot cages built on the floor. The floor of each cage is covered with 4 inches of soil. In the center of each floor cage, a large square section has been framed and filled with an additional 12 inches of soil. Ferrets in each type of cage are offered a choice of two nest boxes for security. Each nest box consists of an outer compartment and an inner nest compartment similar to what a ferret might experience in a prairie dog burrow. The captive ferrets are fed a ration of prairie dogs, hamsters, mice, and prepared moist

cat food. All of the animals are currently doing well and are adapting well to this new environment.

An attempt to breed the ferrets is planned for the current breeding period, February through March 1987. The Wyoming Game and Fish Department is being assisted in the captive breeding effort by the Captive Breeding Specialist Group of the International Union for the Conservation of Nature and Natural Resources. This group, led by Dr. Ulysses Seal, was requested by the Wyoming Game and Fish Department (WGDF) and the FWS to serve as a technical advisory group for the captive breeding aspects of the ferret recovery program. Mr. Mike DonCarlos of the Minneapolis Zoological Garden is a member of the group and will work with the WGDF in its efforts to breed ferrets this spring. Success in breeding this species in captivity may be necessary to prevent its extinction, and it will provide an opportunity to develop a captive population from which ferrets can be reintroduced back into the wild. Ferrets in captivity also provide an opportunity to further the knowledge of this species. Research in the fields of black-footed ferret genetics, physiology, and behavior are currently planned for the captive animals.

Successful captive breeding is very important for recovery of this species and it is equally important that other populations of wild ferrets be found. To help locate another wild population, the State of Montana is currently offering a reward for evidence of the species' presence in that State. Any person who sees a black-footed ferret is asked to report the sighting to the local game and fish department or to the FWS.

During January, the Grand Island Field Office distributed an update to the report titled, "Potential Present Range of the Black-footed Ferret as of January 1, 1981," and subsequent 1981-1986 updates. This update includes all probable and confirmed ferret sightings reported to the Grand Island office during January 1, 1986, through January 1, 1987. States reporting confirmed or probable sightings during the period were Colorado, Utah, and Wyoming.

Competition for Platte River water is high among interests in Colorado, Wyoming, and Nebraska. An interagency effort made up of biologists representing State, Federal, and private agencies is developing habitat models for three listed species that use the Platte River in Nebraska. Habitat Suitability Index (HSI) models are being developed for piping plover and interior least tern nesting habitat and for riverine roosting habitat of migrating whooping cranes. The habitat models will be linked with a hydraulic model of the central Platte River that has been developed through Instream Flow Incremen-

tal Methodology. The goal of the project is to develop habitat versus instream flow relationships that can be used in assessment of project effects, development of reasonable and prudent alternatives to jeopardy actions, reservoir operations studies, and the enhancement of riverine habitat, all as part of ESA Section 7 inter-agency consultation. Model development is being led by the Grand Island Field Office and the Bureau of Reclamation's Kansas-Nebraska Projects Office.

**Region 7**—Approximately 20 Endangered Aleutian Canada geese (*Branta canadensis leucopareia*) succumbed to an outbreak of avian cholera in Modesto, California, during January. The Modesto oxidation ponds are a traditional roosting area for ducks and geese in the San Joaquin Valley. Although Aleutian geese have died previously from cholera at these ponds, mortality has never been as high. David L. Hunter, DVM, of the California Department of Fish and Game's Wildlife Investigations Lab in Rancho Cordova, is cooperating with the FWS in examining the birds. Procedures to haze the flock to discourage their continued use of the area are being implemented.

**Region 8**—Several FWS Cooperative Research Units are engaged in endangered species research projects in Puerto Rico. The Iowa unit recently completed a report on ecological studies of the brown pelican (*Pelecanus occidentalis*), which suggested that food may be a limiting factor, but that environmental contaminants, disease, climate, habitat, and nesting success did not seem to be limiting.

The Louisiana unit is involved in the recovery program for the Puerto Rican parrot (*Amazona vittata*). The objective of the Louisiana study is to determine what impact exotic rats have on parrot production.

A 2-year study by the Florida unit in the Culebra Archipelago (between Puerto Rico and the Virgin Islands) will provide baseline data on populations and habitat assessment for four Endangered sea turtles. Data collected on the hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys conacea*), loggerhead (*Caretta caretta*), and green (*Chelonia mydas*) sea turtles will assist the FWS in developing management strategies to improve nesting success and manage habitat for these turtles on the Archipelago.

