

# ENDANGERED SPECIES

## Technical Bulletin

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

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

During April 1987, the following species were proposed by the Fish and Wildlife Service (FWS) for addition to the Federal list of Endangered and Threatened wildlife and plants:

#### California Freshwater Shrimp (*Syncaris pacifica*)

The loss or deterioration of habitat, along with predation by introduced fishes, has eliminated the California freshwater shrimp from about half of its known historical range. Because most of this crustacean's remaining habitat is vulnerable, the species was proposed for listing as Endangered (F.R. 4/22/87).

*S. pacifica* is the only surviving member of its genus. The only other *Syncaris* species, *S. pasadenae*, occurred in southern California until the lining of stream habitat with concrete for flood control purposes caused its extinction. Stream channelization and lining already has eliminated *S. pacifica* from Santa Rosa Creek, and demand for stream modification as a means of flood control is likely to increase as rapid



photo by Jeurel Singleton

California freshwater shrimp are nearly transparent in water and can reach 2.5 inches (5 cm) in length.

### Dusky Seaside Sparrow Becomes Extinct

The dusky seaside sparrow (*Ammodramus maritimus nigrescens*) became extinct June 16, 1987, when the last bird of this subspecies, an aging male, died at Walt Disney World's Discovery Island Zoological Park in Orlando, Florida.

The cause of death was not determined, although the bird was at least 13 years old, an extremely advanced age for any sparrow. It was one of the last five duskies, all males, brought into captivity during 1979-1980 while biologists searched in vain for surviving females (the last of which was seen in 1975).

The dusky was one of several subspecies of seaside sparrows native to Florida that have suffered from extensive losses of coastal salt marsh habitat. One subspecies, the Smyrna seaside sparrow (*A. m. pelonata*), is believed to have become extinct some time ago, while another, the Cape Sable seaside sparrow (*A. m. mirabilis*), was listed as Endangered in 1967 (the same year as the dusky). In an effort to conserve at least some of the dusky's genetic resources, Discovery Island biologists attempted for several years to cross the remaining duskies



photo by Paul W. Sykes, Jr.

dusky seaside sparrow

with birds of a more abundant subspecies, the Scott's seaside sparrow (*A. m. peninsulæ*). Some hybrids have been produced, but there will be no more "pure" duskies.

urban growth in the region north of San Francisco Bay continues.

The California freshwater shrimp, *S. pacifica*, is endemic to permanent, free-flowing streams in Marin, Napa, and Sonoma Counties. Within these streams, the species inhabits quiet, treelined pools with undercut banks, exposed tree roots, and submerged vegetation. Although once common in the three-county area, the shrimp has seriously declined in numbers and range. In addition to stream channelization, habitat is being damaged by siltation and other water quality problems. Certain agricultural practices destabilize stream banks, and residential development can lead to the erosion of soil into area streams. Annual construction of temporary gravel dams to provide summer swimming areas is another threat because of direct

habitat loss at the sites and interruption of downstream flows. The low reproductive rate of *S. pacifica* also makes it vulnerable to extirpation in creeks with exotic predatory fishes.

Various combinations of these factors have extirpated the shrimp from Semple Creek, Laguna de Santa Rosa Creek, Santa Rosa Creek, and Atascadero Creek. The species survives within restricted portions of 11 streams that comprise approximately half of its historically known habitat. Except for parts of Lagunitas Creek within Samuel P. Taylor State Park and Golden Gate National Recreation Area, all remaining stream habitat is on privately owned land.

(continued on page 4)



**Endangered species program regional staff members have reported the following activities for the months of April and May:**

**Region 1** -In early April, the Marble Bluff Fish Facility opened for passing fish up

Nevada's Truckee River. Shortly after the Lahontan cutthroat trout (*Salmo clarki henshawi*) run began, a run of cui-ui (*Chasmistes cujus*) joined the passage. So far, over 4,400 cui-ui have been passed over the dam. Cui-ui larvae have begun

out-migration.

\*\*\*

The FWS Sacramento Endangered Species Office (SESO) assisted in the investigation of a potential violation of the Endangered Species Act in Sacramento County, California. Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) habitat was cut down along the east levee of the American River. The local reclamation district claims that all vegetation must be removed from the flood control levees. Unfortunately, little habitat for the beetle remains elsewhere. Both sides have agreed on an off-site area to be set aside as compensation. The district will pay for revegetation, fencing, and maintenance of the parcel.

Recent surveys found valley elderberry longhorn beetle emergence holes in elderberry plants along the Feather, Cosumnes, and upper Sacramento Rivers. Also, one female beetle was observed feeding on elderberry bushes along the American River bike trail. A survey by California Department of Fish and Game staff for the beetle from the Nimbus Dam area to the foothills found evidence of beetle activity in dense stands of elderberry plants but not in the isolated plants near the foothills. SESO staff examined two stands of elderberry plants in an area that is to be developed for housing near Roseville and did not find any evidence of beetles. The trees were nearly dead and heavily infested with larvae of leaf-roller insects. These surveys and other studies have revealed new life history information about the beetle.

\*\*\*

The U.S. Army Corps of Engineers has agreed to undertake mitigation in a recently completed Biological Opinion to offset effects of construction and use of the Caliente Creek Flood Control System to the San Joaquin kit fox and blunt-nosed leopard lizard. These measures include purchase of 705 acres of alkali sink lands to provide long-term habitat protection for the two species and additional pre-construction surveys to reduce mortality during construction.

\*\*\*

The SESO staff completed a "no jeopardy" Biological Opinion for the proposed Santa Nella Water Treatment Facility. The project is the first step allowing for additional urban growth in this Merced County, California, community along Interstate 5. The project indirectly affects a small group of kit foxes and would eliminate about 60 acres of prime foraging habitat. Mitigation consists of setting aside and protectively managing approximately 100 acres of formerly heavily grazed range and agricultural land.

\*\*\*

Twenty-two new invertebrates have been recommended to be added to the candidate list for California. The majority are caddisflies, followed by butterflies and beetles. Two rare ants endemic to oak

(continued on page 8)

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

Frank Dunkle, *Director*  
(202-343-4717)

Ronald E. Lambertson  
*Assistant Director for Fish  
and Wildlife Enhancement*  
(202-343-4646)

William E. Knapp, *Acting Chief  
Office of Endangered Species*  
(703-235-2771)

Richard L. Jachowski, *Acting Chief,  
Federal Wildlife Permit Office*  
(703-235-1937)

Clark R. Bavin, *Chief,  
Division of Law Enforcement*  
(202-343-9242)

**TECHNICAL BULLETIN Staff**  
Michael Bender, *Editor*  
Denise Henne, *Assistant Editor*  
(703-235-2407)

**Regional Offices**

**Region 1.** Lloyd 500 Bldg., Suite 1692, 500 N.E. Multnomah St., Portland, OR 97232 (503-231-6118); Rolf L. Walenstrom, *Regional Director*; William F. Shake, *Assistant Regional Director*; Wayne S. White, *Endangered Species Specialist*.

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

**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.

**Region 3.** Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); Harvey Nelson, *Regional Director*; John S. Popowski, *Assistant Regional Director*; James M. Engel, *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*; John I. Christian, *Assistant Regional Director*; Marshall P. Jones, *Endangered Species Specialist*.

**Region 5.** One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Howard Larson, *Regional Director*; Stephen W. Parry, *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*; John D. Green, *Assistant Regional Director*; Barry S. Mulder, *Endangered Species Specialist*.

**Region 7.** 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Jon Nelson, *Assistant Regional Director*; Dennis Money, *Endangered Species Specialist*.

**Region 8** (FWS Research and Development), Washington, D.C. 20240; Richard N. Smith, *Regional Director*; *Endangered Species Staff*; Clarence Johnson, *fish and crustaceans* (202-653-8772); Bettina Sparrowe, *other animals and plants* (202-653-8762).

# Approved Listing Actions

During April 1987, two plants and seven animals were added to the list of Endangered and Threatened species, and one animal was reclassified. These approved listing actions are summarized below:

## Wide-leaf Warea (*Warea amplexifolia*)

This summer annual is endemic to the Lake Wales Ridge of central peninsular Florida, where it occupies sunny openings in long-leaf pine woodlands. Only two populations could be verified during the latest survey. The species' decline primarily has resulted from urbanization and the conversion of scrub habitat to citrus groves. *W. amplexifolia* was proposed for listing as Endangered on May 16, 1986 (see story in BULLETIN Vol. XI No. 6), and the final rule was published in the April 26, 1987, *Federal Register*.

