

ENDANGERED SPECIES

Technical Bulletin

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

Protection for 28 Animals and Plants Proposed During January-June 1992

A total of 28 taxa — 12 animals and 16 plants — were proposed by the Fish and Wildlife Service from January through June 1992 for listing under the Endangered Species Act. If the proposed rules become final, protection will be extended to the following:

Spectacled Eider (*Somateria fischeri*)

The spectacled, or Fischer's, eider (also known as quageq in the Yupik language and quvaasuk in Inupiat) is a large marine duck native to the Arctic and northern Pacific Oceans. Adult males are distinguished by a green head, bright orange bill, and large white eye patch enclosed by a black "spectacle." Females are brown with a less distinct, brown spectacle.

Spectacled eiders nest in coastal areas of the United States (Alaska) and Russia (Siberia). Within the U.S., the species' primary breeding range is along the Yukon-Kuskokwim (Y-K) Delta. Twenty years ago, the Y-K population was estimated to number 50,000 to 70,000 pairs. By 1991, however, only about 2,700 remained. No recent information is available on the eider's status in Siberia, although a 1967 report noted a decline within the center of the breeding range. The Service proposed in the May 8, 1992, *Federal Register* to list the spectacled eider as a Threatened species.

Unfortunately, the reasons for the eider's decline are unknown. Loss of nesting habitat is not believed to be a factor. Although the species has apparently been taken in low numbers for sub-

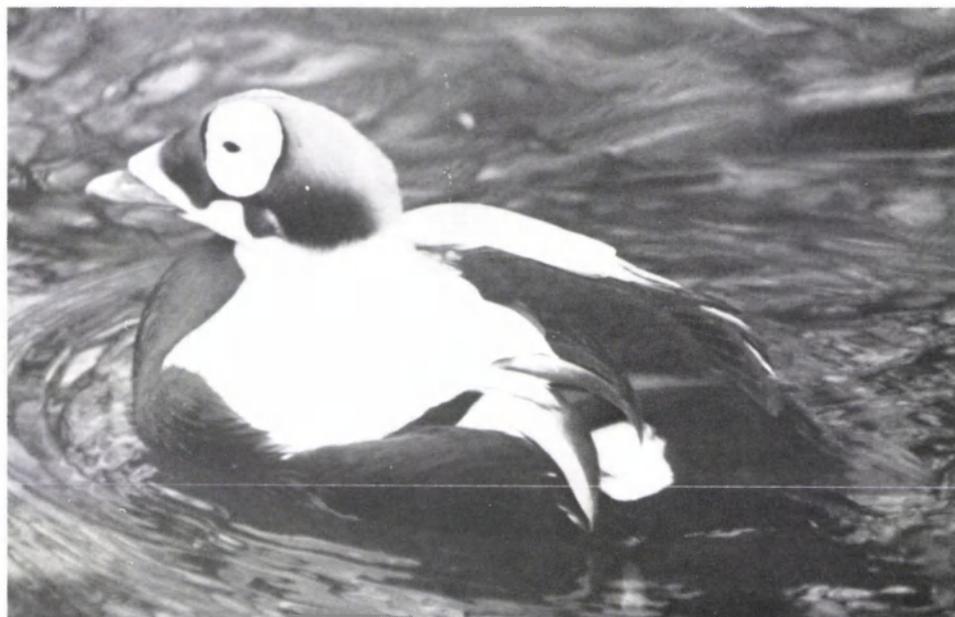


photo by Glen Smart

The large white eye patch and black "spectacle," markings that are most evident in males, inspire the name for this marine duck.

sistence, it is unlikely that this had a significant impact on historically large populations. Sport hunting of spectacled eiders, always minimal, was closed in 1991. The listing petition cited oil spills, other forms of water pollution, the effects of large-scale fishing fleets, and overharvest as potential factors affecting the spectacled eider. Determining the species' winter range and the cause(s) for the population decline will be priorities for the Service.

Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The Pacific coast population of the western snowy plover, a small, pale colored shorebird, was proposed in the January 14 *Federal Register* for listing as

Threatened. This coastal population, which nests along Washington, Oregon, California, and northern Mexico (Baja Peninsula), has declined significantly in distribution and numbers. The bird's interior population, found along inland lakes and rivers, is in better condition and is not included in the listing proposal.

Sand spits, unvegetated beaches, and flat, open areas around estuaries are the preferred nesting habitat for the coastal population of the western snowy plover. In the United States, these birds historically were known to nest at 87 sites: 5 in Washington, 29 in Oregon, and 53 in California. According to the most recent surveys, however, plovers apparently now nest at only 28 sites: 2 in Washington, 6

(continued on next page 6)



Regional News

Regional endangered species staffers have reported the following news:

Region 1 — Success in the effort to breed captive California condors

(*Gymnogyps californianus*) for release into the wild continues. On May 27, the last condor chick of the 1992 breeding season hatched, which brings the number pro-

duced this year by the San Diego Wild Animal Park and Los Angeles Zoo captive breeding flocks to 12. The Fish and Wildlife Service (Service) expects to release six of these chicks into the wild next winter to join the two young California condors that were released January 14, 1992 (see *Bulletin* Vol. XVI, Nos. 9-12). Biologists are pleased with how well these two condors are adapting to life in the wild. When the next release takes place, the two young Andean condors (*Vultur gyphus*) released in January as companions for the California condor pair will be recaptured and taken to Colombia for release into their native South American habitat.

There are now 64 California condors, 62 in the captive breeding flocks and 2 in the wild.

* * *

Region 1 biologists have been working with the Service's Region 8 Hawaii Research Group staff to survey the 'alala, or Hawaiian crow (*Corvus hawaiiensis*), population. Only 12 birds are believed to remain in the wild, all on the Kona or west side of the island of Hawai'i (the "Big Island"). Three active nests were located this year. Unfortunately, two have been abandoned, apparently due to predation by non-native rats, and the birds did not renest. The third pair produced one chick, which took its first sustained flight on June 10. This fledgling is healthy and has begun to forage on its own. Predator trapping in the vicinity to protect the birds has been increased.

There are also 10 adult 'alala at the Olinda captive breeding facility on Maui. Two of the three eggs incubated this year failed due to lethal malpositions. The third egg was watched around-the-clock by the Olinda staff. After it was determined that this chick also was malpositioned, hatching was assisted by hand. The bird finally emerged from its shell on May 27 after a 33-hour effort. It is now healthy and growing. Six of the 10 adults in the Olinda population hatched in captive breeding facilities, and the new chick represents a third generation captive hatch.

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U.S. Fish and Wildlife Service Regions

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

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Regional News

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Region 2 — A total of 131 whooping cranes (*Grus americana*), including 8 juveniles, migrated northward from Texas this April. Only one crane, an adult male, was lost during the winter at Aransas National Wildlife Refuge. Last year, 9 to 11 birds disappeared while overwintering at the refuge.

Canadian biologist Brian Johns reported this spring that water conditions at Canada's Wood Buffalo National Park had improved from those of the same time in 1991. The early summer appears favorable for chick rearing, in contrast to the conditions during last summer's drought.

* * *

The whooping crane captive breeding flocks are experiencing a record year for egg production. At the Service's Patuxent Wildlife Research Center in Laurel, Maryland, 8 pairs produced 47 eggs, compared to 21 eggs in 1991. Six of the pairs are young birds producing through natural copulation. Although a number of the eggs were infertile, eight chicks have hatched there. At the International Crane Foundation in Baraboo, Wisconsin, 14 eggs were laid by 3 pairs. By late May, six had hatched.

* * *

A Whooping Crane Population Viability Workshop was held last August at Fossil Rim Foundation near Glen Rose, Texas. Dr. Ulyses S. Seal of the Captive Breeding Specialists Group, International Union for Conservation of Nature and Natural Resources, chaired the 3-day session. Most aspects of whooping crane recovery and management were discussed but emphasis was on population modeling and genetic management.

A draft whooping crane studbook was completed before the meeting by Claire Mirande and Cherri Snowbank (International Crane Foundation), Dr. George Gee and Jane Nicolich (Patuxent Wildlife Research Center), and Ernie Kuyt (Canadian Wildlife Service). The studbook will provide the basis for future genetic management of the captive flocks. It also identified unique genetic qualities of the

experimental Rocky Mountain cross-fostered population, and some individuals in the Aransas/Wood Buffalo National Park population (AWP).

The AWP was modelled to predict continued egg removal, effects of inbreeding depression, delay of breeding to age 6 years, and various catastrophe frequencies. Extinction became a probability (28 to 62 percent of the simulations) only when the annual mortality rate was also increased to 50 percent. Modelling of the planned releases in Florida at various annual release numbers and release frequencies indicated zero extinction probabilities if the flock experienced a reproductive rate and mortality equivalent to that of the AWP. Variation in the release numbers and interval made little difference in the time interval until the population reached 100 birds.