The Georgia unit also is investigating sea turtles in Puerto Rico. Objectives of a current study are to investigate stock assessment methodology and provide a population estimate for numbers of nesting female sea turtles; calculate nesting success and document reasons for nesting failure; and calculate estimates of numbers of foraging turtles on Mona Island.

# Proposed Listings

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to some extent by one or more of these factors and all remain, at least in part, vulnerable to them. Accordingly, the FWS has proposed the relict trillium for listing as Endangered (F.R. 1/14/87).

The listing proposal did not include a proposal for designating Critical Habitat because the publication of maps and precise location data required for such a designation would make the trillium more vulnerable to taking. *T. reliquum* already is subject to this problem; in the spring of 1986, several hundred plants of the largest population were cut while in bloom by vandals or uninformed wildflower enthusiasts. However, even without a Critical Habitat designation, the species will receive protection under Section 7 of the Endangered Species Act if it is listed.

Comments on the listing proposal should be sent to the Field Supervisor, Asheville Endangered Species Field Office, U.S. Fish and Wildlife Service, Room 224, 100 Otis Street, Asheville, North Carolina 28801 by March 16, 1987.

## *Crescentia portoricensis*

With fewer than 30 individuals known to exist, *C. portoricensis* is one of Puerto Rico's rarest plant species. The survival of this evergreen shrub or small tree is seriously threatened by the direct and indirect impacts of deforestation, and the FWS has proposed to list it as Endangered (F.R. 1/14/87).

*C. portoricensis*, also known as Higuero de Sierra, is endemic to montane mixed evergreen and deciduous forests of the lower Cordillera of southwestern Puerto Rico. The only two known *C. portoricensis* populations are in the Susua and Maricao

Commonwealth Forests. The Susua unit had largely been cleared by the beginning of the twentieth century and, although the forest is recovering, both it and the Maricao unit are experiencing the indirect effects of the deforestation that is occurring on adjacent lands. Associated increases in erosion, landslides, and flash flooding are believed responsible for the disappearance of two previously known populations. Because *C. portoricensis* is restricted to sites along permanent or intermittent watercourses, it remains particularly vulnerable to these problems.

Flood control projects that include large reservoirs in the Maricao area are under long-term consideration for possible construction by the COE. If constructed as originally planned, the impoundments could extend into drainages where *C. portoricensis* occurs. Various alternatives are being evaluated, and the FWS will work with the COE to develop plans that meet project objectives while allowing for conservation of the plant. Because these discussions are beginning early in the project planning process, no conflicts are expected.

Comments on the proposal to list *C. portoricensis* as an Endangered species should be sent to the Field Supervisor, Caribbean Field Office, U.S. Fish and Wildlife Service, P.O. Box 491, Boqueron, Puerto Rico 00622, by March 16, 1987.

## Hualapai Vole (*Microtus mexicanus hualpaiensis*)

The Hualapai vole is an extremely rare, mouse-sized mammal thought to be restricted to the Hualapai Mountains of northwestern Arizona. Only 15 confirmed specimens have ever been captured. Biologists conducting an intensive survey in 1984 were able to locate the vole or its sign at three sites totalling less than one

acre in size. The small patches of remaining suitable habitat are threatened by livestock grazing, recreational activity, and a potential water development. To help prevent the extinction of the Hualapai vole, the FWS has proposed to list it as Endangered (F.R. 1/5/87).

The Mexican vole (*Microtus mexicanus*) occurs in parts of Mexico and the southwestern United States. There are 12 *M. mexicanus* subspecies, 3 of which are found in Arizona. In addition to *M. m. hualpaiensis*, the subject of the listing proposal, there are *M. m. mogollonensis* to the east and *M. m. navaho* to the north-east.

Six vole specimens that might possibly be *M. m. hualpaiensis* have been collected from outside the Hualapai Mountains. Four came from the Music Mountains, about 50 miles (80 kilometers) north of Hualapai Peak. That population is small, isolated, and subject to the same kinds of habitat degradation that has occurred in the Hualapai Mountains. The other two specimens were collected in Prospect Valley, about 90 miles (145 km) northeast of the Hualapais. These two specimens, which instead may represent *M. m. navaho*, were taken more than 73 years ago and no others have been reported from Prospect Valley since that time.

In the Hualapai Mountains, the vole has been found between 5,397 and 8,400 feet (1,645 and 2,560 meters) in elevation, and is primarily associated with conifer forests. Within such woodlands, the vole occurs in moist sites with good grass cover along permanent or semipermanent waters (e.g., springs and seeps). Populations of *Microtus* in the Hualapai and the Music Mountains are disjunct relicts from Pleistocene times. When the North American glaciers retreated and the southwest's climate became warmer and drier, mountaintop "islands" of moist, grassy meadow and forest habitat were isolated by the increasingly arid lowlands.