## Scrub Lupine (*Lupinus aridorum*)

Another plant endemic to the dwindling scrub habitat of the central Florida sand ridge, the scrub lupine's known distribution has been reduced to only about 350 individual plants scattered among 16 sites. All of these remaining sites have been damaged and are within some of the most rapidly growing areas of Florida. The lupine was proposed for listing as Endangered on April 24, 1986 (see BULLETIN Vol. XI No. 5), and the final rule appeared April 7, 1987.

## Five Tombigbee River Mussels

Marshall's mussel (*Pleurobema marshalli*), Curtus' mussel (*P. curtum*), Judge Tait's mussel (*T. taitianum*), the stirrup shell (*Quadrula stapes*), and the penitent mussel (*Epioblasma* (= *Dysnomia*) *penita*), all freshwater mussels or clams, are endemic to the Tombigbee River system in Alabama and Mississippi. These filter-feeding mollusks require riverine habitat with clean water and a moderate-to-swift current. Much of their historical habitat has been heavily modified by reservoir and barge canal construction (primarily relating to the Tennessee - Tombigbee Waterway). The remaining mussels are in remnants of the Tombigbee River bypassed by the project and in a few tributaries. Threats to this habitat include gravel dredging and siltation from a variety of sources. The five mussels were proposed April 7, 1986, for listing as Endangered (see BULLETIN Vol. XI No. 5), and the final rule was published April 7, 1987.

## Cave Crayfish (*Cambarus zophonastes*)

An obligate cave dweller, this crustacean lacks pigment in the body and the eyes (which are reduced). It is known to exist in a pool within a single cave in the Ozark Mountains of Arkansas, and the species' entire population is estimated at fewer than 50 individuals. A tract containing the cave entrance was purchased recently by the Arkansas Natural Heritage Commission and The Nature Conservancy. However, the cave's recharge area is large, and groundwater contamination is a major potential threat to the crayfish. The possibility of illegal collecting and the species' extremely small population size also make it vulnerable to extinction. *C. zophonastes* was proposed May 5, 1986, for listing as Endangered (see BULLETIN Vol. XI No. 6), and the final rule appeared April 7, 1987.

## Waccamaw Silverside (*Menidia extensa*)

Also known as the skipjack or glass minnow, the small fish is endemic to Lake Waccamaw in eastern North Carolina. In addition to its restricted range, the species is threatened because its one-year life cycle makes it vulnerable to even short-term water quality problems. Lake Waccamaw already is incipiently eutrophic, and continued high rates of phosphorous input could lead to massive algal blooms and reduced oxygen levels for the fish. The November 7, 1985, proposed rule to list the Waccamaw silverside as Threatened contained a recommendation for designating the lake as Critical Habitat (see BULLETIN Vol. X No. 12). This designation was included in the final listing rule, published April 8, 1987.

## Tinian Monarch Flycatcher (*Monarcha takatsukasae*)

This small, forest-dwelling bird is found only on the island of Tinian within the Commonwealth of the Northern Mariana Islands in the western Pacific Ocean. It originally was listed as an Endangered species because its 1945 numbers were thought to be critically low due to the removal of native forests for sugarcane production and the destructive impacts of World War II. Since the war, Tinian has been revegetated by a shrubby legume, *Leucaena leucocephala*, to which the monarch has adapted well. In 1982, the bird's numbers were estimated at 40,000, evidence of a recovery to apparently pre-disturbance levels.

Because the population appeared to be healthy once again, the FWS proposed on

November 1, 1985, to delist the Tinian monarch (see BULLETIN Vol. X No. 12). However, recent changes led the FWS to believe it would be more prudent to reclassify the species from Endangered to Threatened rather than to remove it completely from Endangered Species Act protection. One new threat is posed by the recent accidental introduction of an insect that is defoliating the *Leucaena* on Tinian. The increased boat and trade traffic between Tinian and the island of Guam (a result of increased military and civilian development) could lead to the accidental introduction of another exotic species that is extremely harmful to forest birds: the brown tree snake (*Boiga irregularis*). This snake is believed responsible for the extirpation or near eradication of many native birds on Guam. For these reasons, the FWS has reclassified to Threatened, rather than delisted, the Tinian monarch (F.R. 4/6/87), a decision in accordance with the wishes of the Commonwealth government.

Both the Commonwealth and the U.S. Navy have advised the FWS that they have instituted rigorous programs to prevent the spread of the brown tree snake to Tinian. (Approximately two-thirds of Tinian has been leased to the Navy, including most of the monarch's habitat.)

\*\*\*

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.

## Updated List Available

The updated *List of Endangered and Threatened Wildlife and Plants*, current through April 10, 1987, is now available from the Publications Unit, U.S. Fish and Wildlife Service, 148 Matomic Building, Washington, D.C. 20240.

## Buyer Beware!

The April 1987 BULLETIN carried a notice for *Buyer Beware!*, a new brochure developed to alert travelers to the pitfalls of buying protected wildlife products abroad. Inadvertently left out of the notice was mention of the National Fish and Wildlife Foundation, which was a major sponsor of the brochure. We regret the omission.

Copies of the brochure can be requested from the Publications Unit, U.S. Fish and Wildlife Service, 148 Matomic Building, Washington, D.C. 20240.

# Proposed Listings

(continued from page 1)

The only direct Federal activity that may affect the California shrimp is the authorization by the U.S. Army Corps of Engineers (COE) to build temporary dams on Austin and East Austin Creeks. A private organization has a COE permit to construct 3 such temporary dams on East Austin Creek and 24 on Austin Creek annually until 1990. This permit, however, can be modified or revoked if any of its restrictions (e.g., number, size) are not met. The FWS has been in contact with the COE about the status and habitat requirements of the shrimp.

## Louisiana Pearlshell (*Margaritifera hembeli*)

This large freshwater mussel or clam is known to occur in 11 headwater streams of the Bayou Boeuf drainage in south-central Louisiana (Rapides Parish). Its historical range apparently has been reduced due to flooding by impoundments. Most of the remaining populations are small, localized, and threatened by sedimentation and other water quality problems. In an effort to prevent this mussel's extinction, the FWS proposed listing it as Endangered (F.R. 4/24/87).

The Louisiana pearlshell has a generally elliptical shell approximately 3.9 inches (100 millimeters) long. Its preferred habitat is stable sand and gravel substrate in small, clear, free-flowing streams. An extensive search of 39 streams in Rapides Parish during 1985 by biologists with the Louisiana Natural Heritage Program found the species in 11 streams. Of the total population (estimated in 1985 at 10,000 individuals), nearly 90 percent were concentrated in four streams: Long Branch, Bayou Clear, Loving Creek, and Little Loving Creek. The scattered distribution of *M. hembeli* suggests that the species originally occurred throughout the Bayou Boeuf headwater system and that impoundments eliminated populations in intervening areas. Now, the entire Louisiana pearlshell population of a small stream may occur in only several yards of stream length. Because most of the remaining populations are so small and localized, even beavers appear to be a significant threat; *M. hembeli* individuals found at one site in 1985 were later extirpated when the stream was inundated by a beaver pond.

Sedimentation resulting from off-road vehicle (ORV) use and clear-cut logging is the main current threat to the Louisiana pearlshell. Most of the species' range is within Kisatchie National Forest and clear cutting, especially if it occurs up to stream banks, increases erosion. This practice also results in higher rainfall runoff, which increases water velocity and scours the stream channel, making the substrate too

unstable for the mussel. (The U.S. Forest Service has already taken steps to reduce impacts to the mussel from ORVs and timber management.) There is some evidence that water pollution from upstream houses and farms is another threat facing at least the Brown's Creek mussel population. Waste runoff may contain such harmful substances as motor oil, sewage, and agricultural pesticides. The FWS plans to advise residents of means to reduce or eliminate impacts on nearby streams.