Even with females breeding at age 5 years, and no effect of inbreeding depression, the modelling simulations indicated that the Rocky Mountain whooping crane population would become extinct.

* * *

The first combined meeting of the U.S. and Canadian Whooping Crane Recovery Teams was held last October at Regina, Canada. Both teams are updating their recovery plans. These revisions are expected to be completed this year. Each plan is specific to recovery actions within the boundaries of its respective nation. The meeting site was chosen because most members were also participants in the Sixth North American Crane Workshop, which began after the recovery team meetings.

One topic of discussion was what should be done with cranes remaining in the Rocky Mountain cross-fostered population. Project personnel are concentrating on completing their final report on the 17-year experiment. The recovery teams recommended capturing about two-thirds of the birds for future use in captive propagation, and to add their genetic features to the captive flocks. The teams also recommended that birds which summer at Grays Lake, Idaho, be left in the wild for potential use in another experiment. Other Regions of the

Service, State agencies, and other interested groups have been asked to comment on the teams' recommendations before a proposal is made to Director Turner.

* * *

Region 2 issued its first incidental take permit under Section 10(a) of the Endangered Species Act in February 1992. The permit involved the Bee Creek Cave harvestman (*Texella reddelli*) and the Tooth Cave ground beetle (*Rhadine persephone*), troglobites that are restricted to Travis and Williamson Counties, Texas. After 2 years of data gathering, Melvin Simon and Associates of Indianapolis, Indiana, obtained a permit for the construction of a regional shopping mall on a 116-acre tract, resulting in the loss of 2 caves that supported these Endangered invertebrates.

As part of their habitat conservation plan, Melvin Simon and Associates acquired 232 acres of habitat containing 4 caves, then conveyed the land to the Texas Parks and Wildlife Department. The developers agreed to conduct a 10-year study on the environment of 3 of these caves and a 1-year study on cave cricket food habits and populations. In addition, they will control fire ants over the 30-year life of the permit. These non-native ants are a threat to the native cave invertebrates.

* * *

Eighteen thick-billed parrots (*Rhynchopsitta pachyrhyncha*) were released in the Chiricahua Mountains of southeastern Arizona late last year to join others that have been released there since 1986. The released birds came from a variety of sources and represented several age classes. Eight older birds, presumed to have been taken from the wild by smugglers, had been forfeited to the government after being seized by Federal law enforcement officers. The younger birds had been captive-hatched and reared by cooperators. Because experience with previous releases indicated that weak flight muscles and low energy levels make parrots easy prey, the birds were conditioned prior to release. To help them

(continued on page 10)

The Boulder Darter: A Conservation Challenge

Noel M. Burkhead and James D. Williams¹

The boulder darter (*Etheostoma wapiti*) is a small-sized member of the perch family. In general, darters are a diverse group of bottom-dwelling fishes (about 140 species in the United States) that typically flourish in clean, flowing creeks and rivers. Unfortunately, when darters are brought to the attention of the public, the news too frequently is about the decline or demise of a species. Such is the case for this small fish.

The boulder darter was listed by the Fish and Wildlife Service as an Endangered species in 1988. Its only surviving population is found in the Elk River, a large tributary system of the Tennessee River in southern Tennessee and northern Alabama. The primary reasons it needed listing protection were its reduced distribution and the vulnerability of its remaining habitat. The boulder darter is currently restricted to about 6.3 miles (10.1 kilometers) of the main channel of the lower Elk River and a few of its larger tributaries. However, the species is not distributed continuously within this range, but is found at only six sites in the main channel and three sites in two of the tributaries. Historically, the boulder darter also lived in Shoal Creek, a tributary of the Tennessee River in northern Alabama, but that population has been extirpated.

Extinction of the boulder darter may follow in the next 10 to 20 years unless some way can be found to increase the number and size of the populations that still survive. This fish shares some attributes with the Maryland darter (*Etheostoma sellare*), a species that some experts now believe to be extinct.

Reasons for Decline

Many human-caused factors contributed to the decline of the boulder darter. In the Elk River, the principal impacts were impoundment of the upper river section by Tims Ford Reservoir; thermal alteration of the tailwaters below Tims



This male boulder is guarding its nest site. The eggs are present at the right margin of the nest cavity.

Ford Dam from warm to cold water; impoundment of the lower Elk River by Wheeler Reservoir; fluctuating water levels from power generation at Tims Ford Reservoir; industrial, municipal, and agricultural pollution; and extensive siltation from soil erosion. The primary reason for the demise of the boulder darter in Shoal Creek was the impoundment of the lower creek by Wilson Reservoir, siltation from agricultural erosion, and pollution from upstream municipalities in Alabama. Other populations of the boulder darter probably existed in the Tennessee River once but were extirpated by impoundments before they were detected.

These powerful forces degrading the Elk River ecosystem have reduced the boulder darter population to small, isolated subpopulations, an alarmingly familiar pattern in southeastern rare fishes (some of which were relatively common only 20 to 30 years ago). When the population of a species becomes highly fragmented, the species loses its ability to respond to the extremes of nature. For example, it may no longer be able to survive extended periods of severe weather, disease, or dramatic fluctuations in food sources.

The loss of biological adaptability in a species directly arises from the loss of its genetic diversity, which is a consequence of the species losing segments of its total population.

The spotty occurrence of the boulder darter in the Elk River results in part from the rarity of its preferred habitat. As its common name suggests, the boulder darter lives among boulders. However, it is not found among boulders anywhere in the river bed; the location of the boulders is important. The boulders must occur in water 2 to 4 feet (0.6 to 1.2 meters) in depth. Also, the boulders must occur in flowing water that is not too swift, such as in riffles or rapids, and not too slow, as in slightly flowing pools.

Most of the Elk River between the reaches affected by impoundment consists of long, heavily silted pools that have little or no boulder substrate. The relatively few riffles and runs are predominantly floored with gravel and rubble substrates. At two of the six sites that harbor boulder darters, the boulders are in fact parts from old collapsed structures, a stone bridge and a spillway dam. The

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Boulder Darter

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survival of the boulder darter is amazing considering the rarity of its preferred habitat and the severe and chronic degradation of the Elk River.

Laboratory Observations

Biologists have long recognized the critical importance of knowing the reproductive biology of any imperiled species, especially for developing conservation measures to protect and recover the species. Until recently, however, virtually nothing was known about the life history of the boulder darter. Our first goal in research on this species was to observe its spawning behavior and to identify the area(s) of the river that served as spawning habitat. Unfortunately, observing boulder darter spawning behavior was not possible in the Elk River because of the water's consistent turbidity. Further, the river below Tims Ford Dam is subject to significant water level fluctuations resulting from power generation at the dam. In order to overcome the obstacles to studying the darter in its natural environment, 10 darters were captured, transported to Gainesville, Florida, and placed in an artificial stream.

The artificial stream is a 4 by 8 foot (1.2 by 2.4 m) plexiglass aquarium in which current is generated by an electric trolling motor. We mimicked important aspects of the boulder darter's habitat in the artificial stream, notably flow, temperature, photoperiod, and substrate composition. The boulder darters spawned in May and June 1991, yielding the first observations of reproduction for this Endangered species. What we learned in this short period provided important insight into the inherent frailties of this darter at the critical point of creating the next generation.

Reproductive Habitat

The boulder darter spawns in the same habitat in which it normally lives: boulders in flowing water with a velocity of about 1 to 2 feet (0.3 to 0.6 m) per second. The boulder darter belongs to a reproductive guild of darters known as egg clusterers because the eggs are laid in clusters in spaces beneath rocks. The male darter remains at the nest site and aggressively guards the eggs against intruders.

The male boulder darter is picky about the spaces he selects for nest cavities. In fact, the nesting sites must have specific attributes: 1) the space must be between two boulders, not between a boulder and

gravel or a boulder and pieces of rubble, although a space created between a boulder and bedrock might be acceptable; 2) it must have a wedge-shaped configuration, with the two boulders touching at a relative narrow angle, creating a space into which the female wedges her eggs; 3) the site must have current flowing across it; 4) the cavity must be roughly horizontal (no vertical or nearly vertical spaces were selected); and 5) the boulders must not only be in the correct depth and current ranges, but they must also occur in a certain configuration relative to the current and to each other.

The critical importance of current flow across the nest space was revealed when one trolling motor failed during a weekend. All of the eggs in that nest died. Current is obviously important for oxygenating the eggs and possibly for keeping the egg surface swept free of particulate debris and silt. This observation also suggests that the persistent siltation of the Elk River must be very limiting to the survival of egg and possibly larval life stages of the boulder darter. It is well known that silt will smother fish eggs, and species such as the boulder darter that spawn on the bottom are the most vulnerable.