Most of the sites in the Hualapais where *M. m. hualpaiensis* or its sign have been found are public lands administered by the Bureau of Land Management (BLM). Others are owned by the Mohave County Parks Department, the Santa Fe Pacific Railroad, and private citizens. Except for the parkland, these areas are managed by the BLM as part of larger grazing allotments. *Microtus* sites in the Music Mountains also are on BLM lands.

Certain land use practices in the past damaged most of the Hualapai vole's historical habitat, especially when exacerbated by the effects of periodic droughts. The remaining habitat (approximately three-fourths of an acre) in the Hualapai Mountains also appears to be threatened. Livestock concentrates in moist areas around open water and seeps, and could reduce or eliminate the vole's ground cover plants by grazing and trampling.

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*Crescentia portoricensis* is an evergreen, vine-like shrub or small tree reaching up to 20 feet (6 meters) in height. Its leaves are dark-green and leathery, usually clustered at the nodes, and the yellow-white flowers are irregularly bell-shaped.



drawing by Pinau, courtesy of the Arizona Game and Fish Department

### Hualapai vole

Campers and off-road vehicle enthusiasts also are attracted to spring areas, causing further damage. In addition, the Mohave County Parks Department is exploring the possibility of developing a 3-acre lake within historical vole habitat.

Because most of the Hualapai vole habitat is on BLM lands, the cooperation of that agency will be critical to the survival of the Hualapai vole. The BLM is aware of the situation and is giving consideration to the vole's welfare. It is attempting to acquire one of the key sites in the Hualapai Mountains that is currently privately owned. (*Microtus* sites in the Music Mountains already are administered by the BLM.) If the Hualapai vole is listed as Endangered, the BLM will be required to ensure that its activities, including its involvements in grazing leases and water developments, are not likely to jeopardize the species' survival.

Comments on the proposal to list the Hualapai vole as Endangered should be sent to the FWS Regional Director, Region 2 (address on page 2 of this BULLETIN), by March 16, 1987.

### Two Florida Lizards

Two lizards endemic to central Florida, the sand skink (*Neosops reynoldsi*) and the blue-tailed mole skink (*Eumeces egregius lividus*), were proposed for listing as Threatened (F.R. 1/21/87). Both depend on scrub and longleaf pine/turkey oak vegetation with associated sandy soils, a distinctive type of habitat that is

disappearing as agriculture and urbanization spread.

The sand skink, which has adapted to a mostly fossorial (underground) existence, is the only North American skink completely specialized for "swimming" through loose, sandy soils. Its streamlined features include a wedge-shaped head, a partially countersunk lower jaw, a reduction in the number of digits (one toe on the forelimbs and two on the hindlimbs), and tiny forelegs that can be folded into grooves in the body. *N. reynoldsi* burrows to a depth of up to 10 inches (25 centimeters) and feeds on a variety of small, mostly fossorial arthro-

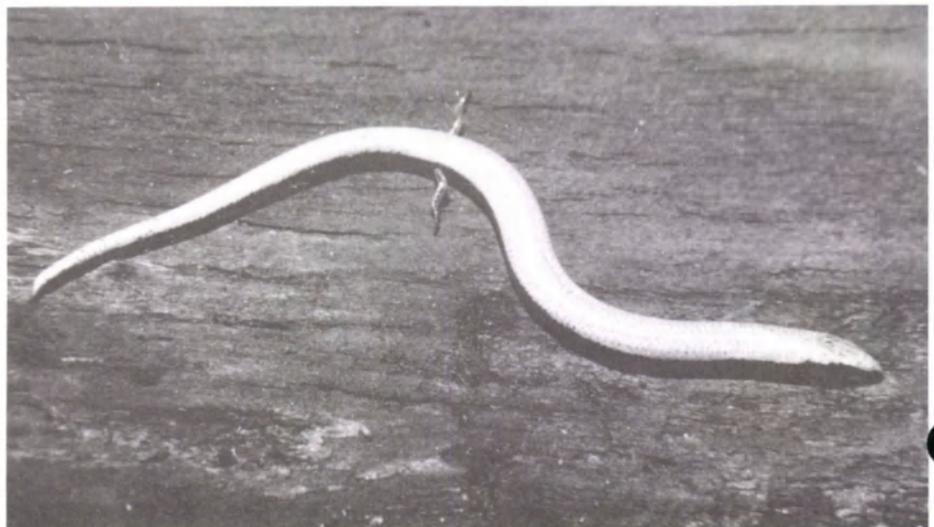
pods (e.g., beetle larvae, termites). The species is known only from the high sandy ridges of Lake, Marion, Orange, Polk, and Highlands Counties.