## Two Puerto Rico Plants

The following rare species of trees native to the Commonwealth of Puerto Rico were proposed for listing as Endangered (F.R. 4/24/87):

A medium-sized tropical evergreen tree in the verbena family (Verbenaceae), *Cornutia obovata* (known locally as the *Palo de Nigua*) is endemic to forests in the limestone hills and lower mountains of northwestern and central Puerto Rico. This species can reach 33 feet (10 meters) in height with a trunk diameter of 6 inches (15 centimeters). Its leaves are opposite, obovate in shape, and covered with fine hairs on the lower surface. The flowers are clustered at the ends of stems, tubular in shape, and purplish in color.

Although *C. obovata* was never known to occur in large numbers, the clearing of forests for a variety of land uses has eliminated some individuals and populations. Only seven individual trees are known to survive. Five of them are within the Rio Abajo Commonwealth Forest, and they would be in danger if forest management policies were to change in ways that would adversely affect the natural vegetation. The other two trees grow on private land, one near a trail heavily used by squatters and the other near a communication facil-

ity that also receives heavy use. It is the species' extreme rarity rather than imminent habitat destruction that is the main threat to the survival of *C. obovata*. Only mature specimens are known and, although abundant flowers have been observed, there is no evidence of recent regeneration.

*Trichilia triacantha* is an evergreen shrub or small tree endemic to low elevation semideciduous dry forests in southwestern Puerto Rico. This species, a member of the mahogany family (Meliaceae), can reach 30 feet (9 m) in height with a trunk 3 inches (8 cm) in diameter. Its dark green, leathery leaves are palmate and three- to seven-parted, with the leaflets bearing three sharp spines at their apex. The flowers are white. Currently, 18 *T. triacantha* individuals are known to exist at 5 sites within Guanica Commonwealth Forest.

Widespread deforestation for agriculture, grazing, and charcoal production has had a significant effect on the native flora of Puerto Rico; the forests in which *T. triacantha* now is known to occur are largely second growth. In addition to suffering the generalized impacts of wood cutting, the species traditionally has been selectively taken for the qualities of its wood (hardness, durability, and appearance). It is not known to what extent this practice continues but at least one population has been lost to cutting in recent years. Because the species is usually found along dry streambeds and ravines that carry periodic torrential rains, destruction of the few remaining specimens by flash flooding also poses the threat of extinction. Further, rapid development in the small remaining areas of similar, privately owned habitat could destroy any undiscovered individuals or populations.

(continued on next page)



The white-haired goldenrod is an upright-to-slightly-arching plant that attains a height of up to 39 inches (98 cm). Its deeply veined leaves are dark green above and pale below, and the stem is covered with fine white hairs. Clusters of small, yellow flowers begin blooming in late August.

photo by John MacGregor

## White-haired Goldenrod (*Solidago albopilosa*)

An herbaceous plant in the aster family (Asteraceae), *S. albopilosa* is endemic to outcrops of Pottsville sandstone found within eastern Kentucky's Red River Gorge area of Menisee, Powell, and Wolfe Counties. It grows primarily in rockhouses (natural, shallow, cave-like formations) and beneath overhanging ledges. Intensive recreational use of these outcrops is damaging *S. albopilosa* habitat, and the FWS has proposed to list the species as Endangered (F.R. 4/24/87).

Most of the Red River Gorge is within Daniel Boone National Forest, and it has been designated a National Geological Area for its unusual topography. (There are several small, private inholdings within the gorge, but the U.S. Forest Service plans to acquire those judged most significant.) The geological features (rockhouses) with which *S. albopilosa* is associated are common in this area, but only a small number currently support the species.

Red River Gorge is a recreational area that draws approximately 240,000 "visitor-use days" per year. The rockhouses are very popular destinations or sites for hiking, camping, climbing, and picnicking. Also, because of the presence of Indian artifacts, collectors dig in even the most remote rockhouses. These activities have resulted in intensive disturbance to *S. albopilosa* habitat. The species has been extirpated from some sites and is being damaged at most of the others.

A threat of a more potential nature is the proposed Red River Lake project. Although the high-water level would not inundate rockhouses, the species' habitat could be damaged by associated construction and recreational activities. The proposed impoundment, however, is opposed by the State of Kentucky and is no longer being pursued as a viable project by the U.S. Army Corps of Engineers. In the event that the proposal is someday revived, plans for protecting *S. albopilosa* would need to be incorporated; however, reauthorization is not expected.

If the species is listed, effects on Forest Service management should be minimal. They would consist primarily of measures to reduce visitor damage at the most important *S. albopilosa* sites and careful planning of any future logging operations.

## Aleutian Shield-fern (*Polystichum aleuticum*)

*P. aleuticum*, a perennial in the fern family (Polypodiaceae), is an extremely rare plant known from only two sites in Alaska's Aleutian Islands. This diminutive species arises from a stout, dark brown rhizome and sends out fronds that reach only about 6 inches (15 cm) high. There are no closely related ferns in North America or

northern Asia. Grazing, soil instability, and the species' low numbers threaten it with extinction, and the fern has been proposed for listing as Endangered (F.R. 4/24/87).

For many years, *P. aleuticum* was known only from a 1932 collection on Atka Island. Surveys conducted in 1984 and 1985 were not successful in finding the population, although the original collection site is not known and could have been overlooked. On the other hand, reindeer, non-native animals introduced to Atka in 1914, have overgrazed the west end of the island and may have contributed to the fern's apparent disappearance. In 1975, a second *P. aleuticum* population of only 15 plants was discovered on Adak Island near the summit of Mt. Reed. The site consists of treeless, alpine talus slopes vegetated with low-growing herbs and prostrate shrubs.

Caribou were introduced on Adak in 1958, and up to 400 now occur on the island. Because they are present in the Mt. Reed area, caribou may be affecting *P. aleuticum* by grazing or trampling. A more likely limiting factor is the instability of the alpine habitat on Mt. Reed due to wind erosion and solifluction (soil movement).

Both Atka and Adak Islands are within the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge. However, part of Atka was selected and conveyed to the Atxam Native Corporation under the Alaska Native Claims Settlement Act of 1971. The northern half of Adak (including Mt. Reed), though still within the refuge, is a U.S. Naval Reservation within which the Navy has development rights. These rights can be exercised if compatible with the refuge, and discussions with the Navy have revealed no conflicts.

The listing proposal identified several immediate measures to conserve and recover *P. aleuticum*, and some have already begun. Intensive surveys for the plant are under way, and "wanted" posters have been distributed to all refuge and Naval personnel and interested private citizens. Future activities may include fencing of fern sites to exclude caribou and propagation of the plant to create a supply for reintroduction.

## Available Conservation Measures

Among the conservation benefits provided by a listing as Threatened or Endangered 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. 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 of Critical Habitat. 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.

---

## Parvovirus and Heartworm Found in Minnesota Wolves

L. David Mech and Steven H. Fritts<sup>1</sup>

Just when it looked like the main threat to the Minnesota wolf (*Canis lupus*) population was long-term human development of habitat, two new, more immediate problems have appeared. Canine parvovirus (CPV) and heartworm (*Dirofilaria immitis*) recently were documented in Minnesota wolves. Both are potentially fatal and are new to wild gray wolves. Their threat to the population is unknown but could be serious.

CPV is a newly discovered disease thought to be an escaped laboratory artifact, and was first found in 1976 in domestic dogs. It raced through the dog population and killed numerous pets — especially pups — before a vaccine was developed. Affecting primarily the digestive system, it is spread via infected feces. CPV had reached the dog population in Ely, the heart of the Minnesota wolf range,

(continued on page 6)

# Minnesota Wolves

(continued from page 5)

by 1979. In 1983, CPV killed 11 of 12 wolf pups and yearlings in a captive wolf colony just north of Minneapolis, thus demonstrating that CPV could be just as serious to wolves as to dogs.

Serologic studies of wolves live-trapped in northern Minnesota then showed that CPV had hit the wild wolf population. By testing serum for antibodies to the disease, we were able to conclude that about half of the surviving wolves in northern Minnesota had been exposed to CPV from 1977 through 1983. This technique, however, does not indicate how many of Minnesota's 1,200 wolves might have perished from the disease, and that remains a mystery.



photo by L. David Mech

gray wolf

That CPV does adversely affect wild wolves was documented in nearby Wisconsin in 1985. There, Wisconsin Department of Natural Resources biologist Dick Thiel found a dead, emaciated wolf that a few months earlier had had an active CPV infection. A single mortality may not seem like much of a problem, but, to a critically low wolf population that has not been able to exceed 30 members since it began to recolonize the State about 1975, the loss of one animal can be critical.