A critical insight gleaned from these observations is that fluctuating water levels from power generation (2 to 3 feet changes in depth) must significantly alter the specific habitat features (depth and water velocity) of the nest cavity the male selected for spawning. It is quite possible that some boulder darter nests may be left stranded out of the water when water levels drop during periods of decreased power generation. Conversely, if a male spawned in a nest cavity during low water levels, how would the survival of the eggs be affected during high water levels? It is possible that fluctuating water levels may be reducing, perhaps significantly, the reproductive success of this Endangered species.

What will be the fate of the boulder darter? At this time, we simply don't know. State and Federal agencies will work together and attempt to patch the

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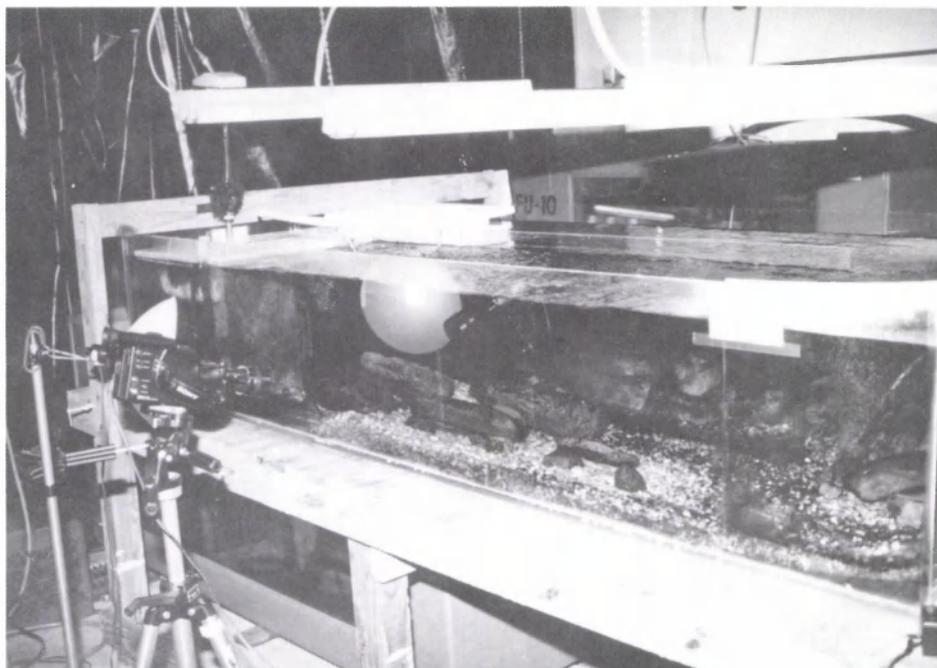


photo by Noel Burkhead

An artificial stream was used to mimic important habitat features of the boulder darter. The video camera was set up to record behavior.

Boulder Darter

(continued from page 5)

ecosystem wounds created by the hand of the human species. Perhaps some ways can be found to create new habitat. Artificial propagation may also play an important role in the recovery of this imperiled fish. One thing is fairly certain: if nothing is done, the boulder darter, like the Maryland darter, will slip from the face of the earth.

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Listing Proposals

(continued from page 1)

in Oregon, and 20 in California. In addition to the loss of nesting habitat, declines in the overall breeding population have been documented. Fewer than 1,500 birds are estimated to remain within the three States. The status of western snowy plovers along the Baja coast is not fully known, but the birds there are probably subject to the same threats facing those in the U.S.

Poor reproductive success has become a serious problem for the coastal population. A primary cause is human disturbance during the plover's nesting season. The loss of plover breeding sites to residential, industrial, and recreational development is another major factor in the bird's decline. Because plovers need open areas in which to nest, the encroachment of European beachgrass (*Ammophila arenaria*), a non-native plant introduced to stabilize dunes, further limits the amount of suitable breeding habitat. Due to the reduced numbers and range, plover populations also are increasingly vulnerable to both native and introduced predators.

Many of the plover's remaining breeding sites are on lands managed by Federal agencies. In the limited instances where human disturbance of nesting plovers has been precluded, either by area closures or by natural events, reproductive success has improved. However, few measures have been implemented so far to protect critical nesting areas.



photo by B. "Moose" Peterson/WRRP

Peninsular bighorn sheep

Desert Bighorn Sheep (*Ovis canadensis*) — Peninsular Ranges Population

The Peninsular Ranges population of desert bighorn sheep is endemic to seven mountain ranges that run from the vicinity of Palm Springs, California, south into Baja California, Mexico. Peninsular bighorns are similar in appearance to other desert bighorns, with pale brown pelage and massive, coiled horns (in males).

The Peninsular bighorn was once described as having the most dense and

stable population of all bighorn sheep in California. By 1979, however, only an estimated 1,171 Peninsular bighorns remained, and there are now fewer than 400 in the U.S. portion of the range. The Service estimates that 1,500 to 2,500 still occur in Mexico.

Among the factors leading to the Peninsular bighorn's decline are habitat loss and degradation; competition with domestic and feral livestock for forage and water; and human disturbance. The main threat now, however, is disease.

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photo by B. "Moose" Peterson/WRRP

western snowy plover

Listing Proposals

(continued from previous page)

The bighorns are susceptible to a variety of bacterial, fungal, and viral infections, and may be experiencing an immune system deficiency caused by ecological stress. The survival rate for lambs is too low throughout most of the range to maintain even the current population size. In the northern Santa Rosa Mountains, for example, no lambs survived in 1990. Because of the serious threat posed by disease, as well as the population's reduced range and numbers, the Service proposed on May 8 to list the Peninsular bighorn as Endangered.

The desert bighorn has long been one of the most highly sought big game species in North America. There is no longer any legal sport hunting of Peninsular bighorns in either the U.S. or Mexico, but poaching is known to occur.

Most of the Peninsular bighorn's remaining U.S. range is in a checkerboard pattern of public/private ownership. If the population is listed, the Bureau of Land Management and the Forest Service will be required to ensure that grazing programs they administer do not jeopardize its survival.

Five California Freshwater Shrimp

On May 8, the Fish and Wildlife Service proposed to list the following species of freshwater shrimp in California as Endangered:

- Conservancy fairy shrimp (*Branchinecta conservatio*)
- longhorn fairy shrimp (*Branchinecta longiantenna*)
- vernal pool fairy shrimp (*Branchinecta lynchi*)
- California linderiella (*Linderiella occidentalis*)
- vernal pool tadpole shrimp (*Lepidurus packardii*)

These small crustaceans are endemic to ephemeral wetlands, such as vernal pools and swales, in the Central Valley, Coast Ranges, and a limited number of sites in the Transverse Range and Santa Rosa Plateau. Their scattered distribution within

vernal pool complexes indicates that they may have very specific water chemistry requirements. All five species produce eggs that can withstand heat, cold, and prolonged dessication. The eggs hatch when the vernal pools and swales fill with rainwater, and hatchlings develop rapidly into adults in order to produce eggs for the next generation.

The unusual habitat upon which these animals depend is threatened by a variety of activities, primarily urban development, water management projects, conversion to agricultural use, off-road vehicle (ORV) use, and disposal of garbage. In the Central Valley alone, approximately 90 percent of the historic vernal pool habitat had been destroyed by 1970, and the loss continues. Much of what remains is being affected indirectly by activities in the surrounding watershed.

Under section 404 of the Clean Water Act, the discharge of fill material into wetlands — including the swales and vernal pools occupied by these shrimp — is regulated by the U.S. Army Corps of Engineers. Accordingly, if the listing proposal is made final, the Corps will be responsible for consulting with the Service before granting any fill permits that may affect the shrimp.

Karner Blue Butterfly (*Lycaeides melissa samuelis*)

Although currently classified as a subspecies of the Melissa blue butterfly, the Karner is considered by some lepidopterists as a separate species. Karner blues have a wingspan of 22 to 32 millimeters (0.87 to 1.26 inches). Males are silvery or dark blue with narrow black margins on the backs of their wings, and females are grayish-brown. On the ventral surface, both sexes are slate gray with orange bands and black spots circled by white.

Historically, the Karner blue occurred at scattered sites within a band extending from eastern Minnesota, across portions of Wisconsin, Illinois, Indiana, Michigan, Ohio, Canada (Ontario), Pennsylvania, New York, Massachusetts, and New Hampshire. This butterfly is found primarily at grassy openings in pine barrens

and oak savannas characterized by the presence of wild lupine (*Lupinus perennis*), the only known plant upon which Karner blue larvae feed. Due to the widespread loss of suitable habitat, the Service proposed on January 21 to list the Karner blue as Endangered.