The blue-tailed mole skink, more restricted in range, is known only from Polk and Highlands Counties. This subspecies forages on the surface or up to 2 inches (5 cm) underground, but it is not as specialized as the sand skink for living in the subsurface substrate. Blue-tailed mole skinks do not compete with sand skinks for food, consuming instead primarily surface-dwelling arthropods (e.g., roaches, spiders, crickets).

Neither of the skinks regularly inhabit substrates where the sand is dry and porous. They apparently depend on certain moisture conditions that maintain body temperatures within a preferred range, provide a microclimate favorable for egg incubation, and support an abundant supply of small invertebrates for food. Although both skinks are sometimes found together under surface vegetational litter, they appear to occupy different microhabitats most of the time. Blue-tailed mole skinks are not evenly dispersed throughout seemingly suitable habitat; rather, they occur in localized pockets, most often under surface litter. Because this litter can provide necessary soil moisture, the uneven distribution of blue-tailed mole skinks could be a function of the uneven distribution of litter. Sand skinks are not as dependent on surface litter and occur over a wider area, possibly due to their ability to burrow deeper for soil moisture.

The sand pine scrub and sandhill areas in which the sand skink and blue-tailed mole skink occur are threatened by a number of factors. These relatively high, well drained sites are in demand for citrus groves, improved pasture, cultivation, and various forms of development (commercial, residential, and recreational). Conversion of native habitat to other uses has

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Sand skinks measure up to 5 inches (13 cm) in total length and are gray to tan in color.

photo by S. Simmons

## Proposed Listings

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caused the ranges of many endemic Florida plants and animals to become greatly reduced and fragmented. Over the past several years, the FWS has listed, or has proposed to list, 13 plants and 4 animals that are endemic to Florida scrub habitat. (See story in this BULLETIN on final listings for seven scrub plants.) Numerous other plants and animals of the region are candidates for future listing proposals.

Fragments of the remaining skink habitat receive protection on Lake Louisa and Wekiwa Springs State Parks, Tiger Creek and Saddle Blanket Lakes Preserves (owned by The Nature Conservancy), Archbold Biological Station (a private research institution), and Ocala National Forest. These conservation areas, however, are not enough to ensure the survival of the skinks.

Listing these two skinks as Threatened would supplement and reinforce the pro-

tection they now receive. The State of Florida, which already lists both skinks under its own legislation as threatened, prohibits their direct take without a State permit. Such permits are available only for approved conservation purposes. Given this fact, and the fact that habitat loss rather than take is the primary threat to the skinks, the FWS included with its listing proposal a provision to allow continued take when in full accordance with applicable State laws and regulations.

Comments on the proposal to list the sand skink and blue-tailed mole skink as Threatened should be sent to the Field Supervisor, Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207, by March 23, 1987.

## Available Conservation Measures

Among the conservation benefits provided by a listing as Threatened or En-

dangered under the Endangered Species Act are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the FWS to develop and implement recovery plans; the possibility of Federal aid to State and Commonwealth conservation departments that have signed Endangered Species Cooperative Agreements with the FWS; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their 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 authorize, fund, or carry out are not likely to jeopardize the survival of a listed species or adversely modify its designated Critical Habitat. If any agency finds that one of its activities may affect a listed species, it is required to consult with the FWS on ways to avoid jeopardy or adverse modification. For species that are *proposed* for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the FWS, although the results of such a conference are non-binding. Potential conflicts almost always are avoided by planning early and using the Section 7 process.

Further 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 listed plants, the rule is different; the trafficking restrictions apply, but collecting of listed plants without a permit is prohibited only on lands under Federal jurisdiction. Some States, however, have their own laws protecting listed plants and animals that may be more restrictive.



photo by Robert S. Simmons

**Blue-tailed mole skinks can reach up to 6 inches (15 cm) in total length. The tail, which makes up somewhat less than half of the length, is blue in young lizards, but it may become pinkish with age or if it is regenerated.**

## Approved Listings

(continued from page 3)

known to survive at only nine sites in three counties. It apparently has been extirpated from two other counties. Although two of the current sites are on the Wilson's Creek National Battlefield, the species is in danger of extinction because of its low numbers, limited distribution, and potential habitat disturbance. *L. filiformis* was proposed April 7, 1986, for listing as Endangered (see BULLETIN Vol. XI No. 5), and the final rule was published January 8, 1987.