The Minnesota wolf population can withstand considerable mortality from many causes; however, fatalities along the periphery of the Minnesota range, where wolf numbers are lowest, would minimize continued dispersal of animals to Wisconsin. This could then impede or prevent wolf recovery in Wisconsin and Michigan.

The same potential problems also could result from heartworm. This parasite is spread from animal to animal via mosquitoes and has gradually made its way northward from the southern United States. It has infected dogs in central Minnesota for several years, and was first found in Ely dogs (within the wolf range) during 1986. On December 31, 1986, a blood sample from an 8-year-old wild wolf in the Ely region, No. 6021, showed larval heartworm. The wolf died as a result of capture in an illegal snare, and an autopsy showed several large adult worms in her heart.

Heartworm larvae are shed by the adult worms that inhabit the heart chambers, although they also can live elsewhere. As the host ages, the worm enlarges and the chances of new infections via more mosquito bites also increase. Thus, greater and greater strain is placed on the heart. For animals like the wolf that earn their living by running, this strain might greatly reduce chances of catching prey and result in premature death.

In 1975, Glynn Riley and Roy McBride wrote about the red wolf, just before its demise in the wild from several possible

causes: "Heartworms (*Dirofilaria immitis*) have been present in all 27 wolves examined....," and "Red wolves three years of age and older usually were heavily parasitized by heartworms, sometimes to the point that the heart valves could not close" ("A Survey of the Red Wolf," pp. 263-277 in *The Wild Canids* by M. W. Fox).

Conceivably, either heartworm or CPV could diminish productivity of an affected animal or survival of its offspring by limiting its hunting abilities. In this respect, Wolf 6021's breeding history is of interest. Born about 1979, Wolf 6021 produced surviving pups in summer 1982 and 1983, and probably also in 1984. In 1985 and 1986, if 6021 bore pups, none survived beyond the first month, even though the wolf held the same territory and mate. No evidence is available connecting this animal's decreased productivity with her heartworm infection, but the possibility of such a link is strong.

Without more information about the natural history of both heartworm and CPV in wild hosts, and the hosts' responses to them, it is impossible to predict the ultimate consequences of these pathogens. Fortunately, in at least part of Minnesota, 20 years of baseline information on natural wolf population fluctuations is available to compare with any changes these two diseases may bring in wolf numbers.

Such a comparison can indicate whether medical measures must be developed to deal with these two new threats or whether the wolf population can contend with them. The answer should become apparent within the next few years. Meanwhile, the Patuxent Wildlife Research Center, in collaboration with the National Wildlife Health Laboratory, will continue to monitor the incidence of these pathogens in the wolf population.

<sup>1</sup>Patuxent Wildlife Research Center, U.S. Fish and Wildlife Service, Laurel, Maryland 20708

## The Role of Captive Propagation in the Recovery of the Mississippi Sandhill Crane

Janet L. McMillen<sup>1</sup>,  
David H. Ellis<sup>1</sup>, and  
Dwight G. Smith<sup>2</sup>

The Mississippi sandhill crane (*Grus canadensis pulla*), darkest colored of all *G. canadensis* populations, was described as a distinct subspecies in 1972. Although its range formerly extended at least from Louisiana into Alabama, the single remaining wild population is confined to southern Jackson County in southwestern Mississippi.

The Mississippi sandhill crane was officially listed in 1973 as Endangered because of its small population (less than 50 individuals), its limited distribution, and the

lack of suitable habitat. Habitat destruction and human disturbance led to its decline. Thousands of acres of nesting habitat were altered for private and commercial development. More important, large tracts of habitat were drained and planted in dense stands of slash pine (*Pinus eliottii*) for pulpwood. Access roads, drainage ditches, and highways were built across savannas, increasing disturbance, interrupting the natural flow of water, and subjecting the bird to increased human-related mortality.

A recovery program is under way to preserve the bird in captivity and augment the wild population. Key components of the

effort include: (1) acquisition and management of habitat on the Mississippi Sandhill Crane National Wildlife Refuge; (2) development of a captive flock at the Patuxent Wildlife Research Center in Laurel, Maryland, for production of eggs and young; and (3) release of Patuxent-produced stock into the wild.

### Habitat Acquisition and Management

The Mississippi sandhill crane NWR was officially established in Jackson County, Mississippi, in 1975 when the Fish  
(continued on next page)

# Crane

(continued from page 6)

and Wildlife Service (FWS) purchased 1,709 acres (692 hectares) acquired by the Nature Conservancy in 1974. Additional purchases and leases have been made, and the refuge currently encompasses about 18,000 acres (7,285 ha). Future plans call for the acquisition of an additional 2,500 acres (1,012 ha).

The habitat management objective is to restore sufficient nesting, feeding, and roosting habitat to support a population of 100 birds (30 breeding pairs and 40 non-breeding birds). To meet this objective, efforts are being made to 1) acquire additional potentially suitable habitat, 2) cut, bulldoze, and/or burn timber and brush to provide open areas for feeding and roosting while maintaining sufficient woody vegetation to provide buffers between territories, 3) improve water economy by plugging ditches and digging small ponds near nesting territories, 4) increase winter food sources on the refuge by planting crops and improving the soil to increase invertebrate abundance, and 5) control predators to improve natural production and adult survival.

## Captive Propagation at Patuxent

Patuxent established its captive Mississippi sandhill crane flock in 1966 with four chicks reared by John Lynch from eggs collected in Jackson County in 1965-1966. The purposes of maintaining this flock are to guard against extinction due to loss of the wild population, increase genetic diversity, and provide captive-produced cranes and eggs for introduction into the wild. The Patuxent flock has grown from three birds in 1966 to 40 in late 1986 as more eggs have been collected from the wild and produced in captivity. This flock's current composition is 9 juveniles and 31 adults/subadults, including 8 productive females. The goal is to increase the captive flock to 15 pairs so that, by 1990, 20 cranes each year can be shipped to Mississippi for release.

To date, 56 eggs have been removed from the wild (an average of 2.6 annually). The removal of one egg from many of the two-egg clutches probably has not diminished recruitment in the wild because pairs typically produce two eggs in a clutch but do not successfully fledge two chicks. Of the eggs that hatched, 74 percent (23 of 31) of the young birds were successfully fledged at Patuxent. Recent wild egg acquisitions have been from pairs whose progeny are not represented in the captive flock. We hope that this will increase genetic diversity in both the captive breeding birds and those destined for reintroduction.

The first Patuxent-produced eggs were laid in 1968; however, they came from unserved females and were infertile. Arti-

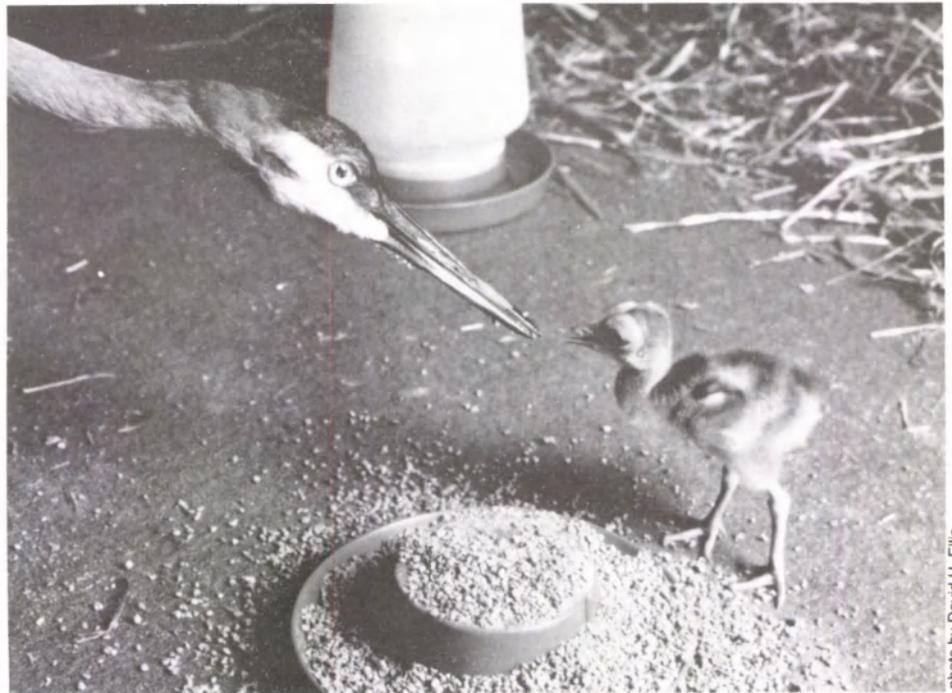


photo by David H. Ellis

**This Mississippi sandhill crane chick is being fed from the bill of a taxidermically prepared crane head in an effort to sexually imprint it on cranes rather than humans.**

cial insemination was begun on the crane in 1970. The first fertile egg was produced in 1973 and the first juvenile fledged in 1974. This bird was the first of its subspecies successfully raised in captivity from an egg fertilized and laid by captive adults.