Over the past 100 years, the butterfly's numbers apparently have declined approximately 99 percent. More than 90 percent of this decline has occurred in the last 10 to 15 years. The subspecies is now believed to be extirpated from Illinois, Massachusetts, Pennsylvania, Ohio, and Ontario. Some Karner blue sites have been destroyed directly by urban, agricultural, and silvicultural development. In other areas, vegetative succession has crowded out the lupine, upon which the Karner blue depends.

Carolina Heelsplitter (*Lasmigona decorata*)

A freshwater mussel, this species inhabits cool, slow-moving, small- to medium-sized streams and rivers. Historically, the Carolina heelsplitter was fairly widespread in the Saluda and Pee Dee River systems in South Carolina and the Catawba and Pee Dee River systems in North Carolina. Due to habitat modification and degradation, it now survives in only a small portion of its former range, and the Service has proposed to list this mollusk as Endangered (E.R. 5/26/92).

The decline of the Carolina heelsplitter is attributed to several factors, including siltation resulting from poor agricultural, forestry, and construction practices; runoff and discharge of municipal, industrial, and agricultural pollutants; and habitat alteration associated with impoundments, channelization, dredging, and sand mining. This species is known to survive in only a few short reaches of Waxhaw Creek (Catawba River system) and Goose Creek (Pee Dee River system) in North Carolina and the Lynches River (Pee Dee River system) and Flat Creek (a Lynches River tributary) in South Carolina. Many of the activities that led to its decline threaten the remaining populations.

(continued on page 8)

Listing Proposals

(continued from page 7)

Clubshell (*Pleurobema clava*) and Northern Riffleshell (*Epioblasma torolusa rangiana*)

Two other freshwater mussels, the clubshell and northern riffleshell, were proposed June 18 for listing as Endangered. Both were once widely distributed but have been eliminated from more than 95 percent of their historical range.

The northern riffleshell formerly occurred in the tributaries of the Ohio River, western Lake Erie, and the St. Clair and Detroit Rivers. It is now extirpated from Illinois, Indiana, West Virginia, and Ontario, Canada. The remaining populations are limited to short reaches of six streams in Kentucky, Michigan, Ohio, and Pennsylvania. The clubshell was widespread in the Ohio River basin and tributaries of western Lake Erie in nine States, but it has disappeared from Alabama, Illinois, and Tennessee. This species now occurs only in segments of 12 streams in Indiana, Kentucky, Michigan, Ohio, Pennsylvania, and West Virginia.

The clubshell and northern riffleshell both depend on high quality stream habitat with clean sand and gravel substrates swept by steady currents. Their decline resulted from the same factors affecting the Carolina heelsplitter: water quality degradation and direct habitat loss due to impoundments and dredging. To make matters worse, a new danger has surfaced. The zebra mussel (*Dreissena polymorpha*), a prolific pest species accidentally introduced into the Great Lakes from Europe in the 1980s, poses a severe threat to the entire native mussel fauna of the Great Lakes and Mississippi River drainages through competition for living space, food, and survival of glochidea (mussel larvae). (See feature in *Bulletin* Vol. XV, No. 11.)

Cave Crayfish

Cambarus aculabrum is a small, cave-dwelling crayfish distinguished from related species by its reduced eyes and total lack of pigmentation. It is endemic to

two sites, Bear Hollow and Logan Caves, in Benton County, Arkansas. Water quality degradation is a serious threat to this aquatic crustacean, and the Service proposed May 26 to list it as Endangered.

Both Bear Hollow and Logan Caves are limestone solution caverns that contain streams fed by surface drainage. Run-off from residential and agricultural development is entering the groundwater and threatens to contaminate *C. aculabrum* habitat. If the crayfish is listed, Federal agencies with regulatory authority over activities that may affect this species will be required to consult with the Service on ways to avoid jeopardy.



The Pima pineapple cactus is an attractive plant that grows up to 7 inches (17.5 centimeters) tall and bears silky yellow flowers. Each spine cluster has one strong, straw-colored, hooked central spine and six radial spines.

Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*)

The Pima pineapple cactus occurs over a relatively large area, including parts of southern Arizona and northern Sonora, Mexico, but it is distributed very sparsely within its range. This variety of cactus is believed to be declining due to habitat degradation and destruction from livestock overgrazing, urbanization, mining, agricultural development, road construction, ORV use, and certain range-management activities. The Service estimates that up to 50 percent of the historical habitat has already been lost. Illegal collecting of this cactus also is a documented

threat. For these reasons, the Service proposed April 20 to list the Pima pineapple cactus as Endangered.

Some Pima pineapple cacti occur on public lands administered by the Bureau of Land Management, Forest Service (Coronado National Forest), and Fish and Wildlife Service (Buenos Aires National Wildlife Refuge). If this plant is listed, all three agencies will be responsible for ensuring that their management activities are not likely to jeopardize its survival.

Puerto Rico Cactus

A very different species of cactus was proposed for listing as Endangered on May 20. *Leptocereus grantianus*, which has no common name, is a sprawling or suberect cactus with elongated stems that reach to just over 6 feet (2 meters) in length and about 2 inches (5 centimeters) in width. This species is nearly spineless and produces green and cream-colored nocturnal flowers.

Leptocereus grantianus is a very rare cactus endemic to Culebra, an island located just off the northeastern corner of Puerto Rico. Only one population of about 50 individuals is known to exist. It grows in a dry thicket along the coast on a rocky slope. Culebra is subject to intense pressure for various types of development, and the sole *L. grantianus* colony is currently proposed as a site for the construction of housing projects.

Seven Desert Milk-vetch Taxa

Seven taxa of milk-vetch in the genus *Astragalus*, plants belonging to the pea family (Fabaceae), were proposed May 8 for protection as Endangered or Threatened species. The following five taxa were proposed for listing as Endangered:

- Lane County milk-vetch (*A. jaege-rianus*)
- Coachella Valley milk-vetch (*A. lentiginosus* var. *coachellae*)
- Fish Slough milk-vetch (*A. lentiginosus* var. *piscinensis*)
- Peirson's milk-vetch (*A. magdalenae* var. *peirsonii*) and

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Listing Proposals

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- triple-ribbed milk-vetch (*A. tricarinatus*).

The other two are not in as great a degree of danger and were therefore proposed for listing as Threatened:

- shining milk-vetch (*A. lentiginosus* var. *micans*) and

- Sodaville milk-vetch (*A. lentiginosus* var. *sesquimetrallis*).

All seven of these perennials are highly endemic to certain sites within the Mojave and Sonoran Deserts in California and Baja California (Mexico), and the Great Basin Desert in Nevada. Their sparse distribution reflects adaptation to habitats with specific soil or moisture conditions. Three taxa are known to occur at only one location, and three more are found at only two or three sites. One plant, the triple-ribbed milk-vetch, was recently observed for the first time in 3 years. Six of the seven taxa occur entirely or primarily on Federal lands administered by the Bureau of Land Management (BLM). The Fish Slough milk-vetch, however, occurs primarily on land owned by the Los Angeles Department of Water and Power, with a smaller portion of the population found on BLM land.

The threats to the survival of these plants are varied and include one or more of the following: grazing and trampling by livestock and feral burros; ORV use; trampling by other recreational users; military training exercises; competition from non-native plants; urbanization; construction related to fisheries development; and activities that alter soil hydrology.

The BLM has taken some steps to reduce the habitat damage caused by off-road vehicles and grazing, but these measures are not enough to ensure the conservation of the seven desert milk-vetch taxa.

Three Florida Rosemary Mints

Three species of plants in the genus *Conradina* were proposed May 20 for listing as Endangered. *Conradina*, or minty rosemary, is a genus of minty aro-

matic shrubs in the family Lamiaceae that resemble the true rosemary (*Rosmarinus officinalis*), an herb native to the Mediterranean region. The three minty rosemaries recently proposed for listing are endemic to Florida.

As its name implies, the Apalachicola rosemary (*C. glabra*) occurs near the Apalachicola River in northern Florida. This very narrowly distributed species is threatened by habitat modification due to certain forestry and roadside right-of-way maintenance practices. The short-leaved rosemary (*C. brevifolia*) is restricted to dry scrub vegetation in central Florida's Lake Wales Ridge, an area with many endemic species that is being destroyed by agricultural and residential development. The Etonia rosemary (*C. etonia*), which occurs near Etonia Creek in Putnam County, also is vulnerable to residential development.

The State of Florida and The Nature Conservancy are engaged in land conservation programs to purchase some of the remaining pockets of Florida sand scrub habitat. This effort is being carried out in coordination with the Service, which has proposed the establishment of a Lake Wales Ridge National Wildlife Refuge. Some *C. brevifolia* sites are within the proposed system of preserves. The other two rosemary mint species occur on privately owned land.