## *Lespedeza leptostachya* (Prairie Bush-clover)

*L. leptostachya* is endemic to the mid-western U.S., inhabiting dry to mesic native prairies. Although it was never common, this perennial now occurs in only a fraction of its historical range. Twenty-six remaining sites are known, distributed over northern Illinois, northern and south-central Iowa, southern Minnesota, and western Wisconsin. Only 14 of these sites receive some degree of official protection. Plants at the other sites face threats from urbanization, agricultural expansion, and construction activities. *L. leptostachya* was proposed December 6, 1985, for list-

ing as a Threatened species (see BULLETIN Vol. XI No. 1), and the classification was made final on January 8, 1987.

## *Cupressus abramsiana* (Santa Cruz Cypress)

Five small populations of this densely branched tree are known from the Santa Cruz Mountains of Santa Cruz and San Mateo Counties, California. Except for part of one population that extends onto Pescadero Creek County Park, all of the groves are on privately owned land. They are vulnerable to a number of threats, including residential development; agricultural ex-

(continued on next page)

# Approved Listings

(continued from previous page)

pansion; logging; genetic contamination from introduced, exotic cypress species; and disruptions in the frequency of the naturally occurring wildfires upon which the Santa Cruz cypress depends. An additional threat to one population at Butano Ridge may arise from oil and gas drilling. The proposal to list the Santa Cruz cypress as Endangered was issued September 12, 1985 (see summary in BULLETIN Vol. X No. 10), and the final rule was published January 8, 1987.

## Giant Kangaroo Rat (*Dipodomys ingens*)

Kangaroo rats, despite their name, are not true rats but small mammals specialized for rapid hopping on their elongated hind legs. They inhabit parts of the relatively dry, open country of western North America. One rare species, the giant kangaroo rat, is found only in south-central California. Its preferred habitat is native annual grassland with sparse vegetation, good drainage, and fine sandy-loam soils. Estimates of the species' historical range vary between 1,300,000 and 2,500,000 acres (527,600 and 1,000,000 hectares). By 1980, extensive conversion of native grasslands to cropland had reduced the species' range to a total area of less than 76,800 acres (31,000 ha). Subsequent surveys indicate that at least half of the habitat remaining in 1980 was lost by 1985, and the problem continues. On August 13, 1985, the FWS proposed to list the giant kangaroo rat as Endangered (see summary in BULLETIN Vol. X No. 9), and

## BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED			THREATENED			SPECIES* TOTAL	SPECIES HAVING PLANS
	U.S. Only	U.S. & Foreign	Foreign Only	U.S. Only	U.S. & Foreign	Foreign Only		
Mammals	26	20	242	5	0	22	315	23
Birds	61	16	141	3	2	0	223	55
Reptiles	8	6	60	10	4	13	101	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	21	6	0	81	43
Snails	3	0	1	5	0	0	9	7
Clams	23	0	2	0	0	0	25	21
Crustaceans	4	0	0	1	0	0	5	1
Insects	8	0	0	5	0	0	13	12
Plants	117	6	1	26	3	2	155	54
<b>TOTAL</b>	<b>294</b>	<b>52</b>	<b>466</b>	<b>79</b>	<b>15</b>	<b>37</b>	<b>943</b>	<b>243**</b>

\* Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

\*\* More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 209  
 Number of species currently proposed for listing: 28 animals  
 28 plants

Number of Species with Critical Habitats determined: 96  
 Number of Cooperative Agreements signed with States: 47 fish & wildlife  
 26 plants

January 31, 1987

the final rule was published January 5, 1987. Because some of the populations are on lands administered by the BLM and Department of Energy, these agencies will be required to consult with the FWS on their activities that may affect the giant kangaroo rat. Such activities include, but are not limited to, issuance of permits for grazing, rodenticide application, and oil or

natural gas exploration or development; however, no major conflicts are expected.

These listed animals and plants are now protected under the Endangered Species Act, the terms of which are summarized in this BULLETIN at the end of the story on species newly proposed for listing.

February 1987

Vol. XII No. 2

# ENDANGERED SPECIES

## Technical Bulletin

Department of Interior, U.S. Fish and Wildlife Service  
 Endangered Species Program, Washington, D.C. 20240

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