Since 1970, 178 known fertile Mississippi sandhill crane eggs have been produced at Patuxent, all but three of them by artificial insemination. Out of that total, 167 remained at Patuxent; 128 (77 percent) of these hatched, and 85 (66 percent) resulted in fledglings. The mean number of young fledged per year, 1.8 before 1980, rose to 10.4 between 1980 and 1986. Peak years were 1984 and 1985, with 17 and 16 young fledged.

The major problems encountered in raising Mississippi sandhill cranes in captivity were 1) low fertility, 2) low hatchability, 3) debilitating toe/leg deformities, and 4) disease. Through the use of Florida (*G. canadensis pratensis*) and greater (*G. canadensis tabida*) sandhill cranes as research surrogates, these problems have largely been resolved. Improved artificial insemination techniques resulted in a 95 percent fertility rate for eggs from 1983 through 1986. The use of a disinfectant egg dip and frequent egg collections have decreased the loss of fertile eggs to bacterial contamination. The mean hatchability of fertile eggs from 1973 through 1979, 30 percent, was increased to 86 percent from 1980 through 1986. Deformed toes and legs in hand-reared crane chicks have virtually been eliminated by limiting daily food intake when weight gain is excessive, and by increasing the chick's activity level through swim therapy. Disease has been significantly reduced through annual pen

rotation, the administration of antibiotics and other treatments for fungi and parasites, continuous monitoring of chicks, and annual examinations of adults.

## Reintroduction Efforts

A "gentle release" program providing captive, parent-reared cranes for release into the wild began in 1975. Eggs laid by Mississippi sandhill cranes at Patuxent are collected and placed under captive foster parents, which rear the young until they are about 120 days old. Contact with humans is limited to ensure that natural imprinting and socialization can occur. At approximately 60 days of age, the chicks' wings are brailed (restrained with a soft plastic strap) to prevent flight.

When the birds are 4 months old, the brails are removed and the birds are transferred to community flight pens where they develop social bonds. The birds are gradually weaned from pelletized food to a diet supplemented by corn to prepare them for the food they will encounter in the wild. Prior to shipment to the refuge in Mississippi, the young are again brailed, administered antibiotics, and given a physical examination. Upon arrival at the release site in Mississippi, the young are confined to pens for about one month, where they further strengthen cohort bonds, develop site fidelity, and learn to forage for corn and natural foods. The scattered grain also attracts wild cranes, which interact with the captives and aid their integration into the wild flock after release. After a period of acclimation, the wing brails are removed, and the juveniles are allowed to leave the holding pens. Supplemental feeding is

(continued on next page)

# Crane

(continued from page 7)

continued until the young become independent.

Captive-reared cranes have been released to the wild annually since 1981. Overall, their social integration and survivorship have been good. Of the 45 birds released since 1981, 19 (45 percent) still survive, and Patuxent-reared birds currently make up approximately 38 percent of the wild flock. Of those that have died, at least one bird was found shot, but most have been killed by avian or mammalian predators (including bobcats, coyotes, and dogs). Several nesting attempts of released birds have occurred. In 1985, a male that had hatched in 1979 paired and nested with a wild female. Two eggs were laid, and the birds were sharing incubation until they abandoned the nest after an accidental human disturbance. Unfortunately, the male was found dead in December 1985. Several other released birds have paired with wild birds, and in 1986,

although no nesting occurred, three pairs (two with one Patuxent member and one with two Patuxent birds) established territories. Finally, in April 1987, a pair with one member of Patuxent origin was observed with a small chick.

In all, four pairs with at least one member of Patuxent origin were observed in 1987.

The future of the Mississippi sandhill crane, while not yet fully secure, is brighter now than in 1972 when the bird was described as a distinct subspecies. A sizeable National Wildlife Refuge now exists and its staff is actively involved in habitat restoration. A captive flock, now well established at PWRC, serves as a gene reservoir and a continuing source of eggs and young to bolster the wild population. The near future calls for additional habitat modification and enlargement of the captive flock until 15 breeding pairs annually produce 20 young for release. Eventually, the wild population must become self-sustaining. If current management efforts continue successfully, this goal may be reached in as few as 10 years.

Two additional programs recently have been employed to augment the wild flock. Beginning in 1982, viable eggs laid at Patuxent have been placed in the wild nests that contain infertile eggs. To date, 11 Patuxent eggs have been substituted, of which 10 have hatched. The feasibility of conducting foster-parenting at the refuge also is being investigated. Five pairs of Florida sandhill cranes have been placed in pens at the refuge and, if these pairs can successfully, routinely rear young, their eggs could be replaced with Mississippi sandhill crane eggs from Patuxent or the wild. Some Mississippi young could, therefore, be raised in their native environment. To date, none of the Florida pairs have nested, although courtship behavior has been observed.

<sup>1</sup> U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland 20708

<sup>2</sup> Southern Connecticut State University, New Haven, Connecticut 06515

## Regional News

(continued from page 2)

woodlands were recommended for addition to the list as well. The ants are threatened by the exotic Argentine ant and habitat loss in valley oak riparian areas. A recent survey of the butterflies of California revealed that the Pheres blue butterfly (*Icaricia icarioides pheres*), which was once believed to be extinct, does exist but is not abundant.

\*\*\*

Grazing and geothermal development appear to threaten several caddisfly species in the eastern Sierra Nevada that are confined to springs on public range land. One species (*Desmona pethula*) has a larval stage that leaves the water and crawls on land (with its case attached to its body) to feed on streamside vegetation. This is very unusual because most caddisflies spend their entire larval and pupal stages in the water.

\*\*\*

The owner of the Rio Verde Estates parcel is preparing to develop his property on San Bruno Mountain, and a permit application has been received by Daly City. The SESO has advised Daly City that the application generally conforms to the Habitat Conservation Plan agreement, but that the addition of one acre of permanent disturbance will likely require an amendment to the plan. The owner has agreed to add an acre from his adjacent Rio Verde Heights parcel as habitat compensation.

\*\*\*

An agreement is being developed to guide long-term management of the California least tern (*Sterna antillarum browni*) at Oakland Airport. This agreement is required by the Corps of Engineers through

a Section 7 consultation on the airport's proposed fill of 450 acres of wetlands. Unless the agreement is accomplished within one year of permit issuance, the airport cannot construct its proposed runway and taxiway extension through the existing least tern colony site.

\*\*\*

An informal consultation with the Corps of Engineers on the proposed replacement of the Mud Slough bridge by Southern Pacific Railroad will result in some positive benefits. The loss of about 0.19 acres of wetlands and possible salt marsh harvest mouse (*Reithrodontomys raviventris*) habitat will be offset by development of a plan that calls for: (1) 0.25 acres of new habitat, (2) long-term monitoring to ensure successful revegetation, and (3) permanent protection of all salt marsh harvest mouse habitat on the railroad right-of-way.

\*\*\*

The Warner sucker (*Catostomus warnereensis*) has recently been documented in the potholes area in northern Warner Valley, Oregon. This area is under consideration for acquisition by the Bureau of Land Management (BLM) to help conserve the species.