Seabeach Amaranth (*Amaranthus pumilus*)

An annual herb in the family Amaranthaceae, the seabeach amaranth can form a clump of a hundred or more branches and sprawl up to about 3 feet (1 meter) in diameter. The stems of this attractive plant are fleshy and bright pink or red. This species is endemic to Atlantic coastal plain beaches, occurring mainly at the accreting ends of barrier islands and on spits. It cannot tolerate competition with other plants, and does not survive where the dynamic nature of its habitat is altered by beach stabilization projects. It often shares the habitat used for nesting by plovers, terns, and other colonial shorebirds.

The seabeach amaranth has been eliminated from two-thirds of its original nine-State range. It no longer occurs in Massachusetts, Rhode Island, New Jersey, Delaware, Maryland, or Virginia. The 41 populations known to have disappeared were probably lost to habitat damage resulting from "hard" beach stabilization structures (e.g., seawalls, rip rap), storm-related erosion, and heavy summer beach use of ORVs. Webworms also have attacked some colonies. These threats continue to face the 55 known populations that remain in the States of New York, North Carolina, and South Carolina. Most of these populations are small and tenuous. For these reasons, the Service has proposed to list the seabeach amaranth as Threatened (E.R. 5/26/92).

Other amaranth species have been cultivated as food in North, Central, and South America for thousands of years, and they are still grown as an important crop in temperate and tropical climates throughout the world. Amaranth seeds have a high nutritional value, and are rich in several amino acids that are often lacking in diets that include little meat protein. The seabeach amaranth is being investigated by the U.S. Department of Agriculture, as well as several universities and private institutes, for its potential use in crop development and improvement. Its favorable traits of salt tolerance and large seeds could be of commercial value if combined with other desirable crop traits. The seabeach amaranth is also valuable as a sand binder. A single large plant is capable of creating a dune up to about 2 feet (60 cm) high containing 70 to 105 cubic feet (2 to 3 cubic meters) of sand.

Okeechobee Gourd (*Cucurbita okeechobeensis*)

This plant, which is native to the south shore of Lake Okeechobee in southern Florida, is an annual in the family Cucurbitaceae. It is a climbing vine with large, heart-shaped leaves, cream-colored, funnel-shaped flowers, and round gourds 3 to 4 inches (7 to 9 cm) in diameter.

(continued on page 10)

Listing Proposals

(continued from page 9)

The vines trellis themselves on available shrubs, historically pond apple but now usually elderberry or Brazilian pepper. The gourds have been described as hanging "like Christmas ornaments."

Although the bitter flesh of the Okeechobee gourd is poisonous, the seeds are edible and nutritious, and the flesh has detergent properties. This species also is resistant to powdery mildew and at least five crop viruses. It contains germplasm that can be introduced into commercially valuable crops to improve their disease resistance.

Until the 1920's, the species was abundant in swampy pond apple forests along the south shore of Lake Okeechobee. However, at least 95 percent of its original habitat was destroyed by agricultural development. The remaining habitat is vulnerable to further development, herbicide use, adverse changes in water level man-

agement, and the spread of non-native plants. Because of these threats, the Service has proposed to list the Okeechobee gourd as Endangered (F.R. 5/20/92).

Godfrey's Butterwort (*Pinguicula ionantha*)

A carnivorous plant in the family Lentibulariaceae, Godfrey's butterwort produces a rosette of fleshy leaves covered with short, glandular hairs that trap insect prey. The flowers are pale violet to white. This plant has been reported from only 20 sites within 4 counties in the Apalachicola region of the Florida panhandle. Much of the species' remaining habitat is on the Apalachicola National Forest.

Godfrey's butterwort inhabits bogs and seasonally wet depressions in grassy pine flatwoods and savannas. The open habitat this species needs historically was maintained by frequent, but low intensity, fires. With fire suppression, the

plant's habitat is vulnerable to encroachment by evergreen shrubs. The resulting thickets eliminate grasses and perennial herbs, including Godfrey's butterwort. This species also is threatened by shading when its open native habitat is converted to pine plantations. Because of its dependence on wetland habitat, drainage is another danger. On May 20, the Service proposed to list Godfrey's butterwort as Threatened.

The unusual nature of carnivorous plants often makes them the targets of commercial and private collectors. During the 1970's, Godfrey's butterwort was among a number of native carnivorous plants avidly collected by hobbyists. Collection of this species probably still occurs, and a comment on the listing proposal stated that the species has been offered for sale recently, but the extent of trade appears to be small.

Regional News

(continued from page 3)

learn natural food sources, they were given branches with pine cones attached. Thick-bills feed primarily on conifer seeds and, to a lesser extent, on acorns and juniper berries. To gain strength, the parrots were subjected to rigorous flight conditioning.

In the initial post-release period, five parrots were killed by predators (hawks), two died of starvation, one died of unknown causes, radio contact was lost with one, and one was recaptured because it failed to flock with the others. At last report, the other eight from this release were being offered supplemental pine cones at the release site and were doing well. An additional nine captive-reared birds are being raised for wild release later this year.

* * *

Region 4 — The known range of the Louisiana pearlshell (*Margaritifera hembeli*) has expanded into the Red River drainage in Louisiana. When this mussel was listed in 1988 as Endangered, its known range was restricted to the Bayou Boeuf drainage in Rapides Parish,

Louisiana. The Bayou Boeuf drainage is south of the Red River drainage and enters the Gulf of Mexico in Vermilion Bay. The Red River flows into the Mississippi River.

Although the two systems are normally separate, there is a possible connection between the tributaries of Bayou Rapides, of the Red River drainage, and Bayou Boeuf during high flood flows. These flows may enable host fish to expand the pearlshell's range into these drainages. Based upon a report of the Louisiana pearlshell from Moccasin Branch in the Red River drainage, biologists from the U.S. Fish and Wildlife Service's (Service) Jackson Field Office, Louisiana Department of Wildlife and Fisheries, and Kisatche National Forest (Forest) conducted a field survey of streams in and adjacent to the Catahoula District of the Forest last fall. Twelve populations of the Louisiana pearlshell were found. These populations were in three different small drainages that eventually flow into the Red River. One drainage is isolated from the others by the impoundment of Lake Iatt. All of the populations were found in small, shallow, clear streams with gravel

or firm sand substrate. Rarely were any other mussel species present.

The typical streams where the Louisiana pearlshell was found are not generally considered to be good mussel habitat because of their small size. Thirteen other streams in the vicinity were searched without finding the Louisiana pearlshell. Many small streams in the Red River drainage will be surveyed by the Service, the Louisiana Department of Wildlife and Fisheries, and the Forest. Upon completion of these surveys, the Service will review the status of the Louisiana pearlshell to determine if its Endangered classification is still warranted.

* * *

Biologists surveying the Black Warrior River system are becoming increasingly concerned about the decline of its native mussels and other aquatic species. The river and its three major tributaries, the Sipsey, Mulberry, and Locust Forks, collectively drain over 6,000 square miles in west-central Alabama. Historically, this river system supported at least 45 species of unionid mussels, including the Endangered penitent mussel (*Epioblasma penita*)

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Regional News

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and the Threatened inflated heelsplitter mussel (*Potamilus inflatus*), as well as five species considered as candidates for listing. A 1975 mussel survey of the Black Warrior River main channel encountered only 18 species of unionid mussels, and results indicated that the diversity and abundance of the unionid fauna had been severely reduced due to the impoundment of the river.

During a 1985 status survey of the flattened musk turtle (*Sternotherus depressus*), biologists collected 28 species of unionid mussels, including four listing candidates, from tributaries of the upper Black Warrior River drainage. In 1990, the Jackson Field Office conducted a mussel survey of 73 sites in the upper Black Warrior River drainage. Apparently suitable mussel habitat was observed at most sites; however, only six live mussels of two species were found, none of which were listed or candidates. Biologists encountered freshly dead specimens of nine other species.

The mussel fauna in the entire Black Warrior River System has experienced a severe decline in diversity, distribution, and abundance. The range of the heelsplitter in the drainage has been severely reduced, and the penitent mussel has been extirpated from the Mulberry Fork. Six major impoundments have inundated many historic mussel collecting areas in the drainage. Water quality degradation from agricultural activity and urban drainage affect many free-flowing tributaries. Nonpoint pollution from poultry and cattle feedlots has been identified by the Alabama Department of Environmental Management as a major water quality problem throughout the drainage. Coal surface mines are also common in the drainage. Mine drainage can result in acidification, mineralization, and sediment loading of streams and rivers, all of which are detrimental to the unionid fauna.

This past year, the Service proposed to list 11 species in the Mobile River system as Threatened or Endangered. Nine of these were known to have occurred in the

Black Warrior River and its tributaries, part of the Mobile River drainage. Recent surveys have found four proposed mussels, the dark pigtoe (*Pleurobema furvum*), triangular kidneyshell (*Ptychobranthus greenii*), Alabama moccasinshell (*Medionidus acutissimus*), and orange-nacre mucket (*Lampsilis perovalis*), surviving in several small headwater streams of the Black Warrior River.

Mussels are not the only species in trouble in the Black Warrior River system. The watercress darter (*Etheostoma nuchale*) is listed as Endangered and the flattened musk turtle is listed as Threatened. In addition, a recent study by the Geologic Survey of Alabama (Survey) found a decline in the numbers and distribution of nine fish species in the lower reaches of the Sipsey, Mulberry, and Locust Forks. In a related study, the Survey believes that nine snail species and seven mussel species within the drainage are in danger, and it considers the status of several aquatic reptiles and amphibians to be either poorly known or of special concern.

Biologists from the Jackson Field Office have discovered colonies of the Endangered tulotoma snail (*Tulotoma magnifica*) in Choccolocco Creek, a tributary of the Coosa River in Alabama. A relict population of this large aquatic snail was discovered in the creek's lowermost unimpounded shoal. The shoal is long and wide, and it has the abundant large rock habitat required by the species. Tulotoma snail colonies were found along the north bank of the shoal for a distance of about 100 meters. Although habitat appeared to be excellent and abundant throughout the shoal, only a single snail was found in the middle, and none were encountered on the south bank. The largest colonies were found at the head of the shoal; downstream colonies generally had fewer than 25 individuals. Juvenile snails (those less than 10 millimeters in shell length) were common in the larger colonies. Although habitat in four other upstream areas was considered common to abundant, no snails were found in these locations. However, small populations of tulotoma snails may exist upstream be-

cause this species can be difficult to locate where it occurs in small numbers.

Tulotoma snails were relatively abundant in the lower 10 to 12 miles of Choccolocco Creek before over half of the known occupied habitat was flooded by Logan Martin Dam. Repeated searches of the unimpounded reaches of Choccolocco Creek in recent years had failed to relocate the snail in the drainage. Water quality degradation probably caused the disappearance of the tulotoma snail, as well as a once abundant unionid mussel fauna, from unimpounded habitat. Prior to the 1991 discovery, the last sighting of the snail in Choccolocco Creek was in 1963. Historically, this species occurred from the Coosa River and its tributaries in Etowah County, northeast Alabama, to the Alabama River in Monroe County, southeast Alabama. In January 1991, when the species was listed, it was only known to occur at one site in the Coosa River, and in localized portions of four Coosa River tributaries.

To assist in the recovery of the Endangered red wolf (*Canis rufus*), North Carolina artist Janet Walker is selling limited-edition color prints of her painting, "Return to the Wild - Red Wolf." Ms. Walker will donate 50 percent of the profit from each print to the recovery program. This money will be matched (up to \$40,000) through a challenge grant administered by the National Fish and Wildlife Foundation. The total size of each print is 23 inches by 28 inches; the actual image size is 18 inches by 24 inches and is reproduced on heavy, acid-free stock. Each print comes with a certificate of authenticity and a note from Ms. Walker. Checks for the purchase price (\$85 for regular prints, \$100 for regular artist proofs, and \$185 for color-remarked artist proofs) can be made payable "Return to the Wild." Please add \$5 for shipping costs. North Carolina residents should also include 6 percent sales tax. Payment should be mailed to the Red Wolf Recovery Program, Alligator River National Wildlife Refuge, Post Of-

(continued on page 12)

Regional News

(continued from page 11)

Post Office Box 1969, Manteo, North Carolina 27954.

* * *

Region 5 — The U.S. Atlantic Coast piping plover (*Charadrius melodus*) population remained stable in 1991, with a count of 742 pairs compared with 739 pairs in 1990. Plover censuses in Atlantic Canada tallied 245 nesting pairs in 1991, compared with 229 pairs in 1990. The apparent increase is attributed to the much more intensive effort exerted in Canada during the 1991 international piping plover census.

Average U.S. Atlantic plover productivity in 1991 was 1.23 chicks per pair, compared with 1.06 chicks per pair in 1990. These productivity figures reflect 68 percent and 81 percent of nesting pairs in 1990 and 1991, respectively. Highest productivity was documented in Maine and Massachusetts, where good production was ascribed to intensive management, lack of nest flooding, and low nest predation.

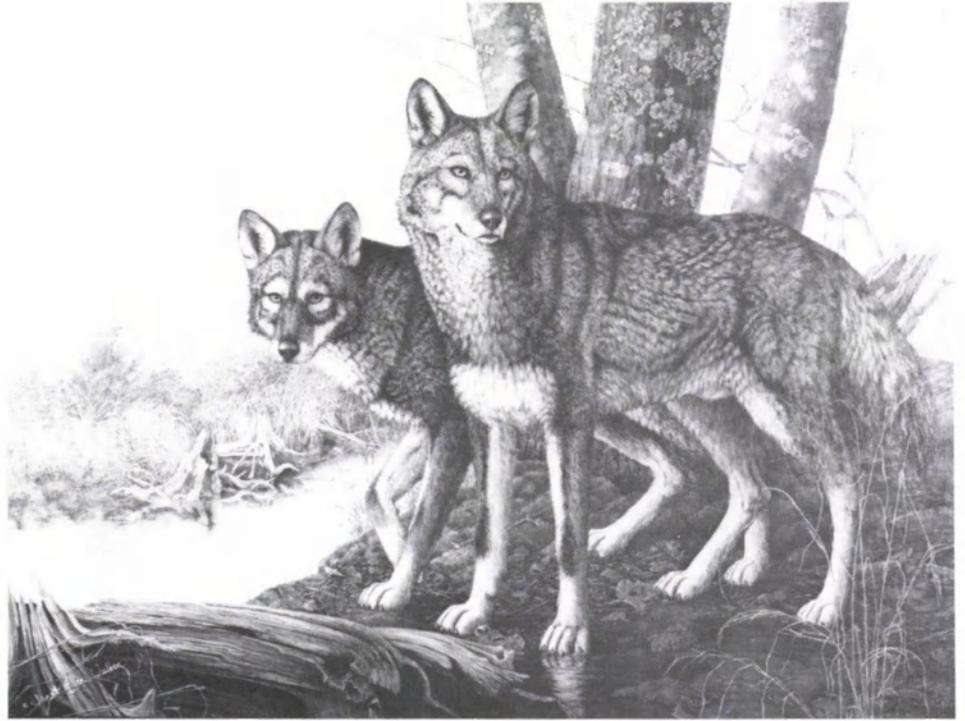
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For the past year, New England Field Office staff have been working closely with a local high school science teacher to develop a set of "Piping Plover Lesson Plans." The lesson plans, consisting of species background information, a set of slides, a simulation game, and other activities, are designed for grades 5 through 7 and are currently being tested by several teachers in area schools.

Beaches where piping plovers nest may be closed to visiting school children, teachers, and the general public during spring and early summer, the time when plovers are present. These lesson plans were developed as a substitute teaching experience in lieu of actual beach trips. Anyone looking for more information on "The Piping Plover Lesson Plans" can contact Linda Morse at the New England Field Office (603/225-1411).

* * *

The Service's New York Field Office has been working with the New York City Department of Environmental Protection (NYCDEP) on protection and



"Return to the Wild - Red Wolf"

management of a new piping plover nest area on a city owned beach in Queens on Long Island. The NYCDEP contacted the New York Field Office for technical assistance after it was learned that plovers had nested in the area in 1991. The Service recommended monitoring and protecting the nesting area, and eliminating beach grading operations in order to preserve the habitat. The New York State Department of Environmental Conservation has been monitoring the site this year and reports that eggs from all three plover nests have hatched. Seven adults and six juveniles have been observed in the area.

* * *

Region 5 has furnished scoping comments on a U.S. Air Force proposal to convert aircraft (from A-10s to F-16s) at two New England Air National Guard bases. The Air Force also proposed lowering the ceiling for training flights to 100-300 feet above ground level in several military airspace areas within Maine, New Hampshire, Vermont, New York, Pennsylvania, and New Jersey.

According to the Service's review, the proposed activity has the potential for affecting bald eagles (*Haliaeetus leucocephalus*) at 17 currently active nesting locations in northern New England

and New York, and more than one-third (14 of 40 active pairs) of the nesting peregrine falcons (*Falco peregrinus*) reestablished in the northeastern U.S. The Service has informed the Air Force and its consultants, Science Applications International Corporation, that a biological assessment is required.