\*\*\*

Seedlings of Malheur wirelettuce (*Stephanomeria malheurensis*) were placed in an enclosure built by the BLM's Burns District Office in southeast Oregon. Eight volunteers assisted in the project.

\*\*\*

A Cooperative Agreement with the State of Idaho was signed for conservation of rare, endangered and threatened plants. The Idaho Department of Parks and Recreation is now eligible to participate in the Endangered Species Grant-in-Aid Program under Section 6 of the Endangered Species Act. Idaho's first project will con-

sist of status surveys for seven candidate plants.

\*\*\*

Through May 20, 1987, production of Endangered raptors at the World Center for Birds of Prey near Boise, Idaho, for the season included approximately 414 peregrine falcon (*Falco peregrinus*) eggs and 10 Mauritius kestrel (*Falco punctatus*) eggs.

\*\*\*

The U.S. Forest Service requested informal consultation on a proposed timber harvest adjacent to the Golden Trout Wilderness Area in the Sequoia National Forest, California, to obtain input on the placement of harvest units, location of roads, timing and intensity of cuts, and other technical matters. The Sequoia Forest staff has expressed a strong desire to design and carry out the sale in a manner that will avoid impacts to the Little Kern golden trout (*Salmo aguabonita whitei*).

\*\*\*

The spring population census of the Borax Lake chub (*Gila boraxobius*) showed that cattle grazing and recreational use are becoming major concerns. About 250 head of cattle were enclosed within the designated Critical Habitat, and damage to salt crusts and marsh vegetation was evident. Because of these problems, The Nature Conservancy is stepping up its negotiations for acquisition of the area. The BLM has been requested to lock gates into the Critical Habitat.

\*\*\*

The single Hawaiian crow (*Corvus hawaiiensis*) egg reported laid April 30, 1987, at the Olinda Endangered Species Facility on the island of Maui has been candled and found to contain a dead embryo. Olinda's aviculturist estimated

(continued on next page)

that the embryo survived for 2 to 3 days. The cause of death has not yet been determined. A dummy egg placed in the nest has been removed to encourage production of another egg. Two other pairs of crows at the facility have built nests.

Field surveys to determine the current distribution and population size of the Hawaiian crow in the wild have focused on locating individual birds and breeding pairs on the island of Hawai'i, within koa forests 3,500 to 5,500 feet in elevation on the western slopes of Hualalai and Mauna Loa. Two birds were found on the State-owned Waiea Tract in the South Kona district. Surveys during the next quarter will examine lower elevation wet ohia forests and other geographic areas that formerly were occupied by the crow.

A forest bird survey conducted during April on the island of Rota, Commonwealth of the Northern Mariana Islands, showed that populations appeared to be healthy and have remained stable since the 1982 survey. The status of the Rota bridled white-eye (*Zosterops conspicillata rotensis*), a Category 2 listing candidate, and the Mariana crow (*Corvus kubaryi*), an Endangered species, appears unchanged. The Rota population of the Endangered Mariana fruit bat (*Pteropus mariannus mariannus*) has been slowly increasing in numbers since 1982 and is estimated at around 2,000. A moratorium on hunting, along with the presence of a conservation officer permanently stationed on the island, is believed to be responsible for the increase in numbers.

**Region 2** -Dr. James Lewis, FWS Whooping Crane Coordinator, attended the first meeting of Canada's Whooping Crane Recovery Team as the representative for the U.S. Meeting participants reviewed a draft of Canada's whooping crane (*Grus americana*) recovery plan, which is now approved in principle by Director General Clarke. The Canadian Wildlife Service expects to publish the plan shortly.

The *Proceedings of the 1985 Crane Workshop* have been published and 150 copies distributed to FWS personnel working on management or research of whooping cranes and sandhill cranes (*Grus canadensis*). The proceedings were edited by Dr. Lewis and Jerry W. Ziewitz, and jointly published by the Platte River Trust and the FWS.

Surveys by Ernie Kuyts of the Canadian Wildlife Service located 30 whooping crane nests this spring at Wood Buffalo National Park, Canada. On May 21, one egg was removed from each of 24 nests for transfer to Grays Lake National Wildlife Refuge, Idaho, and the Patuxent Wildlife Research Center, Maryland. As an experiment, an egg from a twenty-fifth nest was

placed on a nest occupied by a female that previously had lost eggs to predators. Later observations revealed that the female continued to incubate the transferred egg. Twenty-nine active nests containing a total of 32 eggs remain at Wood Buffalo.

A drought at Grays Lake was interrupted by over 3 inches of rain in late May. The recent rains will enhance whooping crane chick rearing conditions in early summer, but a resumption of the drought could still cause poor summer-long brood rearing conditions; therefore, only 12 whooping crane eggs were taken from Wood Buffalo to Grays Lake for use in the cross-fostering experiment. These eggs were placed in the nests of the more successful sandhill crane foster parents, with territories located on more permanent wetland sites where the chance for survival of the whooping crane chicks is greatest. Ten of the 12 eggs had living embryos. Biologists were uncertain about the other two, but their embryos may have been in early stages of development where viability is more difficult to confirm.

Twelve Canadian whooping crane eggs sent to Patuxent to add to the captive flock included seven viable eggs, three that probably were infertile, and two of uncertain status.

Mid-May aerial surveys located 17 of the 21 whooping cranes seen in Colorado during spring migration. In addition, the remains of one of last summer's fledged young was found a few hundred miles from Grays Lake, Idaho, where it died of an unknown cause during fall migration. Only two young were fledged in the summer of 1986. The remaining young bird is doing well. Three of the four female whooping cranes translocated from isolated summering sites and released at Grays Lake last summer were found during the aerial surveys. One had returned to the site where it was first captured in 1986, while the other two chose summering sites over 100 miles from Grays Lake and from their capture sites of 1986.

A new population of the Texas snowbells (*Styrax texana*) has just been planted in the Endangered shrub's native Hill County habitat west of San Antonio. Until now, only 39 wild plants were known, these mostly growing on cliffs where they were safe from livestock and deer browsing. The reestablishment project is being directed by the San Antonio Botanical Gardens, with help from Southwest Texas Junior College, Texas Natural Heritage Program, and the FWS. The new population is being started on a private ranch with full landowner cooperation and assistance from the ranch manager. The selected site seems ideal, having water, soils, and topography similar to other sites supporting the species. Twenty-five seedlings grown by the San Antonio Botanical Gardens were planted in protective wire cages at various cliffside localities. The young

plants will be monitored to determine which of the sites are most suitable for survival and growth.

A total of 34 thick-billed parrots (*Rhynchopsitta pachyrhyncha*) have now been released in the Chiricahua Mountains of southern Arizona. Thirteen of the parrots overwintered in Arizona, but were becoming difficult to track because of failing radios. An additional five birds with radios were released into the existing flock this spring so that biologists could continue to use telemetry to monitor the birds' movements. As of early June, the flock had been more sedentary recently, which suggests that the birds may remain in the area throughout the summer and attempt nesting. The thick-billed parrot generally nests in midsummer to coincide with the increase in the availability of pine seeds, its primary food. This project is a cooperative program with the Arizona Game and Fish Department, U.S. Forest Service (Coronado National Forest), FWS, Los Angeles and San Diego Zoos, Jersey Wildlife Preservation Trust (United Kingdom), and International Council for Bird Preservation (U.S.).

Four new bald eagle (*Haliaeetus leucoccephalus*) nesting territories were discovered in Arizona this spring. A total of 23 sites were occupied in Arizona, with 19 of them active. As of May 29, 23 nestings of fledglings survived. If all 23 fledged, the 1987 nesting season will be a record level of productivity for the southwest population.

Two adult Endangered Colorado squawfish (*Ptychocheilus lucius*) were captured from the San Juan River, New Mexico, by an interagency team of biologists from the U.S. Bureau of Reclamation, New Mexico Department of Game and Fish, University of New Mexico, and FWS. The fish, captured by electro-fishing, represent the first confirmation of the species in New Mexico in over 25 years. Additional surveys are planned for this summer and fall. A similar survey effort is being conducted concurrently on the Utah portion of the river by the Utah Division of Wildlife Resources.

The BLM, in cooperation with the FWS and Arizona Game and Fish Department, has initiated a program directed toward removal of exotic fish species from stock tanks on BLM lands within the Aravaipa Creek watershed of Arizona. Removal of such exotics as green sunfish (*Lepomis cyanellus*) and bullheads (*Ictalurus* spp.) is necessary to prevent movement of these fish into Aravaipa Creek where they would prey upon the Threatened spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*).

Twenty-one Endangered Chihuahua chubs (*Gila nigrescens*) were captured

(continued on page 10)

# Regional News

(continued from page 9)

from the Mimbres River, New Mexico, and taken to Dexter National Fish Hatchery. The chubs will be used to supplement the existing broodstock, which originated from 10 fish captured from the Mimbres River in 1979. Future plans involve stocking their offspring into selected tributaries of the Mimbres River after an agreement is reached among the FWS, U.S. Forest Service, and New Mexico Department of Game and Fish.

\*\*\*

The Nature Conservancy has purchased 11,503 acres of Matagorda Island, Texas, and the FWS recently paid \$3 million for a portion of the acquisition. As funds become available, the balance will be purchased from the Conservancy over the next 2 years. This portion of Matagorda Island contains winter territories of several whooping crane family groups and has suitable habitat for expansion of the Aransas flock. The Conservancy portion of the tract will be managed by the FWS under a lease management agreement.

\*\*\*

The New Mexico ramshorn snail (*Peccosorbis kansasensis*), a native of southeastern New Mexico, will be the subject of a status and distribution study this summer. The study is jointly funded by the U.S. Forest Service, New Mexico Department of Game and Fish, and FWS, and will be conducted by Dr. Richard Smartt of the New Mexico Museum of Natural History and Dr. Art Meitcalf of the University of Texas at El Paso. This minute (1/4-inch) snail lives in small pools within bedrock basins in ephemeral stream channels, and is currently known from only two localities. Potential threats to the existence of the snail at those two locations include gravel mining, pesticide spraying, and oil and gas development.

\*\*\*

The annual meeting of the Region 2 herpetological team was held in Phoenix, Arizona, on April 10 and 11. The team reviewed recently completed status work on the Chihuahuan mud turtle (*Kinosternon hirtipes murrayi*) and Sonoran tiger salamander (*Ambystoma tigrinum stebbinsi*). The team recommended that the turtle be moved from candidate Category 2 to 3C as a result of that work, and that the salamander be retained in Category 2 pending further clarification of its taxonomic status. (Category 2 taxa are those for which there is evidence that a listing proposal possibly is appropriate but for which there is not yet enough evidence to support publication of a proposal. Category 3C comprises taxa once under consideration for listing but now thought to be more abundant and/or less subject to threat.) The draft revision of the FWS Notice of Review of animal candi-

date species was examined and changes in the status of several species were recommended.

The primary topic of the meeting concerned the apparent decline of leopard frogs in the U.S., particularly in the Southwest. Populations of several species of leopard frogs and other *Rana* species are disappearing. Some are experiencing sudden, complete adult die-offs. The team recommended that the FWS pursue toxicological studies, concentrating on the lowland leopard frog (*Rana yavapaiensis*), which may be experiencing the same type of adult mortalities that resulted in the extirpation of the Tarahumara frog (*Rana tarahumarae*) from the U.S. Any persons having information on declines of leopard or other ranid frogs in the U.S. or Mexico are urged to contact the Region 2 Endangered Species Office (address and phone number on BULLETIN page 2).

\*\*\*

Implementation of the Stacy Dam biological opinion in west-central Texas is under way. A herpetologist, Okla Thornton, has been hired by the Colorado River Municipal Water District and is already in the field implementing the alternatives necessary to eliminate jeopardy to the Threatened Concho water snake (*Nerodia harteri paucimaculata*). Exceptionally high rainfall and a late spring should provide excellent habitat for the snake and its principal food source — fish. Habitat manipulation to improve juvenile feeding areas (riffles) and guaranteed stream flows make up the major alternatives to be implemented by the water district. The U. S. Army Corps of Engineers has issued the Section 404 and Section 10 permits that authorize Stacy Dam, and construction will begin soon. Before construction is completed in 1990, over 100 miles of suitable habitat on the Colorado River are to be created or improved, and at least one tributary stream, Ash Creek, will be protected for the Concho water snake.

\*\*\*

Recent investigations have revealed that the Endangered woundfin minnow (*Plagopterus argentissimus*) is facing serious threats. It is being completely replaced by an exotic species, the red shiner (*Notropis lutrensis*). The woundfin minnow is found only in the Virgin River of Nevada, Arizona, and Utah. In the 1970's, introduced red shiners began increasing in abundance in the Nevada portion of the river. By 1980, they had completely replaced woundfin there and become increasingly common in collections from the Arizona portion of the river. It was hoped, however, that the Virgin River Narrows, a 10-mile-long canyon, would restrict movement of the red shiner into the Utah portion of the river because the Narrows is normally dry and only contains water during the spring runoff or after summer storms. However, red shiners were discovered above the Narrows in the Utah portion of

the river in 1984. By fall 1986, red shiners represented 84 percent of the fish collected near St. George, Utah. In contrast, woundfin represented only 3.2 percent. The immediate concern is that red shiners will move above the Washington Fields Irrigation Dam and replace woundfin in the last 8 to 10 miles of the Virgin River, which currently is not contaminated. Immediate action must be taken to prevent the further spread of red shiners. Chemical renovation of the river from the Washington Field Diversion to the Narrows may be the only solution.

\*\*\*

**Region 4** - A cooperative effort by the Alabama Department of Conservation and Natural Resources, Samford University, and the FWS has resulted in the identification of six potential transplant sites for reestablishment of watercress darter (*Etheostoma nuchale*) populations. This darter is known from only three locations, all spring ponds in urban areas of Jefferson County, Alabama. Four of the six potential sites are receiving final consideration. Conservation agreements permitting the introduction of the darters to the springs have been developed with the landowners of two of the sites. Two additional springs may receive darter populations pending their designation as sites of "nonessential experimental populations."

\*\*\*

The U.S. Forest Service has funded a \$32,000 challenge grant proposal from the FWS, North Carolina and Tennessee Heritage Programs, and North Carolina Plant Conservation Program to assist in mountain bald (alpine meadow) management. Of special concern is a 10,000-acre area of the Roan Mountain Massif, located on the North Carolina/Tennessee border, which includes 13 candidates for Federal listing and numerous State-listed species. A meeting of all involved agencies was held in late March to plan this season's work and discuss hiring of field assistants.

\*\*\*

The small captive colony of Choctawhatchee beach mice (*Peromyscus polionotus allophrys*) at Auburn University in Alabama produced its first offspring on March 10, 1987. Establishment of captive Perdido Key (*P. p. trissyllepsis*) and Alabama (*P. p. ammobates*) beach mice colonies also is planned.

\*\*\*

Approval has been obtained from the U.S. Forest Service for prescribed burning, a habitat management technique, in North Carolina's Linville Gorge wilderness. Ten plots were burned in March to test the effects of fire on mountain golden heather (*Hudsonia montana*), which occurs only within this wilderness area. During the burning, the first sighting for the year was made of a territorial pair of peregrine falcons that had returned to the gorge, hopefully to nest.

(continued on next page)

A long-standing Florida manatee (*Trichechus manatus*) consultation under Section 7 of the Endangered Species Act has been resolved. The firm of Ferinel, Inc. had requested a permit from the U.S. Army Corps of Engineers to develop a marina on the North Fork of the St. Lucie River in Florida, an area from which the FWS had no information concerning manatee use. As part of the resolution, Ferinel agreed to fund a survey of natural resources and manatee use in the area. The results indicated no verifiable manatee use within a 5-mile (8-kilometer) radius of the project site, most likely due to the absence of food and other suitable habitat characteristics.

A study has begun in an effort to determine the impact of boat wakes on seagrasses in Hobe Sound (Martin County, Florida), a manatee feeding area. The study is a cooperative effort of the Beaufort Laboratory of the National Marine Fisheries Service, the Marine Research Laboratory of the Florida Department of Natural Resources (DNR), the FWS Jacksonville Office, and the Sirenia Project. The 3-year study will determine the hydrological factors influencing seagrass productivity, composition, and distribution within Hobe Sound. The Florida DNR will use the data to evaluate the necessity for establishing a "no-wake zone" in Hobe Sound.