* * *

In Virginia, the James River contains the largest winter concentration of bald eagles in the State and the largest known summer concentration of bald eagles in the eastern United States. To protect one of the summer night roosts, the Service purchased 3,537 acres in 1991 and added 613 acres this year to create the James River National Wildlife Refuge.

* * *

West Virginia Division of Natural Resources personnel who conducted winter bat surveys at 26 caves during the 1991-1992 season discovered two new small colonies of Indiana bats (*Myotis sodalis*). In addition, the Indiana bat population in Martha's Cave, Pocahontas County, now exceeds historic levels (approximately 150 bats), and the population stands at 210. After a population decline in the 1970's, the cave entrance was fenced to protect the bats.

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Regional News

(continued from previous page)

Two round-bar cave gates at Cave Mountain Cave in Pendleton County were replaced with angle-iron gates in March 1992. This project was carried out under a Challenge Cost-Share Agreement between the West Virginia Division of Natural Resources and the U.S. Forest Service (Monongahela National Forest). Roy Powers designed and supervised construction of the new gates. This cave harbors a large maternity colony of Virginia big-eared bats (*Plecotus townsendii virginianus*). The gates were completed March 29, 1992, and by April 7 over 300 *Plecotus* had returned to the cave.

The Service's New Jersey Field Office recently reviewed a draft work plan for wetland restoration at a Clean Water Act-section 404 violation site. A large, previously unknown population of a Threatened wetland plant, the swamp pink (*Helonias bullata*), was nearly destroyed as a result of the violation, which involved a clay-mining operation (see *Bulletin* Vol. XVI, No. 3). In a letter to the violator, the Philadelphia District of the U.S. Army Corps of Engineers identified all of the Service's recommendations concerning restoration of the 17-acre wetland site and purchase of another swamp pink site as corrective measures required to resolve the violation. In the draft work plan, the violator outlined design studies and a preliminary restoration plan.

Informal consultation with the Maine Department of Transportation has prevented adverse impacts on the Furbish lousewort (*Pedicularis furbushiae*), an Endangered plant in the snapdragon family. A stretch of highway along the St. John River will be relocated, thus avoiding the necessity of placing riprap on approximately 500 feet of habitat containing a number of lousewort plants.

The Pine Barrens in Concord, New Hampshire, contain the only remaining New England population of the Karner blue butterfly (*Lycæides melissa samuelis*), recently proposed by the Service for list-

ing as Endangered. The habitat is located on and near airport land owned by the City of Concord. Because such airport lands are under the jurisdiction of the Federal Aviation Authority (FAA), the Service will have the opportunity to work with the FAA and the City to promote the conservation of Karner blue habitat.

Several months ago, the City of Concord initiated plans for a land exchange that would remove 74 acres of habitat from FAA oversight authority. A private development corporation was to be the recipient of the surplus airport property. The corporation proposed construction of an airport industrial park, anchored by a U.S. Postal Service Mail Distribution Center. As recently as the mid-1980's, Dr. Dale Schweitzer reported that this habitat supported a colony of approximately 1,000 Karner blue butterflies. Because the loss of this pine barren habitat would threaten the survival and recovery of the sole New England population of Karner blue butterflies, intensive negotiations began among the Service, The Nature Conservancy, the City of Concord, and the development corporation. The goal was to protect the most valuable butterfly habitat while accommodating industrial development in the lower quality habitat areas.

After numerous meetings, the involved parties signed a Memorandum of Understanding and Cooperative Agreement on January 10, 1992. The agreement endorses a land exchange that provides the development corporation with land for the Post Office and a somewhat more limited industrial park. In exchange, the City will receive a parcel of property for future development of an airport terminal. The Service will acquire deeded conservation easements on about 28 acres within the industrial park and a management agreement with the City for about 100 acres on airport grounds. As currently envisioned, the protected habitat will become an addition to the newly established Great Bay National Wildlife Refuge (formerly Pease Air Force Base).

Researchers from The Nature Conservancy reported the results of 1991 status

surveys for the sandplain gerardia (*Agalinis acuta*) in New York. The surveys were conducted for the New York Natural Heritage Program and the Service with funding provided under Section 6 of the Endangered Species Act. This Endangered plant occurs at 6 locations on Long Island, with only 11 sites throughout its distribution in the north-east.

Individual plants have been counted since 1986. Overall, the 1991 season was a poor one for the New York sites, with numbers totaling 515, down slightly from 1990. The highest numbers were recorded in 1989 with a total of 1,808 plants at the New York sites. Hot, dry weather from mid-June through July may have resulted in the loss of young plants. Habitat management activities were undertaken at several of the sites, and management is a continuing need. The Nature Conservancy is preparing formal management plans for each of the sites under a Section 6 funding agreement.

After meeting with the Service's New York and Long Island Field Offices, Town of Babylon officials have agreed to work with the Service and The Nature Conservancy to protect habitat for piping plovers and seabeach amaranth (*Amaranthus pumilus*) at the Town's Overlook and Cedar Beaches on Long Island. Protection measures being implemented include fencing and posting the habitat, restricting vehicular traffic, and development of a written management agreement with The Nature Conservancy. The Service is providing public outreach literature, and is assisting the Town in the development of interpretive signs about the piping plover and the coastal dune ecosystem.

The Service held a public meeting in Jonesville, Virginia, on the proposed Endangered listing for the Lee County cave isopod (*Lirceus usdagalum*). Local interests are concerned that listing the isopod would stop the construction of a Federal prison facility and an airport planned for Lee County. Service representatives ex-

(continued on page 14)

Regional News

(continued from page 13)

plained the Endangered Species Act's section 7 process and the need to protect the groundwater in the karst (highly porous limestone) area where these facilities might be sited. The public responded favorably, and we are working with Federal and local planning authorities to provide protection for the isopod during the siting, construction, and operation phases of the proposed facilities.

The recovery effort for the American burying beetle (*Nicrophorus americanus*) received a boost this past winter when the Cincinnati Zoo Insectarium reported that it had successfully raised over 300 larvae from 13 pairs of this Endangered insect that are on loan there. Re-pairings are being conducted to maximize the reproductive output of the short-lived adult beetles, which have only a 12-month life span. It is hoped that habitat suitable for reintroduction of this species can be identified in the Ohio area this summer.

Currently, American burying beetles are known to survive in the wild in Rhode Island and eastern Oklahoma. A reintroduced population on a small island in Buzzard's Bay, Massachusetts, is also showing signs of success. While Cincinnati's zoo is the only one involved in the recovery program for this species, other captive American burying beetle populations are being maintained at Boston University and the Oklahoma Biological Survey.

An analysis by the Service's Delaware Estuary program of New Jersey's 1991 stranding statistics for sea turtles and marine mammals showed that 25 (36 percent of all strandings reported in the State of New Jersey) were loggerhead turtles (*Caretta caretta*) caught on the intake structures of the Salem Nuclear Power Plant. As a result of a monitoring program required by the National Marine Fisheries Service, nearly all of the turtles are being recovered alive and released offshore.

State Natural Heritage Program personnel, Federal endangered species biolo-

gists, and other botanists from 4 States met February 24 to discuss recovery criteria, strategies, and tasks for the northeastern bulrush (*Scirpus ancistrochaetus*) draft recovery plan. Also discussed was the recent discovery of three previously unknown populations of this plant in Franklin and Cumberland Counties, Pennsylvania. This brings the number of known surviving populations to 16 rangewide. Eleven of these populations are on private lands and are threatened by habitat loss (primarily by wetland draining, dredging, and filling for residential development, recreation, and agriculture).

Biologists with the Service's New England Field Office have concluded an intensive Section 7 consultation with the Federal Highway Administration on a proposed riverbank stabilization project along the Connecticut River in New Hampshire within and adjacent to populations of the dwarf wedge mussel (*Alasmidonta heterodon*). A no-jeopardy opinion was issued. This biological opinion was based on close coordination with the New Hampshire Department of Transportation (NHDOT) that led to project modification and a number of protective measures.

The NHDOT redesigned the project to eliminate all stone fill below ordinary high water. They also reduced the project length, developed erosion control guidelines, and agreed to hire one person to monitor water quality before, during, and after the construction. Water quality, especially turbidity, will be monitored to determine the effectiveness of erosion control measures. Weekly activity logs, including daily multiple sampling of turbidity, will be submitted to the New England Office for review throughout the duration of the project.

Region 6 — A 25-pound pallid sturgeon (*Scaphirhynchus albus*) was captured in the Yellowstone River near Fallon, Montana. This fish was found upstream of a rock irrigation diversion structure, and it marks the first time since 1950 the species has been documented so far up-

stream. Record spring flows on the Yellowstone River may have allowed fish passage over the diversion structure for the first time in many years.