This spring, the Jacksonville Office was notified that a Florida Department of Transportation (DOT) project would have an impact on the manatee. The project involved replacement of a 10-foot-wide culvert under South Patrick Road on Merritt Island with two 5-foot-wide culverts. The length of the culvert would be increased from about 40 to 85 feet. Following an on-site meeting with DOT, the Jacksonville Office consulted with the Florida DNR about the advisability of the project. It was decided that, to protect the manatee and eliminate the possibility of injury or death, the old culvert should be replaced with another that is 10 feet wide. This would permit manatees ample room to move through and provide enough air space in times of high water. As of June 4, a final decision had not been made by the Florida DOT to accept this recommendation. No federal funding is involved in the project.

The Jacksonville Office has received a final status survey report on the Florida scrub lizard (*Sceloporus woodi*). The survey was conducted by the Florida Cooperative Fish and Wildlife Research Unit in Gainesville. An attempt was made to visit all remaining scrub sites within the historical range of this endemic Florida species; 529 sites were searched and 359 had scrub lizards. Many historical sites have disappeared because of conversion to citrus groves, housing, or commercial uses. The scrub lizard is nearly extirpated from the Gulf Coast of Florida, and its cen-

tral and east coast scrub habitats have decreased greatly. Secure populations remain in Ocala National Forest, a State park, a State preserve, a National Wildlife Refuge, and several private conservation lands. While the scrub lizard is still widespread, its populations are expected to continue their decline.

Eglin Air Force Base in Walton County, Florida, proposes to extend an existing golf course through Mill Creek, one of five streams that the Endangered Okaloosa darter (*Etheostoma okaloosae*) inhabits. Approximately 90 percent of the darter's range occurs on Eglin Air Force Base. Jacksonville Office biologists met with Air Force personnel this spring to discuss design constraints and actions to minimize impacts to the creek. Okaloosa darters require streams of small to medium size with a moderate to swift current and a clear, sandy substrate. Due to its limited range, the darter is especially vulnerable to habitat destruction. A Section 7 consultation is in progress.

A helicopter survey of northern Georgia cliffs was conducted by the Asheville, North Carolina, Field Office and the U.S. Forest Service to determine the potential for peregrine falcon nesting sites and/or occupancy. Twenty-two cliffs were considered, but only two (in addition to the two already accepted for hacking) offered much potential.

**Region 5** - On March 27 and 28, a cave important to the Endangered Virginia big-eared bat (*Plecotus townsendii virginianus*) was gated to prevent disturbance of bats by unauthorized visitors. The gating project was a combined effort by the FWS (biologists from the Annapolis, Maryland, and Asheville, North Carolina, Field Stations), Cave Conservation Institute, West Virginia Department of Natural Resources/Non-Game Program biologists, and volunteers from Albright College in Reading, Pennsylvania. Located on Monongahela National Forest land in West Virginia, the cave houses the second largest known Endangered big-eared bat maternity colony. This is the first time that an angle iron design (zero air flow restriction) gate has been placed on an Endangered bat maternity colony site. The decision to use this gate design was based on the results of a Patuxent Wildlife Research Center (PWRC) study conducted at this cave, which indicated that the bats would fly through the angle iron bars. The cave also has an alternate entrance available to the bats. The bats' use of the gate will be carefully monitored this summer.

Biologists from the FWS Gloucester Point, Virginia and Annapolis Field Stations, in collaboration with refuge personnel and the PWRC, are conducting a study assessing the presence and impacts of

several types of contaminants on the ecosystem of the Dismal Swamp National Wildlife Refuge and on the Threatened Dismal Swamp shrew (*Sorex longirostris fisheri*). An inactive landfill adjacent to the refuge is suspected as a source of these contaminants, which include the pesticide chlordane. Samples of sediments, fish, and small mammals will be analyzed to determine whether or not any of these toxic substances occur at levels that could pose a threat to the shrew or to other fish and wildlife resources at the refuge.

**Region 6** - Spring 1987 marked the seventh whooping crane migration during which aerial surveys were flown by the FWS Grand Island, Nebraska, Field Office. Fifty-four miles of whooping crane Critical Habitat along the Platte River between Grand Island and Lexington, Nebraska, are flown daily, weather permitting, during spring and fall migrations to determine whooping crane use and site characteristics. The earliest arrival and longest stay for a whooping crane in Nebraska was recorded this spring; a juvenile crane, which became separated from its parents during the 1986 fall migration and spent the winter with sandhill cranes in Oklahoma, was observed in the Platte River Valley for 34 days between March 17 and April 19. During survey flights, 10 riverine roost sites used by the juvenile were identified, and 5 site evaluations were completed.

As part of the Greater Yellowstone Bald Eagle Research Project, a breeding pair of bald eagles is being monitored in Grand Teton National Park, Wyoming. The adult male from the territory was trapped March 1, 1987, and fitted with a radio transmitter. The eagle was tracked until April 14, when it was determined that something was wrong. The researchers were able to capture the bird, which had extensive damage to the basal portion of the upper mandible. It was apparent that the bird had been hit by a small caliber bullet. As a result of the injuries, the male will be euthanized, ending the pair's nesting attempt. The female remains in the area, exhibiting high fidelity to the territory. Within a week of the nest failure, a subadult male and adult male moved into the area. The Greater Yellowstone research group will continue to monitor the long-term outcome of this territory, which has been occupied for the last 20 years.

For the second year, a pair of peregrine falcons is nesting in a box on a ledge near the roof of the Hotel Utah in Salt Lake City, Utah. This year, the female returned with a new, younger mate. Four viable eggs have been found in the nest.

Good news about the black-footed ferrets (*Mustela nigripes*) being held at the Wyoming Game and Fish Department's Sybille, Wyoming, captive breeding facility: a litter of six young ferrets was born

(continued on page 12)

## Regional News

(continued from page 11)

June 6! As of mid-June, all six were gaining weight and appeared healthy. Several other litters are anticipated, and could arrive up through July 4.

This success in the first year of the program is due to the efforts of the Captive Breeding Specialist Group; Dr. Don Kwiatkowski, the biologist assigned to the captive breeding facility; and Dr. Tom Thorne, the Wyoming Game and Fish Department's wildlife veterinarian.

\*\*\*

The Colorado River Fishes Recovery Team met in Las Vegas, Nevada, April 15 - 17, 1987. The meeting was called primarily to revise and update the recovery plans for the Colorado squawfish, bonytail chub (*Gila elegans*), and humpback chub (*Gila cypha*). Completed revisions should be ready for distribution at the end of calendar year 1987. The team believes that drastic measures will be necessary to prevent extinction of the bonytail chub, among them collection of all individuals encountered in the wild for use in captive propagation. It will also be necessary to release their offspring to augment existing populations as soon as possible. The team further recommended listing the razorback sucker (*Xyrauchen texanus*) as an Endangered species throughout the Colorado River Basin.

\*\*\*

**Region 8 (Research)** - Another Aleutian Canada goose (*Branta canadensis leucopareia*) was found dead March 14, 1987, in the migration staging area near Crescent City, California. The FWS National

### 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	60	16	141	4	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	23	6	0	83	45
Snails	3	0	1	5	0	0	9	7
Clams	28	0	2	0	0	0	30	21
Crustaceans	5	0	0	1	0	0	6	1
Insects	8	0	0	5	0	0	13	12
Plants	121	6	1	26	3	2	159	56
<b>TOTAL</b>	<b>303</b>	<b>52</b>	<b>466</b>	<b>82</b>	<b>15</b>	<b>37</b>	<b>955</b>	<b>247**</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: 213  
 Number of species currently proposed for listing: 22 animals  
 32 plants

Number of Species with Critical Habitats determined: 97  
 Number of Cooperative Agreements signed with States: 47 fish & wildlife  
 27 plants

May 31, 1987

Wildlife Health Center's necropsy found 17 lead shot pellets in the gizzard. A tentative diagnosis of lead poisoning was confirmed

by liver lead analysis in early April. This is the third lead-poisoned Aleutian Canada goose to be diagnosed this season.

May-June 1987

Vol. XII No. 5-6

# ENDANGERED SPECIES

## Technical Bulletin

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

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