The first recapture of a tagged pallid sturgeon occurred on the Missouri River in the fall of 1991 near Williston, North Dakota. This fish was originally captured in February 1991 below Fort Peck Dam in Montana. At that time, the fish was tagged with a disk tag and a PIT (passive integrated transponder) tag. It then travelled in excess of 150 miles before being netted in North Dakota.

Two female pallid sturgeon were recently added to the Blind Pony State Hatchery in Missouri. These fish, plus the six males already at the facility, will be used in future captive propagation programs.

A contaminant evaluation of interior least tern (*Sterna antillarum*) and piping plover eggs and chicks on the Missouri River in South Dakota was completed by the Service's South Dakota Fish and Wildlife Enhancement Office in 1991. The evaluation identified naturally occurring selenium and cadmium in the shale bluffs along the Missouri River. These substances are being released into the river through wind and water erosion. Levels of selenium detected in the eggs were found to be elevated enough, based on the results of other studies, to cause embryo toxicity, but the selenium impacts on these Missouri River eggs were unknown. Although there are no known PCB sources in South Dakota, low concentrations of PCB's also were found. It is possible that female terns and plovers may be exposed to PCB's on the wintering grounds or during migration.

One of the largest fall migrant concentrations of bald eagles in the Nation occurs at Hauser Lake near Helena, Montana. An estimated 200 to 300 bald eagles use the area at any one time during early winter. The first arrivals reach Hauser Lake in mid-October, and the last birds depart for southern wintering grounds around mid-December. Overall,

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Final Listing Rules for 53 Species

Seven animals and 46 plants were classified as Endangered or Threatened species from January 1 through June 30, 1992. The following list gives the name, classification, and date of listing for each species. Details on the following listing actions are available in the *Federal Register* notices for those dates:

ANIMALS

- Snake River sockeye salmon (*Oncorhynchus nerka*) — Endangered (F.R. 1/3/92)
- Louisiana black bear (*Ursus americanus luteolus*) — Threatened (F.R. 1/7/92)
- Kanab ambersnail (*Oxyloma haydeni kanabensis*) — Endangered (F.R. 4/17/92)
- goldline darter (*Percina aurolineata*) — Threatened (F.R. 4/22/92)
- blue shiner (*Cyprinella caerulea*) — Threatened (F.R. 4/22/92)
- Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*) — Endangered (F.R. 5/20/92)
- Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) — Endangered (F.R. 6/22/92)

Regional News

(continued from previous page)

close to a thousand eagles may migrate through the area over the season. The birds feed on the kokanee salmon that spawn below Canyon Ferry Dam at Hauser Lake.

The eagle concentration attracts national attention. Over 10,000 visitors have visited the viewing site at Hauser Lake in the past several years. The visitors center had 2,500 visitors in 1991, including 1,000 school children. Visitors came from 29 States and 7 foreign countries. A cooperative management plan is being developed among the Service; Montana Department of Fish, Wildlife and Parks; U.S. Forest Service; Bureau of Reclamation; Lewis and Clark County; and various private landowners to outline strategies for managing the large number of visitors to minimize impacts on the

(continued on page 16)

PLANTS

- clay reed mustard (*Schoenocrambe argillaceae*) — Threatened (F.R. 1/14/92)
- Barneby reed mustard (*Schoenocrambe barnebyi*) — Endangered (F.R. 1/14/92)
- Ute ladies'-tresses (*Spiranthes diluvialis*) — Threatened (F.R. 1/17/92)
- Leedy's roseroot (*Sedum integrifolium* var. *leedyi*) — Threatened (F.R. 4/22/92)
- Morefield's leather flower (*Clematis morefieldii*) — Endangered (F.R. 5/20/92)
- sensitive joint-vetch (*Aeschynomene virginica*) — Threatened (F.R. 5/20/92)
- Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*) — Endangered (F.R. 6/8/92)

Three Florida Plants — Threatened (F.R. 5/8/92)

- Telephus spurge (*Euphorbia telephoides*)
- white birds-in-a-nest (*Macbridea alba*)
- Florida skullcap (*Scutellaria floridana*)

Five Puerto Rico Plants — Endangered (F.R. 4/22/92)

- capa rosa (*Callicarpa ampla*)
- palo de jazmin (*Styrax portoricensis*)
- palo colorado (*Ternstroemia luquilensis*)
- *Ternstroemia subsessilis*
- *Ilex sintenisii*

Six California Plants — Endangered (F.R. 6/22/92)

- Howell's spineflower (*Chorizanthe howellii*)
- Sonoma spineflower (*Chorizanthe valida*)
- Menzies' wallflower (*Erysimum menziesii*)
- Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*)
- beach layia (*Layia carnosa*)
- clover lupine (*Lupinus tidestromii*)

Twenty-five Hawaiian Plants — all but one Endangered

- Hawaiian red-flowered geranium (*Geranium arboreum*) — F.R. 5/13/92
- liliwai (*Acaena exigua*) — F.R. 5/15/92
- mahoe (*Alectryon macrococcus*) — F.R. 5/15/92
- ko'oko'olau (*Bidens micrantha* ssp. *kalealaha*) — F.R. 5/15/92
- 'oba wai (*Clermontia oblongifolia* ssp. *mauiensis*) — F.R. 5/15/92
- haha (*Cyanea lobata*) — F.R. 5/15/92
- haha (*Cyanea mceldowneyi*) — F.R. 5/15/92
- ha'iwale (*Cyrtandra munroi*) — F.R. 5/15/92
- nohoanu (*Geranium multiflorum*) — F.R. 5/15/92
- kio'ele (*Hedyotis coriacea*) — F.R. 5/15/92
- wawae'iole (*Huperzia mannii*) — F.R. 5/15/92
- nehe (*Lipochaeta kamolensis*) — F.R. 5/15/92
- *Lysimachia lydgatei* — F.R. 5/15/92
- alani (*Melicope mucronulata*) — F.R. 5/15/92
- *Schiedea haleakalensis* — F.R. 5/15/92
- dwarf iliau (*Wilkesia hobdyi*) — F.R. 6/22/92
- Hawaiian bluegrass (*Poa sandwicensis*) — F.R. 5/13/92
- *Poa siphonoglossa* — F.R. 5/13/92
- *Chamaesyce halemanni* — F.R. 5/13/92
- *Dubautia latifolia* — F.R. 5/13/92
- *Stenogyne campanulata* — F.R. 5/13/92
- *Xylosma crenatum* — F.R. 5/13/92
- *Stenogyne kanehoana* — F.R. 5/13/92
- 'ihi'ihii (*Marsilea villosa*) — (F.R. 6/22/92)
- Haleakala silversword or 'abinahina (*Argyroxiphium sandwicense* ssp. *macrocephalum*) — Threatened, F.R. 5/15/92

Regional News

(continued from page 15)

eagles and to provide information to the general public about the eagles.

* * *

Region 8 (Research) — During May, biologists with Region 8's Hawaii Field Station participated in a survey of forest bird populations on Maui. This project was conducted in cooperation with the Hawaii Department of Land and Water Resources, the National Park Service, and The Nature Conservancy of Hawaii. Preliminary results indicate that the populations of two Endangered birds, the crested honeycreeper (*Palmeria dolei*) and Maui parrotbill (*Pseudonestor xanthophrys*), are similar to what were observed in 1980. Two other species recorded previously, the nuku-pu'u (*Hemignathus lucidus*) and Maui 'akepa (*Loxops coccineus ochraceus*), were not located this spring.

* * *

An immature Mississippi sandhill crane (*Grus canadensis pulla*) that was released on the Mississippi Sandhill Crane National Wildlife Refuge in 1991 was discovered dead in February 1992. It was emaciated and had lesions indicative of lead poisoning. A flat, well-worn triangular object was recovered from the gizzard. The lead concentration in the liver was 69 parts per million (wet weight), confirming the preliminary diagnosis of lead poisoning as the cause of death. To

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	56	250	9	23	338	33
Birds	73	153	12	0	238	70
Reptiles	16	64	18	14	112	27
Amphibians	6	8	5	0	19	8
Fishes	55	11	36	0	102	53
Snails	7	1	6	0	14	8
Clams	40	2	2	0	44	37
Crustaceans	8	0	2	0	10	5
Insects	14	1	9	0	24	13
Arachnids	3	0	0	0	3	0
Plants	280	1	71	2	354	143
TOTAL	558	491	170	39	1258*	397**
Total U.S. Endangered	558	(278 animals, 280 plants)				
Total U.S. Threatened	170	(99 animals, 71 plants)				
Total U.S. Listed	728	(377 animals, 351 plants)				

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

** There are 325 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife
39 plants

Number of CITES Party Nations: 112

August 31, 1992

our knowledge, this is the first documented lead poisoning death of a Mississippi sandhill crane.

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